

ABSTRACT

Capstone Design explores the planning of an outdoor Wi-Fi network at Telkom University in Bandung TECHNOPLEX Region using Wi-Fi 6 technology. The background problem addressed are the uneven Wi-Fi signal coverage, slow internet connection speeds in outdoor areas of the campus, and suboptimal Access Point placement. This results in limited Access Point capacity and areas with inadequate Wi-Fi coverage.

The methodology employed includes bandwidth requirement analysis, user estimation, calculation of required Access Points, Wi-Fi demand calculation, and simulation and testing using the WISCloud Ruijie Networks and NetSpot platforms. Comparisons between the existing Wi-Fi 5 infrastructure and the new Wi-Fi 6 design are also conducted to assess potential performance improvements. Testing encompasses signal distribution, connectivity, and network capacity under various scenarios, including high load situations.

Research findings indicate that implementing Wi-Fi 6 with optimal Access Point placement based on a Heatmap can significantly enhance the coverage and performance of the outdoor Wi-Fi network at the campus. Simulations and testing estimate the need for 21 Access Points to cover the entire target area. Capacity testing demonstrates the network's ability to handle up to 100 active users per Access Point and provide coverage across all outdoor areas of Telkom University Bandung. This design provides an optimal solution for the issues faced by the Directorate of the Information Technology Center (PuTI) at Telkom University in improving the quality of outdoor Wi-Fi services.

Keywords: *Outdoor Wi-Fi, Wi-Fi 6, Telkom University, Access Point, Ruijie Networks, Bandwidth, Signal Coverage, Network Simulation, Network Optimization, User Capacity*