ABSTRACT

Enterprises with headquarters and branches require reliable and efficient Virtual Private Network (VPN) connectivity. However, these connections are vulnerable to disruptions when the main internet line fails, while traditional VPN solutions often lack an effective failover mechanism to maintain connection availability. This research implements a Software-Defined Wide Area Network (SD-WAN) using ZeroTier to build an automated VPN failover system. The system performance was evaluated through 30 test scenarios, where the main internet connection was intentionally disconnected to measure the recovery time and network quality. Quality of Service (QoS) parameters such as throughput, packet loss, delay, and jitter were measured using iperf3 software and ping commands. The failover system proved successful in restoring the connection with an average downtime of 11.33 seconds. During the transition process, there was an average packet loss of 11.30%. The overall network performance after recovery achieved an average throughput of 8.96 Mbps, delay of 15.33 ms, and jitter of 1.43 ms. Based on these parameters, the system achieved a final Quality of Service (QoS) index score of 3.5, which falls into the "Satisfactory" category.

Keywords: SD-WAN, Zerotier, Failover, VPN.