ABSTRACT

The increasing demand for a reliable internet network is very important to meet the needs of companies. However, currently, the ranking of mobile internet and internet in Indonesia is still below global standards. Network congestion, which is a major contributor to low internet quality, causes various challenges such as service outages, communication failures, and decreased connection speeds.

The study emphasizes the importance of implementing effective congestion management mechanisms. Focusing on the utilization of the simple path method and comparing its effectiveness with the Dijkstra algorithm in managing internet networks, this study aims to develop network traffic optimization methods and identify alternative routes to improve overall network performance, especially in complex traffic conditions, within the framework of a Decision Support System (DSS).

The analysis showed that the use of Simple Path increased packet delivery rates threefold and reduced packet loss by half compared to the traditional Dijkstra method, with 58.54% of packets successfully delivered and a 41.46% reduction in packet loss. In addition, Simple Path facilitates the use of alternative routes for about 24% of total requests using alternative routes. Network graph exploration identifies solid points and analyzes the capacity of each network link. Twelve links show occupancy rates above 90%, indicating congestion, with NE2-4-KBL to NE3-KBL-HSI as the main cause of package delivery failures, accounting for about 70.6% of total failed requests. Simple Path analysis highlights about 46% of total failed requests passing through this link. These findings emphasize the importance of congestion management strategies and the use of alternative routes to improve network performance and reduce packet loss, thereby contributing to business efficiency, user experience, and customer satisfaction.

Keywords - ***congestion management, simple path, Alternative routing, Network Traffic Optimization***