

WebSocket
to me!

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The **Vonage**[®] API Platform

Before...



Before...

(A few years ago)



HTTP Polling

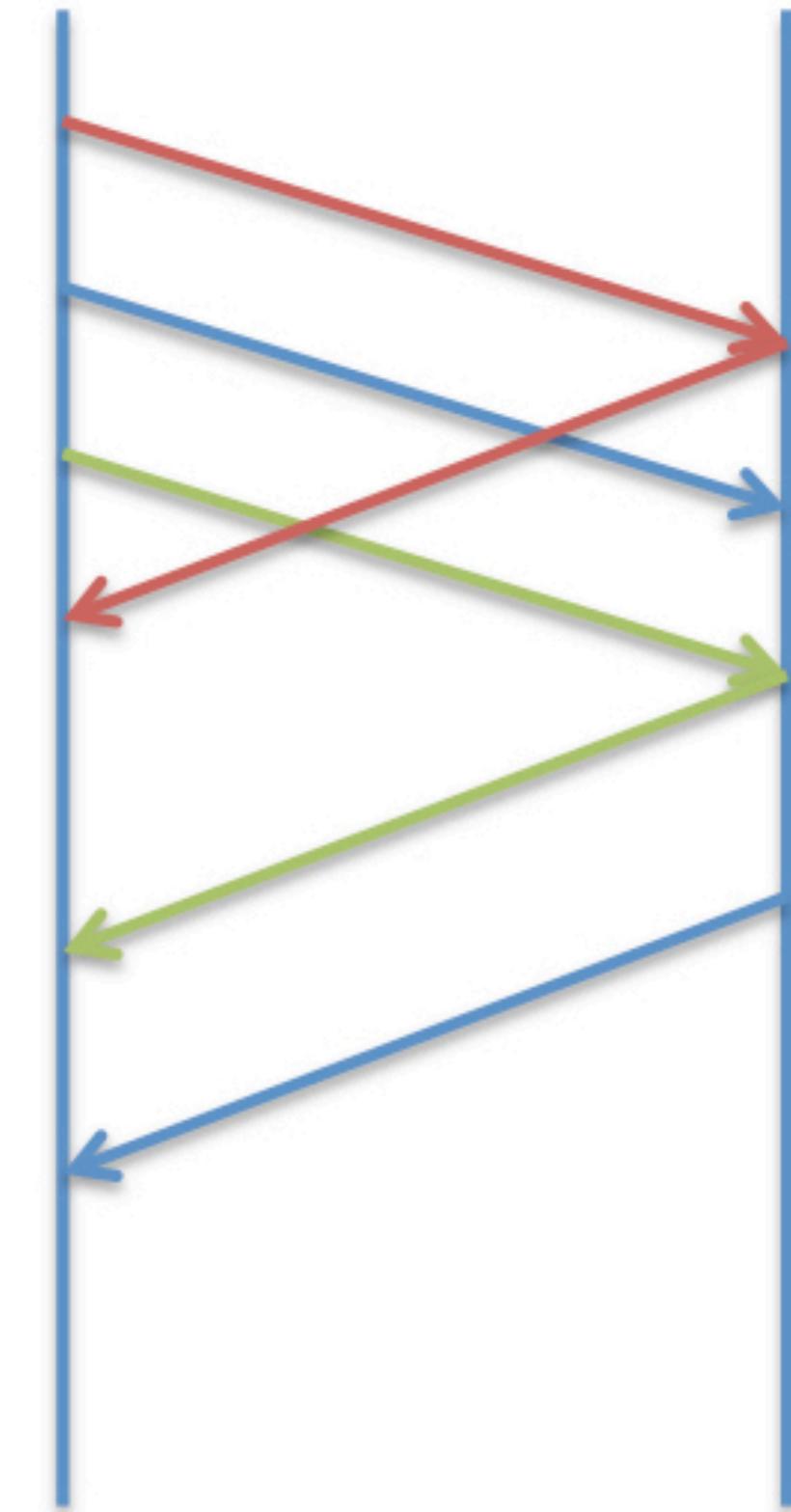
TCP/IP Sockets

WebSockets

/web' säkəts/

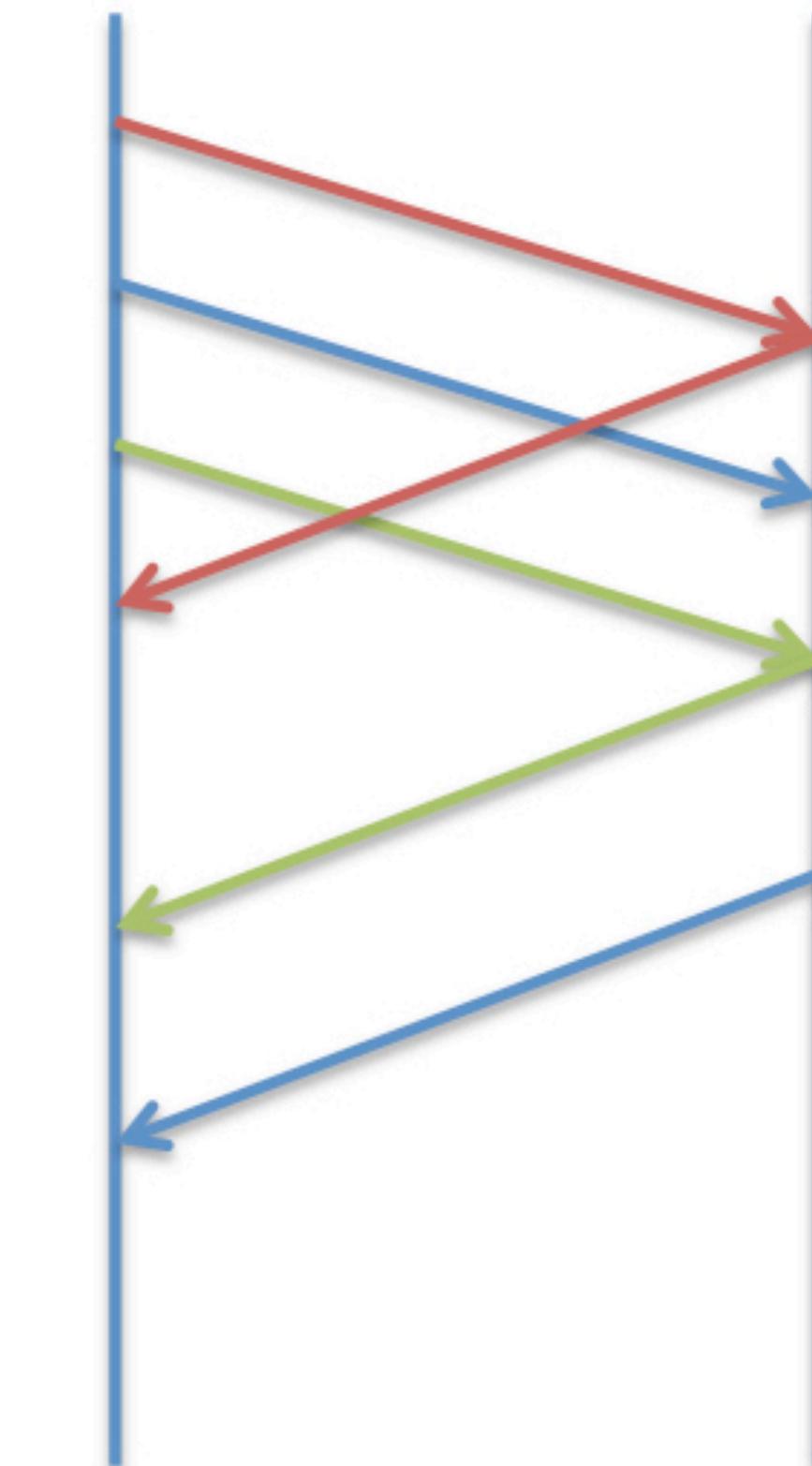
bi-directional

Client Server



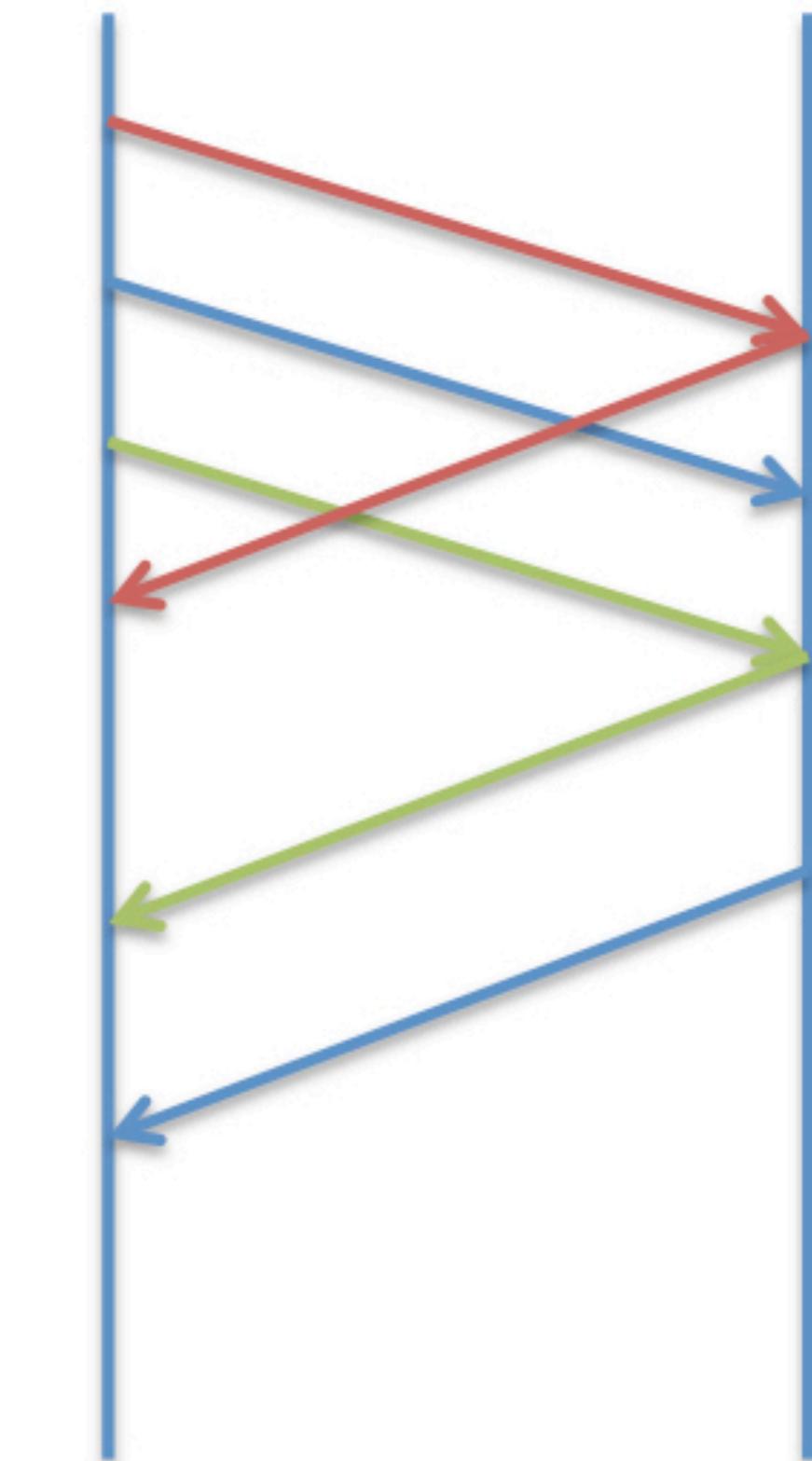
realtime communication

Client Server

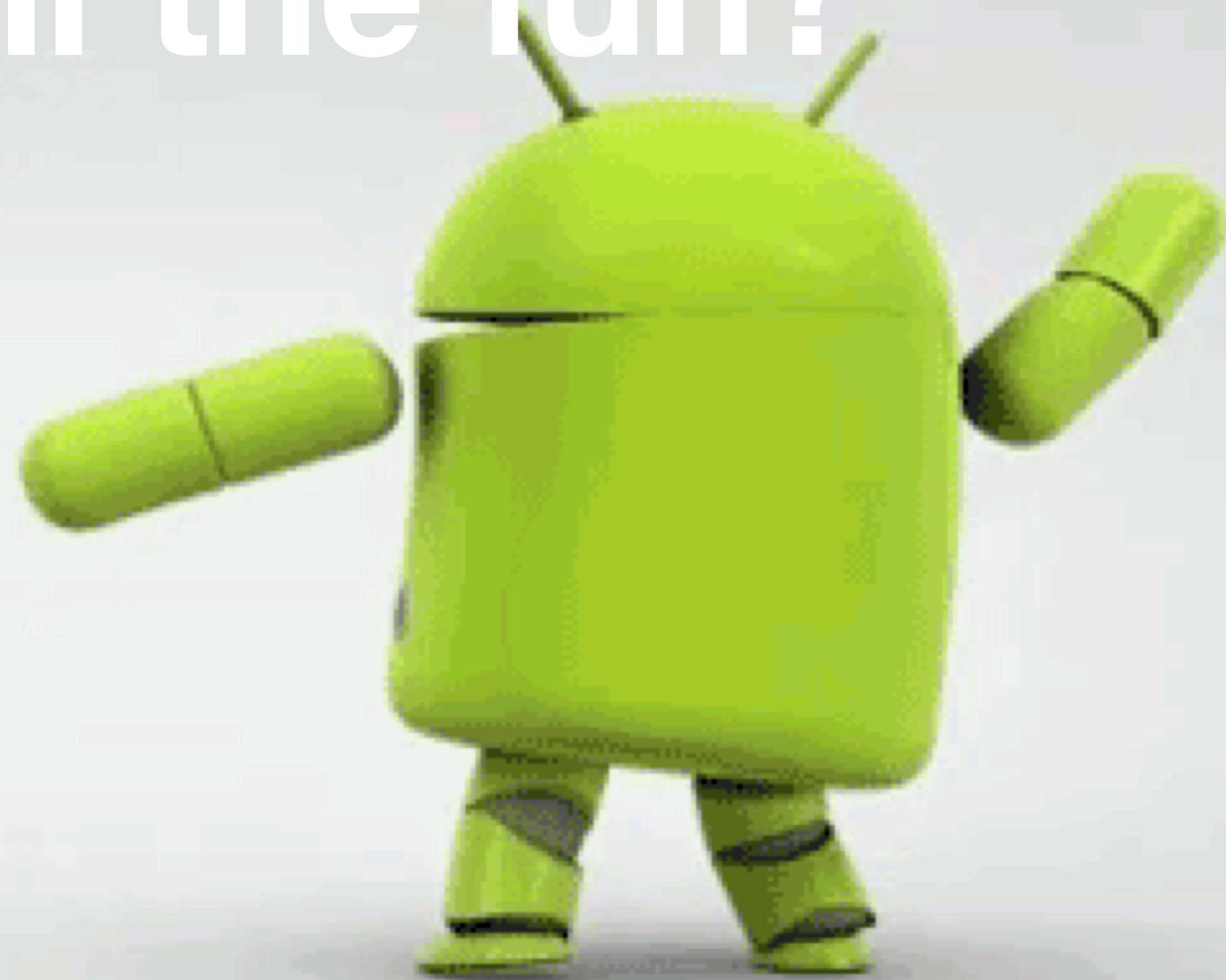


servers & clients

Client Server

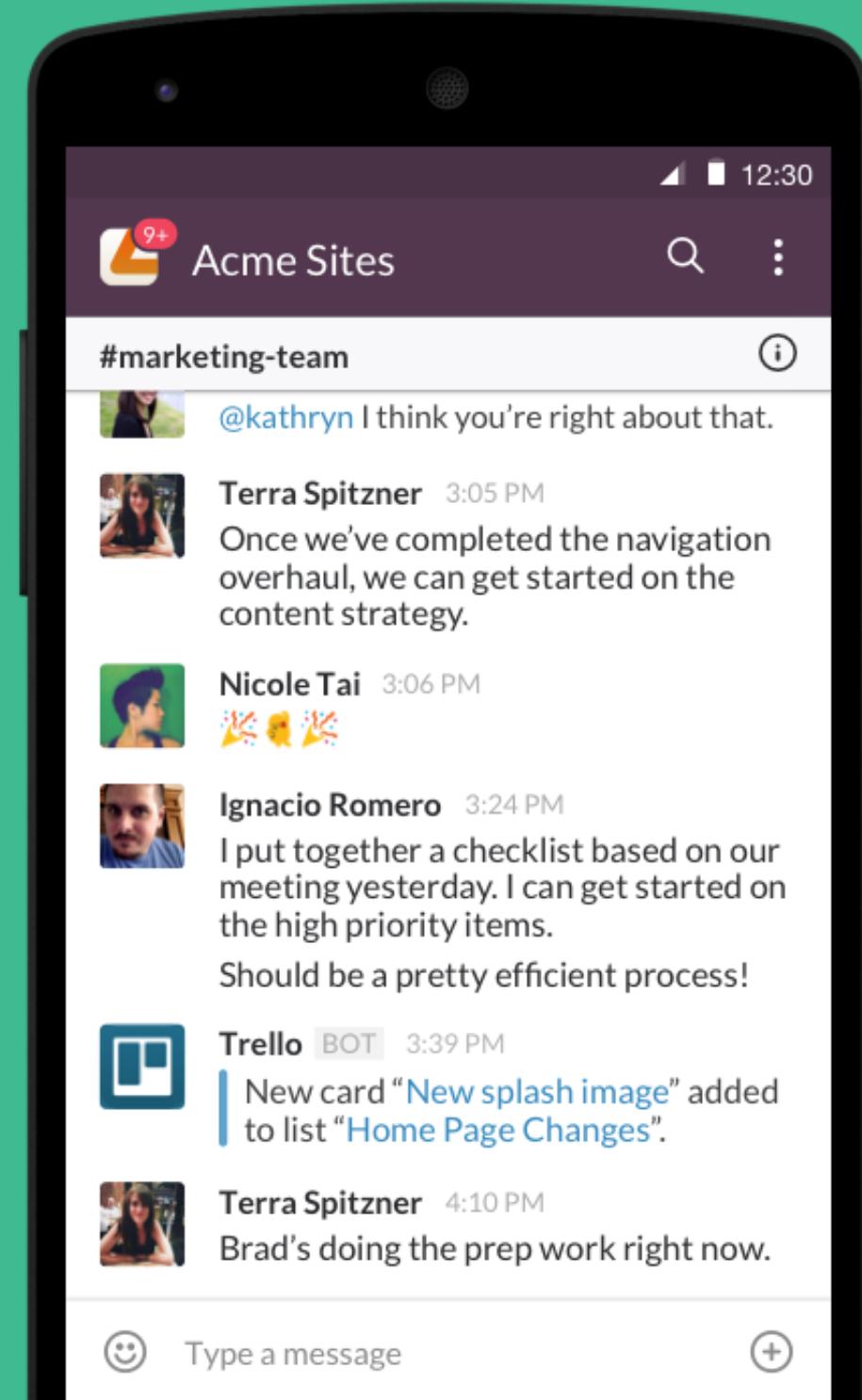


Why should browsers have all the fun?

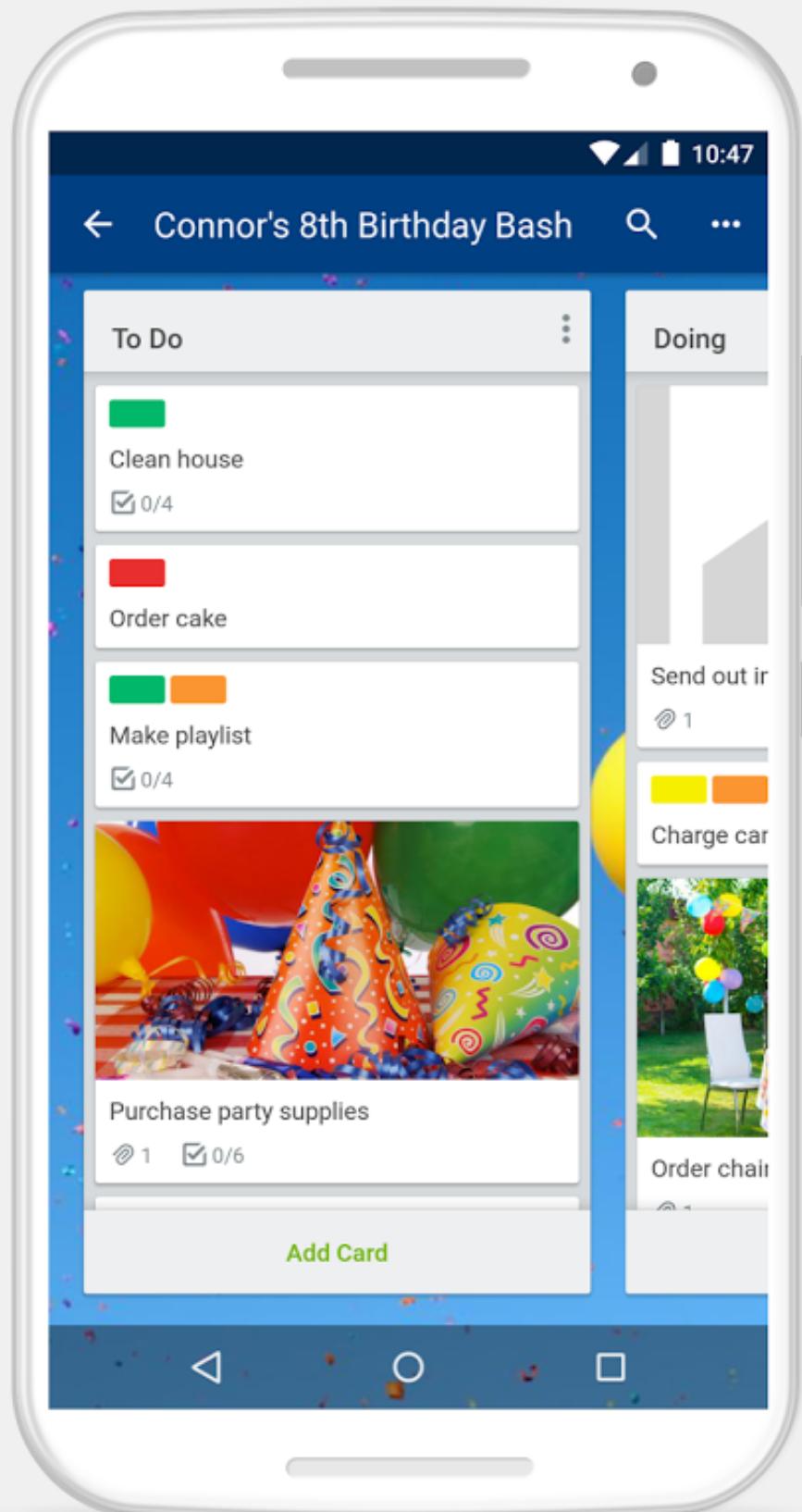


Who uses WebSockets?

All your team's messages, files
and services in one place.



Trello is the tool that lets you
organize anything



How can I stop him?



Let's
Get
Started

Handshake



NEW EPISODE
CN
CARTOON NETWORK

gifs.com

HTTP request from client to server

GET /chat HTTP/1.1

Host: server.example.com

Upgrade: websocket

Connection: Upgrade

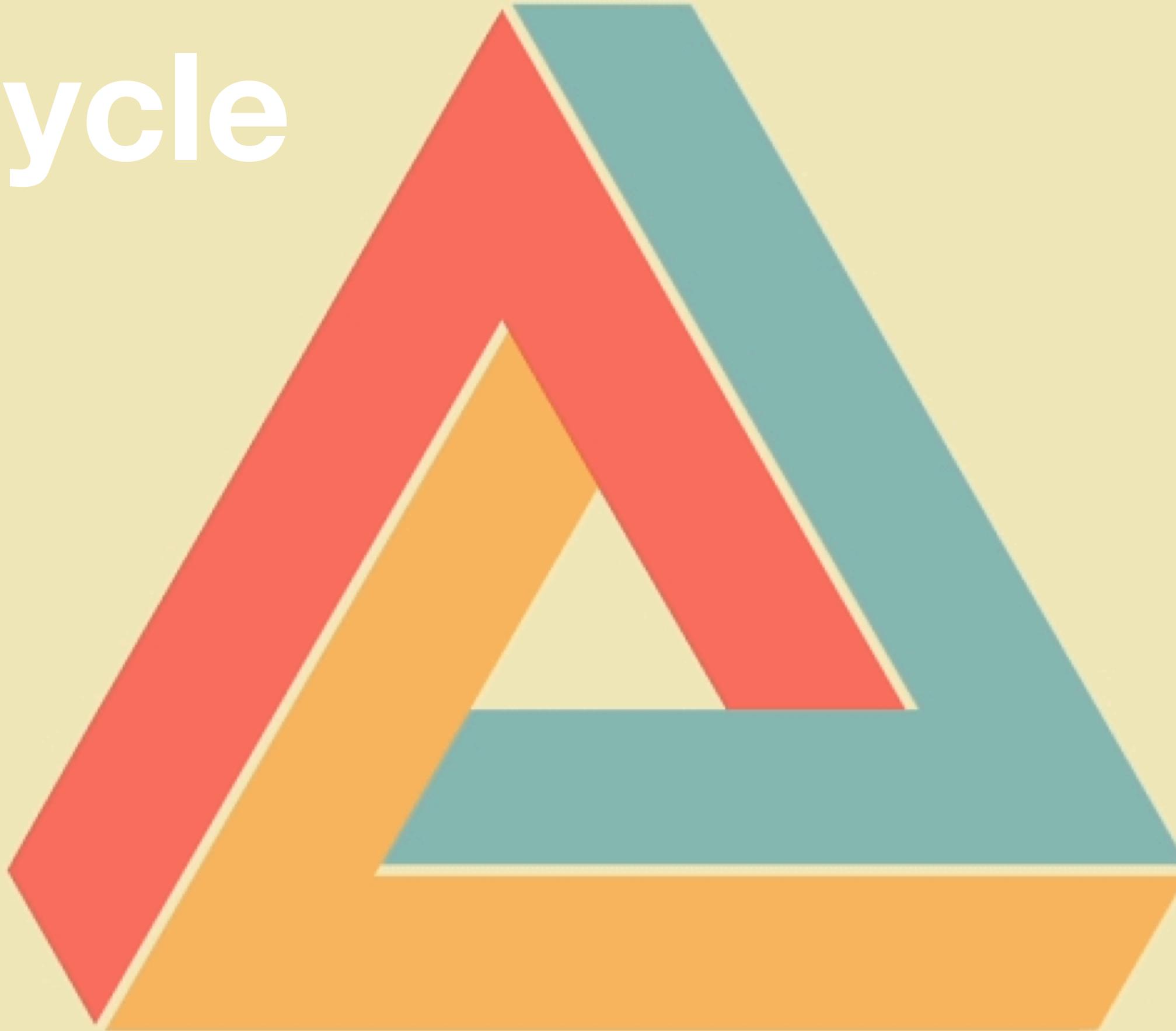
Connection upgrades to the WebSocket protocol

HTTP/1.1 101 Switching Protocols

Upgrade: websocket

Connection: Upgrade

Lifecycle



Open

Send & receive messages

Close

PERSISTENT CONNECTION



- Connecting:
 - Enqueue messages
 - Won't be sent yet
- Open:
 - Peer has accepted
 - Send away!
- Closing:
 - Graceful shutdown started
 - Send enqueued messages but no more

- **Closed:**
 - all messages sent/received
- **Canceled:**
 - Connection failed.
 - Messages may fail

Echo

The screenshot shows the 'Echo Test' section of the websocket.org website. At the top, there is a navigation bar with links for HOME, DEMOS, ARTICLES, BOOK, DOWNLOAD, DOCKER HUB REPO, and ABOUT. The 'HOME' link is currently active. Below the navigation bar, the title 'Echo Test' is displayed in bold black font. A descriptive text follows, stating: 'The first section of this page will let you do an HTML5 WebSocket test against the echo server. The second section walks you through creating a WebSocket application yourself.' It also mentions that users can inspect WebSocket messages using their browser. A green box with a checkmark icon and the text 'This browser supports WebSocket.' is present. On the left side, there is a 'Location:' field containing 'wss://echo.websocket.org', a checked checkbox for 'Use secure WebSocket (TLS)', and two buttons: 'Connect' and 'Disconnect'. On the right side, there is a 'Log:' area which is currently empty, and a 'Clear log' button at the bottom.

Echo Test

The first section of this page will let you do an HTML5 WebSocket test against the echo server. The second section walks you through creating a WebSocket application yourself.

You can also [inspect WebSocket messages](#) using your browser.

Try it out!

This browser supports WebSocket.

Location:
wss://echo.websocket.org
 Use secure WebSocket (TLS)

Message:
Rock it with HTML5 WebSocket
Send

Log:

Clear log

OkHttp

OkHttp

An HTTP & HTTP/2 client for Android and Java applications

[Download v3.7.0](#)



Overview

HTTP is the way modern applications network. It's how we exchange data & media. Doing HTTP efficiently makes your stuff load faster and saves bandwidth.

OkHttp is an HTTP client that's efficient by default:

- HTTP/2 support allows all requests to the same host to share a socket.
- Connection pooling reduces request latency (if HTTP/2 isn't available).
- Transparent GZIP shrinks download sizes.
- Response caching avoids the network completely for repeat requests.

[Overview](#)

[Examples](#)

[Download](#)

[Contributing](#)

[License](#)

What is OkHttp

- HTTP client
- Powers Retrofit
- Added native WebSocket support recently


```
public void onOpen(WebSocket webSocket, Response response) {  
    webSocket.send("Hello!");  
    webSocket.send(ByteString.decodeHex("deadbeef"));  
    // 1000 is like HTTP's 200  
    webSocket.close(1000, "Goodbye!");  
}
```

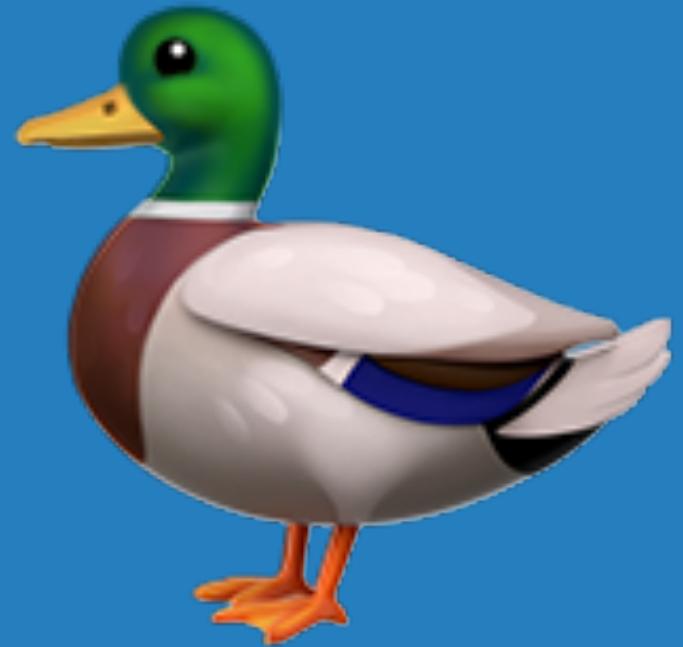
```
public void onMessage(WebSocket webSocket, String text) {  
    Log.d(TAG, "Receiving: " + text);  
}
```

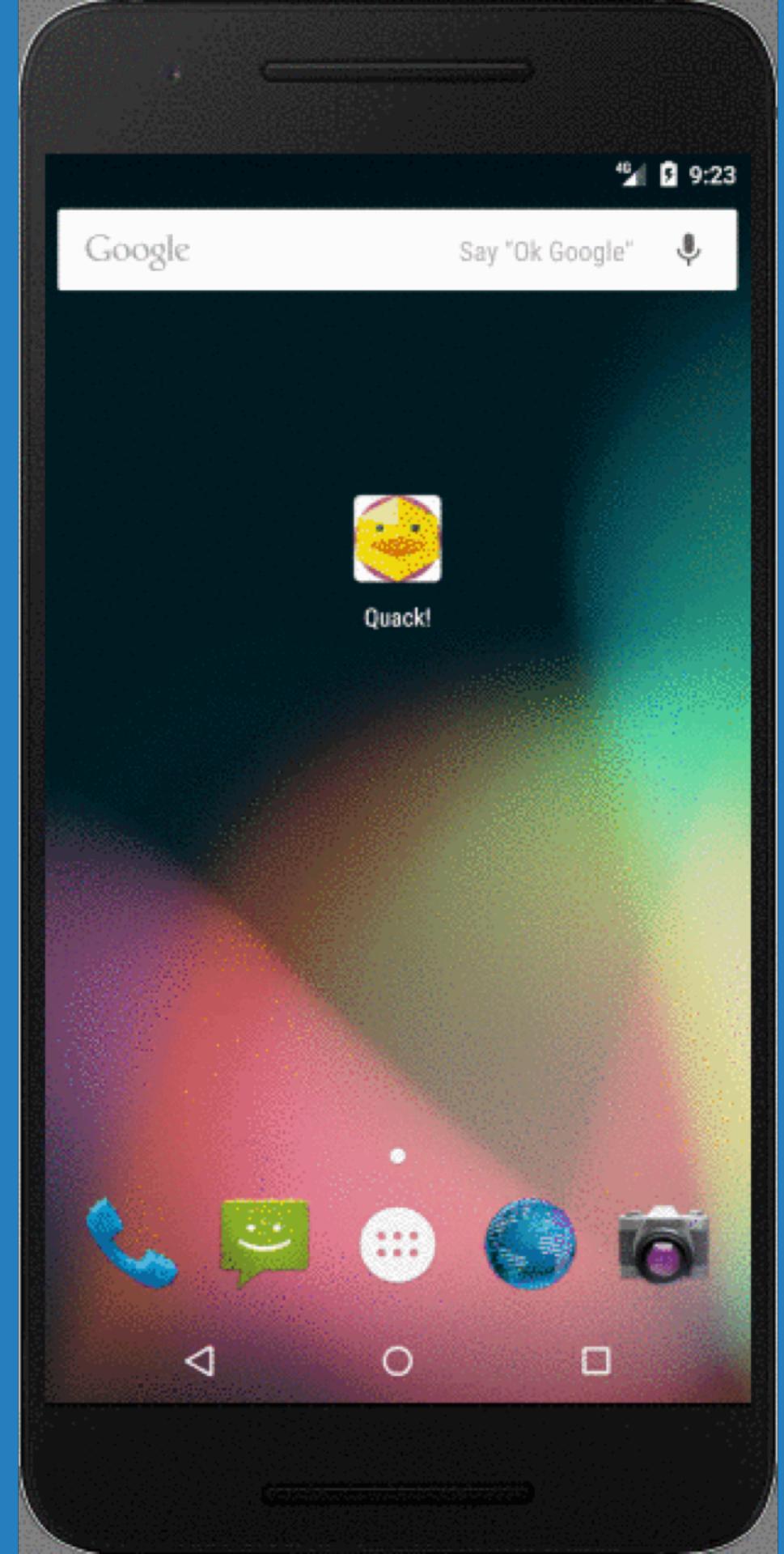
```
public void onMessage(WebSocket webSocket, ByteString bytes) {  
    Log.d(TAG, "Receiving bytes: " + bytes.hex());  
}
```

```
public void onClosing(WebSocket webSocket,  
    int code, String reason) {  
    Log.d(TAG, "Closing: " + code + " / " + reason);  
}  
}
```

```
public void onFailure(WebSocket webSocket,  
    Throwable t, Response response) {  
    Log.e(TAG, "Error: " + response.toString(), t);  
}  
}
```

Quack!





github.com/ChrisGuzman/Quack



Update UI on
the main thread

**Update UI on
the main thread**

(And introducing the emoji scale of ease)

runOnUiThread()

```
public void onMessage(WebSocket webSocket, String text) {  
    runOnUiThread(new Runnable() {  
        @Override  
        public void run() {  
            chatTxt.setText(text);  
        }  
    });  
}
```

Rating:

Piece of cake



EventBus

```
public void onMessage(WebSocket webSocket, String text) {  
    EventBus.getDefault().post(new MessageEvent(text));  
}
```

```
@Subscribe(threadMode = ThreadMode.MAIN)  
public void onMessage(MessageEvent event) {  
    textView.setText(event.getText());  
}
```

Rating:

**Simple & easy to use, if that's
your cup of tea**



Manage threads

- **AsyncTask**
- **Handlers**
- **Loopers**
- **HandlerThread**
- **ThreadPool**
- **Loader**
- **IntentService**
- **BroadcastReceiver**
- **LocalBroadcastManager**

Stacy Devino: Async Tasks, Threads, Pools, and Executors

Android Performance Patterns Season 5

Rating:

A little messy, but all the ingredients are there



RxJava

```
Observable.create(new Observable.OnSubscribe<RxEvent>() {  
    @Override  
    public void call(final Subscriber<? super RxEvent> subscriber) {  
        @Override  
        public void onMessage(WebSocket webSocket, String text) {  
            subscriber.onNext(new RxEventStringMessage(webSocket, text));  
        }  
    }  
})
```

<https://github.com/jacek-marchwicki/JavaWebsocketClient>

Rating:

Easier if you watch someone do it first. Can take some time to setup

Kinda like chipotle



Binary data with ByteString

```
6 7 9 2 5 F 6 7 D E F 5 6 6 E 9 9 A 2 A
1 E E D 5 9 2 B D 5 D 8 8 9 D 8 B 0 5 6
E E A 6 1 C 9 3 F D E 3 A 7 B D 2 5 3 0
0 D B 3 E B C 8 1 7 8 E 7 E 9 1 9 4 1 5
```

Encode

```
ByteArrayOutputStream stream =  
    new ByteArrayOutputStream();  
  
bitmap.compress(  
    Bitmap.CompressFormat.JPEG, 100, stream);  
  
byte[] bitMapData = stream.toByteArray();  
  
OkHttpWebSocket.send(ByteString.of(bitMapData));
```

Decode

```
String strBase64 = bytes.base64();
```

```
byte[] decodedString = Base64.decode(  
    strBase64, Base64.DEFAULT);
```

```
Bitmap decodedByte = BitmapFactory.decodeByteArray(  
    decodedString, 0, decodedString.length);
```

```
imageView.setImageBitmap(decodedByte);
```

Or...

Send link to media

Download over HTTP

Show media after downloaded

Persistent Connection

- Wrap OkHttpClient in a singleton
- Pass around activities
- Stop when backgrounded
- Make new connection when foregrounded

Heartbeat



- Server pings, client pong.
- No pong? Server closes connection.
- Prevents proxies & firewalls from closing inactive connections
- Also helpful to conserve resources

OkHttp Ping/Pong

- OkHttp handles pings automatically, though not customizable
- You can set a ping interval with
`OkHttpClient.Builder().pingInterval()`

What about Sockets?

- Just different protocol
- Agreed upon standards
- GCM/FCM uses idle socket connection

WebSocket Benefits

- More likely to be offered as API
- Implement security scheme
(ws vs wss)

watch out!

- Implement your own queue
- Don't expect graceful shutdowns!
- You sent your messages, but peer closed abruptly?
Peer won't get messages.
- Constant open connection can drain batteries
- Could be negatively affected by Doze
- Not supported directly by HTTP/2

Workarounds

- Don't keep connections open in the background
- Fall back to push notifications for persistence
- WebSockets are more performant than polling:
Less device waking

Other libraries?



socket.io

Home Demos Get started Docs Slack 53

Star 31,793

Download v1.7.3

SOCKET.IO 1.0 IS HERE

FEATURING THE FASTEST AND MOST RELIABLE REAL-TIME ENGINE



~/Projects/tweets/index.js

```
1. var io = require('socket.io')(80);
2. var cfg = require('./config.json');
3. var tw = require('node-tweet-stream')(cfg);
4. tw.track('socket.io');
5. tw.track('javascript');
6. tw.on('tweet', function(tweet){
7.   io.emit('tweet', tweet);
8. });
```



https://your-node-app.com

Tweets about **socket.io** and **javascript**

-  RT @rickySolon: "The Software Developer's Library... now
-  .@reactjs If anyone else gets lost, I found these po... now
-  For those looking at #bootcamps in the #Chicago ... now
-  RT @daedalus418: The Habits of Effective JavaScri... now

Socket.io

- Not really websockets, but that's good!
- It falls back to polling if no WS connection
- Need to use Socket.IO on client *and* server
- Has binary streaming (image, audio, video)
- Open source, run by contributors

PubNub

- Provide subscribe/publish key, & channel name
- Has public channels you can mess around with

Pusher

- WebSockets, with HTTP fallback
- (beta) Support for GCM/FCM

Fund

Experiments

Lif x Plu x Co x CA x De x Op x NC x Lex x Co x Ne x API x Pu x An x Pu x Cli x Pu x Int x Ho x Chris
realtime-reddit-demo.herokuapp.com

Pusher Realtime Reddit API

POWERED BY PUSHER

This is Reddit, viewer discretion is strongly advised

Fork me on GitHub

AskReddit

Listening

Have you ever encountered someone you know in person on Reddit? What happened?

what do you's where to bed?

What is keeping you from your dreams? What are you going to do about it?

Married people of Reddit: Why are you still married?

Which questions are you tired of seeing on this sub?

Americans of Reddit, how popular are peanut butter and jelly sandwiches these days?

Redditors, Which song was ruined for you when you used it as ringtone?

What's happened in your lives that seems like something straight from a book/movie/fairy-tale? Whether good or bad, how did it impact your life?

Can anyone who works for an Airline share more details about how people are ~~actually selected for involuntary~~

[reddit.com/r/pics/comments/6591d6/when_this_is_your_work_place/](https://www.reddit.com/r/pics/comments/6591d6/when_this_is_your_work_place/)

pics

Listening

Scottsdale, Arizona in full bloom [OC]



When this is your work place

gifs

Listening



Reese Witherspoon makes the cutest face eva



If Darth Vader and Annie Wilkes would have a baby it would definetly look like that! SO evil and CUTE | Evil Baby looks evil

a

Listening



[1080 x 1920] Coronado Beach, CA



Saw an Arkansas Post. Had to keep it

Life. Plura Code CAPI DevR Open NCD Lex Conn Nexn APIs Push Andro Push Client Push Inter How PN Pu x Chris

Secure https://www.pubnub.com/developers/realtime-data-streams/twitter-stream/

PubNub

USE CASES PRODUCTS & FEATURES BLOCKS CATALOG DEVELOPERS PRICING PLANS CUSTOMERS Get Started

Twitter Stream

A realtime stream of actual messages on Twitter at a maximum rate of 50 Tweets per second.

Author: [Stephen Blum](#)

 **julien baker fan act**@loganhamilton_
please dont get me killed @POTUS

 **Steven Edmunds**@stevenedmunds39
Allisha Gray Overall 4th pick in the WNBA Draft 2017

 **Santignac**@PepePotente
como cuando te estas rasurando y sin querer te cortas un huevit... epaleeee

 **D a n i a**@Dania_12maria
MI tweet fijado es para ti @RKARTISTA

 **Jen**@Jennalauren11
@kgainespdx @dgibsonpdx who voted no imma fight them

 **Sean McCue**@SKMQU
@mikeviltig 🦌🔫

Chat with us 

Secure <https://www.pubnub.com/developers realtime-data-streams/wikipedia-changes/>

PubNub

USE CASES PRODUCTS & FEATURES BLOCKS CATALOG DEVELOPERS PRICING PLANS CUSTOMERS Get Started

Wikipedia Changes

This data stream provides any recent modifications to the database of Wikipedia articles, in all languages and categories.

event	item	user	link
wiki modification	User:Ocfootballknut/sandbox/Draft Work Area	Ocfootballknut	https://en.wikipedia.org/w/index.php?diff=775297549&oldid=775297462
wiki modification	Vezot	EP111	https://en.wikipedia.org/w/index.php?diff=775297550&oldid=763506242
wiki modification	Clap Your Hands Say Yeah	Happyomen	https://en.wikipedia.org/w/index.php?diff=775297552&oldid=775296637
wiki modification	Talk:Casablanca (film)	Kmhkmh	https://en.wikipedia.org/w/index.php?diff=775297551&oldid=775285753
wiki modification	Like the Way I Do	EI C	https://en.wikipedia.org/w/index.php?diff=775297553&oldid=775295992
wiki modification	Serpentine soil	73.170.227.250	https://en.wikipedia.org/w/index.php?diff=775297554&oldid=775297526
wiki modification	Draft:Jay Dunlap	Mgabir26	https://en.wikipedia.org/w/index.php?diff=775297555&oldid=775297258
wiki modification	Sulaiman Khatib	Wiae	https://en.wikipedia.org/w/index.php?diff=775297556&oldid=775297515

view in console



What else?

- Long polling/Comet/Keep Alive
- Server Side Events
- IRC (TCP)
- MQTT (how FB Messenger worked)
- XMPP (how WhatsApp works)
- HTTP/2

WebSockets vs WebRTC

- WebRTC is peer to peer, not client/server
- WebRTC is better suited for audio/video
- WebSockets are better for text or transferring of bytes

- Java-WebSocket
- AndroidAsync
- How we built r/place
- Building r/place in a weekend
- r/place alternatives

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chris-guzman.com

github.com/ChrisGuzman/Quack

The Vonage® API Platform