**Massachusetts Cluster Directions (NAT and DHCP)**

159.X.128.0 /17

**Part I - IP Addressing Scheme**– 4 LANs, 3 WAN links

Lawrence - 2,000 hosts Boston - 13,000 hosts Plymouth - 48 hosts New Bedford - 900 hosts

|  |  |  |
| --- | --- | --- |
| **Subnet Name/Size** | **Network Address** | **Subnet Mask** |
|  | 159.X.128.0 |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

Public IP Addressing

The Massachusetts Cluster has only four LANs. The IP Scheme starts at 159.X.128.0 The sizes of the LANs are:

The IP addresses that you calculate for each of your LANs will be used to build the public IP NAT pool. Do NOT assign these public IP addresses to the devices on the LANs. There are also 4 WAN Links. WAN Link # 4 should begin at 159.X.204.76 if you did your IP scheme properly. The WAN links obviously will use the public IP addresses you calculated above.

Private IP Addressing

The devices on the LAN will be actually assigned private IP addresses that will be NAT'ed into public IP addresses. The private IP addresses to assign to each LAN are:

* Lawrence - 172.16.152.0 /21
* Boston - 10.X.0.0 /18
* Plymouth - 192.168.X.0 /26
* New Bedford - 10.X.0.0 /22

Please note that two of the LANs use the same IP addresses (Boston and New Bedford). This is fine since these private IP addresses will not be used outside of their LANs.

**LAN IP Scheme (DHCP via routers)** (Use Private IP addresses only)

* DHCP will be delivered to each LAN via the router that connects to them.
* The switches on each LAN will get the second to last usable IP address statically assigned.
* The PCs on each LAN will get their IP addresses from DHCP. Be sure your DHCP router assigns IP, subnet mask and default gateway to all PCs.

**Part II. Routing Protocols**

RIP

All routers should be configured with RIPv2. RIP should only be configured with one network statement for the public IP network 159.X.0.0 If you configure your routers with the private IP addresses, you will lose significant points, since private IP addresses are not routed. In fact, two of the LANs in the topology use the same private IP addressing structure. RIP will definitely get screwed up if you try to route these private IP addresses.

Static Routes

A default route should be present on each router pointing towards the backbone. You can build this manually on each router or use your Default-Information Originate command on the proper router to use RIP to make the other routers build them automatically. Either way, New Bedford will need to build a default route, pointing toward Philadelphia.

You will also need to build static routes on all routers for the public IP addresses used on the LANs of the other routers. If the default route is already carrying the data between networks in the proper direction, you don't need to create the route, but if the router must go *against* the default route, a static route will definitely be needed.

**Part III. NAT**

Each of the LANs will be configured with NAT. Each LAN will require a different range of IP addresses for the NAT pool that they build. For dynamic and PAT, you will also have to create an ACL for the private IP addresses that you want NAT'ed into public IPs when they leave their LAN.

* Lawrence - Dynamic NAT
* Boston - 10.X.0.0 /18 - Dynamic NAT
* Plymouth - Static NAT - Do this for all PCs, switch and server.
* New Bedford - 10.X.0.0 /22 - PAT - Your NAT pool is only 1 IP address

\***Reminders**

In order to test connectivity between the LANs, you will have two situations:

1. Your PING goes with the default route - Your envelope tool should work fine. Since the destination network is unknown, the default route will carry it in the right direction and end up with a successful delivery.

2. Your PING goes against the default route - Since the destination network is unknown and the default route carries you away from your destination, this will not work. You will first have to have the destination private IP addresses get NAT'ed into a public IP address. Then, you can use the magnifying glass tool (NAT translation) to see what that public IP is. At that point, from the source device, you can use the command prompt from other routers to PING that public IP address. Be quick as the NAT translations disappear from the router pretty quickly.