International Journal of Scientific Research in Engineering and Management (IJSREM)
Volume: 07 Issue: 03 | March - 2023 Impact Factor: 7.185 ISSN: 2582-3930

VIPER HTTP WEB SERVER (A Custom Web Server)

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Abstract: - This research paper presents the design and implementation of a Web Server designed in C++ which is a Custom Web server that is it can be used for specific tasks which makes it faster than other open-source web servers it can also be used to meet the specific needs of a particular organization. The paper discusses the challenges faced during the development process and the solutions that were implemented to overcome them. Performance tests were conducted to evaluate the server's efficiency and effectiveness using different web applications that interact with Data Bases and external Third Party APIs, and the results demonstrate that it performs at a high level even under heavy loads. Overall, this paper provides valuable insights into the development of custom web servers and highlights the benefits of creating a tailored solution for specific organizational needs.

Keywords: - Customized Web Server, Web Services, HTTP Protocols, Web Applications

I. INTRODUCTION

This project is made so that many specific tasks which include web applications or web services can be optimized by creating a custom web server. This project is applicable for many product developments which don't require fancy web servers which are open source and has several unused configurations which take time. Using this web server, a user can configure the server as per their needs. There are very few efficient web servers available in C++ which make it difficult for beginners to learn web application development as most of the students learn C/C++ as their first language and they are familiar with the syntax and logic required in C++. Using Viper Web Server they can learn web application development in C++. Since C++ is not an interpreted language which makes it is faster than other programming languages. Products like IOT applications or Machine Learning applications need a fast response for every request which can be achieved using a custom web server which is designed in C++. Using socket programming and HTTP protocols Viper Web Server is developed and multi-threading is applied to it so that it can serve multiple requests simultaneously. Database integration and third-party libraries support is available for full-stack development.

II. PROBLEM FORMULATION

Viper Web Server is designed to optimize server-side processing and handle high traffic volumes, resulting in faster response times and increased throughput. It can also be further developed with advanced encryption protocols and security features, providing better protection against cyber threats and data breaches. Since it is a custom web server Custom web servers can be tailored to meet the specific requirements of an organization, allowing for greater flexibility and customization than traditional web servers. Viper Web Server is built to maximize hardware and software resources, reducing the overall cost of ownership and operation.

Overall, it provides a powerful and flexible solution for organizations looking to improve performance, security, and scalability in their web applications. While there may be some challenges associated with building and maintaining custom web servers, the benefits they offer are well worth the effort for many organizations.

III. LITERATURE REVIEW

A custom web server is a specialized software application designed to provide web services to clients over the internet. This type of server is typically built to cater to the specific requirements of a particular organization, and it may offer features that are not available in standard web servers.

A literature review of custom web servers reveals that there are various advantages to building and using a custom web server. For instance, custom web servers can be tailored to meet specific performance requirements and can handle high traffic volumes. Additionally, they can provide better security and reliability than standard web servers, especially if they are designed with advanced encryption protocols.

According to a study by T. Li et al. (2020), custom web servers can be designed to optimize server-side processing, resulting in better performance and faster response times. The study compared the performance of a custom web server with that of a standard web server and found that the custom server outperformed the standard server in terms of throughput and latency.

Similarly, a review by K. G. Kizilkaya et al. (2019) showed that custom web servers can be used to improve the performance of web applications. The study focused on optimizing the performance of a web-based data management system by building a custom web server that was specifically designed to handle large amounts of data. The custom server was able to achieve significantly better performance than the standard server, with reduced response times and increased throughput.

IV. METHODOLOGY

The methodology includes the steps to be followed to achieve the objective of the project during the project development. Socket programming for TCP/IP protocol with HTTP 1.1 Standards is used to design the web server. A web server is basically a network application that is designed with HTTP standards which includes a server and a client. In the Web Server case, the client is the browser most of the time that initiates a request, the request is initiated in a particular format which is strictly following HTTP standards. The server receives the request and parses it to separate various parameters such as type of request, query string, HTTP version, status code, etc. According to the request, actions are performed if it is specified by the application programmer using request mappings, and processing starts after which a response is created using HTTP protocol and is sent to the client whether the processing was successful or not, and the respective response is displayed at the user's end. There is much internal processing that is done on the server side in parsing the request headers, request, creating the response header, sending the response, etc. Multi-threading is used so that server can serve multiple requests at a time so that no user has to wait for the server to be available. After the processing of a thread is done, it is killed which is handled by the server, the user doesn't need to take care of that.

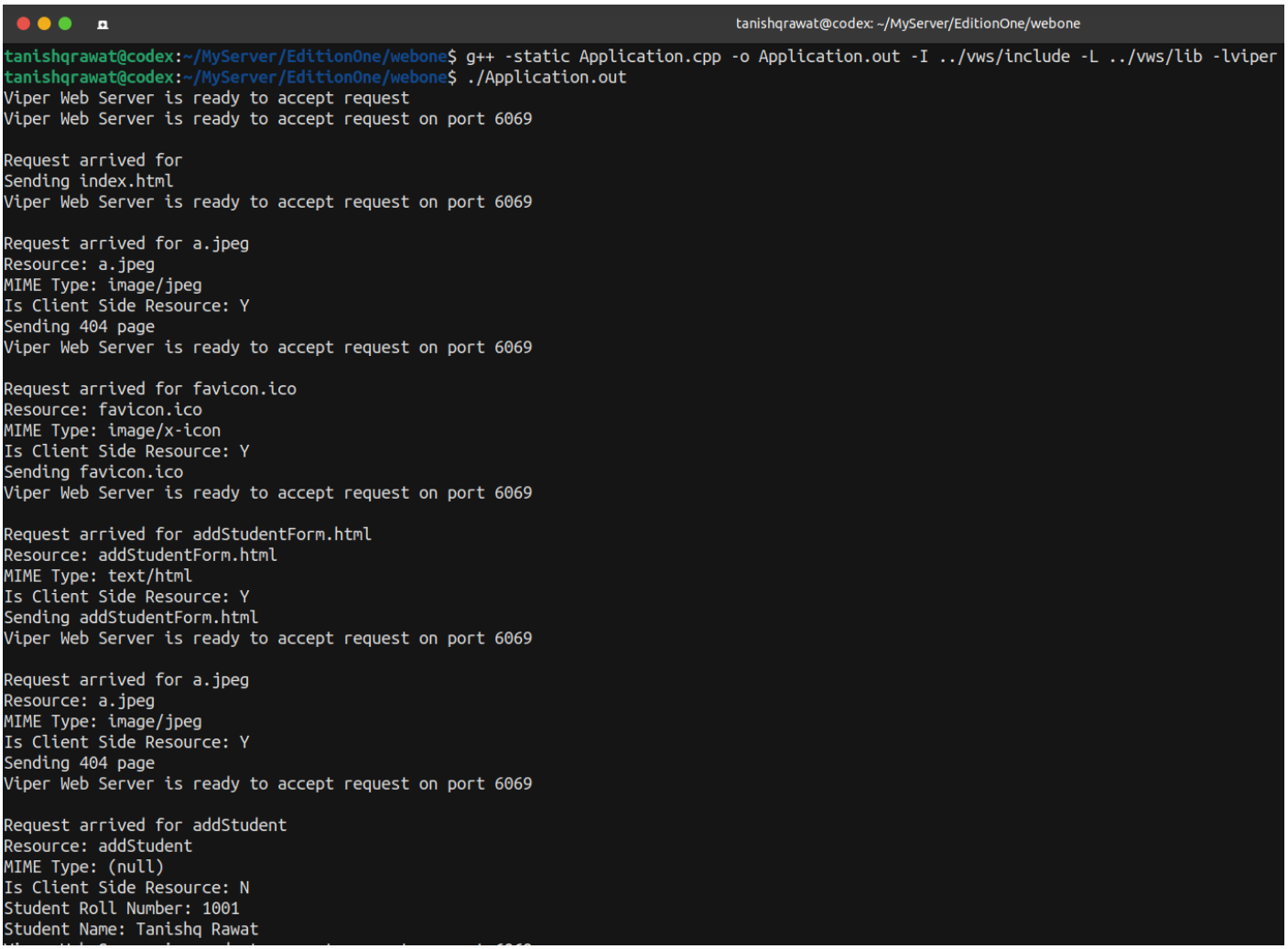

Figure -1: Representation of Server serving requests for a web app named "Application"

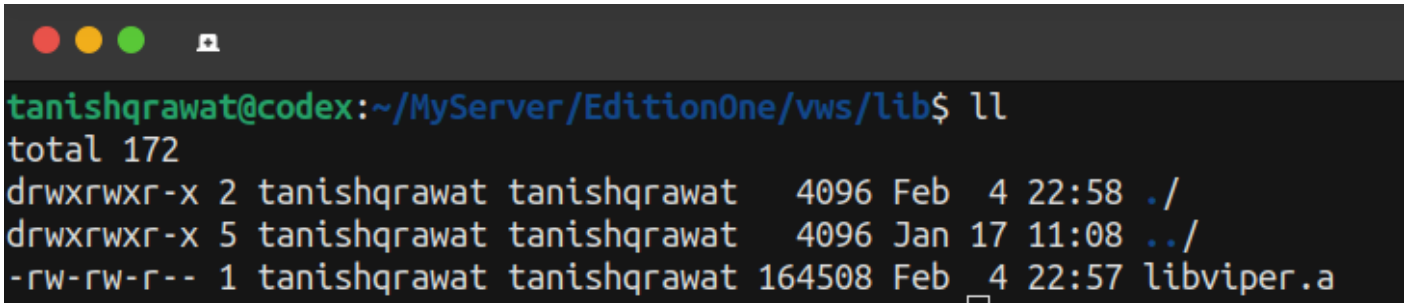

Figure -2: Representation of library file which can be used to create a web app using Viper HTTP Web Server

VI. CONCLUSION

This project comes under the category of Software development and web application development. Overall, Viper Web Server provides a powerful and flexible solution for organizations looking to improve performance, security, and scalability in their web applications. While there may be some challenges associated with building and maintaining custom web servers, the benefits they offer are well worth the effort for many organizations.

VII. ACKNOWLEDGMENT

The success and final outcome of this project required a lot of guidance and assistance from many people and we are extremely privileged to have got this all along with the completion of my project. All that we have done is only due to such supervision and assistance and we would not forget to thank them.

We respect and thank **MR. Prafull Kelkar**, for providing me with an opportunity to do the project work and giving me all support and guidance, which made me complete the project duly. I am extremely thankful to him for providing such nice support and guidance, although he had a busy schedule managing corporate affairs.

I owe our deep gratitude to my project guide **MR. Prafull Kelkar**, who took a keen interest in my project work and guided me all along, till the completion of my project work by providing all the necessary information for developing a good system. I would also like to express my gratitude and respect to the CSE professor of the department **Prof. Narendra Pal Singh,** who always supported my growth and development and under whose guidance this project report is completed.

VII. REFERENCES

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VIII. BIOGRAPHIES

I am Tanishq Rawat, Associate Software Engineer at Mobileum and a Final Year Student at Acropolis Institute of Technology and Research, Indore, India. My area of interest is software/product development. I am curious about various domains such as Network Programming, Image Processing, and Data Analysis. I have a professional experience of 8 months as Full Time Engineer and 13 months as an Intern.