

IMPLEMENTATION OF CLIENT-SERVER CONCEPT USING SOCKET PROGRAMMING IN E-ADUAN PORTAL IN UITM

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ABSTRACT - Implementation of client-server concept using socket programming in e-aduan portal in uitm. This project aims to implement a client-server using socket programming that enables real-time communication between students (clients) and lecturers (servers) through chat features. Software tools and languages used include Laragon for local development, Visual Studio Code for code editing, HTML/CSS for web page design, PHP for server-side scripting, and WebSocket for real-time two-way communication. The e-aduan portal offers features such as user registration, real-time messaging, notifications for lecturers, report history display and status reporting. Implementation includes database construction, home page design and server-side processing. Performance evaluation focuses on throughput and latency using tools such as Wireshark for network traffic analysis. The results show successful implementation, providing an efficient platform for report submission, communication and updates between students and lecturers. However, some limitations are identified, including scalability and optimization for larger user loads. The implementation of the client-server concept using socket programming on the e-aduan portal in uitm showcases its potential in facilitating effective communication and streamlining the education process.

Keywords: Client-server concept, socket programming, e-aduan portal, distributed system architecture, real-time communication.

1. INTRODUCTION

Online portals have now become common and numerous. Thus, efforts to manage the online Portal become more important so that every function on the Portal can run smoothly and steadily. But the significant challenge in the development of this Portal is to create high quality content. Hence, there is a need to design a system architecture that allows content creation to occur automatically, generating a fast workflow (Ting & Yen, 2021). System architecture such as WebSocket technology is a computer communications technology, which will be implemented to enable full-duplex communication over a single TCP connection. This ensures efficient and bidirectional communication between the clients and the server. This project aims to establish a communication mechanism between multiple clients and a server, enabling real-time messaging and collaboration. By utilizing socket programming, the project ensures efficient and reliable communication between the clients and the server.

2. METHODOLOGY

The methodology consists of five key phases such as initial planning, information gathering, design and development, testing and evaluation, and documentation. The initial planning phase involves defining the goals and objectives of the project, as well as creating a high-level plan for achieving them. During the information gathering phase, relevant information and data related to the e-aduan portal and its requirements are collected. The design and development phase focuses on establishing the unique features and functionality of the client-server application in the testing and evaluation phase, the client-server application is thoroughly tested to ensure its reliability and performance. Finally, the documentation phase involves documenting the entire implementation process, including the research activities, design decisions, development approach, testing results, and any lessons learned.

3. RESULTS AND DISCUSSION

The network performance of the implementation of socket programming on a website is evaluated using Wireshark. The system will analyze network performance based on latency and throughput. Latency refers to the time it takes for a request or data packet to travel from the client to the server from a specific source address to destination address. The information on the size of the data in bits and the average time taken to send the message (average sending time) in milliseconds have been recorded. For example, for a message size of 13 bits, the average sending time is 0.0407×10^{-3}

⁶ms. Throughput is a metric that quantifies the amount of data transferred between the client and server over a specific period. The project seeks to understand how a packet length will affect the time it takes for packets to reach their destination. The information on the size of the data in bits, the average time taken to transmit the message in seconds, and the calculation of throughput in bits per second (bits/s) have been recorded. For example, for a message size of 13 bits, the time taken to transmit the message is 0.1405s, so the throughput of this size data is 320.99 bit/s. Similarly, the values are recorded for different message sizes. However, the system's performance can be further improved by expanding the size data.

4. NOVELTY OF RESEARCH / PRODUCT

This research brings novelty through the implementation of socket programming on websites. This is due to socket programming being one of the best methods in distributed computing that can improve a system's performance (Maata et al., 2018). The implementation of client server concept using socket programming will allow the chatting features more efficiency and effectiveness of the communication process. Its implementation will also allow the server to connect and exchange messages successfully and with security (Bhatt & Bindal, 2020).

5. CONCLUSION

In conclusion, this project has successfully implemented the client-server concept using socket programming in the e-aduan portal. The project also has enhanced the functionality and performance of the portal by establishing a distributed system architecture that enables seamless communication between clients and servers successfully. By employing socket programming and a distributed system architecture, the portal can handle multiple client requests simultaneously, enabling faster response times and improved overall performance. This can be accomplished by implementing appropriate socket management and error handling, as well as testing and evaluating the performance of the e-aduan portal in detail.

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