

# 10KB OR BUST

## THE DELICATE POWER OF WEBPACK AND BABEL

BRIAN HOLT — MICROSOFT — @HOLTBT



I'm currently a cloud developer advocate for Microsoft Azure

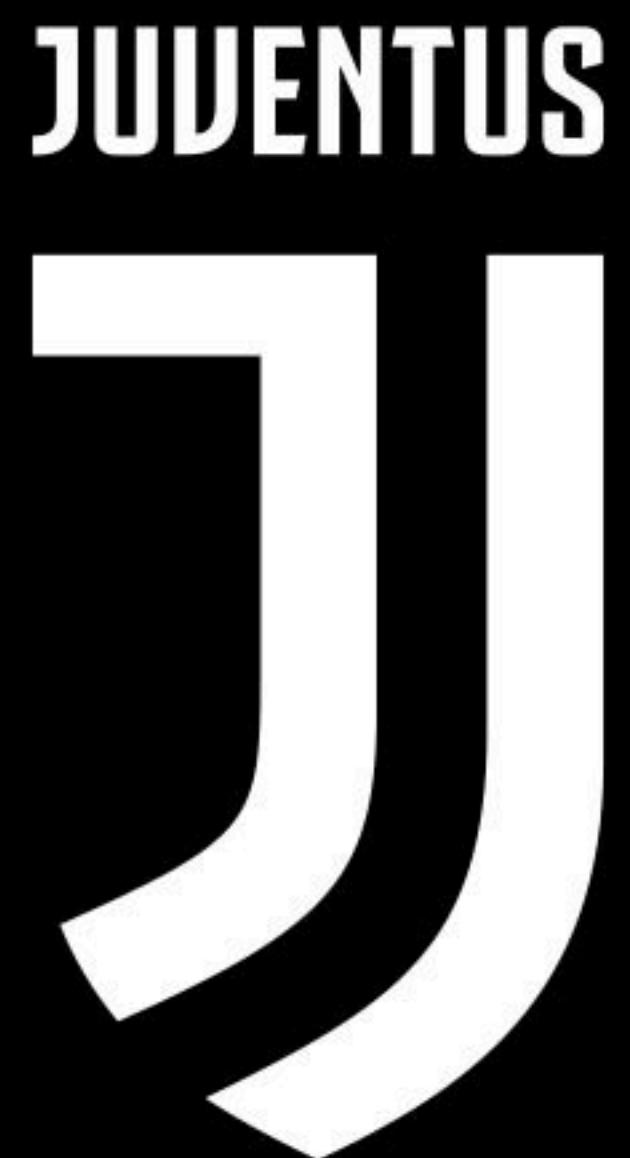
**FRONT END  
HAPPY HOUR**

Frontend *Masters*



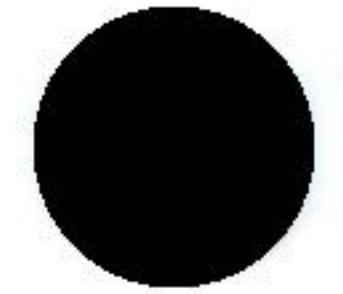






Cities I've lived in





Internet Person

Following



I only ask that frameworks put warnings on their products when they can't be accessible.  
E.g.: "This site best viewed with a high net worth"

10:38 AM - 3 Oct 2017

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12 Retweets 43 Likes



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8

12

43



WE'RE TRYING OUR BEST, DAMMIT

A woman with long dark hair is singing into a white microphone. She is wearing a dark top and a necklace. Red stage lights illuminate her face and hair, creating a dramatic effect. Water is splashing around her, particularly on the right side of the frame, suggesting a shower or a fountain. The background is dark.

**I WILL SURVIVE**

Most companies just need to survive

NOT EVERY APP NEEDS TO WORK ON 2G ON  
A LOW-POWER PHONE

KNOW YOUR AUDIENCE

THAT SAID, TODAY WE'RE TALKING ABOUT  
2G ON LOW-POWER DEVICES 😂

TECH	SPEED
2G	14 Kbps
3G CDMA	144 Kbps
4G LTE	100,000 Kbps
GIGABIT FIBER	1,000,000 Kbps

**U-robotics**



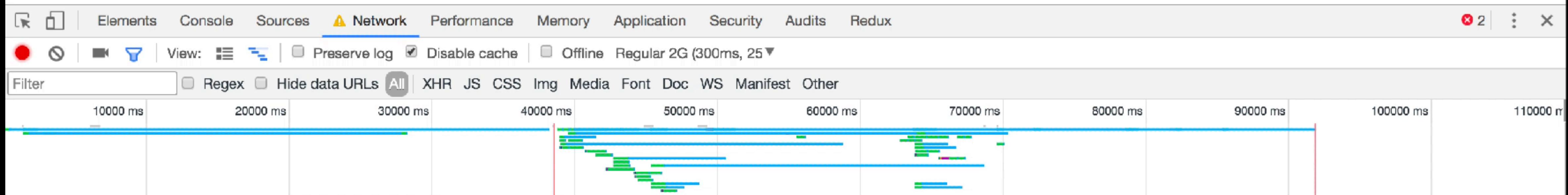
REMEMBER BROWSING THE NET ON THIS?

2G IS SLOWER

PARTICULARLY BECAUSE THE WEB  
CAN BE SO BLOATED NOW



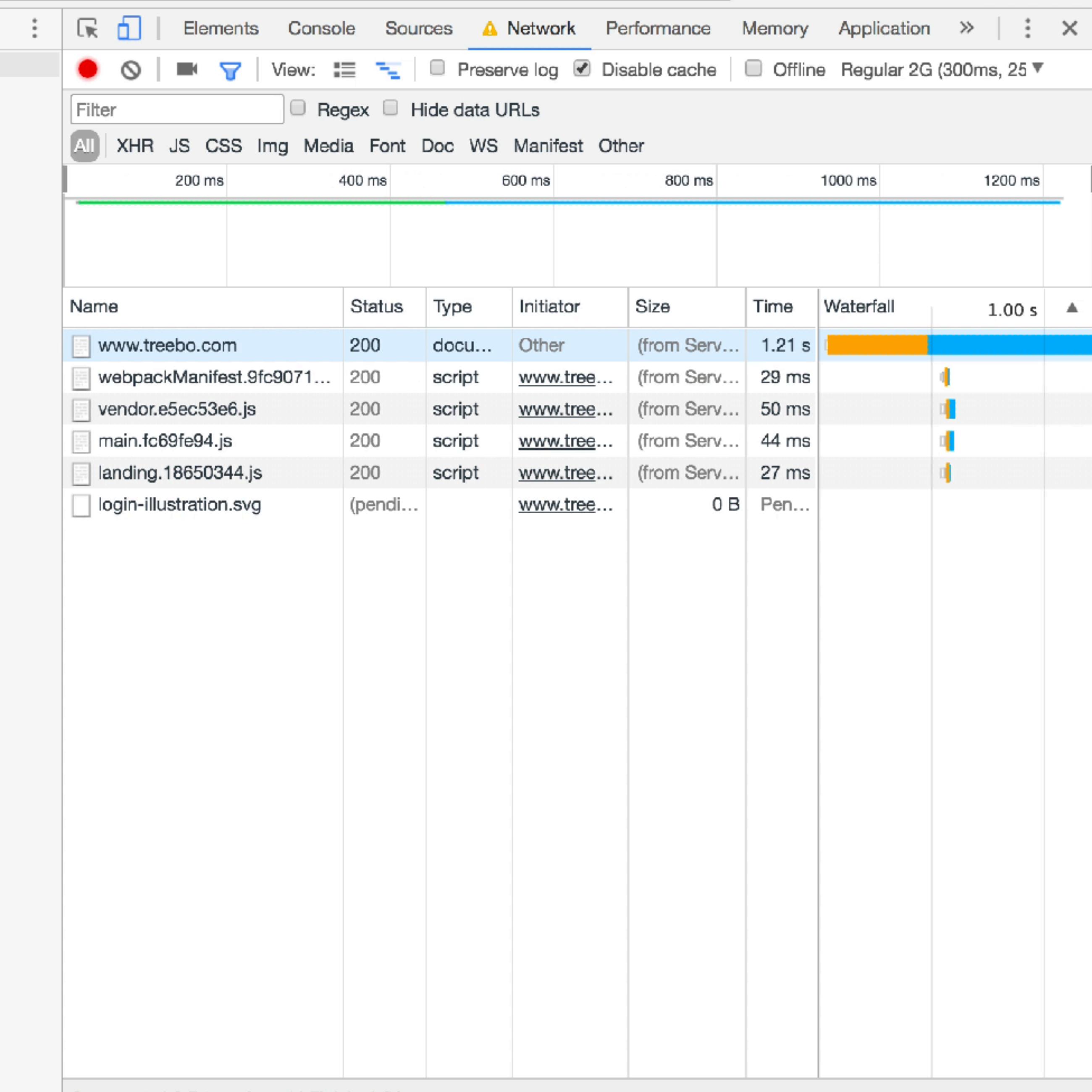
# Demo of LinkedIn.com taking about 90 seconds to load



Recording network activity...

Perform a request or hit ⌘ R to record the reload.

Demo of [treebo.com](https://www.treebo.com) taking about 12 seconds to load



IF THIS IS A COMPETITION, BANGALORE IS  
KICKING SILICON VALLEY'S 🍑

OKAY, I FEEL SUFFICIENTLY BAD

WHAT DO I DO?



# QUESTION YOUR FRAMEWORK

NAME	SIZE (KB)	2G TIME (SEC)
PREACT	3.5	0.117
VUE	21.3	0.71
REACT (+DOM)	30.5	1.02
ANGULAR	59.8	1.99
EMBER	144.2	4.81



**BABEL-PRESET-ES2015**



**@BABEL/PRESET-ENV**

# COMPILE YOUR CODE TWICE WITH BABEL

- With modules
  - `target: { esmodules: true }`
  - `<script type="module" src="./compiled-with-fewer-transformations.js">`
- Without modules
  - `target: { esmodules: false }`
  - `<script src="./compiled-with-all-the-transformations.js">`

LET'S TREE SHAKE

```
1  const _ = require("lodash");
2
3  _.get({ nodevember: "hi!" }, "nodevember");
```

Asset	Size	Chunks	Chunk Names
bundle.js	73.3 kB	0 [emitted]	main

```
[  
  "env",  
  {  
    "targets": {  
      "browsers": "last 2 versions"  
    },  
    "modules": false  
  }  
]
```

"modules": false

```
1 import get from "lodash-es/get";
2
3 get({ nodevember: "hi!" }, "nodevember");
```

Asset	Size	Chunks	Chunk Names
bundle.js	11.1 kB	0 [emitted]	main

# bundle.js

## node\_modules

### lodash-es

\_isKey.js

isSymbol.js

\_getRawTag.js

isObjectLike.js

\_isMasked.js

\_toKey.js

\_mapCacheClear.js

\_getMapData.js

\_toSource.js

\_root.js

\_MapCache.js

\_hashGet.js

\_baseGet.js

\_castPath.js

\_listCacheGet.js

\_mapCacheDelete.js

\_getNative.js

\_baseIsNative.js

\_isKeyable.js

\_Hash.js

\_baseGetTag.js

\_hashSet.js

\_memoizeCapped.js

get.js

\_hashDelete.js

\_hashClear.js

memoize.js

\_baseToString.js

\_ListCache.js

\_listCacheDelete.js

\_hashHas.js

\_mapCacheSet.js

\_objectToString.js

\_Map.js

\_getValue.js

eq.js

\_stringToPath.js

\_freeGlobal.js

isObject.js

isFunction.js

\_listCacheSet.js

\_assocIndexOf.js

toString.js

\_coreJsData.js

\_listCacheClear.js

isArray.js

\_nativeCreate.js

\_Symbol.js

sfo

node\_modules

webpack

buildin

global.js

.tmp

webpackEntry.js

index.js

# bundle.js

## node\_modules

## lodash-es

TREE SHAKING IS NO •

(silver bullet, lol)

USE BUILTINS

## `useBuiltIns: 'usage'`

Adds specific imports for polyfills when they are used in each file. We take advantage of the fact that a bundler will load the same polyfill only once.

In

a.js

```
var a = new Promise();
```

b.js

```
var b = new Map();
```

**Out (if environment doesn't support it)**

```
import "core-js/modules/es6.promise";
var a = new Promise();
```

```
import "core-js/modules/es6.map";
var b = new Map();
```

**Out (if environment supports it)**

```
var a = new Promise();
```

```
var b = new Map();
```

LOOSE MODE

```
1 "use strict";
2
3 var _createClass = (function () {
4     function defineProperties(target, props) {
5         for (var i = 0; i < props.length; i++) {
6             var descriptor = props[i];
7             descriptor.enumerable = descriptor.enumerable || false;
8             descriptor.configurable = true;
9             if ("value" in descriptor) descriptor.writable = true;
10            Object.defineProperty(target, descriptor.key, descriptor); // (A)
11        }
12    }
13    return function (Constructor, protoProps, staticProps) {
14        if (protoProps) defineProperties(Constructor.prototype, protoProps);
15        if (staticProps) defineProperties(Constructor, staticProps);
16        return Constructor;
17    };
18 })();
19
20 function _classCallCheck(instance, Constructor) {
21     if (!(instance instanceof Constructor)) {
22         throw new TypeError("Cannot call a class as a function");
23     }
24 }
25
26 var Point = (function () {
27     function Point(x, y) {
28         _classCallCheck(this, Point);
29
30         this.x = x;
31         this.y = y;
32     }
33
34     _createClass(Point, [
35         {
36             key: "toString",
37             value: function toString() {
38                 return "(" + this.x + ", " + this.y + ")";
39             }
40         }]);
41
42     return Point;
43 })();
```

```
1 "use strict";
2
3 function _classCallCheck(instance, Constructor) { ... }
4
5 var Point = (function () {
6     function Point(x, y) {
7         _classCallCheck(this, Point);
8
9         this.x = x;
10        this.y = y;
11    }
12
13 Point.prototype.toString = function toString() { // (A)
14     return "(" + this.x + ", " + this.y + ")";
15 };
16
17 return Point;
18 })();
```

BUILD USING NODE\_ENV=“PRODUCTION”

# CODE SPLITTING

# SOURCE MAPS

# SCOPE HOISTING



# MODULE CONCATENATION PLUGIN

not scope hoisted

```
1 (function(){  
2   'use strict';  
3  
4   var helper = WEBPACK_REQUIRE_METHOD(0);  
5  
6   var action = function() {  
7     var value = helper();  
8     return value;  
9   };  
10  
11  exports.action = action;  
12});
```

scope hoisted

```
1 (function() {  
2   'use strict';  
3  
4   function helper() {  
5     /* inlined function from module */  
6   }  
7  
8   var action = function() {  
9     var value = helper();  
10    return value;  
11  };  
12  
13  exports.action = action;  
14});
```



**Jeremy Gayed** 😎

@tizmagik

Follow



70K => 37K (gzip!) savings on our main  
bundle using **#Webpack** 3 RC.2 +  
ModuleConcatenationPlugin 😱 🔥  
Awesome work **@TheLarkInn** **@wSokra** et al!

Webpack 2	Webpack 3RC + ModuleConcatenationPlugin
306.05 KB (70.78 KB gzip) main.js	176.79 KB (37.8 KB gzip) main.js
676.07 KB (213.09 KB gzip) vendor.js	673.59 KB (211.65 KB gzip) vendor.js

10:26 AM - 17 Jun 2017

**137** Retweets **362** Likes



11

137

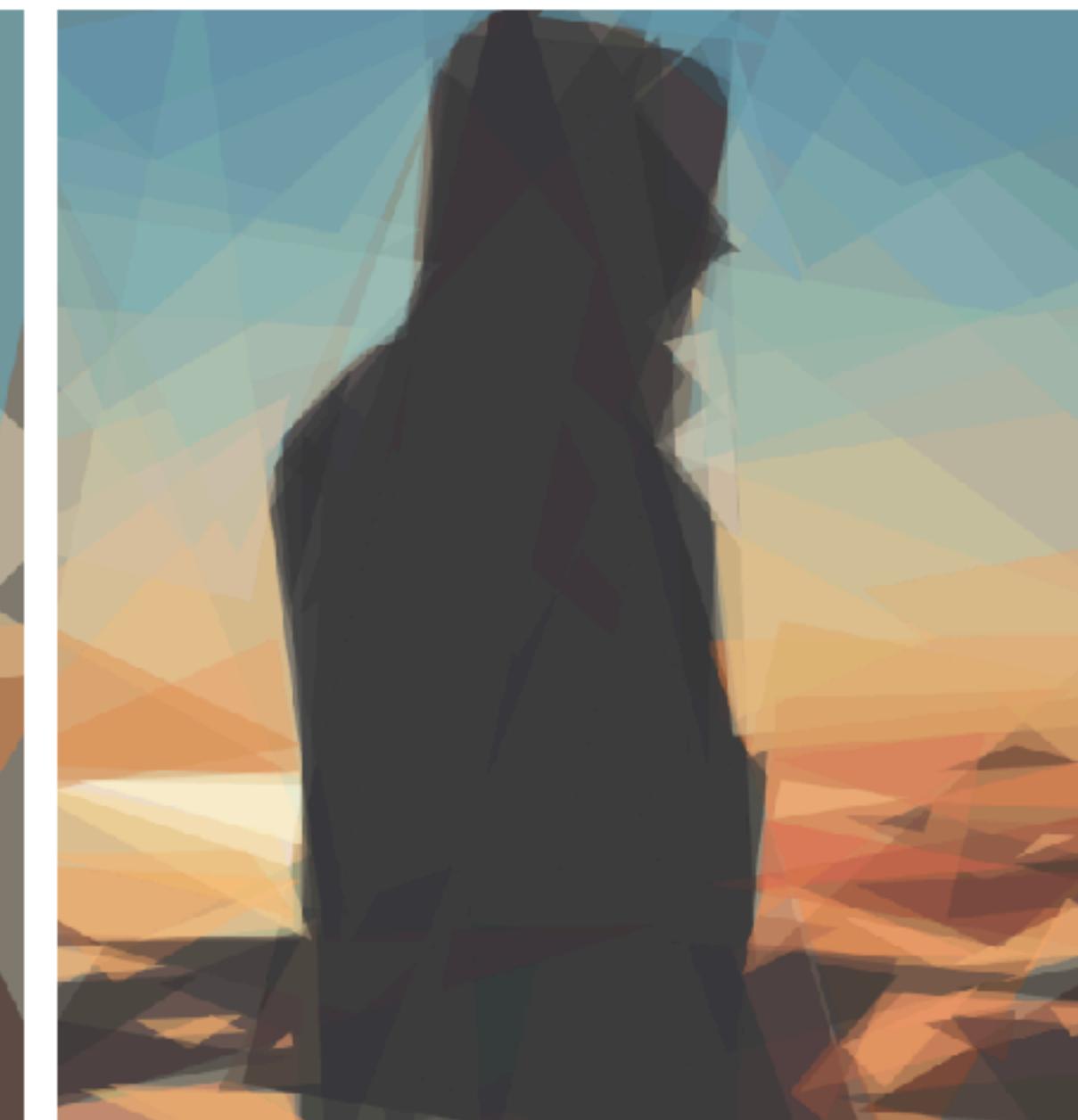
362



# IMAGE SKELETONS



Processing this picture using Primitive, using 10 shapes and 100 shapes.



Processing this picture using Primitive, using 10 shapes and 100 shapes.

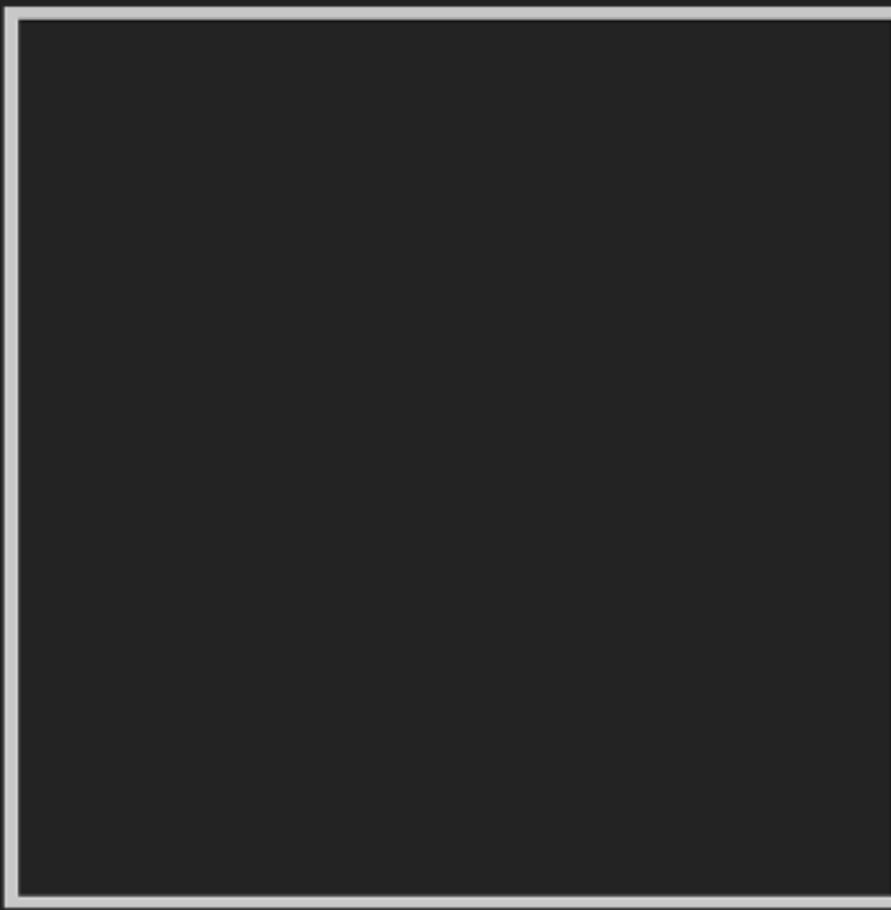


Demo of using SVGs to animate drawing of your loading image

See CodePen in bottom right

PLACEHOLDERS

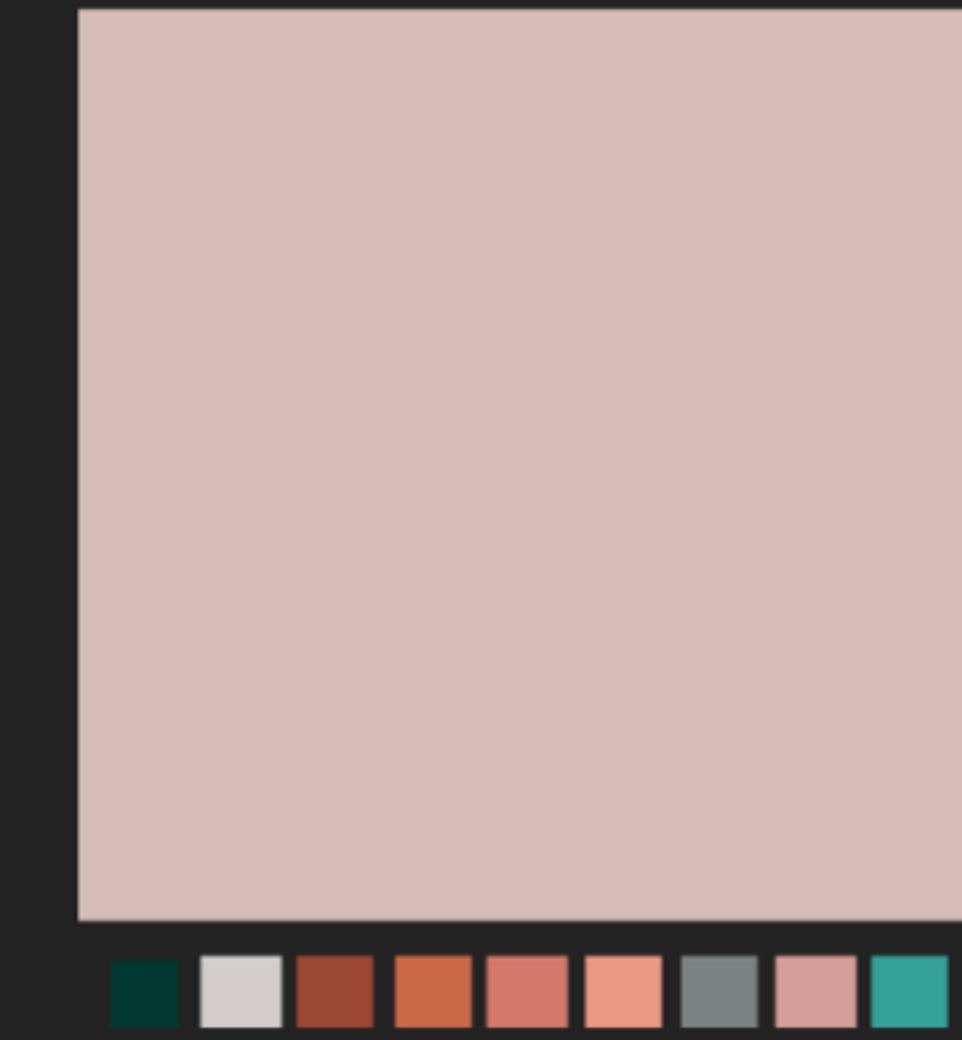
# Options



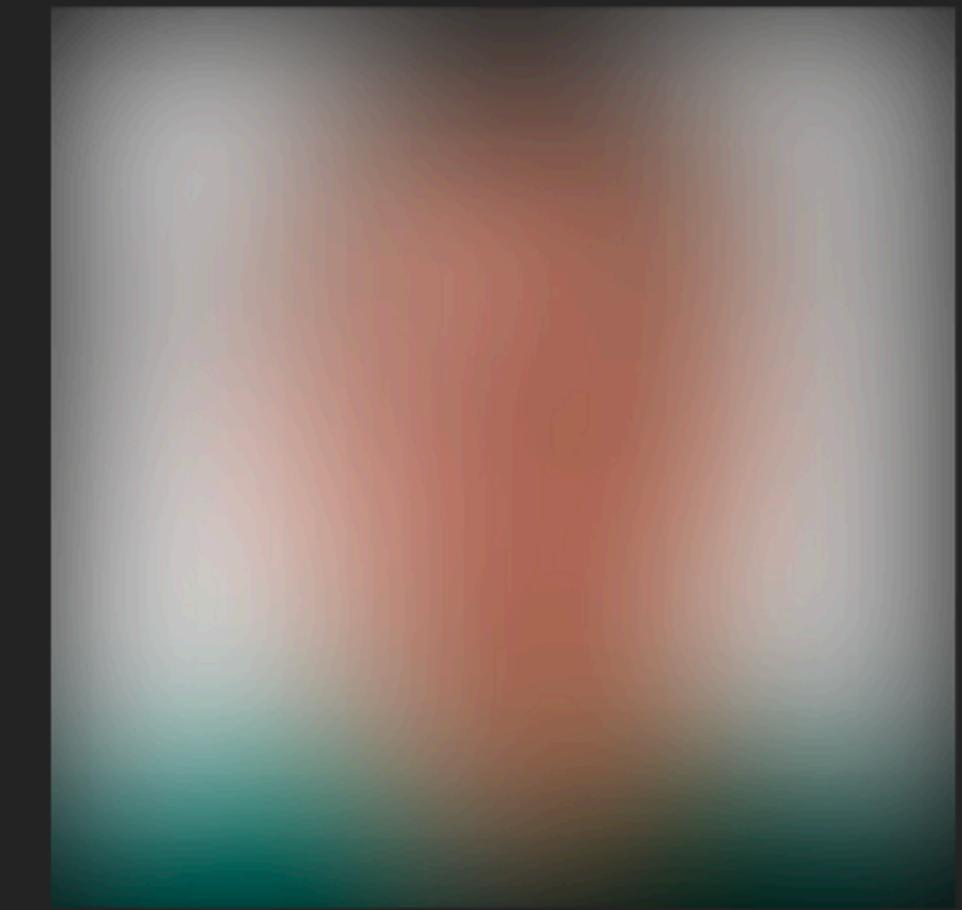
Nothing



Placeholder



Solid colour



Progressive image  
loading or "Blur-up"

Asset	Size	Chunks	Chunk Names
bundle.js	1.26 MB	0 [emitted]	[big] main

Asset	Size	Chunks	Chunk Names
bundle.js	3.99 MB	0 [emitted]	[big] main

You can cut out a lot of page weight with loading placeholders

# 10KB OR BUST

- Initial payload should be under 10KB
  - Invest time and effort into tuning your build. Many of these wins are free
  - Load no scripts and only the bare styles to get above the fold visuals
  - Using a script, load the rest in background
  - Use image skeletons, load real images later
  - Use code splitting to only get the code you need up front, delay the rest until later



[aka.ms/voxxed](http://aka.ms/voxxed)

Some tips and tricks for server-side and serverless performance

REDUCE TTFB (TIME-TO-FIRST-BYTE)

# SERVER TIMINGS API

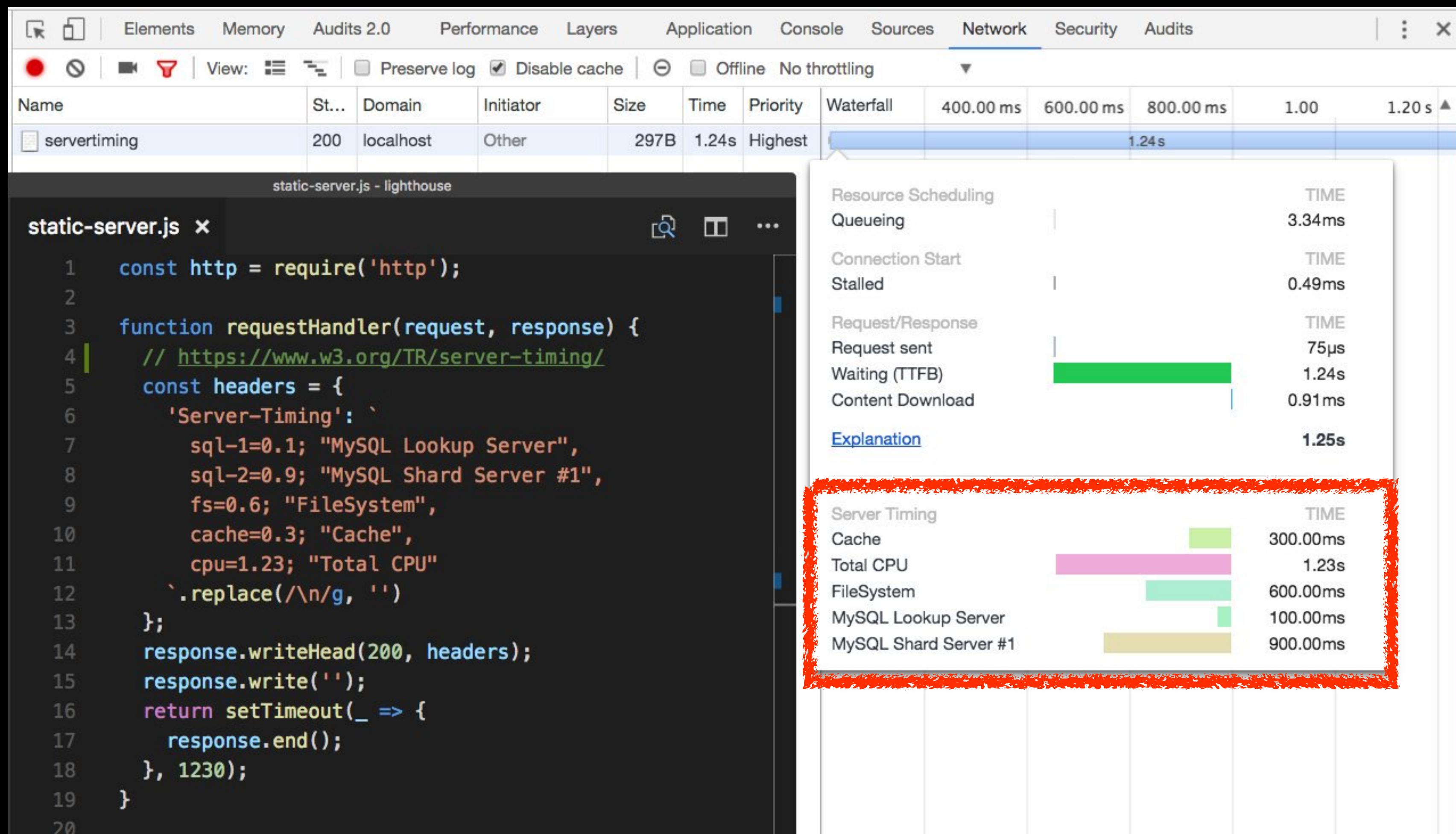


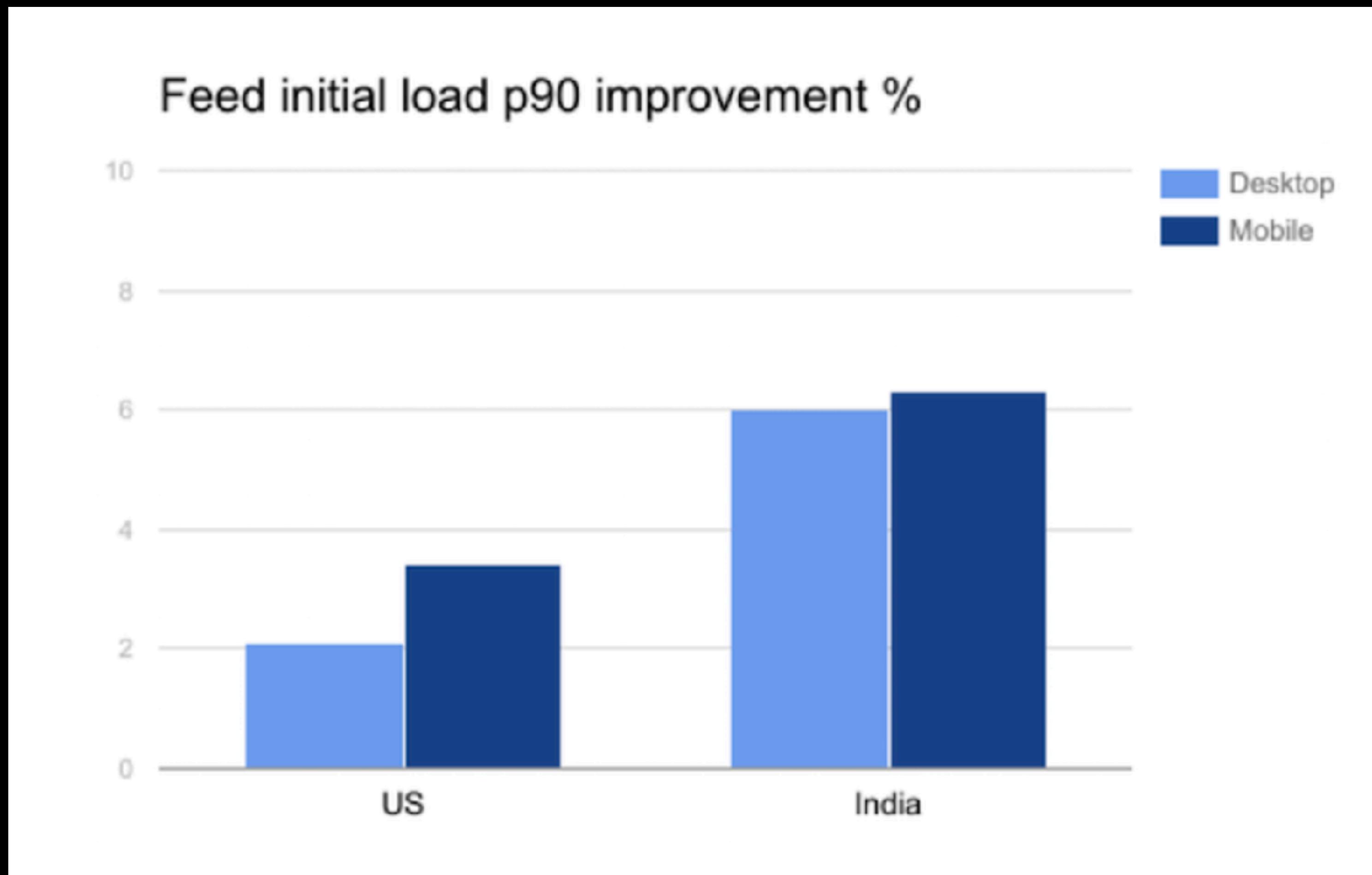
Image credit: Paul Irish

# COMPRESS YOUR RESPONSES

**Original Size:** 241 bytes gzipped (73.28KB uncompressed)

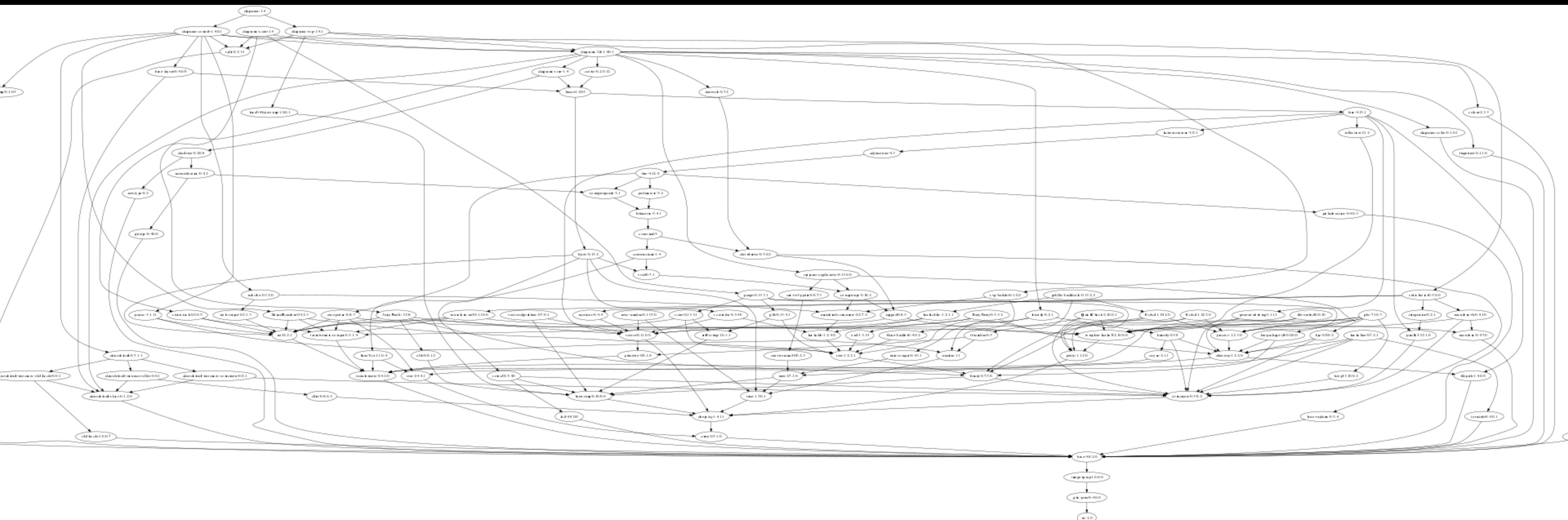
BROTLI

# LINKEDIN'S PERFORMANCE INCREASE WITH BROTLI





# COLD START



By Adam majewski (Based on the answer by Joachim Breitner on SO) [CC BY-SA 4.0 (<https://creativecommons.org/licenses/by-sa/4.0>)], via Wikimedia Commons

AZURE-FUNCTION-PACK

THE FUTURE

A close-up photograph of a man with light brown hair and a well-groomed mustache. He is wearing a dark-colored t-shirt and is looking directly at a computer monitor. The monitor displays a dark, abstract or possibly a game-like scene with some glowing elements. The background is slightly blurred, showing what appears to be a room with other people and possibly some equipment or furniture.

*Computers are the thing of the future.*



roadmap/wishlist perf stuff: create a performance compat table, remove loose mode option and figure out how to make that happen automatically

14m

AOT (AHEAD-OF-TIME COMPILATION)



# PARTIAL EVALUATION

PREPACK

Input

```
(function () {  
    function hello() { return 'hello'; }  
    function world() { return 'world'; }  
    global.s = hello() + ' ' + world();  
})();
```

Output

```
(function () {  
    s = "hello world";  
})();
```

Input

```
(function () {  
    function fibonacci(x) {  
        return x <= 1 ? x : fibonacci(x - 1) + fibonacci(x - 2);  
    }  
    global.x = fibonacci(23);  
})();
```

Output

```
(function () {  
    x = 28657;  
})();
```

# “DISAPPEARING” FRAMEWORKS



Ivy

# BINARY BYTE CODE



# HACKER NEWS CLONE

NAME	3G TTI (SEC)	2G TTI (SEC)
PREACT	1.5	1.92
SVELTE	2.2	2.5
REACT (+DOM)	2.09	2.57
GLIMMER	2.81	4.12
ANGULAR	3.2	4.3

THANK YOU

[aka.ms/voxxed](http://aka.ms/voxxed)