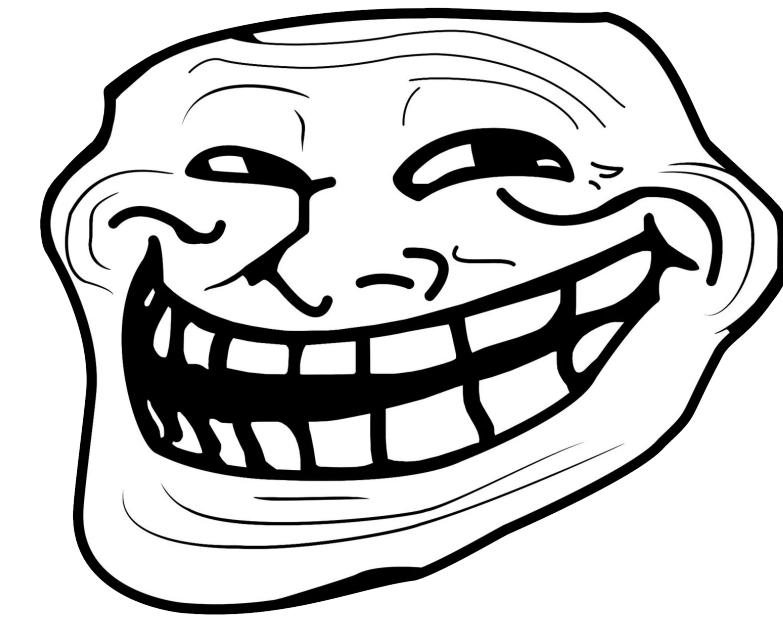


Hvorfor er nettsiden min treig?

Et dypdykk i performance på web

Knut Haugen @ Javazone 2025

Fordi du bruker React



Knut Haugen

Utvikler siden år 2000

NRK siden 2017

Jobber med strømming av video og avspillere



Historietime

Familien Lykke

Familielykke er som kjent et relativt begrep.





React*

"I hold this truth to be self-evident: the larger the abstraction layer a web developer uses on top of web standards, the shorter the shelf life of their codebase becomes, and the more they will feel the churn."

Skal vi bruke React?



Må vi støtte IE9?

|

Nei



Nei

OLD MAN YELLS AT CLOUD



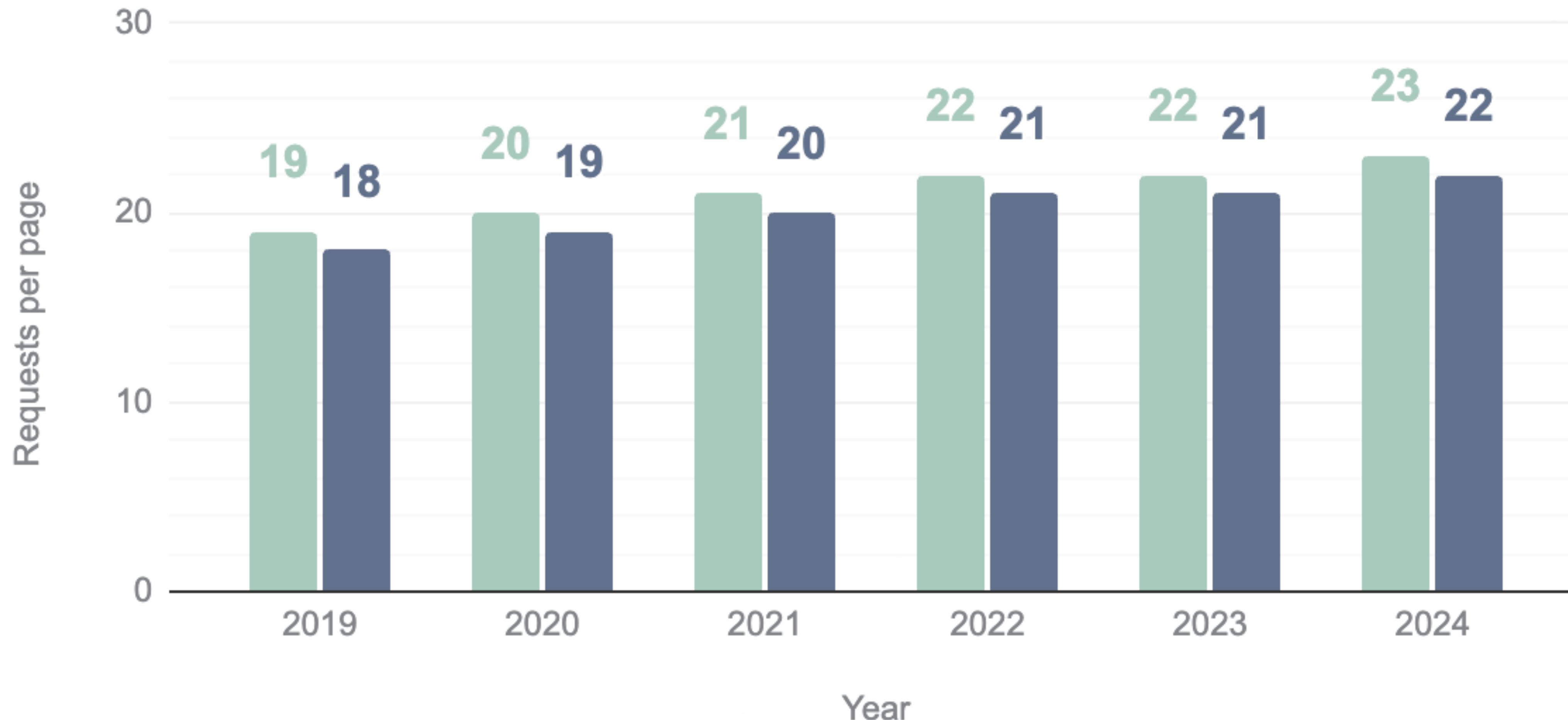
Hvordan står det til med
webben?

**Jobben er å lage gode
brukeropplevelser**

Median JavaScript requests per page

Web Almanac 2024: JavaScript

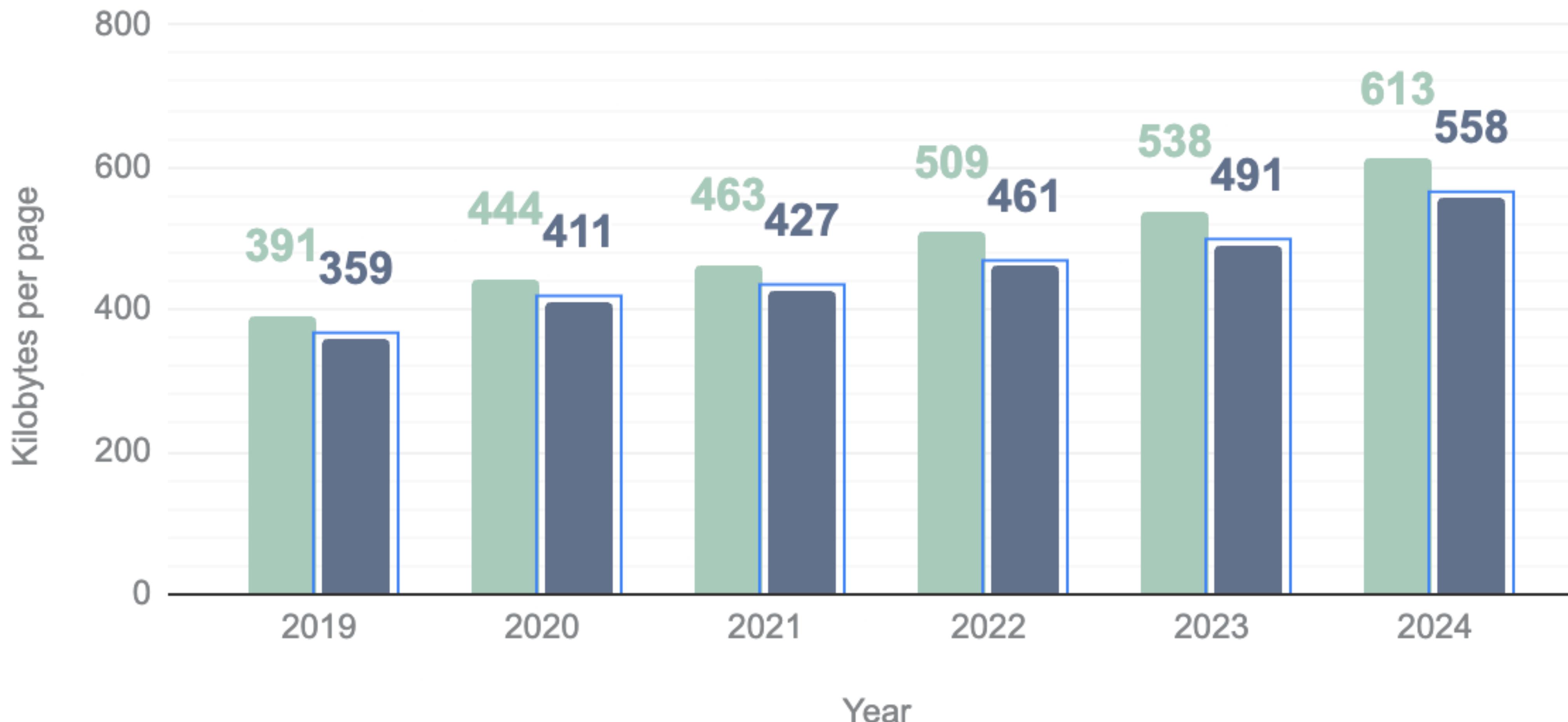
desktop mobile



Median JavaScript kilobytes per page

Web Almanac 2024: JavaScript

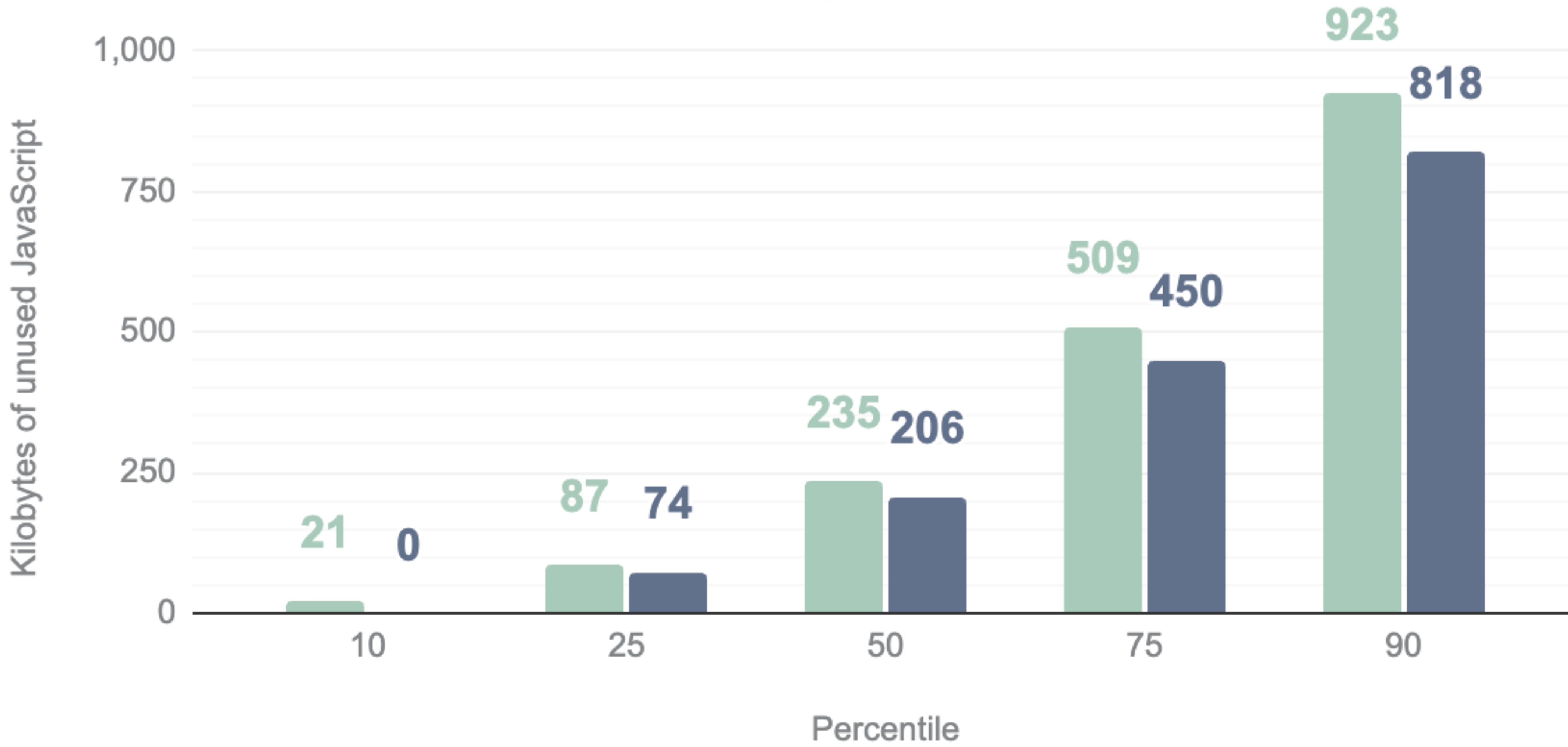
desktop mobile



Distribution of unused JavaScript

Web Almanac 2024: JavaScript

desktop mobile



ARMV7

1350 Mhz

1GB RAM



2020

49%

Andel android-telefoner i det Norske markedet

~1 mill eldre

315 182 flyktninger i Norge

580 000 med lav inntekt

Utviklere er ikke vanlige folk

Environment settings

Use the [device toolbar](#) and configure throttling to simulate real user environments and identify more performance issues.

CPU: 20× slowdown ▾

Network: Fast 4G ▾

Disable network cache

While this might have been an acceptable tradeoff in a time where every CPU cycle mattered, it's a bad proposition today when we mostly care about developer productivity and time to market.

Web components som redning

Noen ord om arkitektur

20-stjerners sommerferie

Hvem er den ultimate sommerstrategen? Få med deg sommerens morsomste utfordringer!

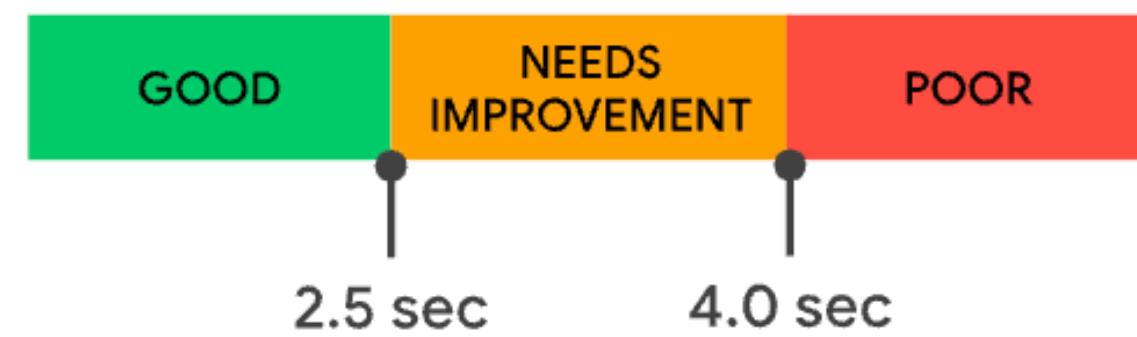


Web Vitals

(Loading)

LCP

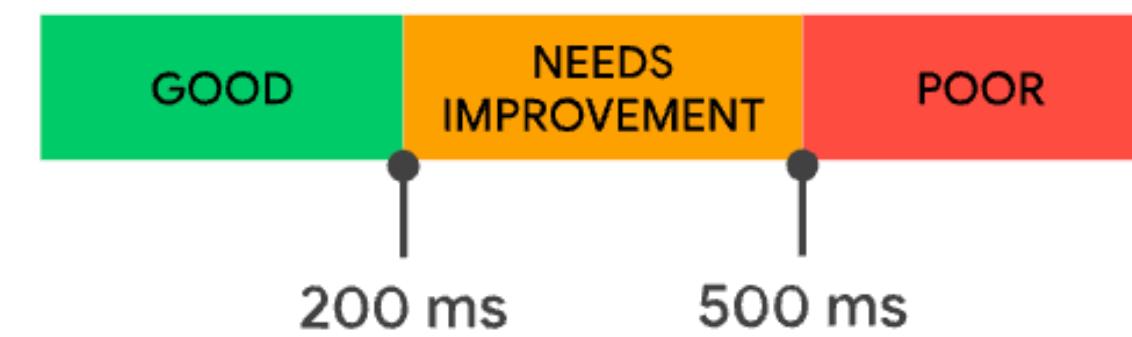
Largest Contentful Paint



(Interactivity)

INP

Interaction to Next Paint



(Visual Stability)

CLS

Cumulative Layout Shift



LCP

Sök Logg på NRK

Largest Contentful Paint (LCP)
4.00 s

Your local LCP value of **4.00 s** needs improvement.
LCP element `h2.color-white.margin-0.margin-bottom-...`

Cumulative Layout Shift (CLS)
0.00

Your local CLS value of **0.00** is good.
Worst cluster `1shift`

Interaction to Next Paint (INP)
8 ms

Your local INP value of **8 ms** is good.
INP interaction `keyboard`

Learn more about local and field metrics

Interactions Layout shifts

▶ keyboard INP `a.text-style-subhead1.display-inline-flex.border-0.text-decoration-none.color-whit...` 8 ms

Next steps

Field metrics
See how your local metrics compare to real user data in the [Chrome UX Report](#).
[Set up](#)

Environment settings
Use the [device toolbar](#) and configure throttling to simulate real user environments and identify more performance issues.

CPU: 6x slowdown
Network: Fast 4G
 Disable network cache

Record [⌘ E](#)

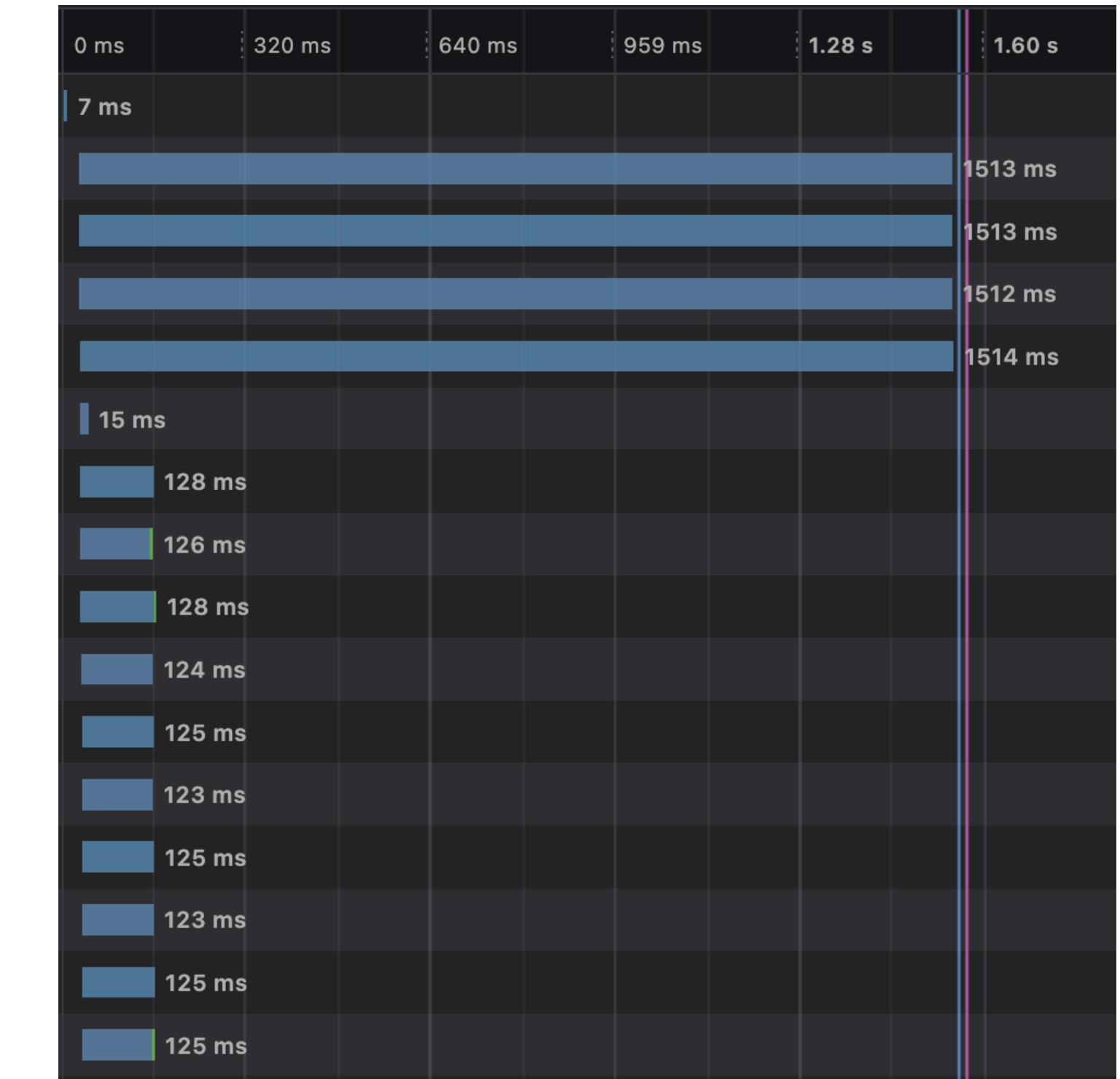
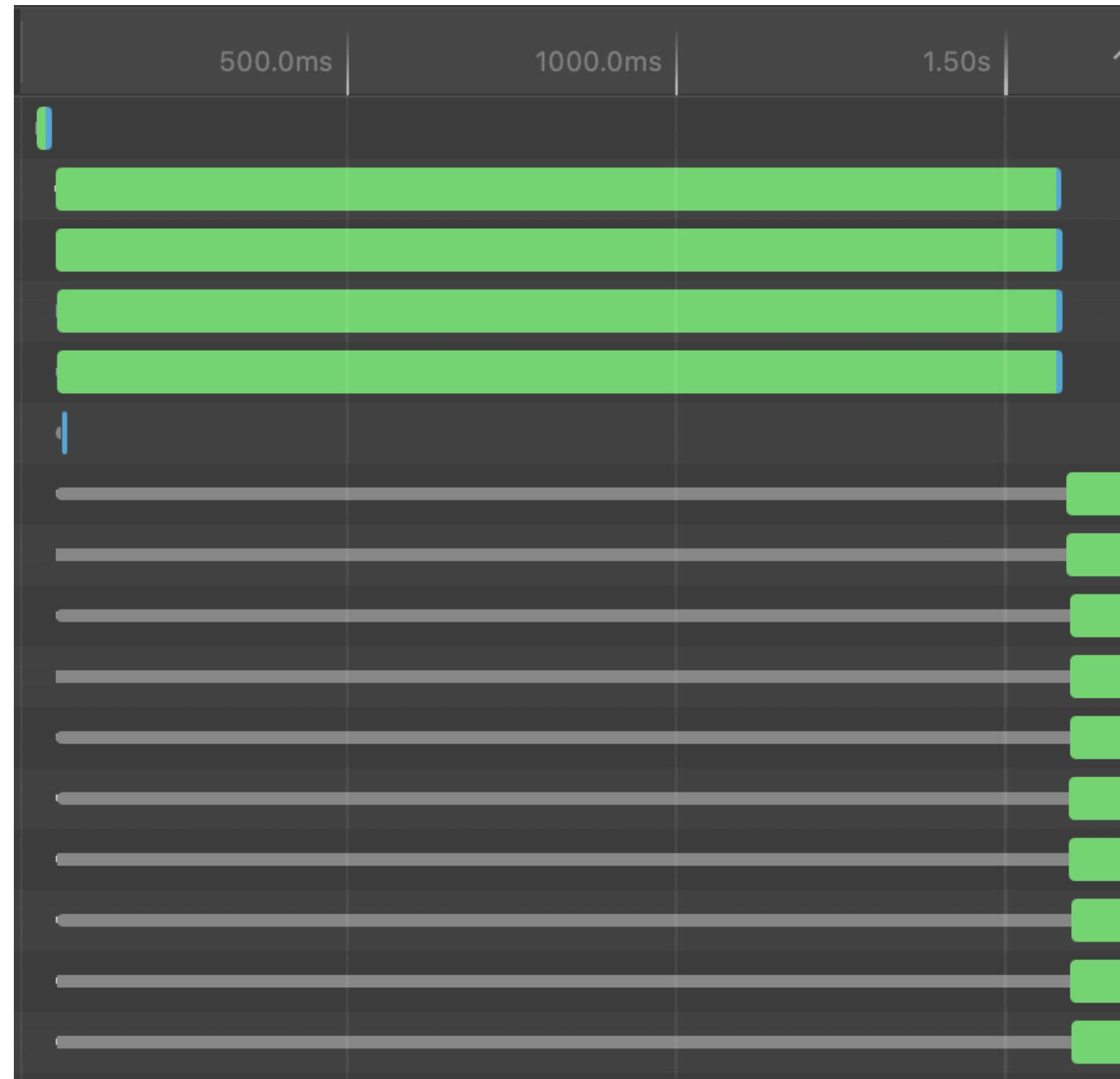
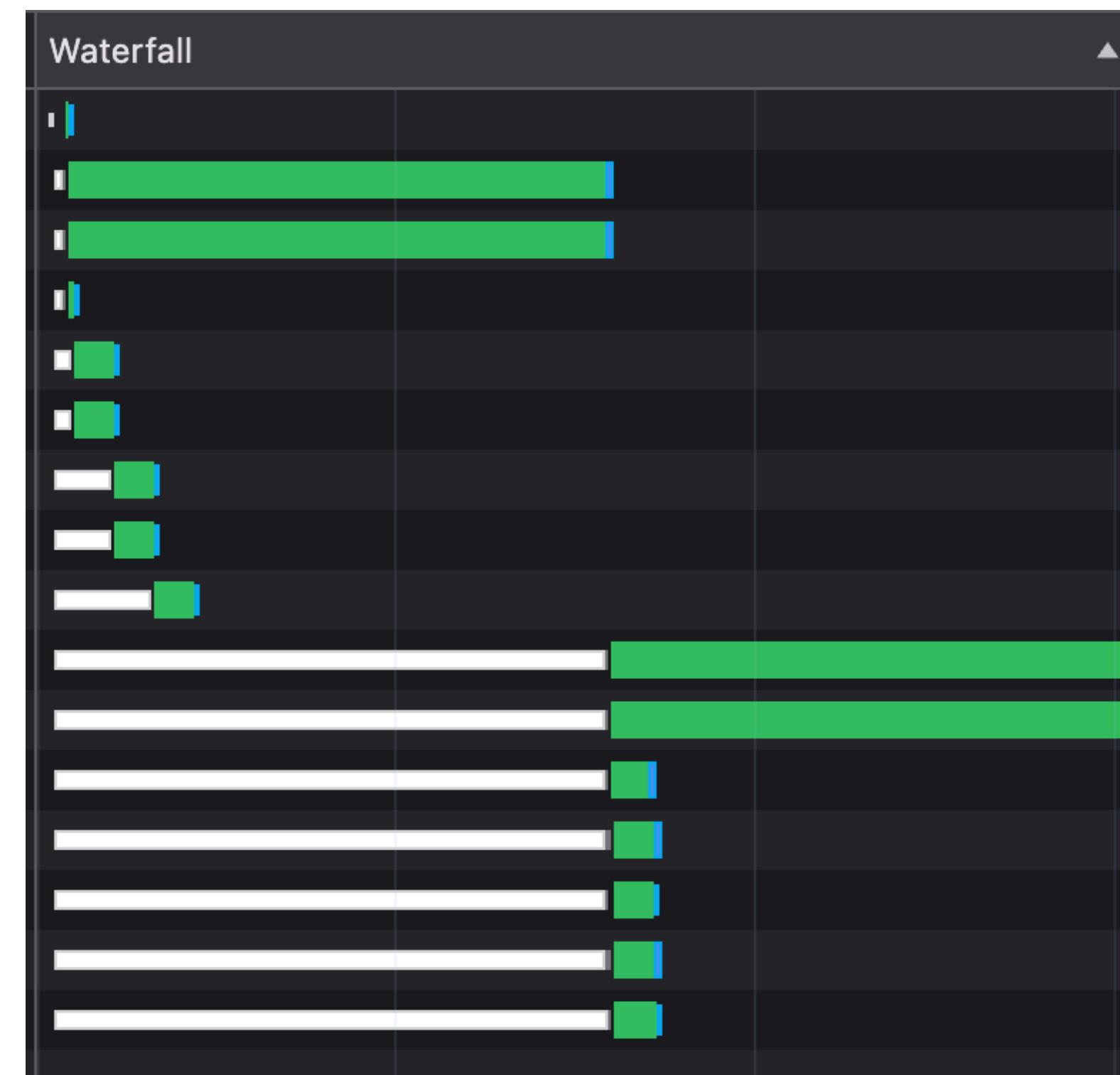
Record and reload [⌘ ⌘ E](#)

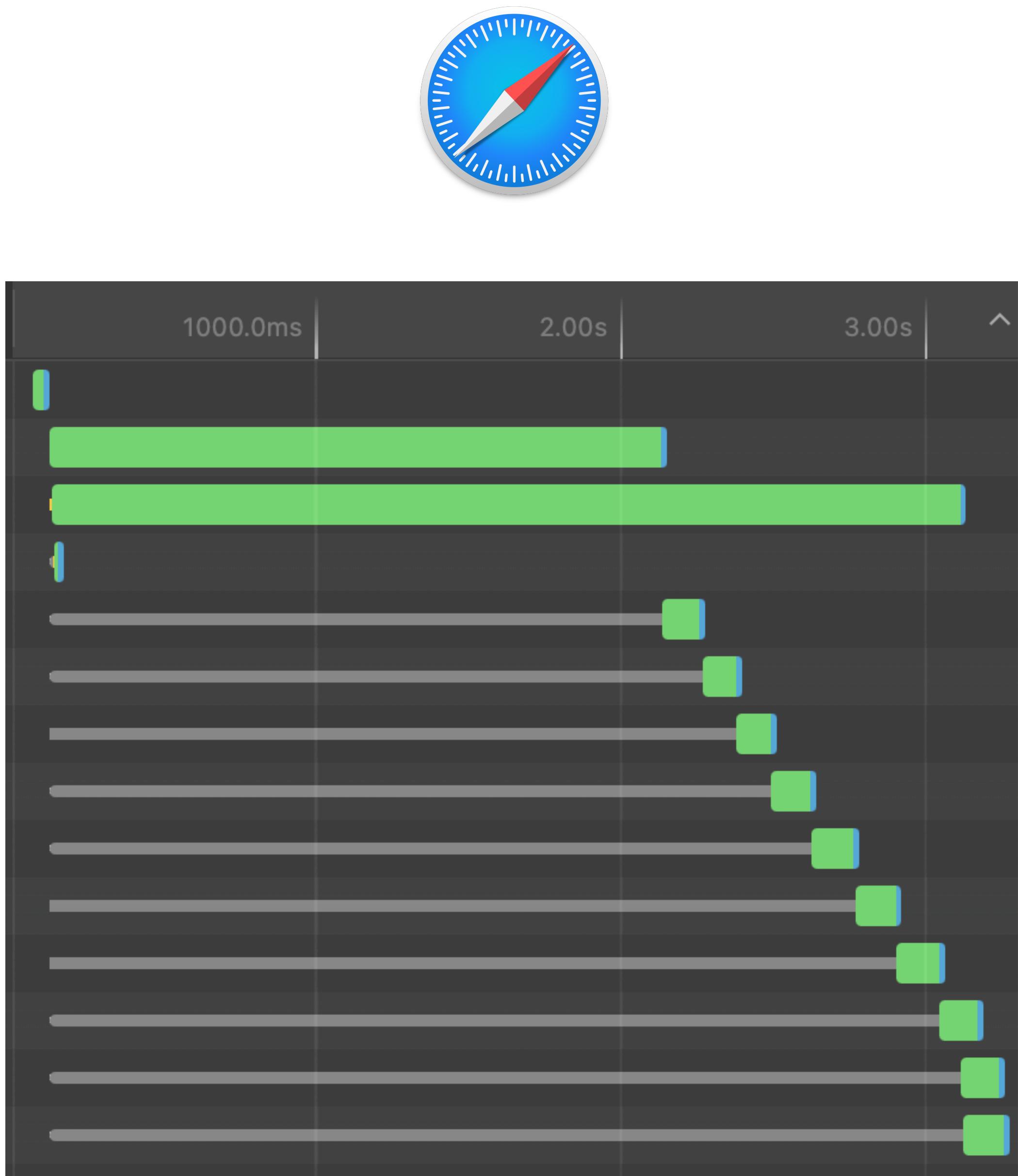
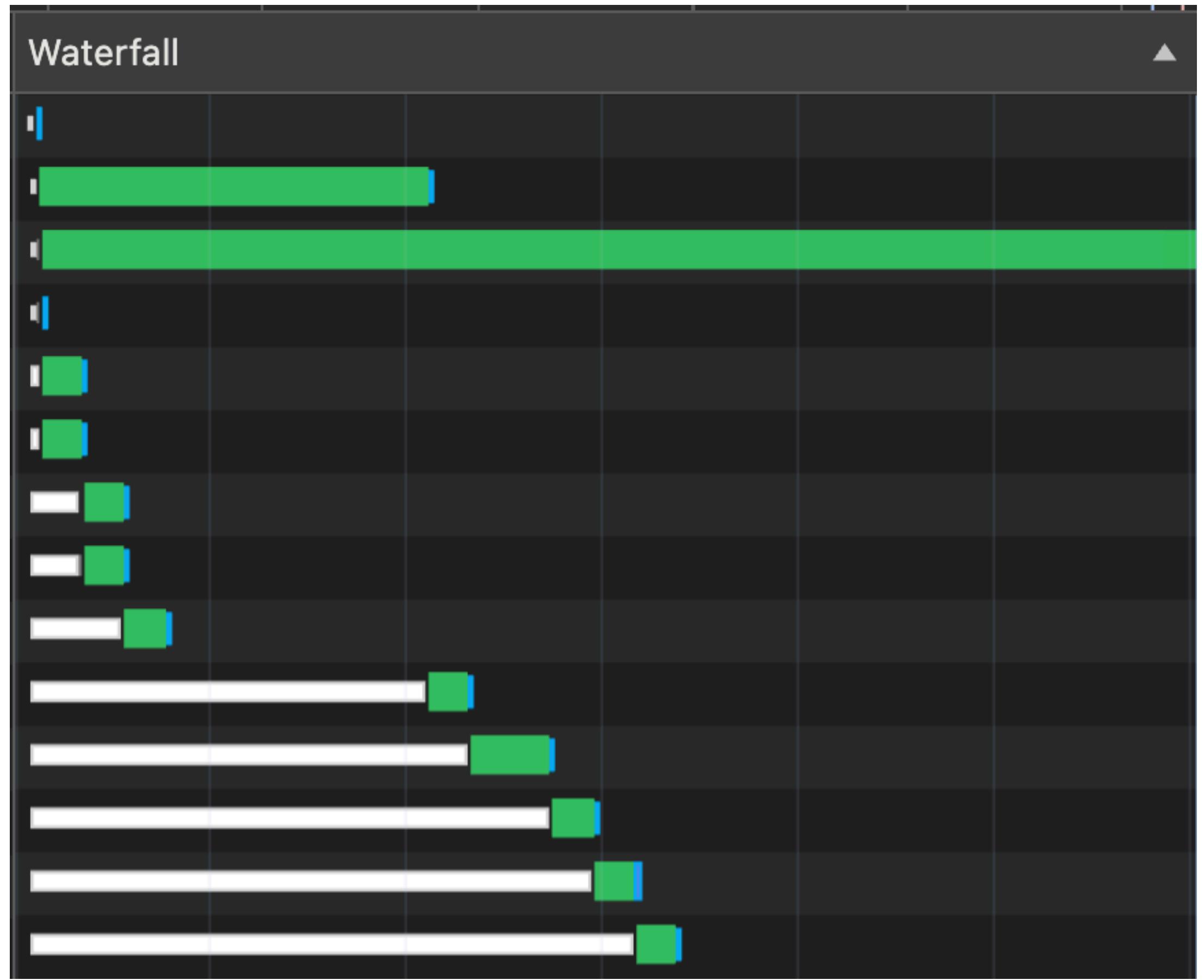
Console Issues Network conditions +

Tight mode / 2 step waterfall

Type/prioritet	Highest	High	Medium	Low	Lowest
HTML					
CSS (head)					
JS (head)					
JS (async)					
JS (defer)					
JS (body)					
Image (body)					
Image (5 første)					

Type/prioritet	Highest	High	Medium	Low	Lowest
HTML					
CSS (head)					
JS (head)					
JS (async)					
JS (defer)					
JS (body)					
Image (body)					
Image (5 første)					



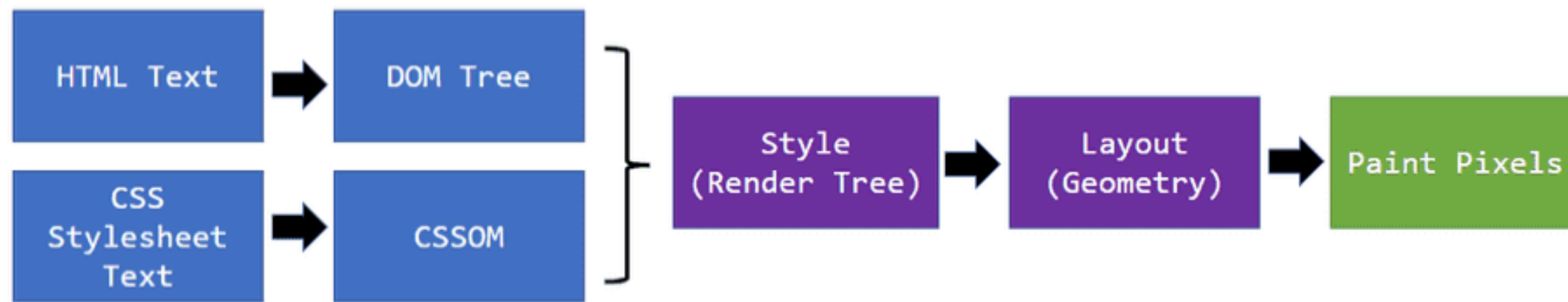




Type/prioritet	Highest	High	Medium	Low	Lowest
Font (@font-face)					
Font preload			 		
Font preload fetchpriority=high		  			
Font preload fetchpriority=low				 	

fetchpriority

Rendering pipeline



INP

CPU: 20x slowdown

Network: No throttling

Show custom tracks [Learn more](#)

Console Network conditions Rendering Network request blocking Issues What's new X

All levels ▾ No Issues 10 hidden ⚙

Hide network Log XMLHttpRequests

Preserve log Eager evaluation

Selected context only Autocomplete from history

Group similar messages in console Treat code evaluation as user action

Show CORS errors in console

✖ ▶ Error parsing 'integrity' attribute ('{__INJECTED_FROM_CONFIG_TS__}'). The hash algorithm [\(index\):136](#) must be one of 'sha256', 'sha384', 'sha512', or 'ed2559', followed by a '-' character.

⚠ ▶ Lit is in dev mode. Not recommended for production! See <https://lit.dev/msg/dev-mode> for more information. [reactive-element.js:46](#)

[DevTools] Long animation frames for 440ms keyboard interaction [VM18263:2](#)

Scripts:

(index)	Blocking dur...	Invoker type	Invoker	Function	Source	Char position
0	59	'event-liste...	'#document.o...	'handleSpati...	' https://tiz...	12700
1	248	'event-liste...	'#document.o...	'handleSpati...	' https://tiz...	12700
2	49	'event-liste...	'#document.o...	'handleSpati...	' https://tiz...	12700

▼ Array(3) i

0:
 Blocking duration: 59
 Char position: 12700
 Function: "handleSpatialNavigation"
 Invoker: "#document.onkeydown"
 Invoker type: "event-listener"
 Source: "<https://tizen-smart-tv.n635469.clients.dev.nrk.no/src/client/index.ts>"
 ► [[Prototype]]: Object
 1: {Blocking duration: 248, Invoker type: 'event-listener', Invoker: '#document.onkeydown', Function:
 2: {Blocking duration: 49, Invoker type: 'event-listener', Invoker: '#document.onkeydown', Function:
 length: 3
 ► [[Prototype]]: Array(0)

Intersecting long animation frame events: ► [...] [VM18263:5](#)

>

Det skjer for mye her!

AbortController

ScrollObserver

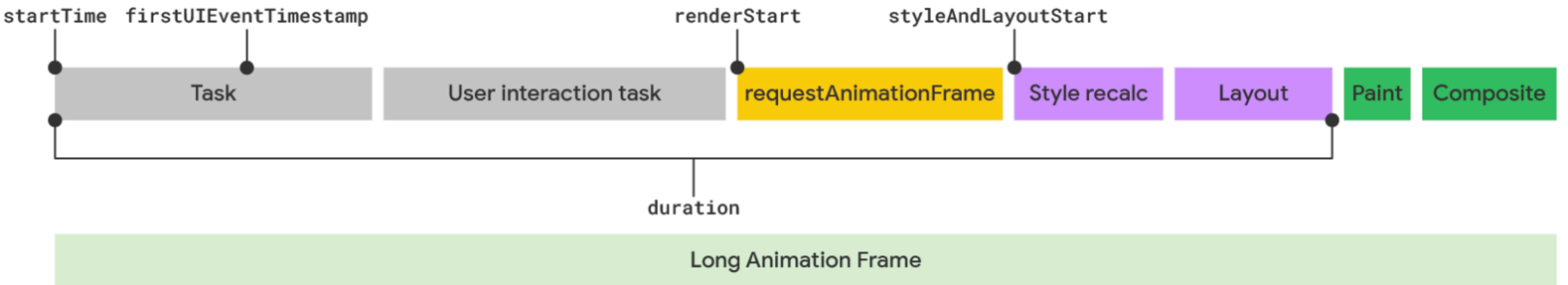
Bildestørrelse

Animasjons-easing

Box-shadow

Soft Navigations API

LOAF

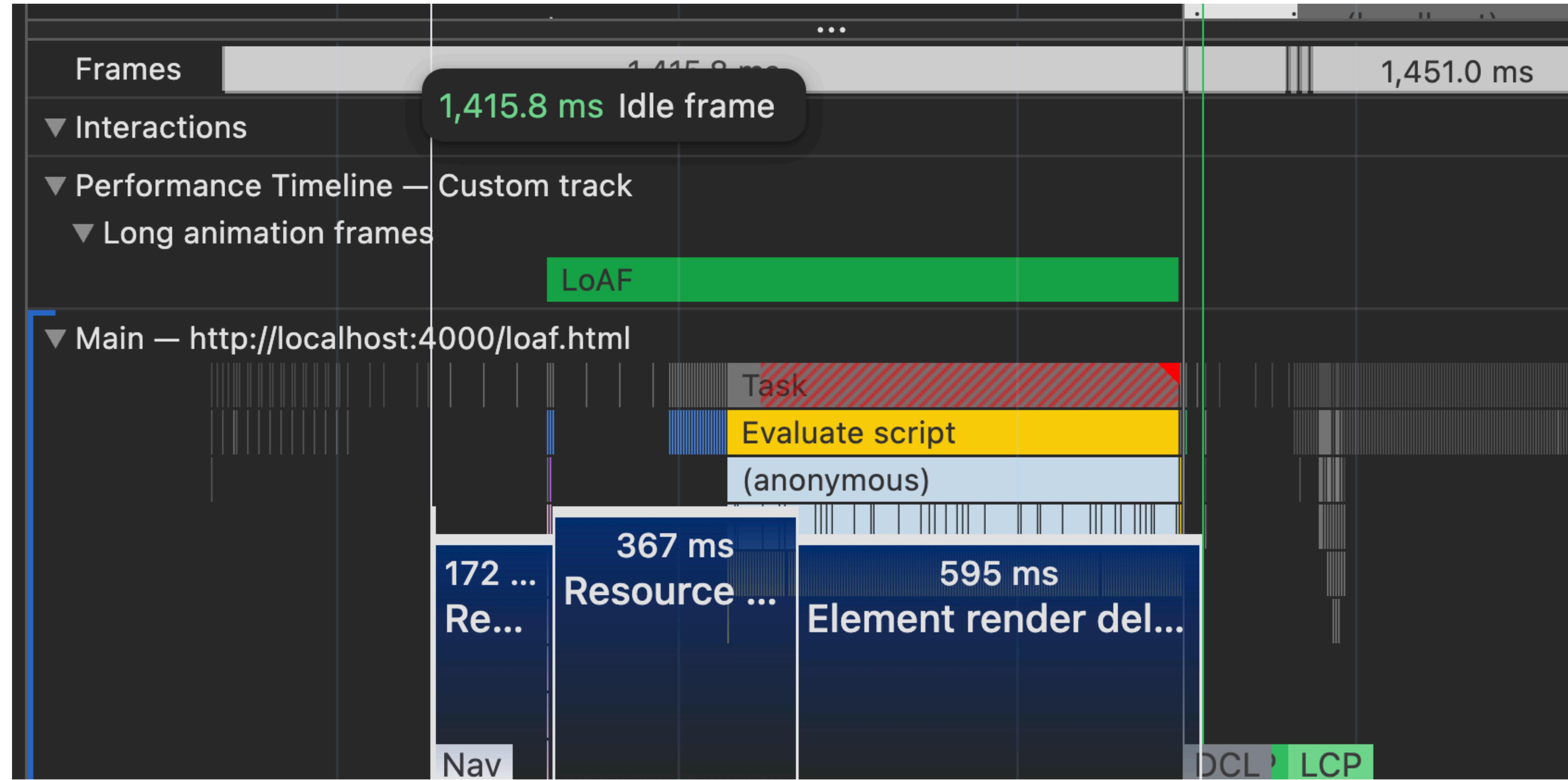


A diagram of the timings of a long animation frame according to the LoAF API (minus `blockingDuration`).

```
  ▶ PerformanceLongAnimationFrameTiming {renderStart: 1105.600000238419  
  ▶ firstUIEventTimestamp: 0, blockingDuration: 616.82, scripts:  
    blockingDuration: 616.82  
    duration: 932.5  
    entryType: "long-animation-frame"  
    firstUIEventTimestamp: 0  
    name: "long-animation-frame"  
    renderStart: 1105.600000238419  
    ▶ scripts: [PerformanceScriptTiming]  
    startTime: 173.7000004768372  
    styleAndLayoutStart: 1105.600000238419  
    ▶ [[Prototype]]: PerformanceLongAnimationFrameTiming
```

▼ 0: PerformanceScriptTiming

```
duration: 666
entryType: "script"
executionStart: 438
forcedStyleAndLayoutDuration: 0
invoker: "http://localhost:4000/script.js?c=2&delay=250&clientdelay=666"
invokerType: "classic-script"
name: "script"
pauseDuration: 0
sourceCharPosition: 0
sourceFunctionName: ""
sourceURL: "http://localhost:4000/script.js?c=2&delay=250&clientdelay=666"
startTime: 437.89999997615814
▶ window: Window {window: Window, self: Window, document: document, name: '',  
windowAttribution: "self"
▶ [[Prototype]]: PerformanceScriptTiming
```



```
const observer = new
PerformanceObserver((list) => {
  for (const entry of list.getEntries()) {
    console.log(entry);
  }
});
observer.observe({ type: "long-animation-
frame", buffered: true });
```

requestAnimationFrame()

scheduler.yield()

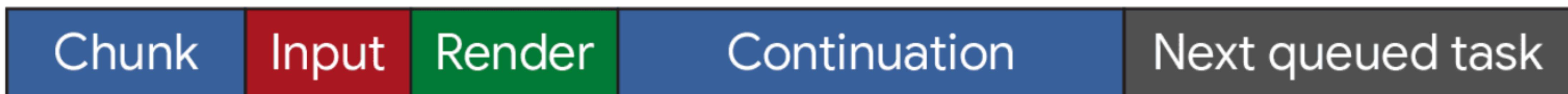
Without yielding:



With yielding:



With yielding and continuation:



Layout Thrashing

offsetWidth/Height/Parent

window.innerHeight/Width

clientLeft/Top/Width

formEl.select()

mouseEvt.layerX/layerY/offsetX/offsetY

getClientRects()

getBoundingClientRects()

innerText

window.scrollX/scrollY

scrollHeight/Width

getComputedStyle()

scrollBy/scrollTo()

elementFromPoint

focus()

```
▼ 0: PerformanceScriptTiming
  duration: 666
  entryType: "script"
  executionStart: 438
  forcedStyleAndLayoutDuration: 0
  invoker: "http://localhost:4000/script.js?c=2&delay=250&clientdelay=666"
  invokerType: "classic-script"
  name: "script"
  pauseDuration: 0
  sourceCharPosition: 0
  sourceFunctionName: ""
  sourceURL: "http://localhost:4000/script.js?c=2&delay=250&clientdelay=666"
  startTime: 437.89999997615814
▶ window: Window {window: Window, self: Window, document: document, name: '',
  windowAttribution: "self"
▶ [[Prototype]]: PerformanceScriptTiming
```

Lab versus RUM

Report from Sep 3, 2025, 3:26:56 PM

<https://tv.nrk.no/>

Analyze

Mobile

Desktop



Discover what your real users are experiencing

This URL

Origin



Core Web Vitals Assessment: Failed ?

Expand view

■ Largest Contentful Paint (LCP)



● Interaction to Next Paint (INP)



● Cumulative Layout Shift (CLS)



OTHER NOTABLE METRICS

● First Contentful Paint (FCP)



● Time to First Byte (TTFB) Δ



📅 Latest 28-day period ? ([history](#))

⌚ Full visit durations

💻 Various desktop devices

📶 Various network connections

● Many samples ([Chrome UX Report](#))

>All Chrome versions



Diagnose performance issues

61

Performance

96

Accessibility

81

Best Practices

100

SEO

Forskjellige LCP-elementer

Caching

**INP krever *ekte*
brukerinteraksjon**

DEVICE MEMORY

P75

TREND

EVENTS

DISTRIBUTION

all

▲ 206 ms

→ baseline

29M



1 GB

● 712 ms

↘ 245.6%

0% of all



2 GB

● 504 ms

↘ 144.7%

6% of all



4 GB

▲ 243 ms

↘ 18%

43% of all



8 GB

● 149 ms

↗ 27.7%

50% of all



Prioriter RUM-data

You can't improve what you
don't measure

Jakob Groß

JS tv-web ▾

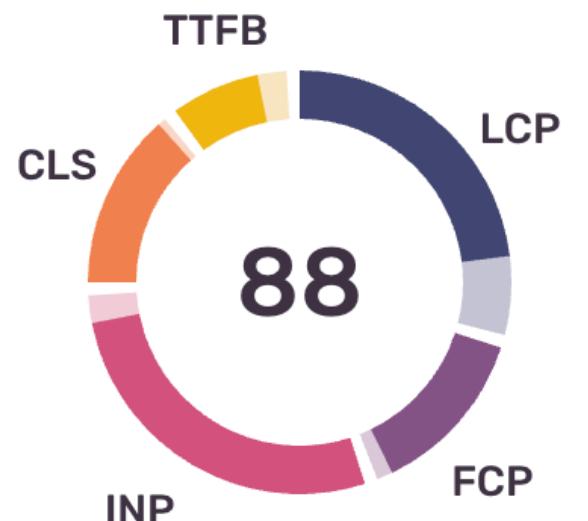
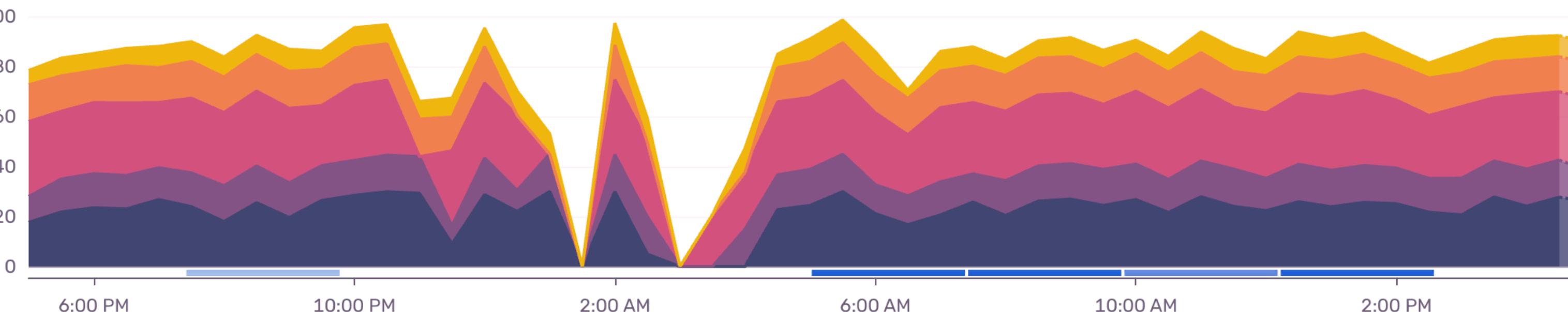
All Envs ▾

24H ▾

Browser Type: All ▾

Performance Score ⓘ

Last 24 hours

**Score Breakdown**
● SCORE.LCP ● SCORE.FCP ● SCORE.INP ● SCORE.CLS ● SCORE.TTFB ● Releases
**Largest Contentful Paint** ⓘ

● 2.03s

Meh 80

First Contentful Paint ⓘ

● 861ms

Good 92

Interaction to Next Paint ⓘ

● 136ms

Good 93

Cumulative Layout Shift ⓘ

● 0.09

Good 96

Time To First Byte ⓘ

● 418ms

Meh 78

Q Search for more Pages

PAGES	PROJECT	PAGELOADS ↓	LCP	FCP	INP	CLS	TTFB	PERF SCORE	OPPORTUNITY
/	JS tv-web	111	3.15s	870ms	192ms	0.1	229ms	Meh 83	3.05
/direkte/nrk1	JS tv-web	43	2.10s	820ms	68ms	0	262ms	Good 90	0.57
/sok	JS tv-web	39	1.93s	522ms	72ms	0.11	194ms	Good 90	0.45
/guide	JS tv-web	22	1.05s	819ms	90ms	0	423ms	Good 96	0.16
/program/*	JS tv-web	19	1.64s	1.01s	34ms	0	721ms	Meh 87	0.41
/programmer	JS tv-web	16	883ms	647ms	66ms	—	231ms	Good 98	0.07
/serie/fra-boelle-til-bestevenn	JS tv-web	9	1.04s	1.16s	324ms	0	352ms	Meh 84	0.18
/programmer/drama-serier	JS tv-web	9	4.60s	511ms	76ms	—	138ms	Meh 82	0.16

Web-vitals

+

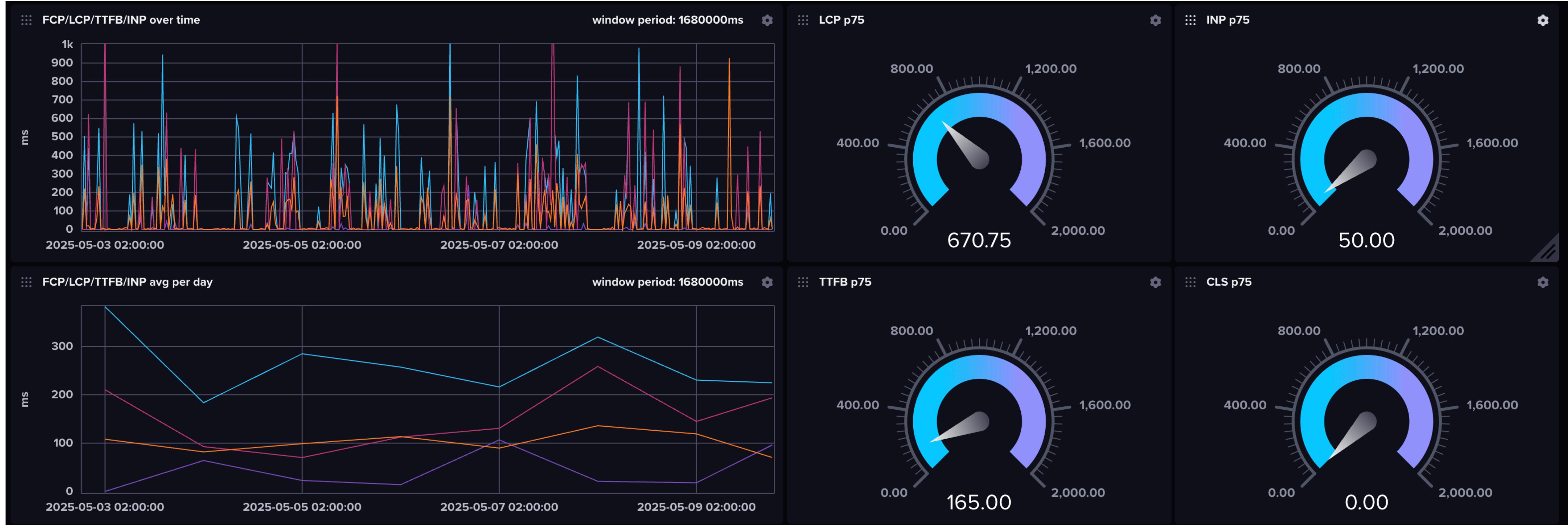
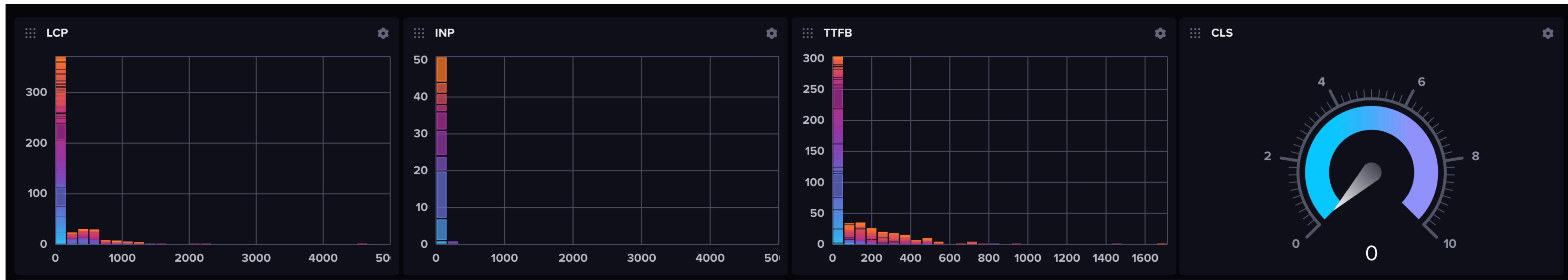
Litt-kode

+

Influxdb

====

RUM-dashboard



THAT'S NOT ENOUGH

WE HAVE TO GO DEEPER

Data ❤

Connection timing

Request/Response timing

Element info

Interaction type

Paint duration

Redirects

Server timing

LoAF timing

Dns timing

Fetch timing

HTTP version

Transfer size

```
entryType: "resource"
fetchStart: 174.6000002384186
finalResponseHeadersStart: 287.89999997615814
firstInterimResponseStart: 0
initiatorType: "img"
name: "https://tv-web.n635469.clients.dev.nr.no/image.jpg?c=1"
nextHopProtocol: "h2"
redirectEnd: 0
redirectStart: 0
renderBlockingStatus: "non-blocking"
requestStart: 179.6000002384186
responseEnd: 537.2999999523163
responseStart: 287.89999997615814
responseStatus: 200
secureConnectionStart: 174.6000002384186
```

▼ serverTiming: Array(1)

► 0: PerformanceServerTiming {name: 'image', duration: 100, description: ""}

length: 1

► [[Prototype]]: Array(0)

startTime: 174.6000002384186

transferSize: 25222

Server-Timing: db;dur=53, app;dur=47.2

OUF

Lazy loading LCP-bildet

Lazy loading av høypri-bilder

Lazy decoding av høyprilder

Preccconnect i html uten crossorigin

Preload som forsinker andre requests

Preload av LCP-bildet

Preload av for mye data

Preloader ting som ikke brukes tidlig!

Preloader ting som ikke brukes noensinne

Preload uten `as`

**What looks bad in the lab
looks terrible in your hand**

Want to build faster websites?

Learn how browsers parse, layout & paint

Treat JS as a tool, not the foundation(!)

Favor static HTML or server side rendering at all times

Use Core Web Vitals alongside other metrics to learn
shortfalls, improve and iterate

Then keep doing that.

View Transitions

+

Speculation Rules API

=



```
@view-transition {  
    navigation: auto;  
}
```

```
{  
  "prerender": [  
    {  
      "where": {  
        "and": [  
          { "href_matches": "/foo" },  
          { "not": { "href_matches": "/logout" } }  
        ]  
      }  
    }  
  ],  
  "prefetch": [  
    {  
      "urls": ["next.html", "next2.html"],  
      "referrer_policy": "no-referrer"  
    }  
  ]  
}
```

Oppsummert
Bry deg om ytelse
Kjenn brukerne dine
Målekte brukerdata
Kjenn browseren
Vit at du ikke er en bruker
Kast rammeverket! (Neida. Joda)

Takk for meg!

<https://blog.knuthaugen.no/>



knuthaug.bsky.social