nccgroup
Web Performance

The five stages of JavaScript performance grief

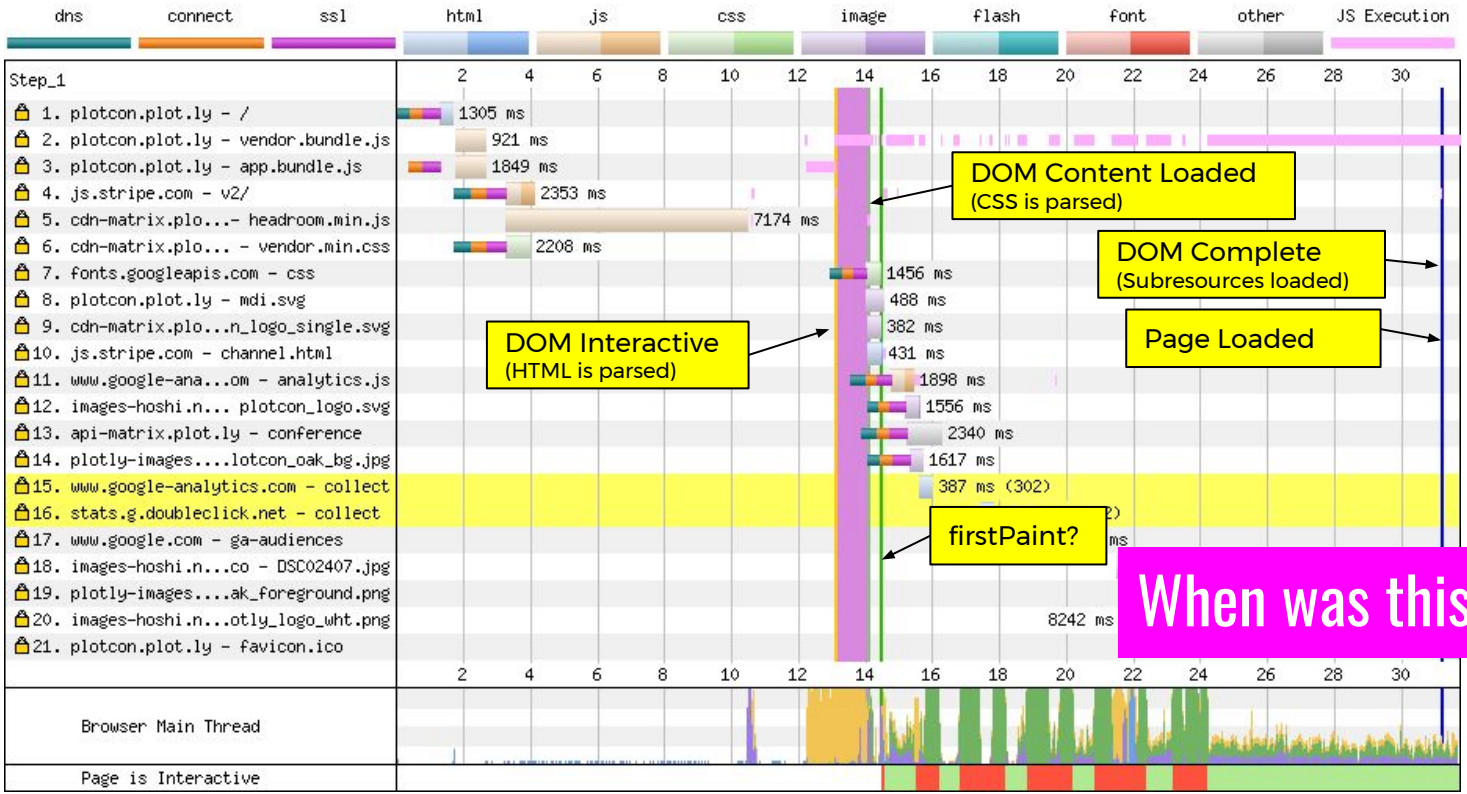
Measuring ‘Speed’

You have to measure

Real User

performance

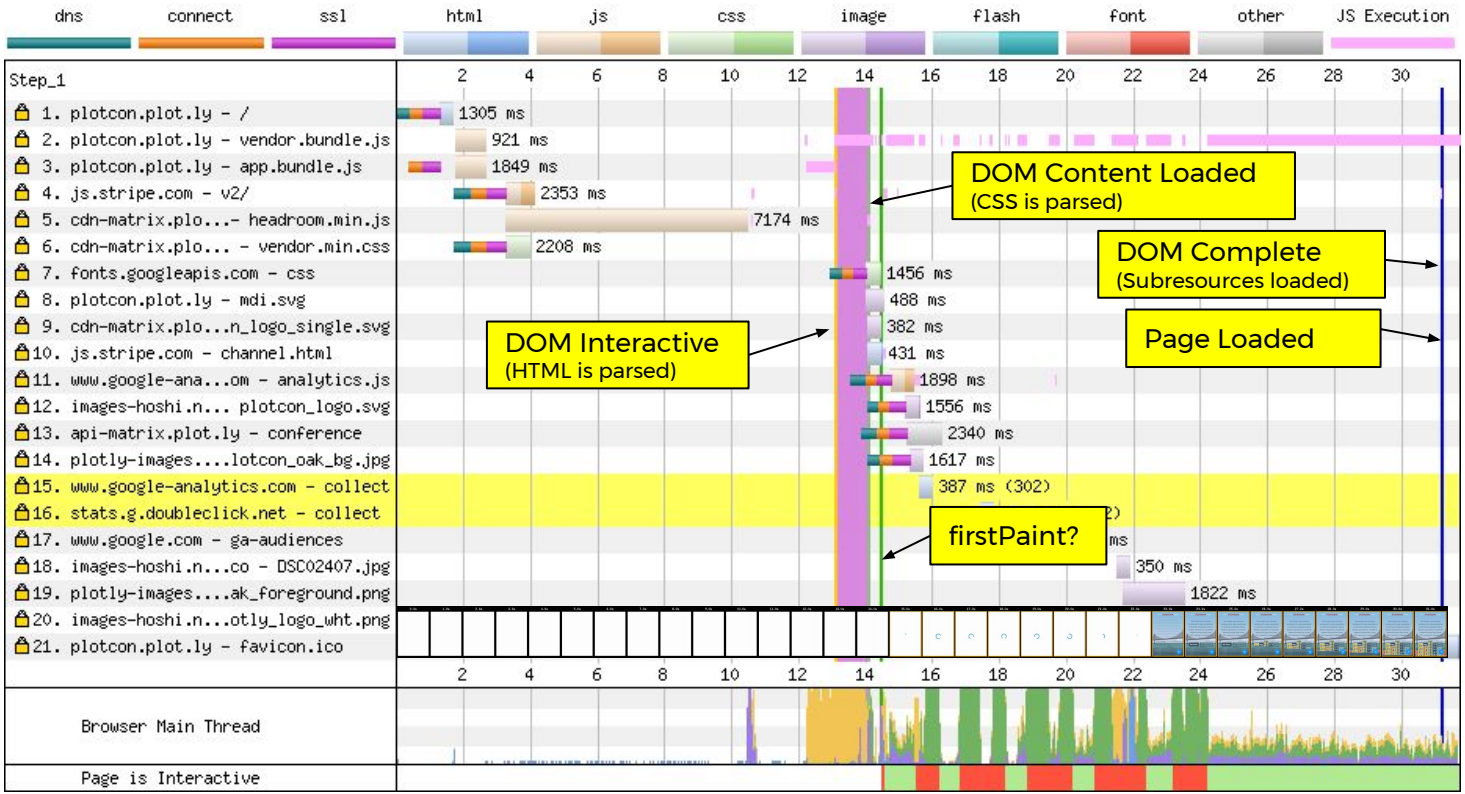
Nav Timings in WebPageTest



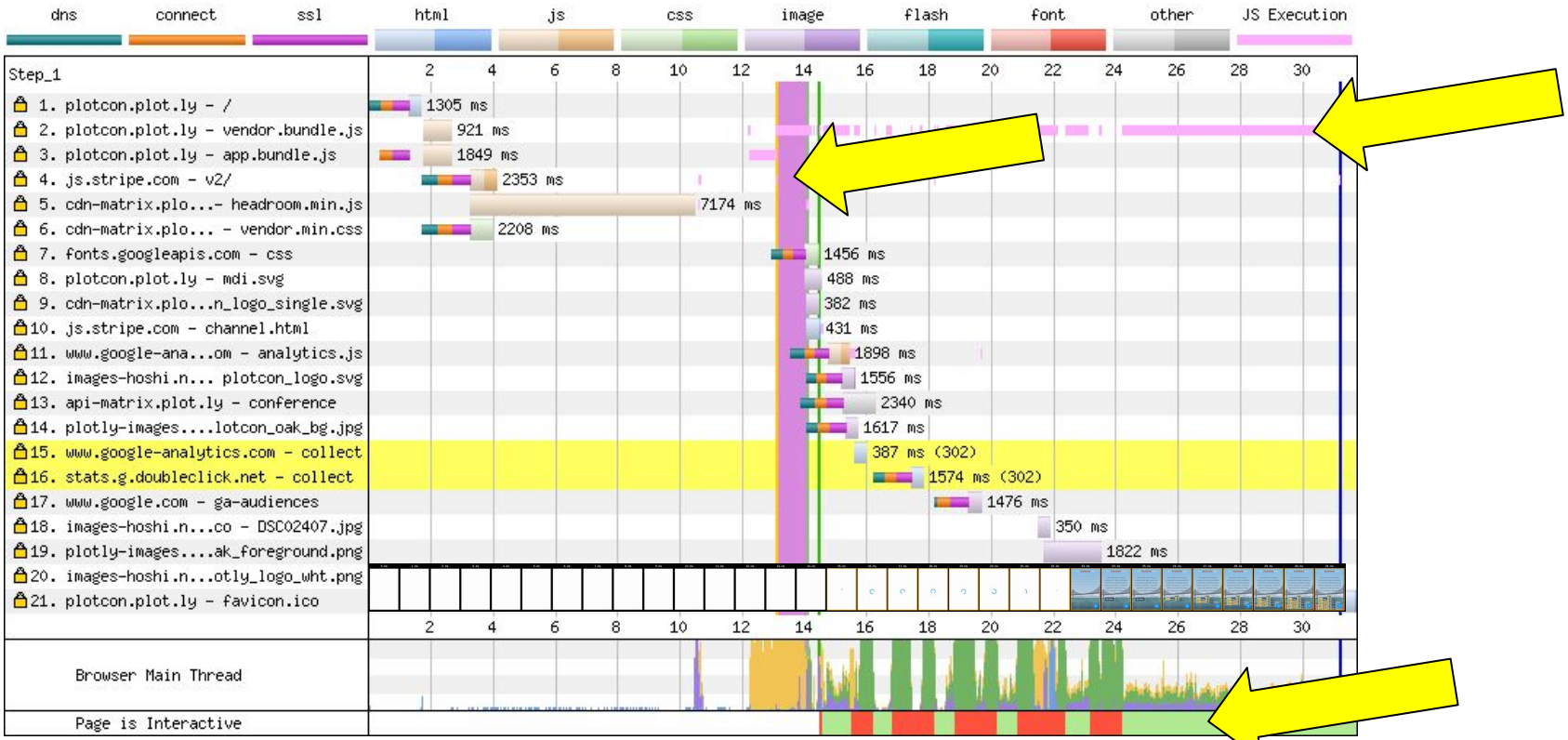
When was this page usable?

plotcon.plot.ly tested on Moto G4 @ 3G

Nav Timings in WebPageTest



Nav Timings in WebPageTest

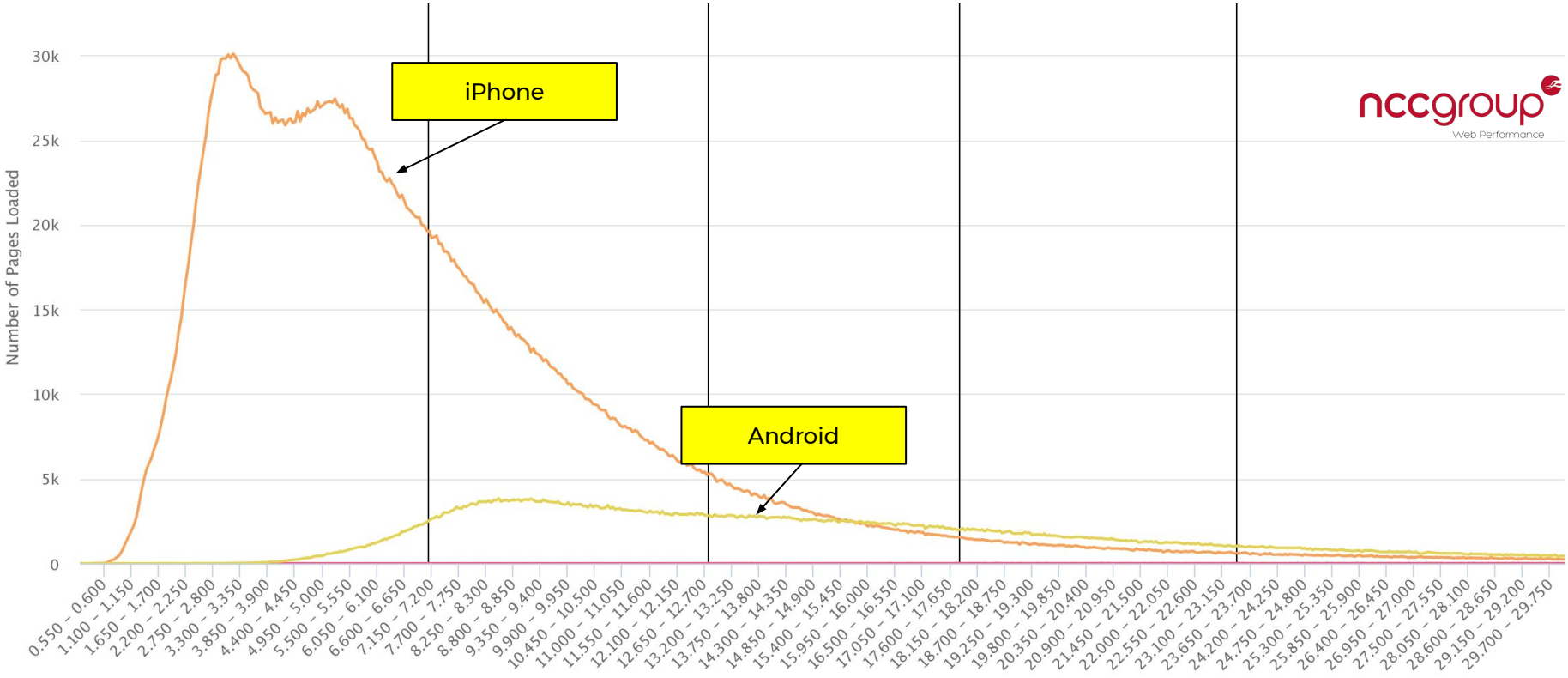


plotcon.plot.ly tested on Moto G4 @ 3G

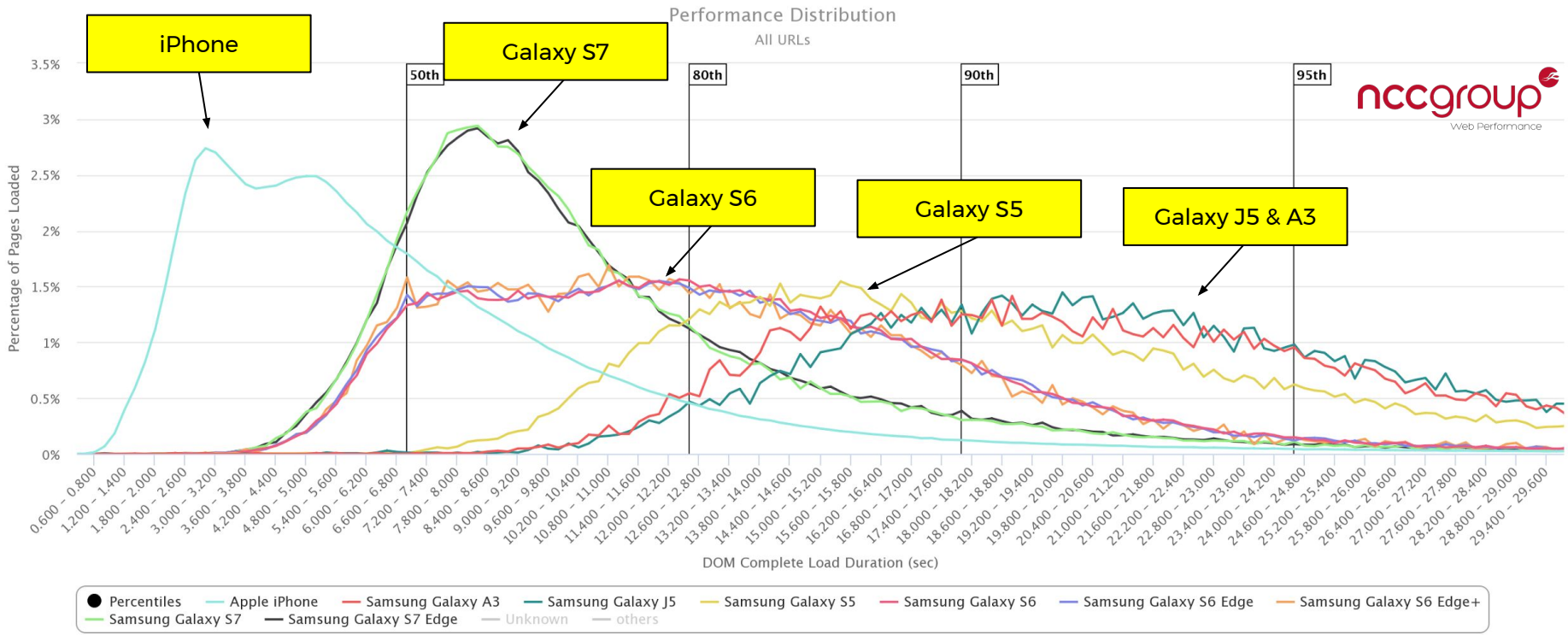
Navigation Timing API

https://goo.gl/6sbQX5

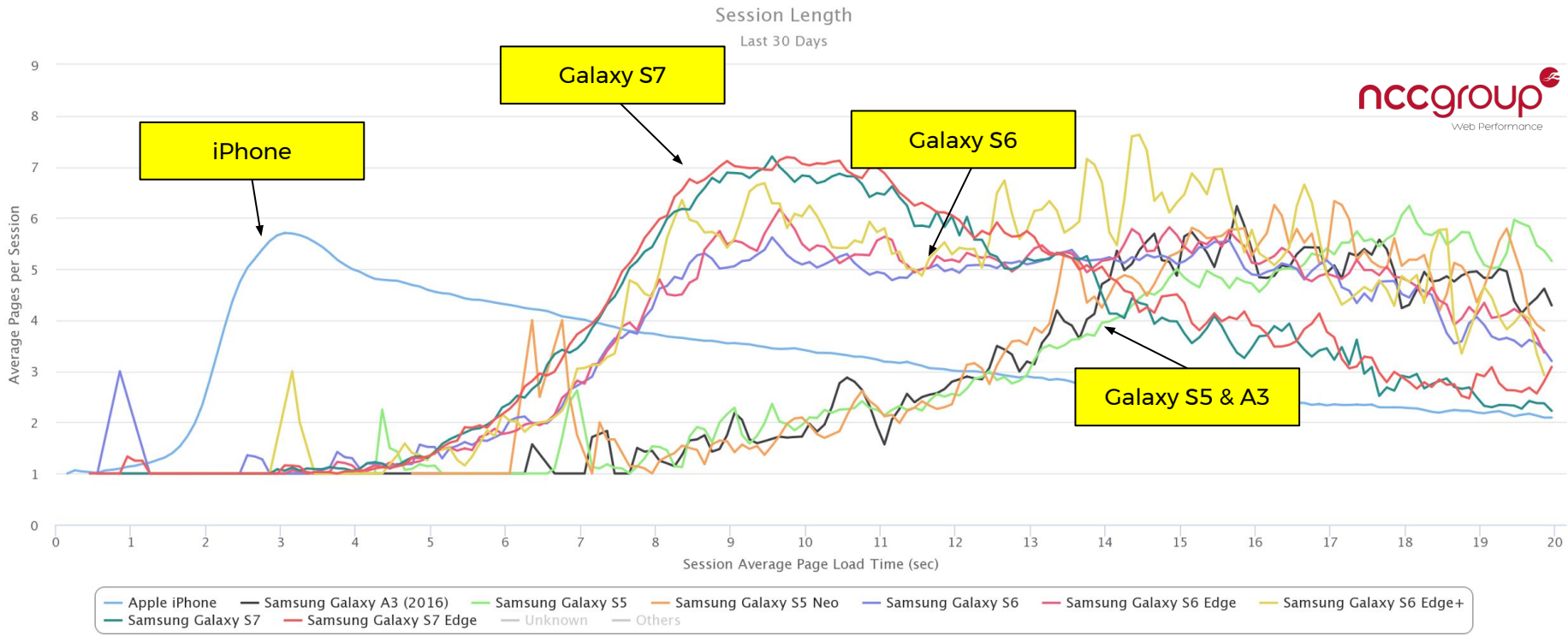
Distributions tell a story (Smartphone OS)



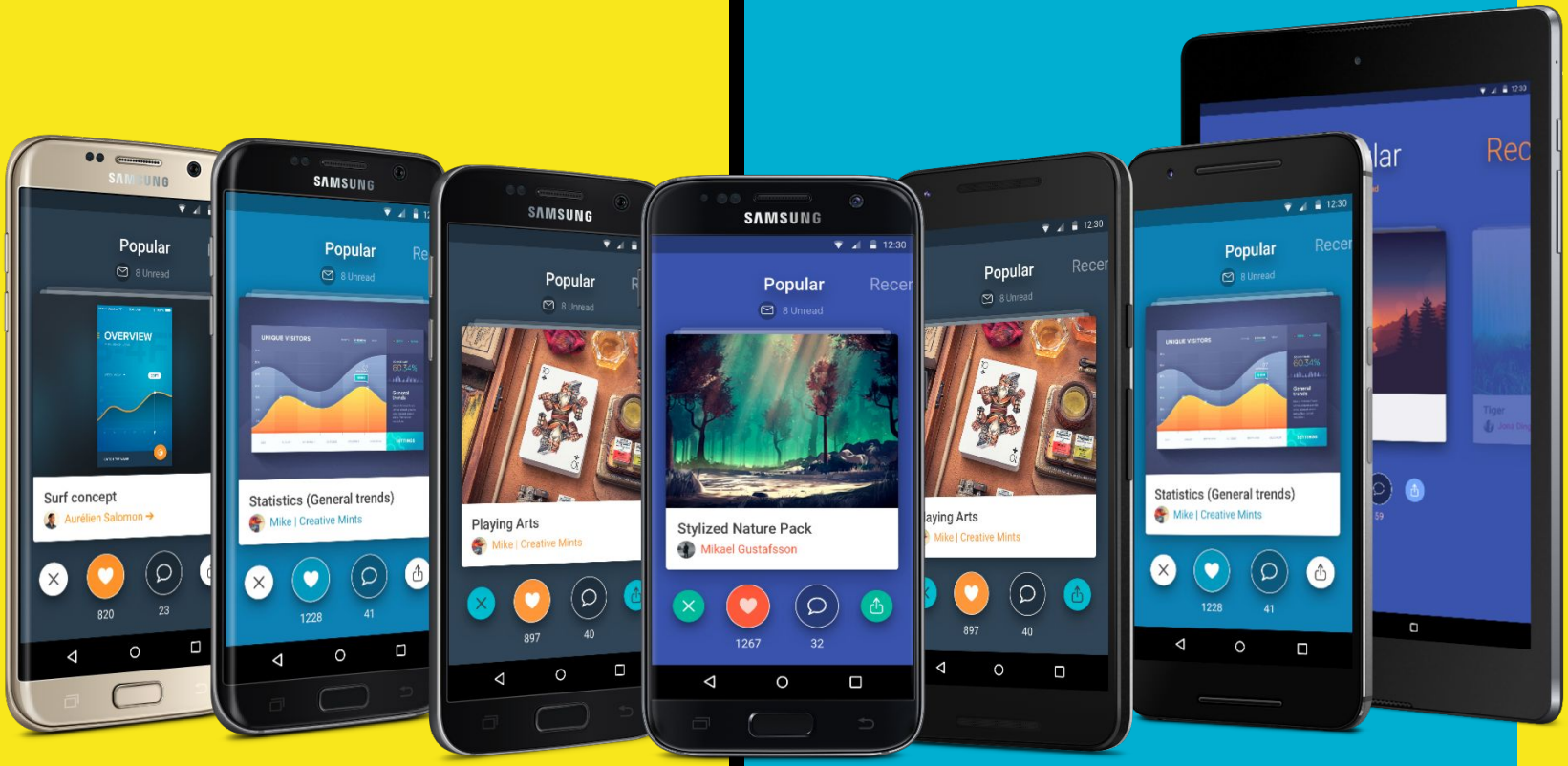
Distributions tell a story (Top 10 Models)



Distributions tell a story (Engagement by Model)



There were 25,000 unique Android devices detected in 2015



Only 15 iPhone models have ever been produced

. . .

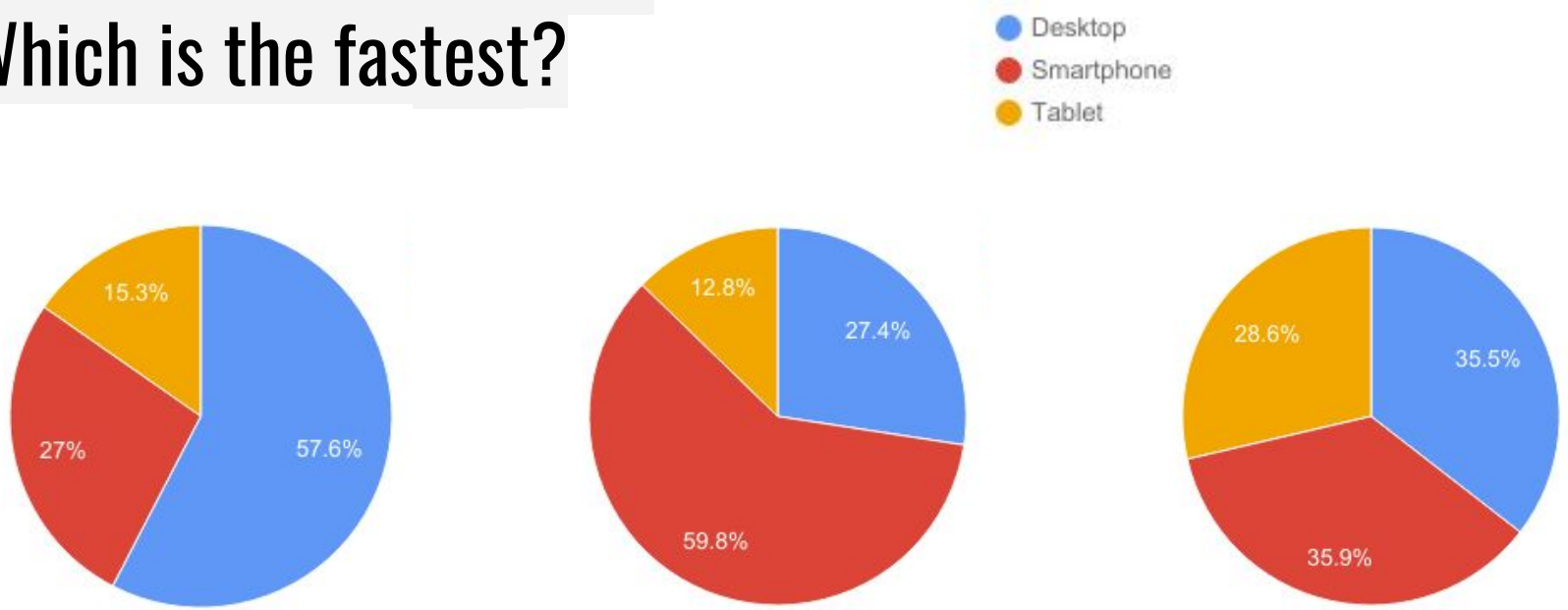
The five stages of grief

Denial
Bargaining
Anger
Depression
Acceptance

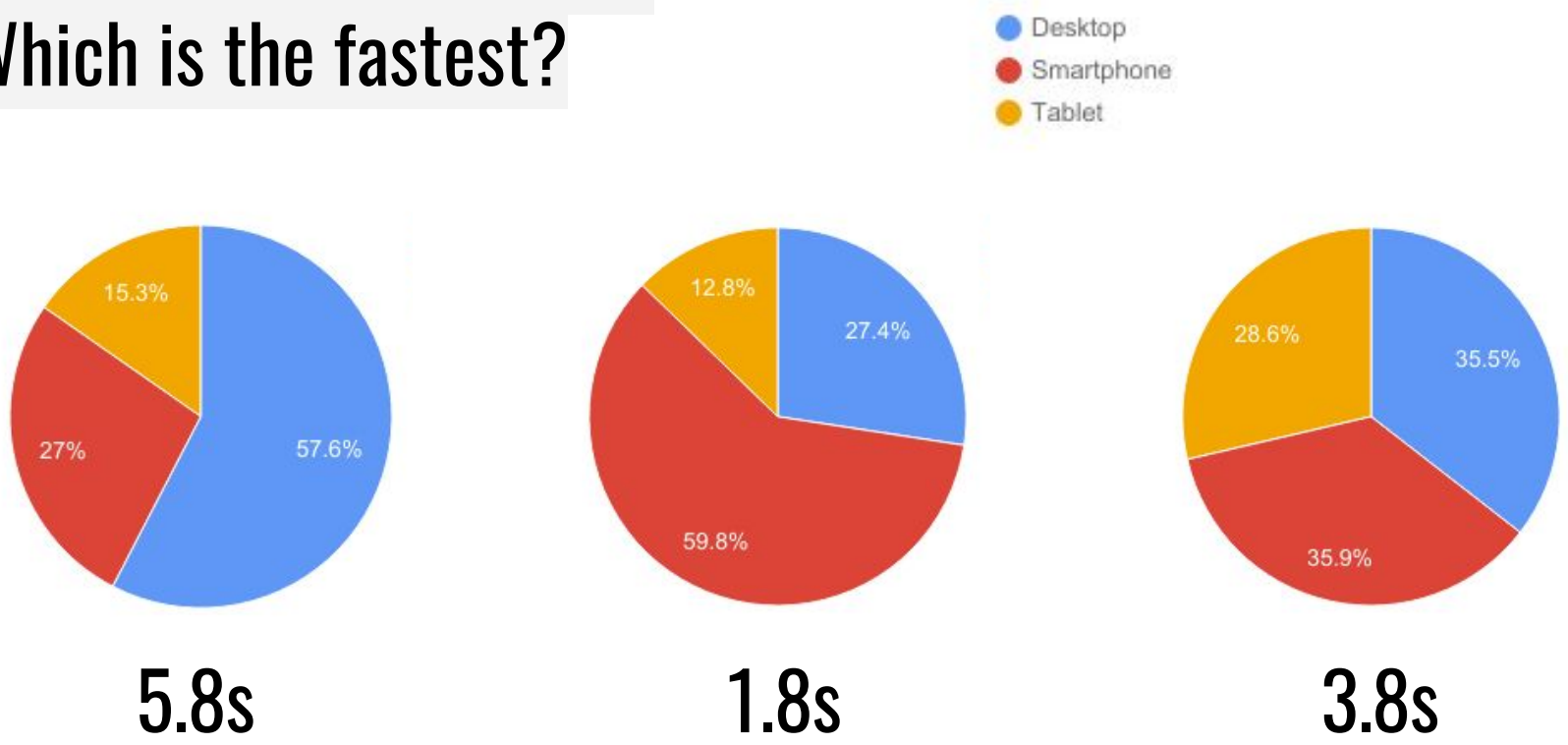
Denial

We don’t have much Smartphone traffic

Three large UK retailers. Which is the fastest?



Three large UK retailers. Which is the fastest?



5.8s

1.8s

3.8s

Median smartphone DOM Content Loaded time

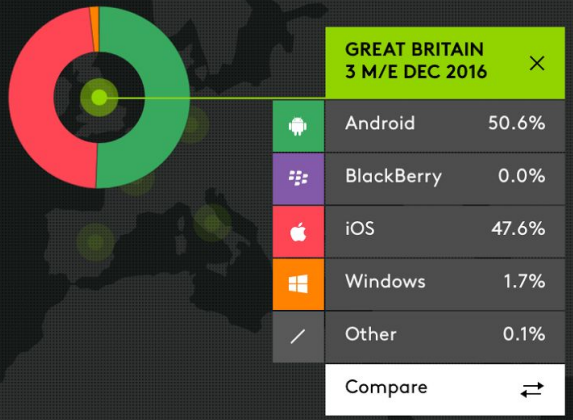
Sites with faster mobile experiences have more mobile traffic

We don’t have much Android traffic

Smartphone OS sales market share

Read our expert's latest commentary

iOS and Android push towards a Two-OS world



https://www.kantarworldpanel.com/global/smartphone-os-market-share/

53%

of mobile visits over 3 seconds are abandoned

https://www.doubleclickbygoogle.com/articles/mobile-speed-matters/

53%

of mobile visits over 3 seconds are abandoned

like, proper lost

https://www.doubleclickbygoogle.com/articles/mobile-speed-matters/

53%

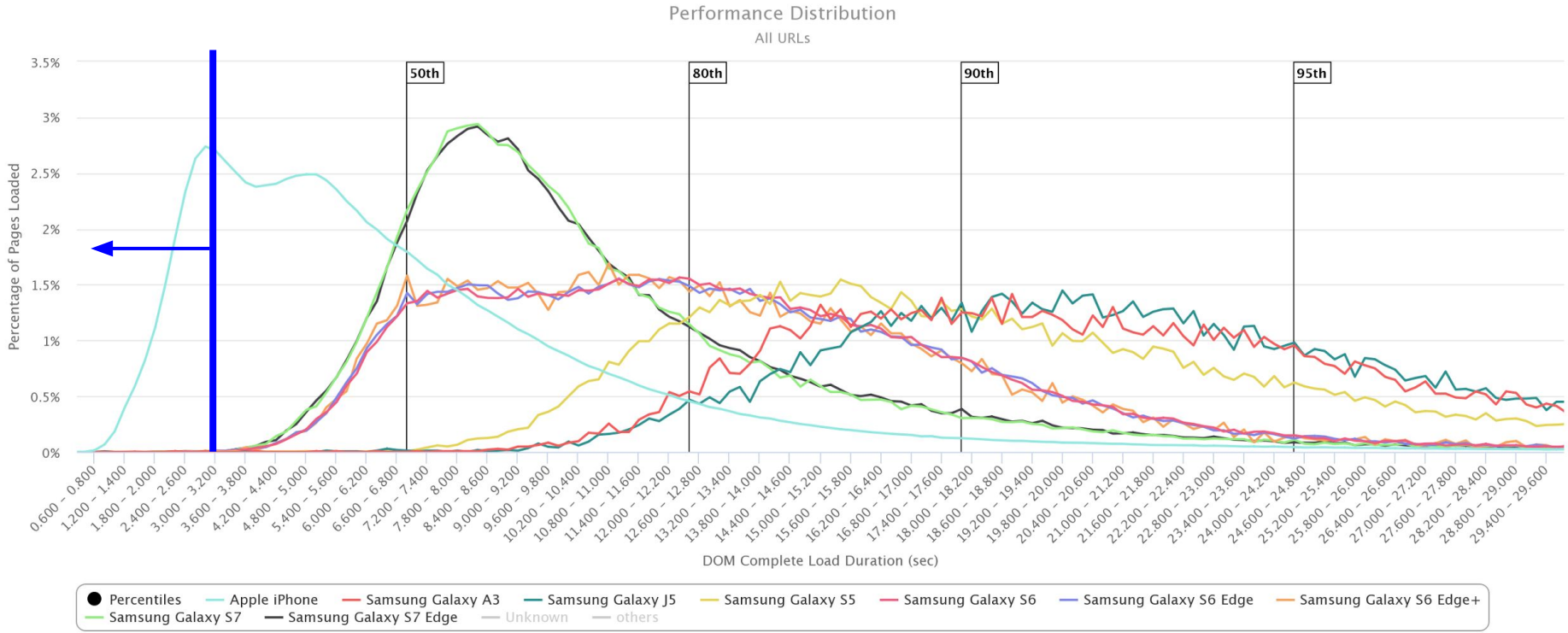
of mobile visits over 3 seconds are abandoned

like, proper lost

not bounces, just *silent echoes in an analytics void*

https://www.doubleclickbygoogle.com/articles/mobile-speed-matters/

Three seconds...



Android doesn’t convert as well as iPhone

The Android-iOS conversion rate gap is now a mere 5%

MoovWeb - Q1 2015

The Android-iOS conversion rate gap is now a mere 5%

(Android users want to buy things, who knew?)

MoovWeb - Q1 2015

Denial - Summary

- Android & iPhone traffic *should* be equal
- Android & iPhone conversions *should* be equal
- Android bounce rate is likely understated
- Question assumptions about your users

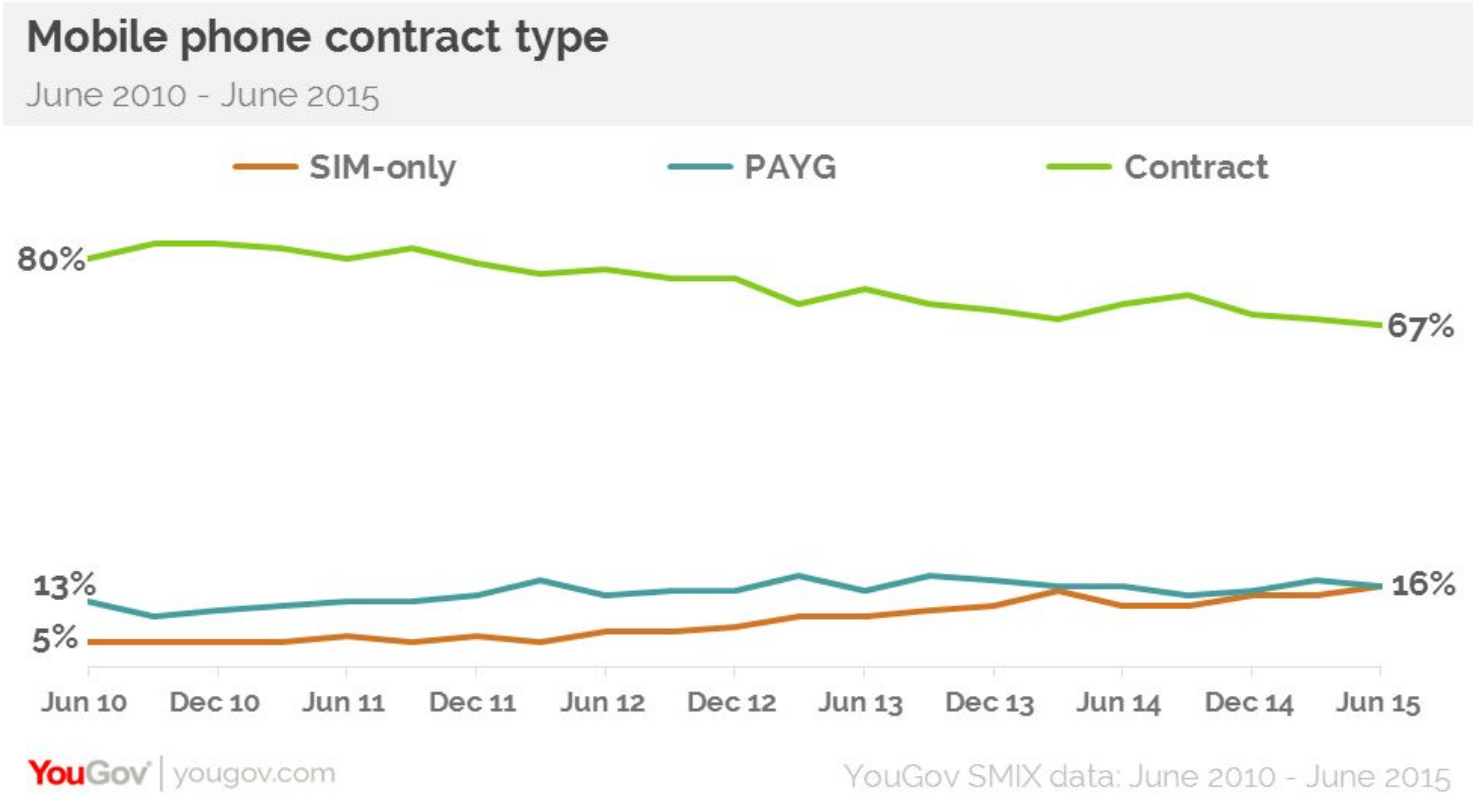
Bargaining

Android devices are getting faster

The Galaxy S8 is only
15% faster than the Galaxy S6.

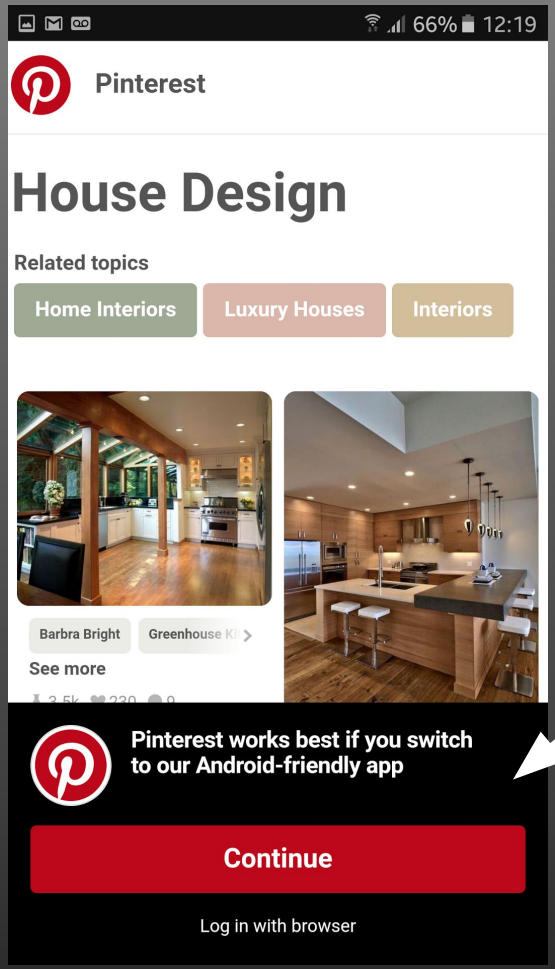
It’s 3x slower than the iPhone 7

People are moving to PAYG

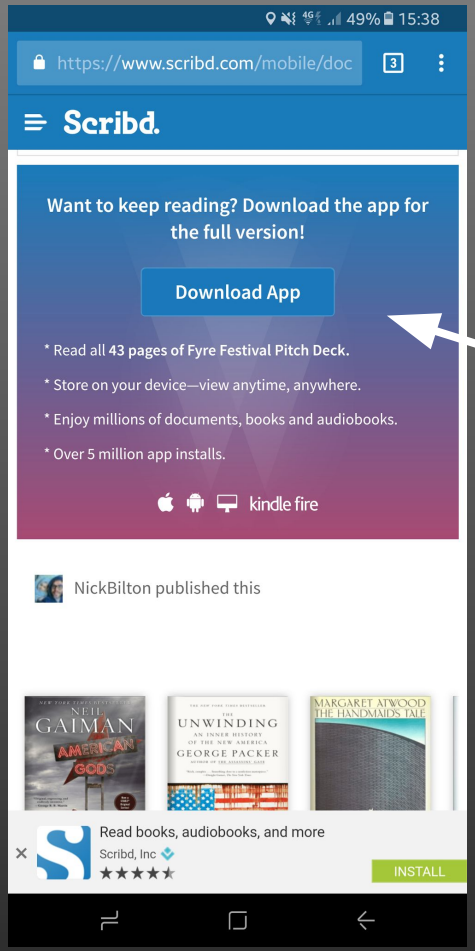


27% of ‘techies’ have old phones

We've got an app!

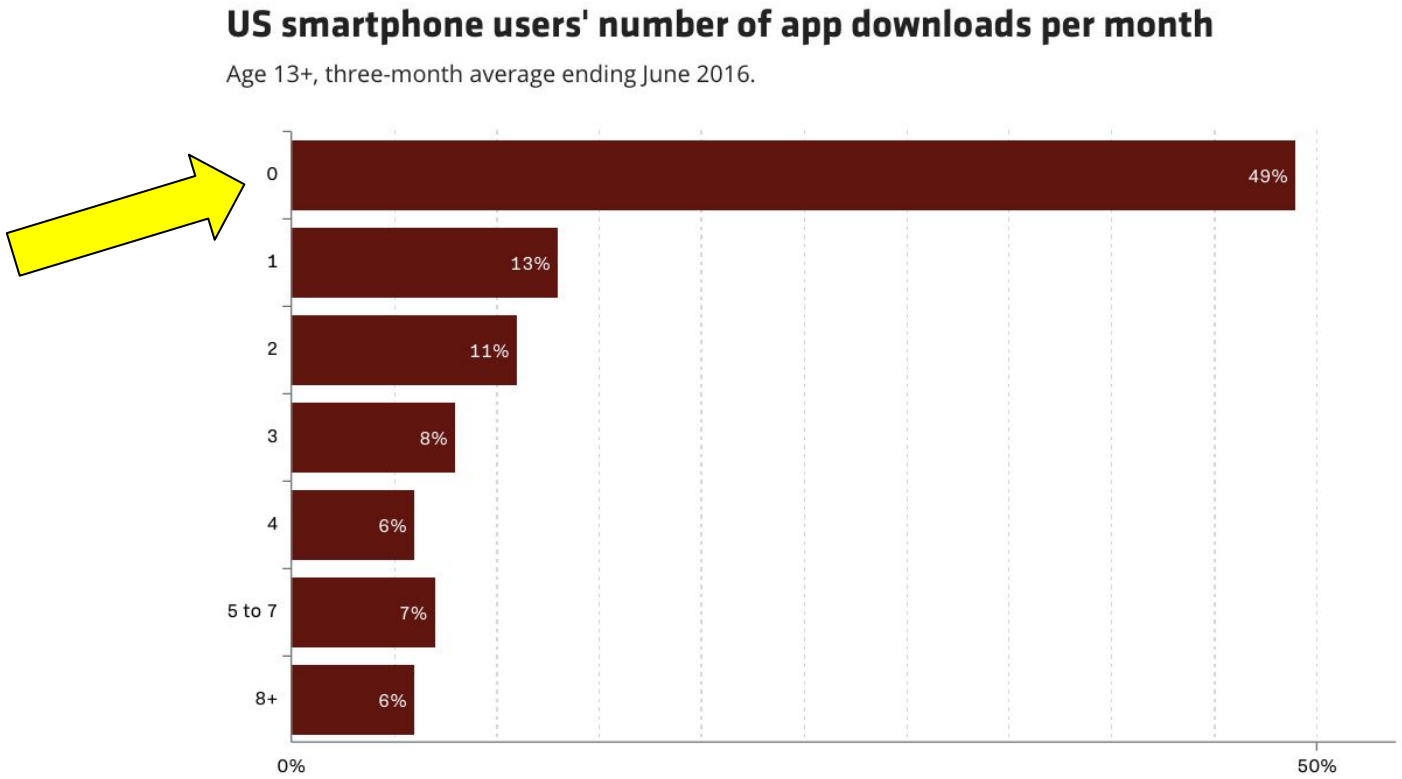


That takes guts



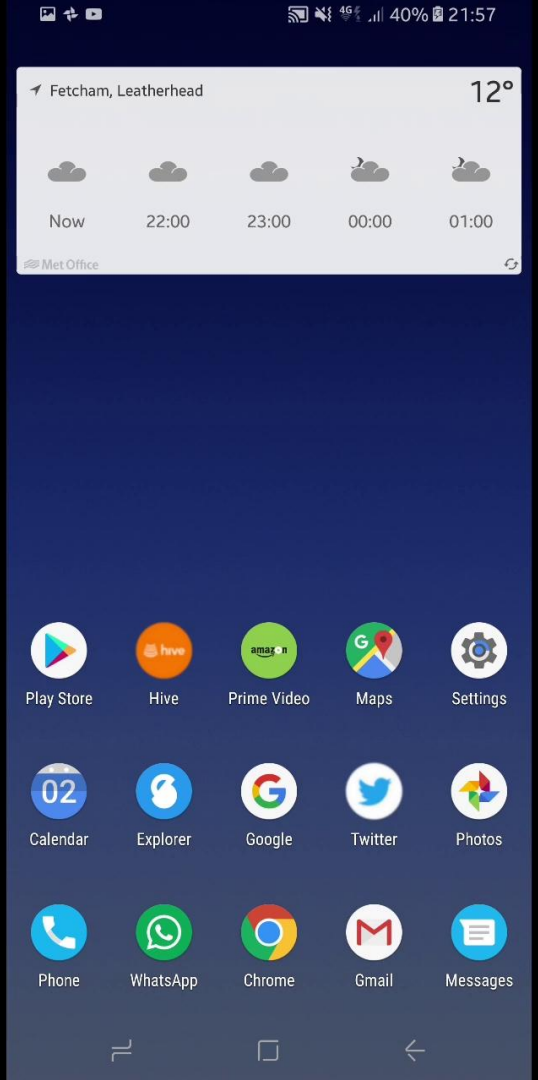
That takes guts

Average # apps downloaded per month?



People with cheap phones expect a slow experience

Your website competes with native applications

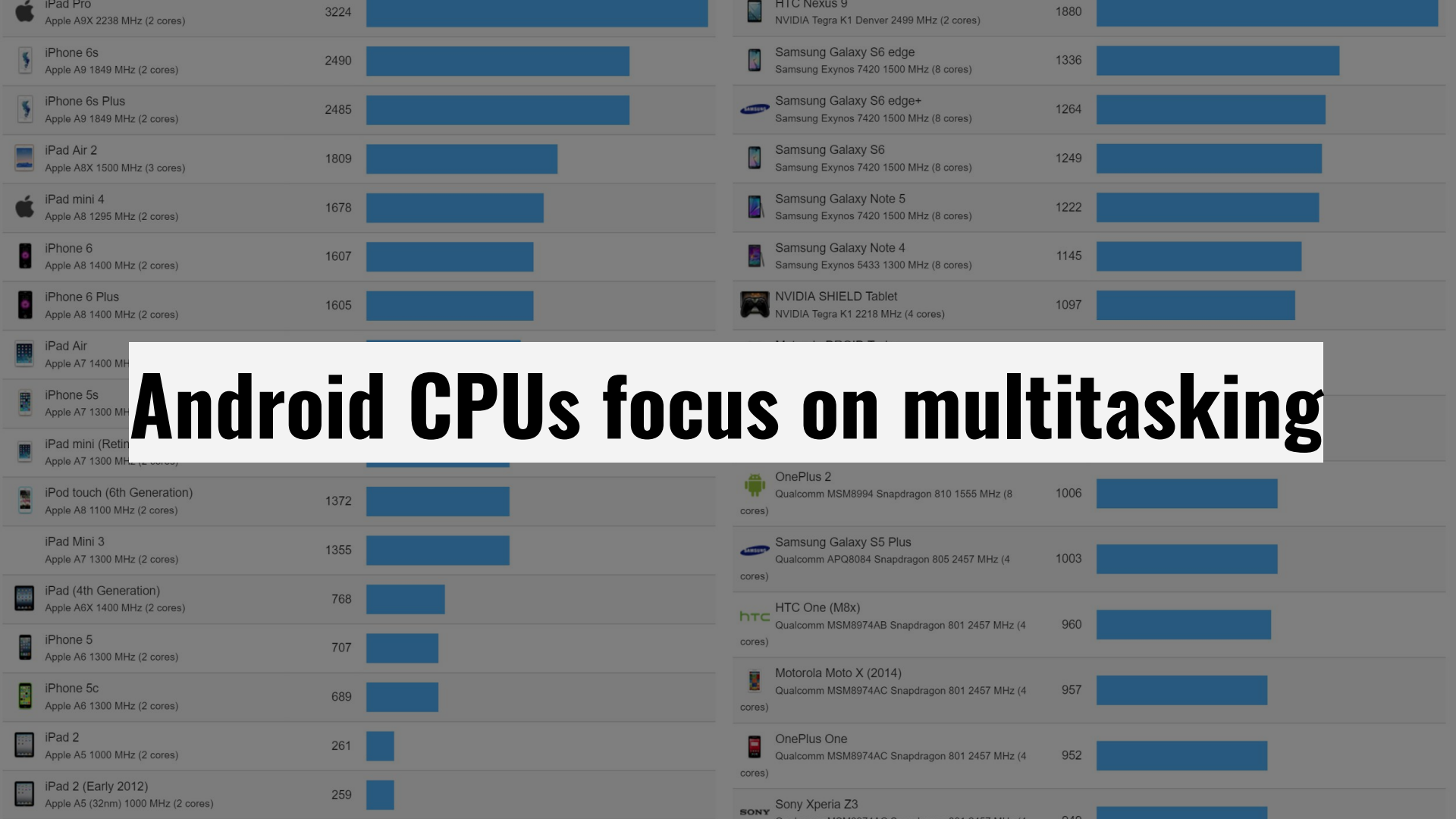

40% 21:57
Fetcham, Leatherhead
12°
Now
22:00
23:00
00:00
01:00
Met Office
Play Store
Hive
Prime Video
Maps
Settings
Calendar
Explorer
Google
Twitter
Photos
Phone
WhatsApp
Chrome
Gmail
Messages

Bargaining

- Do not assume that devices will catch up
- Users won’t install your app
- Users with slow devices still expect fast websites!

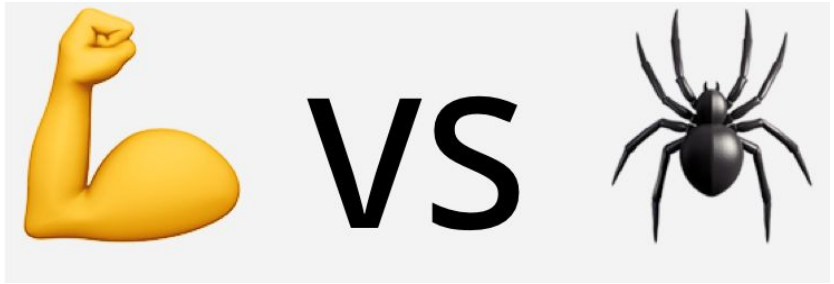
Anger

Why is Android so slow?!



Android CPUs focus on multitasking

iPhone vs Android



Whose job is it?

Anger

- Android devices are slower than iPhones :(
- Lack of ownership of the problem

Depression

Why did we choose Angular?

Legit stock photo

Optimising for everything is hard

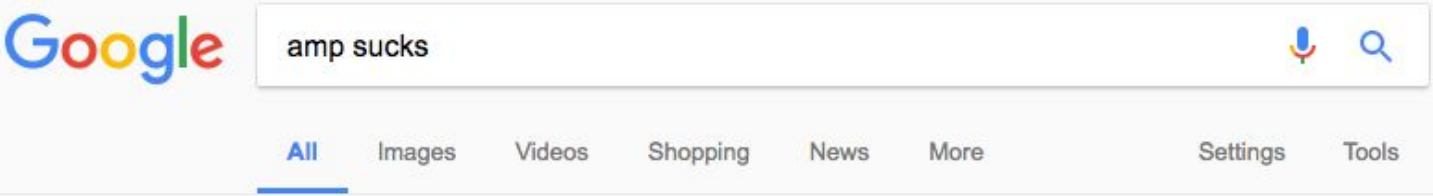
Responsive web design *squishes* desktop sites onto mobile viewports

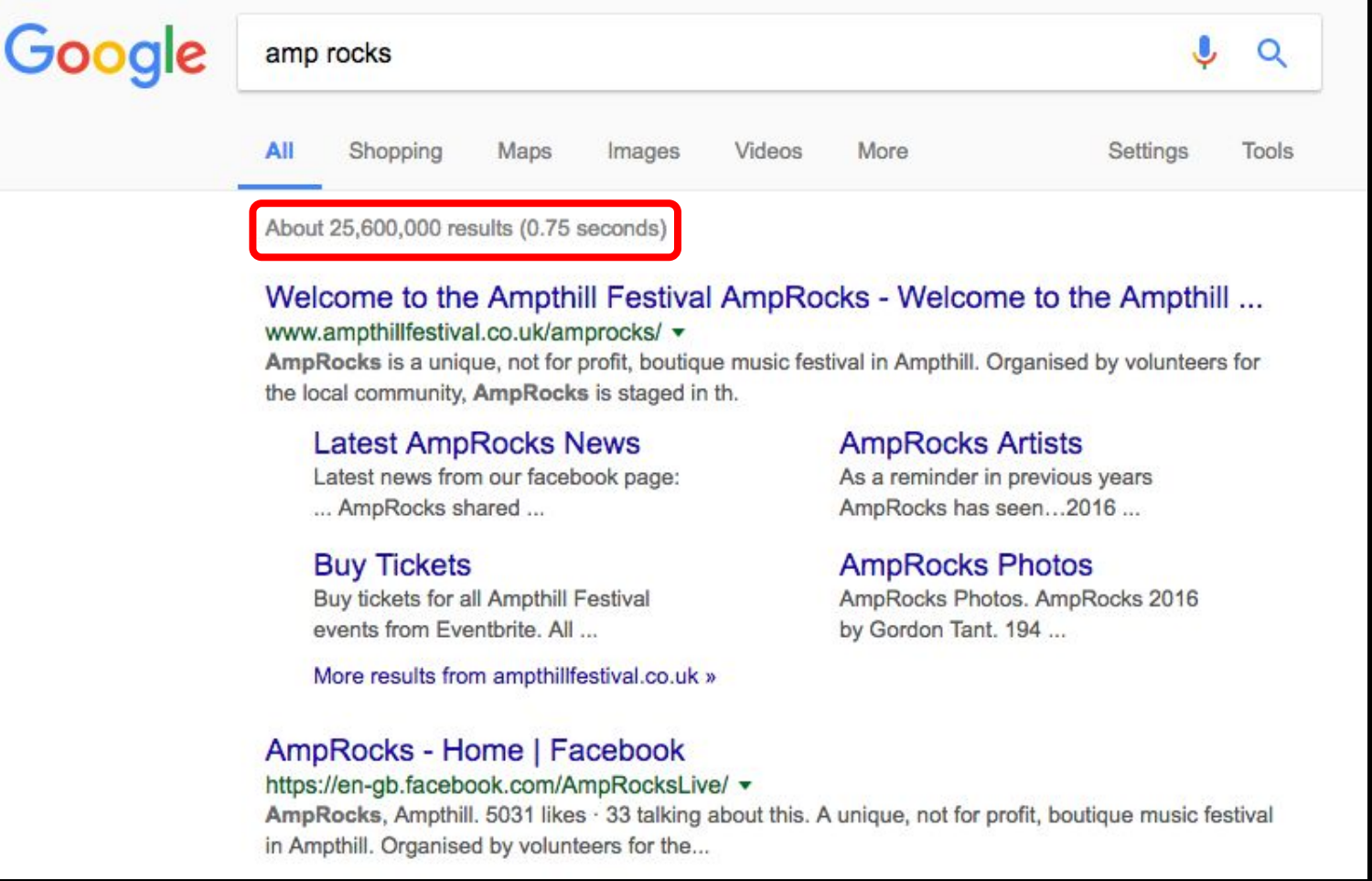
AMP :(

Instant. Everywhere.

For many, reading on the mobile web is a slow, clunky and frustrating experience - but it doesn't have to be that way. The Accelerated Mobile Pages (AMP) Project is an open source initiative that embodies the vision that publishers can create mobile optimized content once and have it load instantly everywhere.

https://www.ampproject.org/


Google
amp sucks
All
Images
Videos
Shopping
News
More
Settings
Tools
About 23,400,000 results (0.95 seconds)
The Problem With Google AMP - Slashdot
https://tech.slashdot.org/story/17/01/18/1455259/the-problem-with-google-amp
18 Jan 2017 - Kyle Schreiber has raised some issues about Google's AMP (Accelerated Mobile Pages), an open ... AMP sucks ass, everybody knows that.
Google AMP SUCKS - Google Product Forums
https://productforums.google.com/forum/#!topic/webmasters/...amp%7Csort...
28 Nov 2016 - 2 posts - 2 authors
Google AMP sucks how do I disable this? I am not gonna take pictures or tell you what websites arnt working because its all of them, I can't ...
How to turn off accelerated mobile pages / AMP? - Google Product ...
productforums.google.com/d/topic/news/ixPneB4vpGk
31 Mar 2016 - 100+ posts - 77 authors
These amp pages really suck! They don't open properly, scroll down properly, don't link properly, and don't save as bookmarks properly!
Google AMP sucks : webdev - Reddit
https://www.reddit.com/r/webdev/comments/5i6ybb/google_amp_sucks/
13 Dec 2016 - It's on reddit now, so when I search for posts it pulls up the AMP version and I cant login or reply or anything. Is there a way to set an option...


Google
amp rocks
All
Shopping
Maps
Images
Videos
More
Settings
Tools
About 25,600,000 results (0.75 seconds)
Welcome to the Ampthill Festival AmpRocks - Welcome to the Ampthill ...
www.ampthillfestival.co.uk/amprocks/
AmpRocks is a unique, not for profit, boutique music festival in Ampthill. Organised by volunteers for the local community, AmpRocks is staged in th.
Latest AmpRocks News
Latest news from our facebook page: ... AmpRocks shared ...
AmpRocks Artists
As a reminder in previous years AmpRocks has seen…2016 ...
Buy Tickets
Buy tickets for all Ampthill Festival events from Eventbrite. All ...
AmpRocks Photos
AmpRocks Photos. AmpRocks 2016 by Gordon Tant. 194 ...
More results from ampthillfestival.co.uk »
AmpRocks - Home | Facebook
https://en-gb.facebook.com/AmpRocksLive/
AmpRocks, Ampthill. 5031 likes · 33 talking about this. A unique, not for profit, boutique music festival in Ampthill. Organised by volunteers for the...

Acceptance

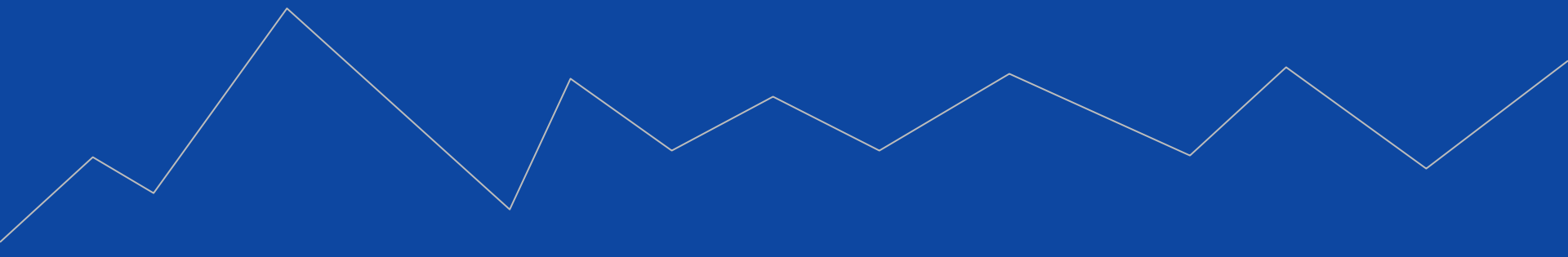
What can we do?

Track JS Execution On Phones

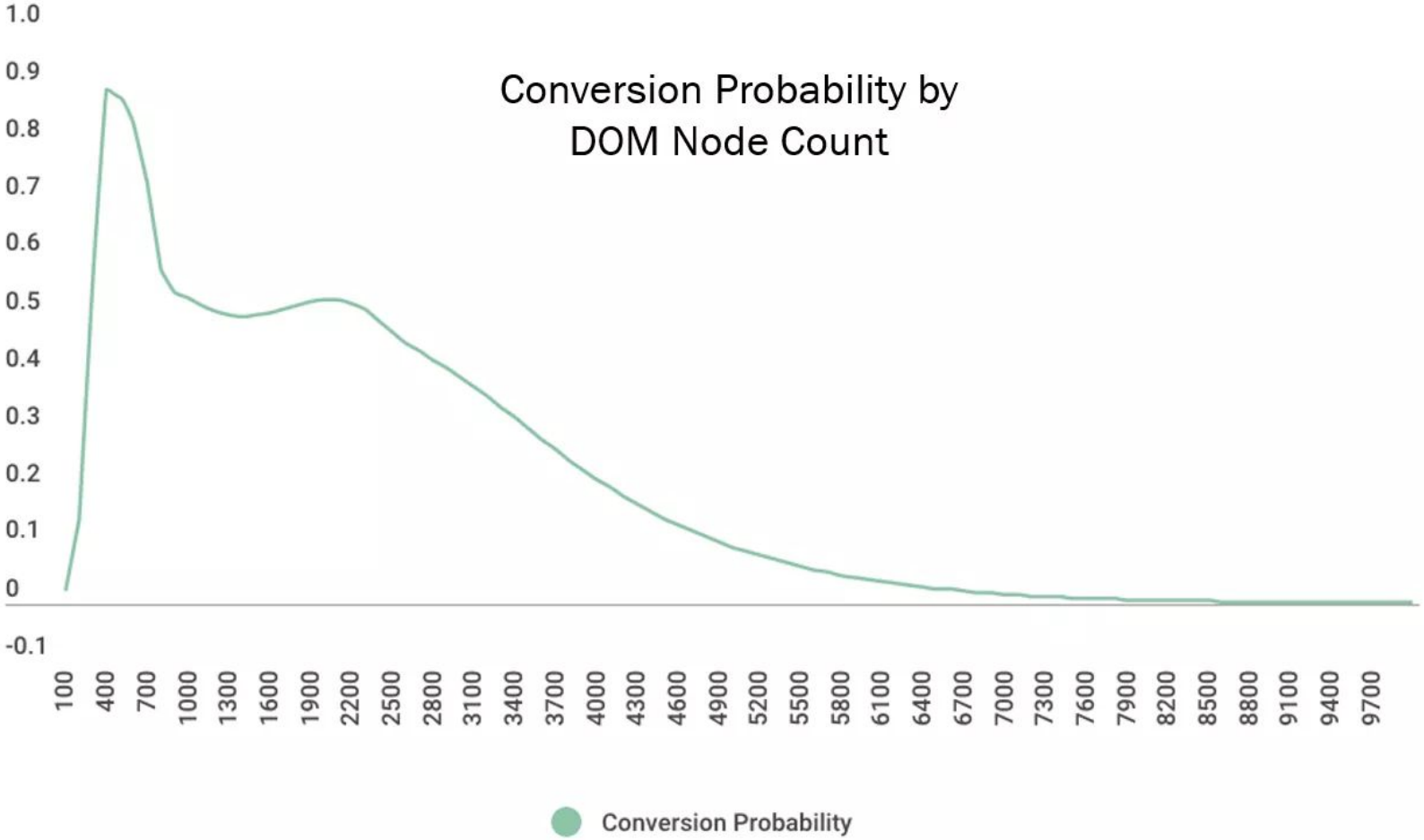
There's no point measuring JS performance on Desktop

Track JS Execution using...

Developer Tools
or WebPageTest
or RUM (https://github.com/SOASTA/measuring-continuity/blob/master/examples/cpu-page-busy.js)



Manage DOM complexity


Conversion Probability by
DOM Node Count
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
-0.1
100
400
700
1000
1300
1600
1900
2200
2500
2800
3100
3400
3700
4000
4300
4600
4900
5200
5500
5800
6100
6400
6700
7000
7300
7600
7900
8200
8500
8800
9100
9400
9700
Conversion Probability

yellowlab.tools has your back

DOM complexity

🔴	DOM elements count	2948
🔴	DOM max depth	26
🟢	Number of iframes	5
🟡	IDs duplicated	2

DOM manipulations

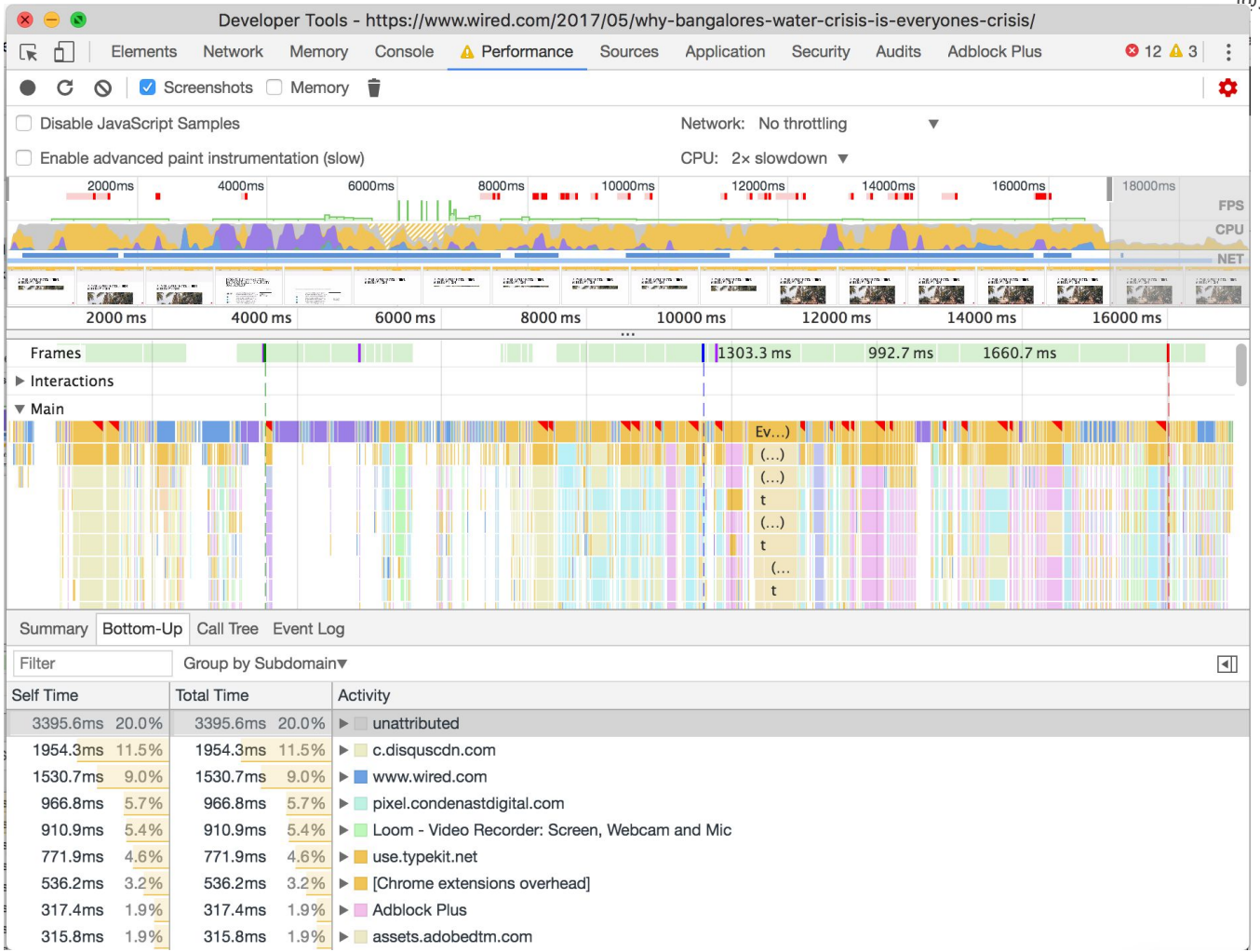
🔴	DOM access	2732
🔴	Queries without result	562 ⚠⚠
🔴	Duplicated DOM queries	885 ⚠

CSS complexity

🟠	Rules count	2605
🟠	Complex selectors	535
🔴	Colors count	170
🔴	Similar colors	58
🟠	Breakpoints count	38
🟡	Not mobile-first media queries	99

https://github.com/gmetais/YellowLabTools/

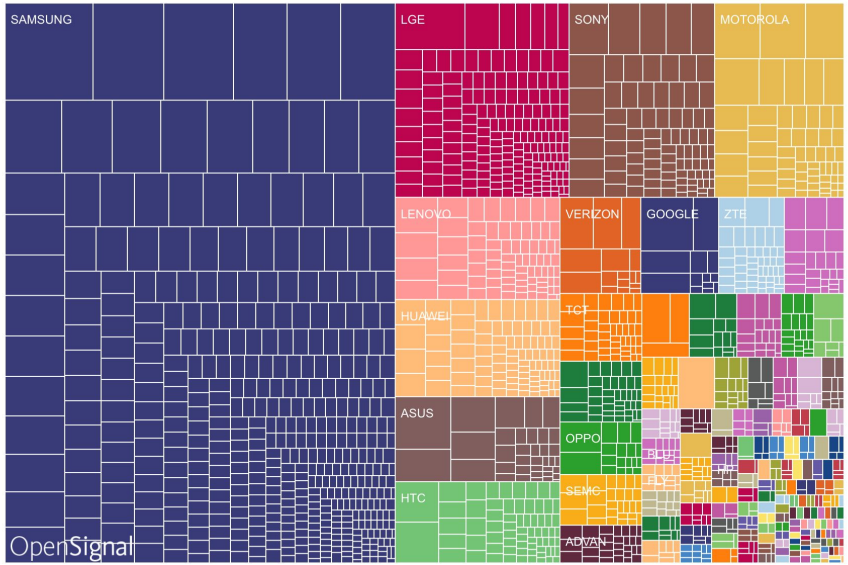
Budget Third-party Content


Developer Tools - https://www.wired.com/2017/05/why-bangalores-water-crisis-is-everyones-crisis/
Elements
Network
Memory
Console
Performance
Sources
Application
Security
Audits
Adblock Plus
12
3
Screenshots
Memory
Disable JavaScript Samples
Network: No throttling
Enable advanced paint instrumentation (slow)
CPU: 2× slowdown
2000ms
4000ms
6000ms
8000ms
10000ms
12000ms
14000ms
16000ms
18000ms
FPS
CPU
NET
2000 ms
4000 ms
6000 ms
8000 ms
10000 ms
12000 ms
14000 ms
16000 ms
Frames
1303.3 ms
992.7 ms
1660.7 ms
Interactions
Main
Ev...)
(...)
(...)
t
(...)
t
(...
t
Summary
Bottom-Up
Call Tree
Event Log
Filter
Group by Subdomain
Self Time
Total Time
Activity
3395.6ms 20.0%
3395.6ms 20.0%
unattributed
1954.3ms 11.5%
1954.3ms 11.5%
c.disquscdn.com
1530.7ms 9.0%
1530.7ms 9.0%
www.wired.com
966.8ms 5.7%
966.8ms 5.7%
pixel.condenastdigital.com
910.9ms 5.4%
910.9ms 5.4%
Loom - Video Recorder: Screen, Webcam and Mic
771.9ms 4.6%
771.9ms 4.6%
use.typekit.net
536.2ms 3.2%
536.2ms 3.2%
[Chrome extensions overhead]
317.4ms 1.9%
317.4ms 1.9%
Adblock Plus
315.8ms 1.9%
315.8ms 1.9%
assets.adobedtm.com

Render on the Server

Why give away control?

SPAs



Safe, easy to scale, cheap, easy to monitor...

Unpredictable, uncontrollable, hard to measure

Stop Enhancing

Initial page payload

Final progressively enhanced page

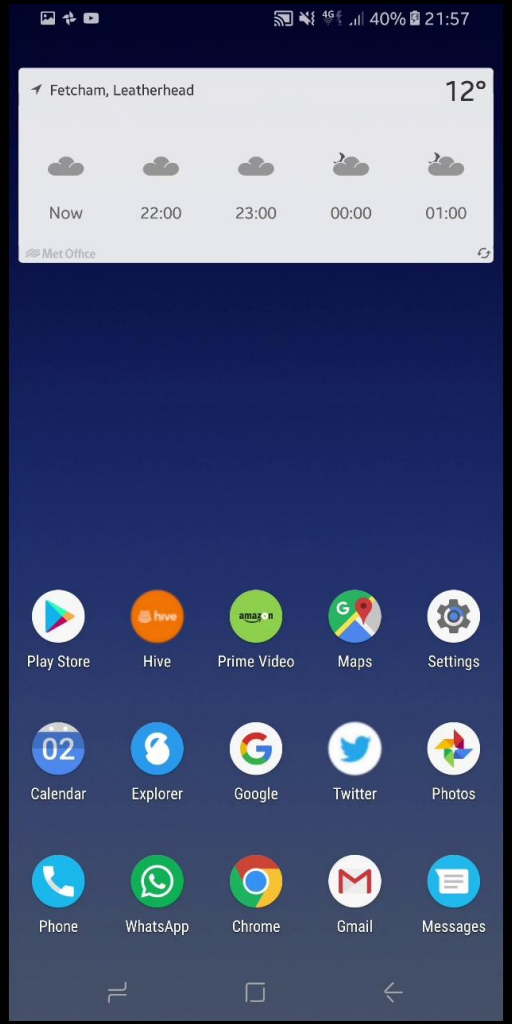
https://speakerdeck.com/patrickhamann/breaking-news-at-1000ms-front-trends-2014

The Guardian. Moto G1. 100Mb/s.

14s

https://www.webpagetest.org/result/170207_NV_130V/

Embrace (mobile) Technology

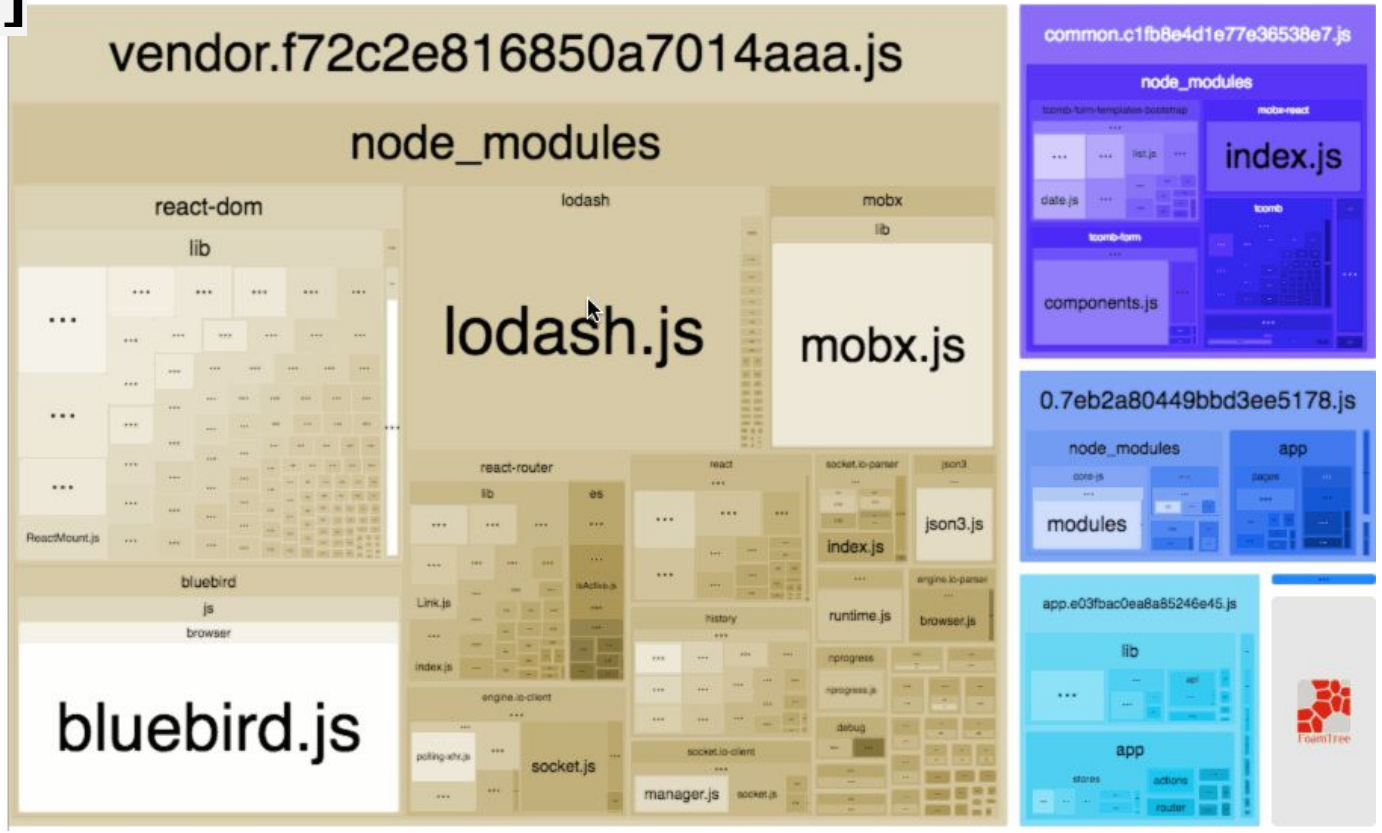

40% 21:57
Fetcham, Leatherhead
12°
Now
22:00
23:00
00:00
01:00
Met Office
Play Store
Hive
Prime Video
Maps
Settings
Calendar
Explorer
Google
Twitter
Photos
Phone
WhatsApp
Chrome
Gmail
Messages

1. Performance is more of a challenge than you think
2. Performance is everyone's responsibility
3. JavaScript is a bigger problem than network
4. Test on *representative* mobile devices

Let's keep in touch.

@SimonHearne
webperf.ninja

[sidebar]



https://www.npmjs.com/package/webpack-bundle-analyzer

All the Nav Timings

boomerang is a JavaScript library that measures the page load time experienced by real users, commonly called RUM.

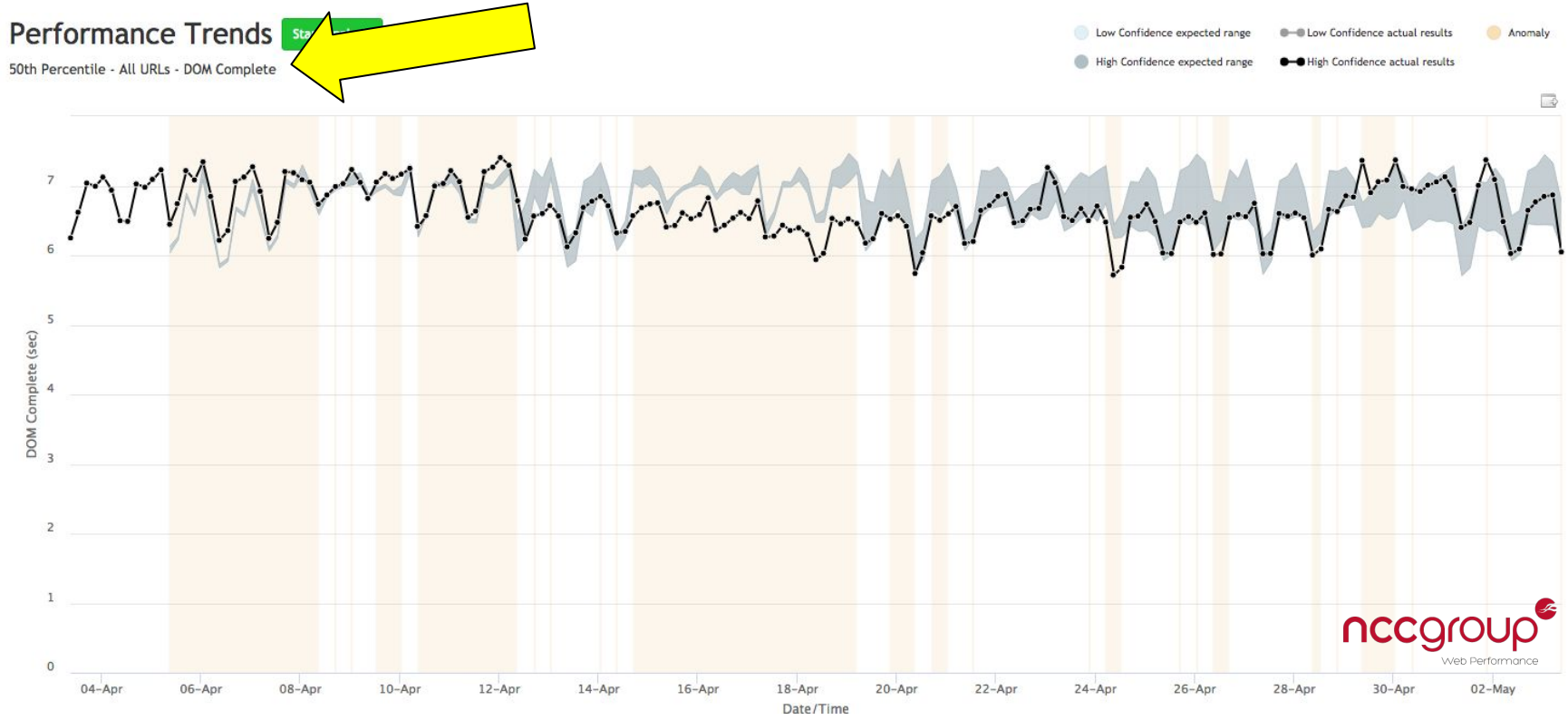
nccgroup
Web Performance

mPulse

(SpeedCurve)

https://github.com/SOASTA/boomerang

All the DATA


Performance Trends
50th Percentile - All URLs - DOM Complete
Low Confidence expected range
Low Confidence actual results
Anomaly
High Confidence expected range
High Confidence actual results
DOM Complete (sec)
0
1
2
3
4
5
6
7
04-Apr
06-Apr
08-Apr
10-Apr
12-Apr
14-Apr
16-Apr
18-Apr
20-Apr
22-Apr
24-Apr
26-Apr
28-Apr
30-Apr
02-May
Date/Time
nccgroup
Web Performance

Distributions tell a story (Top 10 Browser versions)