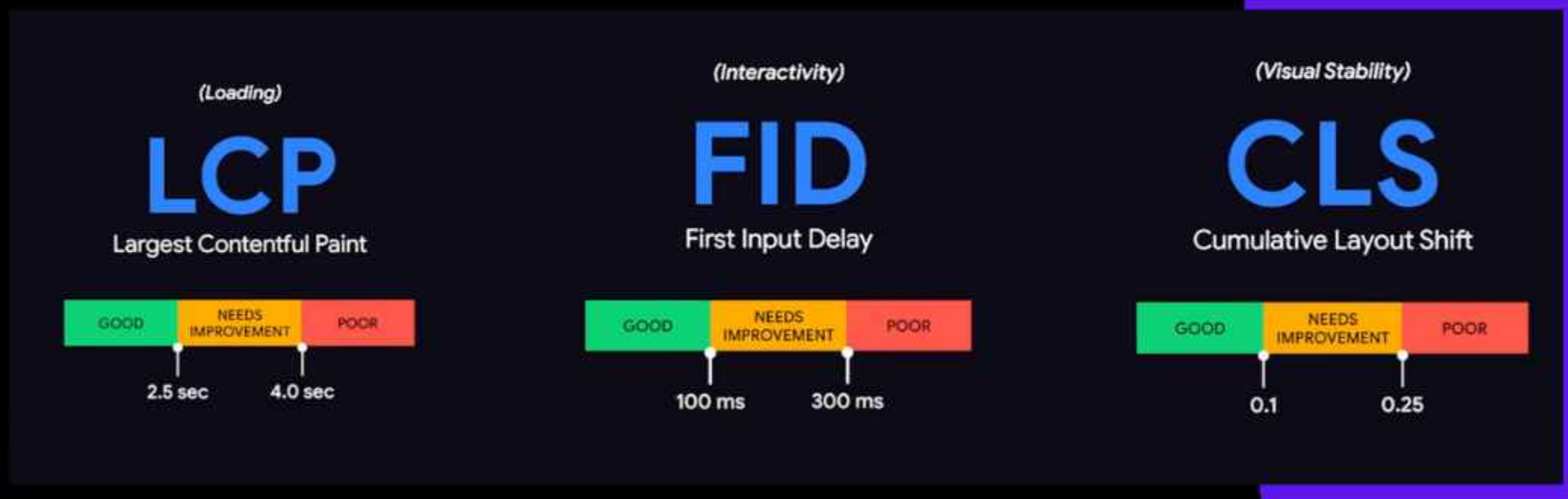
CORE WEB VITALS

FOR MEASURING AND OPTIMIZING WEB PERFORMANCE



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When considering Core Web Vitals for measuring and optimizing web performance, the three key metrics to focus on are:

- Largest Contentful Paint (LCP)
- First Input Delay (FID)
- Cumulative Layout Shift (CLS)

Largest Contentful Paint (LCP)

LCP is part of the Core Web Vitals, a set of metrics defined by Google to assess and ensure a good user experience on the web. LCP reports the render time of the largest image, text block, or video visible in the viewport, relative to when the user first navigated to the page.

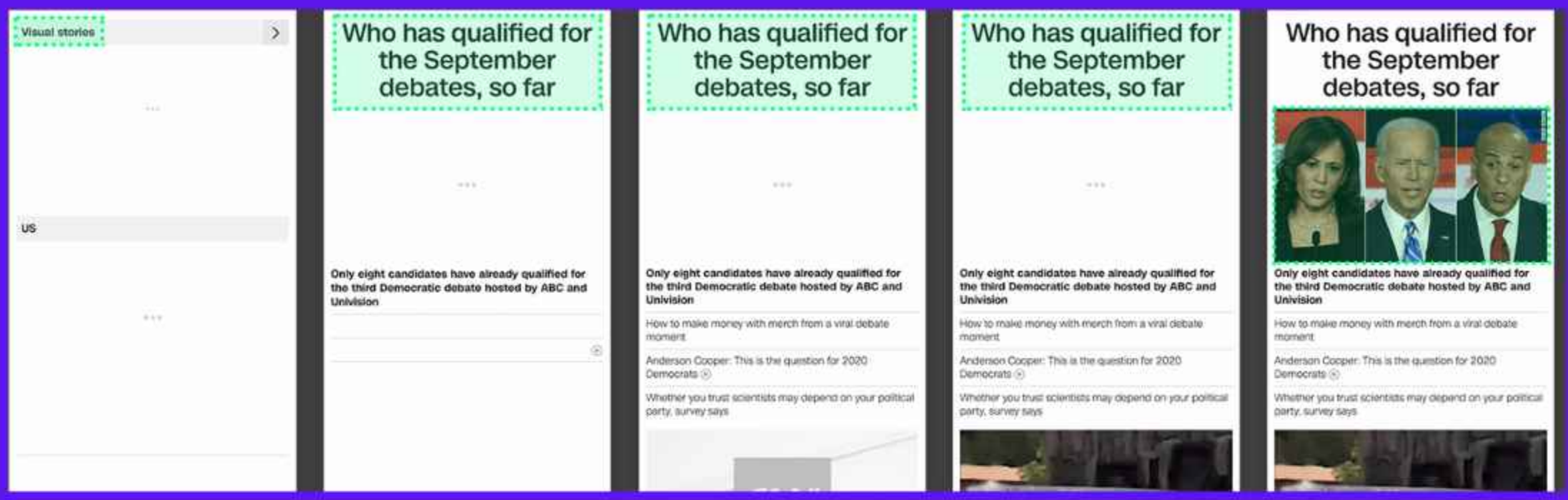
LCP in simpler words

In simpler words:

- LCP measures how quickly the main content of a webpage appears when you visit it. Think of it like this: when you open a webpage, LCP tracks how long it takes for the biggest thing you see (like a image or headline) to show up on your screen.

- It's basically answering the question: "How long do I have to wait before I can see what this page is actually about?"

- Google uses this measurement as one of its Core Web Vitals to determine if websites are providing a good experience. Faster LCP times mean visitors can see and use your content sooner, making them more likely to stay on your site instead of getting impatient and leaving.



- As a page loads, the Largest Contentful Paint (LCP) element can change. Initially, text content might be the largest contentful element on the page. However, as loading continues and larger elements appear, the LCP element often changes -

- Example, when a image finishes loading, it frequently becomes the new LCP element since it typically occupies more screen space than text.

Here’s the LCP breakdown :

Good: Main content loads in 2.5 seconds or less—fast and user-friendly.

Needs Improvement: Loads in 2.5 to 4 seconds—okay, but could be quicker.

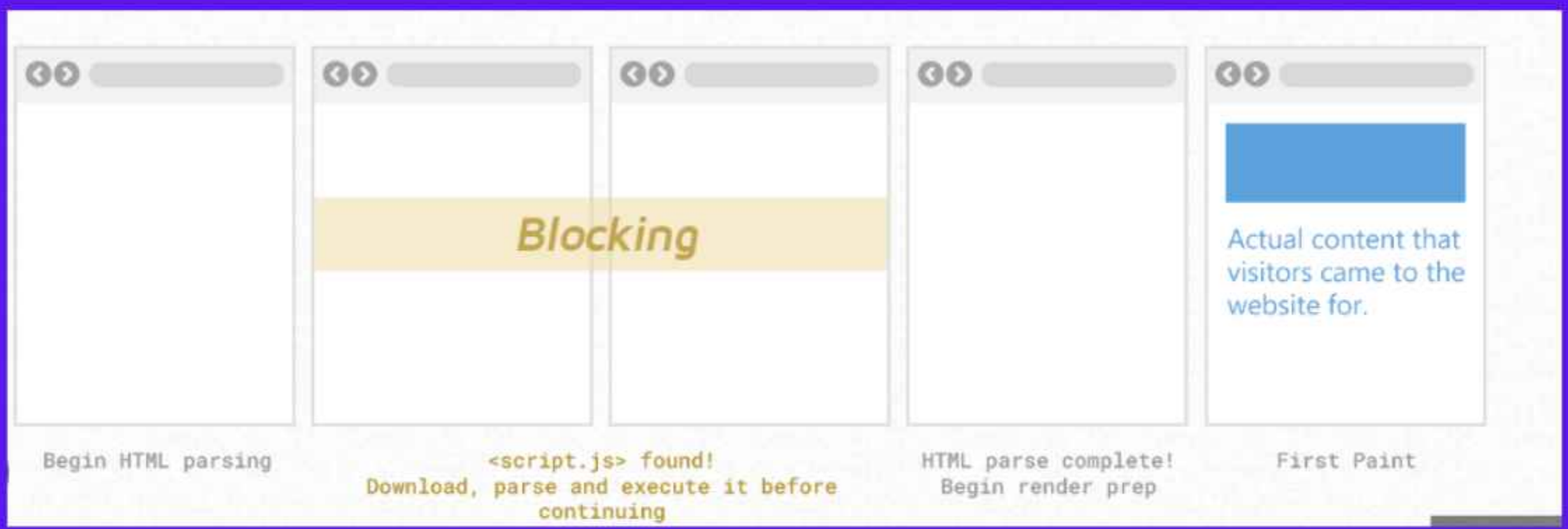
Poor: Takes over 4 seconds—slow, and needs speeding up.

Causes of Poor LCP Performance

Several factors can contribute to poor LCP performance:

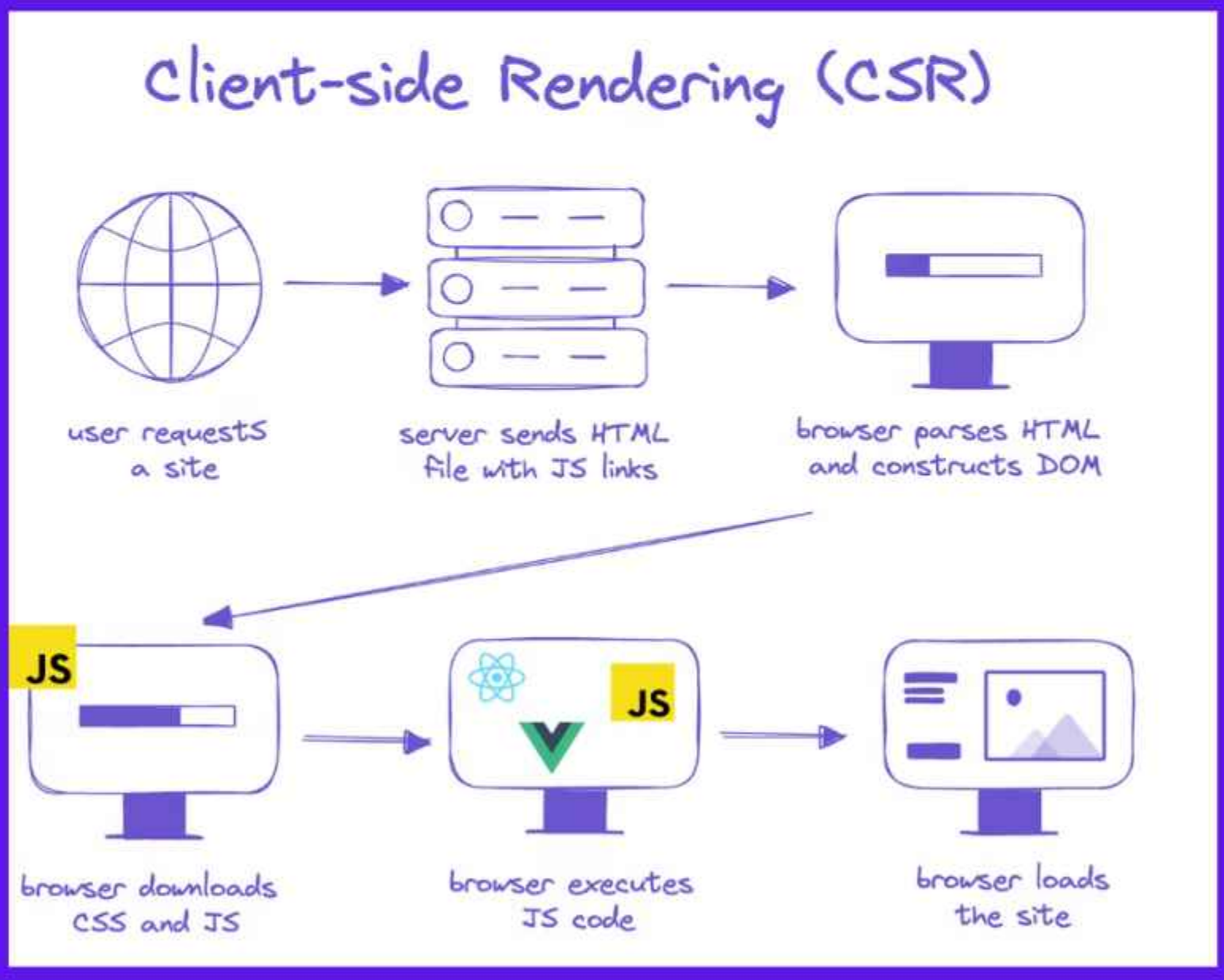
- **Slow Server Response Times:** If the server takes too long to respond to the initial request, it delays the rendering of the content.

Render-Blocking JavaScript and CSS: If JavaScript and CSS files block the rendering process, they can delay the loading of the main content.



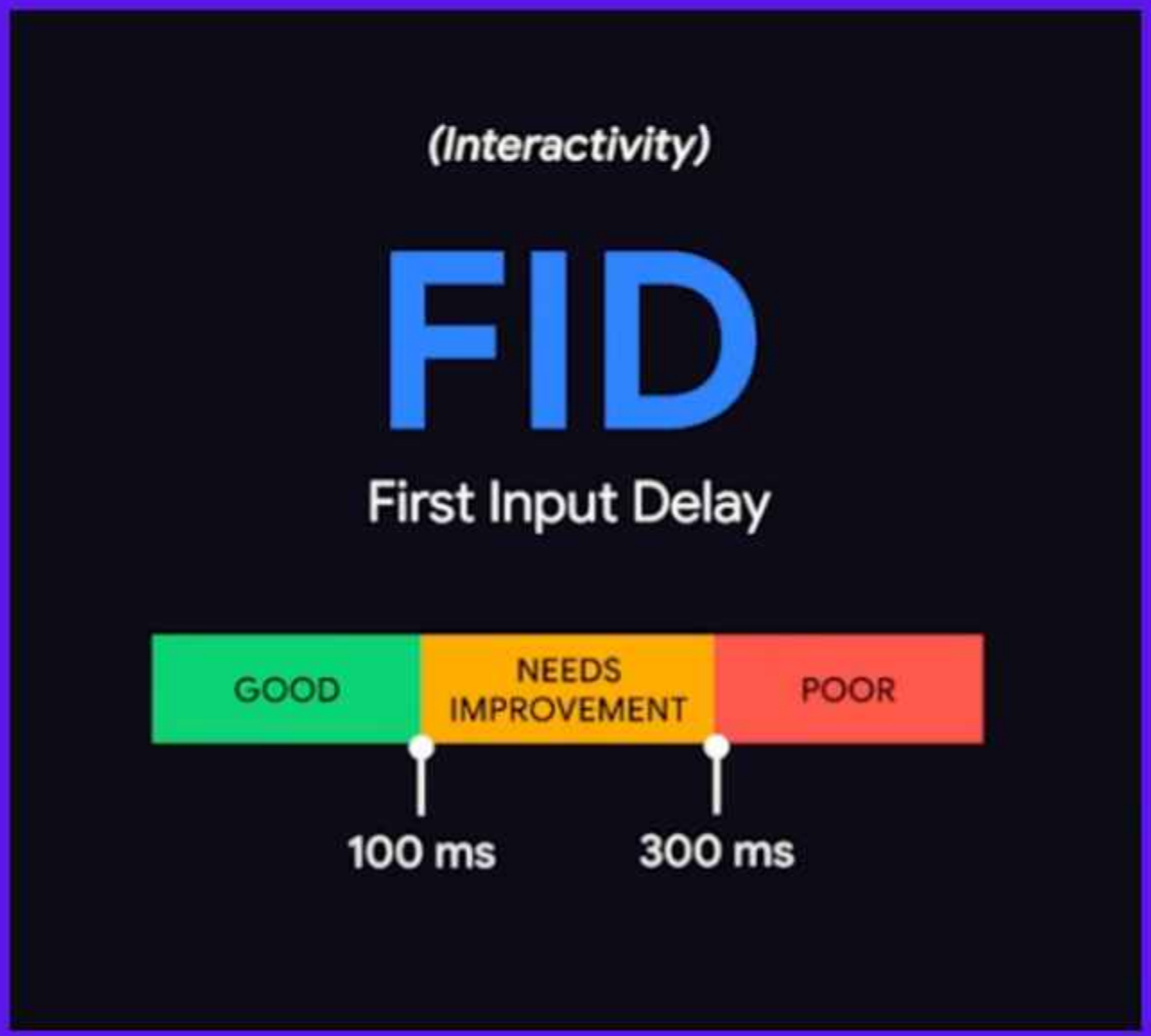
- **Resource Load Times:** Large images, videos, and other resources can take longer to load, especially if they aren't optimized.

- **Client-Side Rendering:** Using JavaScript to create and render large portions of the page content



First Input Delay (FID)

First Input Delay (FID) is a key performance metric that measures the time from when a user first interacts with your website (like clicking a link, tapping a button, or using a custom JavaScript-driven control) to the time the browser begins to process that interaction.



Here are the FID metrics in three simple lines:

Good: 100 milliseconds or less—super responsive and seamless interaction.

Needs Improvement: 100 to 300 milliseconds—some delay, but can be improved.

Poor: More than 300 milliseconds—noticeable lag, which frustrates users.

Heavy JavaScript execution is the main cause of poor FID.

Specifically:

Long Tasks - JavaScript execution that blocks the main thread for more than 50ms, preventing the browser from responding to user interactions

Main Thread Congestion - When the browser's main thread is busy parsing, compiling, and executing JavaScript, it cannot respond to user interactions

FID measures the delay in processing events, not the actual event handling time itself.

This delay happens specifically when:

- The browser is busy with JavaScript execution
- The main thread is blocked
- The browser cannot yet process the user's interaction

Cumulative Layout Shift (CLS)

Cumulative Layout Shift, or CLS, is a metric that quantifies how much a webpage layout shifts during the loading process. Essentially, it measures the visual stability of your webpage.

Have you ever been reading something online, or trying to click something, and suddenly the page moved and you lost your place

Here are the CLS metrics

- **Good:** 0.1 or less—super stable, with minimal unexpected shifts.
- **Needs Improvement:** 0.1 to 0.25—some shifts, needs fixes for better stability.
- **Poor:** More than 0.25—frequent shifts causing a disruptive experience.

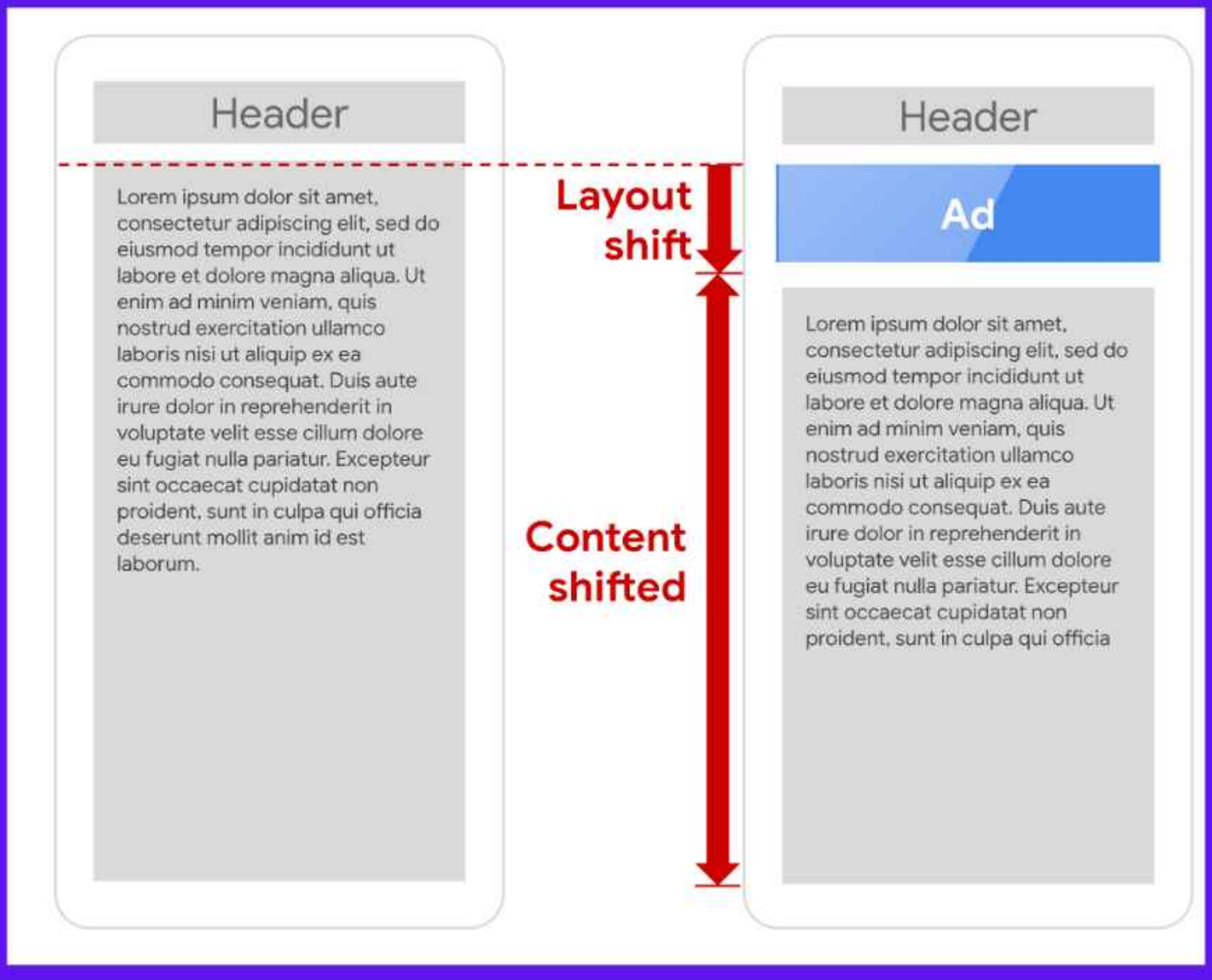
Common Causes of Poor Cumulative Layout Shift (CLS)

1. Images Without Dimensions

When images don't have width and height attributes, browsers can't reserve space for them. When these images finally load, they push other content around, creating a jarring experience for users.

2. Ads and Embeds Without Reserved Space

Third-party content like advertisements and social media embeds often load after the main content. Without proper space allocation, they force existing content to move when they appear.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3. Dynamically Injected Content

Content added to the page after initial load (like popups, notifications, or "load more" results) can push existing content out of place. This is especially problematic when injected above content the user is currently viewing.

4. Web Font Loading Issues

When custom fonts load, they can replace system fonts, causing text to change size and reflow. This creates shifts as paragraphs and headings adjust to the new font dimensions.

Conslusion

- These metrics work together as a balanced scorecard for your site's performance. Neglecting any one area can undermine the user experience, even if the others are excellent.

- By addressing the specific causes of poor performance in each metric, you can create faster, more responsive, and visually stable websites that users love to visit and Google rewards with better rankings.