

CONTENTS

Agreement Page

Originality Statements

ABSTRACT	iv
Contents	vii
List of Figures	ix
List of Tables	1
1 INTRODUCTION	2
1.1 Background	2
1.2 Problem Formulation	3
1.3 Purpose	3
1.4 Scope of Research	3
1.5 Research Methodology	3
1.6 Structure of Thesis	4
2 BASIC CONCEPT	5
2.1 Software Defined Networking	5
2.1.1 Defense Mechanism in SDN	6
2.2 Mininet	7
2.3 OpenFlow	8
2.4 RYU	8
2.5 DDoS	9
2.6 Support Vector Machine	10
3 SIMULATION DESIGN	12
3.1 Simulation Design	12
3.2 Hardware	12
3.3 Analysis Tools	12
3.3.1 sFlow-RT	13
3.3.2 Wireshark	14

3.3.3	Iperf	15
3.4	Simulation Sequence	17
3.4.1	Network topology	18
3.5	Flowchart of The Controller	19
3.6	RYU Controller	21
3.7	SVM Decision Boundary	24
3.8	Measurement Parameter	25
3.8.1	Throughput	25
3.8.2	Down Time	26
3.8.3	Recovery Time	27
3.8.4	Accuracy Score	27
4	RESULT ANALYSIS	29
4.1	Normal Traffic	29
4.2	DDoS Traffic	29
4.2.1	Throughput of DDoS attack without SVM mitigation	30
4.2.2	Throughput of DDoS Attack with SVM mitigation	31
4.2.3	Throughput Comparison Between 5 Attackers	32
4.3	Down Time with SVM Mitigation	33
4.4	Recovery Time SVM Mitigation	34
4.5	Accuracy Score of Simulation	34
5	CONCLUSION AND SUGGESTION	36
5.1	Conclusion	36
5.2	Suggestions	36
Bibliography		37