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HTML5 and Java Technologies

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MAKE THE
FUTURE
JAVA

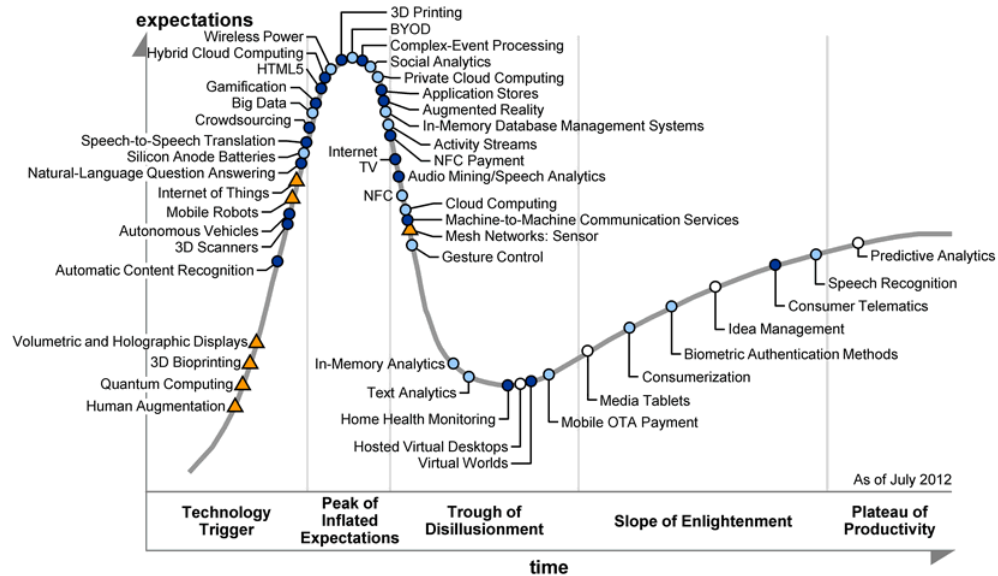ORACLE®

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

- 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

HTML5

Geolocation
Device orientation and motion
Multimedia

Data

HTML5

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

Logic

HTML5

Web workers
Touch events

+ JS

UI

HTML5

Elements
Canvas
Svg, webgl

+ CSS3

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

- Avatar

HTML5 Browser Support and Demos

- 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

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
									2.3
							3.2		3.0
	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 |

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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 Diagram
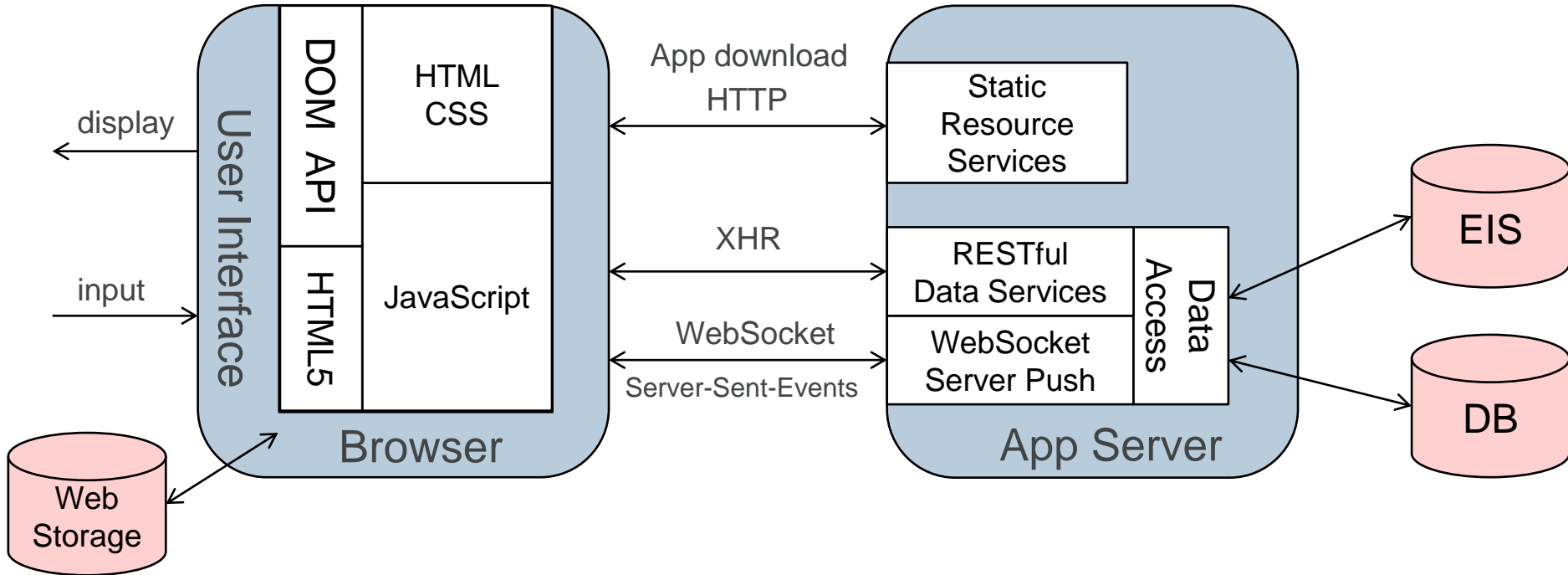
# Thin Server Architecture

- 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
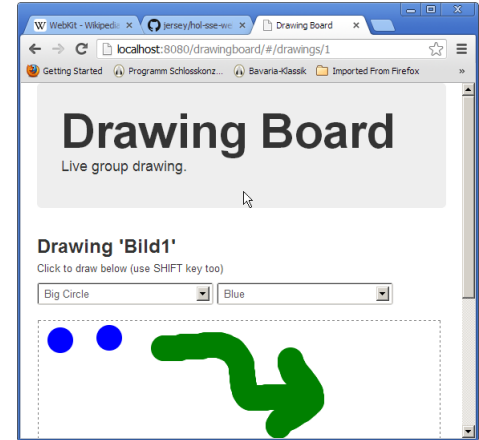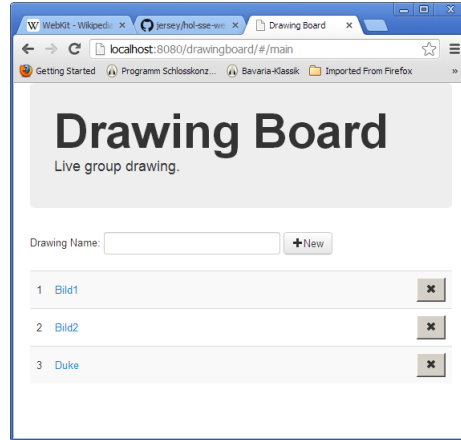
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Thin Server Architecture

With Java EE

Drawing Board Demo

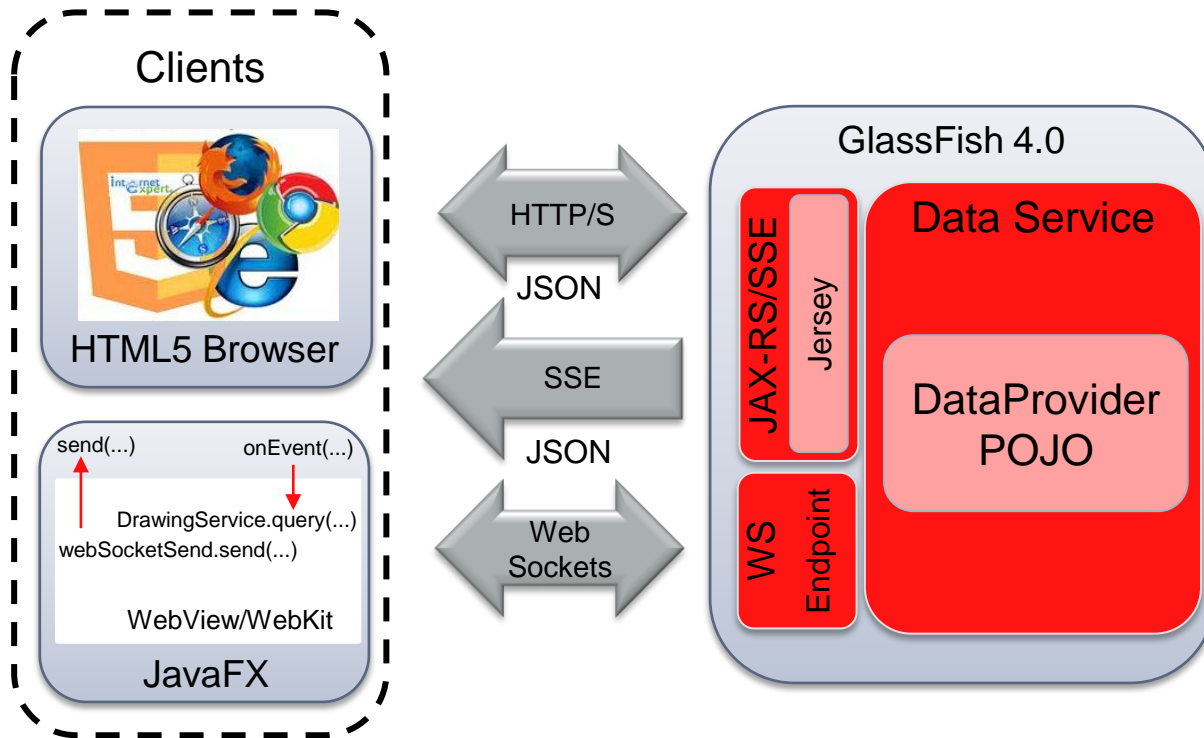http://github.com/jersey/hol-sse-websocket
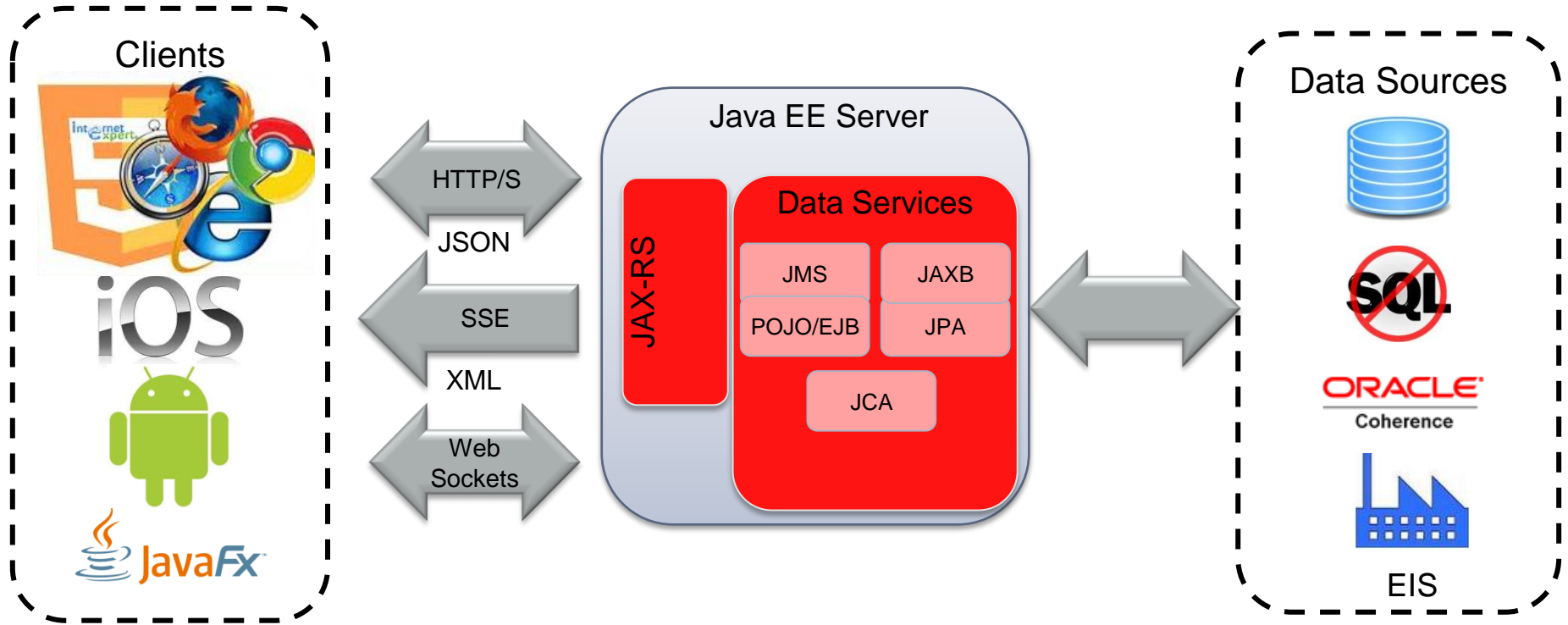
- Collaborative drawing
- Two-page application
  - List of drawings
  - Drawing
- Demonstrating
  - Server-side: JAX-RS, JSON, WebSocket, SSE Java API
  - Client-side: JAX-RS, WebSocket, SSE Java and JavaScript API
  - JavaFX hybrid Java/HTML5 application

# 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
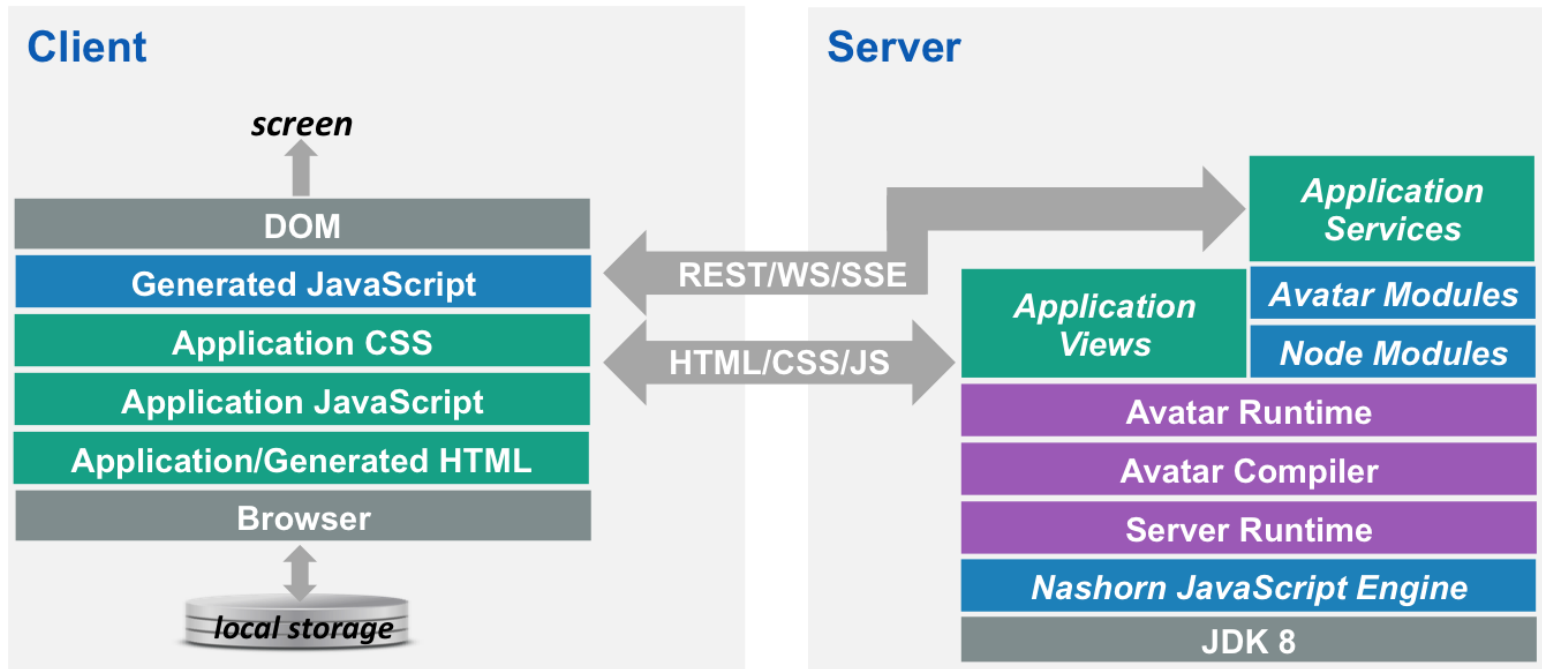
Project Avatar

avatar.java.net
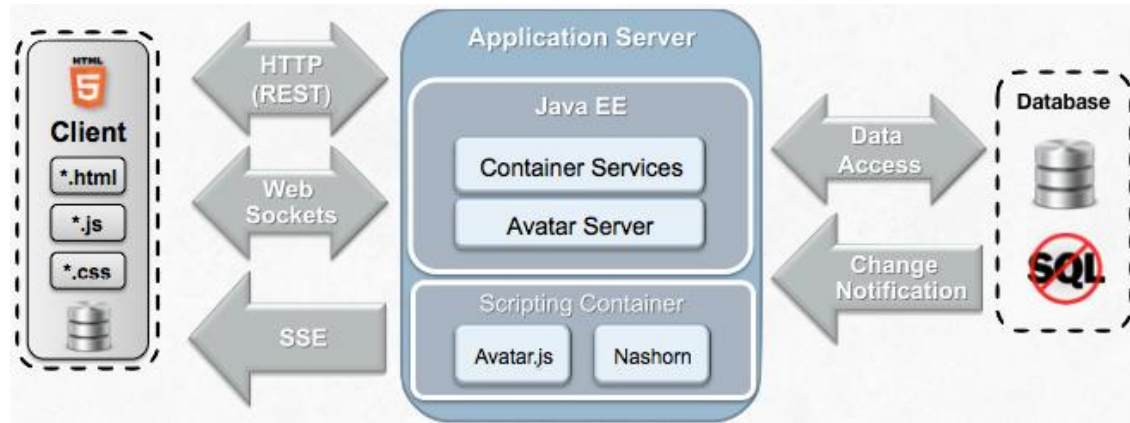
- End-to-end TSA-framework for HTML5 applications
- Service complonents implemented in JavaScript
  - Using a node.js implementation with Nashorn
- View components implemented in JavaScript
  - Using HTML5 + Widgets + Data Binding with EL
  - Minimal JavaScript code needed

Avatar Architecture

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

- Avatar
  - http://avatar.java.net
  - http://avatar-js.java.net

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Hardware and Software

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