EECS 4481 - Project Phase 4

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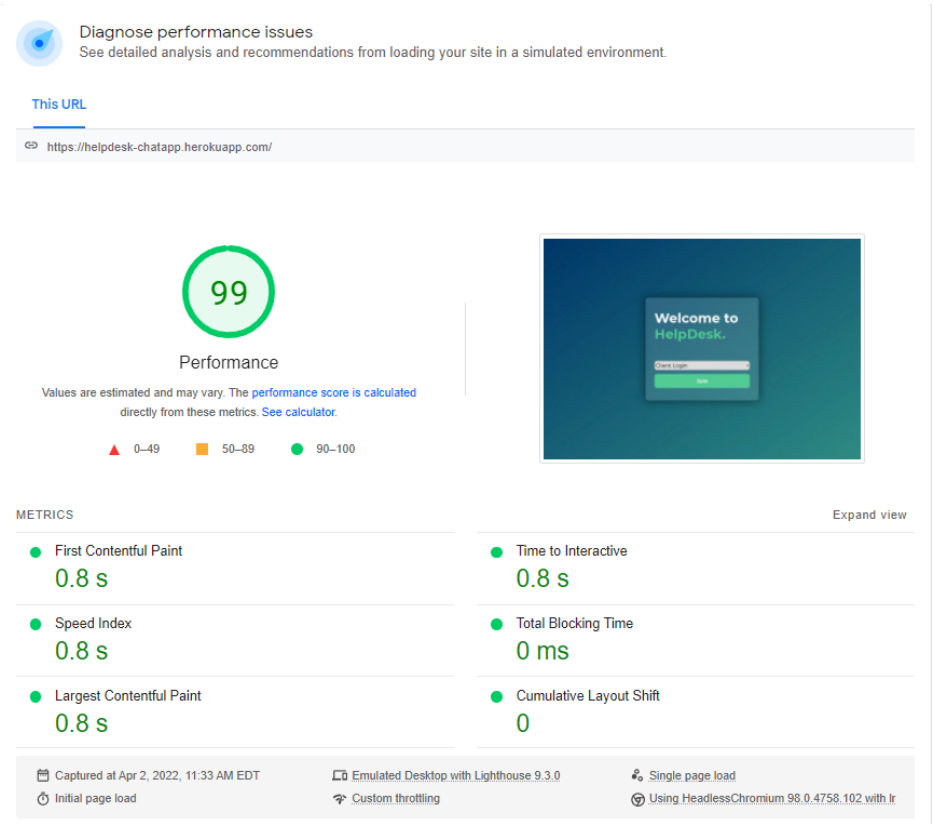
1. Google PageSpeed

In phase 2 we performed Penetration Testing using Burp Suite and discovered two vulnerabilities, Weak Passwords and Tentative CSRF vulnerability. In this part, we present our solution to these vulnerabilities. After patching, these vulnerabilities are no longer present.

1.1 Initial PageSpeed

Desktop results:



Mobile results:

Mobile Desktop

This URL

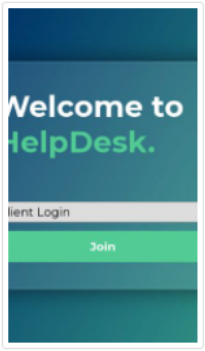
https://helpdesk-chatapp.herokuapp.com/

83

Performance

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

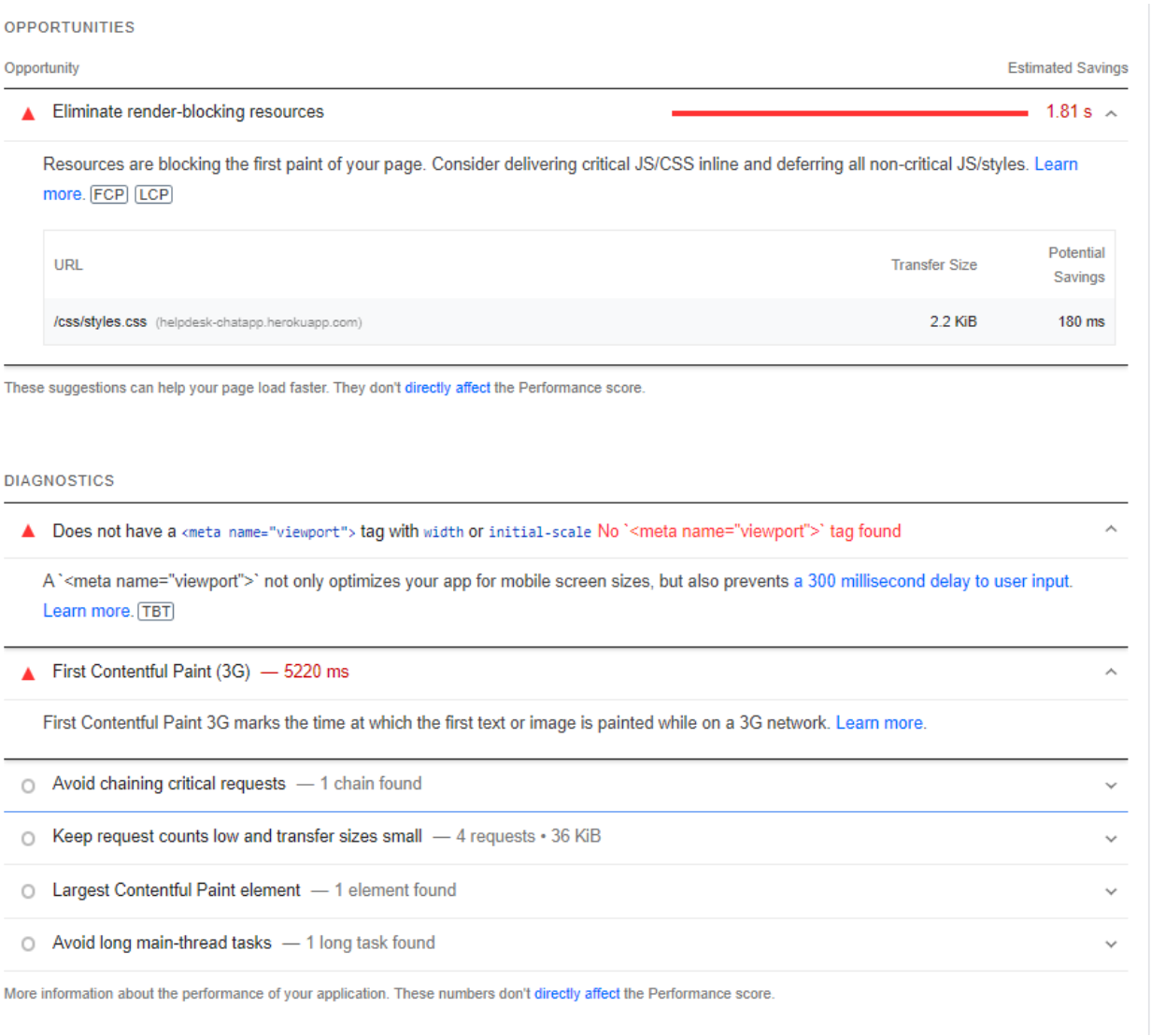
▲ 0–49 ■ 50–89 ● 90–100



METRICS Expand view

■ First Contentful Paint 2.7 s	● Time to Interactive 2.7 s
▲ Speed Index 10.9 s	● Total Blocking Time 0 ms
■ Largest Contentful Paint 2.7 s	● Cumulative Layout Shift 0

Captured at Apr 3, 2022, 12:26 AM EDT
Initial page load
Emulated Moto G4 with Lighthouse 9.3.0
Slow 4G throttling
Single page load
Using HeadlessChromium 98.0.4758.102 with lr



OPPORTUNITIES

Opportunity	Estimated Savings
▲ Eliminate render-blocking resources	1.81 s

Resources are blocking the first paint of your page. Consider delivering critical JS/CSS inline and deferring all non-critical JS/styles. Learn more. FCP LCP

URL	Transfer Size	Potential Savings
/css/styles.css (helpdesk-chatapp.herokuapp.com)	2.2 KiB	180 ms

These suggestions can help your page load faster. They don't directly affect the Performance score.

DIAGNOSTICS

▲ Does not have a `<meta name="viewport">` tag with `width` or `initial-scale` No `<meta name="viewport">` tag found

A `<meta name="viewport">` not only optimizes your app for mobile screen sizes, but also prevents a 300 millisecond delay to user input. Learn more. TBT

▲ First Contentful Paint (3G) — 5220 ms

First Contentful Paint 3G marks the time at which the first text or image is painted while on a 3G network. Learn more.

○ Avoid chaining critical requests — 1 chain found

○ Keep request counts low and transfer sizes small — 4 requests • 36 KiB

○ Largest Contentful Paint element — 1 element found

○ Avoid long main-thread tasks — 1 long task found

More information about the performance of your application. These numbers don't directly affect the Performance score.

1.2 After Optimization PageSpeed

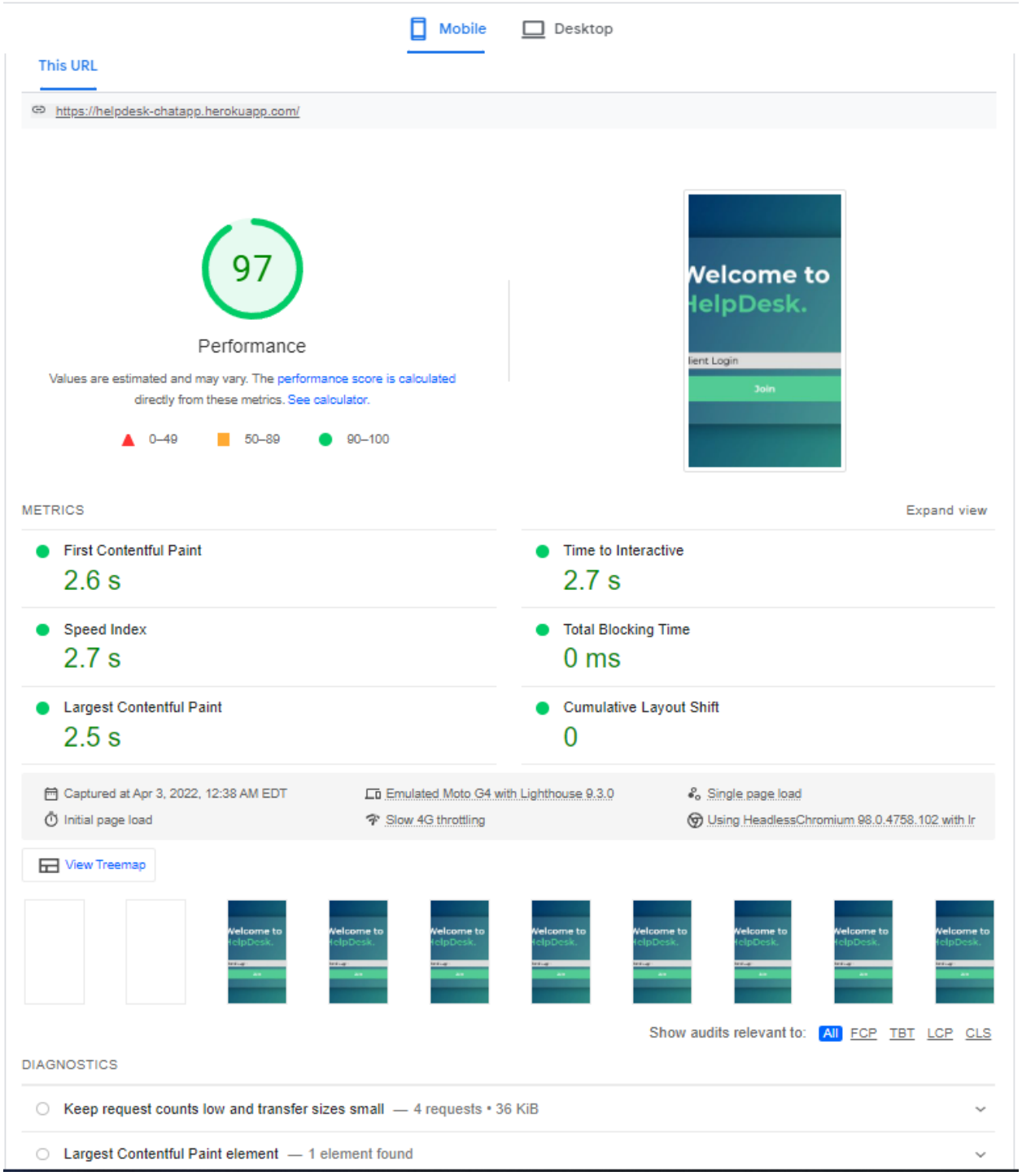
While the pagespeed performance of the initial desktop page was without any significant blemishes, as seen in the diagnostics. The performance of the mobile initial page speed was lacking, at 83%, and multiple opportunities of improvement were identified. So, as a team, we decided to put our sole attention towards the mobile performance, to find solutions to the problems shown in diagnostics and increase the performance score.

Our first successful improvement was based around eliminating render-blocking resources. This problem was resolved by modifications on the html header, like adding preloading of the stylesheet, and the cascading style sheet of the initial page. With these changes the overall

performance already was raised to 88%. Further, the team also managed to eliminate another red flag which was resolved by adding ‘<meta name=”viewport”>’ to the header in the html file.

These changes, plus smaller other changes, increased the performance of mobile initial pagespeed to 97% which is a great improvement from our previous performance.

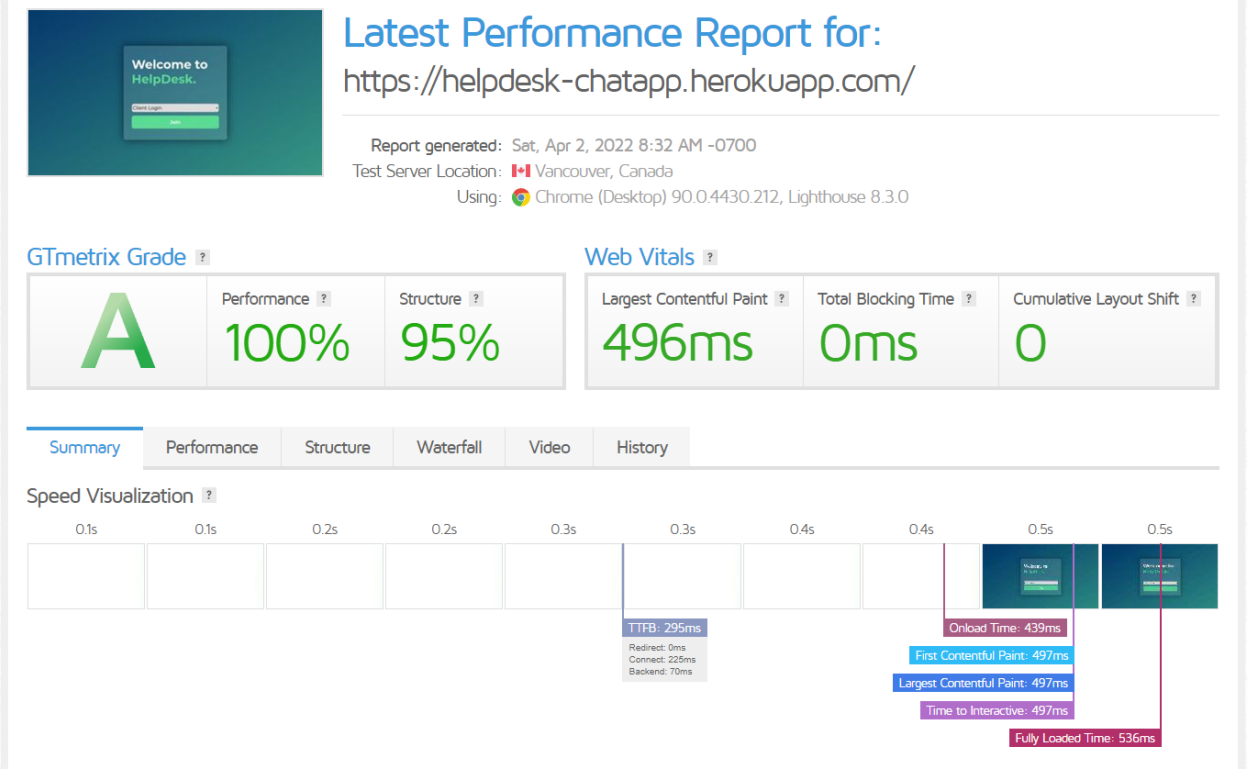
Results:

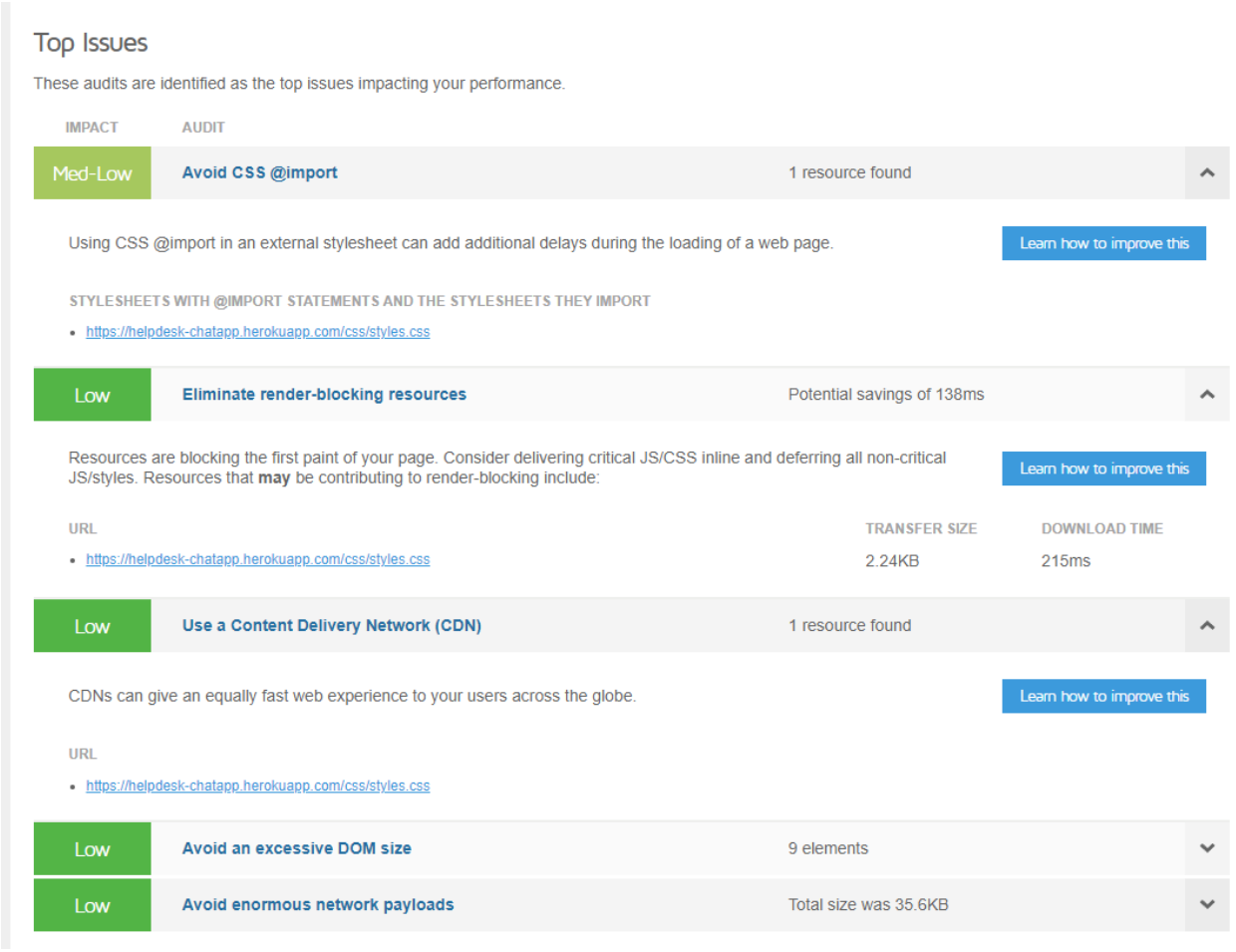


2. Site Performance Testing

2.1 GTmetrix

Results:

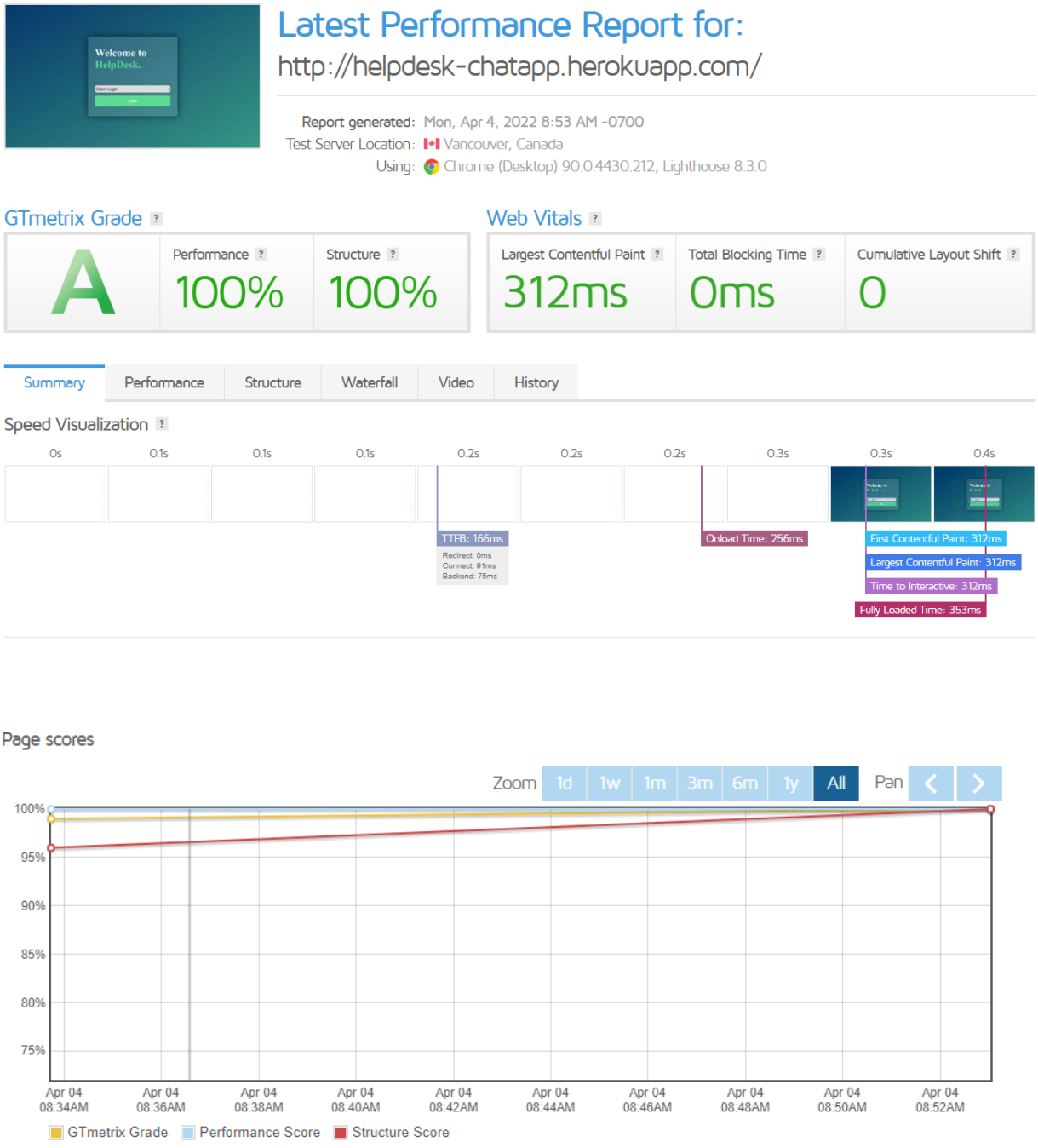




2.2 GTmetrix Optimization

The GTmetrix results gave us great feedback regarding the performance of the website. The overall grade given to our site was an A, with the performance score being at 100% while structure score at 95%. The team was very pleased with the scores, yet we still tried to find areas we could further improve. The most noticeable improvement we can make is that of the structure score, which is believed to be dropped from the Low-Medium impact top issue; Avoid CSS @import.

We made changes to the cascading style sheets of our system to mitigate this impact and hopefully eliminate the Low-Medium impact issue resulting in a better structure score. And this it did, just as we had hypothesized, as one can see in the optimized system GTmetrix results.

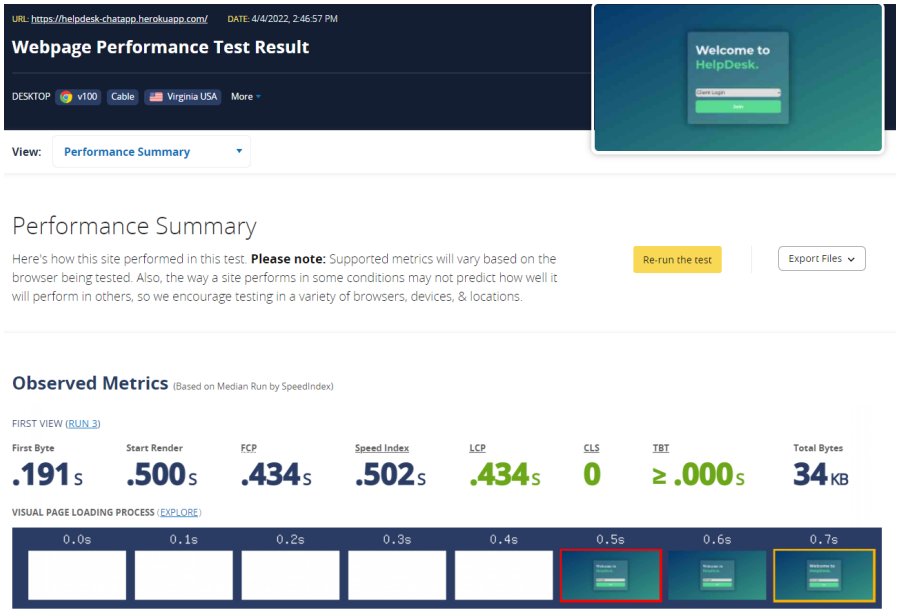


Our team is glad to say that our GTmetrix scores are 100% all around, as can be seen in the Page scores history above. We are pleased with the improvements made using this online tool.

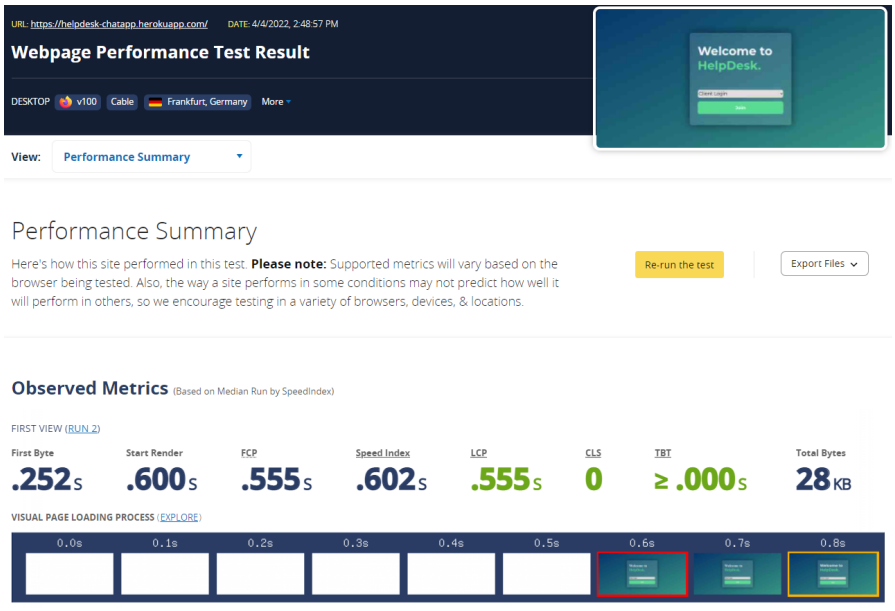
2.3 WebPageTest Site

WebPage Performance results help us further understand where our system is lacking or needs changes to improve its performance on browsers. We noticed the site suggested that we do the tests on various browsers as that can vary results and will help us understand our performance on the different systems.

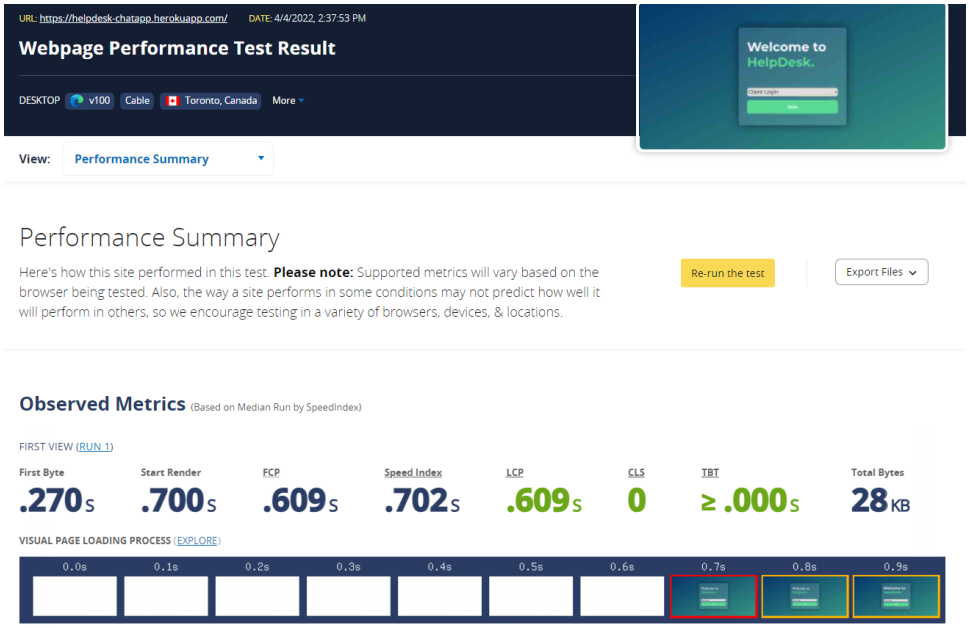
Chrome Results:



FireFox Results:

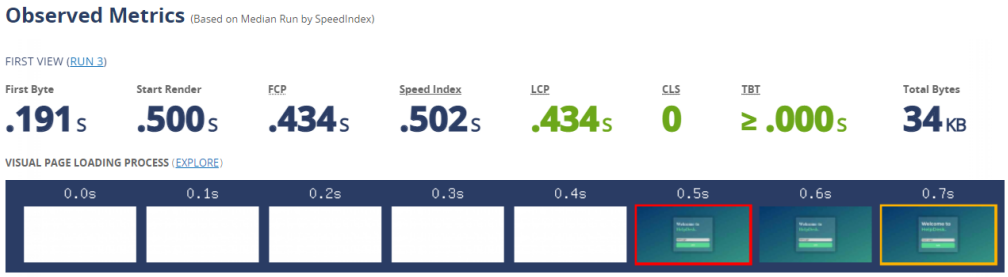


Edge Results:



What was the load time?
0.5 seconds

What was the duration in seconds that elapsed until the page was visually complete?
0.7 seconds



How many requests are there on the page?
5 requests

Request Details

#	Resource	Content Type	Request Start	DNS Lookup	Initial Connection	SSL Negotiation	Time to First Byte	Content Download	Bytes Downloaded	CPU Time	Error/Status Code	IP
1	https://helpdesk-chatapp.herokuapp.com/	text/html	0.708 s	174 ms	172 ms	354 ms	190 ms	1 ms	0.9 KB	-	200	23.22.144.165
2	https://helpdesk-cha...p.com/css/styles.css	text/css	0.954 s	-	-	-	179 ms	1 ms	1.9 KB	-	200	23.22.144.165
3	https://fonts.google...400,700&display=swap	text/css	1.676 s	172 ms	171 ms	182 ms	183 ms	1 ms	0.5 KB	-	200	172.217.13.74
4	https://helpdesk-cha...blic/img/favicon.png	text/html	1.965 s	-	-	-	184 ms	2 ms	0.2 KB	-	404	23.22.144.165
5	https://fonts.gstati...m459WlhyyTh89Y.woff2	font/woff2	2.39 s	71 ms	172 ms	181 ms	173 ms	185 ms	30.2 KB	-	200	172.217.2.99

2.4 WebSite Optimization.com

Web Page Speed Report

URL:	https://helpdesk-chatapp.herokuapp.com/
Title:	HelpDesk
Date:	Report run on Sat Apr 2 12:03:57EDT2022

Diagnosis

Global Statistics

Total HTTP Requests:	1
Total Size:	784 bytes

Object Size Totals

Object type	Size (bytes)	Download @ 56K (seconds)	Download @ T1 (seconds)
HTML:	784	0.36	0.20
HTML Images:	0	0.00	0.00
CSS Images:	0	0.00	0.00
Total Images:	0	0	0
Javascript:	0	0.00	0.00
CSS:	0	0.00	0.00
Multimedia:	0	0.00	0.00
Other:	0	0.00	0.00

External Objects

External Object	QTY
Total HTML:	1
Total HTML Images:	0
Total CSS Images:	0
Total Images:	0
Total Scripts:	0
Total CSS imports:	0
Total Frames:	0
Total Iframes:	0

Download Times*

Connection Rate	Download Time
14.4K	0.81 seconds
28.8K	0.50 seconds
33.6K	0.46 seconds
56K	0.36 seconds
ISDN 128K	0.25 seconds
T1 1.44Mbps	0.20 seconds

*Note that these download times are based on the full connection rate for ISDN and T1 connections. Modem connections (56Kbps or less) are corrected by a packet loss factor of 0.7. All download times include delays due to round-trip latency with an average of 0.2 seconds per object. With 1 total objects for this page, that computes to a total lag time due to latency of 0.2 seconds. Note also that this download time calculation does not take into account delays due to XHTML parsing and rendering.

Page Objects

QTY	SIZE#	TYPE	URL	COMMENTS
1	784	HTML	http://helpdesk-chatapp.herokuapp.com	Header size = 325 bytes Up to 435 bytes could have been saved through compression. View a formatted version of this HTML file
1 ^	784*		Total (^unique objects)	

This site is not using HTTP compression, otherwise called content encoding using gzip. Consider compressing your textual content (XHTML, JavaScript, etc.) with mod_gzip or similar products.

* CSS alternate stylesheets may be referenced in the HTML but are not actually downloaded until they are needed and are therefore not included in the total page size.

Analysis and Recommendations

- TOTAL_HTML - Congratulations, the total number of HTML files on this page (including the main HTML file) is 1 which most browsers can multithread. Minimizing HTTP requests is key for web site optimization. Y
- TOTAL_OBJECTS - Congratulations, the total objects on this page (including the HTML) is 1 which most browsers can multithread in a reasonable amount of time. Minimizing HTTP requests is key to minimizing object overhead (see Figure II-3: Relative distribution of latency components showing that object overhead dominates web page latency in Website Optimization Secrets for more details on how object overhead dominates web page latency.
- TOTAL_SIZE - Congratulations, the total size of this page is 784 bytes. This page should load in 0.36 seconds on a 56Kbps modem. Based on current average web page size and composition trends you want your page to load in less than 20 seconds on a 56Kbps connection, with progressive feedback. Ideally you want your page to load in 3 to 4 seconds on a broadband connection, and 8 to 12 seconds for the HTML on a dialup connection. Of course, there's always room for improvement.
- HTML_SIZE - Congratulations, the total size of this HTML file is 784 bytes, which less than 50K. Assuming that you specify the HEIGHT and WIDTH of your images, this size allows your HTML to display content in under 10 seconds, the average time users are willing to wait for a page to display without feedback.
- MULTIM_SIZE - Congratulations, the total size of all your external multimedia files is 0 bytes, which is less than 10K.

4. Source Code

All of our source code is provided in the GitHub repository. The GitHub repository for the help-desk chat software can be found at the following link: https://github.com/Harsh-B-Patel/HelpDeskApp/tree/main. Please make sure that you utilize the **main branch** in the repository. The Readme file contains installation instructions.

5. Presentation

https://docs.google.com/presentation/d/1GHH0_ZGSgJytZJ1V57uHYm1sn3rqu8CVbNsZKSVkbTU/edit#slide=id.g120b5cdcb2c_0_3