Lightning-Fast **Web Performance**

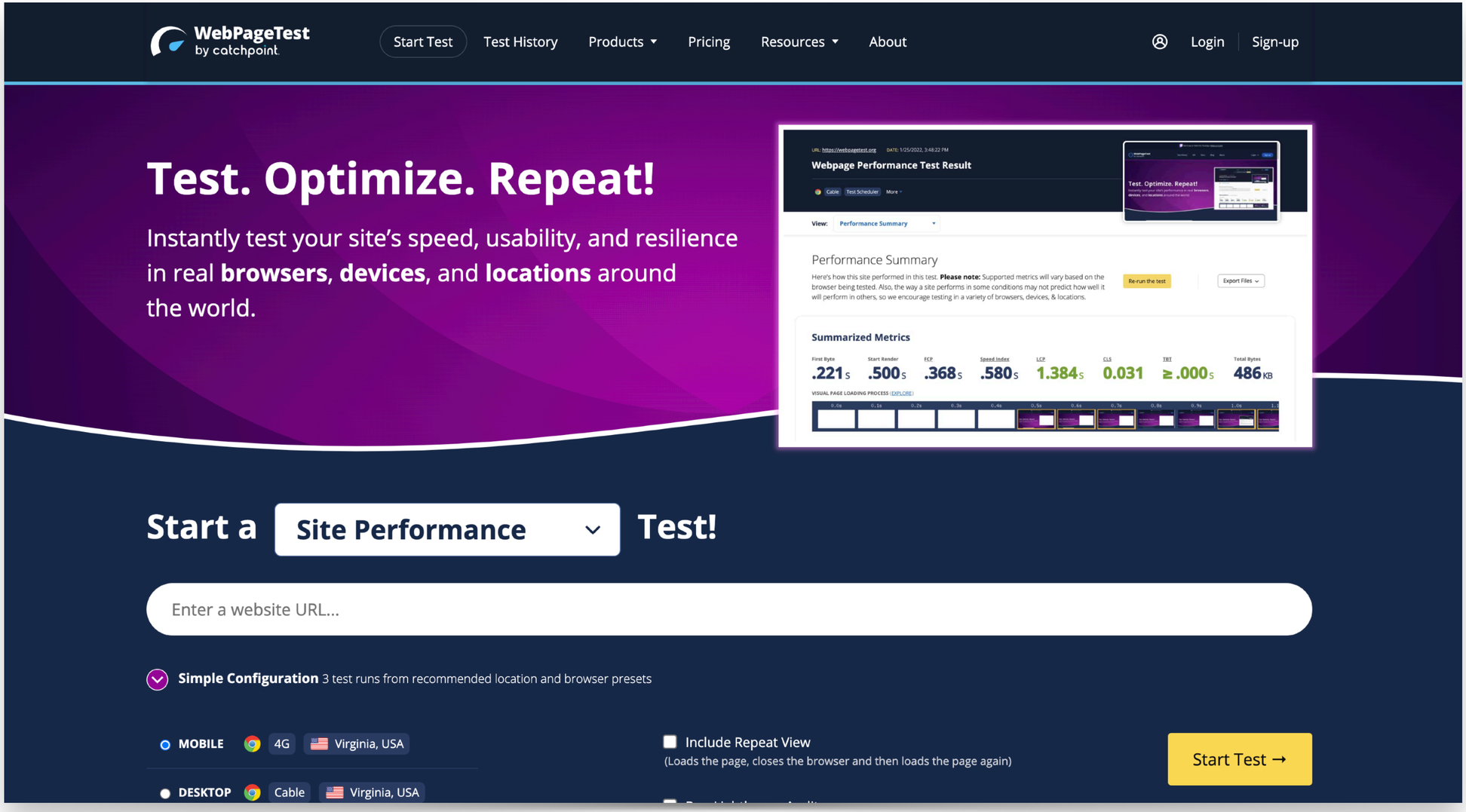
Scott Jehl, WebPageTest Team

WebPageTest by catchpoint

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

Identifying Problems



http://webpagetest.org

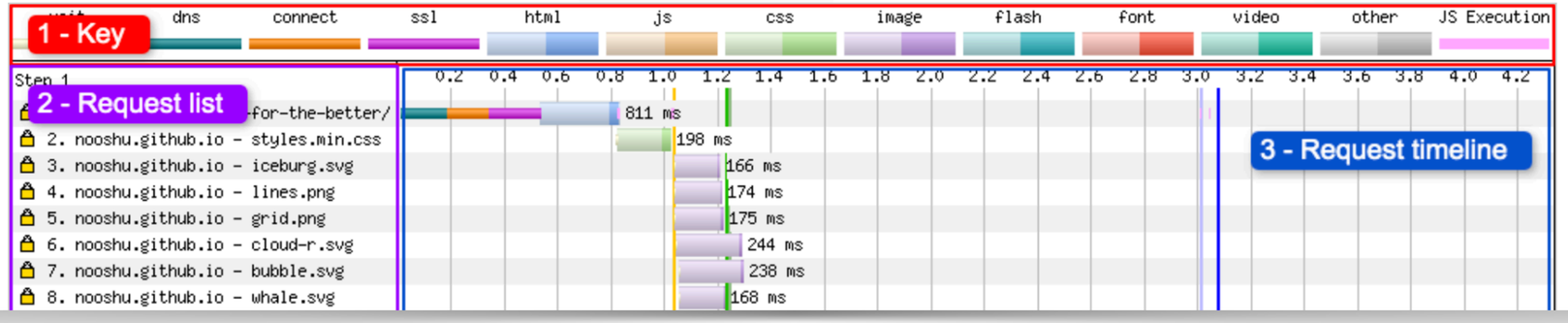
How to read a Web Page Test waterfall chart

Published: Oct 2, 2019 Tagged: webperf, ramblings. Read time: 20 mins

So I often find myself looking at WebPageTest (WPT) waterfall charts, but as I seem to have the memory of a chimpanzee (not a goldfish, that's a myth) I tend to forget some of the details and what they all mean. So I decided to pull together many bits of information into a single blog post I can then refer to at a later date. If you find it useful, or think I've forgotten anything, please let me know.

Basic Layout

Here's the basic layout of the waterfall chart user interface:



https://nooshu.github.io/blog/2019/10/02/how-to-read-a-wpt-waterfall-chart/

ed Insights

Enter a web page URL

Analyze

Enter a valid URL

Make your web pages fast on all devices

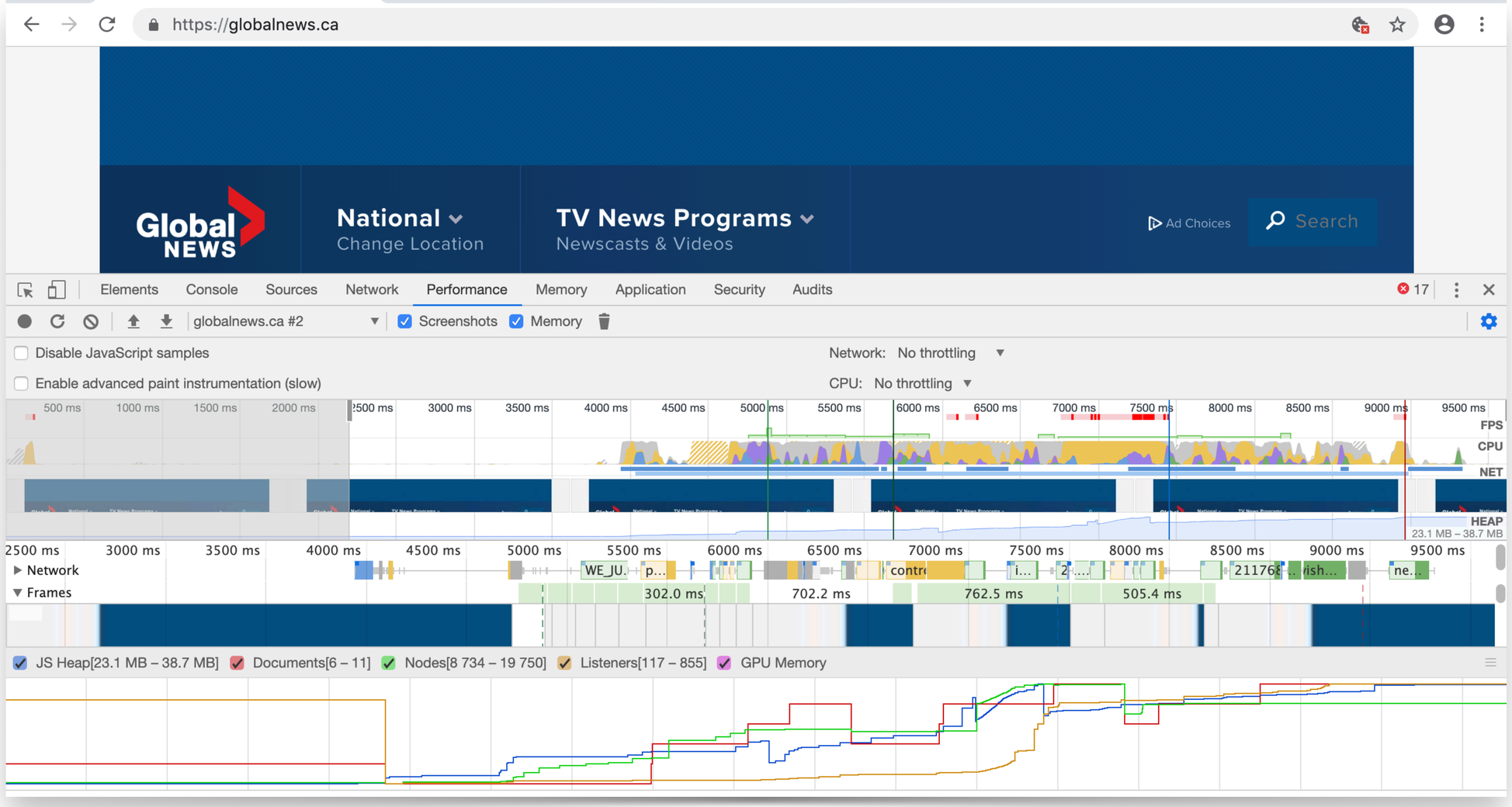
CHECK OUT

What's new

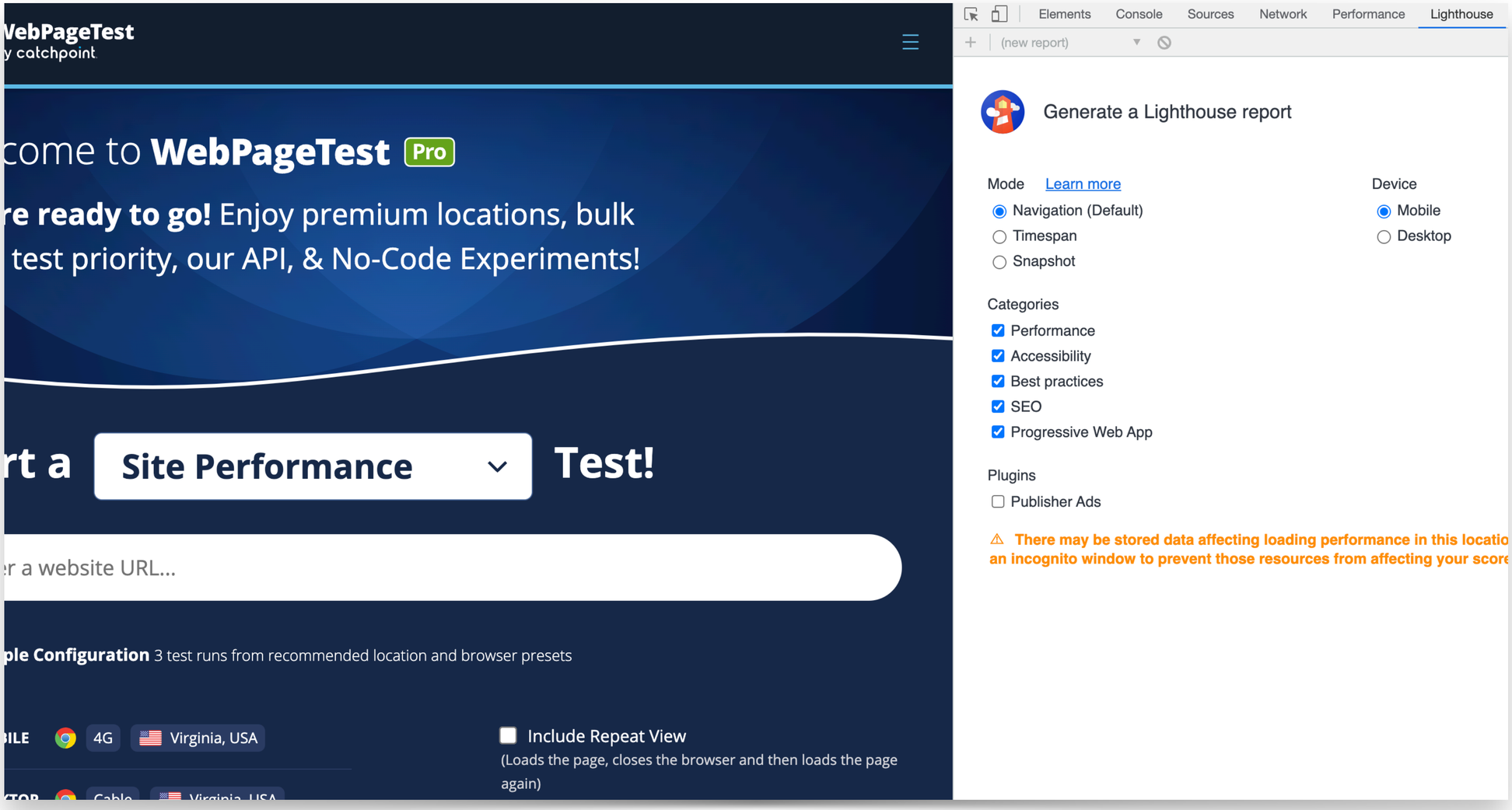
Documentation

Learn about Web Performance

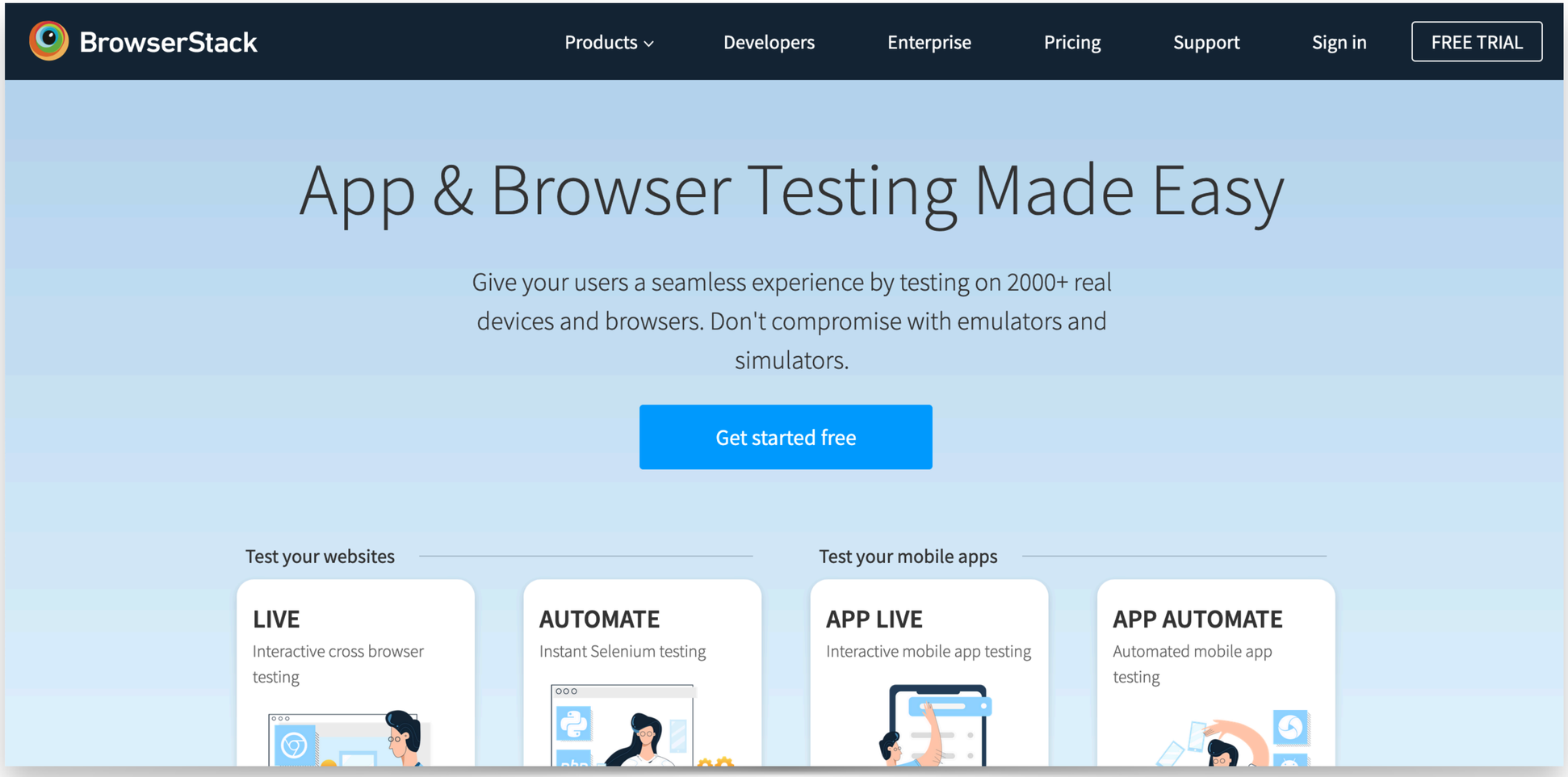
https://pagespeed.web.dev/



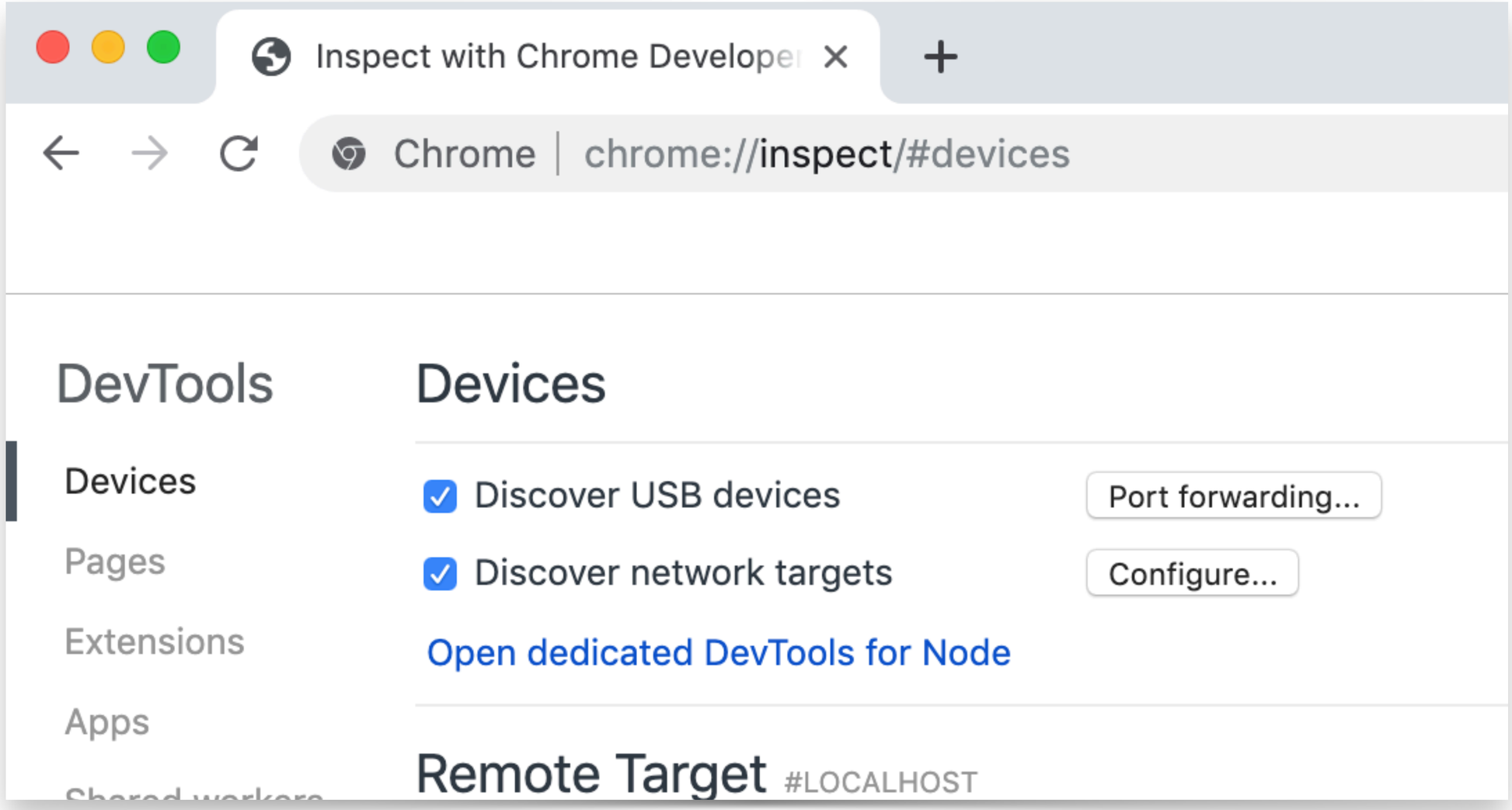
https://developers.google.com/web/tools/chrome-devtools



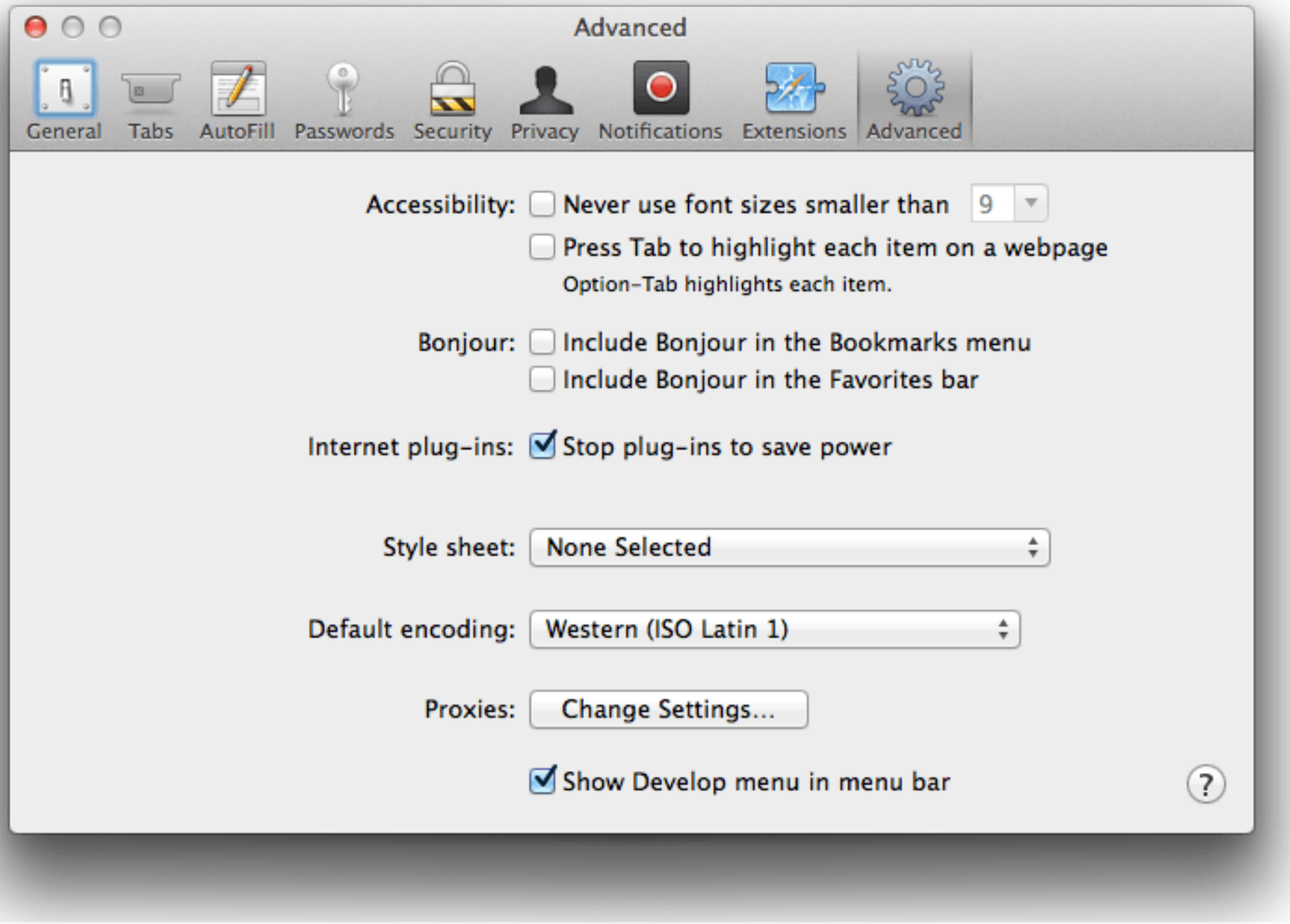
https://developers.google.com/web/tools/lighthouse/



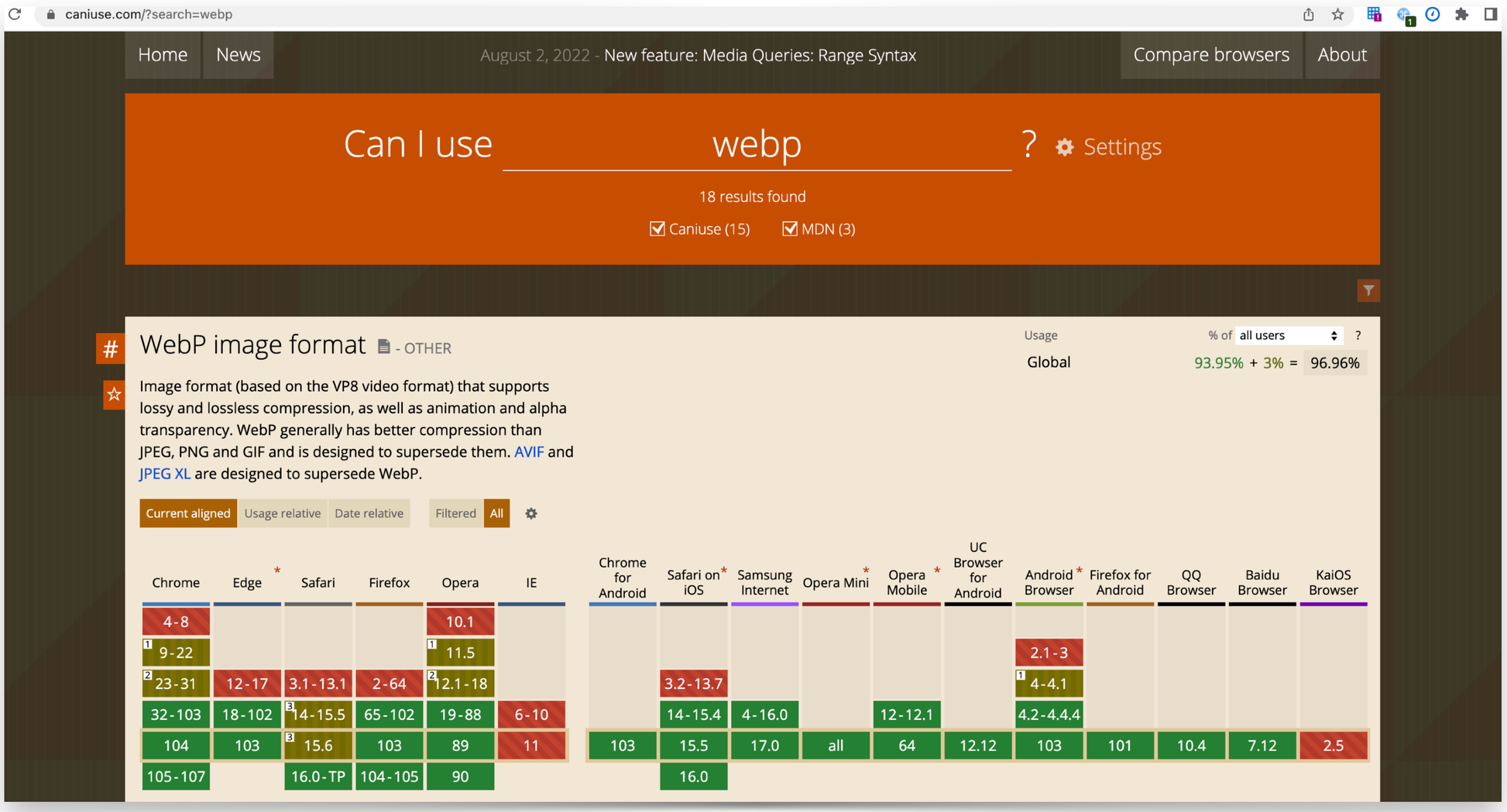
https://www.browserstack.com/



https://developers.google.com/web/tools/chrome-devtools/remote-debugging



https://blog.idrsolutions.com/2015/02/remote-debugging-ios-safari-on-os-x-windows-and-linux/



https://caniuse.com/#feat=webp

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
	This exceeds the $1.25 per day poverty level.
Switzerland	45

Goals & Budgets

Your site vs competitor 1

You display meaningful content (FMP)
0.3 seconds slower

You visually complete (VC)
2.4 seconds faster

you

FIRST PAINT (FP) **2.3s**

FIRST CONTENT (FCP) **2.6s**

FIRST MEANINGFUL (FMP) **3.0s**

VISUALLY COMPLETE (VC) **3.7s**

FIRST PAINT (FP) **2.3s**

FIRST CONTENT + MEANINGFUL (FCP + FMP) **2.6s**

VISUALLY COMPLETE (VC) **6.1s**

Comp 1

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

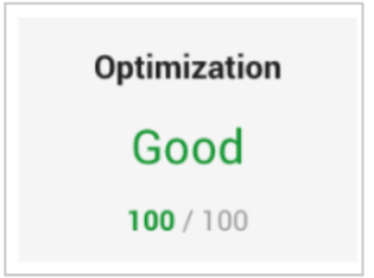
#abandonment #2016

Subscribe

Follow along using the magic of RSS.

Mobile Perf Goals

PSI Score of 100 to maximize SEO potential



Shift First Paint (FP) and Content Paint (FCP) to sub-2.0 seconds.

Speed up First Meaningful Paint (FMP) by 700ms to 2.3 seconds. This beats by 300ms (2.6s now)

Visually Complete (VC) by 300ms to 3.4 seconds. This widens your lead over to almost 3 seconds.

JANUARY 28, 2013

Setting a performance budget

performance performance budget

Jason Grigsby once quipped that "We've remade the Internet in our image….obese." He was right, of course. Average page weight and number of connections has been increasing at a rather alarming rate.

This is why I've been so happy to see the recent rash of posts discussing performance as a fundamental component of design. The latest comes from Mr. Brad Frost. He makes the case that performance is not just something developers need to worry about, but that it is an "essential *design* feature."

One of the things he suggests doing is mentioning performance in project documents.

> *Statements of work, project proposals and design briefs should explicitly and repeatedly call out performance as a primary goal. "The goal of this project is to create a stunning,*

https://timkadlec.com/2013/01/setting-a-performance-budget/

8 January, 2020

Performance Budgets, Pragmatically

Table of Contents

One of the key tools that performance engineers have at their disposal is the Performance Budget: it helps us—or, more importantly, our clients—ensure that any performance-focused work is monitored and maintained after we've gone.

By establishing an acceptable threshold, be that based on RUM data, bundle analysis, image weight, milestone timings, or any other suitable metric, we can be sure that new or unrelated bodies of work do not have a detrimental impact on the performance of our site.

The difficulty, however, lies in actually defining those thresholds. This post is for anyone who has struggled with the question, ***'But what should our budgets actually be?!'***

Targets vs. Safeguards

Hi there, I'm Harry. I am an award-winning **Consultant Front-end Architect**, **designer**, **developer**, **writer** and **speaker** from the UK. I **write**, **tweet**, **speak** and **share code** about authoring and scaling CSS for big websites. You can **hire me**.

Follow @csswizardry

I am currently **accepting new projects** for Q1–2 2020

Projects

https://csswizardry.com/2020/01/performance-budgets-pragmatically/

“

Having a pre-defined ‘budget’ is a clear, tangible way to frame decisions about what can and can’t be be included, and at a suitably early stage in the project.

Mark Perkins

https://clearleft.com/posts/responsive-design-on-a-budget

What if a change breaks the budget?

- Optimize an existing feature or asset on the page.
- Remove an existing feature or asset from the page.
- Don’t add the new feature or asset.

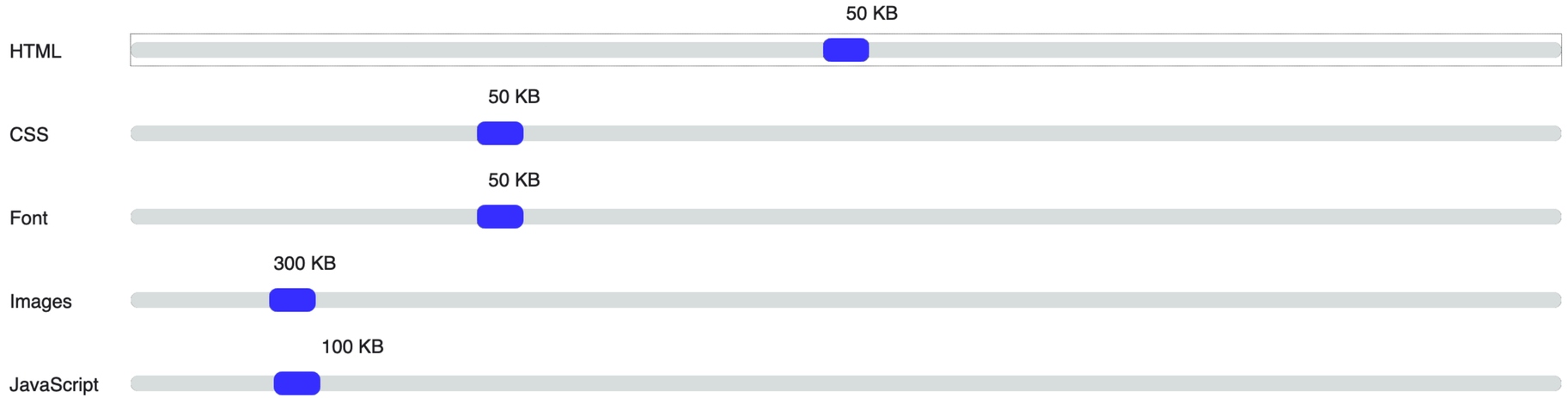
Performance Budget Calculator

4.5s **Estimated Time to Interactive**

Median TTI for similar mobile sites.

3.4 - 5.6s **Time to Interactive Range**

25th - 75th percentile TTI for similar mobile sites.



* Measurements represent *transferred* file size.

Download budget.json

A budget.json file can be used with the Lighthouse CLI to set performance budgets.

https://perf-budget-calculator.firebaseapp.com/

http archive

REPORTS DISCUSS ALMANAC ABOUT

The **HTTP Archive** Tracks How the **Web is Built.**

We periodically crawl the top sites on the web and record detailed information about fetched resources, used web platform APIs and features, and execution traces of each page. We then crunch and analyze this data to identify trends — learn more about our methodology.

View Reports

Codifying,
Monitoring

WEBPAGETEST

Travis CI

Some checks were not successful
1 failing and 2 successful checks

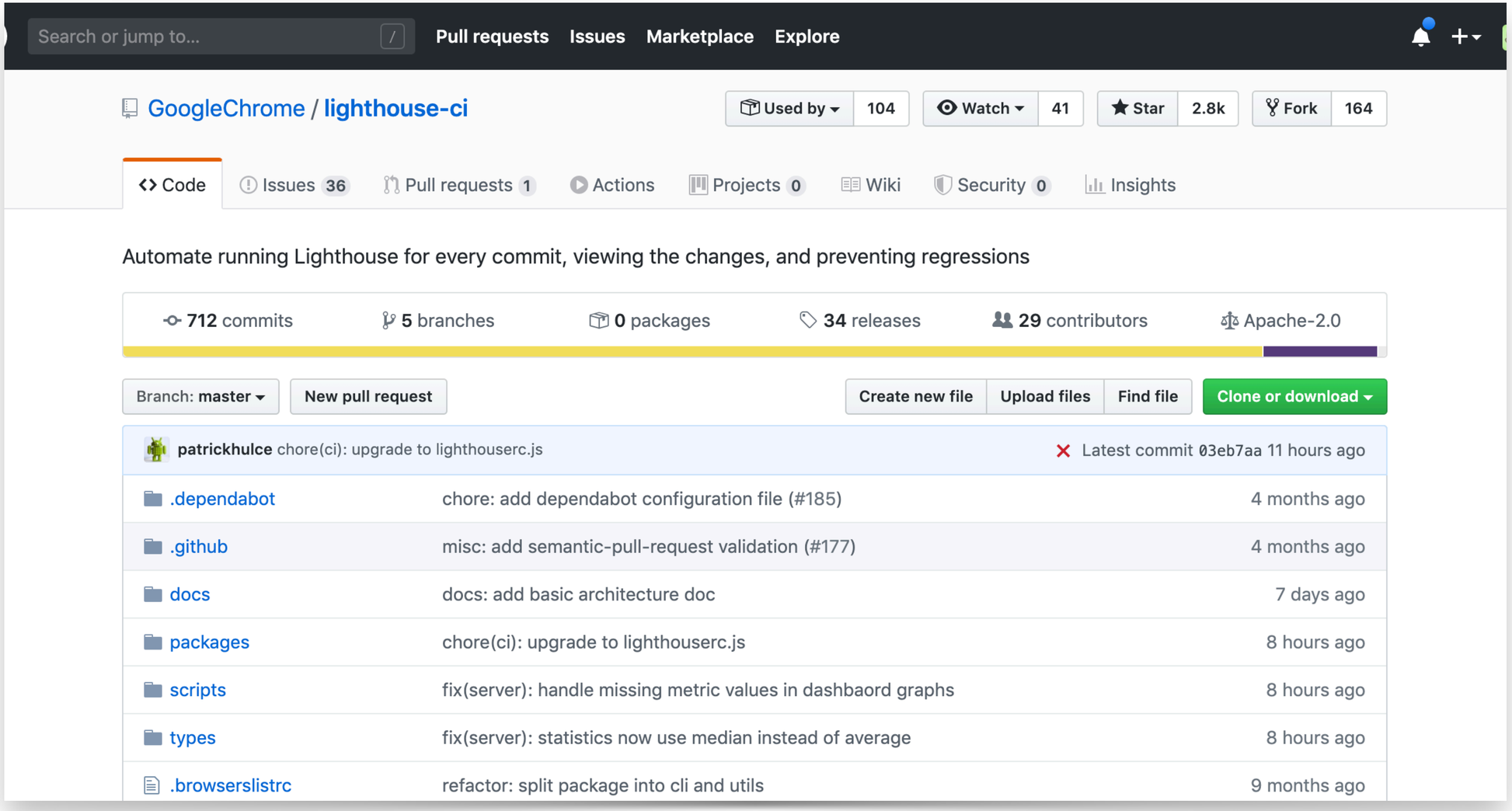
Hide all checks

✕	**Lighthouse** — Failed. Required scores: performance:96,pwa:100.	Details
✓	**continuous-integration/travis-ci/pr** — The Travis CI build passed	Details
✓	**continuous-integration/travis-ci/push** — The Travis CI build passed	Details

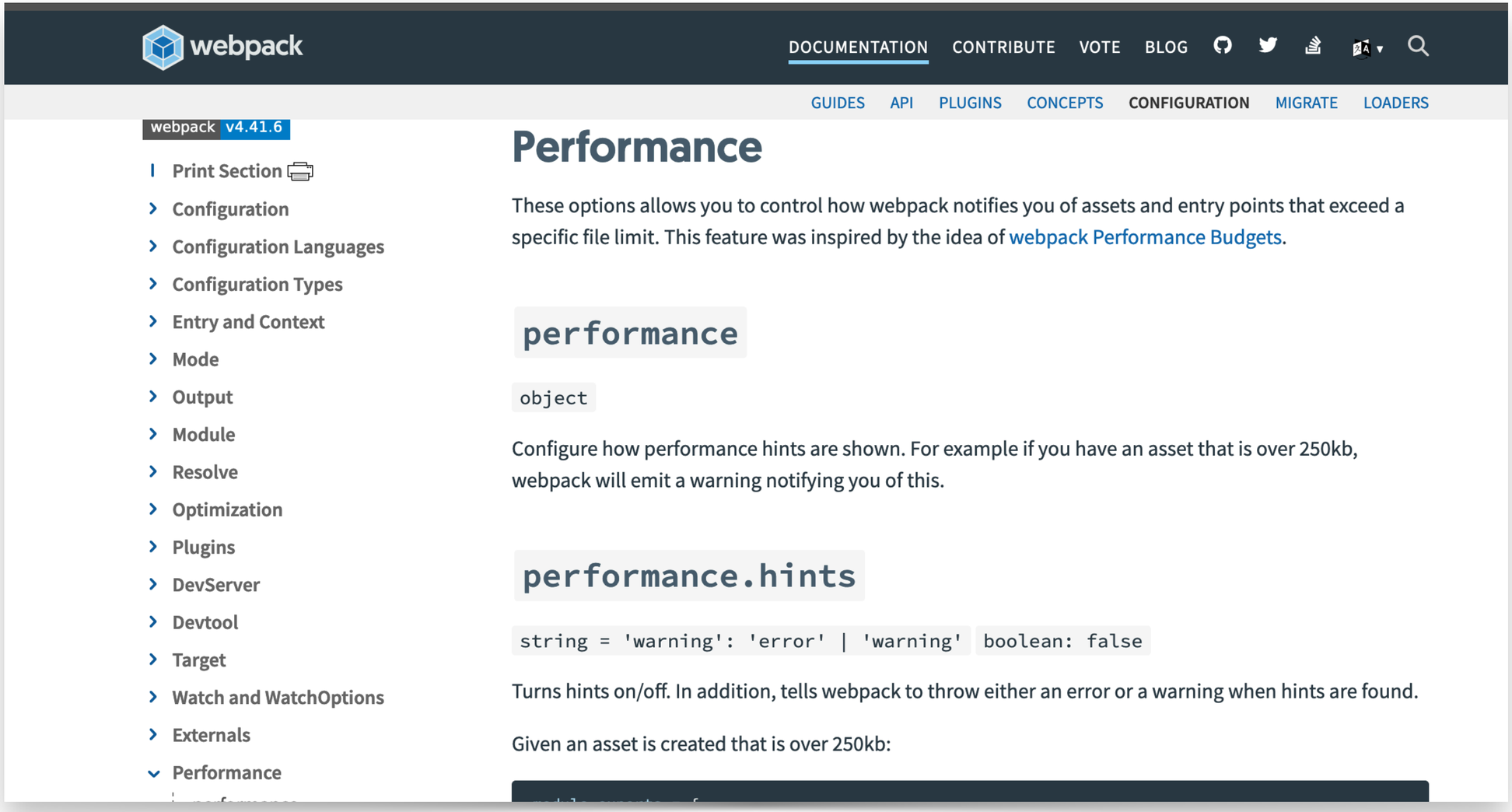
This branch has no conflicts with the base branch
Merging can be performed automatically.

Merge pull request ▾ You can also open this in GitHub Desktop or view command line instructions.

https://github.com/ebidel/lighthouse-ci

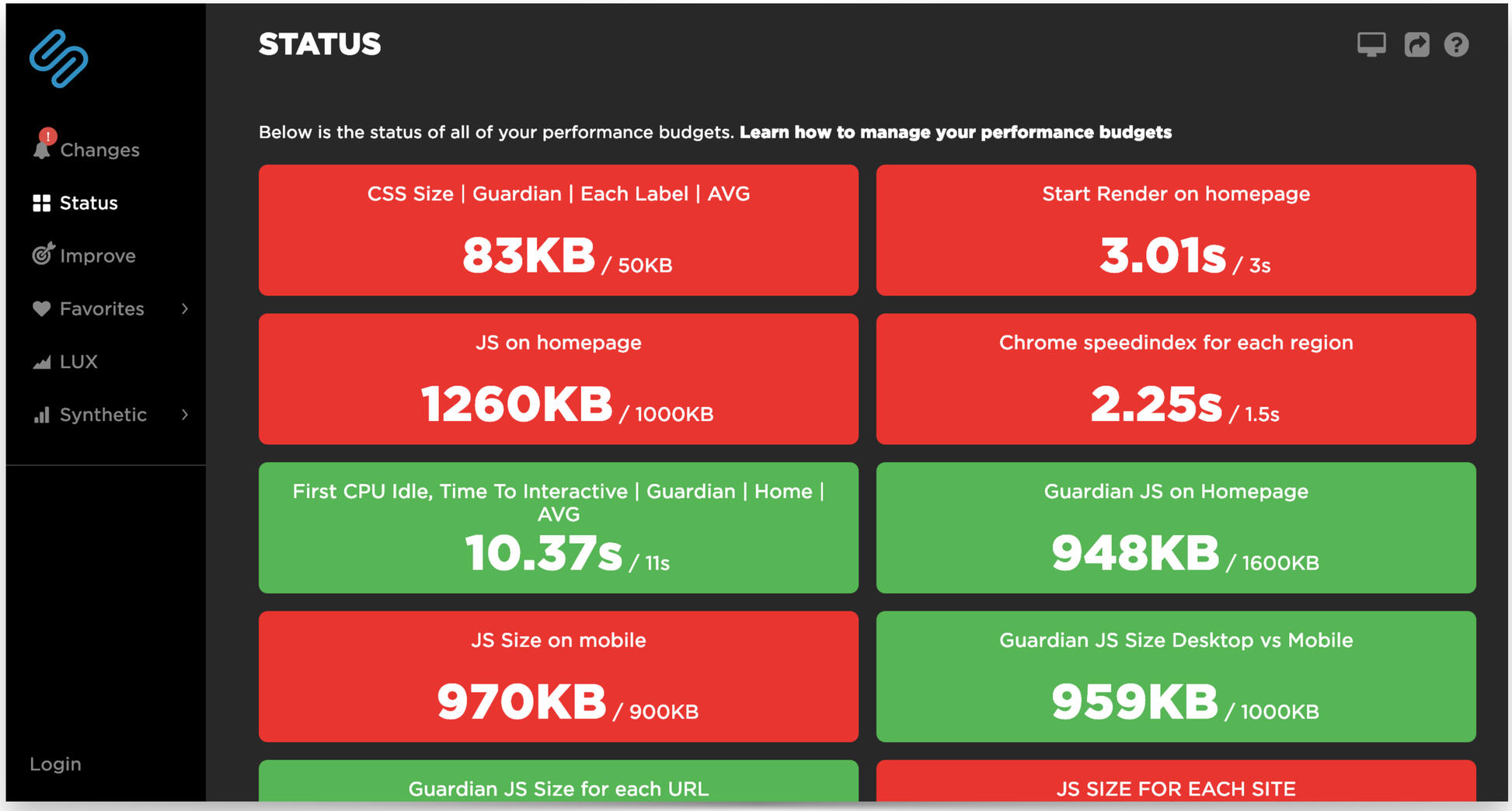


https://github.com/ebidel/lighthouse-ci



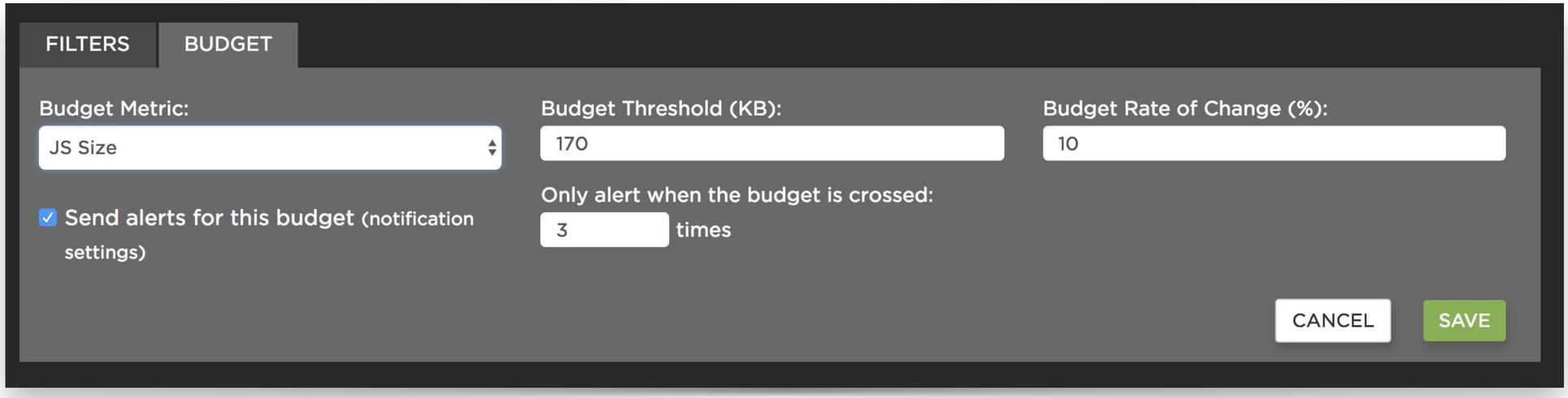
https://webpack.js.org/configuration/performance/

https://speedcurve.com/



https://speedcurve.com/

SpeedCurve



https://speedcurve.com/

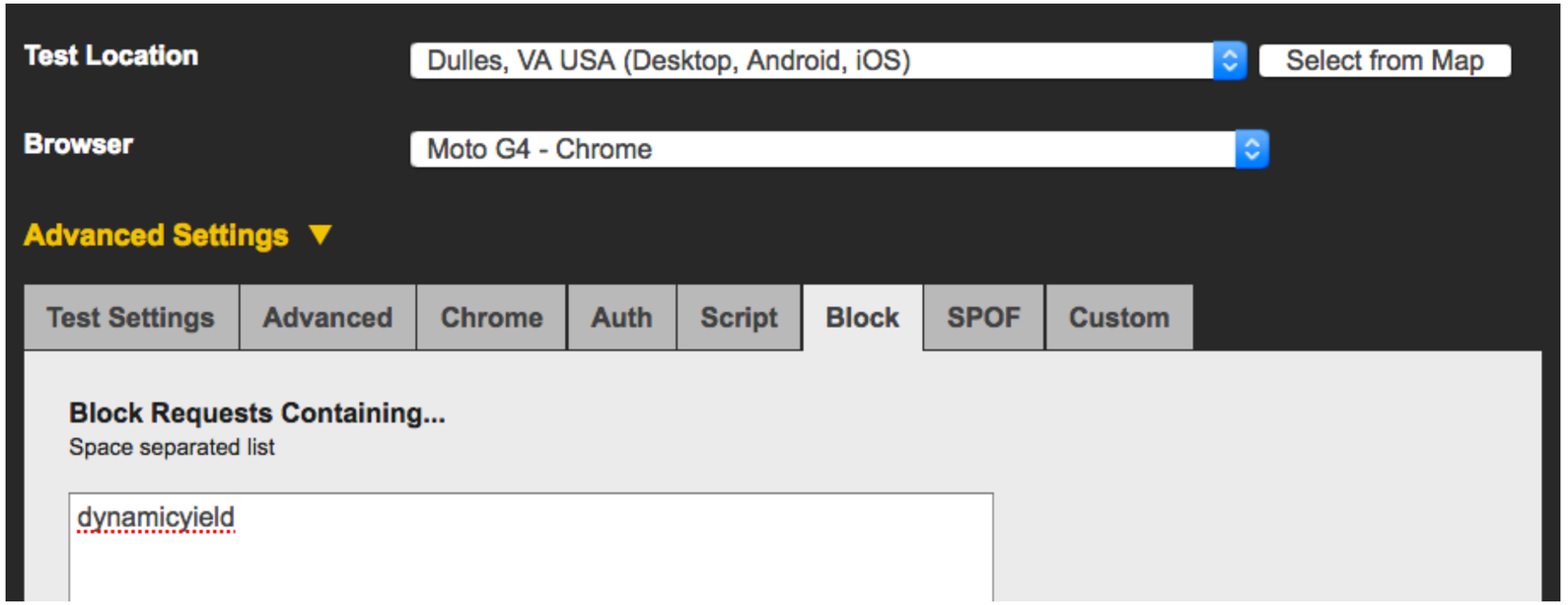
SpeedCurve

JS Size is over by 55%

The budget on JS (Syn), US West Coast, Chrome has crossed over the threshold of 170 KB by 55% and is now 264 KB.

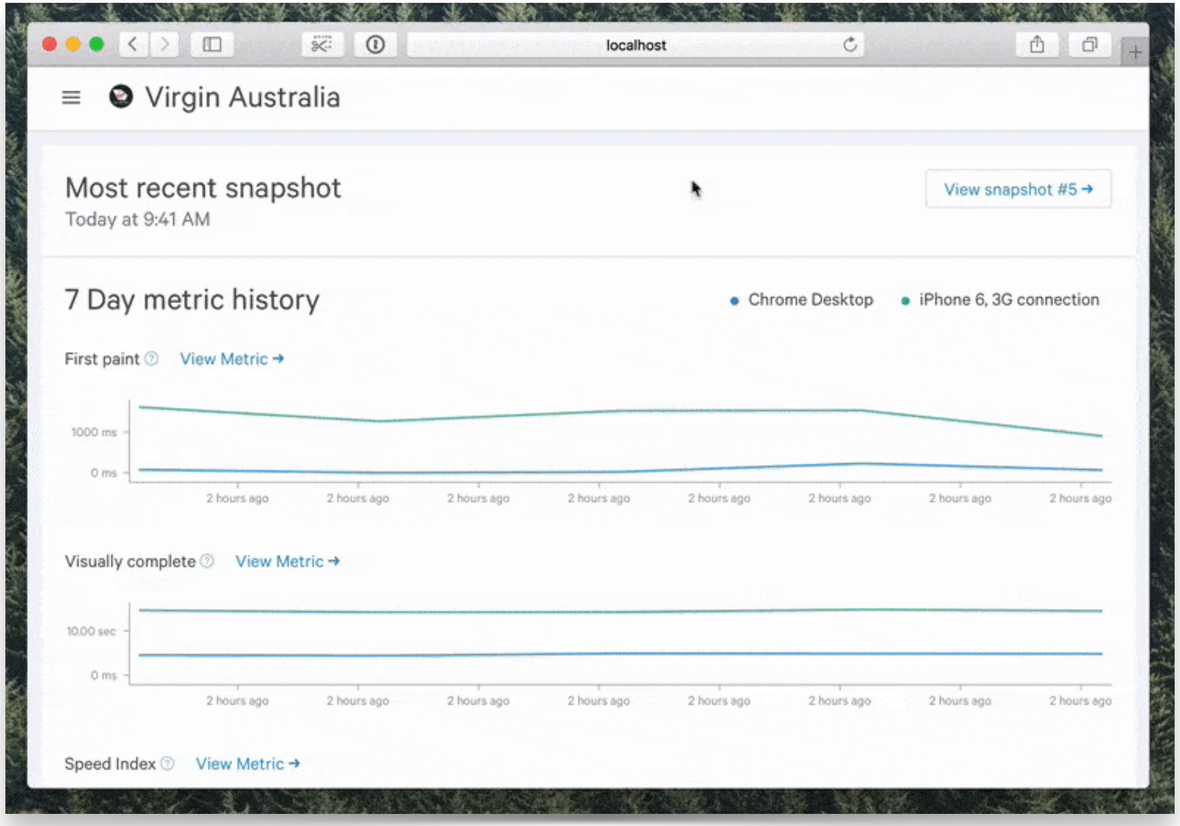
SpeedCurve's performance budget alerts inform me when I've exceeded my JavaScript size budget.

https://speedcurve.com/


Test Location
Dulles, VA USA (Desktop, Android, iOS)
Select from Map
Browser
Moto G4 - Chrome
Advanced Settings
Test Settings
Advanced
Chrome
Auth
Script
Block
SPOF
Custom
Block Requests Containing...
Space separated list
dynamicyield

https://calibreapp.com/

Calibre

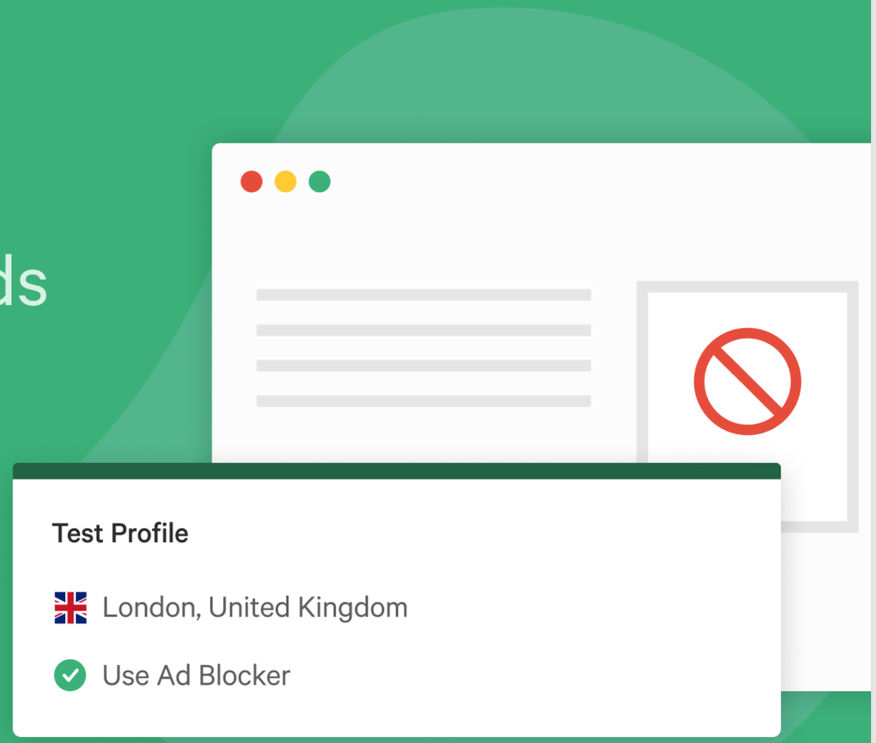


https://calibreapp.com/docs/metrics/budgets

Adblocking NEW

Test your site with or without ads and third-party scripts.

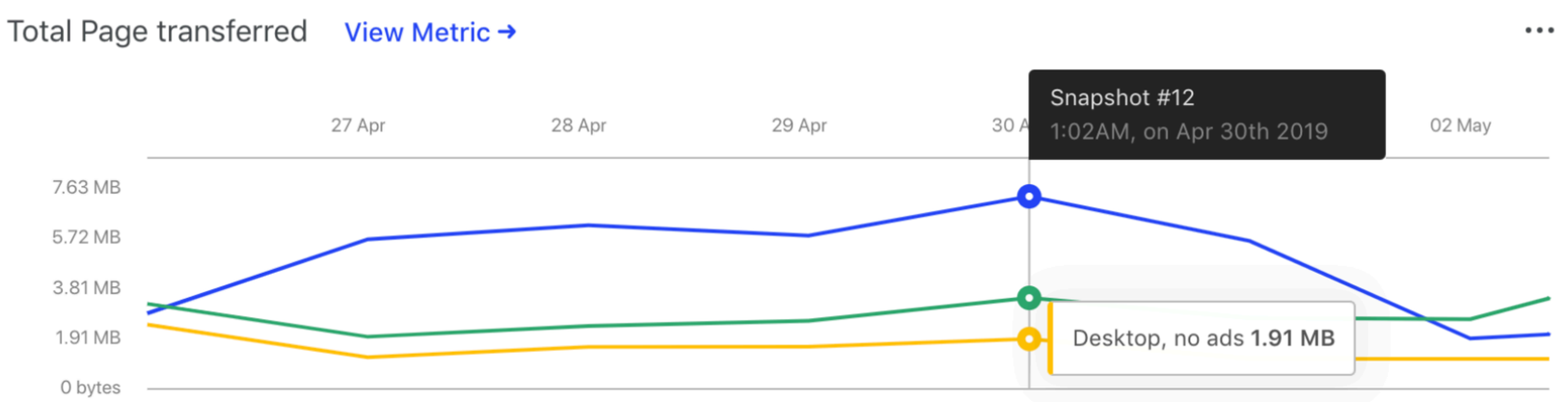
- Effortlessly compare performance
- No code changes required



https://calibreapp.com/blog/test-without-ads/

Ad blocking in action

After Calibre has tested your site, stats will be shown alongside existing Test Profiles:



https://calibreapp.com/blog/test-without-ads/

Lightning-Fast **Web Performance**

Scott Jehl, WebPageTest Team

WebPageTest by catchpoint

Taking it further!

- Audit some sites you've worked on. (Or any site!)
- Check it in Webpage Test, PSI, Dev Tools
- Identify 3 most critical performance problems