Netlab 1: GNS3 Starting Guide – Simple LAN Topology

Purpose: In this Lab exercise, we will learn the basics on how to use GNS3, a powerful emulator for complex network topologies.

Background: **GNS3** is a **Graphical Network Simulator** that allows emulation of complex networks. You may be familiar with VMWare or Virtual PC that are used to emulate various operating systems in a virtual environment. These programs allow you to run operating systems such as Windows or Linux in a virtual environment on your computer. GNS3 allows the same type of emulation using Cisco Internetwork Operating Systems (IOS). It allows you to run a Cisco IOS in a virtual environment on your computer. GNS3 is a graphical front end to a product called Dynagen. Dynamips is the core program that allows IOS emulation. Dynagen runs on top of Dynamips to create a more user friendly, text-based environment. A user may create network topologies using simple Windows ini-type files with Dynagen running on top of Dynamips. GNS3 takes this a step further by providing a graphical environment.
GNS3 allows the emulation of Cisco IOSs on your Windows or Linux based computer. Emulation is possible for a long list of router platforms and PIX firewalls. Using modular cards in a router, switching platforms may also be emulated to the degree of the card's supported functionality. There are a number of router simulators on the market, but they are limited to the commands that the developer chooses to include. Almost always there are commands or parameters that are not supported when working on a practice lab. In these simulators you are only seeing a representation of the output of a simulated router. The accuracy of that representation is only as good as the developer makes it. With GNS3 you are running an actual Cisco IOS, so you will see exactly what the IOS produces and will have access to any command or parameter supported by the IOS. In addition, GNS3 is an open source, free program for you to use. However, due to licensing restrictions, we have a limited number of Cisco IOS images to use with GNS3 but enough for you to understand the concepts of Internetworking. Also, GNS3 will provide around 1,000 packets per second throughput in a virtual environment. A normal router will provide a hundred to a thousand times greater throughput. GNS3 does not take the place of a real router, but is meant to be a tool for learning and testing in a lab environment. Using GNS3 in any other way would be considered improper[1]

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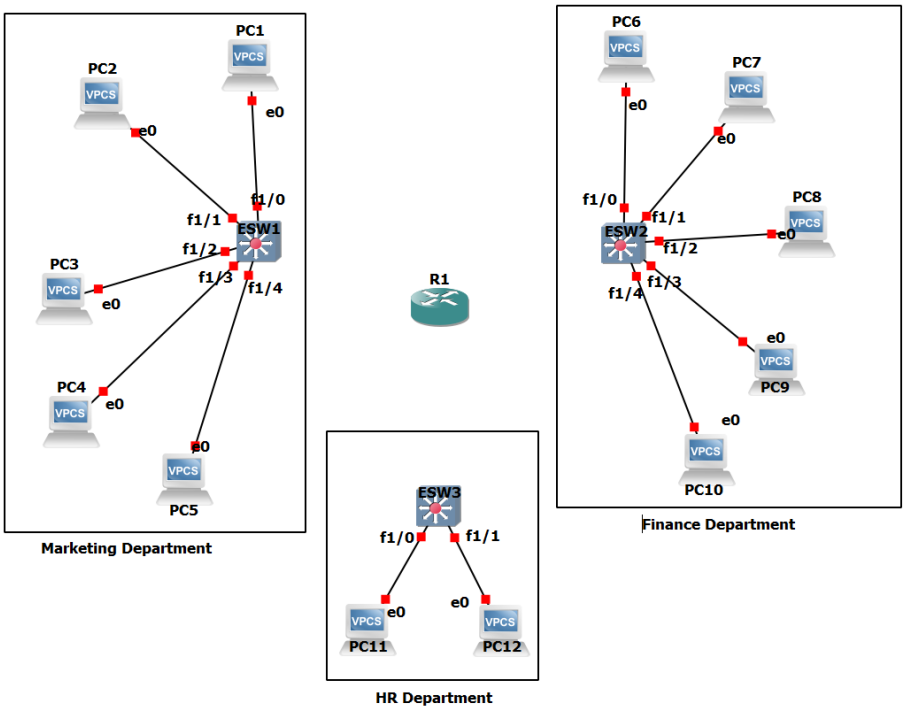
Procedure

Build the topology as shown in the figure below:



You need to interconnect the Router R1 with the three ESW switches. Setup IP addresses for the VPCs and the router interfaces. (See Table 1)

Department	Network or Bdcst Doamin	Mask	Gateway
Marketing	192.168.0.0/24	255.255.255.0	192.168.0.1
Finance	192.168.10.0/24	255.255.255.0	192.168.10.1
HR	192.168.200.0/24	255.255.255.0	192.168.200.1

Table 1

Make sure your interfaces are ON (no shutdown). You should be able to ping from/to all the VPCs in the network.

Questions

What are the MAC addresses and IP addresses of your devices?

Device	MAC Address	IP Address
PC1		
PC2		
PC3		
PC4		
PC5		
PC6		
PC7		
PC8		
PC9		
PC10		
PC11		
PC12		
R1 (Marketing If)		
R1 (Finance If)		
R1 (HR If)		

Use Wireshark to capture traffic in the link going from the **Marketing Department** to the router R1 and answer the following questions. Note: Apply the filter **ICMP** to only show the ping traffic.

1.- What pinging a VPC in the HR department from any VPC in the Marketing Department, what is the destination MAC address in the packets?

2.- What pinging a VPC in the HR department from the Marketing Department, what is the destination IP address in the packets?

3.- What pinging a VPC in the HR department from the Marketing Department, what is the source IP address in the packets?

4.- Ping from PC10 to PC2. What are the source and destination MAC addresses? What are the source and destination IP addresses?

5.- In Wireshark, change the filter from **ICMP** to **ARP**. Ping PC1 to PC3.

What are the entries in the ARP table in PC1?

What ARP packets you see in Wireshark? Describe its content