DAFTAR ISI

Abstrak i

Abstract ii

Lembar Pengesahan iii

Lembar Pernyataan Orisinalitas iv

Lembar Persembahan v

Kata Pengantar vi

Daftar Isi 1

Daftar Gambar 5

Daftar Tabel 9

BAB I PENDAHULUAN 11

I.1 Latar Belakang 11

I.2 Rumusan Masalah 13

I.3 Tujuan Penelitian 13

I.4 Batasan Penelitian 13

I.5 Manfaat Penelitian 14

I.6 Sistematika Penulisan 14

BAB II TINJAUAN PUSTAKA 15

II.1 Microsegmentation 15

II.2 Firewall 15

II.2.1 *Firewall* Tradisional 16

II.2.2 Next-Generation Firewall 16

II.3 Insider Attack 16

II.4 Denial of Service (DoS) & Distributed Denial of Service (DDoS) 16

II.5 ICMP & ICMP Flood Attack 17

II.6 Service Quality across Independently Managed Networks (SEQUIN) . 18
II.6.1 One-way Delay 18
II.6.2 IP Packet Delay Variation 19
II.6.3 Packet Loss 19
II.6.4 Capacity 19
II.6.5 Maximum Transmission Unit (MTU) 19
II.7 Virtualization 20
II.8 PPDIOO 21
II.9 GNS3 22
II.10 QEMU & KVM 22
II.11 VMware 23
BAB III METODOLOGI PENELITIAN 24
III.1 Model Konseptual 24
III.2 Sistematika Penelitian 25
III.3 Gambaran Penelitian 29
BAB IV PEMBAHASAN PENELITIAN 30
IV.1 Kebutuhan Penelitian 30
IV.2.1 Kebutuhan Perangkat Keras Fisik 30
IV.2.2 Kebutuhan Perangkat Keras *Virtual* 30
IV.2.3 Kebutuhan Perangkat Lunak 31
IV.2 Topologi Sistem Jaringan 32
IV.3.1 Topologi Non-Microsegmented 32
IV.3.2 Topologi *Microsegmented* 34
IV.3.3 Konfigurasi Alamat IP 35
IV.3 Perancangan Pengujian 35
IV.3.1 Skenario 1 35

IV.3.2 Skenario 2 39
IV.4 Konfigurasi Sistem 41
IV.4.1 Topologi Non-Microsegmented 41
IV.4.2 Topologi *Microsegmented* 44
BAB V PENGUJIAN DAN ANALISIS PENGUJIAN 56
V.1 Pengujian Fungsionalitas Sistem 56
V.2 Pengujian Keamanan 59
V.2.1 Data Normal 60
V.2.2 Skenario 1 63
V.2.3 Skenario 2 73
V.3 Pengujian Quality of Service 80
V.3.3 One-way Delay 81
V.3.4 IP Packet Delay Variation 85
V.3.5 Packet Loss 88
V.3.6 Capacity 92
V.4 Pengujian Resource Utilization 96
V.4.3 Firewall CPU Utilization 96
V.4.4 Firewall Memory Utilization 96
V.4.5 Server CPU Utilization 97
V.4.6 Server Memory Utilization 97
V.5 Analisis Pengujian 98
V.5.3 Analisis Pengujian Fungsionalitas 98
V.5.4 Analisis Pengujian Keamanan 98
V.5.5 Analisis Pengujian *Quality of Service* 99
V.5.6 Analisis Pengujian Resource Utilization 102
V.5.7 Analisis Keseluruhan 104

BAB VI KESIMPULAN DAN SARAN 106
VI.2 Kesimpulan 106
VI.3 Saran 106
DAFTAR PUSTAKA 107