How and why ($) to improve web performance

Practical tips for 2023

cognizant
netcentric

1 second

loading time improvement

-14%

users leaving the website at landing
(bounce rate)

+13%

users reaching website goals
(conversion rate)

Source: How Renault improved its bounce and conversion rates by measuring and optimizing Largest Contentful Paint

Business Graph

Takeaways

1. Web Performance (Web Vitals)
2. Business impact of Web Vitals
3. Top recommendations for 2023

Andrea Verlicchi

- Tons of websites
- Front-end development
- Web performance consultant

Google Hackathon, London

Roadmap

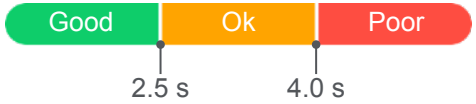
1. Web performance, Search Engine Optimisation, and business impact
2. Measuring web performance
3. Quiz game! 🎉
4. Improvement tips for 2023

Web performance, SEO, and business impact

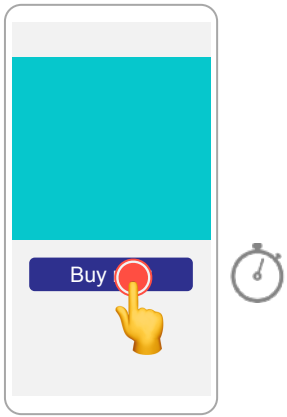
Google Core Web Vitals

Loading

Largest Contentful Paint (LCP)



Interactivity



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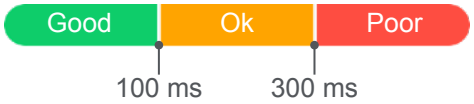
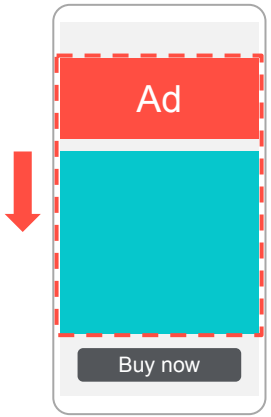


Visual stability

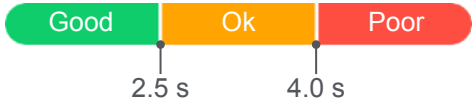


Cumulative Layout Shift (CLS)

Google Core Web Vitals - News!

Loading

Largest Contentful Paint (LCP)



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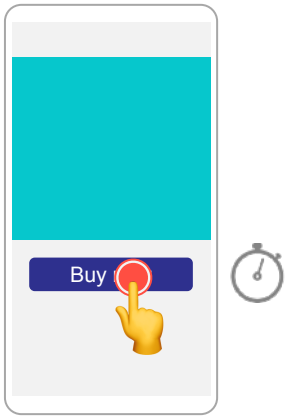
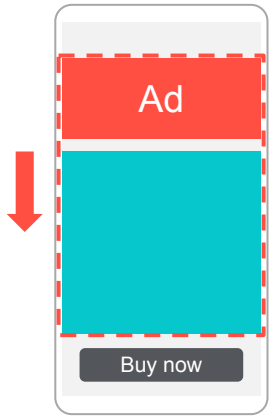


Interaction to Next Paint (INP)

Visual stability



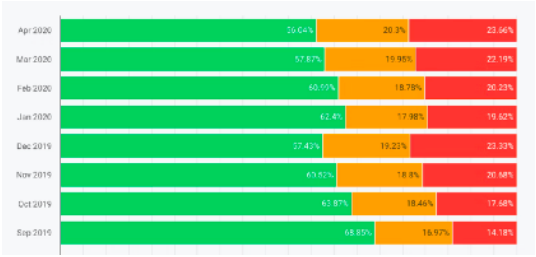
Cumulative Layout Shift (CLS)

March 2024

How does Google know?

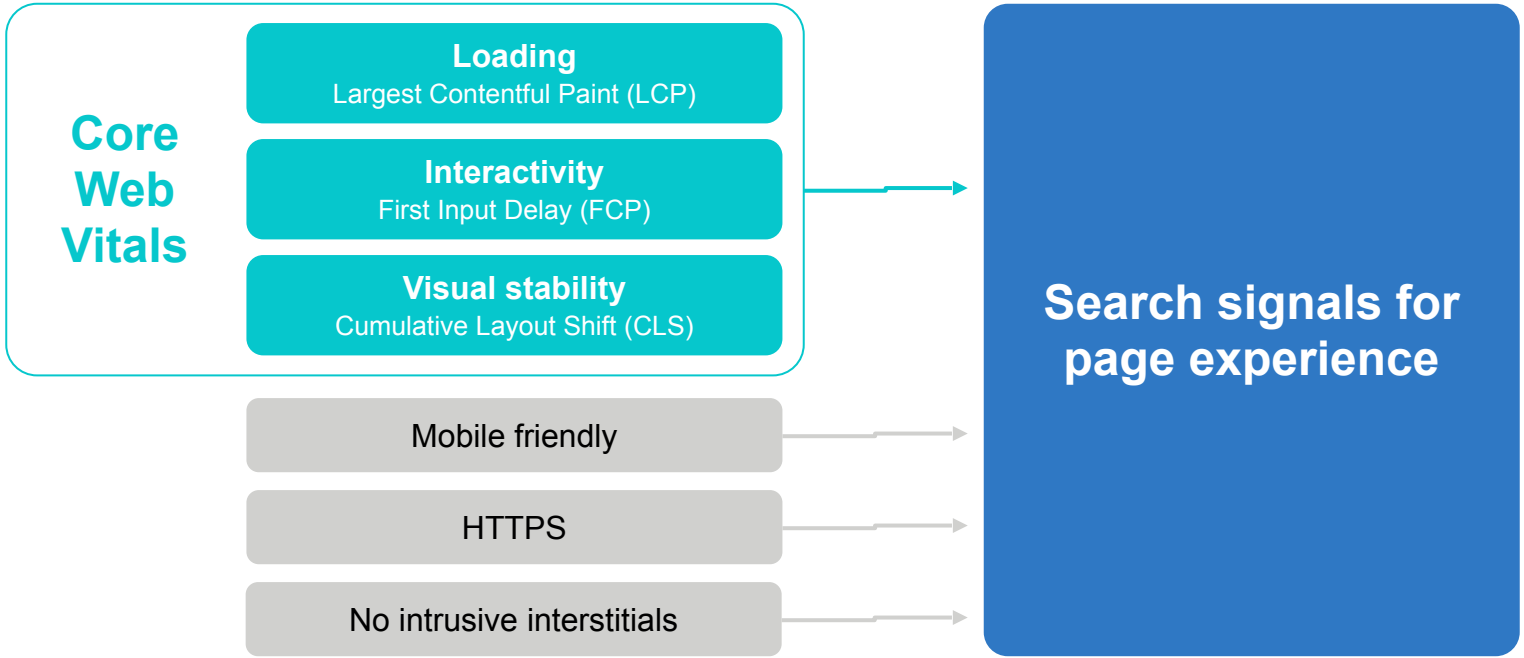
Google Chrome

Chrome User Experience (CrUX)



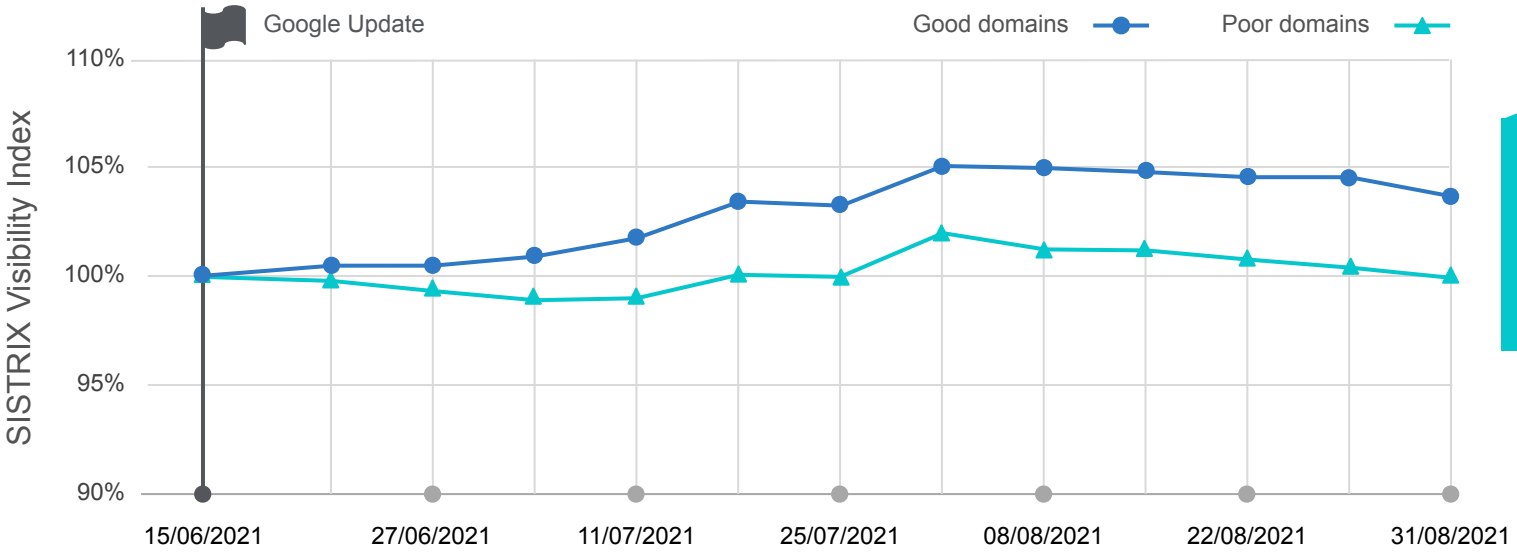
CrUX Report

The Core Web Vitals impact your Google Search ranking



Source: https://developers.google.com/search/blog/2020/11/timing-for-page-experience

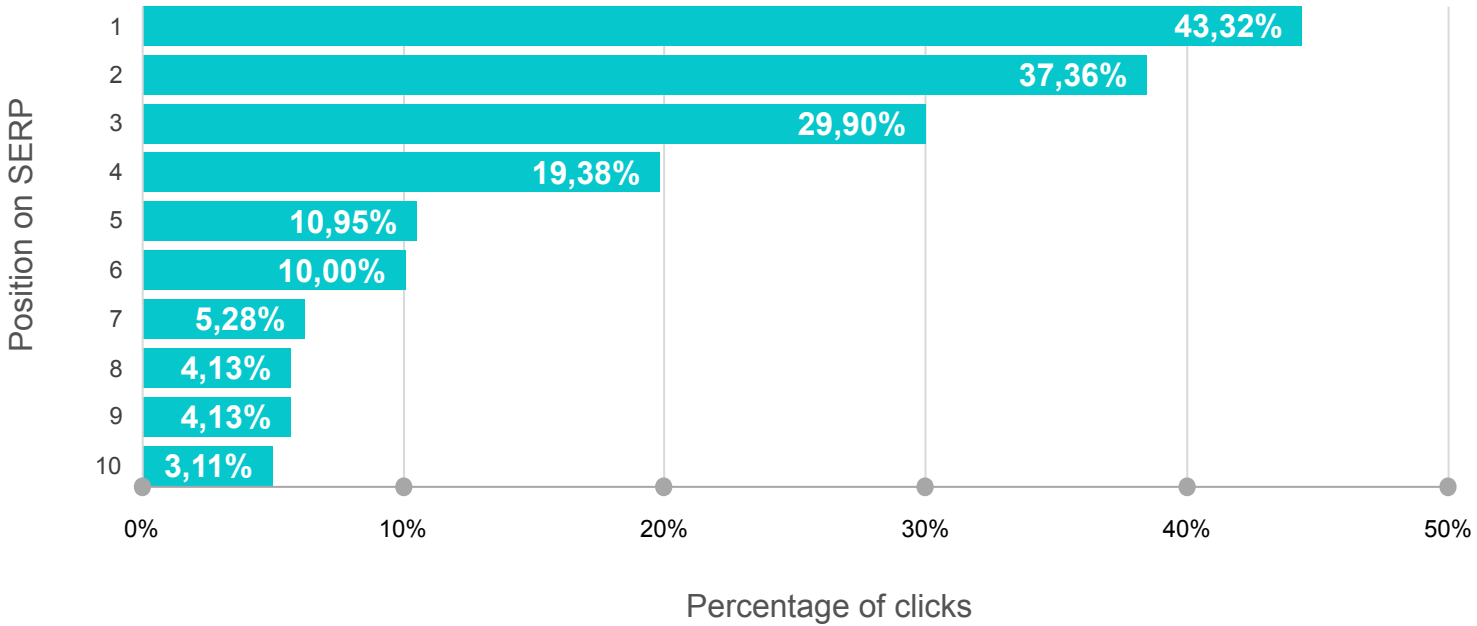
The Core Web Vitals impact the Google search ranking



4%
Increase in ranking

Source: https://www.sistrix.com/blog/core-web-vitals-is-a-measurable-ranking-factor/

Average Google Click-Through Rate (CTR) by Position



34,2%

Average increase in organic traffic by climbing 1 rank

Source: https://clictadigital.com/what-is-the-average-google-click-through-rate-by-position/

Success = Traffic × Conversion

Good performance

High conversion + low traffic cost

Poor performance

Low conversion + high traffic cost

Sustainability

Source: CO2 emissions on the Web

Sustainability

Shaving off a single kilobyte in a file that is being loaded on 2 million pages reduces CO2 emissions by an estimated 3000 kg per month.

118 kg

5X

Source: CO2 emissions on the Web

Measuring web performance

Real User Monitoring

The big picture,
spot anomalies

Lab

Find the cause,
test solutions

Real User Monitoring

Chrome User Experience Report (CrUX)

mPulse

SpeedCurve

The big picture, spot anomalies

Lab

Pagespeed insights

Lighthouse

WebPageTest by catchpoint

Find the cause, test solutions

Real User Monitoring

- On every page, while users browse the web
- Real users, real devices, connections, locations
- User interactions
- Summary, dashboard

The big picture, spot anomalies

Lab

- A single, specific URL
- Emulation, one location
- Detailed! Video, waterfall, CPU, memory, etc.
- No user interactions
- Immediate results

Find the cause, test solutions

Quiz time!

Thanks for playing

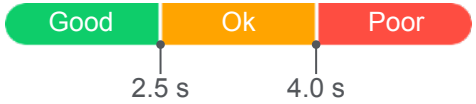
Improvement tips for 2023

- Largest real-world impact
- Relevant and applicable to most sites
- Realistic to implement

Google Core Web Vitals

Loading

Largest Contentful Paint (LCP)



Interattività

First Input Delay (FID)

Stabilità visiva

Cumulative Layout Shift (CLS)

Ensure the LCP resource is discoverable 🔍 from the HTML source

72% of mobile pages
LCP element = an image

39% of those images
not discoverable from HTML source

Sources: Web Almanac

- Load the image using an `<img>` element with the `src` or `srcset` attribute
- Prefer server-side rendering (SSR) over client-side rendering (CSR)
- If your image needs to be referenced from an external CSS or JS file, include it in the HTML source via a `<link rel="preload">` tag.

Ensure the LCP resource is prioritized 🔺

- Add `fetchpriority="high"` to the `<img>` tag of your LCP image
- Never set `loading="lazy"` on the `<img>` tag of your LCP image
- Defer non-critical resources when possible

Use a CDN to optimize document and resource server-time (TTFB)

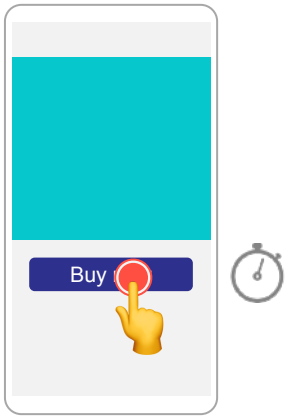
Serve your content as geographically close to your users as possible.

Cache that content so recently-requested content can be served again quickly.

- Increase how long content is cached for.
- Cache content indefinitely, and purge the cache on updates.
- Move dynamic logic from your origin server to the edge

Google Core Web Vitals

Interactivity



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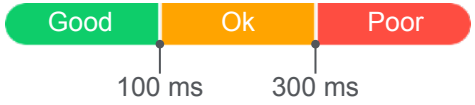
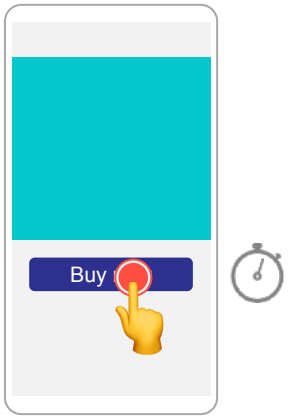


Google Core Web Vitals

Interactivity



Interaction to Next Paint (INP)

Good | Ok | Poor

200 ms | 500 ms

Avoid or break up long tasks

Tasks include rendering, layout, parsing and compiling and executing scripts.

50ms of main-thread blocking threshold for a task to be considered “long”.

19 is the median number of long tasks on mobile

Sources: Web Almanac

- Break up long tasks into smaller ones, yielding often to the main thread
- Consider using APIs such as `isInputPending` and the Scheduler API.

Avoid unnecessary 🟨 JavaScript

460 kb / page

median of JS code served to each page

Too much Javascript

create an environment where tasks are competing for the main thread's attention

Sources: Web Almanac, Optimize LCP / Make it discoverable

- Use the coverage tool in Chrome DevTools to find unused code
- If unused because it will be used later, move to separate bundle - code splitting
- Using a tag manager? Periodically check your tags.

Avoid large 🐙 rendering updates

Javascript is not the only thing that can affect your website's responsiveness.

Rendering can be expensive and can interfere with your website's ability to respond to user inputs.

Sources: Web Almanac, Optimize LCP / Make it discoverable

- Avoid using `requestAnimationFrame()` for doing any non-visual work.
- Keep your DOM size small.
- Use CSS containment (`contain` property)

Google Core Web Vitals

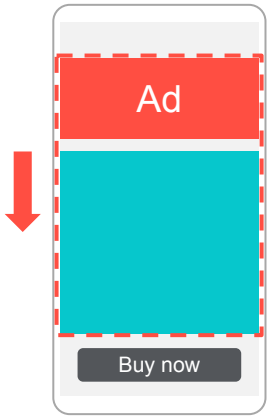
Caricamento

Largest Contentful Paint (LCP)

Interattività

First Input Delay (FID)

Visual stability



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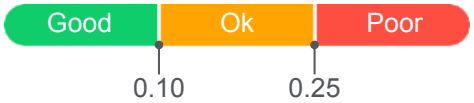

Set explicit sizes
on any content loaded from the page

0px initial default height
for unsized images

72% of pages
have at least one unsized image

Sources: Web Almanac,

- Explicitly set `width` and `height` attributes (or equivalent CSS properties) on images
- Use the `aspect-ratio` CSS property to reserve space for other lazy loaded content (ads, embedded videos, etc.)
- If aspect is unknown, use `min-height`

Ensure pages are eligible for back/forward cache (bfcache) 💭

35% of pages are ineligible for the bfcache

Sources: Web Almanac

- Check if your pages are eligible for the bfcache using bfcache tester in DevTools
- Work on the reasons why they are not

Sources: bfcache tester in DevTools

Avoid animations and transitions that use layout-inducing CSS properties

15% less likely to have "good" CLS if you animate any CSS property that could affect layout

Absolutely positioned elements that animate top or left will cause layout shifts

Sources: Web Almanac, Optimize LCP / Make it discoverable

- Never animate or transition CSS properties that require browsers to update page layout
- Instead of animating `top` or `left`, animate `transform:translateX()` or `transform:translateY()`

Let’s wrap up

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- + organic traffic
- + brand perception
- + conversion rate
- – carbon footprint

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Contact us

Feedback form