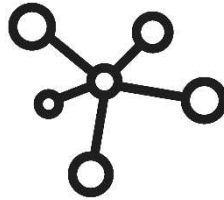**HTTP2 Server**

*Computer Networks*

# Ain Shams University
# Faculty of Engineering
# CESS
# CSE351 Computer Networks
# Fall 24
# Proposal Document

## Proposal Done by:

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# ABSTRACT

An HTTP/2 web server design is presented in this proposal with the goal of enhancing the effectiveness and performance of contemporary web communication. By leveraging essential elements of the HTTP/2 protocol, such as header compression, flow control, and multiplexing, the server gets around the drawbacks of HTTP/1.1. The server can now manage several data streams over a single TCP connection thanks to these improvements, which lowers latency and optimizes resource utilization.

Specialized components at the core of the server's design cooperate to guarantee seamless operation. The Connection Handler manages incoming client connections and validates the initial HTTP/2 handshake. The Frame Processor takes care of parsing and validating HTTP/2 frames. The Stream Manager handles stream lifecycles, including creation, prioritization, and closure, ensuring the server follows multiplexing rules. The HPACK Module compresses and decompresses headers efficiently, helping to minimize data size and save bandwidth. The Flow Control Module manages data transmission to prevent overload, while the Error Handler gracefully addresses any protocol violations or errors that arise.

# PROJECT SCOPE

Developing a reliable, high-performance web server that fully supports the HTTP/2 protocol is the goal of this project. By implementing HTTP/2, the server will offer faster connectivity, lower latency, and better efficiency in comparison to traditional HTTP/1.1 servers.

Managing several client connections at once, accurately processing incoming requests, and effectively managing numerous requests and responses over a single connection are the project's main goals. The server will also implement effective data flow management, reduce communication overhead with header compression, and ensure stable operation through robust error handling.

To further enhance performance, the server will support persistent connections to minimize the need for repeated handshakes, improving response times. The design document will provide more detailed technical information on these features.

# BRIEF OVERVIEW

The demand for faster and more efficient data exchange has driven the widespread adoption of HTTP/2 as web communication continues to evolve. Designing and building an HTTP/2 web server that addresses the problems with HTTP/1.1 is the aim of this project. The goal is to deliver a server that maximizes resource utilization, decreases latency, and boosts speed.

The server is designed to handle multiple client connections simultaneously by using multiplexing, allowing it to send and receive multiple requests and responses over a single connection. To improve bandwidth efficiency, it uses HPACK for compressing HTTP headers. Flow control mechanisms are also implemented to regulate data transmission rates, ensuring smooth communication and fair resource distribution.

With a modular architecture, the server comprises components that manage connections, process incoming frames, handle stream lifecycles, and manage errors effectively. This design ensures the server is scalable, reliable, and fully compliant with HTTP/2 standards (RFC 7540 and RFC 7541), making it suitable for modern web applications that demand high performance and reliability.