

IMPLEMENTASI METODE SIMPLE QUEUE DAN QUEUE TREE UNTUK OPTIMASI MANAJEMEN BANDWIDTH JARINGAN DI SOLO TECHNOPARK

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INTISARI

Latar Belakang: Gedung *RnD (Resource and Development)* Solo Technopark, khususnya lantai 2, memiliki peranan penting untuk sektor bisnis seperti penyedia tempat pelatihan teori *OGSCI (Oil Gas Skill Centre of Indonesia)*, ruang seminar, ruang kelas pelatihan, ruang logistik, ruang HKI (Hak Kekayaan Intelektual), ruang keuangan dan ruang *support OGSCI*. Semua ruangan ini memiliki jaringan Internet baik *wifi* maupun *LAN* untuk menunjang aktivitas dan mobilitas agar lancar. Namun, jaringan saat ini masih belum optimal dikarenakan adanya keluhan terkait kondisi jaringan yang ada, seperti *lagging* dan sering *disconnect* saat ada rapat *online* dan *streaming video*.

Tujuan: Tujuan penelitian ini adalah untuk mengembangkan dan menerapkan solusi manajemen *bandwidth* berbasis metode *Simple queue* dan *Queue tree* di Solo Technopark dengan melihat nilai dari *throughput*, *delay*, *packet loss* dan *jitter* pada jaringan guna meningkatkan efisiensi penggunaan sumber daya *bandwidth*.

Metode Penelitian: Penelitian ini menggunakan pendekatan *NDLC* untuk mengoptimalkan manajemen *bandwidth* di Solo Technopark dengan metode *Simple queue* dan *Queue tree*. Dimulai dengan pemetaan kebutuhan, diikuti oleh identifikasi masalah seperti pola penggunaan jaringan dan infrastruktur. Berdasarkan analisis tersebut, sistem manajemen *bandwidth* dirancang untuk mengatasi permasalahan yang teridentifikasi.

Hasil: hasil pengukuran parameter *QoS* menggunakan aplikasi Wireshark, terlihat bahwa manajemen *bandwidth* menggunakan metode kombinasi *Simple queue* dan *Queue tree* lebih tepat diterapkan di Solo Technopark dibandingkan metode *Simple queue* saja. Dengan metode kombinasi ini, kinerja jaringan menunjukkan peningkatan signifikan dalam hal menaikkan nilai *throughput* dan menurunkan *delay*, *jitter* dan *packet loss*. Kombinasi *Simple queue* dan *Queue tree* menghasilkan perbedaan yang jauh lebih baik dalam manajemen *bandwidth*.

Kesimpulan: Kombinasi metode *Simple queue* dan *Queue tree* dalam manajemen *bandwidth* di Solo Technopark terbukti lebih efektif dibandingkan penggunaan *Simple queue* saja serta meningkatkan kinerja jaringan dalam hal menaikkan nilai *throughput* dan menurunkan *delay*, *jitter*, dan *packet loss* secara signifikan.

Kata-kunci: *NDLC*, *Simple queue*, *Queue tree*, Mikrotik, *Bandwidth*

IMPLEMENTATION OF SIMPLE QUEUE AND QUEUE TREE METHODS FOR BANDWIDTH MANAGEMENT OPTIMIZATION IN SOLO TECHNOPARK NETWORK

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ABSTRACT

Background: *The RnD (Resource and Development) Building at Solo Technopark, particularly the second floor, plays a vital role in business sectors such as providing theoretical training space for OGSCI (Oil Gas Skill Centre of Indonesia), seminar rooms, training classrooms, logistics rooms, IPR (Intellectual Property Rights) offices, finance rooms, and OGSCI support rooms. All of these rooms are equipped with Internet networks, both Wi-Fi and LAN, to support smooth activities and mobility. However, the current network is still not optimal due to complaints regarding the existing network conditions, such as lagging and frequent disconnections during online meetings and video streaming.*

Objective: *The purpose of this research is to develop and implement a bandwidth management solution based on the Simple queue and Queue tree methods at Solo Technopark by evaluating the throughput, delay, packet loss, and jitter values on the network to enhance the efficiency of bandwidth resource usage.*

Method: *This research uses the NDLC approach to optimize bandwidth management at Solo Technopark with the Simple queue and Queue tree methods. It begins with mapping requirements, followed by identifying issues such as network usage patterns and infrastructure. Based on this analysis, a bandwidth management system is designed to address the identified problems.*

Result: *The results of QoS parameter measurements using the Wireshark application show that bandwidth management using a combination of Simple Queue and Queue Tree methods is more suitable for implementation at Solo Technopark compared to the Simple Queue method alone. With this combined method, network performance demonstrates a significant improvement in terms of increasing throughput and reducing delay, jitter, and packet loss. The combination of Simple Queue and Queue Tree produces a much better difference in bandwidth management.*

Conclusion: *The combination of Simple Queue and Queue Tree methods in bandwidth management at Solo Technopark has proven to be more effective compared to using Simple Queue alone, significantly improving network performance by increasing throughput and reducing delay, jitter, and packet loss.*

Keywords: *NDLC, Simple queue, Queue tree, Mikrotik, Bandwidth*