

ABSTRAK

Kualitas layanan jaringan internet merupakan faktor krusial dalam mendukung aktivitas digital masyarakat saat ini. Penelitian ini bertujuan untuk mengukur, mengevaluasi, dan merumuskan rekomendasi perbaikan *Quality of Service* (QoS) pada jaringan internet ICONNET di Gampong Blang Pulo. Pendekatan pemecahan masalah dalam penelitian ini menggunakan metode *Network Development Life Cycle* (NDLC). Pengumpulan data lalu lintas jaringan dilakukan melalui teknik *packet sniffing* menggunakan perangkat lunak Wireshark pada tiga skenario aktivitas pengguna: *Game Online*, *Video Streaming*, dan *Voice over Internet Protocol* (VoIP). Evaluasi parameter QoS diklasifikasikan menggunakan standar internasional ETSI TIPHON. Berdasarkan hasil pengujian secara keseluruhan, kualitas jaringan didominasi oleh kategori "Sangat Bagus" (Indeks 4). Kinerja jaringan paling bagus dan stabil tercatat pada Lokasi 3 dan Lokasi 4, dengan rentang performa kondisi normal menunjukkan: *Throughput* antara 0,11 Mbps hingga 27,01 Mbps (bergantung beban aplikasi), *Packet Loss* yang sangat prima di angka 0% hingga 0,53%, *Delay* yang responsif pada 1,34 ms hingga 40,29 ms, dan *Jitter* yang stabil di kisaran 0,41 ms hingga 19,18 ms. Sebaliknya, kinerja jaringan paling buruk dengan degradasi layanan yang kritis ditemukan di Lokasi 1 pada sesi jam sibuk. Pada kondisi tersebut, *Throughput* anjlok hingga 0,06 Mbps akibat kelebihan beban (*overcapacity*), *Delay* melonjak ekstrem hingga 965,90 ms yang memicu fenomena *bufferbloat*, dan *Jitter* meningkat tajam menjadi 78,67 ms. Sebagai tindak lanjut pada tahap perancangan (*Design*) NDLC, penelitian ini merekomendasikan solusi peningkatan kapasitas *bandwidth*, penerapan manajemen *bandwidth* berbasis algoritma *Per Connection Queue* (PCQ) untuk menjamin asas keadilan (*fairness*), serta rekayasa lalu lintas (*Traffic Engineering*) menggunakan QoS Prioritas. Pada tahap manajemen (*Management*), diusulkan penyusunan *Standard Operating Procedure* (SOP) pemeliharaan preventif guna mempertahankan stabilitas jaringan di masa mendatang.

Kata Kunci: ICONNET, NDLC, TIPHON, *Quality of Service*, Wireshark.

ABSTRACT

The quality of internet network services is a crucial factor in supporting current digital activities. This research aims to measure, evaluate, and formulate recommendations for improving the Quality of Service (QoS) of the ICONNET internet network in Gampong Blang Pulo. The problem-solving approach in this research utilizes the Network Development Life Cycle (NDLC) methodology. Network traffic data collection was conducted through packet sniffing techniques using Wireshark software across three user activity scenarios: Online Gaming, Video Streaming, and Voice over Internet Protocol (VoIP). The evaluation of QoS parameters was classified using the ETSI TIPHON international standards. Based on the overall test results, the network quality is dominated by the "Very Good" category (Index 4). The best and most stable network performance was recorded at Location 3 and Location 4, with normal performance ranges showing: Throughput between 0.11 Mbps and 27.01 Mbps (depending on application load), excellent Packet Loss from 0% to 0.53%, responsive Delay from 1.34 ms to 40.29 ms, and stable Jitter in the range of 0.41 ms to 19.18 ms. Conversely, the worst network performance with critical service degradation was found at Location 1 during peak hours. Under these conditions, Throughput plummeted to 0.06 Mbps due to user overcapacity, Delay spiked extremely to 965.90 ms triggering a bufferbloat phenomenon, and Jitter rose sharply to 78.67 ms. As a follow-up in the NDLC Design phase, this research recommends bandwidth capacity upgrades, the implementation of bandwidth management based on the Per Connection Queue (PCQ) algorithm to ensure fairness, and Traffic Engineering using Priority QoS. For the Management phase, the development of a Standard Operating Procedure (SOP) for preventive maintenance is proposed to maintain future network stability.

Keywords: ICONNET, NDLC, TIPHON, Quality of Service, Wireshark.