CONTENTS

APPROVAL PAGE

SELF DECLARATION AGAINST PLAGIARISM

ABSTRACT **iv**

PREFACE **v**

ACKNOWLEDGMENTS **vi**

CONTENTS **viii**

LIST OF FIGURES **xi**

LIST OF TABLES **xiii**

I INTRODUCTION **1**

1.1 Background 1

1.2 Problem Identification 3

1.3 Objectives 3

1.4 Scope of Work 4

1.5 Expected Results 4

1.6 Research Methodology 5

II BASIC CONCEPT **6**

2.1 Named Data Networking 6

2.1.1 NDN Packet 7

2.1.2 NDN Router 8

2.2 Routing Protocol and Forwarding Strategy in NDN 9
2.2.1 Routing Protocol 10
2.2.2 Forwarding Strategy 10
2.2.2.1 Best Route 10
2.2.2.2 Multicast 11
2.2.2.3 Access 11
2.3 Performance Measurement 11
2.3.1 Round Trip Time (RTT) 12
2.3.2 Throughput 12
2.3.3 Packet Loss 13
2.3.4 Routing Overhead 13
2.3.5 CPU Utilization 14

III SYSTEM MODEL AND THE PROPOSED METHOD 15

3.1 Network Elements 15
3.1.1 CARI Protocol 15
3.1.1.1 NDN Router 16
3.1.1.2 Producer 16
3.1.1.3 Consumer 17
3.1.1.4 Controller 17
3.2 Control Packet Design 17
3.3 Centralized Adaptive Routing (CARI) Protocol 18
3.3.1 Main Program 19
3.3.2 Route Discovery 20
3.3.3 Route Calculation 21
3.3.4 Update Route 22
3.3.5 Adaptive Link Cost Calculation 22
3.4 Complexity Comparison 25
3.5 Scenarios and Evaluation 26

3.5.1 First Scenario 27
3.5.2 Second Scenario 28
3.5.3 Third Scenario 29
3.5.4 Parameter Measurement Method 30
3.5.4.1 Round Trip Time (RTT) 30
3.5.4.2 Routing Overhead 31
3.5.4.3 CPU Usage 31

IV RESULT AND ANALYSIS **32**
4.1 First Scenario 32
4.2 Second Scenario 34
4.2.1 Second Scenario (a) 34
4.2.2 Second Scenario (b) 35
4.3 Third Scenario 37
4.4 CPU Usage Analysis 40
4.5 Scale/Wide Scale Variable on Cost Calculation 42

V CONCLUSION **45**
5.1 Conclusion 45
5.2 Future Research 46

REFERENCES **47**