Challenge Lab

THIS CHALLENGE LAB SHOULD BE COMPLETED INDIVIDUALLY!

Objective:

In this challenge lab you will configure a four router and six switch topology. When you are finished, you should have full connectivity among all devices within the topology based upon the following specifications.

Configuration Details:

The following section provides configuration details for each topic found within the network topology. Every little detail is not provided. You must use your knowledge gained this semester to decipher what is required to provide a full working configuration for each and every topic found below by using the details provided as well as the network topology. So, these really are simply network specifications as well as a configuration details per topic. Please know that this lab is not written to be followed in a specific order. You must decide what topic you should tackle first, next, and potentially last. You've worked hard all semester, now let's pull everything together and apply the knowledge you've learned to one network scenario. Good Luck with your final challenge lab!

1. VLANs
   - ✓ Make sure all VLANs are created and named according to the network topology.
   - ✓ Configure each interface to belong to the appropriate VLAN.
   - ✓ Ensure that the appropriate mode of operation is set for each switch interface.

2. EtherChannel
   - ✓ Configure link aggregation between the appropriate switches using the interfaces shown in the topology diagram.
   - ✓ Both sides should be unconditionally set using a standardized, non-proprietary protocol.
   - ✓ When this is correctly configured, all VLANs should be able to traverse this etherchannel.

3. InterVLAN Routing with a Router-on-a-Stick
   - ✓ The subinterfaces used on the router that requires intervlan routing should have the first available IP Address in the subnet (ie: network) bound to the subinterface created for each VLAN you are routing for.
   - ✓ Make sure you are not using SVIs in this InterVLAN routing configuration.

4. InterVLAN Routing with SVIs
   - ✓ The VLAN interfaces used on the Layer3 switches should have the first available IP Address in the subnet (ie: network) bound to the SVI created for each VLAN you are routing for.
   - ✓ Make sure you are not using subinterfaces in this InterVLAN routing configuration.
   - ✓ Use only SVIs on the layer3 switches.

5. Default Static Routing and Default Route Injection
   - ✓ The ISP Router should have a default static route to the Edge Router.
   - ✓ The Edge Router should have a default static route to the ISP router.
   - ✓ All internal routers with the exception of the Edge router should learn the default static route from the Edge Router automatically via default route injection through OSPF Area 0.

6. Dynamic Routing
   - ✓ You should use OSPF on the Edge Router (with the exception of the interface that connects to the ISP Router) and the Sw-HQ3560 Layer3 switch.
   - ✓ The ISP router should not be configured with a dynamic routing protocol.

7. Access Control Lists
   - ✓ Verify the Web-Server has the HTTP Service configured and operating correctly.
   - ✓ Deny HTTP access from PCx1 access to the Web-Server.
   - ✓ Allow all other traffic from any host to traverse this interface
   - ✓ Hint: PCx1 should be able to ping any host 😉

8. SSH
   - ✓ Enable SSH on all devices and ensure PCx4 is the only PC allowed to access all devices via SSH.
   - ✓ Telnet should not be allowed.

9. DHCP
   - ✓ Configure the DHCP server for the appropriate networks according to the network topology.
   - ✓ Ensure the relay agent is in place, if required.
   - ✓ The IP Address range should begin with the IP Address specified on the specific device, such as a PC.
   - ✓ The gateway should be set to the first available address within the appropriate range.
   - ✓ Make sure a DNS server and DNS suffix is specified within every DHCP scope configured.

10. NAT/PAT
    - ✓ Configure dynamic NAT with PAT using a pool of four public IP Addresses on the router that has both RFC1918 Addressing as well as public IP Addressing.
    - ✓ Make sure you are only allowing the subnets used throughout the entire network topology to be translated to the public IP Address range. Nothing more!

11. HSRP

- ✓ L3Switchx0 should be the Active Path for VLAN1 and VLAN112 while L3Switchx2 should be the Active Path for VLAN144 (both L3Switches should backup the other in case of a failure).
- ✓ The first available IP Address should be used as the Virtual IP Address (VIP) for each VLAN HSRP is configured for.

Make sure you save your packet tracer file frequently (and make a backup copy) so you do not lose your work in case the application crashes. It is always nice to revert back to a previous backup in case the file is corrupt.

What's Next?

When you are done with this challenge, complete the following:

1. Save your .pkt file as YOURFIRSTNAME.YOURLASTNAME-CHALLENGELAB-2023fall.pkt.

2. Create a document for your challenge lab report. Include your name at the top and take a screenshot of your topology. This should include EVERYTHING you see in the topology diagram below or more.

3. For each topic above, you have one page within your lab report (ie: your word document) to prove that your configuration works. You may NOT issue a "show running-config" to demonstrate that something is configured correctly. You may issue a specific command such as "show ip route" to verify an OSPF route is learned from an adjacent router. You may only provide up to three screenshots per page to verify a specific topic is configured and operating appropriately. Please follow the order presented above and label each page with the topic number and topic heading. For instance, 6. Dynamic Routing should be listed on the top of the page where you are verifying that dynamic routing is working successfully.

4. When you have added all of your screenshots to your lab report, save it as YOURFIRSTNAME.YOURLASTNAME-CHALLENGELAB-2023fall.pdf.

5. Submit your .pkt and .pdf files to the appropriate assignment within brightspace.

(Please do not zip these files nor should you submit multiple .pngs, .gifs, .jpgs, etc…)

Topology