

Lightning-Fast Web Performance

Scott Jehl, WebPageTest Team



Course Agenda

1. Introduction
2. **Why Performance Matters**
3. Metrics! How do we define fast?
4. Identifying Performance Problems
5. Making Things Faster
6. Wrapping Up

Why Does
Performance Matter?

A Hostile Medium

“

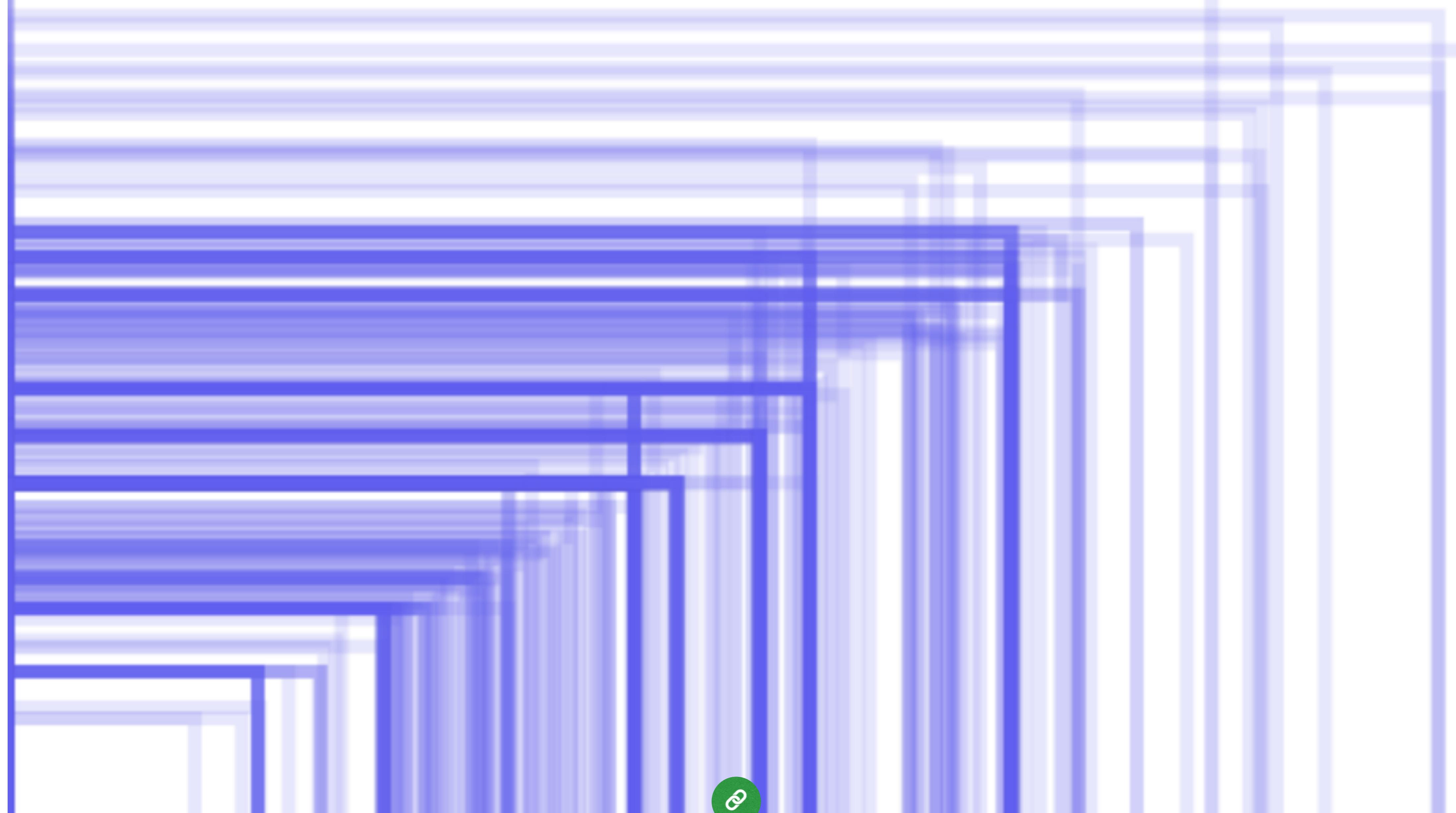
The web is not a platform.
It's a continuum.

Jeremy Keith

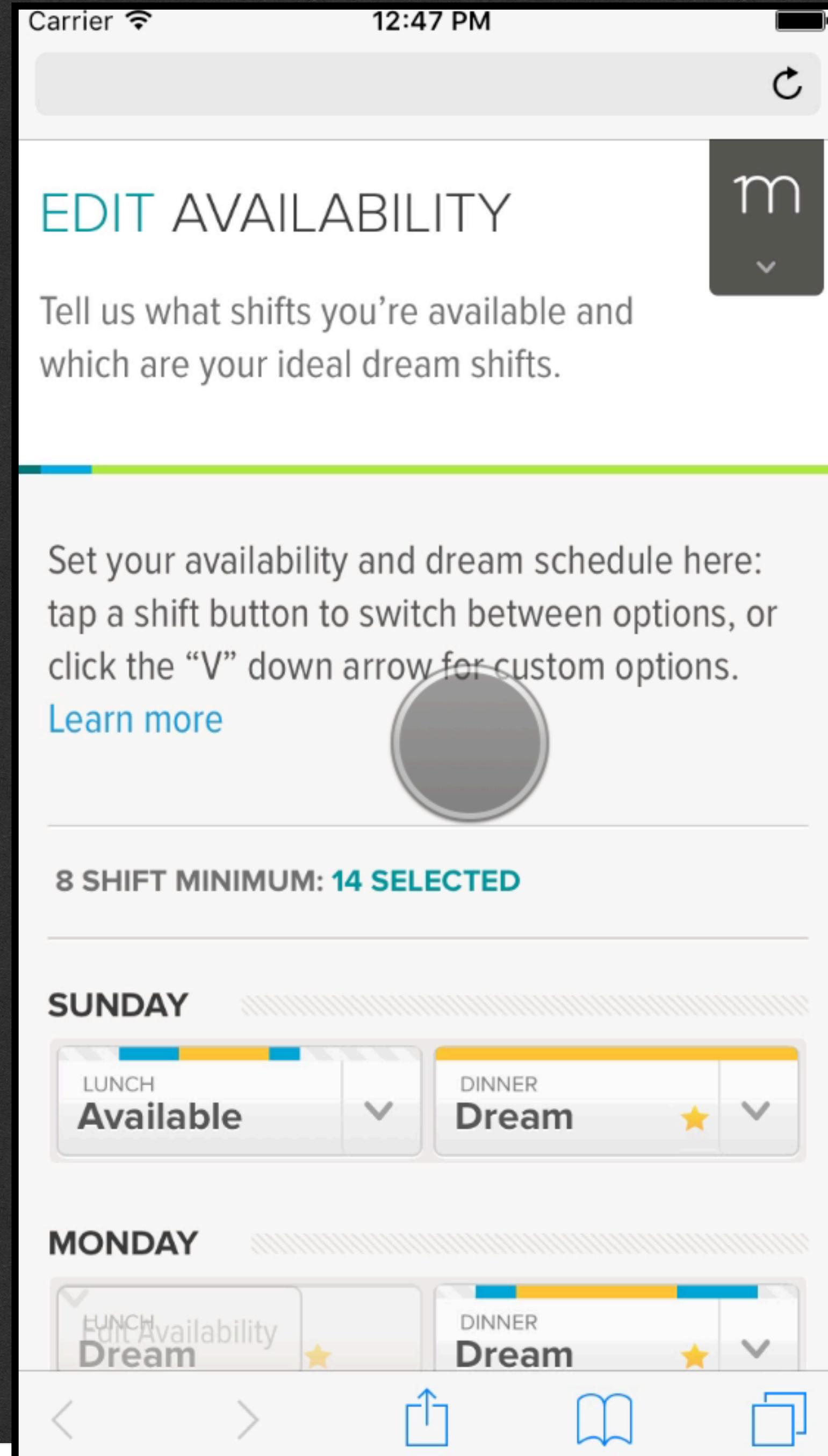
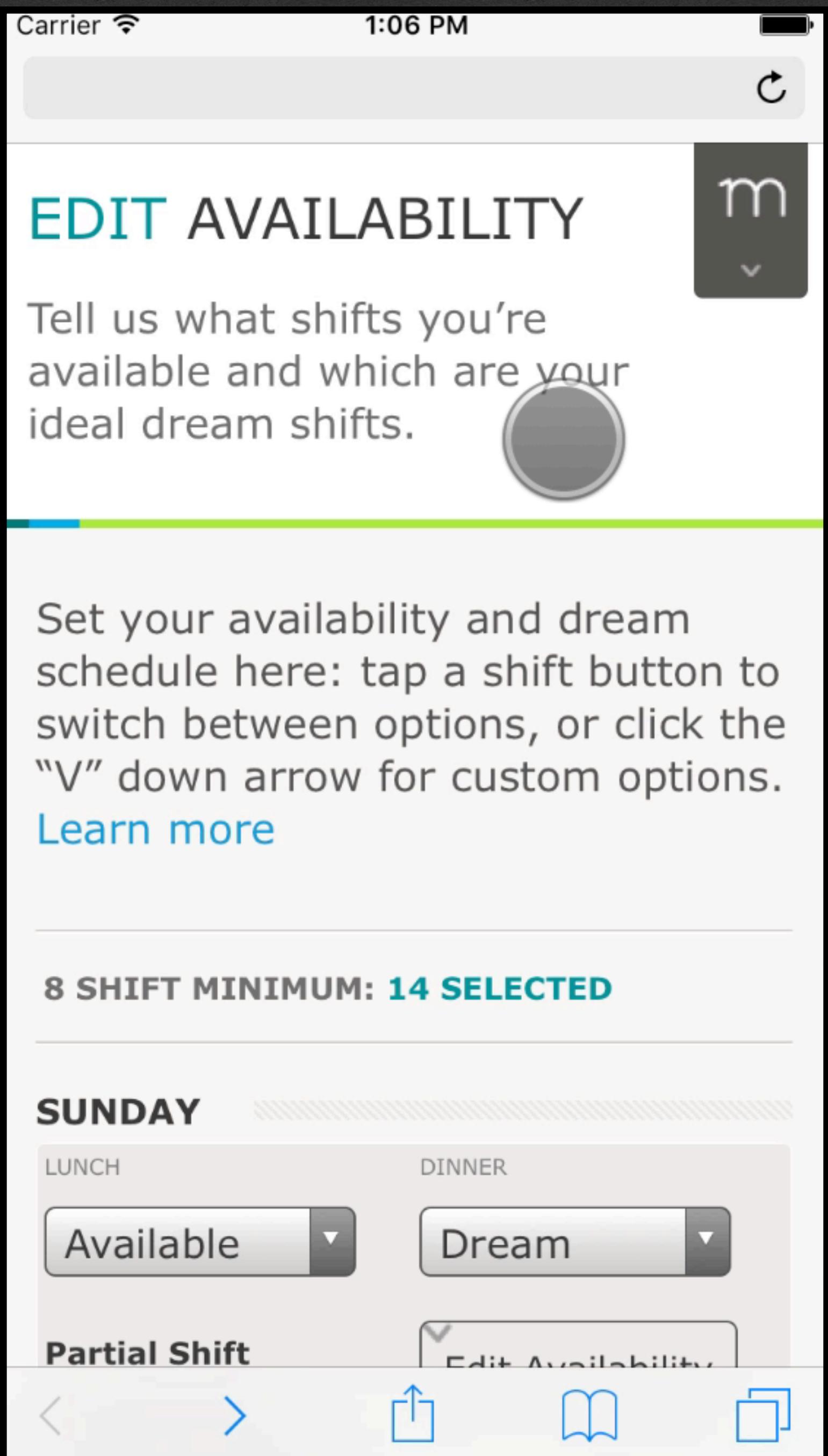


<https://adactio.com/journal/6692>





<https://twitter.com/lukew/status/542002569392844801>







“

2013: 60% of the
world's connections
are sub-3G

Ericsson Mobility Report, 2013

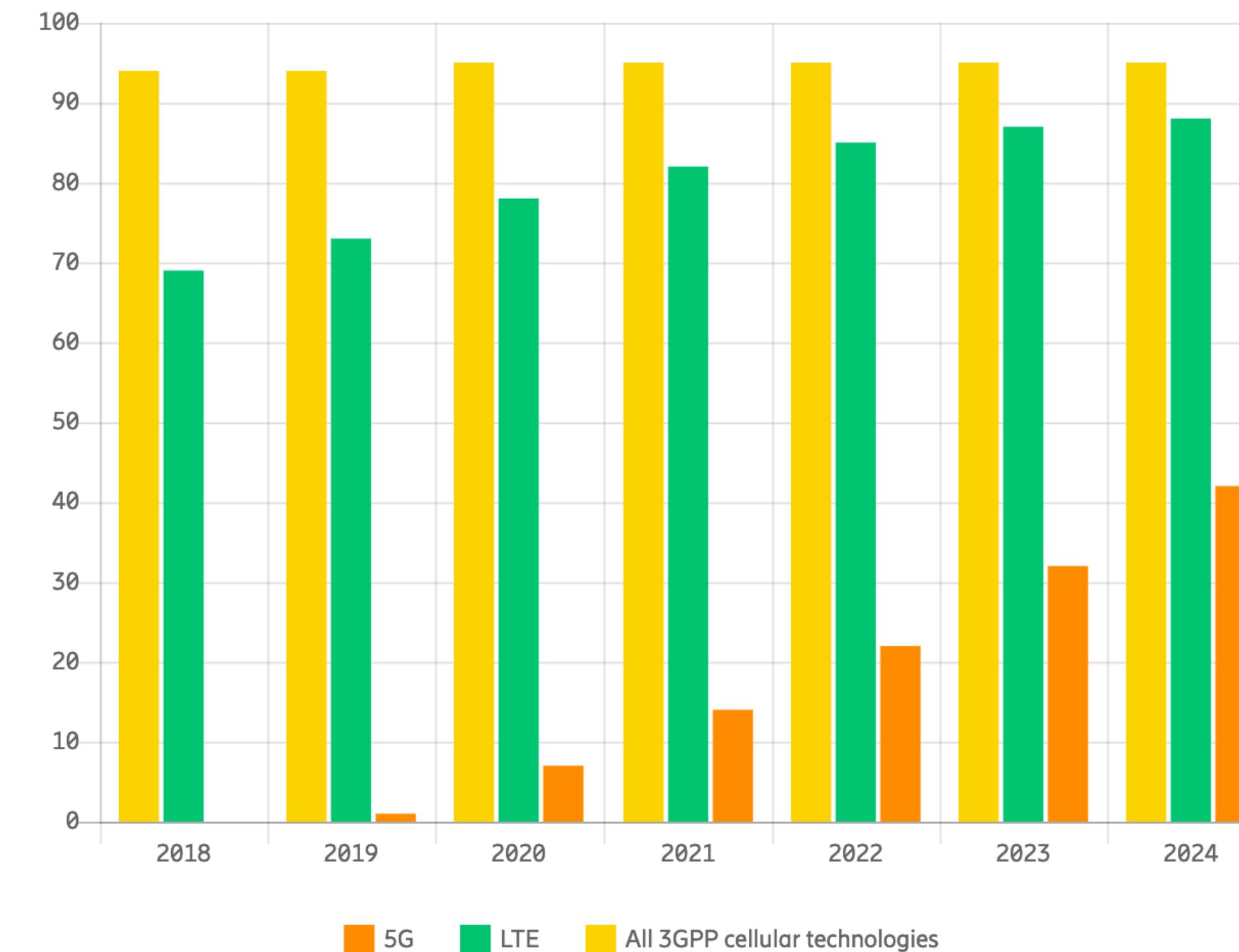


<http://www.ericsson.com/res/docs/2013/ericsson-mobility-report-june-2013.pdf>

2018-24 Population Coverage & Speed

Unit: %

Source: Ericsson (Feb 2019)



<https://www.ericsson.com/en/mobility-report/mobility-visualizer?f=16&ft=2&r=1&t=1,2,19&s=14&u=4&y=2018,2024&c=6>

A photograph of a night sky filled with star trails, creating a sense of motion and connectivity. The stars appear as long, thin white lines against a dark blue background. In the foreground, the silhouettes of several tall, dark green pine trees are visible, their branches reaching upwards. The overall atmosphere is mysterious and futuristic.

5G



<https://www.flickr.com/photos/johnragai/15823751904>





Amazon's Choice



Alcatel 1X Unlocked Smartphone (AT&T/T-Mobile) - 5.3" 18:9 Display, Android Oreo (Go Edition), 8MP Rear Camera, 4G LTE - Dark Gray (U.S. Warranty)

by Alcatel

★★★★★ 33

\$90¹⁴

✓prime Get it as soon as Today, Mar 4

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Amazon Best Sellers

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Cell Phones & Accessories

Carrier Cell Phones

Unlocked Cell Phones

Mobile Broadband

Accessories

Cases, Holsters & Clips

SIM Cards & Prepaid Minutes

Best Sellers in Unlocked Cell Phones

#1



Samsung Galaxy A20 32GB A205G/DS 6.4" HD+
4,000mAh Battery LTE Factory Unlocked GSM...

★★★★★ 251
\$153.98 prime

#2



Samsung Galaxy A10 32GB (A105M) 6.2" HD+
Infinity-V 4G LTE Factory Unlocked GSM...

★★★★★ 374
\$133.00 prime

#3



BLU Advance A4 -Unlocked Dual Sim Smartphone
-Black

★★★★★ 1,490
\$39.99 prime

#4



Google - Pixel 3a with 64GB Memory Cell Phone
(Unlocked) - Just Black

★★★★★ 380
\$399.00 prime

#5



Samsung Galaxy A10 A105M 32GB Duos GSM
Unlocked Phone w/ 13MP Camera - Blue

★★★★★ 374
\$129.97

#6



Samsung Galaxy A20 32GB A205G/DS 6.4" HD+
4,000mAh Battery LTE Factory Unlocked GSM...

★★★★★ 251
\$153.99

#7



Apple iPhone 6, GSM Unlocked, 16GB - Space
Gray (Renewed)

★★★★★ 4,776
\$111.00

#8

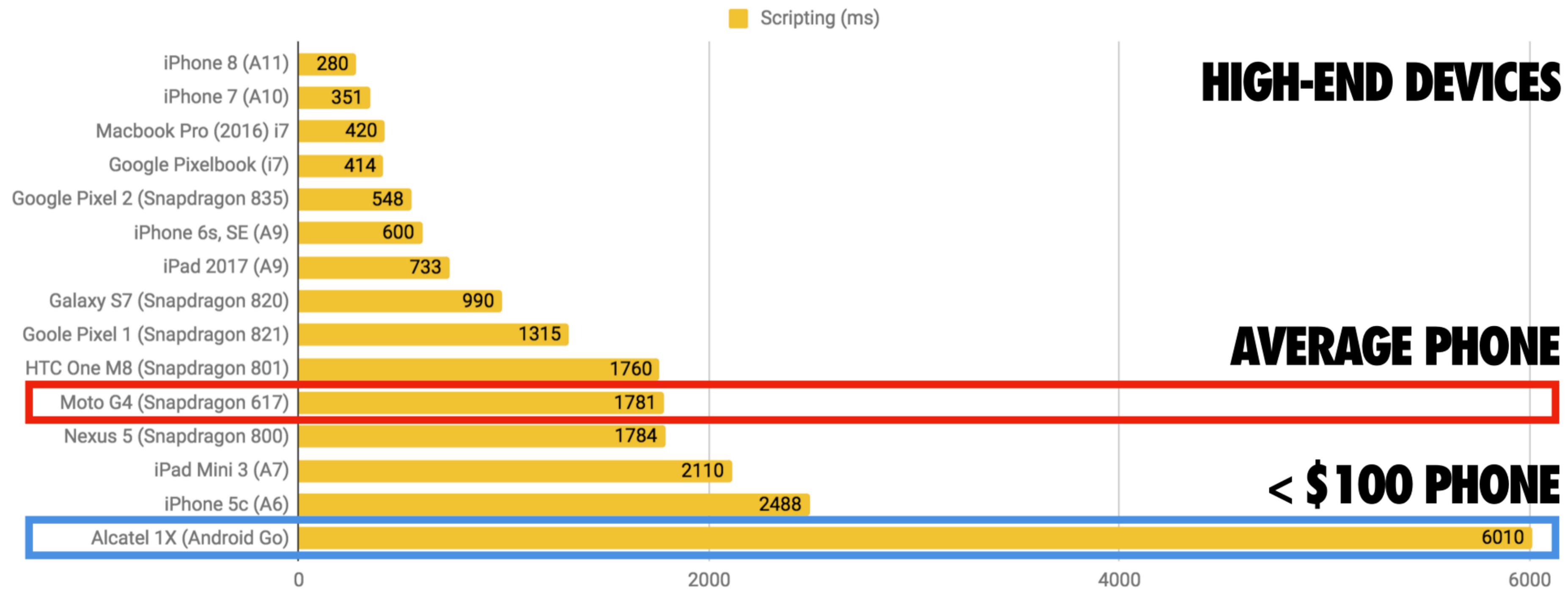


Apple iPhone 6S, GSM Unlocked, 64GB - Rose
Gold (Renewed)

★★★★★ 2,205
\$165.95



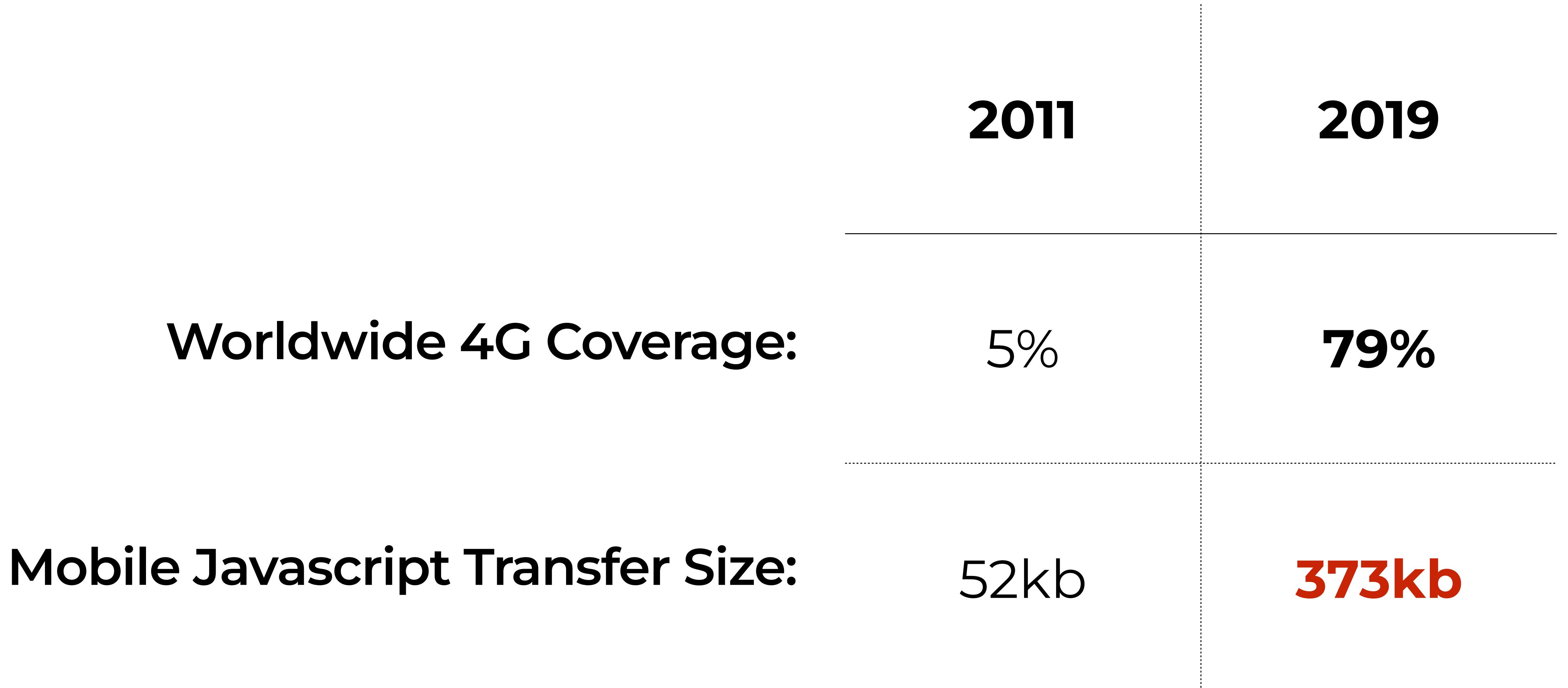
2018 JAVASCRIPT PROCESSING TIMES



Tests run during July, 2018 on hardware running the latest versions of Android and iOS available

1MB JS UNCOMPRESSED (200KB min/compressed)



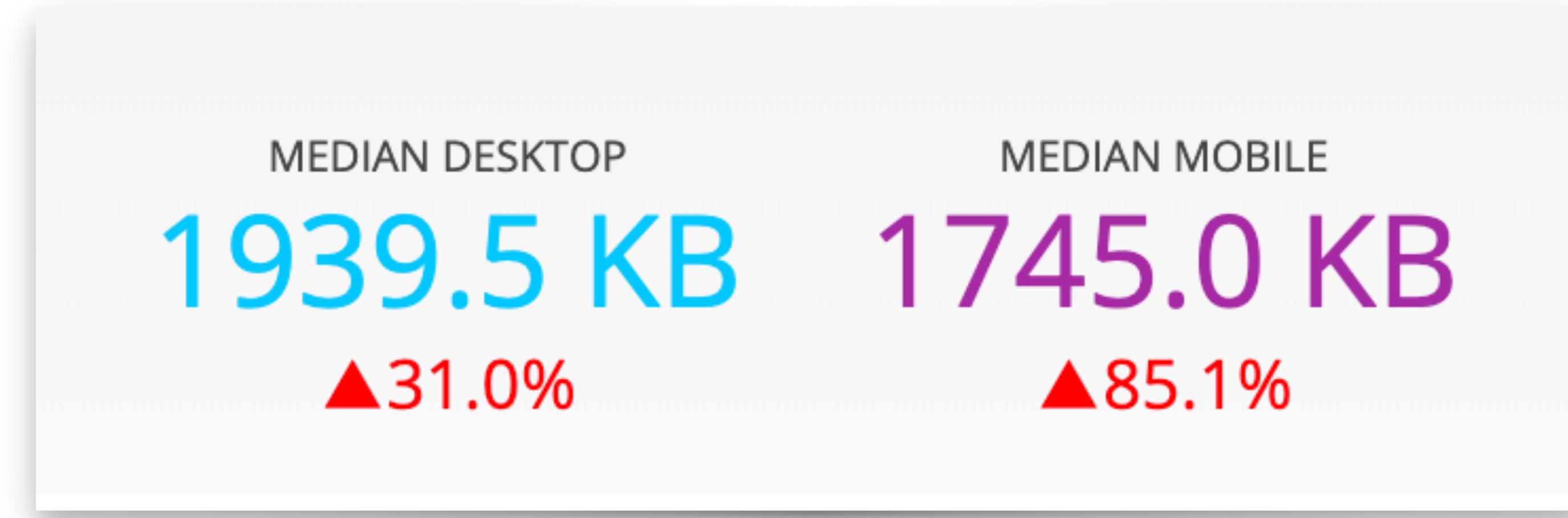


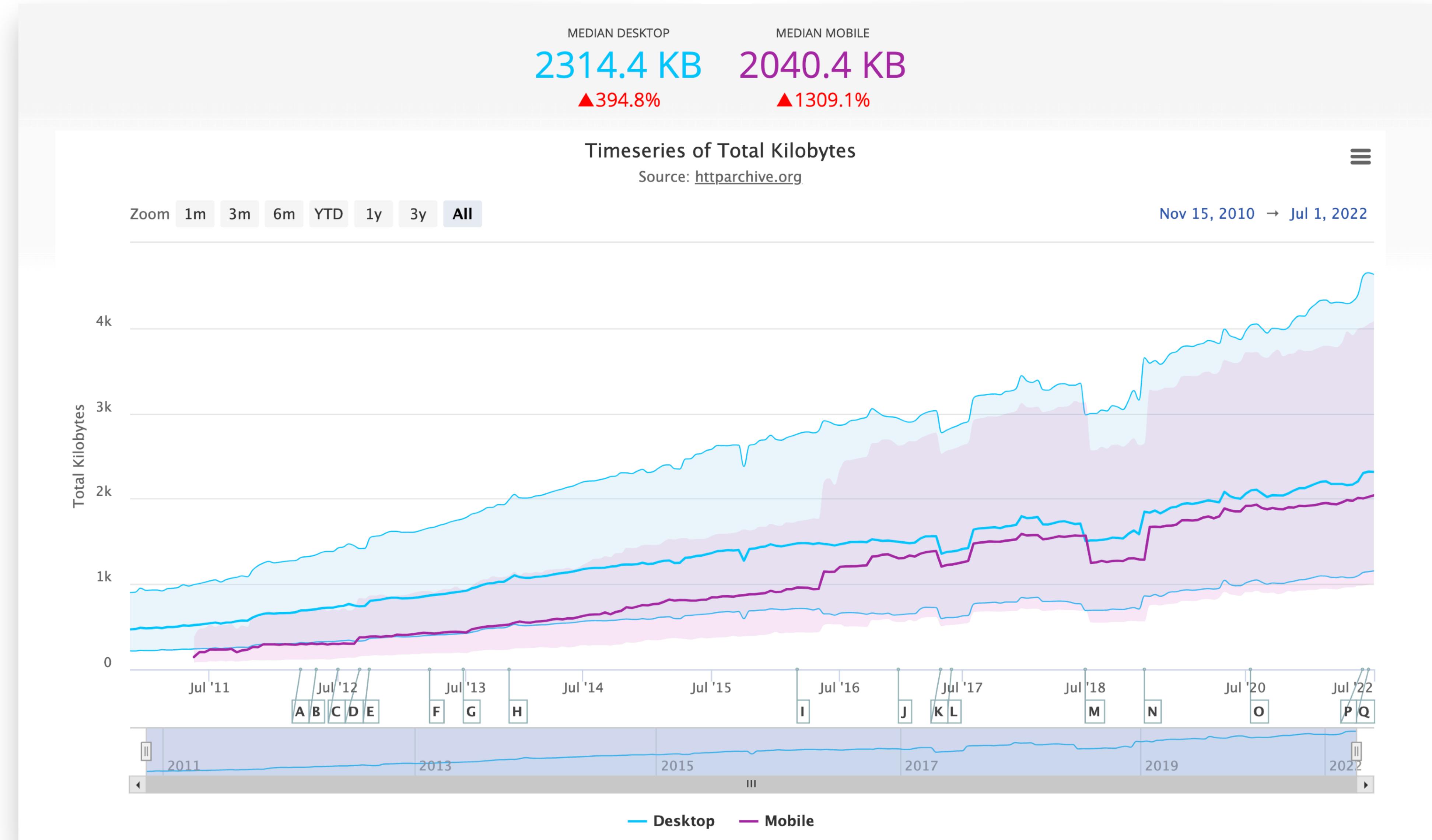
	2011	2022
Worldwide 4G Coverage:	5%	>85%
Mobile Javascript Transfer Size:	52kb	474kb

We are shifting
the burden

From the network
to the device

Page weight, on average...





Popular news homepage weights

The
New York
Times

CNN

The
Guardian

Google news

28mb

8mb

2.2mb

1.9mb



What Does My Site Cost?

Find out how much it costs for someone to use your site on mobile networks around the world.

<http://www.wired.com/2015/03/our-new-site/> weighs 11.27MB. Here's what that costs around the globe.

Want to make things better? Check out the [full results and recommendations at WebPageTest.org](#).

Cost in USD Cost in USD, PPP Cost as % of GNI, PPP Postpaid Prepaid

Cost in USD, PPP (POSTPAID DATA)

This is the cost of the site based on data from the [ITU](#) and [World Bank](#). The cost of data is standardized based on the PPP factor. Prices were collected from the operator with the largest marketshare in the country, using the least expensive plan with a (minimum) data allowance of 500 MB over (a minimum of) 30 days. Prices include taxes. Because these numbers are based on the least expensive plan, they are **best case scenarios**.

Country	Cost (in USD, PPP)
Vanuatu	\$4.06
Switzerland	\$45

This exceeds the \$1.25 per day poverty level.

WPO stats

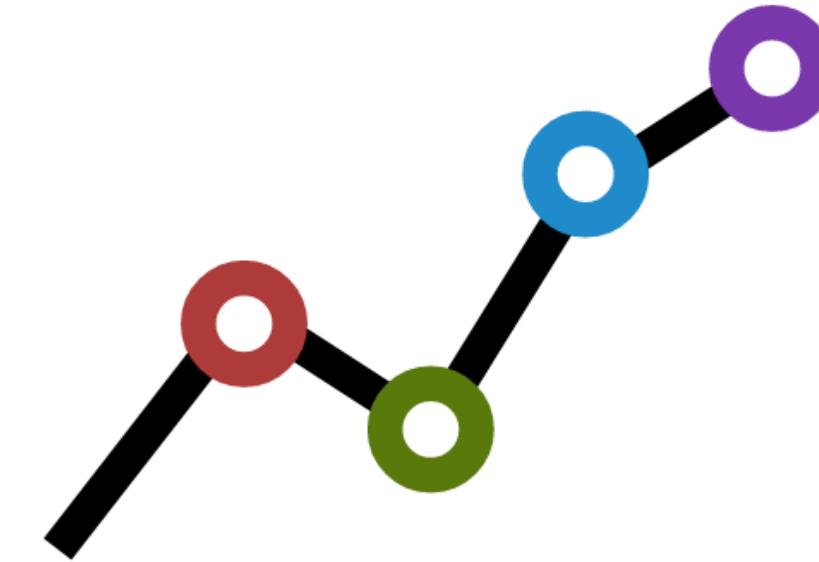


Case studies and experiments demonstrating the impact of web performance optimization (WPO) on user experience and business metrics.



<https://wpostats.com/>

WPO stats



Case studies and experiments demonstrating the impact of web performance optimization (WPO) on user experience and business metrics.



Google's DoubleClick found that publishers whose mobile sites load in 5 seconds earn up to 2x more mobile ad revenue than sites loading in 19 seconds.

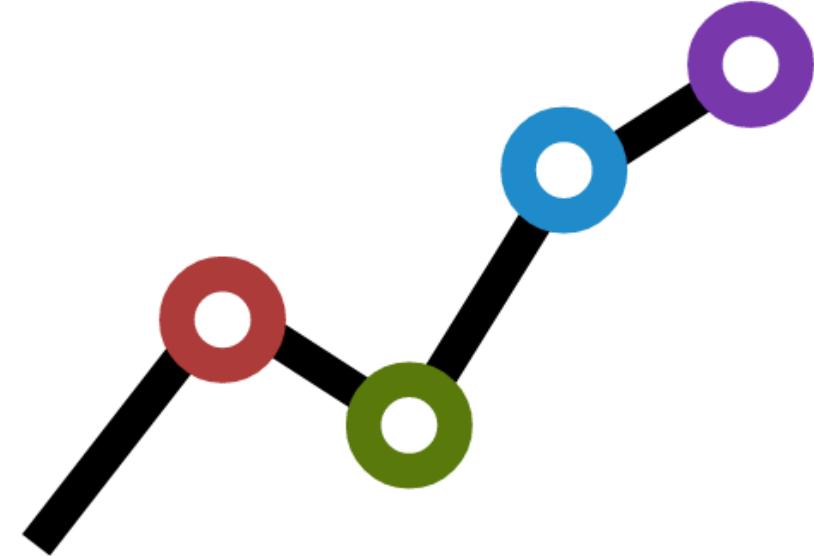
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[#revenue](#) [#ads](#) [#2016](#)

WPO stats



Case studies and experiments demonstrating the impact of web performance optimization (WPO) on user experience and business metrics.



53% of visits to mobile sites are abandoned after 3 seconds according to research from Google's DoubleClick.

SHARE ON TWITTER

#abandonment #2016

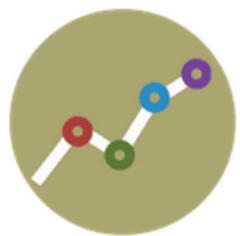
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WPO stats



Case studies and experiments demonstrating the impact of web performance optimization (WPO) on user experience and business metrics.



BBC has seen that they lose an additional 10% of users for every additional second it takes for their site to load

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#abandonment #2017

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Google Webmaster Central Blog

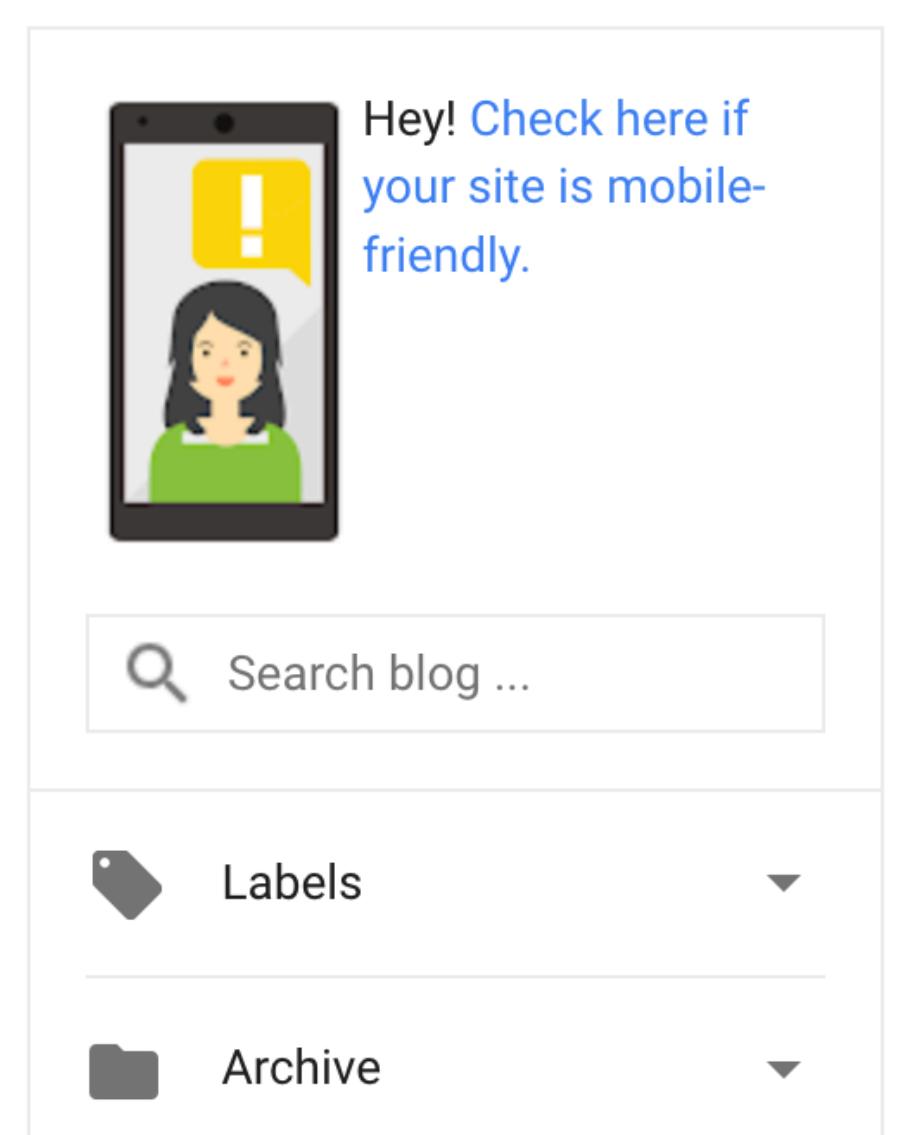
Official news on crawling and indexing sites for the Google index

Using page speed in mobile search ranking

Wednesday, January 17, 2018

Update July 9, 2018: The Speed Update is now rolling out for all users.

People want to be able to find answers to their questions as fast as possible — [studies](#) show that people really care about the speed of a page. Although speed has been used in ranking for some time, that [signal](#) was focused on desktop searches. Today we're announcing that starting in July 2018, page speed will be a ranking factor for mobile searches.





CHRIS ZACHARIAS



DECEMBER 21, 2012

Page Weight Matters

Three years ago, while I was a web developer at YouTube, one of the senior engineers began a rant about the page weight of the video watch page being far too large. The page had ballooned to as high as 1.2MB and dozens of requests. This engineer openly vented that “if they can write an entire Quake clone in under 100KB, we have no excuse for this!” Given that I agreed with him and I was excited to find a new project, I decided to champion the cause of getting the YouTube watch page to weigh in under 100KB. On the shuttle home from San Bruno that night, I coded up a prototype. I decided to limit the functionality to just a basic masthead, the



<https://blog.chriszacharias.com/page-weight-matters>

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