

DESIGN AND IMPLEMENTATION OF A NETWORK SECURITY MODEL

SUBMITTED

BY

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This Report Presented in Partial Fulfillment of the Requirements for the Degree of Bachelor of Science in Computer Science and Engineering.

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DHAKA, BANGLADESH

7th DECEMBER, 2019

APPROVAL

This Internship titled “**DESIGN AND IMPLEMENTATION OF ANETWORK SECURITY MODEL**”, submitted by **MD. MUNZARUL HAQUE**, ID No: 163-15-8429 to the Department of Computer Science and Engineering, Daffodil International University has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of B.Sc. in Computer Science and Engineering and approved as to its style and contents. The presentation has been held on **7th December, 2019**

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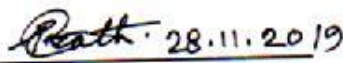
External Examiner

DECLARATION

I hereby declare that, this internship report has been done by **MD. Mnuzarul Haque** ID No: 163-15-8429 to the department of Computer Science and Engineering, Daffodil International University. Under the supervision of **Refath Ara Hossain, Lecturer Department of CSE,** Daffodil International University.

I also declare that neither this internship report nor any part of this internship report has been submitted elsewhere for award of any degree or diploma. And also I declare that, I collect information from BASIC Bank Limited, Data Center, Books and Internet.

Supervised by:

 28.11.2019

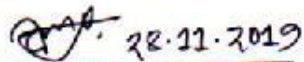
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I very much respect and wish the **Refath Ara Hossain, lecturer at the Department of CSE Daffodil International University**, Dhaka, a big commitment. Profound experience and unmistakable curiosity of administrators in the field of IT and network administration to do this entry level position. The unending patience, informative direction, continuous encouragement, constant and lively supervision, constructive reviews, practical guidance, multiple second-rate proposals and revisions at all stages have made it feasible to complete this internship.

I would like to extend my heartfelt thanks to **Dr. Syed Akhter Hossain, Professor and Head of the CSE Department**, for his kind support in completing my internship, as well as to other faculty members and staff of the CSE Department of Daffodil International University.

ABSTRACT

In this internship, I have designed and implemented a secured computer network for a company. I have used VLSM, VLAN, cisco routers and switches and firewalls to implement and configure the network. I have studied the types of threats a computer network may face and their implications on the performance of a computer network. I configured the firewalls with access control list (ACL) such that unauthorized access to the network can be minimized. I have used cisco packet tracer to simulate the design and the configurations of the network.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

Internet and networks are now linked to the computer network in the area of local security. Attacks to knowledge then, networking significantly increased. A lot of these risks they've become dangerous or theft-caused clever attacks .The Internet is increasing exponentially. There are more instant advantages as the government becomes more involved in business-critical applications on the Internet. Many companies and governments risk losing that asset without adequate protection and network security.

1.2 Motivation

The Banking sector is a very challenging sector for career. The Internship teaches me how I can work in the banking sector. And internship teaches me weather I am perfect in the banking sector or any others corporate sector. The internship gives me eight (8) hours working experience and that will at a lot to my end of study. Internship is a one kind of a job. This three-month internship will teach me something that will benefit me a lot for my next job life.

1.3 Internship Objectives

Find attractive training resumming skills on the list below:

- Will help to set up a professional employer.
- Will get leadership and work of the team.
- Start learning more about IT and networking.
- Get a better understanding of how networking works in the banking sector
- Implement professional skill well.
- Know my duties and duties well.

1.4 Introduction to the Company

The Bank plays an important role in the country's business sector and industrialization. Bank has good faith in their policy of work and trade. They are getting their company bigger. Basic Bank is a great example of leadership and teamwork. Basic bank takes care of its client, partner, government shareholder and customer at all times. Principally the bank take deposits from the customers against interest and lend it to the borrower against interest termination period. Basic bank is always involved in their social activities. Basic bank established their foundation in 2 August 1988. Their customers are increasing day by day for better service of Basic bank.[2]

1.5 Report Layout

In the chapter (1) I showed in chapter 1 introduction, motivation, internship object and introduction to the company.

In the chapter (2) I showed in chapter 2 the company introduction, bank organization and banking weakness, strangeness and threats.

In the chapter (3) I showed in chapter 3 how to exercises, Events and work of internship.

In the chapter (4) I showed in chapter 4 Competencies Earned, Smart Plan, and Reflections.

In the chapter (5) I showed in chapter 5 Conclusion and Future Scope.

CHAPTER 2

INTERNSHIP ORGANIZATION

2.1 Company Introduction

BASIC Bank Limited (Bangladesh Small Industries and Commerce Bank Limited) was established as a banking company under the former Companies Act 1913 and began operating in 1989. It is regulated by the 1991 Banking Companies Act. The Bank began as a joint venture of the BCC Foundation with 70% shares and the Government of Bangladesh with 30% shares. Since the BCC Foundation was not operational after the dissolution of the BCCI, the Government of Bangladesh took over 70% of the shares of the BCC Foundation on 4 June 1992 and became 100% owner of the Bank. General Banking Department plays a vital role in facilitation of the country. General banking consists of the opening of accounts, bills, remittances, clearing, money and computer sections. In doing so, it establishes a contract with Banker Consumer, collects customer bills, remits customer funds from one location to another, and honors Cheque drawn from that branch. General banking department offers these services in a faster and better manner. They should be given a chance to exchange their views and ideas about the Bank's products and services.[6]

2.2 Services and Market Situation

The various operations are being functioned in the BASIC BANK LTD, the major functions of Basic Bank can be described briefly:

- Payment function
- Collection function, Fund Transfer, Investment functions,
- Issuing Letter of Credit (LC), Issuing Bank Guarantee,
- Small industries get term loans from the bank.
- Commercial banking services.

- Collection of deposit.
- Short term trade finance.
- Working capital finance services for manufacturing units.
- Facilitating international trade.
- Micro credit services.
- Foreign trade services e.g. export, import, remittance etc.

2.3 SWOT Analysis

Like every other organization BASIC bank also has its own strengths, weaknesses, opportunities and threats. Those are discussed in a table below.

Strengths	Opportunities
<ul style="list-style-type: none"> • State owned • Unique objectives • Competitive capital • Strong network back ups • Skilled HR management • Prudent governing body 	<ul style="list-style-type: none"> • Expansion possibilities • Growing market of SME • Agricultural funds of govt.
<ul style="list-style-type: none"> • Corruption • Lack of resources • Low public interest • Less revenue compared to competitors 	<ul style="list-style-type: none"> • Growing competition • Loan corruption • Low security initiative • Shifting SME sector to IT sector
Weaknesses	Threats

2.4 Organizational Structure

In below fig 2.4 show the Organizational Structure of BASIC Bank Ltd [6]

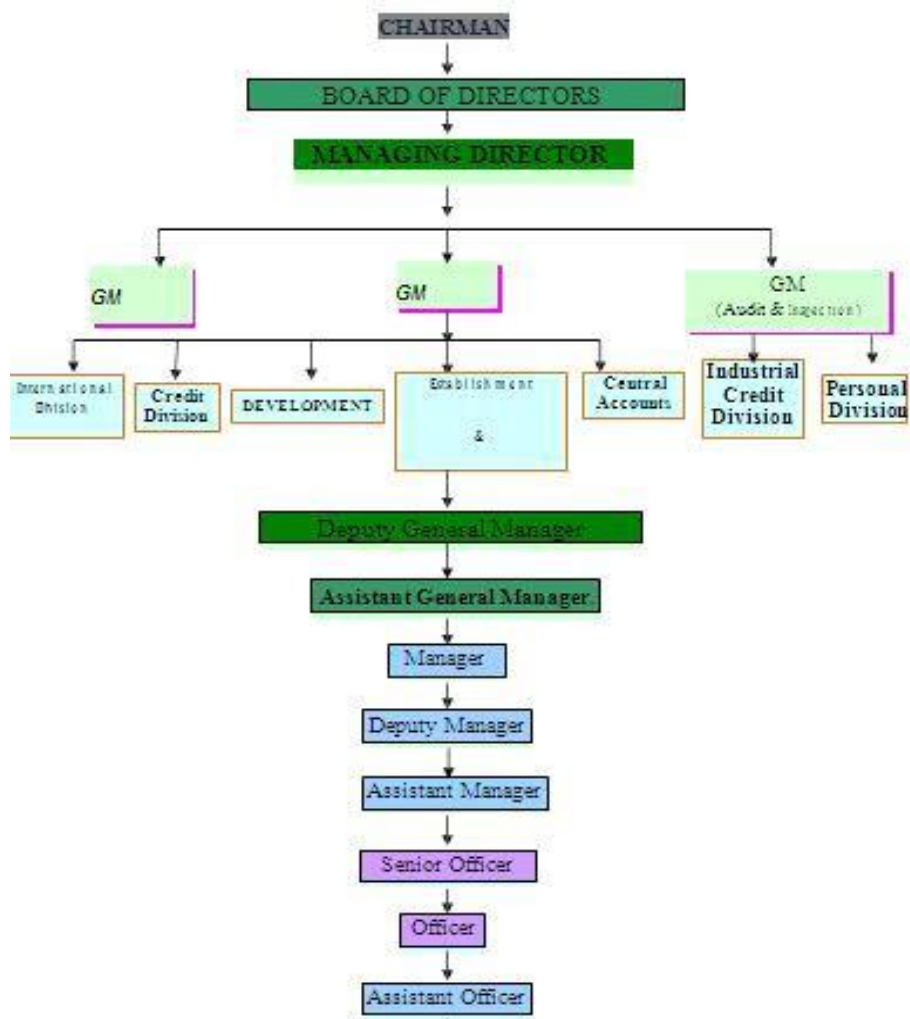


Figure: 2.4 Organizational Structure of BASIC Bank Ltd

CHAPTER 3

EXERCISE, EVENT AND ACTIVITIES

3.1 Daily Task and Activities

3.1.1 Design of VLSM

If subnets with different host amounts are needed, VLSM will be used. You will receive one of three different setups in this exercise. You need to design the VLSM address scheme and configure the devices using the address scheme.[1]

In below fig 3.1.1 shows the design of a VLSM

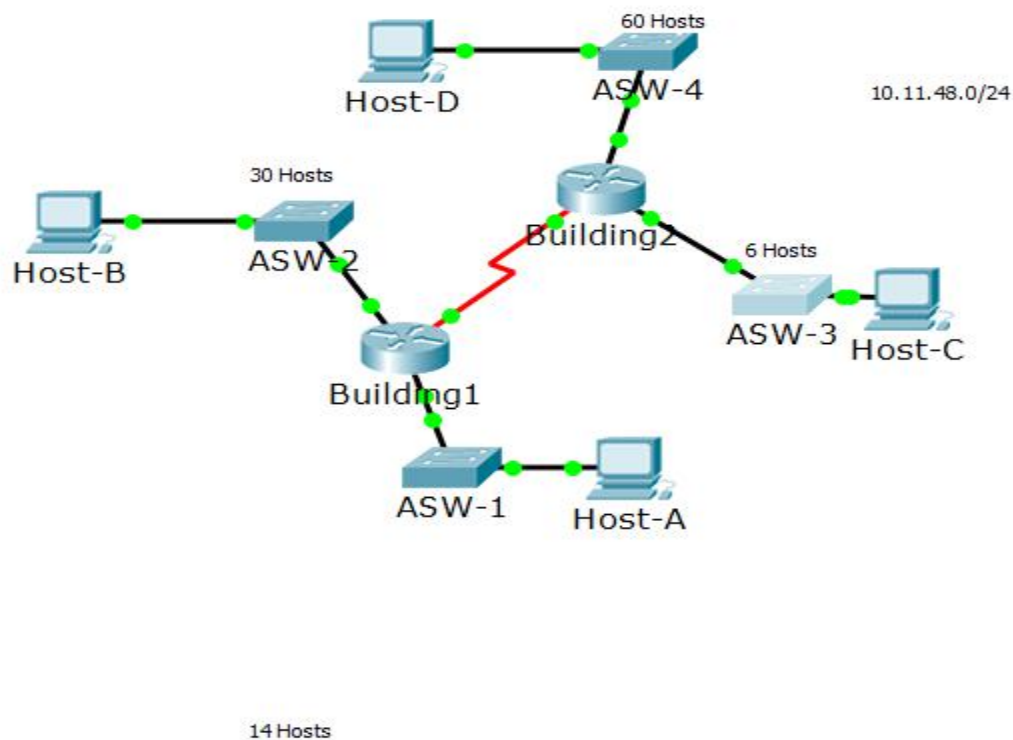


Figure: 3.1.1 VLSM

- Variable Length Subnet Masking – VLSM – is a technique that allows network administrators to divide that IP address area into subnets of different sizes, unlike plain, same size Sub netting.
- When VLSM is allowed, a large subnet can be divided into a group of smaller subnets that can be used to handle smaller host sets.
- The subnet mask defines the length of the subnet (the number of host addresses on the subnet).Fixed-Long Subnet Masking (FLSM) generates subnets of the same length. But where some subnets have a lot of hosts, and some have a few, FLSM results in some subnets having a lot of orphaned addresses, or some host sets being too large to fit into a subnet.
- Applied routing access control lists, malicious traffic packets filtering and tariff restrictions, this filtering can generally be performed on the basis of two networks the source and destination to the traffic type.

Network is always the first address in the subnet so now we can see where the first addresses in the subnet are threats to action knowledge to networking significantly have increased a lot of these hazards they've been unsafe or theft-Cause clever attacks. The Internet is increasing exponentially. There are more instant advantages as the government becomes more involved in business-critical applications on the Internet.

3.1.2 Configure VLAN VTP and Inter-VLAN Routing

Configure the trunk on SB1DLSW, SB1ALSW1 and SB1ALSW2. The trunk ports for SB1DLSW, SB1ALSW1 and SB1ALSW2 all ports are connected to another switch or router. Set all trunk ports to trunk mode, and assign VLAN to trunk mode 6 as a resident of VLAN. On SB1DLSW, configure port Fa0/1-4 and Gig1/1 as trunk port. The scope command greatly reduces the number of redundant commands that must be applied when configuring the same commands on different ports.

```
Switch1(config)#int range f0/1-4
```

```
Switch1(config-if-range)#switchport mode trunk
```

```
Switch1(config-if-range)#switchport trunk vlan 10
```

```
Switch1(config-if-range)#exit
```

Switch1, configure port Fa0/1-4 as trunk port.

```
Switch2(config)#int range f0/1-4
```

```
Switch2(config-if-range)#switchport mode trunk
```

```
Switch2(config-if-range)#switchport trunk vlan 10
```

```
Switch2(config-if-range)#exit
```

Switch2, configure port Fa0/1-4 as trunk port.

```
Switch3(config)#int range f0/1-4
```



```
Switch3(config-if-range)#switchport mode trunk
```

```
Switch3(config-if-range)#switchport trunk vlan 10
```

Switch3(config-if-range)#exit To view trunk ports, use the following command:

```
Switch3#show interfaces trunk
```

3.1.3 CISCO Command for VLAN[3]

In below Figure 3.1.3: show the CISCO Command

Enter the enable command to access privileged EXEC mode:

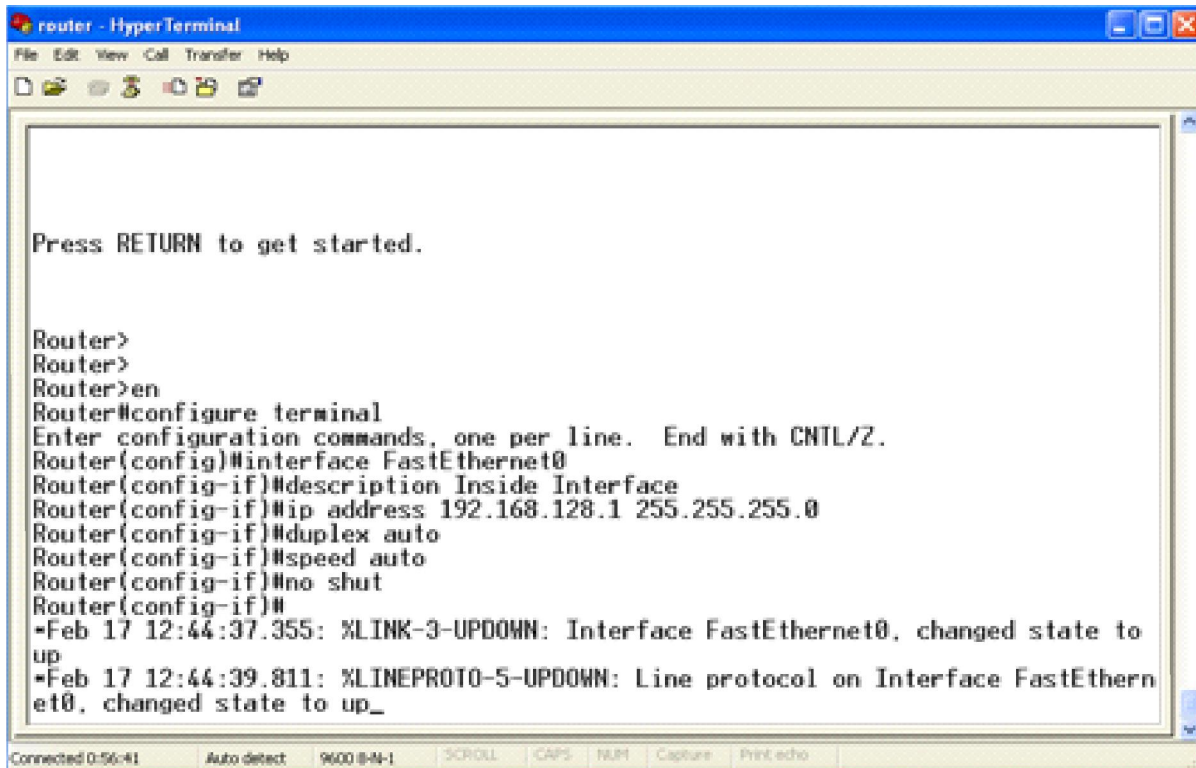
```
Switch> enable
```

```
Switch#
```

Enter the configure command, a message prompts you for the source of the configuration commands:

```
Switch# configure terminal
```

```
Switch(config)#
```



```
router - HyperTerminal
File Edit View Call Transfer Help
Press RETURN to get started.

Router>
Router>
Router>en
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface FastEthernet0
Router(config-if)#description Inside Interface
Router(config-if)#ip address 192.168.128.1 255.255.255.0
Router(config-if)#duplex auto
Router(config-if)#speed auto
Router(config-if)#no shut
Router(config-if)#
*Feb 17 12:44:37.355: %LINK-3-UPDOWN: Interface FastEthernet0, changed state to
up
*Feb 17 12:44:39.811: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthern
et0, changed state to up_

Connected 0:56:41 Auto detect 9600 B-M-1 SCROLL CAPS NUM Capture Print echo
```

Figure 3.1.3 CISCO Command

Clear all existing configurations on the switches

Switch # crase startup- config

Reload configuration

Switch# reload

It's a good practice or remove any unused ports on switches by shutting them down.

Disable all of the transition ports:

Switch#config term

Switch(config)#interface range fa0/1-24

Switch(config-if-range)#shutdown

Switch(config-if-range)#interface range gi0/1-2

Switch(config-if-range)#shutdown

Re-enable the user ports

S2(config)#interface range fa0/6, fa0/11, fa0/18

S2(config-if-range)#switchport mode access

S2(config-if-range)# no shut

3.1.4 Firewall

It depicts an enterprise with a local network that involves a 194.0.0.0 to 194.0.0.7 licensed subnet called Local Net. In below fig 3.1.4 shows the Firewall [2]

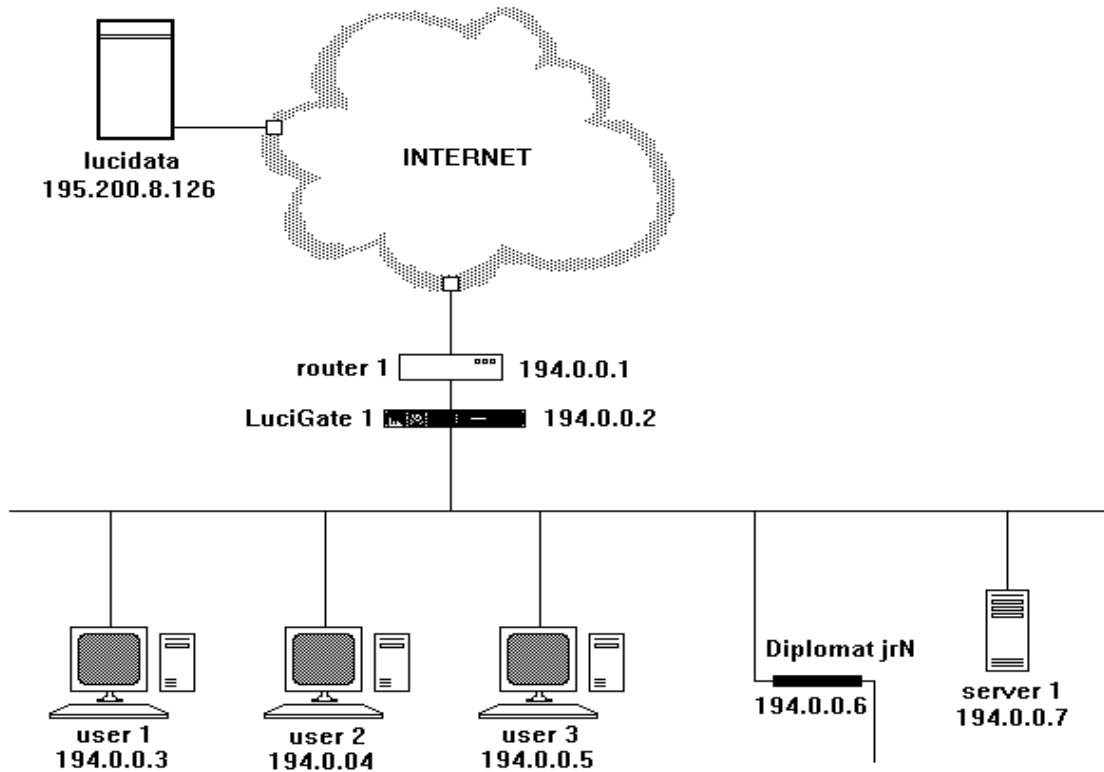


Figure 3.1.4: Firewall

It has an Internet access router (router 1), and the LuciGate Firewall (LuciGate 1) is positioned in the normal network security role. The way the IP addresses are assigned in the example does not matter and there is no need for the LuciGate itself to have an IP address.

3.2 Access Control List (ACL)

The Access Control List (ACL) is a set of rules of filtering network traffic. ACLs can be set up on network devices with packet filters, such as routers and firewalls. [4]

In below fig 3.2 shows the Access Control List (ACL)

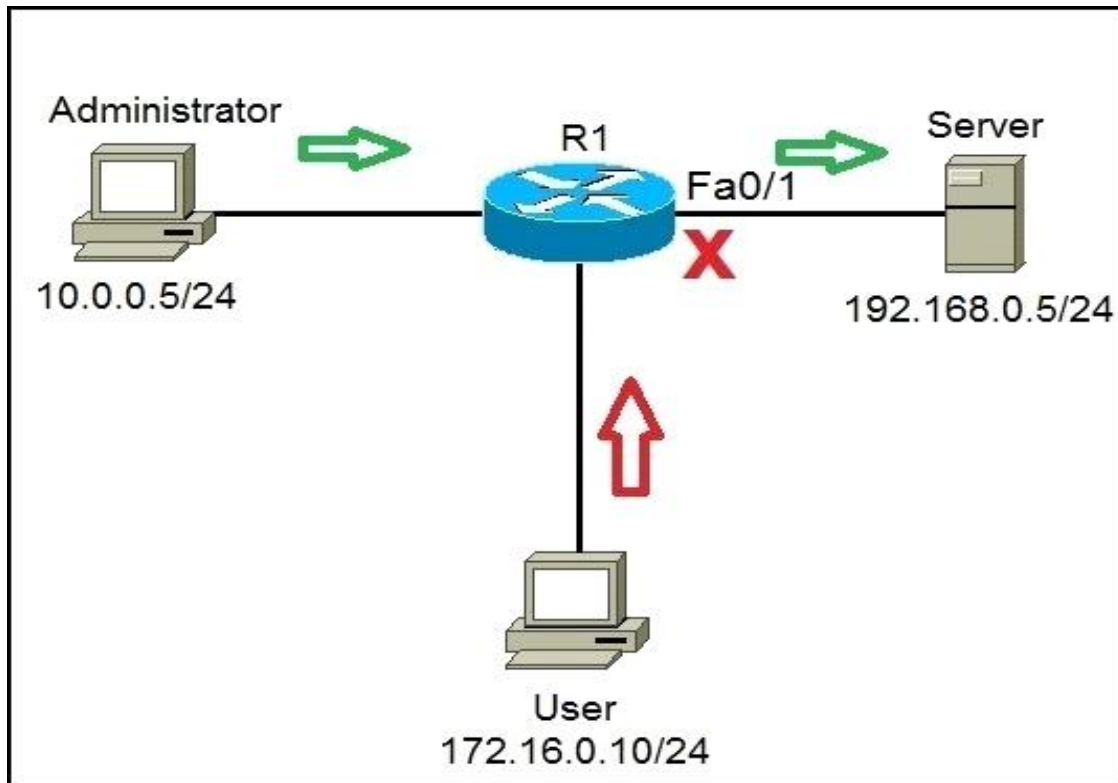


Figure 3.2: Access Control List (ACL)

ACLs contains a list of packet classification conditions that help you determine when to allow or deny network traffic. They are applied to packets leaving or entering an interface based on the interface.

3.3 Project Task and Activities

3.3.1 About IPsec: Internet Protocol Security (IPsec) computing secure network protocol suite that verifies and encrypts data packets sent over the Internet Protocol network. It can be used in safe virtual networks.[5]

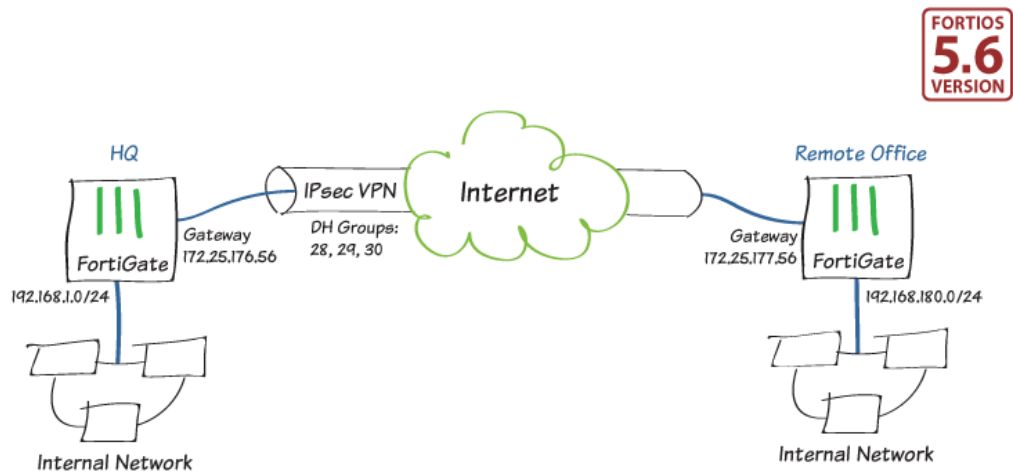


Figure: 3.3.1 Internet Protocol Security System

3.3.2 Multi-Area OSPF

OSPF (Open Shortest Path First) multi-area is a way to limit the number of neighbors in an area. Both routers have to peer for the broadcast domain in a single area with the DR (Designated Router) or BDR (Backup Designated Router if used). Both routers are familiar with all connections and their states in the field in an individual area. Dividing each of them and into more manageable areas can help speed up traffic to its destination. All routers in the OSPF area maintain a link database (note that this is fully separate from the main routing table) in which all routers and links within the location are known to them.

3.4 Challenges

Network Address Translation (NAT) is a method of converting one IP address space to another by modifying the network address information in the packet IP header while going through a Street routing process. Originally, the technique was used as a solution to avoid having to redirect each host when switching the network. It has become a popular and essential tool for preserving global address space in the face of IPv4 address exhaustion. The Internet-routable IP address of the NAT gateway can be used for the entire private network. Initially, the technique was used as a solution to avoid having to redirect each host if moving the network.

Wireless Router

Wireless router is a device that performs the functions of a router that also offers the functions of a wireless access point. It is used to provide access to the Internet or to a private network of computers. It can be deployed on a wired local area network, on a wireless LAN, or on a mixed wired and wireless network, depending on the manufacturer or design.

CHAPTER 4

COMPETENCIES AND SMART PLAN

4.1 Competencies Earned

Throughout the entire period of internship in BASIC bank limited I learned a lot of competencies. I knew a few earlier and learned a few in this period. The mentionable competencies are configuring routers, network configuring, and configure computer programming the routers and lastly network operating system under the supervision of expert in BASIC bank IT department. The most alluring for me was IP configuring in this internship.

4.2 Smart Plan

BASIC bank limited works much planned manner in their networking. To provide excellent service to the customers and country the bank has created excellent networking service throughout the process of their bank. All organization should focus on their networking service as it helps an organization to become more efficient in their entire banking process. Banks in our country is slowly focusing on this important fact that networking service betterment results in increased revenue and outcome is more efficient.

4.3 Reflections

BASIC bank limited a service provider for the small industry and commerce facilities in the country. As ours is developing country we have a lot of small industries and those ventures need support. While providing services to these industries the bank needs excellent network configuration and maintenance of the service. BASIC bank limited provides service to the most reputed organizations in the country and has earned reputation in this sector. The Bank handles entire system with corporate network.

CHAPTER 5

CONCLUSION AND FUTURE CAREER

5.1 Discussion and Conclusion

In this internship process I learned that passion for the work makes the learning faster than the time we put in the work. If we love the work or we have the passion to work in networking the time we put for the work will not be the hindrance for the amount of learning. I started 6 hours a day in BASIC bank then I found that 8 hours was not very long for me. I enjoyed working in the IT department. They are very amiable and the work environment in the bank is very friendly. In such a short period of time I learned a lot of things.

5.2 Scope for Further Career

Career opportunities are massive in this networking under Linux programming. As our country is moving towards the digital era and it is super helpful for us as CSE students because career openings are wide. We can join in the IT departments of any organization for our wide learnings in this field.

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Access time 21/10/2019 at 11:23PM

Appendix



Bank Details

Name: Bangladesh Small Industries and Commerce Bank Limited
Address: ICT DIVISION: People Insurance Bhaban (5th Floor), 36 Dilkusha Commercial Area,
Dhaka
Telephone: 956 2960, 955 5087
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E-mail: basichrd@basicbanklimited.com
Website: www.basicbanklimited.com