ABSTRACT

Vendor lock-in is a major challenge in the implementation of *Software-Defined Wide Area Networks* (SD-WAN), where users become dependent on a single vendor's solution. This dependency can limit system flexibility, hinder innovation, and increase long-term network management costs. This problem drives the need for a more open network architecture that is not reliant on a single hardware brand.

This research proposes the use of *Universal Customer Premises Equipment* (uCPE) as an open solution to address the issue of *vendor lock-in*. The solution is implemented using an *open-source* SD-WAN software, flexiWAN, running on two uCPE devices from different vendors: the Silicom Cordoba IA3003 and the Advantech FWA-T011. The main focus of this study is to test the interoperability, performance, and functionality of this combined system as a foundation for a flexible network.

The test results show that the uCPE solution with flexiWAN successfully established a functional and stable connection between the different devices, with an average latency performance of under 15 ms. Although there is an *overhead* that limits the maximum *throughput*, the data transfer performance between devices (averaging 17-18 Mbps) is considered adequate for operational needs. Key SD-WAN features such as *Zero Touch Provisioning* (ZTP), *Link Failover*, and the *firewall* also proved to function properly. This study validates that an *open-source* based uCPE is a valid and cost-effective alternative for supporting a flexible SD-WAN solution.

Keywords: flexiWAN, *Open-source*, SD-WAN, uCPE, *Vendor Lock-in*