



KAAZING



Think BIG, Really BIG!

Building next-generation Web Apps with
WebSocket and HTML5

- Kaazing Corporation (<http://kaazing.com>)
 - Kaazing WebSocket Gateway
- Apache Software Foundation
- Speaker, Author, Blogger:
<http://matthiaswessendorf.wordpress.com>
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Agenda

- Real Time (Web)
 - Think about it...
- WebSocket
 - Introduction
 - Handshake and Client API
- *Remix!*
 - *WebSocket and other (HTML5) APIs*

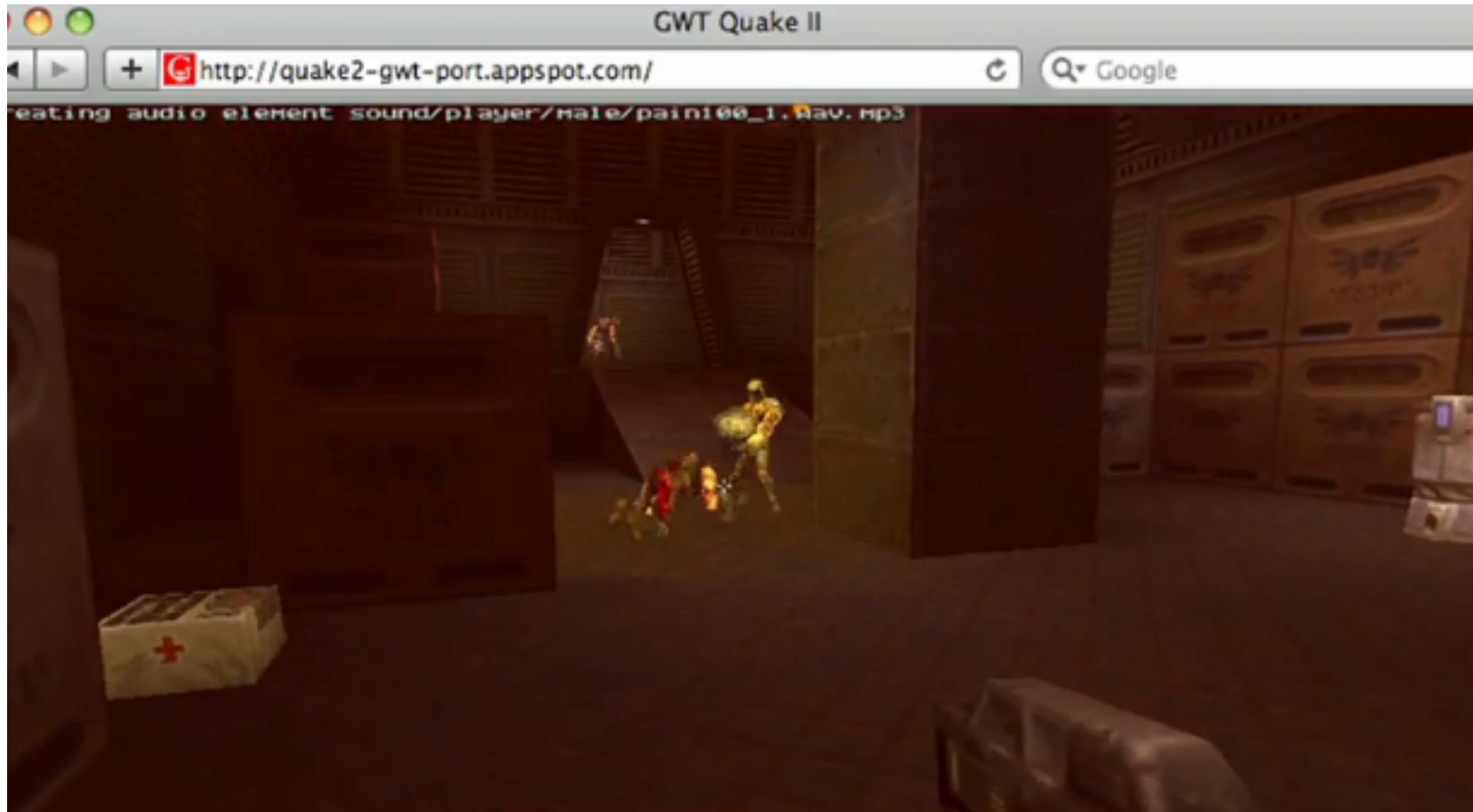
Agenda

- *Real Time (Web)*
 - Think about it...
- WebSocket
 - Introduction
 - Handshake and Client API
- *Remix!*
 - *WebSocket and other (HTML5) APIs*

- Every application has a hook...
 - Collaborative tooling
 - Share / edit documents
 - chat
 - Gaming (web based games)
 - Monitoring (→ server console)
 - ...

What is your use-case?

Latency kills!



Think different ...



Think different!

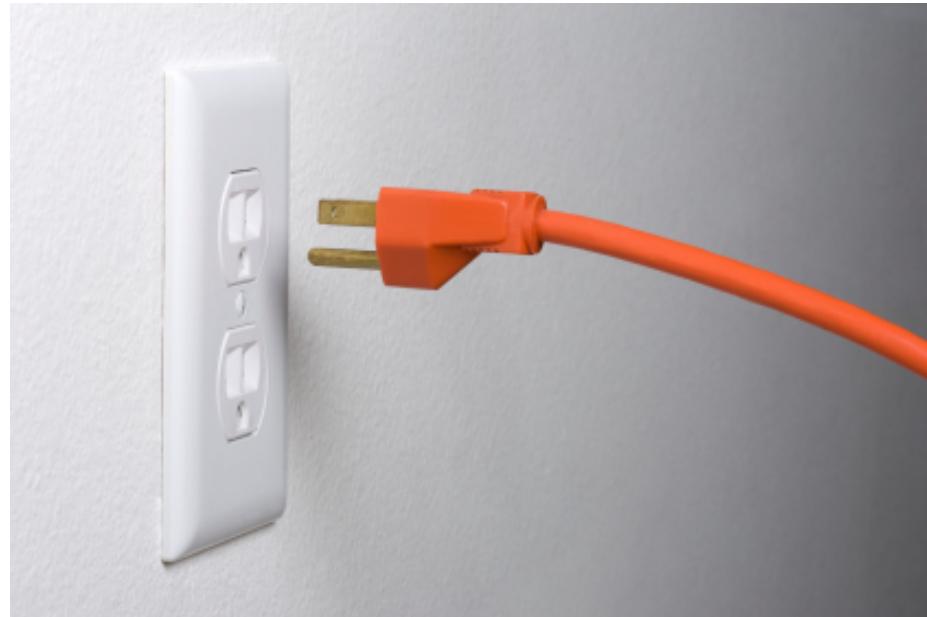


Challenge...

“If we were not restricted by the traditional limitations of HTTP, what type of Web applications would we build?”

Agenda

- Enter HTML5 WebSocket!



... is a bi-directional AND full-duplex
communication STANDARD
for next-generation web applications

(“TCP for the web”)

WebSocket is full-duplex!

- Enables web pages to communicate (in full-duplex mode) with a remote host
 - Traverses firewalls, proxies, and routers seamlessly
 - Leverages Cross-Origin Resource Sharing (CORS)
 - Shares port with existing HTTP content (80, 443)
 - Work with existing Authentication and Authorization frameworks (e.g. Kerberos)
- Extend any TCP/UDP based protocol!!!
 - AMQP
 - XMPP/STOMP/JMS
 - VNC
 - ...

- Wednesday
 - Messaging Workshop:

JMS and WebSocket

Spring Roo

Apache ActiveMQ

Kaazing WebSocket Gateway

HTTP is Half Duplex





**Half Duplex Communication
is Primitive**

Question for the Audience!

- What are some common names for Ajax Polling implementations?



Live HTTP headers

Headers Generator Config About

HTTP Headers

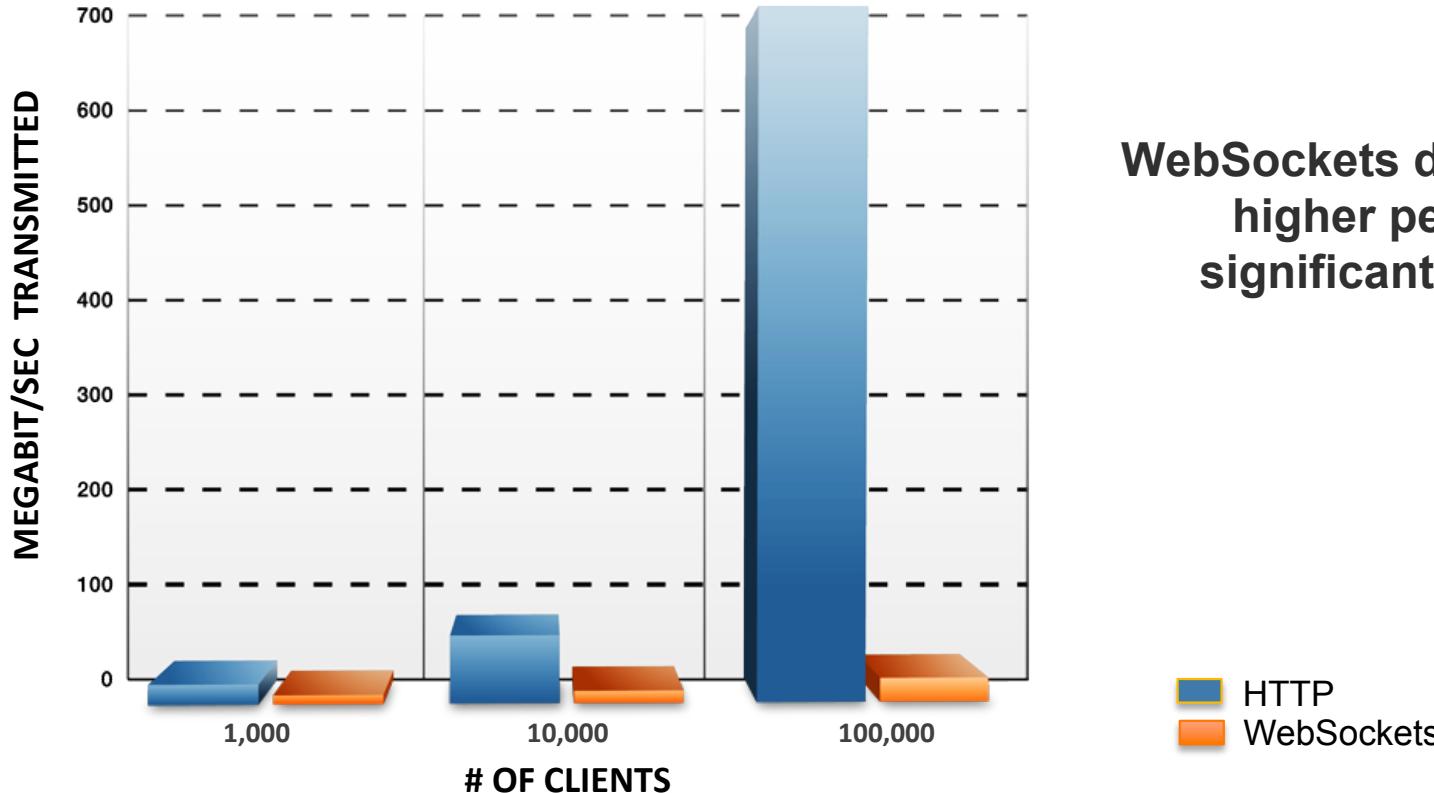
```
Accept-Language: en-us
Accept-Encoding: gzip,deflate
Accept-Charset: ISO-8859-1,utf-8;q=0.7,*;q=0.7
Keep-Alive: 115
Connection: keep-alive
Referer: http://gpokr.com/
Cookie: __utma=247824721.249959541.1288799217.1288799217.1297318825.2; __utmz=247824721.1288799217.1.1.utmcsr=(dir...
```

HTTP Header Overhead

```
HTTP/1.1 200 OK
Server: Apache-Coyote/1.1
Expires: Fri, 10 Feb 2012 06:21:05 GMT
Cache-Control: public
Etag: W/"20867-1293462570000"
Last-Modified: Mon, 27 Dec 2010 15:09:30 GMT
Content-Type: image/png
Content-Length: 20867
Date: Thu, 10 Feb 2011 06:21:05 GMT
```

Save All... Replay... Capture Clear Close

HTTP vs. WebSockets



WebSockets delivers substantially higher performance with significantly less bandwidth

| | HTTP traffic* |
|--------|-------------------------|
| Google | 788 bytes, plus 1 byte |
| Yahoo | 1737 bytes, plus 1 byte |

* Header information for each character entered into search bar

| | WebSockets Traffic* |
|--|----------------------------|
| | 1 byte, plus 1 byte |
| | 1 byte, plus 1 byte |

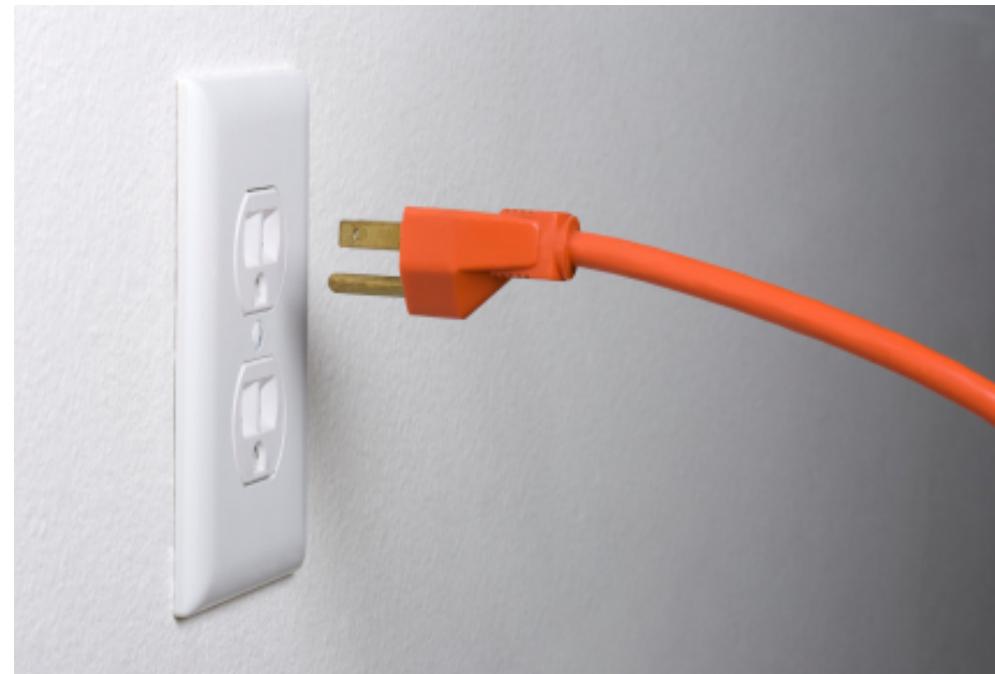
Enter WebSocket!

From Complexity...

(spell it with the letters C,O,M,E,T!)



... to simplicity!



- Client API (W3C)
 - (simple) JavaScript API
- Network Protocol (IETF)
 - Under development
 - draft-hixie-thewebsoketprotocol-76
 - ...
 - draft-ietf-hybi-thewebsoketprotocol-07*

WS Protocol / Handshake

GET /chat HTTP/1.1

Host: server.example.com

Upgrade: **websocket**

Connection: Upgrade

Sec-**WebSocket**-Key: dGhIHNhbXBsZSub25jZQ==

Sec-**WebSocket**-Origin: http://example.com

Sec-**WebSocket**-Protocol: chat, superchat

Sec-**WebSocket**-Version: 7

HTTP/1.1 101 Switching Protocols

Upgrade: **websocket**

Connection: Upgrade

Sec-**WebSocket**-Accept: s3pPLMBiTxaQ9kYGzhZRbK+xOo=

Sec-**WebSocket**-Protocol: chat

A photograph showing the interior of a train carriage. The carriage has a warm, wooden-toned interior with rows of orange leather seats facing forward. Overhead, there are blue luggage racks and several rectangular light fixtures. Large windows on both sides provide a view of the tracks and greenery outside.

Less
Overhead...

A lot less!!!

\0x00Hello, WebSocket\0xff

WebSocket Client API

JavaScript

```
// Create new WebSocket
var mySocket =
    new WebSocket("ws://echo.websocket.org");

// Attach listeners
mySocket.onmessage = function(evt) {
    doSomeFancyDhtml(evt.data);
};

mySocket.onopen = function(evt) { ... };

mySocket.onclose = function(evt) { ... };

mySocket.onerror = function(evt) { ... };
```

WebSocket Client API

JavaScript

```
// Send data...
mySocket.send("HTML5 WebSocket rocks! ");
```

```
// Close WebSocket
mySocket.close();
```

- UDP meets WebSocket

WebSocket Support

- Browsers:
 - Firefox 4 (will be enabled in FF5)
 - Chrome/Chromium
 - Safari 5 & iOS4
 - IE (there is a plugin)
- *To test support visit: <http://websocket.org>*
- Servers:
 - Kaazing WebSocket Gateway
 - Node.js
 - mod_pywebsocket
 - Netty
 - Resin

- It is NOT just a better Ajax or XHR, nor was it designed to be!
- WebSocket was NOT designed to be a one-size-fits-all replacement for HTTP!

- When you build Desktop applications (client server solutions) do you develop your application using raw TCP sockets?
- Or, are you using higher level protocols and APIs, such as XMPP, JMS, JDBC?

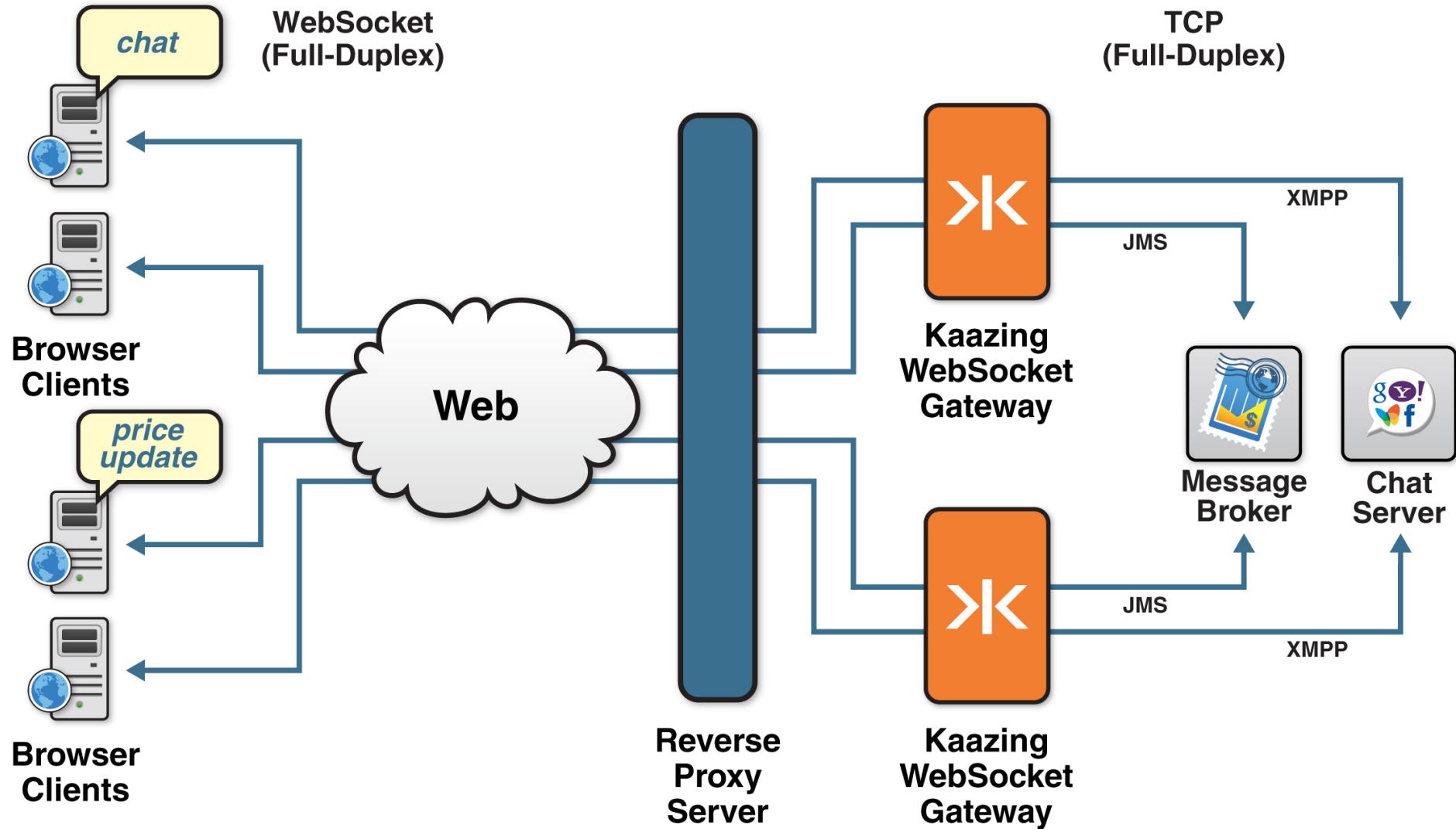
You should think of WebSocket the same way:

- Extend client-server protocols to the Web
 - XMPP, Jabber
 - Pub/Sub (Stomp/AMQP)
 - Gaming protocols
 - Any TCP-based protocol



WebSocket Architecture

KAAZING™



THANK YOU!

<http://kaazing.me>

<http://kaazing.com/download.html>



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