FRONT END PERFORMANCE FOR FULL-STACK DEVELOPERS

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CHROME DEVTOOLS

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WHO THE HECK AM I?

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ASSUMPTIONS

USING CANARY

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TURN ON CHROME DEVTOOLS EXPERIMENTS

chrome://flags/

TURN OFF ANY EXTENSIONS

SETTINGS -> EXPERIMENTS

SHIFT SIX TIMES

LOAD TIMES

THE THIN ORANGE LINE

“First Meaningful Paint is essentially the paint after which the biggest above-the-fold layout change has happened, and web fonts have loaded.”

1000 MILLISECONDS

100 MILLISECONDS FROM INPUT

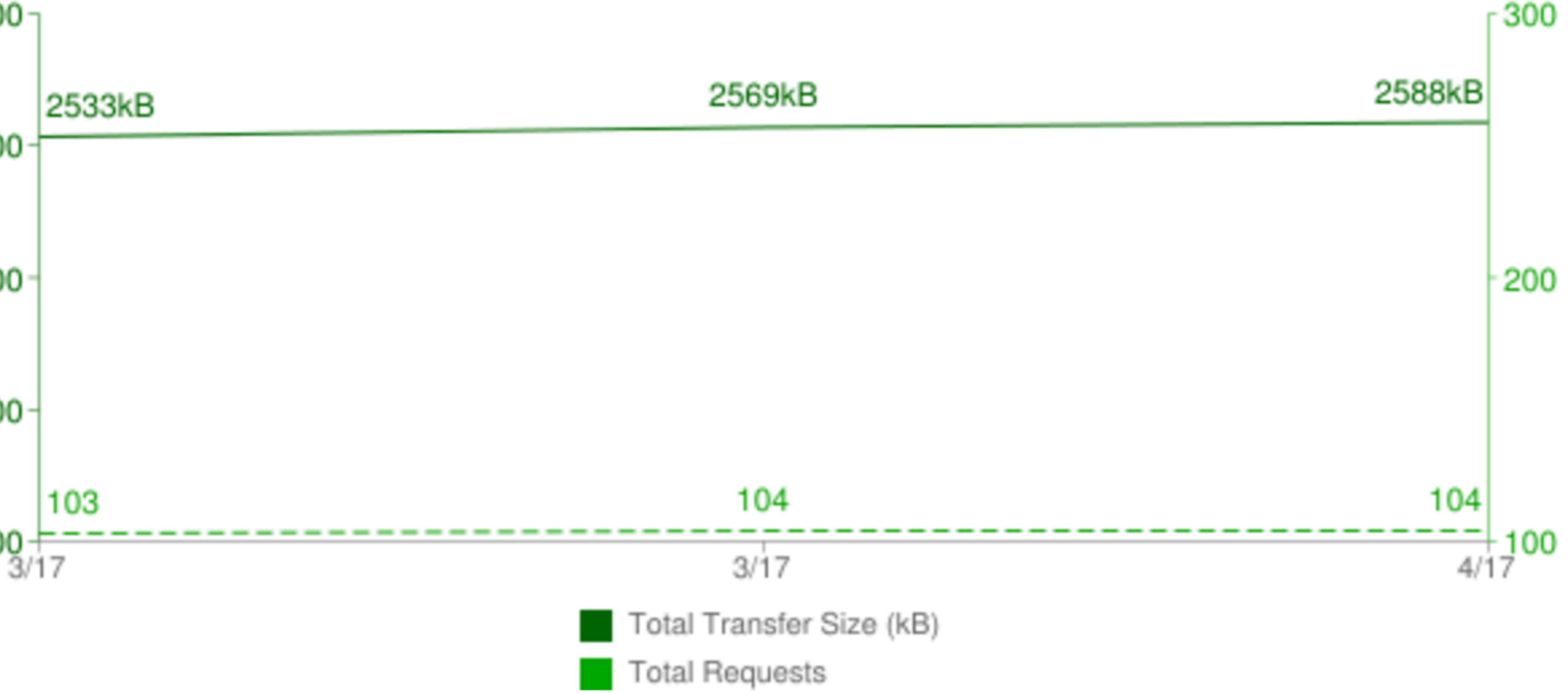
NETWORK SPEEDS

» US: ~25% of users still on 3G

» US: ~1.4 Megabytes/Second

» Worldwide: ~625 KB/s

Total Transfer Size & Total Requests



LOAD PERFORMANCE IS (MOSTLY) NETWORK PERFORMANCE

CRITICAL RENDERING PATH

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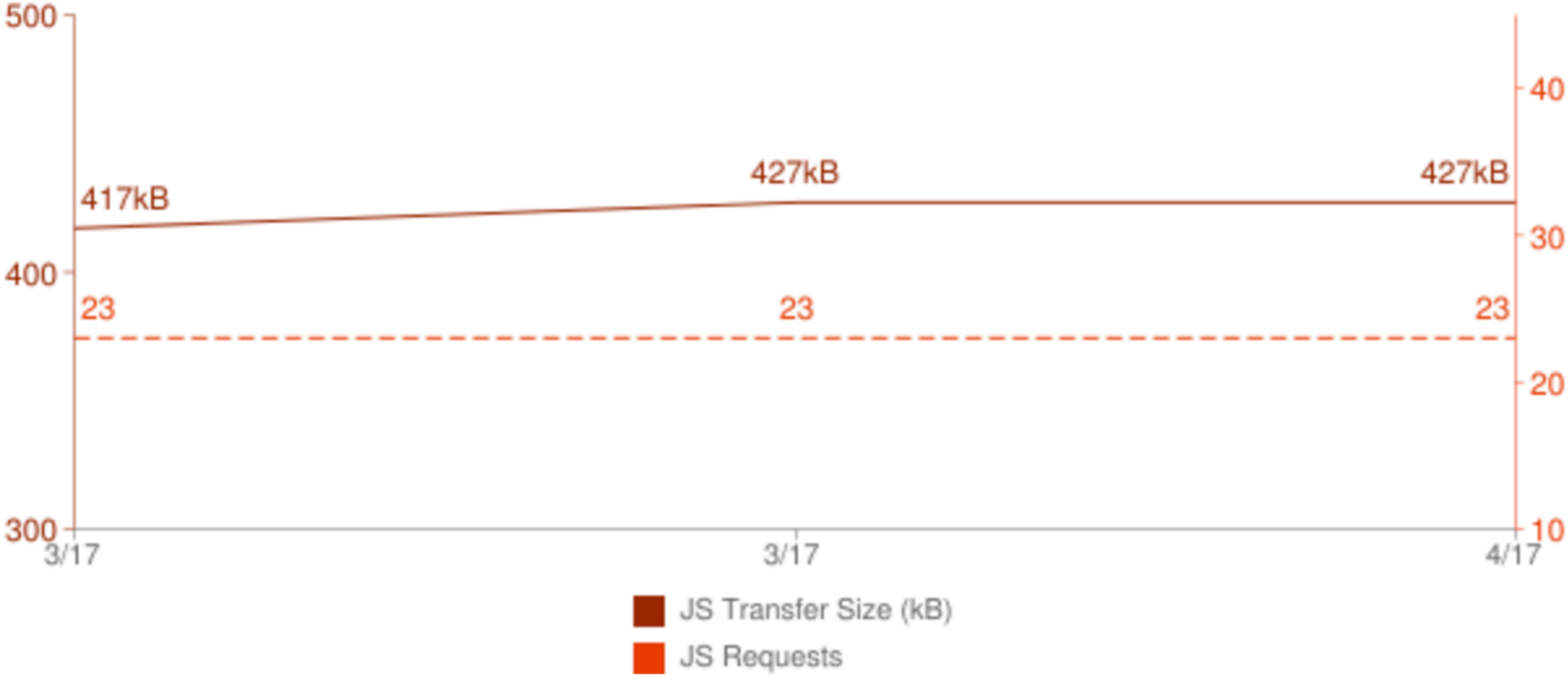
1. Get HTML document
2. Start speculative preloading
3. Build DOM and CSSOM
4. Combine into render tree
5. Layout
6. Paint

JAVASCRIPT IS THE ENEMY

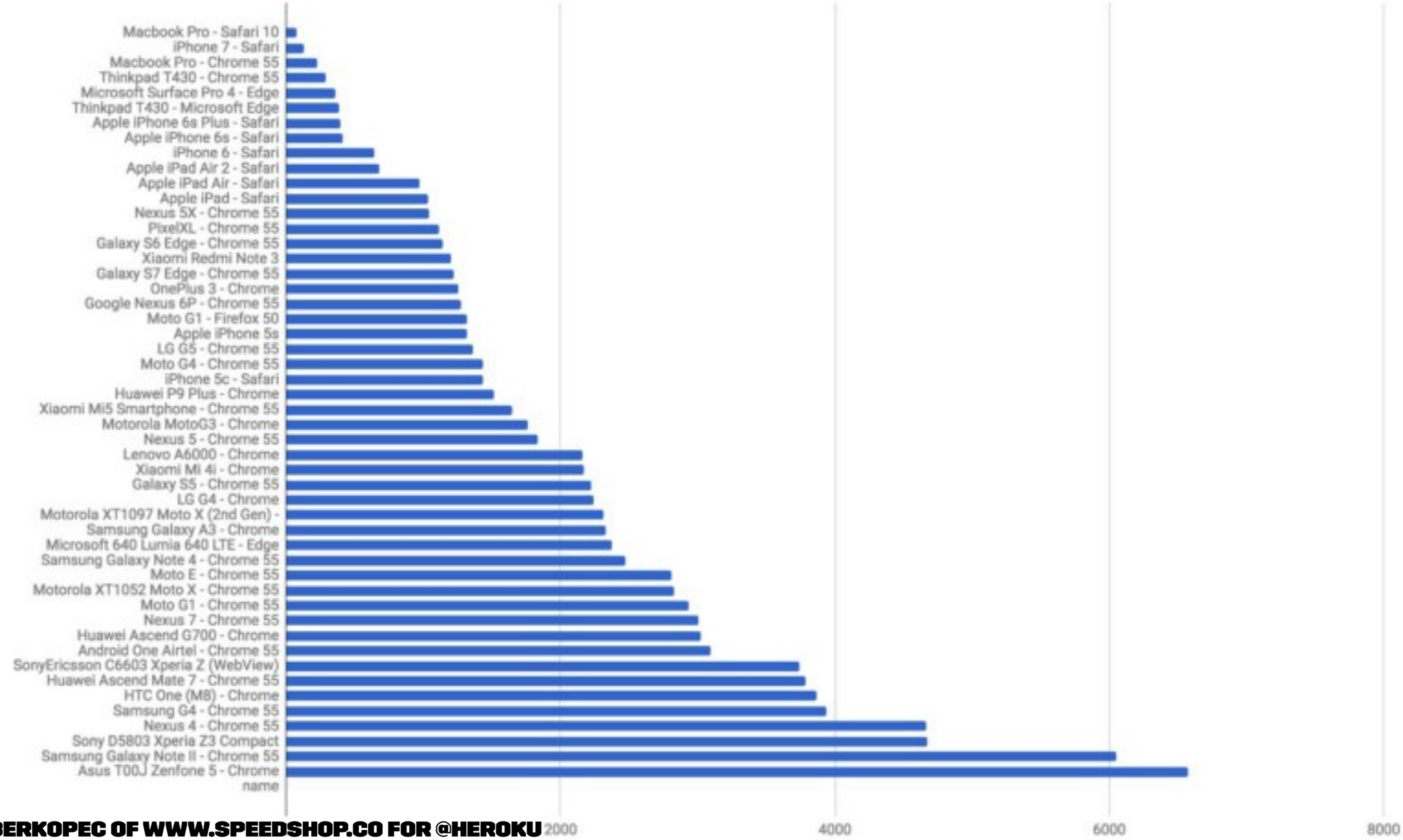
1. Wait for script to download
2. If all the CSS on this page hasn't downloaded yet, wait again.
3. Parse and execute this script

JS Transfer Size & JS Requests



NOT JUST GZIPPED SIZE

1MB ~= 1 SEC JUST TO PARSE



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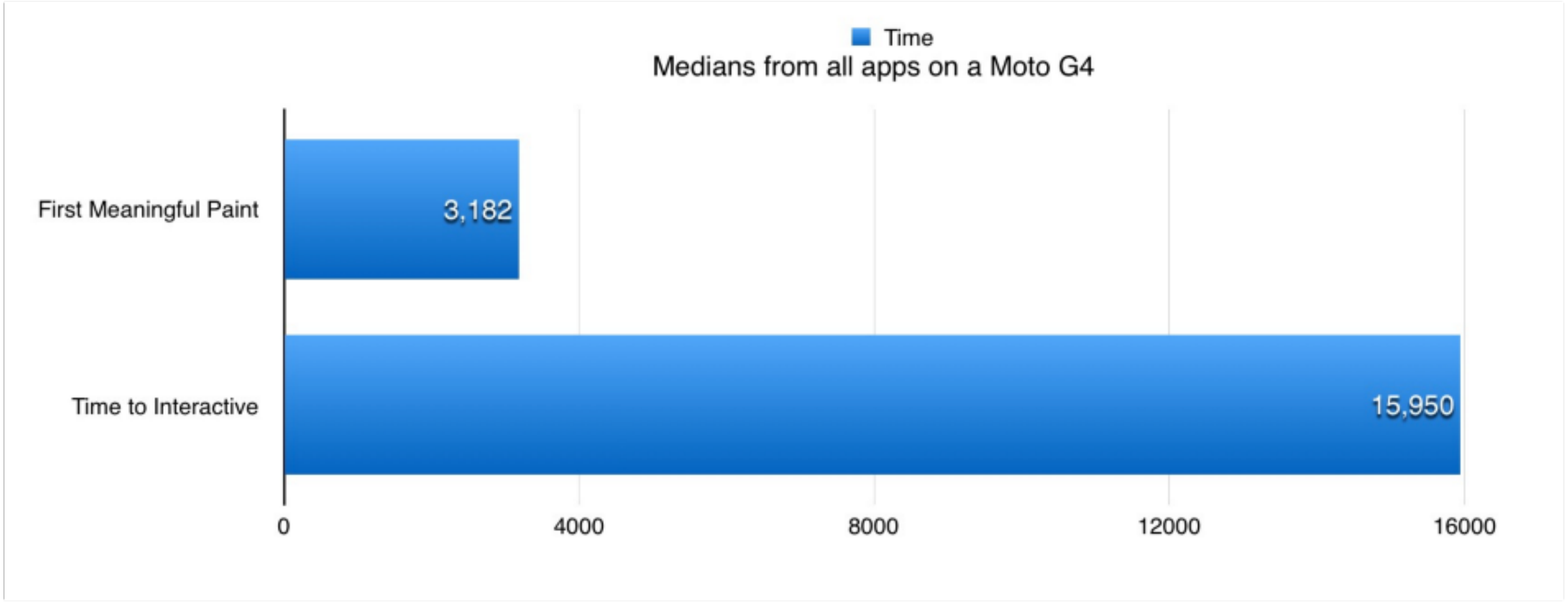

JS apps became interactive in 16s on average mobile hardware over 3G

On desktop, most took 8 seconds to be fully usable on a cable connection.

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EXERCISE 1: LET'S LOOK AT THE CRP OF A PAGE

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HOW TO HALVE LOAD TIMES WITH ONE WEIRD TRICK: NO JAVASCRIPT

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async

defer

LAST RESORT
BOTTOM OF THE PAGE

MAKING JS SMALLER

» Webpack

» Google's Closure Compiler

» Using smaller libraries

EXERCISE 2: IDENTIFYING JS BLOCKING

CODERWALL

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OPENSTREETMAP

RUBYGEMS.ORG

INLINING CSS

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CSS IN THE BODY

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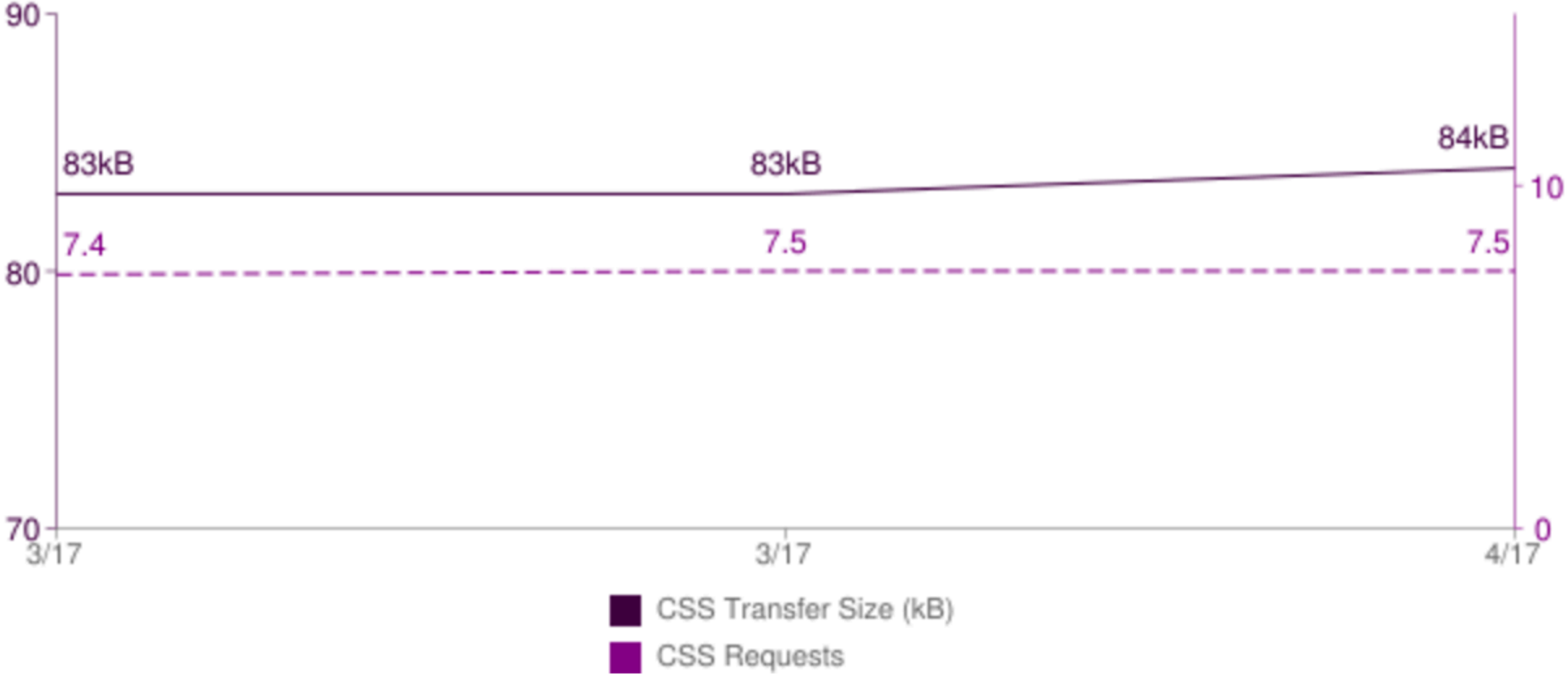
CSS Transfer Size & CSS Requests



EXERCISE 3: LOOKING FOR BLOCKING CSS

HN

RUBYGEMS.ORG

HTTP/2

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PARALLELIZING MANY RESOURCES

SIDEKIQ.ORG

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SERVER PUSH

LINK HEADERS

```
Link: </css/style.css>; rel=preload;
```

1. application.js and application.css
2. Things which cannot be cached
3. Next pages
4. Redirects

rackhttppreload

RUBYGEMS.ORG

STREAMING RESPONSES

DOESN'T ACTUALLY WORK (LOL)

WEBFONTS

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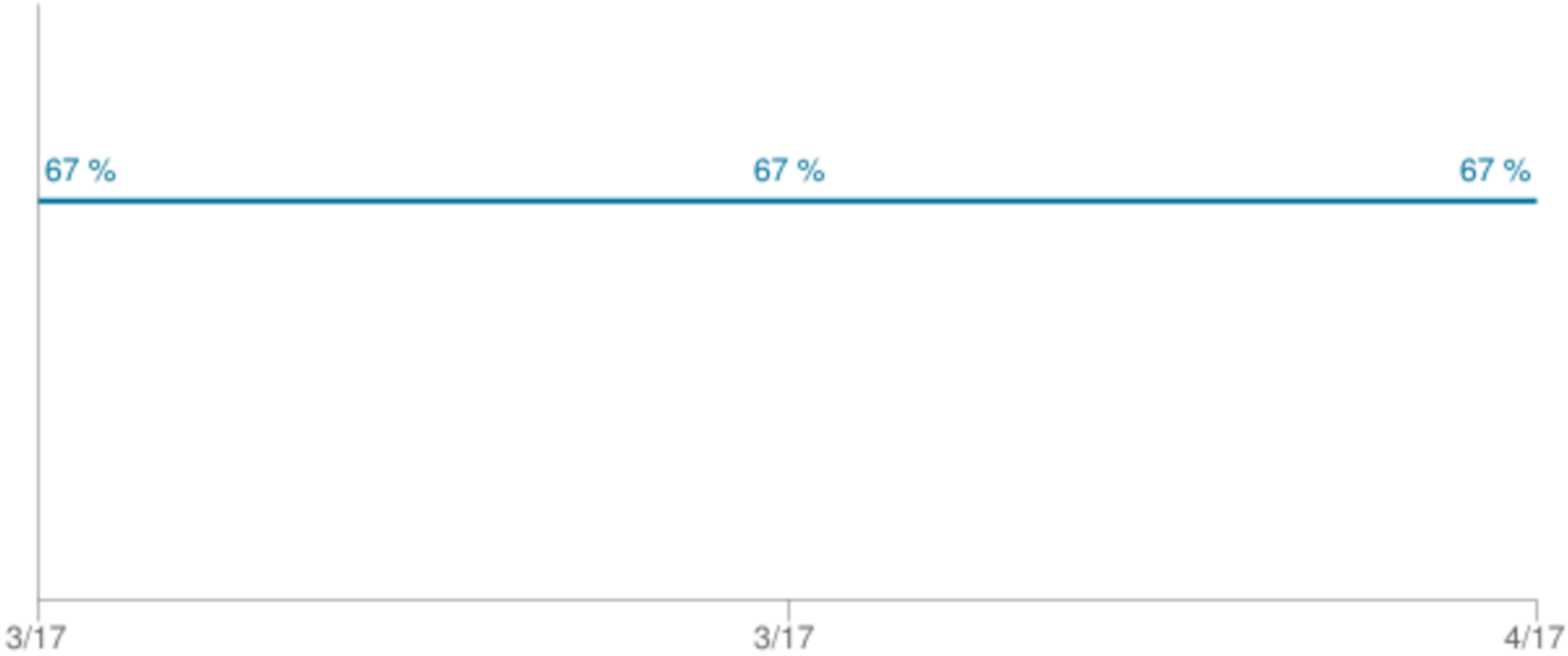
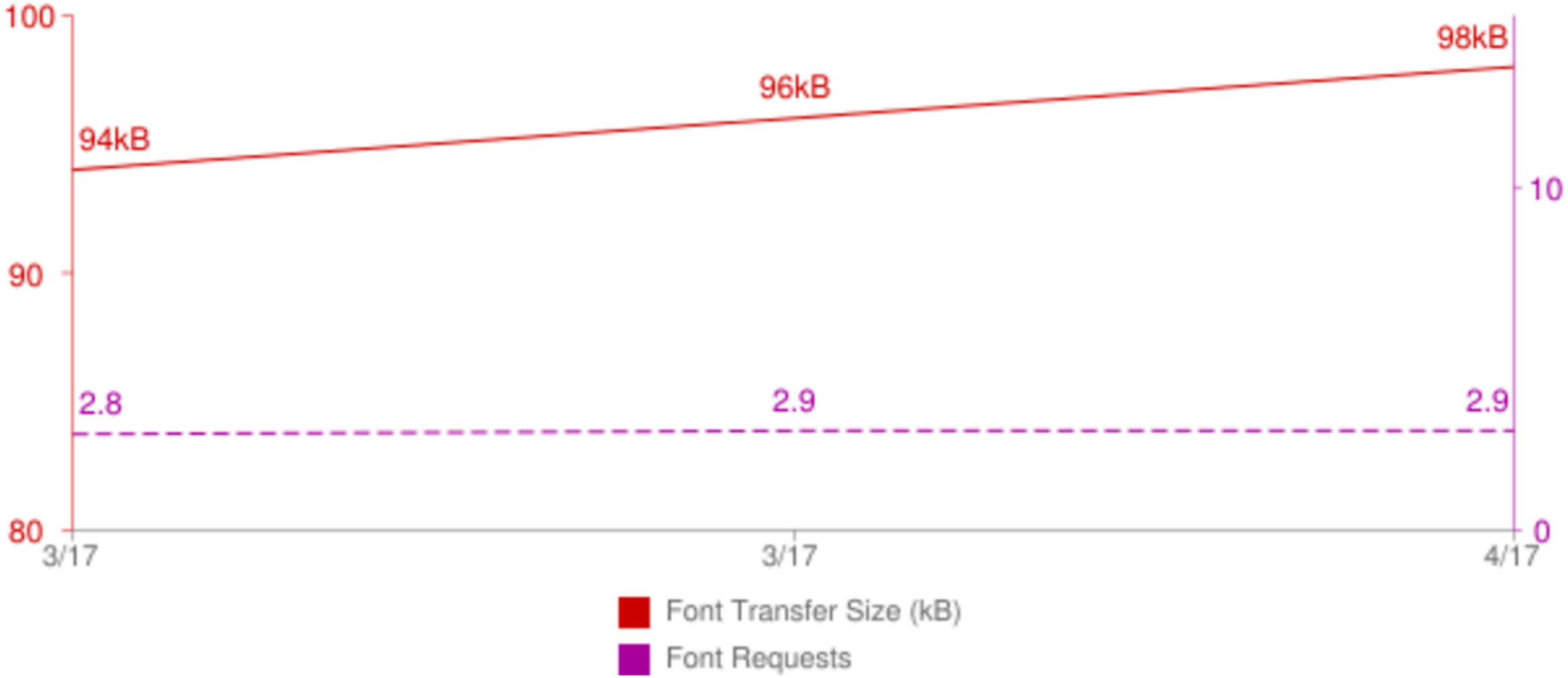
Sites with Custom Fonts



Font Transfer Size & Font Requests



Basecamp

Rubygems.org

» Use Webfonts as spice, not filler.

» Don't use Typekit (blocking JS)

» Just use Google WebFonts

HTTP CACHING

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```
$(document).ready();
```

BIG DOMS

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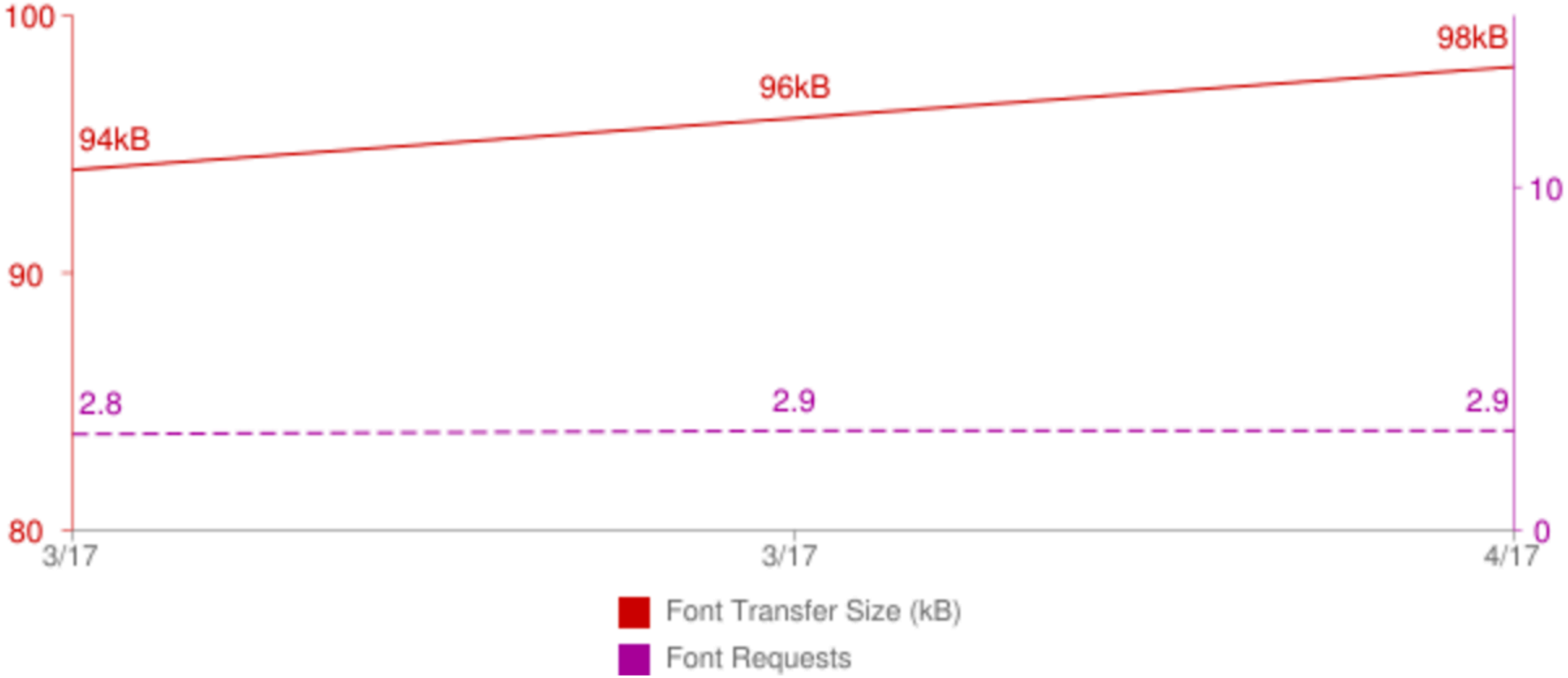
100 Avoids an excessive DOM size**: 212 nodes** (target: 1,500 nodes)

▼ More information

Total DOM Nodes	DOM Depth	Maximum Children
212	11	37
target: < 1,500 nodes	*target: < 32*	*target: < 60 nodes*

IMAGE OPTIMIZATION

Font Transfer Size & Font Requests



SCRIPT DISCOVERY AND preload

```
<link rel="preload" href="/styles/other.css" as="style">
```

1. Find blocking JavaScript
2. Find blocking CSS and WebFonts
3. Preload late-discovered resources
4. Optimize images
5. Add server push and/or HTTP/2
6. Analyze startup performance (document.ready)
7. Check HTTP caching

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