

CECS 303 NETWORKS AND NETWORK SECURITY

Netlab 3: IP Addressing Planning

Purpose: In this Lab exercise, you will build your first Wide Area Network (WAN) topology in GNS3.

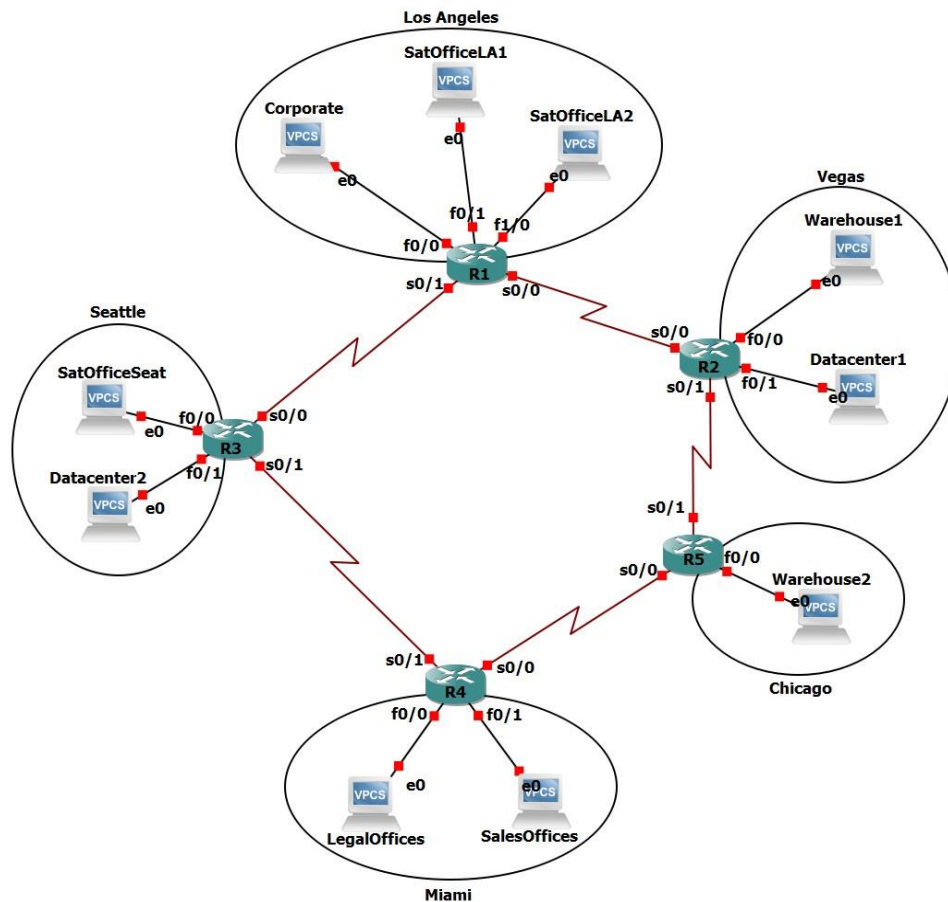
Procedure:

We have a nationwide company with multiple LANs in different locations. Before launching GNS3 to build the given topology, you need to fill in the table below with the planned IP addressing scheme that uses a Class C network in the most efficient way possible to meet the requirements without wasting IPs. You will work subnetting the full Class network 1XX.1YY.0.0/16. You need to design the entire topology providing network ID, broadcast ID, Mask, and Gateway for each location.

Location	Required Usable IPs	Network ID	Broadcast ID	Mask in Decimal Notation	Gateway
Los Angeles Sat Office LA1	25	175.106.5.0/27	175.106.5.31/27	255.255.255.224	175.106.5.6/27
Los Angeles Sat Office LA2	20	175.106.6.0/27	175.106.6.31/27	255.255.255.224	175.106.6.7/27
Los Angeles Corporate	120	175.106.2.0/25	175.106.2.127/25	255.255.255.128	175.106.2.3/25
Vegas Warehouse 1	32	175.106.4.0/26	175.106.4.63/26	255.255.255.192	175.106.4.5/26
Vegas Datacenter 1	128	175.106.1.0/24	175.106.1.7/24	255.255.255.0	175.106.1.2/24
Chicago Warehouse 2	5	175.106.9.0/29	175.106.9.7/29	255.255.255.248	175.106.9.10/29
Miami Legal Offices	64	175.106.3.0/25	175.106.3.127/25	255.255.255.128	175.106.3.4/24
Miami Sales Office	18	175.106.7.0/27	175.106.7.31/27	255.255.255.224	175.106.7.8/27
Seattle Datacenter 2	250	175.106.0.0/24	175.106.0.255/24	255.255.255.0	175.106.0.1/24
Seattle Sat Office	6	175.106.8.0/29	175.106.8.7/29	255.255.255.248	175.106.8.9/29

Table 1

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Your instructor will provide a pre-built topology as shown above in the form of a GNS3 portable project. Your goal will be to achieve a fully working topology. Keep in mind that each PC represents an entire LAN, not just one host. Configure a **DHCP server** to provide IPs to each LAN. You will use the values you filled in **Table 1**. The provided topology has been pre-configured with IP addresses and routing protocol in the WAN side. Your job will be to setup IP addresses in the routers for each interface connecting LANs in the topology. Last but not least, before you can perform pings from one city to another, you need to set up routing to advertise your newly created networks. The commands to use are:

```
(config)#router rip
```

```
(config-router)#network [network ID] ← one statement per network
```

```
(config-router)#exit
```

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If you have any doubts, refer to the [Cisco IOS Reference Sheet](#) to find out how to setup DHCP Server and RIP (routing protocol) in a Cisco router.

Lab is completed when you are able to ping all the locations. Submit a Wireshark capture of any of the point-to-point links showing a successful DHCP message exchange as well as ping requests and replies. In addition to the packet capture file, submit an output of the routing tables in each router (total of 5). The command to use for this output is: `show ip route`. All submissions will be uploaded in OneDrive.