

Web Performance

Alaa Reuschenbach & Lucas Dohmen



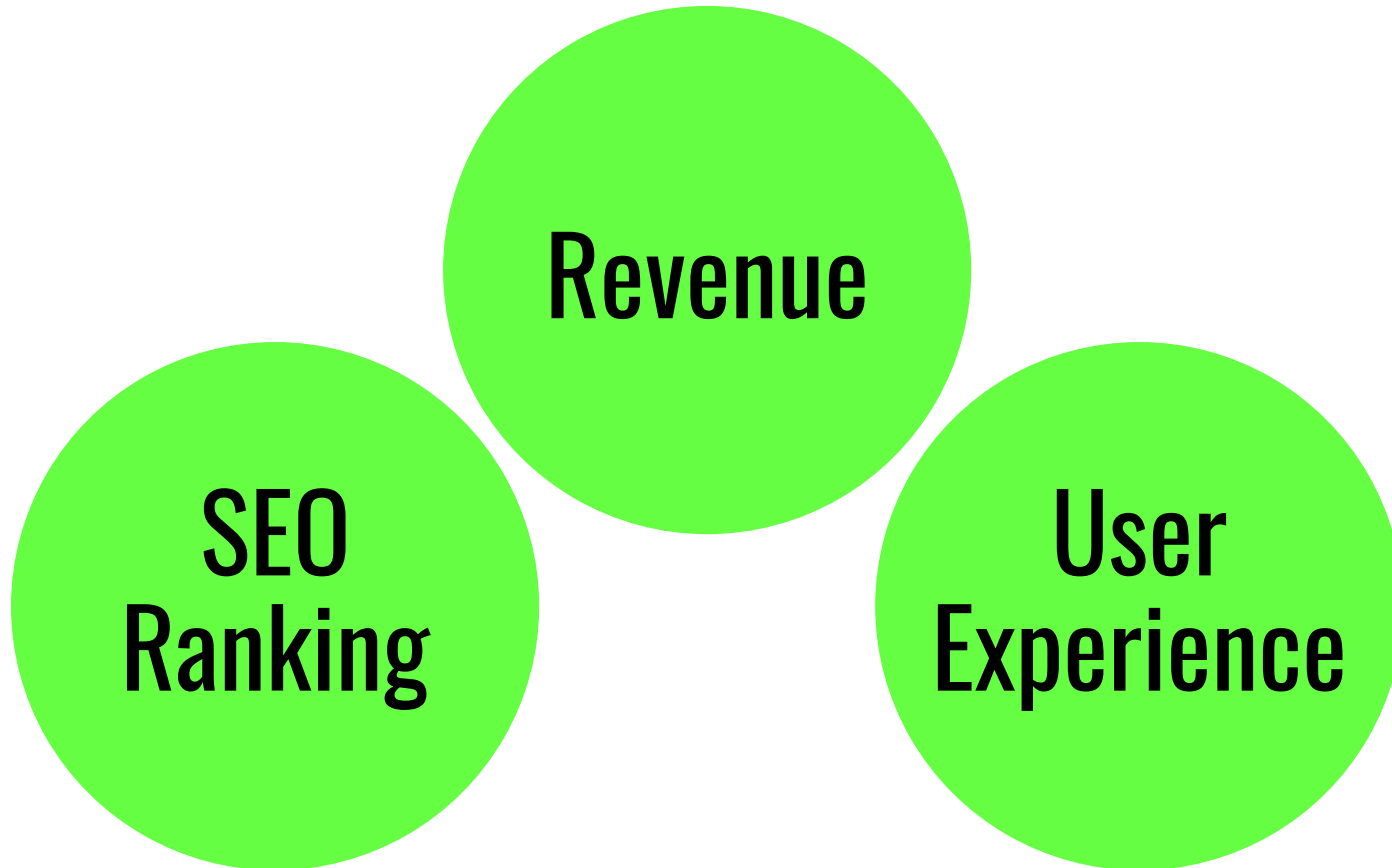
SWAGLab

Photo by Luca David, published under the Unsplash Licence

What is Web Performance?

- ◆ Perceived speed of the website for individual users
 - ◆ How fast does the page load?
 - ◆ How fast does the page respond to input?
- ◆ This is not about scalability as in how many people can use the website at once

Why is Web Performance important?



Who we are



Lucas Dohmen

Principal Consultant at
SWAGLab



Alaa Reuschenbach

IT-Consultant at
SWAGLab

**At komoot, Lucas led the effort of
improving the performance of the web app.**

So how does it work?

Agenda

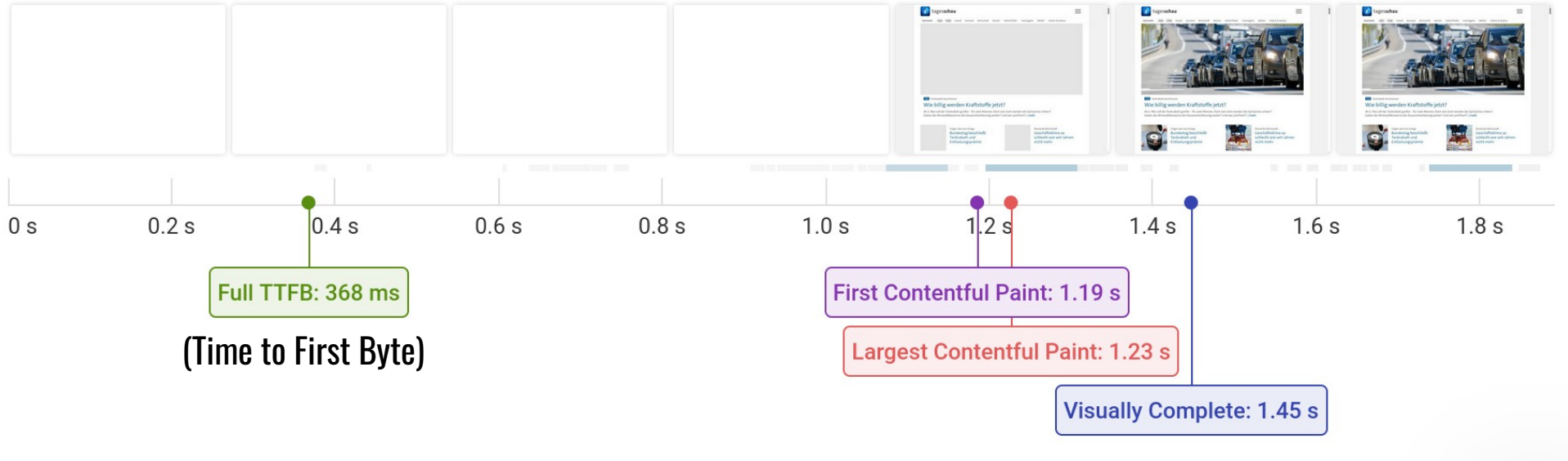
- ◆ **Metrics**
- ◆ **Reduce Bandwidth**
- ◆ **Loading Order**
- ◆ **Organizational Measures**
- ◆ **Wrap-up**

Metrics

Page Rendering

Rendering Filmstrip

FCP 1.2 s LCP 1.2 s All 1.4 s ▼



Time to First Byte

	DURATION	START TIME	END TIME
● Waiting	3 ms	0 ms	3 ms
● DNS	6 ms	3 ms	8 ms
● TCP	105 ms	8 ms	113 ms
● SSL (TLS 1.3)	111 ms	113 ms	225 ms
● TTFB	144 ms	225 ms	368 ms

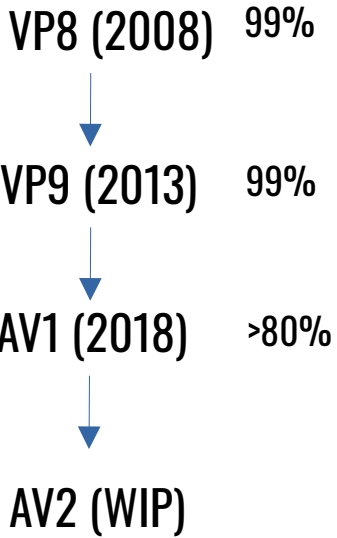
Core Web Vitals

- ◆ **Largest Contentful Paint** < 2.5s
- ◆ **Cumulative Layout Shift** < 0.1
- ◆ **Interaction to next Paint** < 200ms

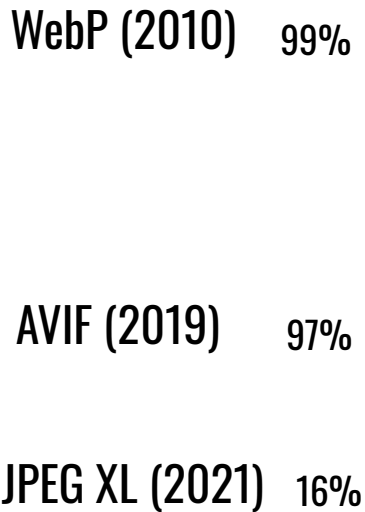
Reduce Bandwidth

Compression is always evolving

Videos



Images



Text



Fonts



Text Compression

Always enable

Brotli and Zstandard

Compression

Image Compression

- ◆ **WebP**
- ◆ **AVIF**
- ◆ **JPEG XL**

Demo Time: Image Compression

Optimizing Fonts

- ◆ **WOFF2**
- ◆ **Subsetting**
- ◆ **Layout Features**

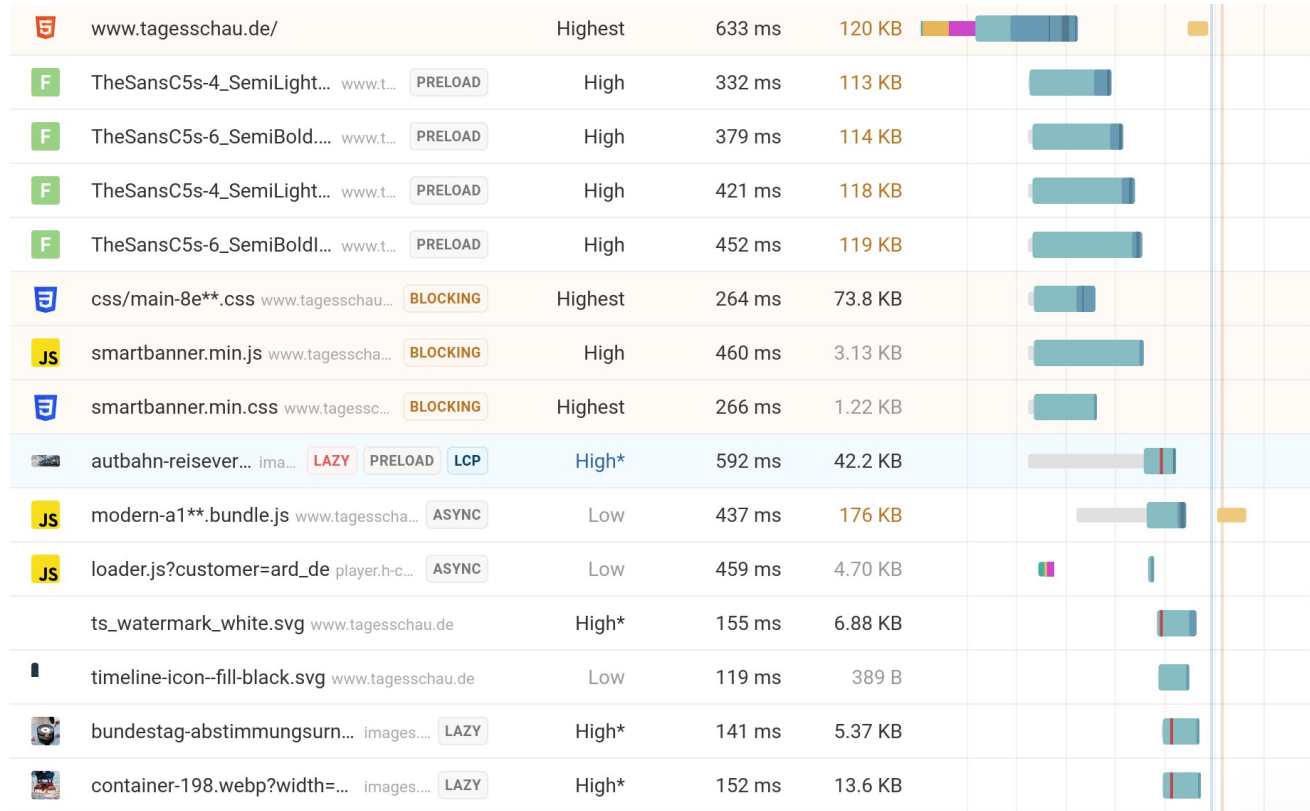
Demo Time: Font Optimization

Optimizing Fonts

Font	Uncompressed	Compressed	Subsetting	Reduced Featureset
Lato Regular	75kb	28kb	15kb	15kb
Fixel Variable	472kb	199kb	74kb	31kb

Loading Order

Waterfall



Demo Time: Waterfall

Eager load & Preload

Above the fold

Below the fold

**The problem:
The fold is a lie**

Lazy load

Tools

Commercial Tools

Lab Testing Tools:

- Lighthouse
- webpagetest.org
- DebugBear
- ...

RUM Tools:

- CruX
- DebugBear
- SpeedCurve
- Datadog
- New Relic
- Sentry
- ...

Chromium DevTools

https://www.tagesschau.de/

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There were issues affecting this run of Lighthouse:

- There may be stored data affecting loading performance in this location: indexedDB. Audit this page in an incognito window to prevent those resources from affecting your scores.
- The page loaded too slowly to finish within the time limit. Results may be incomplete.

67 Performance

Values are estimated and may vary. The [performance score is calculated](#) directly from these metrics: [Sag calculator](#).

▲ 0-49 ■ 50-89 ● 90-100

METRICS Expand view

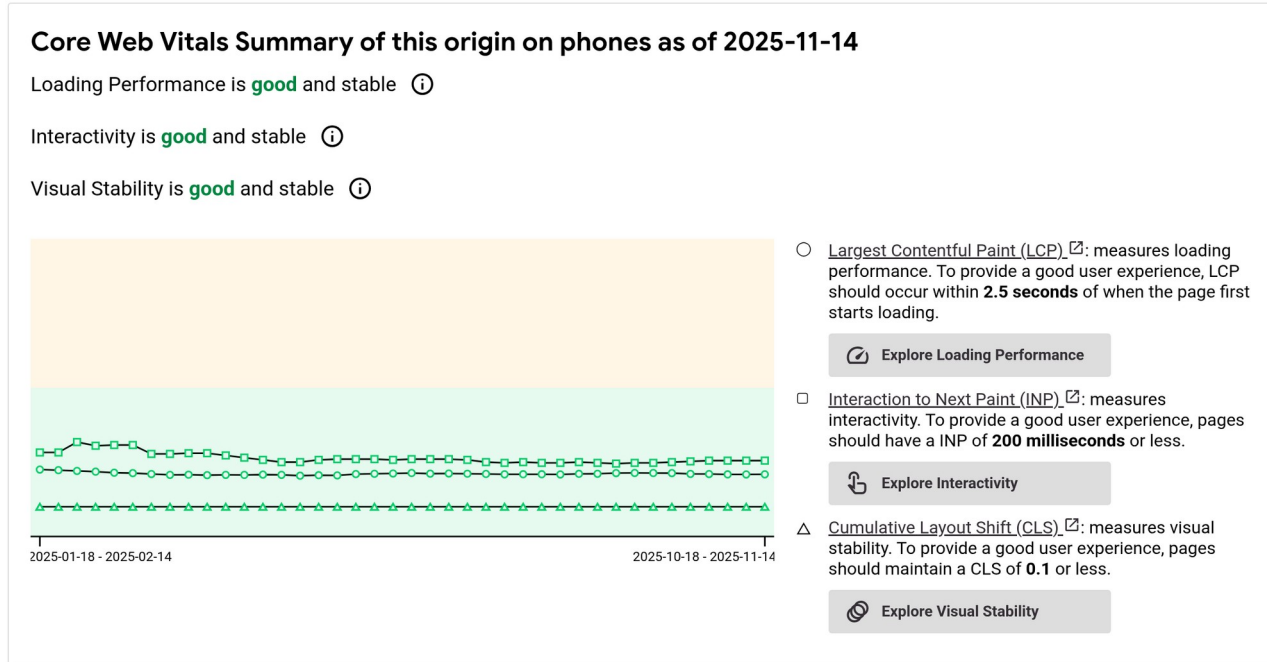
<p>■ First Contentful Paint</p> <p>1.9 s</p>	<p>▲ Largest Contentful Paint</p> <p>6.1 s</p>
<p>■ Total Blocking Time</p> <p>300 ms</p>	<p>● Cumulative Layout Shift</p> <p>0</p>
<p>■ Speed Index</p> <p>4.8 s</p>	

View Treemap

Show audits relevant to: All FCP LCP TBT CLS

CrUX

Performance in all Chrome Browsers



Available only if your site has enough visitors

Additional hints

- **Always set width and height for img to improve CLS**
- **Compression Dictionary**
- **Font-display: swap/optional**

Organizational Measures

Organizational Measures

- ◆ **We define performance budgets to prevent regressions:**
 - ◆ **Time based: Using one of the metrics**
 - ◆ **Size based: File transfer size (JS, images...)**
 - ◆ **Rule based: Lighthouse score**
- ◆ **We either define alerts or fail the build**

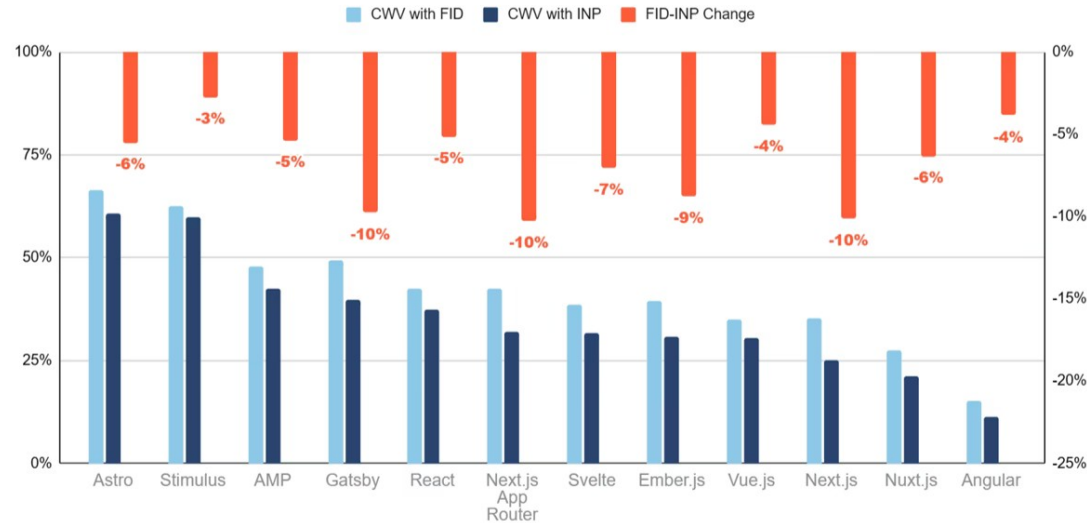
Wrap-up

**The Largest Contentful Paint can be improved
with a lot of small steps**

INP might require bigger changes

The Frontend Sadness Index

Web Almanac 2024: Performance (HTTP Archive and CrUX)



Thanks!

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