Assignment II: Network Setup & Routing
CS3006D Computer Networks
S6 CSED NIT Calicut
Evaluation / Demo Due date: April 01, 2025 05:00 PM

This assignment has to be done individually. Each of you could setup the network in your laptop. The assessment evaluation would be done individually, on one to one basis. For assessment, you have to complete the setup, book a slot and demonstrate it along with the viva. You have to record the video with your own voice comments and submit that. In viva, the questions relating to the assignment will be asked. There is no written material to be returned with this assessment. The video has to be shared via google drive, by attaching it in the eduserver submission link. Make sure that the video like is accessible to me & TAs.

After completing this assignment, you will be able to setup your own network, using the concepts of classfull addressing and classless addressing with help of subnetting of IP address ranges. You would be also understanding the concepts of using static and dynamic routing protocols.

For this Assignment, you will be setting up multiple low end machines (RHL09 as routers & WindowsXP) in your laptop using virtualbox. You could also use desktop machines in SSL / NSL Lab, if the configuration of laptop is not enough. In each of these laptop, you should be hosing minimum of six VMs, where three VMs would be having two virtual NIC cards, and both of these would be connected to two seperate virtual switches (Internal Network). Ideally, three VMs has to be Linux PC (Flavour & version depends upon exercise). The other three VMs could be Linux or Windows (depends upon your host configuration).

What you will do

Network Diagram is given in Appendix I. There are four different networks in this setup, and each network uses a router to communicate to the other network. You could use the IP range of 172.16.20.64/26 and has to subnet it to four different network having subnet mask of 255.255.255.240.

Your aim is to setup and configure the routers, so that all the systems will communicate between each other.

HINT: Router have two Legs (NIC Cards), and is used to interconnect machines between different networks.

TASK I

Setup the router in all three laptop using using Redhat Linux 9 available from

http://archive.download.redhat.com/pub/redhat/linux/9/en/iso/i386/

It is an old version of linux which has 3 CDs for full installation. Please do a full installation of Linux VM using all three CDs. RAM could be allocated to 256 MB.

1. Configure static routes in all three Linux VMs so that, all the systems communicate between each other. Note down the routing table in each machine. Check whether all systems are able to communicate between each other.
2. Remove static routes and enable routing service in Linux using RIP, so that it becomes a router. Compare the routing table generated automatically to that which you have given manually. Do you feel any issues with the routing messages that is being exchanged between systems? What is the version of RIP protocol?

Shutdown and save the VM. The each Linux Router VM and its host name should be named with your First name. Example if your name is Arun Krishnan his VM name and Host name should be "Arun_[ROUTER#]_RHL9_Task01". ROUTER# is the router number which could be 1 or 2 or 3.

Record the video of static router configuration and dynamic router configuration. Keep it for future reference and has to be produced once requested at time of evaluation.

TASK IIA-IPv4

Allocate 512 MB of RAM for VMs to install **PFSense / OPNSense**, to convert it to a working L3 Device or a router. You may install the package named FRR to make it as a router. Note that there are multiple software packages that you could use inside that to convert it to a router. Now, make three copies of the VM, so that you have three routers that you can use for this assignment

1. You have to use the address range given above to setup the IPv4 Networking
2. You should set up RIP routing with FRR. Check the routing tables and the routing messages that is being exchanged between systems.
3. You should set up OSPF routing with FRR. Check the routing table and the routing messages is being exchanged between systems? Is there any difference?

The same naming format has to be used for VMs. Record the configuration video and keep it for future reference and has to be produced once requested at time of evaluation.

TASK IIB-IPv6

Now, make new copies of the above three router VMs, so that you have three routers that you can use for this assignment

1. You have to use IPv6 along with IPv4 as dual stack for this part of assignment. ISP have assigned an IPv6 address 2001:5591:DEE6:A00::/56 to your organisation. As taught in class, you have to subnet and make it as /64 for implementing IPv6 networking of your organisation.
2. You should set up RIP routing with FRR. Check the routing tables and the routing messages that is being exchanged between systems.
3. You should set up OSPF routing with FRR. Check the routing table and the routing messages is being exchanged between systems? Is there any difference?

APPENDIX I – Network Setup