

Autobahn

A WebSocket client/server for Python
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What to expect

- Quick-n-Dirty History of the web
- HTTP and successors
- WebSocket
- Autobahn
- Examples

Dub-Dub-Dub

The web is defined as: “...a system of interlinked hypertext documents accessed via the Internet. With a web browser, one can view web pages that may contain text, images, videos, and other multimedia, and navigate between them via hyperlinks.[1]”

[1] http://en.wikipedia.org/wiki/World_Wide_Web#How_the_Web_works

Browsing Model

- Deliver web pages on request to clients.
- This means delivery of HTML and other content

HTTP

- Browsing model tightly coupled HTTP protocol
- A request-response protocol in the client-server model
 - Polling, page-by-page
- Stateless protocol

HTTP

- Various versions: HTTP/0.9, HTTP/1.0 and HTTP/1.1
- It is used everywhere, and now, also abused.

HTTP

GET /index.html HTTP/1.1\r\n

Host: www.example.com\r\n

\r\n

HTTP/1.1 200 OK

Date: Mon, 23 May 2005 22:38:34 GMT

Server: Apache/1.3.3.7 (Unix) (Red-Hat/Linux)

Last-Modified: Wed, 08 Jan 2003 23:11:55 GMT

Etag: "3f80f-1b6-3e1cb03b"

Accept-Ranges: none

Content-Length: 438

Connection: close

Content-Type: text/html; charset=UTF-8

Deficiencies in HTTP

- Has worked well for 20+ years
- Not interested in all the shortcomings of the HTTP protocol.
Only:
 - HTTP relates to modern web apps
 - How WebSocket is a potential solution, and how to use it

The Problem

- Web Apps
 - ...need to be responsive
 - ...free and easy bi-directional communication
 - ...low protocol overhead

Example

- “The biggest hurdle is the HTTP 1.1 specification, which states that a browser should not have more than two simultaneous connections with a web server.”[1]

[1] [http://en.wikipedia.org/wiki/Comet_\(programming\)](http://en.wikipedia.org/wiki/Comet_(programming))



View Photos of Bill (1)

View Videos of Bill

Send Bill a Message

Poke Bill

Steve, I'm better than you and I have 40 billion reasons why.

Information

Networks: Microsoft Harvard University Rich White People

Relationship Status: Married to Melinda Gates

Birthday: October 28, 1955

Mutual Friends

5 friends in common See All



Steve Ballmer



Paul Allen



Warren Buffett

Friends

223 friends See All

Bill Gates just bought Azerbaijan!

Wall Info Photos Boxes Notes

Write something...

Share

Filters

RECENT ACTIVITY

Bill and Ashton Kutcher are now friends. Comment Like

Bill is now a fan of Tool Academy and Project Runway. Comment Like



Steve Jobs Remember that OS you made that was awesome? Yeah, neither do I. at 4:45pm March 26 Comment Like

Steve Wozniak liked this.



Bill Gates at 4:48pm March 26 I'll mention that to the 88.9% market share I have. BTW, saw the new iPod shuffle. It looks like a tampon.

Write a comment...



Bill Gates SAYS NO TO THE NEW FACEBOOK at 12:02pm March 26 Comment Like



Warren Buffett I took your advice and sleep on piles of money now. My back feels so much better! at 4:30am March 26 Comment Like



Bill Gates JUST FOUND OUT ABOUT GUITAR HERO. HOW DID I MISS THIS? at 11:08pm March 25 Comment Like



Every 14-year-old in America at 11:10pm March 25 The Xbox 360 is the best thing ever made by anyone ever.



Every 14-year-old in Japan at 11:15pm March 25 Uh, heard of motion controlled sensors? Try the Wii.



Every 14-year-old in America at 11:17pm March 25 Wii is fun, but playing the Wii by yourself is the saddest thing in the world, ever. It's worse than when my mom and dad got divorced.

Facebook on iOS

- How many of you have an iPhone?
- Have you tried the old version of the Facebook app?
 - It was an HTML 5 disaster. Why?

How do we fix this?

- Hacks
 - Comet: Ajax Push, ...
- HTTP/2.0
 - Google's SPDY
 - Microsoft's HTTP S&M

What we're looking for

- We need the ability to
 - push data
 - communicate bi-directionally
 - have long-lived connections
- ...but outside of the HTTP request-response semantics!

...maybe WebSocket?

SPDY

- SPDY is a middleware protocol that doesn't tackle this problem as it still uses HTTP
- Google however will include support for WebSocket over SPDY/3
 - “--enable-websocket-over-spdy”[1]

[1] <http://peter.sh/experiments/chromium-command-line-switches/>

MS S&M

- Microsoft, in a fit of creative wisdom
 - A WebSocket extension
 - Extension uses some SPDY semantics for multiplexing

What is WebSocket

(and where's the
Python!?)

WebSocket

- Compliment to HTTP
- True, bi-directional communication protocol
- Supported in all major web browsers
- Many non-browser frameworks

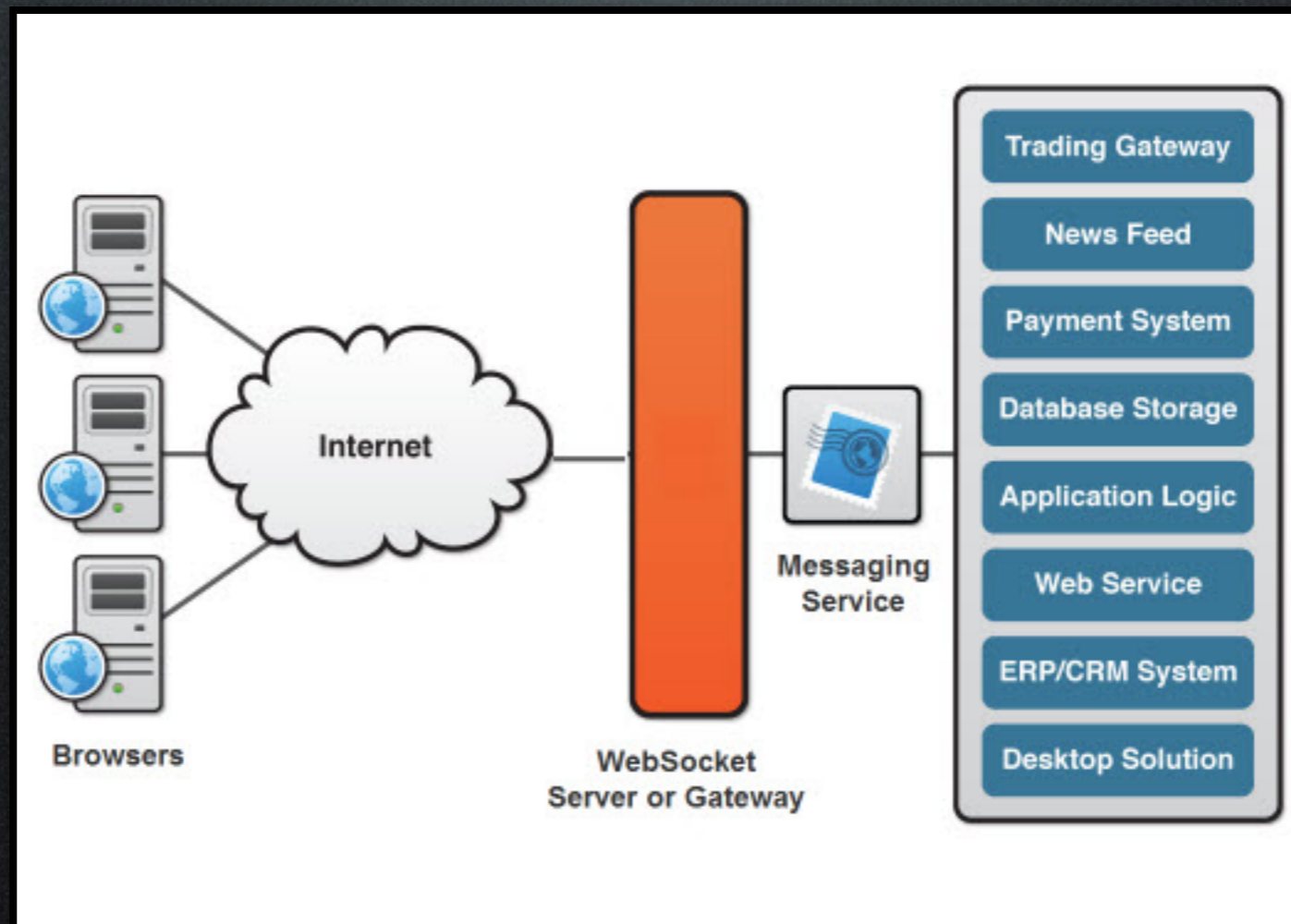
WebSocket

- A persistent web-standard-based connection
- light-weight framing model
 - control, binary, text frames
- Highly-extensible

WebSocket

- Initiated with HTTP “Upgrade:” header
- Protocol Home
 - <https://www.websocket.org/>

WebSocket



Example

```
GET /chat HTTP/1.1
Host: server.example.com
Upgrade: websocket
Connection: Upgrade
Origin: http://example.com
Sec-WebSocket-Key: dGh1IHNhbXBsZSBub25jZQ==
Sec-WebSocket-Version: 13
Sec-WebSocket-Extensions: http2

HTTP/1.1 101 Switching Protocols
Upgrade: websocket
Connection: Upgrade
Sec-WebSocket-Accept:
s3pPLMBiTxaQ9kYGzZhZRbK+xOo=
Sec-WebSocket-Extensions: http2
```

Autobahn

- Project Home: <http://autobahn.ws/>
- Open-sourced, on GitHub
- My current choice

Autobahn

- | Python A Twisted-based framework for client/server
- | JS Provides WAMP for browser WS API
- | Android Client library
- | Testsuite 300 test cases, fully automated

Why Autobahn

- It's well-written
- Easy to use, event-driven twisted implementation
- BIG plus is the 300 case test suite used to test client/server compliancy

Specifications

- RFC 6455
 - <http://bit.ly/rocpy-ws-rfc>
- HTML 5 WebSocket API
 - <http://bit.ly/rocpy-ws-api>

Extensions

- Extensible
 - Negotiated at HTTP handshake
- WAMP
 - Official Autobahn RPC/PubSub layer
 - <http://wamp.ws>

Example: Broadcast

Example: RPC

Example: PubSub

Personal Project

- RSWebSocket
 - Passes all 300+ tests
- RSWamp
 - Compliant with WAMP v1
- Vernacular

Questions