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HTML5 and Java Technologies

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MAKE THE
FUTURE
JAVA

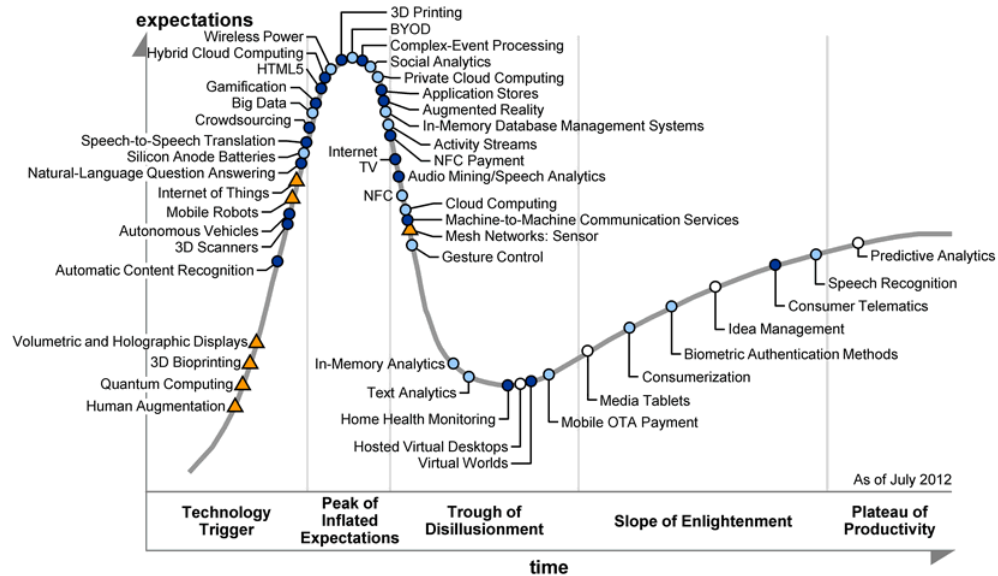
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Agenda

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

Motivation



Plateau will be reached in:

○ less than 2 years ● 2 to 5 years ● 5 to 10 years ▲ more than 10 years ⊗ obsolete before plateau

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 ``, `<div>`
 - `<nav>`, `<footer>`, `<audio>`, `<video>`, ...
- API
 - Canvas 2D (for immediate mode 2D drawing), Timed media playback
 - Offline Web Applications, Local Storage 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, implemented 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

- Browser 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

Usage stats: Global

Support:	57.1%
Partial support:	4.64%
Total:	61.74%

Bidirectional communication technology for web apps

Show all versions

	IE	Firefox	Chrome	Safari	Opera	iOS Safari	Opera Mini	Android Browser	Blackberry Browser
								2.1	2.1
						3.2		2.2	2.3
	7.0	16.0				4.0-4.1		3.0	4.0
	8.0	17.0	23.0			4.2-4.3		4.0	4.1
	9.0	18.0	24.0	5.1		5.0-5.1		4.1	7.0
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

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

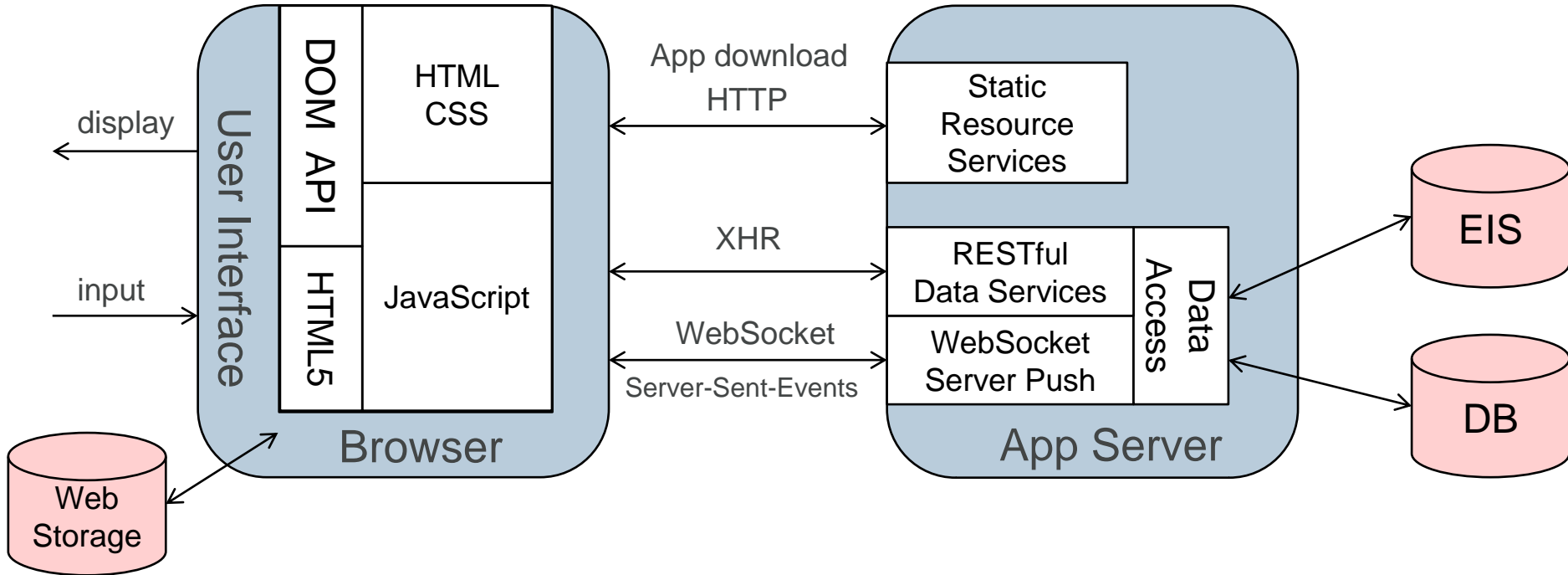
Thin Server Architecture (TSA)

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

Runtime application presentation



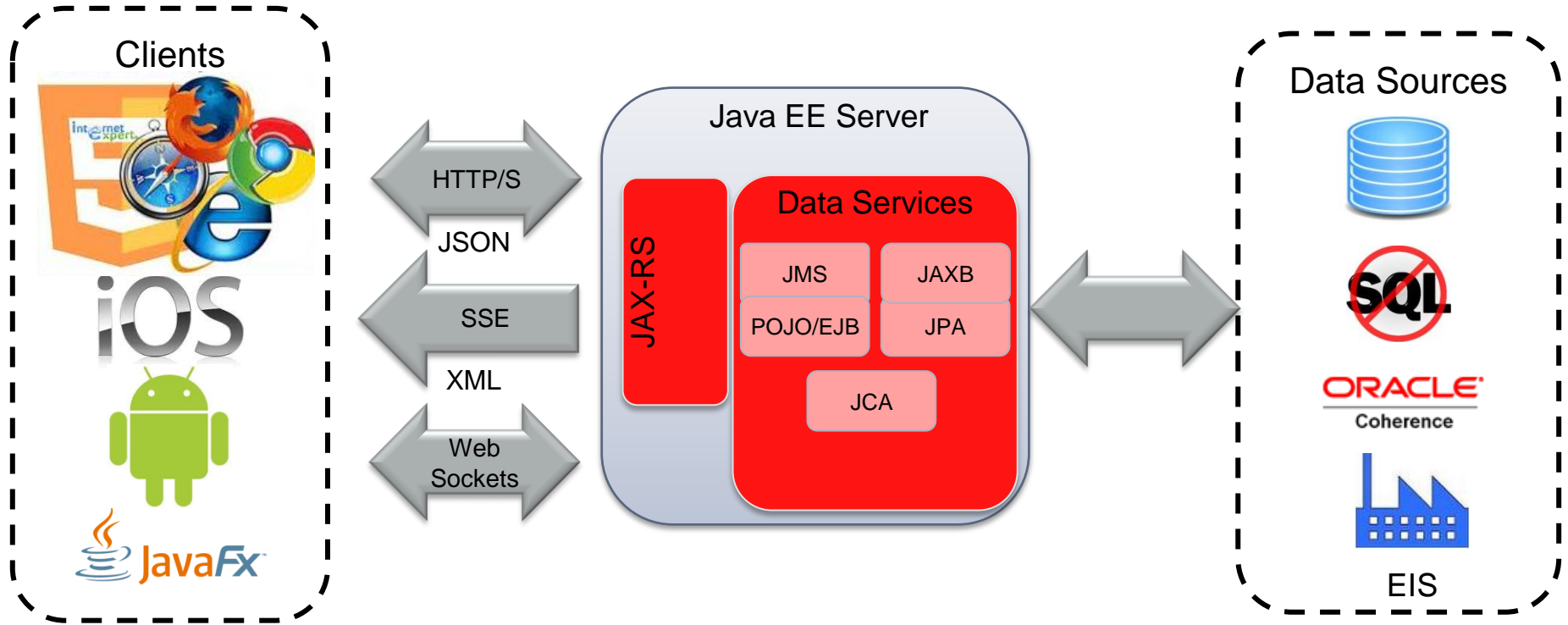
Thin Server Architecture

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 between client and server, UI events stay on client
- Improved user experience
- Offline support only possible with TSA

Thin Server Architecture

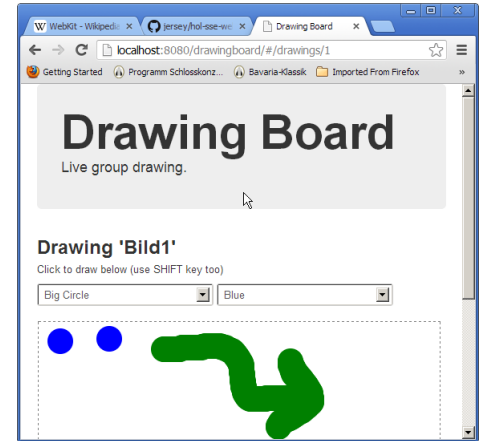
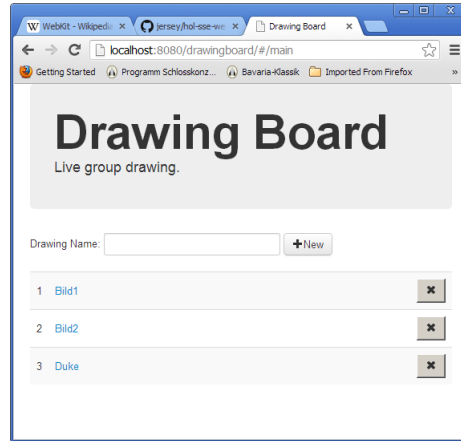
With Java EE



Drawing Board Demo

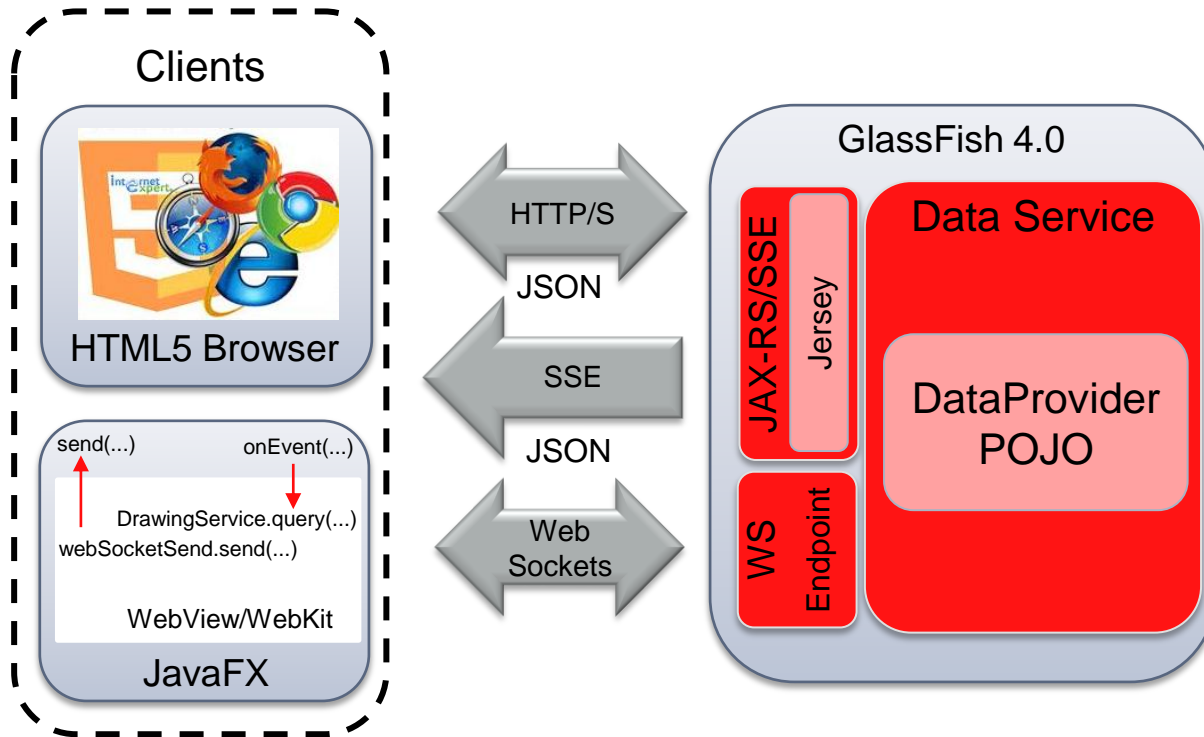
<http://github.com/jersey/hol-sse-websocket>

- 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

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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