CoGrammar

Welcome to this session:

Skills Bootcamp - Web Performance Optimization

The session will start shortly...

Questions? Drop them in the chat.
We'll have dedicated moderators
answering questions.

Safeguarding & Welfare

We are committed to all our students and staff feeling safe and happy; we want to make sure there is always someone you can turn to if you are worried about anything.

If you are feeling upset or unsafe, are worried about a friend, student or family member, or you feel like something isn't right, speak to our safeguarding team:

Ian Wyles
Designated Safeguarding Lead

Simone Botes

Nurhaan Snyman

Rafiq Manan

Ronald Munodawafa

Tevin Pitts

Scan to report a safeguarding concern

or email the Designated Safeguarding Lead:
Ian Wyles
safeguarding@hyperiondev.com

CoGrammar HyperionDev

Skills Bootcamp Cloud Web Development

- The use of disrespectful language is prohibited in the questions, this is a supportive, learning environment for all - please engage accordingly. **(Fundamental British Values: Mutual Respect and Tolerance)**
- No question is daft or silly - **ask them!**
- There are **Q&A sessions** midway and at the end of the session, should you wish to ask any follow-up questions. Moderators are going to be answering questions as the session progresses as well.
- If you have any questions outside of this lecture, or that are not answered during this lecture, please do submit these for upcoming Academic Sessions. You can submit these questions here: **Questions**

Skills Bootcamp Cloud Web Development

- For all **non-academic questions**, please submit a query: ***www.hyperiondev.com/support***
- **Report a safeguarding incident: *www.hyperiondev.com/safeguardreporting***
- We would love your feedback on lectures: ***Feedback on Lectures.***
- Find all the lecture **content** in your **Lecture Backpack** on GitHub.
- If you are hearing impaired, please kindly use your computer's function through Google chrome to enable captions.

Learning Outcomes

- Discuss the importance of web performance and its impact on user experience and SEO.
- Identify common performance bottlenecks in web applications and their causes.
- Apply strategies for optimising front-end performance, such as code minification, lazy loading, and image optimisation.
- Utilise performance monitoring tools (e.g., Lighthouse, PageSpeed Insights) to assess and improve web page load times.

Do you regularly test your website for performance?

A. Yes
B. No

How familiar are you with browser developer tools (e.g., Chrome DevTools)?

A. Beginner
B. Intermediate
C. Advanced

CoGrammar

What is the biggest performance challenge you face?

A. Large images
B. Too many scripts
C. Slow server response

CoGrammar

Question

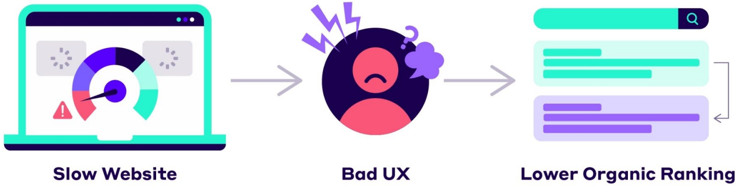
- Why do some websites load quickly and deliver seamless experiences, while others are slow and frustrating?

Lecture Overview

- → Discussing the Importance of Performance
- → Identifying Bottlenecks and Tools
- → Implementing Optimization Techniques

The Case for Speed

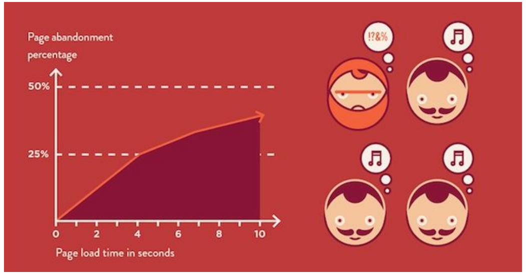
- Statistics:
  - "53% of mobile users abandon a site if it takes longer than 3 seconds to load."
  - "1-second delay reduces conversions by 7%."
- Impact Areas:
  - User Experience
  - SEO and Rankings
  - Conversion Rates and Revenue

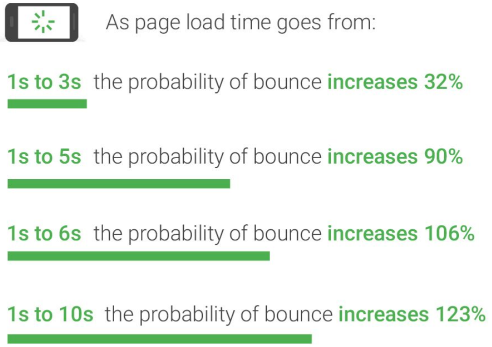


CoGrammar

What Makes a Website Great?

- Amazon's calculated that a page load slowdown of just one second could cost it **$1.6 billion** in sales each year.
- Google has calculated that by slowing its search results by just four tenths of a second they could lose **8 million** searches per day–meaning they'd serve up many millions fewer online adverts.
- Read more here.




As page load time goes from:

1s to 3s the probability of bounce **increases 32%**

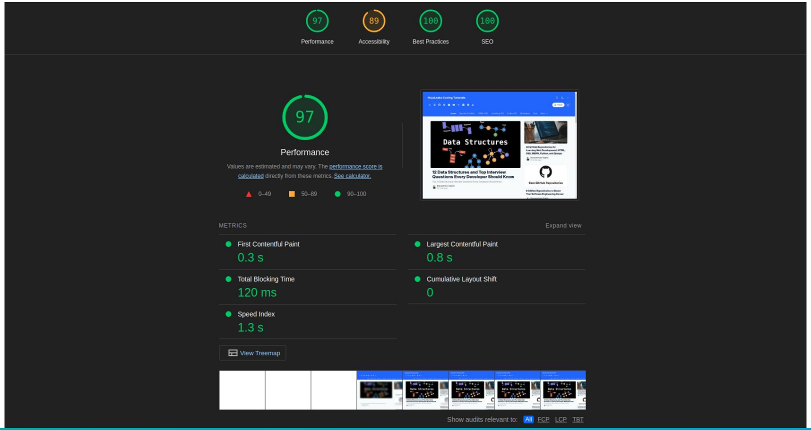
1s to 5s the probability of bounce **increases 90%**

1s to 6s the probability of bounce **increases 106%**

1s to 10s the probability of bounce **increases 123%**

Measuring Website Performance

- ❖ Core Web Vitals:
  - ➢ Largest Contentful Paint (LCP): < 2.5s.
  - ➢ First Input Delay (FID): < 100ms.
  - ➢ Cumulative Layout Shift (CLS): < 0.1.
- ❖ Additional Metrics:
  - ➢ Time to First Byte (TTFB).
  - ➢ Speed Index (SI).



97 Performance | 89 Accessibility | 100 Best Practices | 100 SEO

97

Performance

Values are estimated and may vary. The performance score is calculated directly from these metrics. See calculator.

▲ 0–49 ■ 50–89 ● 90–100

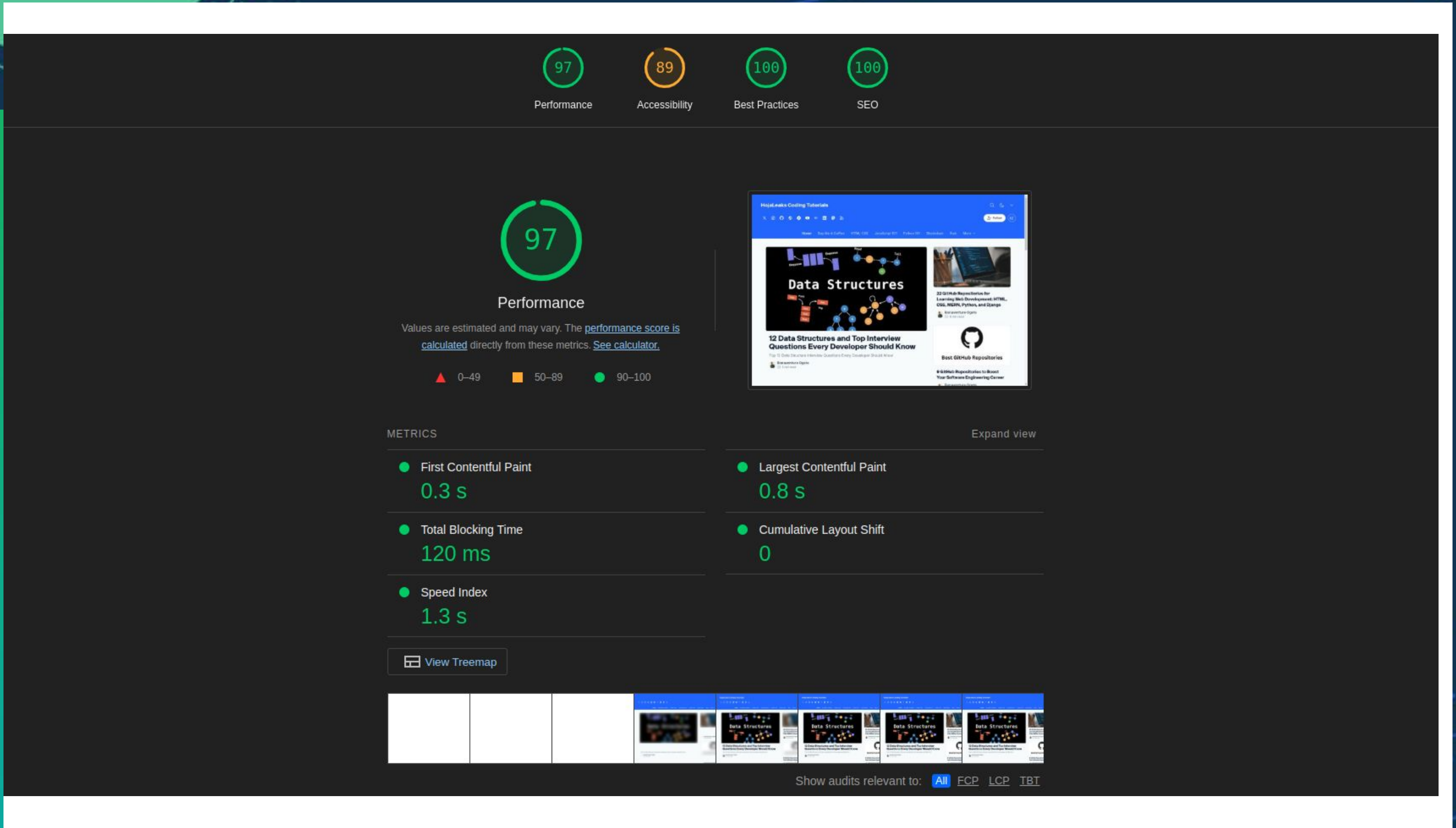
METRICS

- ● First Contentful Paint 0.3 s
- ● Largest Contentful Paint 0.8 s
- ● Total Blocking Time 120 ms
- ● Cumulative Layout Shift 0
- ● Speed Index 1.3 s

Show audits relevant to: All FCP LCP TBT

Expand view
View Treemap
HojaLeaks Coding Tutorials
Data Structures
12 Data Structures and Top Interview Questions Every Developer Should Know
Best GitHub Repositories

Measuring Website Performance



97 Performance | 89 Accessibility | 100 Best Practices | 100 SEO

97

Performance

Values are estimated and may vary. The performance score is calculated directly from these metrics. See calculator.

▲ 0–49 ■ 50–89 ● 90–100

METRICS

Expand view

● First Contentful Paint
0.3 s

● Largest Contentful Paint
0.8 s

● Total Blocking Time
120 ms

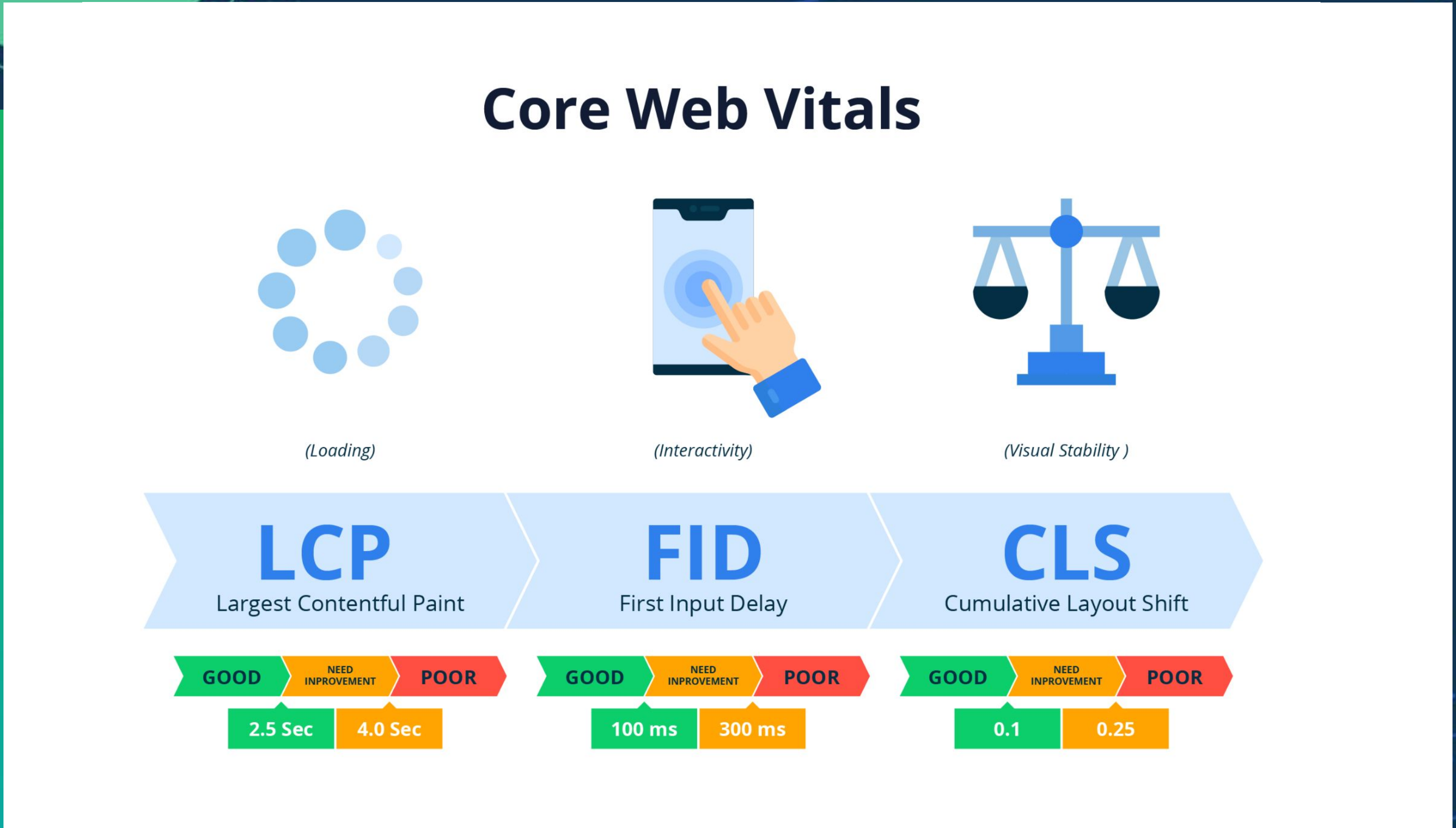
● Cumulative Layout Shift
0

● Speed Index
1.3 s

View Treemap

Show audits relevant to: All FCP LCP TBT

Measuring Website Performance



Core Web Vitals

(Loading)

(Interactivity)

(Visual Stability)

LCP
Largest Contentful Paint

GOOD | NEED INPROVEMENT | POOR

2.5 Sec | 4.0 Sec

FID
First Input Delay

GOOD | NEED INPROVEMENT | POOR

100 ms | 300 ms

CLS
Cumulative Layout Shift

GOOD | NEED INPROVEMENT | POOR

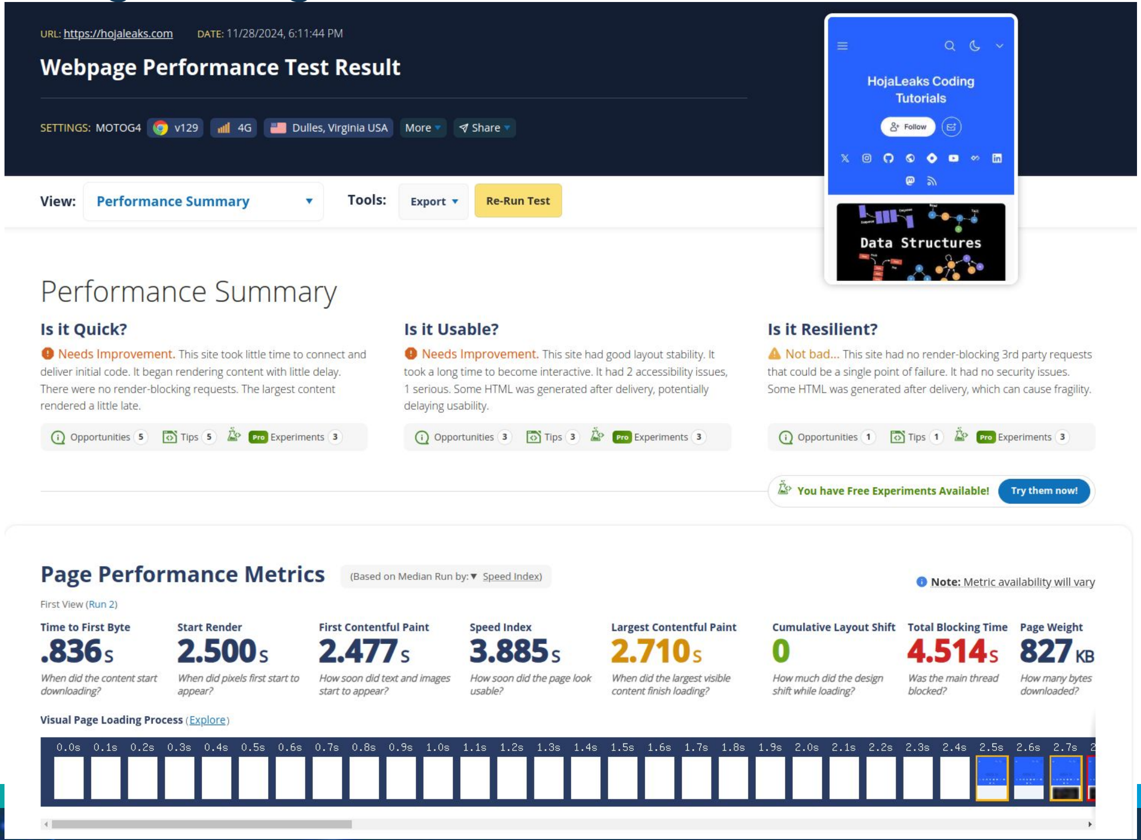
0.1 | 0.25

How to Measure Performance

- ❖ Tools Overview:
  - ➢ Google Lighthouse (built into Chrome DevTools).
  - ➢ WebPageTest.org for deeper analysis.
  - ➢ GTmetrix for detailed insights.

How to Measure Performance

- ❖ WebPageTest.org



URL: https://hojaleaks.com DATE: 11/28/2024, 6:11:44 PM

Webpage Performance Test Result

SETTINGS: MOTOG4 v129 4G Dulles, Virginia USA More ▾ Share ▾

View: Performance Summary ▾ Tools: Export ▾ Re-Run Test

Performance Summary

Is it Quick?

Needs Improvement. This site took little time to connect and deliver initial code. It began rendering content with little delay. There were no render-blocking requests. The largest content rendered a little late.

Opportunities 5 Tips 5 Pro Experiments 3

Is it Usable?

Needs Improvement. This site had good layout stability. It took a long time to become interactive. It had 2 accessibility issues, 1 serious. Some HTML was generated after delivery, potentially delaying usability.

Opportunities 3 Tips 3 Pro Experiments 3

Is it Resilient?

⚠ Not bad... This site had no render-blocking 3rd party requests that could be a single point of failure. It had no security issues. Some HTML was generated after delivery, which can cause fragility.

Opportunities 1 Tips 1 Pro Experiments 3

You have Free Experiments Available! Try them now!

Page Performance Metrics

(Based on Median Run by: ▾ Speed Index)

Note: Metric availability will vary

First View (Run 2)

Time to First Byte	Start Render	First Contentful Paint	Speed Index	Largest Contentful Paint	Cumulative Layout Shift	Total Blocking Time	Page Weight
.836s	2.500s	2.477s	3.885s	2.710s	0	4.514s	827KB
When did the content start downloading?	*When did pixels first start to appear?*	*How soon did text and images start to appear?*	*How soon did the page look usable?*	*When did the largest visible content finish loading?*	*How much did the design shift while loading?*	*Was the main thread blocked?*	*How many bytes downloaded?*

Visual Page Loading Process (Explore)

0.0s 0.1s 0.2s 0.3s 0.4s 0.5s 0.6s 0.7s 0.8s 0.9s 1.0s 1.1s 1.2s 1.3s 1.4s 1.5s 1.6s 1.7s 1.8s 1.9s 2.0s 2.1s 2.2s 2.3s 2.4s 2.5s 2.6s 2.7s

CoGrammar

Let's take a break

CoGrammar

Why Websites Slow Down

- Top Performance Issues:
  - Large, unoptimized images.
  - Too many or blocking scripts (e.g., JavaScript).
  - Lack of caching strategies.
  - Inefficient server response times.

CoGrammar

Improving Website Speed

- Quick Wins:
  - Compress images (e.g., TinyPNG, WebP).
  - Minify CSS, JavaScript, and HTML.
  - Use lazy loading for images and iframes.
- Advanced Techniques:
  - Implement Content Delivery Networks (CDNs).
  - Defer non-critical JavaScript.
  - Optimize server response times with caching and gzip.

Optimizing for Accessibility

- Why Accessibility Matters:
  - Faster sites help users with disabilities.
  - WCAG Guidelines (e.g., color contrast, alt text).
- Tips for Optimized Accessibility:
  - Use semantic HTML.
  - Test with screen readers.

Design for Everyone

- Key Web Content Accessibility Guidelines (WCAG):
  - Ensure sufficient color contrast for text and backgrounds.
  - Provide alt text for all images.
  - Enable keyboard navigation for all interactive elements.
- Common Pitfalls:
  - Hard-to-read text, missing alt text, and inaccessible forms.

Wrap-Up

❖ What was the most valuable thing you learned?

❖ What will you implement first on your website?

CoGrammar

Wrap-Up

- ❖ Key Takeaways:
  - ➢ Regularly measure performance.
  - ➢ Prioritize Core Web Vitals.
  - ➢ Implement optimization techniques systematically.

Which tool can compress images to reduce file size?

A. Photoshop
B. TinyPNG
C. Notepad

What does lazy loading optimise?

A. JavaScript speed
B. Image loading
C. Server requests

Questions and Answers

CoGrammar

Thank you for attending

CoGrammar

SKILLS FOR LIFE
SKILLS BOOTCAMPS

Department for Education