

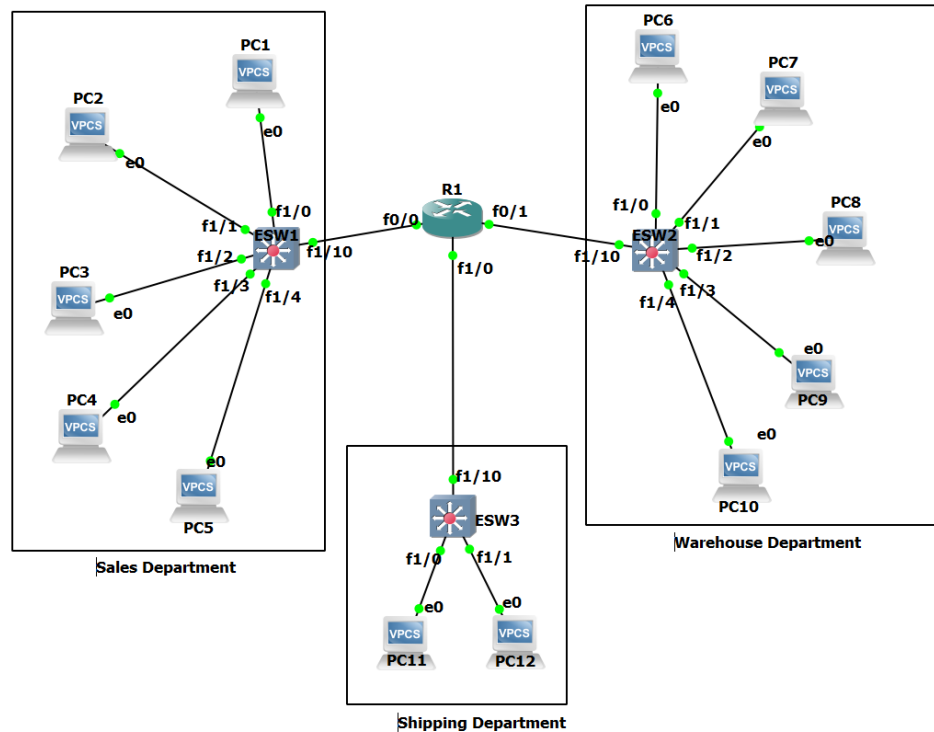
Netlab 1: GNS3 Starting Guide – Simple LAN Topology

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 OS on your Windows, MAC, or Linux based computer. Emulation is possible for a long list of router platforms and firewalls from different manufacturers. 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 improper¹

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). Use a network 10.20.30.0/24 to fulfill all IP address requirements

Department	SubNet ID or Bdcst Doamin	Mask	Gateway
Sales	10.20.30. 0/26	255.255.255. _192_	10.20.30. _1/26_
Shipping	10.20.30. _80/29	255.255.255. _248_	10.20.30. _81/29
Warehouse	10.20.30. 64/28	255.255.255. _240_	10.20.30.65/28_

Table 1

Make sure your interfaces are Turned ON (no shutdown). You should be able to ping from/to all VPCs within each network and across the networks.

Questions

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

Device	MAC Address	IP Address
PC1	00:50:79:66:68:0b	10.20.30.11/26
PC2	00:50:79:66:68:00	10.20.30.12/26
PC3	00:50:79:66:68:01	10.20.30.13/26
PC4	00:50:79:66:68:02	10.20.30.14/26
PC5	00:50:79:66:68:03	10.20.30.15/26
PC6	00:50:79:66:68:04	10.20.30.66/28
PC7	00:50:79:66:68:05	10.20.30.67/28
PC8	00:50:79:66:68:06	10.20.30.68/28
PC9	00:50:79:66:68:07	10.20.30.69/28
PC10	00:50:79:66:68:08	10.20.30.81/29
PC11	00:50:79:66:68:09	10.20.30.82/29
PC12	00:50:79:66:68:0a	10.20.30.83/29
R1 (Sales If)	c204.0f70.0000	10.20.30.1/26
R1 (Shipping If)	c204.0f70.0010	10.20.30.81/29
R1 (Warehouse If)	c204.0f70.0001	10.20.30.65/28

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

1.- When pinging a VPC in the Warehouse department from any VPC in the Sales Department, what is the destination MAC address in the packets?

I pinged PC 6 from PC 2 using ping 10.20.30.66 and I got timeout for the first two times and then it ran. The MAC address for pc6 is 00:50:79:66:68:04

2.- When pinging a VPC in the Sales department from the Shipping Department, what is the destination IP address in the packets?

When pinging from PC11 to PC 1 using ping 10.20.30.11, it runs the seq 5 times and gives timeout whereas when pinging PC2, it gave timeout for seq 1,2 and ran for 3-5. The IP address for PC 1 is 10.20.30.11/26 and for PC2 is 10.20.30.12/26

10.20.30.82

3.- When pinging a VPC in the Sales department from the Warehouse Department, what is the source IP address in the packets?

When pinging from PC10 to PC4, seq1 was timeout and it ran after that. The number on Wireshark was 106 and the source IP is 10.20.30.70. The reply is 107 and source IP for that is 10.20.30.14.

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

The source and destination IP address according to Wireshark is 10.20.30.70 and 10.20.30.12 and the MAC addresses are 00:50:79:66:68:08 and 00:50:79:66:68:00.

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

What are the entries in the ARP table in PC1?

In PC1 in SolarPutty, ARP table is empty. PC1 to PC3 is unreachable.

What ARP packets do you see in Wireshark? Describe its content

Wireshark shows 266 packages out of which 16 are shown. The background color changed from pink to yellow and some of the sources and destinations became private, c2 or broadcast.