

— 第二届 —

前端开发者年度大会

FEDAY



Web Performance in the Age of HTTP/2

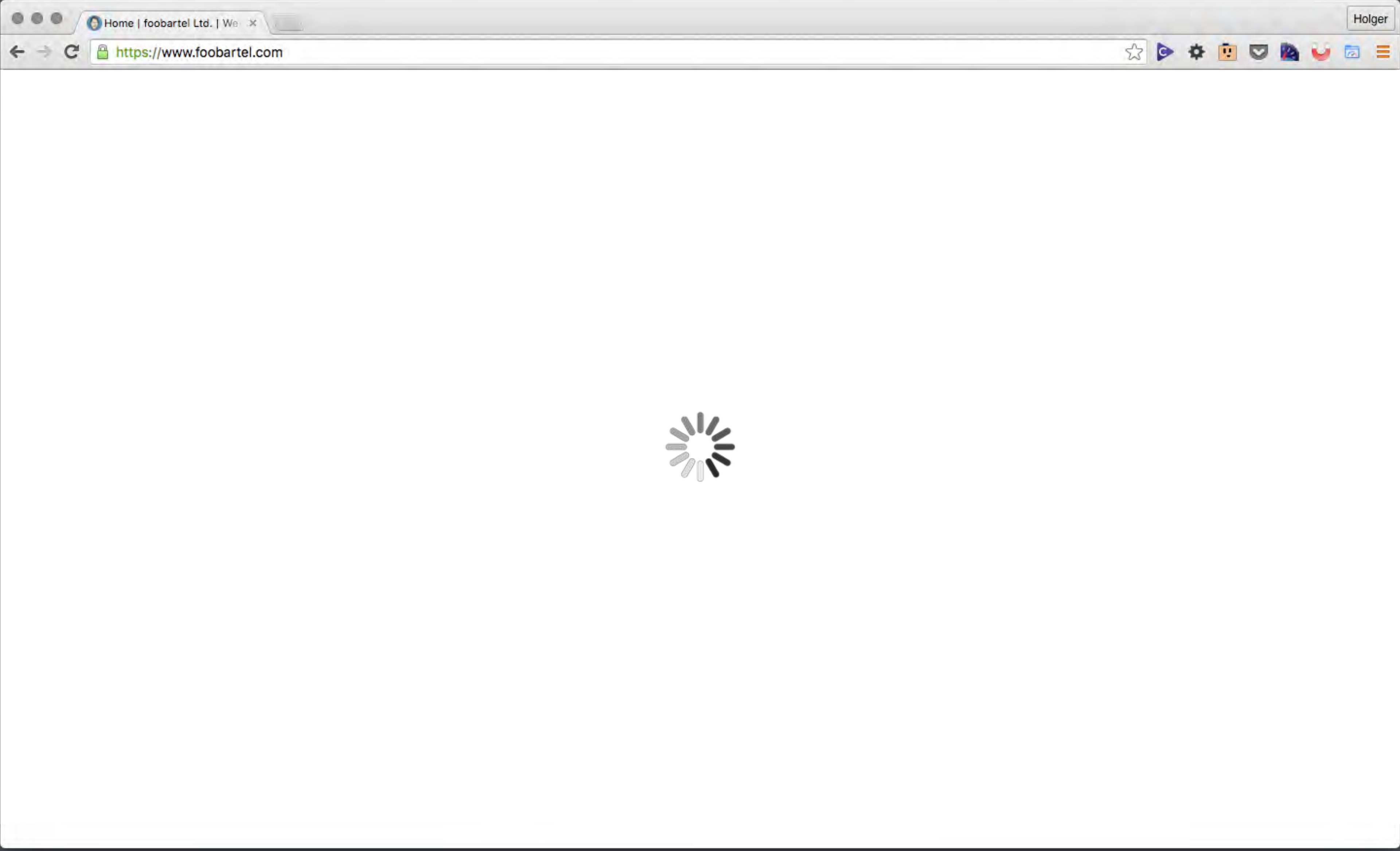


Holger Bartel | @foobartel | FEDay, Guangzhou, China, 19/03/2016

@foobartel

Also on Sina Weibo! ;)





Waiting



Nobody likes to wait.

And it's been like that for a long time.



waiting

'weɪtɪŋ/

noun

1. the action of staying where one is or delaying action until a particular time or event.

"years of waiting"



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Web Performance

User Expectations

Users expect ~2-3 seconds to load a site...

This is a user's definition of 'fast'

And today, we're even aiming to **deliver something** faster

User Expectations

50% of people say they'll abandon a page that takes
longer than 4 seconds to load

User Expectations

Depending on a users location and infrastructure it
might take longer

More than 8-10 seconds of load time for sure is pushing
it and people **will not wait**

Delay	User perception
0-100 ms	Instant
100-300 ms	Small perceptible delay
300-1000 ms	Machine is working
1,000+ ms	Likely mental context switch
10,000+ ms	Task is abandoned

The unofficial rule of thumb in the web performance community:

Render pages, or at the very least provide visual feedback, in under 250 milliseconds to keep the user engaged!

Our Logical Conclusion:
Faster is Better!

The Impact of Performance

(and why you should care)

40% of surveyed online shoppers will abandon a page that takes more than 3 seconds to load.
— Akamai

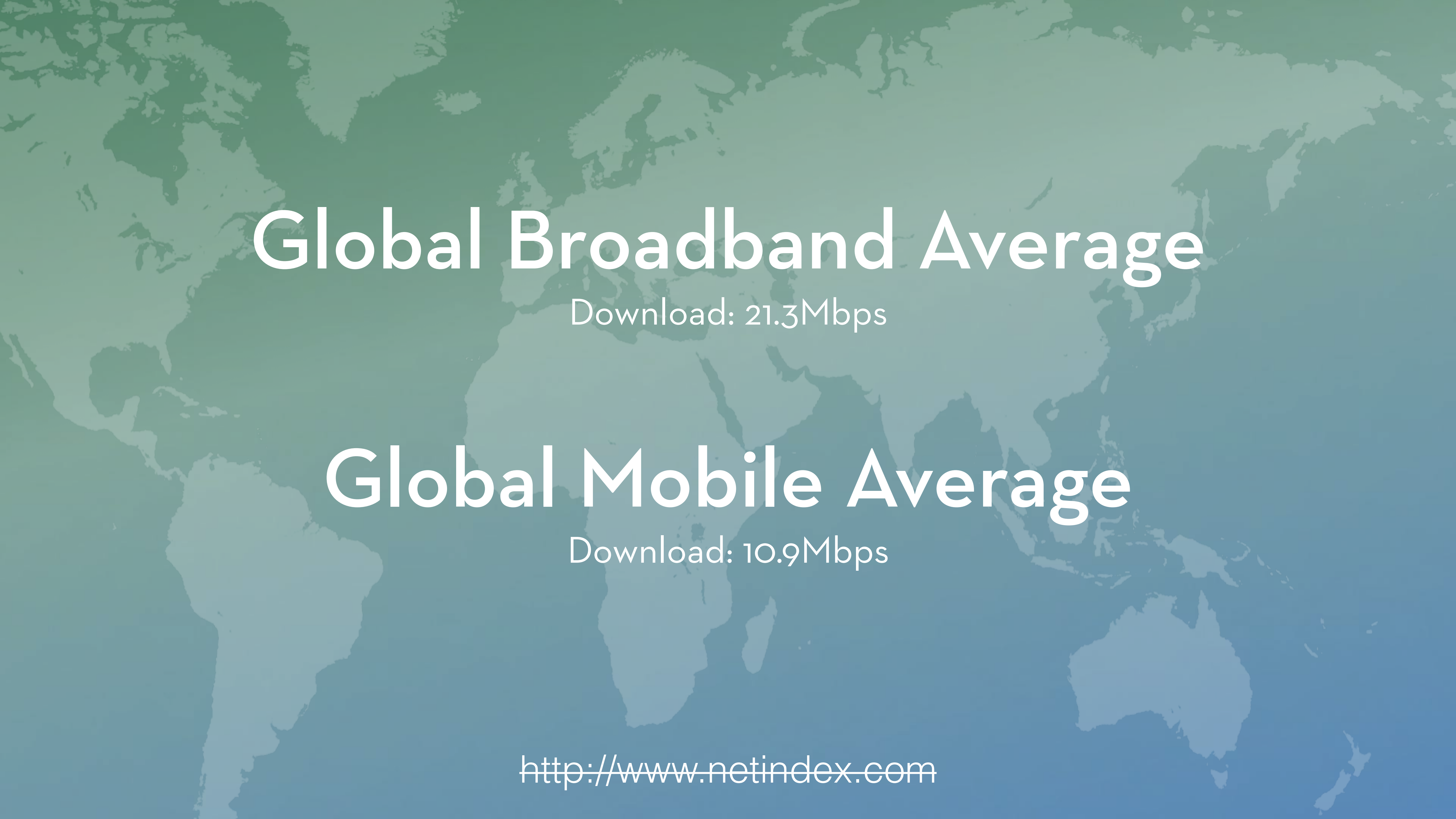
Adding half a second to a search results page can decrease traffic and ad revenues by 20%
— Google

Speeding up a fundraising site by 60% increased donations by 14%.
— Obama Campaign

Every additional 100 milliseconds of load time decreased sales by 1%.
— Amazon

A world map in shades of blue and green serves as the background. Overlaid on the map are several yellow curved lines with circular endpoints, representing network connections between different regions. One line connects a point in North America to a point in Europe. Another line connects a point in Europe to a point in East Asia. A third line connects a point in East Asia to a point in Australia. A fourth line connects a point in Australia to a point in South America. A fifth line connects a point in South America to a point in Africa. The text is centered over the map.

Let's have a look at Global Network Speed

A stylized world map in shades of green and blue, serving as the background for the text.

Global Broadband Average

Download: 21.3Mbps

Global Mobile Average

Download: 10.9Mbps

<http://www.netindex.com>

Top 20 Countries Broadband Download 2012 - 2014



November 2014

Philippines

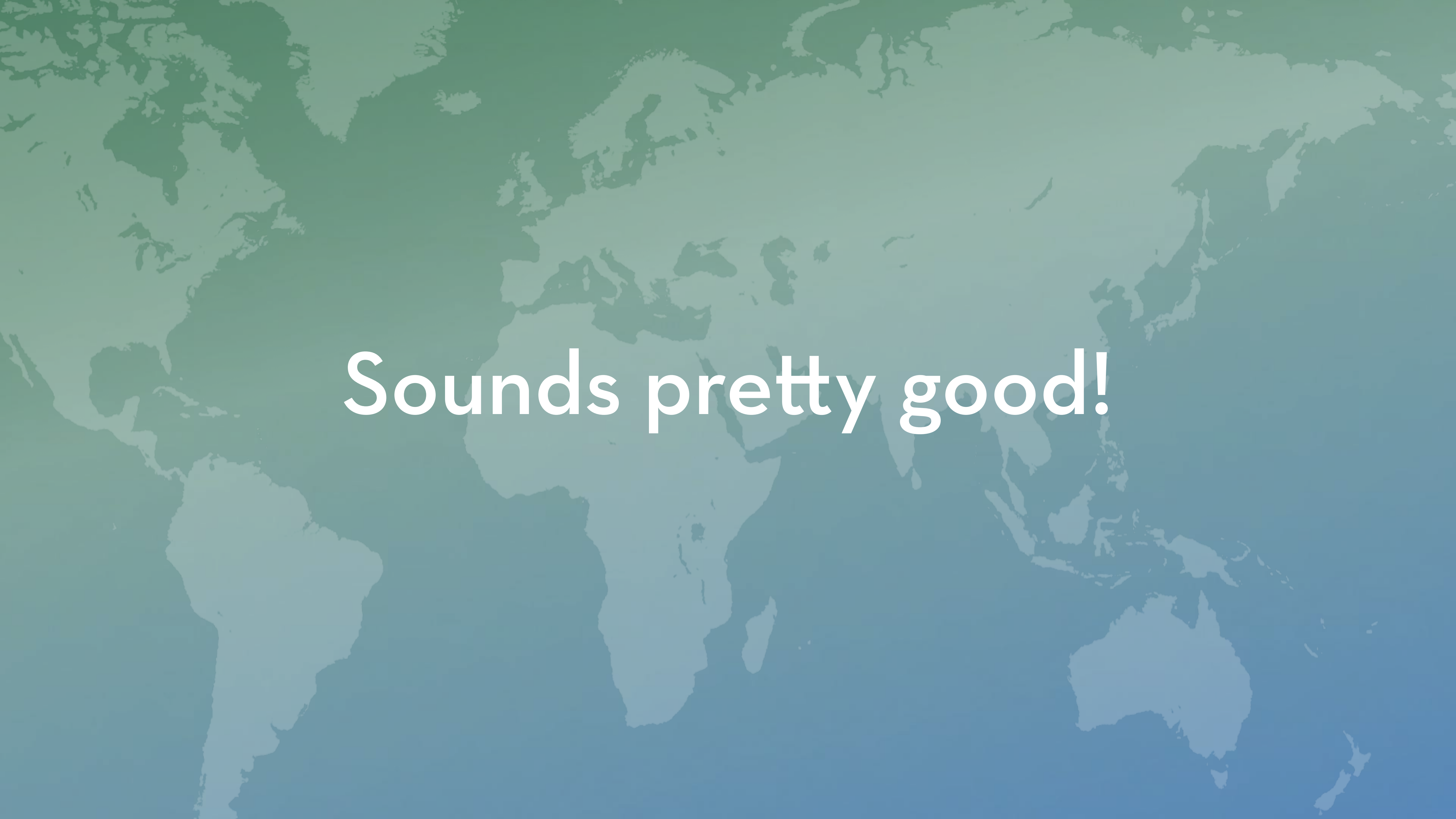
Download: 3.49Mbps (Mobile roughly the same)

Indonesia

Download: 5.27Mbps (Mobile 2.67Mbps)

USA

Download: 31.3Mbps (Mobile 13.33Mbps)

A world map is shown in the background, rendered in a light blue color. Overlaid on this map is a semi-transparent gradient that transitions from a dark green at the top to a medium blue at the bottom. Centered on this background is the text "Sounds pretty good!" in a white, sans-serif font.

Sounds pretty good!



3G, Edge, GPRS

3G, Edge, GPRS
or Maybe (Close to) Offline...



This is Why
Faster Sites are Better!

2013 - 2016



Building for Performance

Performance Techniques Today

Concatenation of Files

Image Sprites

Inline Images

Domain Sharding

Rendering Pages

Render-Tree Construction, Layout & Paint

Waiting for DOM and CSSOM to build the render tree.

Render tree contains nodes to render the page.

Layout computes the exact position and size.

Paint turns the render tree into pixels on screen.

Render Blocking CSS

Waiting for CSS

Avoids “Flash of Unstyled Content” (FOUC)

Render Blocking JavaScript

The parser has to stop for scripts before continuing to parse HTML.

JavaScript can query and modify DOM and CSSOM.

JavaScript blocks DOM construction unless explicitly declared as async.

Loading JavaScript

Every request fetched inside of HEAD, will postpone the rendering of the page

Limit HTTP Requests

Every request takes roughly ~200ms

Avoid unnecessary redirects

The Critical Rendering Path

Critical Resource

Critical Path Length

Critical Bytes

Optimising the Critical Rendering Path



Getting stuff on the screen
fast

Minimize the number of critical resources.

Minimize the number of critical bytes.

Minimize the critical path length.

A critical resource is a resource that can block initial rendering of a page.

ElementsNetworkSourcesTimelineProfilesResourcesAuditsConsole

Preserve log

Filter

AllDocumentsStylesheetsImagesScriptsXHRFontsWebSocketsOther

☐ Hide data URLs

Name	Method	Status	Type	Initiator	Size	Time	Timeline
webfont.js	GET	200	text/javascript	(index):44	7.1 KB	137 ms	
jquery.js?ver=1.11.0	GET	200	application/javascript	www.latitude22...	94.4 KB	2.09 s	
jquery-migrate.min.js?ver=1.2.1	GET	200	application/javascript	www.latitude22...	7.3 KB	1.18 s	
jquery.themepunch.plugins.min.js?rev=4.1.4&ver=...	GET	200	application/javascript	www.latitude22...	75.9 KB	2.20 s	
jquery.themepunch.revolution.min.js?rev=4.1.4&v...	GET	200	application/javascript	www.latitude22...	79.6 KB	2.52 s	
jquery.isotope.min.js	GET	200	application/javascript	www.latitude22...	43.1 KB	1.58 s	
jquery.carouFredSel.min.js	GET	200	application/javascript	www.latitude22...	53.8 KB	1.62 s	
jquery.form.min.js?ver=3.50.0-2014.02.05	GET	200	application/javascript	www.latitude22...	16.2 KB	1.76 s	
scripts.js?ver=3.8.1	GET	200	application/javascript	www.latitude22...	9.7 KB	1.85 s	
money.min.js?ver=0.1.3	GET	200	application/javascript	www.latitude22...	1.5 KB	1.86 s	
accounting.min.js?ver=0.3.2	GET	200	application/javascript	www.latitude22...	3.3 KB	1.81 s	
jquery.cookie.min.js?ver=1.3.1	GET	200	application/javascript	www.latitude22...	1.5 KB	1.95 s	
conversion.min.js?ver=1.2.3	GET	200	application/javascript	www.latitude22...	4.9 KB	2.03 s	
add-to-cart.min.js?ver=2.1.12	GET	200	application/javascript	www.latitude22...	2.4 KB	2.04 s	
jquery.blockUI.min.js?ver=2.60	GET	200	application/javascript	www.latitude22...	9.7 KB	2.06 s	
woocommerce.min.js?ver=2.1.12	GET	200	application/javascript	www.latitude22...	1.2 KB	2.09 s	
cart-fragments.min.js?ver=2.1.12	GET	200	application/javascript	www.latitude22...	1.8 KB	2.19 s	
jquery.yith-wcwl.js?ver=1.0	GET	200	application/javascript	www.latitude22...	2.8 KB	2.26 s	
love-it.js	GET	200	application/javascript	www.latitude22...	1.3 KB	2.27 s	
jquery.cookie.js	GET	200	application/javascript	www.latitude22...	1.8 KB	2.29 s	
jquery.hoverIntent.min.js	GET	200	application/javascript	www.latitude22...	1.6 KB	2.44 s	
bootstrap.min.js	GET	200	application/javascript	www.latitude22...	31.1 KB	2.59 s	
jquery.easing.js	GET	200	application/javascript	www.latitude22...	8.4 KB	2.51 s	
jquery.flexslider-min.js	GET	200	application/javascript	www.latitude22...	16.8 KB	2.54 s	
jquery.prettyPhoto.js	GET	200	application/javascript	www.latitude22...	21.8 KB	2.59 s	
jquery.fitvids.js	GET	200	application/javascript	www.latitude22...	3.4 KB	2.68 s	
view.min.js?auto	GET	200	application/javascript	www.latitude22...	7.4 KB	2.76 s	
functions.js	GET	200	application/javascript	www.latitude22...	75.6 KB	3.42 s	
comment-reply.min.js?ver=3.9.1	GET	200	application/javascript	www.latitude22...	1.0 KB	2.87 s	
jquery.elevateZoom.min.js	GET	200	application/javascript	www.latitude22...	31.5 KB	3.34 s	
analytics.js	GET	200	text/javascript	(index):105	11.0 KB	40 ms	

31 / 111 requests | 629 KB / 2.8 MB transferred | 39.26 s (load: 8.76 s, DOMContentLoaded: 5.80 s)

ConsoleSearchEmulationRendering

Device

Apple iPhone 4

Screen

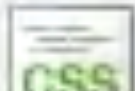
EmulateReset

User Agent

Sensors

Viewport: 640 x 960, devicePixelRatio = 2

User agent: Mozilla/5.0 (iPhone; U; CPU iPhone OS 4_2_1 like Mac OS X; en-us) AppleWebKit/533.17.9 (KHTML, like Gecko) Version/5.0.2 Mobile/8C148 Safari/6533.18.5

	grid.css?ver=2 /wp-content/themes/enfold/css	GET	200 OK	text... Parser	www... 15.1 KB
	base.css?ver=2 /wp-content/themes/enfold/css	GET	200 OK	text... Parser	www... 13.0 KB
	player.css f.vimeocdn.com/p/2.4.10/css	GET	200 OK	text... Script	86094... 9.2 KB
	language-selector.css?v=3.1.5 /wp-content/plugins/sitepress-multilingual-cms/res	GET	200 OK	text... Parser	www... 6.1 KB
	eventon_dynamic_styles.css?ver=3.9.1	GET	200	text...	www... 5.4 KB
	two-column-plugins-legacy-assets/css	OK		Parser	5.2 KB

35 / 240 requests | 761 KB / 3.7 MB transferred | 2.3 min (load: 8.99 s, DOMContentLoaded: 4.81 s)

 jquery.elevateZoom.min.js	GET	200	application/javascript	ww
 analytics.js	GET	200	text/javascript	(ir
31 / 111 requests 629 KB / 2.8 MB transferred 39.26 s (load: 8.76 s, DOMContentLoaded: 5.80 s)				
Console Search Emulation Rendering				
Device	Apple iPhone 4			
Screen				
User Agent	Emulate Reset			
Sensors	Viewport: 640 x 960, devicePixelRatio = 2			

The History of HTTP