

# Programming WebSockets

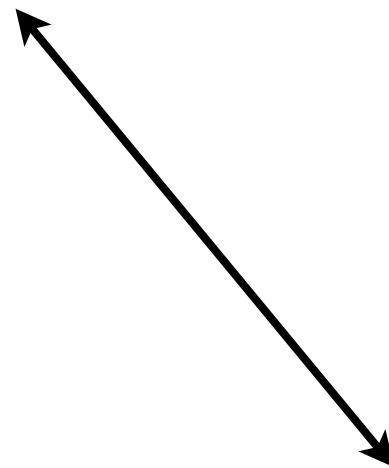
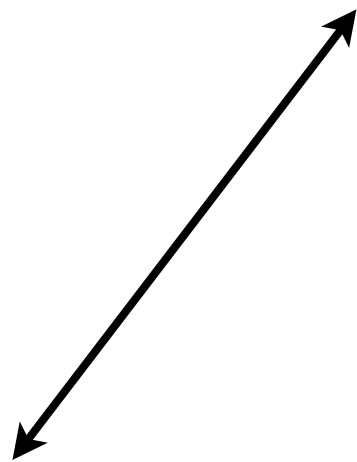
Sean Sullivan  
Portland Java User Group  
April 20 2010

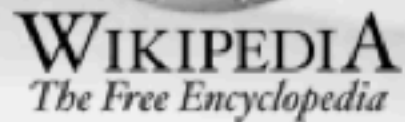


# Agenda

- WebSockets overview
- Demo
- WebSocket programming

***jetty://***





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## discussion

## history

From Wikipedia, the free encyclopedia

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# Push technologies

- Flash sockets
- Silverlight duplex services
- Comet
- WebSockets

Web Sockets – Wikipedia, the free encyclopedia

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## Web Sockets

From Wikipedia, the free encyclopedia

**Web Sockets** is a technology providing for bi-directional, full-duplex communications channels, over a single [Transmission Control Protocol](#) (TCP) socket, designed to be implemented in [web browsers](#) and [web servers](#). The Web Sockets API is being standardized by the [W3C](#) and the Web Socket protocol is being standardized by the [IETF](#).

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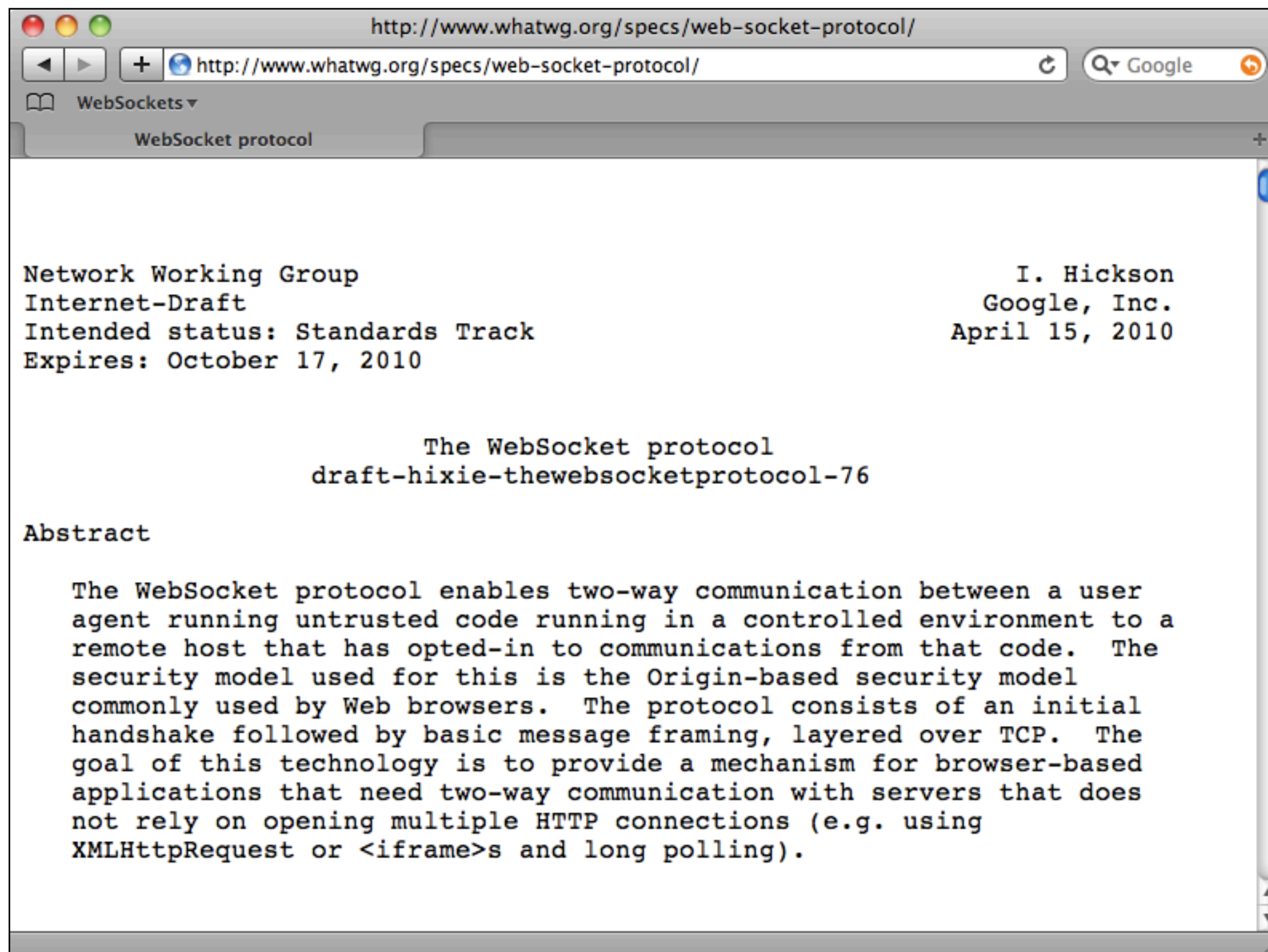
# WebSockets

a technology that enables bidirectional communication between web browsers and server-side processes



# WebSockets

- Network protocol
- JavaScript API





W3C Editor's Draft



# The WebSocket API

Editor's Draft 15 April 2010

**Latest Published Version:**

<http://www.w3.org/TR/websockets/>

**Latest Editor's Draft:**

<http://dev.w3.org/html5/websockets/>

**Previous Versions:**

<http://www.w3.org/TR/2009/WD-websockets-20090423/>

<http://www.w3.org/TR/2009/WD-websockets-20091029/>

**Editors:**

[Ian Hickson](#), Google, Inc.

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Demo

```
GL_EXT_bgra GL_EXT_stencil_wrap
GL_EXT_texture_filter_anisotropic
GL_EXT_secondary_color
GL_EXT_blend_func_separate
GL_EXT_shadow_funcs
GL_EXT_stencil_two_side
GL_EXT_depth_bounds_test
GL_EXT_texture_compression_s3tc
GL_EXT_texture_compression_dxt1
GL_EXT_texture_sRGB
GL_EXT_blend_equation_separate
GL_EXT_texture_mirror_clamp
GL_EXT_packed_depth_stencil
GL_EXT_bindable_uniform
GL_EXT_texture_integer
GL_EXT_gpu_shader4
GL_EXT_framebuffer_sRGB
GL_EXT_provoking_vertex
GL_APPLE_flush_buffer_range
GL_APPLE_ycbcr_422 GL_APPLE_rgb_422
GL_APPLE_vertex_array_range
GL_APPLE_texture_range
GL_APPLE_float_pixels
GL_ATI_texture_float
GL_ARB_texture_float
GL_ARB_half_float_pixel
GL_APPLE_pixel_buffer
GL_APPLE_object_purgeable
GL_NV_point_sprite GL_NV_blend_square
GL_NV_fog_distance GL_NV_depth_clamp
GL_NV_multisample_filter_hint
GL_NV_fragment_program_option
GL_NV_fragment_program2
GL_NV_vertex_program2_option
GL_NV_vertex_program3
GL_NV_conditional_render
GL_ATI_texture_mirror_once
GL_ATI_texture_env_combine3
GL_ATI_separate_stencil
GL_SGIS_texture_edge_clamp
GL_SGIS_texture_lod
GL_EXT_texture_array
GL_EXT_vertex_array_bgra
GL_EXT_packed_float
GL_EXT_texture_shared_exponent
...allowing CDS
...enabling
GL_EXT_compiled_vertex_array
...WGL_EXT_swap_control not found
...GL_EXT_point_parameters not found
...GL_EXT_shared_texture_palette not
found
...using GL_ARB_multitexture
-----
===== Quake2 Initialized =====
Waiting for 1 images
```

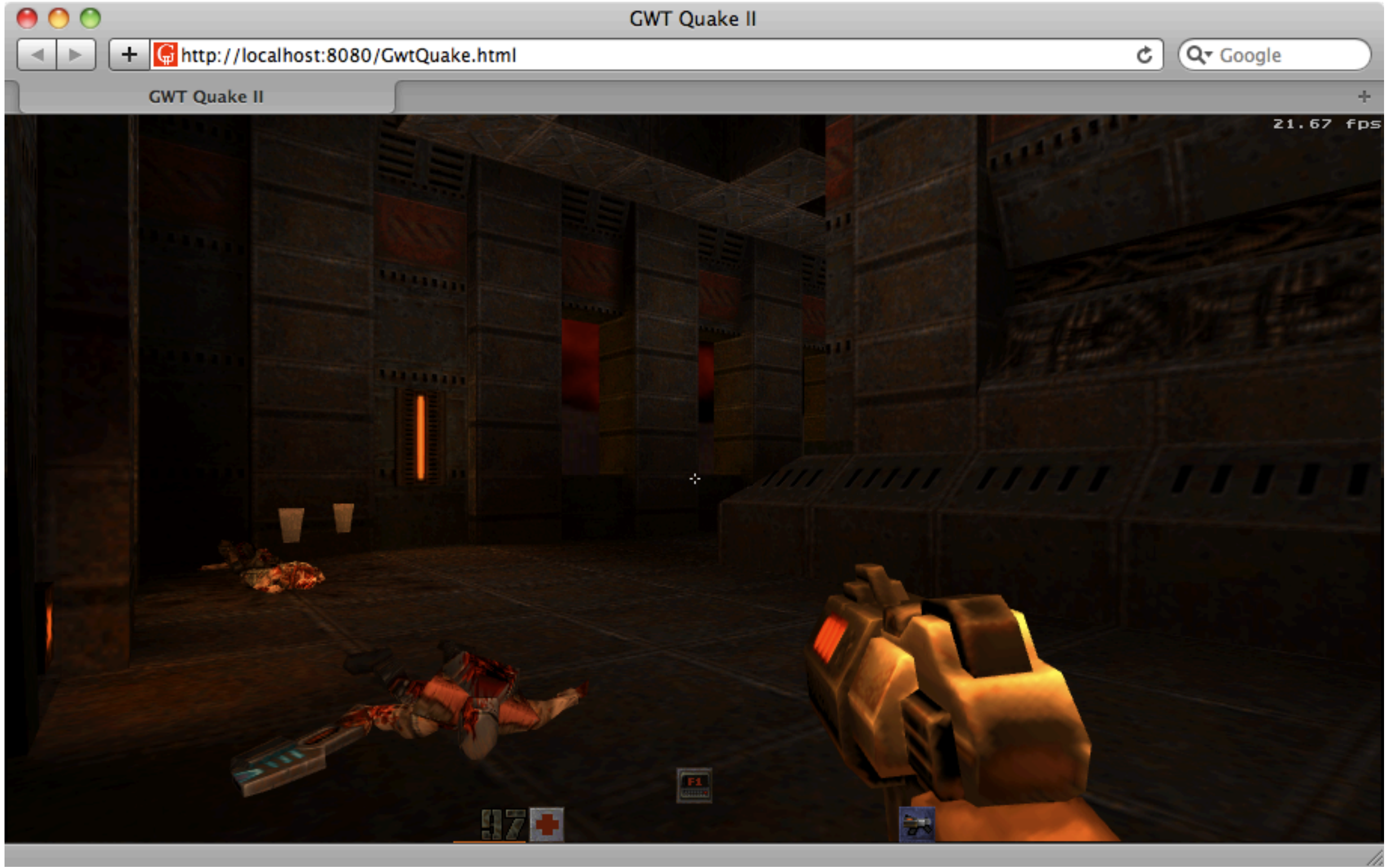


• GAME

• MULTIPLAYER

• OPTIONS





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http://code.google.com/p/quake2-gwt-port/

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Quake II GWT Port

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Quake II and the Quake logo are trademarks of id Software.

**Note:** We recently reset the repository to clean some things up, so if you cloned it you may find that the commit ids no longer match, and you'll need to re-clone. Our apologies for any inconvenience.

## Quake II GWT Port

The Quake II GWT port brings the 3d gaming experience of [Quake II](#) to the browser.

In the port, we use WebGL, the Canvas API, HTML 5 <audio> elements, the local storage API, and WebSockets to demonstrate the possibilities of pure web applications in modern browsers such as Safari and Chrome.

The port is based on the Jake2 project, compiled to Javascript using the Google Web Toolkit (GWT). Jake 2 is a Java port of the original Quake II source code, which was open sourced by id software.

To make the Jake 2 code work with GWT, we have

- Created a new [WebGL](#) based renderer
- Ported the network layer for multiplayer games from UDP to the [WebSocket API](#)
- Made all resource loading calls asynchronous
- Created a GWT implementation of Java nio buffers based on WebGL arrays (to be ported to [ECMAScript Typed Arrays](#))

**Activity:**  [High](#)

**Code license:**  
[GNU General Public License v2](#)

**Labels:**  
[Google](#), [WebGL](#), [GWT](#), [Quake](#)

**Featured wiki pages:**  
[BuildingAndRunning](#)  
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[cromwellian](#)

One error in opening the page. For more information, choose Window &gt; Activity.



quake2-gwt-port - Project Hosting on Google Code

http://code.google.com/p/quake2-gwt-port/source/browse/#hg/src/com/google/gwt/corp/websocket

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Quake II GWT Port

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Source path: hg/

Directories	Filename	Size	Rev	Date	Author
▼hg	<a href="#">CloseEvent.java</a>	663 bytes	r5c7c4b545f	Mar 31, 2010	Joel Webber
▶lib	<a href="#">MessageEvent.java</a>	819 bytes	r5c7c4b545f	Mar 31, 2010	Joel Webber
▶maven-build	<a href="#">OpenEvent.java</a>	662 bytes	r5c7c4b545f	Mar 31, 2010	Joel Webber
▼src	<a href="#">WebSocket.java</a>	4.8 KB	r5c7c4b545f	Mar 31, 2010	Joel Webber
▼com					
▼google					
▼gwt					
▼corp					
compatibility					
▶emul					
▶gfx					
localstorage					
▶webgl					
websocket					
▶jake2					
▶war					

Go to "http://code.google.com/p/quake2-gwt-port/source/browse/src/com/google/gwt/corp/websocket/CloseEvent.java"

# Browser support

- Google Chrome 4.0.249.0 and higher
- WebKit nightly builds
- Firefox: TBD
- Internet Explorer 9: TBD

# WebSockets and HTML5

"At last week's telecon, while discussing ISSUE-64, it was proposed that we declare WebSocket (both API and protocol) out of scope for HTML5. Since the API and protocol have been in separate specs for some time, this would have no immediate material effect. However, it would prevent us from putting WebSocket back in the main HTML5 spec in the future, unless new information came to light which would allow us to reopen the decision."

September 9 2009

<http://www.w3.org/html/wg/tracker/issues/64>

# WebSockets and HTML5

`"Since there was no objection, the resolution  
has now passed."`

September 23 2009

<http://www.w3.org/html/wg/tracker/issues/64>

# WebSockets protocol

- ports 80 and 443
- HTTP “upgrade” handshake

# Browser request

GET /test HTTP/1.1

Upgrade: WebSocket

Connection: Upgrade

Origin: <http://www.pjug.org/test>

Host: [www.pjug.org](http://www.pjug.org)

Content-Length: 0

# Server response

HTTP/1.1 101 Web Socket Protocol Handshake

Upgrade: WebSocket

Connection: Upgrade

Server: FooServer/1.5

WebSocket-Location: ws://www.pjug.org/test

WebSocket-Origin: http://www.pjug.org/test

Content-Length: 0

Date: Fri, 08 May 2009 07:23:58 GMT



# WebSockets programming

- client-side API
- server-side API

# WebSocket URLs

- `ws://example.com/demo`
- `wss://example.com/demo`

# JavaScript example

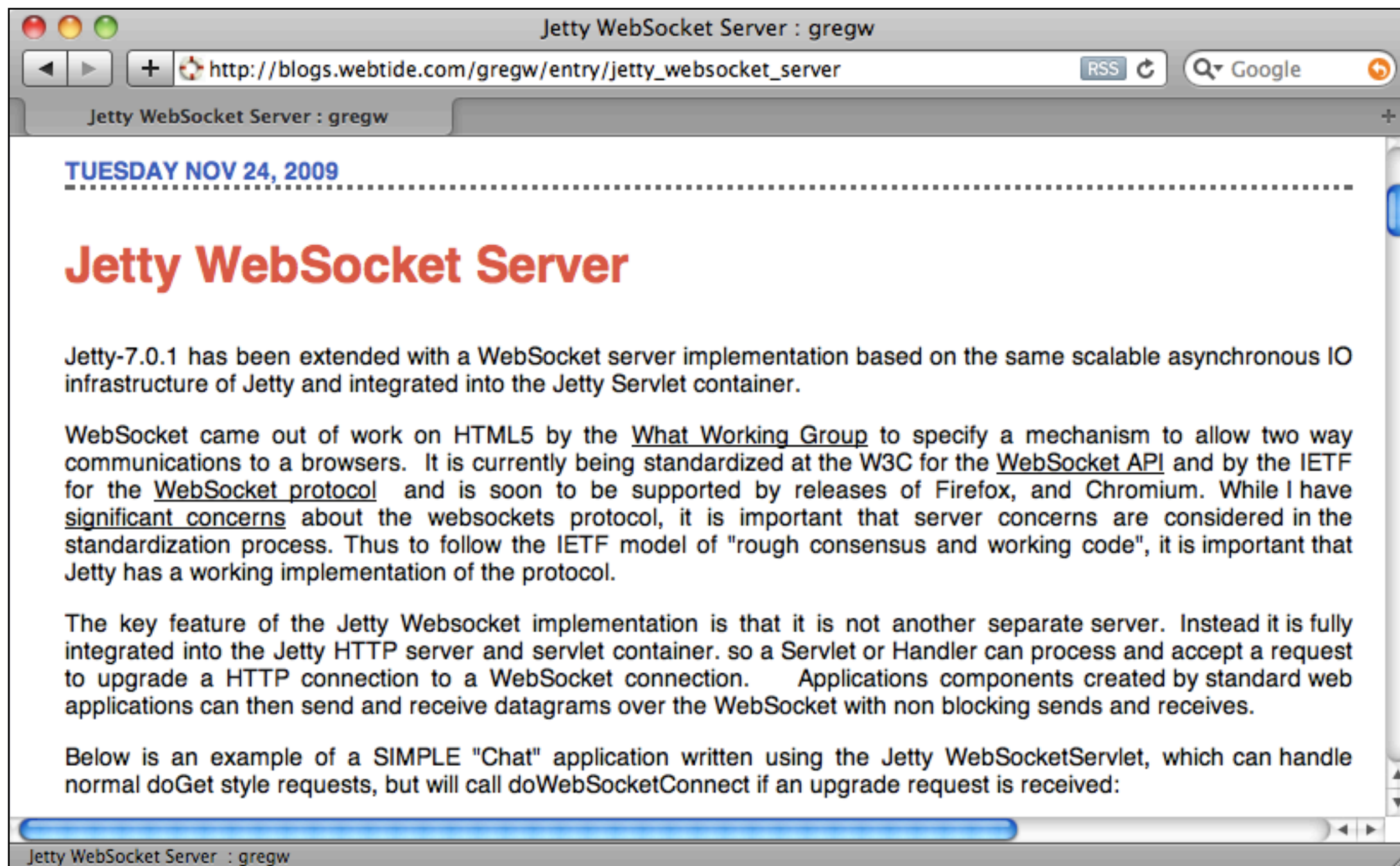
```
var socket = new WebSocket( 'wss://game.pjug.org/updates' );
```

# event handlers

- *onopen*
- *onmessage*
- *onerror*
- *onclose*

# Server-side API

- no standard Java API
- Jetty API
- Glassfish (Grizzly) API
- jWebSocket API



TUESDAY NOV 24, 2009

## Jetty WebSocket Server

Jetty-7.0.1 has been extended with a WebSocket server implementation based on the same scalable asynchronous IO infrastructure of Jetty and integrated into the Jetty Servlet container.

WebSocket came out of work on HTML5 by the [What Working Group](#) to specify a mechanism to allow two way communications to a browsers. It is currently being standardized at the W3C for the [WebSocket API](#) and by the IETF for the [WebSocket protocol](#) and is soon to be supported by releases of Firefox, and Chromium. While I have [significant concerns](#) about the websockets protocol, it is important that server concerns are considered in the standardization process. Thus to follow the IETF model of "rough consensus and working code", it is important that Jetty has a working implementation of the protocol.

The key feature of the Jetty Websocket implementation is that it is not another separate server. Instead it is fully integrated into the Jetty HTTP server and servlet container. so a Servlet or Handler can process and accept a request to upgrade a HTTP connection to a WebSocket connection. Applications components created by standard web applications can then send and receive datagrams over the WebSocket with non blocking sends and receives.

Below is an example of a SIMPLE "Chat" application written using the Jetty WebSocketServlet, which can handle normal doGet style requests, but will call doWebSocketConnect if an upgrade request is received:

org.eclipse.jetty.websocket (Jetty :: Project 7.0.2.v20100331 API)

http://download.eclipse.org/jetty/stable-7/apidocs/org/eclipse/jetty/websocket/package- Google

apidocs code WebSockets demo

org.eclipse.jetty.websocket

## Package org.eclipse.jetty.websocket

### Interface Summary

<a href="#">WebSocket</a>	
<a href="#">WebSocket.Outbound</a>	
<a href="#">WebSocketParser.EventHandler</a>	

### Class Summary

<a href="#">WebSocketBuffers</a>	The WebSocket Buffer Pool.
<a href="#">WebSocketConnection</a>	
<a href="#">WebSocketFactory</a>	Factory to create WebSocket connections
<a href="#">WebSocketGenerator</a>	WebSocketGenerator.
<a href="#">WebSocketHandler</a>	
<a href="#">WebSocketParser</a>	Parser the WebSocket protocol.
<a href="#">WebSocketServlet</a>	Servlet to upgrade connections to WebSocket



# GWT + WebSockets

- <http://code.google.com/p/gwt-websockets/>
- <http://code.google.com/p/gwt-websocketrpc/>
- <http://code.google.com/p/quake2-gwt-port>

# jQuery

- <http://code.google.com/p/jquery-websocket/>
- <http://code.google.com/p/jquery-graceful-websocket/>

# Other projects

- Glassfish
- jWebSocket
- JBoss Netty
- Resin

# Thank you

[sean@seansullivan.com](mailto:sean@seansullivan.com)