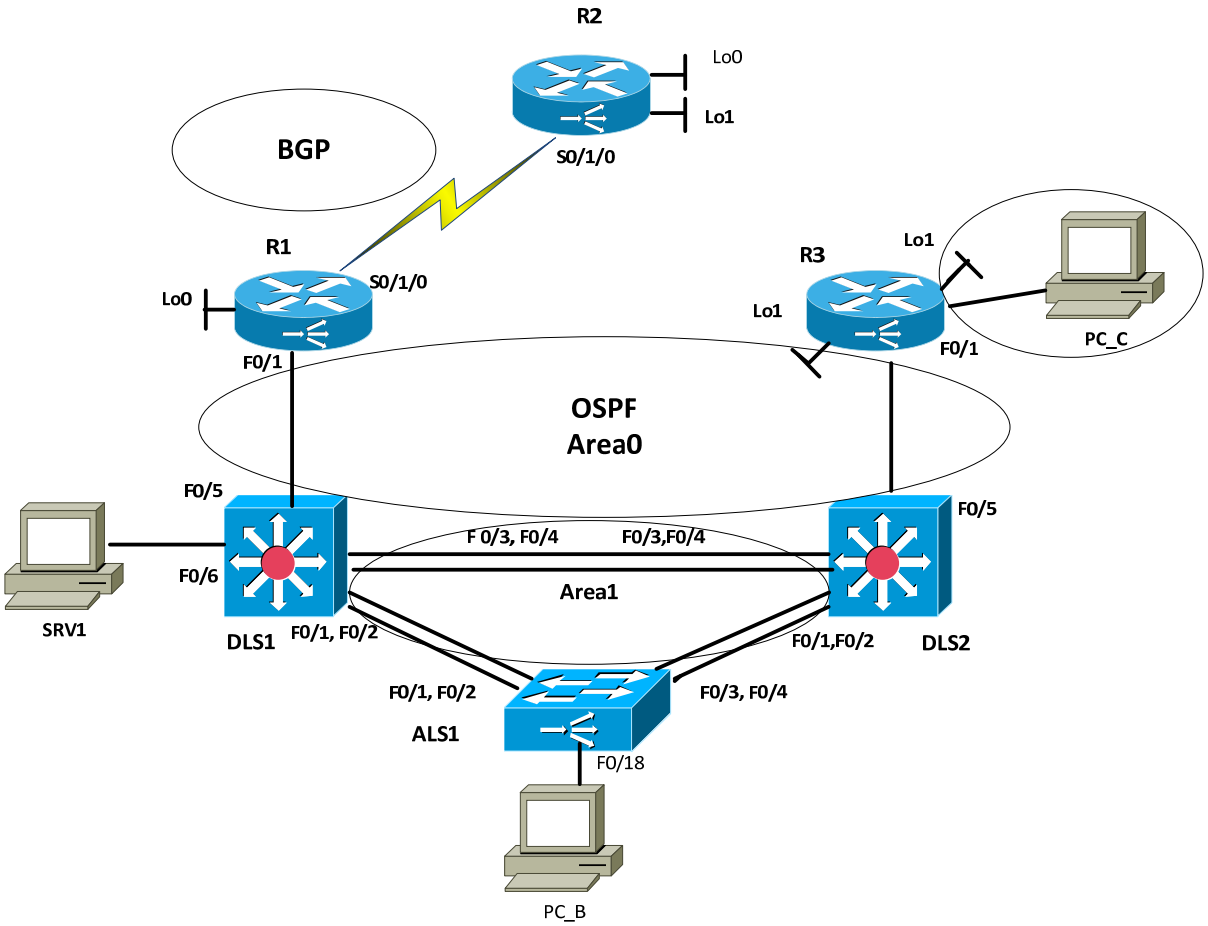
Laboration 1

Examine the Topology and Basic Troubleshooting Commands

Topology



Objectives

Part 1: Erase the startup config and copy the Base configuration file from flash to the running config for each device.

Part 2: Examine the existing configuration and getting to know the topology and basic troubleshooting commands.

Laboration Overview

This Laboration is the first practical exercise for the course CCNPv6 TSHOOT. In Part 1, you erase the existing configuration and load the base configs. In Part 2, you will use basic troubleshooting commands to get to know the topology and get used to basic troubleshooting commands. This topology will be used in all laborations in the course, and it is really important to know how the topology looks like and how the network works without errors, to be able to troubleshoot the network in the upcoming laborations.

Required Resources

- 3 routers (Cisco 1841 with Cisco IOS Release 12.4(24)T1 Advanced IP Service or comparable)
- 1 switch (Cisco 2960 with the Cisco IOS Release 12.2(46)SE C2960-LANBASEK9-M image or comparable)
- 2 switches (Cisco 3560 with the Cisco IOS Release 12.2(46)SE C3560-ADVIPSERVICESK9-M image or comparable)
- SRV1 (Windows PC with a static IP address) with TFTP and syslog servers, plus an SSH client (PuTTY or comparable) and WireShark software
- PC-B (Windows PC—DHCP client) with PuTTY and WireShark software
- PC-C (Windows PC—DHCP client) with PuTTY and WireShark software
- Serial and Ethernet cables

Part 1: Load the Base Configuration Files from Flash to the Running Config

Step 1: Verify the existence and location of the Base configuration files.

The base configuration file should be present at the desktop of the PCs in the lab room. Make sure you have access to this directory. If the directory and files are not present, contact your instructor.

Step 2: Erase the startup config from NVRAM.

Step 3: Delete the VLAN database from flash (switches only).

Step 4: Reload the device, but do *not* save the system configuration if prompted.

Step 5: When the device restarts, do not enter the initial configuration dialog, but terminate autoinstall if prompted.

Step 6: Copy the Base device configuration file to the running config.

The format of these files is TSHOOT-xxxx-Base-Cfg.txt, where *xxxx* is the name of the device.

Note: Although it is possible to copy the file to the startup config and reload the device, the RSA keys for SSH cannot be generated from the startup config.

Step 7: Copy the running config to the startup config.

Even if you see an Autosave message indicating that the running configuration has been saved to NVRAM, copy the running config to the startup config manually.

Note: If the device is rebooted at this point, you can log in remotely with the username **admin** and the password **adminpa55**. To access privileged EXEC mode, use the enable password **ciscoenpa55**.

Step 8: Repeat Steps 2 through 7 for all other devices in the network.

Step 9: Set the time on the NTP server R2.

Set the correct time on the NTP server R2 using the **`clock set`** command.

Step 10: Configure the PCs.

a. Configure SRV1 with the static IP address **172.16.50.1/24** and the default gateway **172.16.50.254**.

b. Start the syslog server and TFTP server on SRV1.

c. Configure PC-B and PC-C as DHCP clients.

d. Release and renew the DHCP leases on PC-B and PC-C.

Note: It is important to release and renew the DHCP leases on PC-B and PC-C because the PCs may have obtained a valid IP address previously and this could mask a problem.

Part 2: Examine the Topology

It is really important to have good knowledge of the existing topology before starting to troubleshoot. The documentation of the IP addresses, routing protocols and VLANs from this laboration can be very useful in the upcoming laborations.

Step 1: Fill in the IP addressing table.

Use different ***show*** commands to fill in the table below. For each device use: ***show ip interface brief, show vlan, show running-config, ipconfig*** etc on each device to find out how the topology works, and which addresses and VLANS that exists. Use the following table to record the results of the show commands. Fill in the IP addresses, subnet masks, default gateways (if existing) and VLAN numbers.

IP Addressing Table

Device	Interface/SVI	IP Address	Subnet Mask	Default Gateway
R1	FA0/1			
	S0/0/0 (DCE)			
	Lo0			
R2	S0/0/0			
	Lo0			
	Lo1			
R3	FA0/0			
	FA0/1			
	Lo0			
	Lo1			

Device	Interface/SVI	IP Address	Subnet Mask	Default Gateway
ALS1	VLAN ___			
DLS1	Fa0/5			
DLS1	Lo0			
DLS1	VLAN ___			
DLS1	VLAN ___			
DLS1	VLAN ___			
DLS1	VLAN ___			
DLS1	VLAN ___			
DLS1	VLAN ___			
DLS2	Fa0/5			
DLS2	Lo0			
DLS2	VLAN ___			
DLS2	VLAN ___			
DLS2	VLAN ___			
DLS2	VLAN ___			
DLS2	VLAN ___			
DLS2	VLAN ___			
SRV1	NIC			
PC-B	NIC			
PC-C	NIC			

Step 2: Routing protocols and static routes

To fill in the table below, use the following commands: ***show ip route, show ip protocols, show ip ospf neighbors, show ip ospf interface brief, debug ip ospf packet, debug ip ospf events, debug ip ospf packets, show ip eigrp interfaces, show ip eigrp neighbors, debug eigrp packets, debug ip eigrp, show ip bgp, show ip bgp summary, show ip bgp neighbors, show running-config, show running-config | begin ip route, show running-config | include ip route*** etc. Here you will find information of the routing protocols that are used in all devices and information of the static routes configured. Make sure to check if the routes are redistributed between different routing protocols.

Routing protocols and static routes Table

Device	Routing protocol	Static/default routes	Interfaces included	Other information (process ID, AS number, area etc.)

Notes

_____
_____
_____
_____
_____
_____
_____

Step 3: Investigate the switch configurations

On the switches, use the following commands to investigate the trunk links, etherchannels, Spanning-Tree Protocol, VTP etc; ***show interface trunks, show interface status, show arp, show cdp neighbors, show spanning-tree summary, show vlan brief, show etherchannel summary, show running-config | begin Port-Channel*** etc . Fill in the table and answer the questions below.

Trunk Interfaces Table

Device	Trunk interfaces	Encapsulation	VLANs allowed	Native VLAN
DLS1				
DLS2				
ALS1				

Etherchannel Table

Device	Port-channel group	Ports in group	Status of ports
DLS1			
DLS2			
ALS1			

VTP Table

Device	Domain name	VTP mode	VTP version

Device	Domain name	VTP mode	VTP version
DLS1			
DLS2			
ALS1			

Which protocol is used for Spanning-Tree? _____

Spanning-Tree Root

VLAN	Root
10	
20	
30	
50	
100	
200	

Step 4: Dynamic IP addressing of hosts

Use the following commands on DLS1 and R3 to investigate how the dynamic IP addressing of hosts works; ***show ip nat statistics, show ip nat translations, debug ip nat, debug ip icmp, show ip dhcp bindings, show ip dhcp pool, debug ip dhcp server events, show running-config | begin dhcp excluded-address.*** Write down all important information regarding the dynamic IP addressing. Make sure to check that the address ranges for the dhcp or nat pool, default-gateway, excluded addresses etc are correct.

Notes

_____
_____
_____
_____
_____
_____
_____

Step 5: First-Hop Redundancy Protocol

What FHRP protocol is used? _____

VLAN	Active device	Standby device	Virtual IP address
10			
20			
30			
50			
100			
200			

The commands to be used to provide this information is ***show standby brief, debug standby packets, show standby vlan [vlan number] brief, show running-config | include standby***.

Step 6: Demonstrate basic network connectivity

With all devices connected, you should be able to ping from any device in the network to any other device. Perform pings according to the Ping Test table below.

Note: All pings in the table must be successful. If not, there are issues that need to be resolved.

Ping Test Table

From Device/Interface/IP	To Device/Interface/IP	Successful (Y/N)
PC-B	PC-C (DHCP 172.16.80.2)	
PC-B	HSRP default gateway (172.16.10.254)	
PC-B	SRV1 (172.16.50.1)	
PC-B	ALS1 mgmt (172.16.100.1)	
PC-B	DLS1 mgmt (172.16.100.252)	
PC-B	DLS2 mgmt (172.16.100.253)	
PC-B	R1 Fa0/1 (172.16.2.2)	
PC-B	R2 Lo1 (172.30.1.1)	
PC-B	R3 Fa0/1 (172.16.2.14)	
PC-C	R3 default gateway (172.16.80.1)	
PC-C	SRV1 (172.16.50.1)	
PC-C	ALS1 mgmt (172.16.100.1)	
PC-C	DLS1 mgmt (172.16.100.252)	
PC-C	DLS2 mgmt (172.16.100.253)	
PC-C	R1 Fa0/1 (172.16.2.2)	
PC-C	R2 Lo1 (172.30.1.1)	
PC-C	R3 Fa0/1 (172.16.2.14)	
ALS1 mgmt vlan 100 (172.16.100.1)	DLS1 mgmt (172.16.100.252)	
ALS1 mgmt vlan 100	DLS2 mgmt (172.16.100.253)	
ALS1 mgmt vlan 100	R1 Fa0/1 (172.16.2.2)	
ALS1 mgmt vlan 100	R2 Lo1 (172.30.1.1)	
ALS1 mgmt vlan 100	R3 Fa0/1 (172.16.2.14)	

Notes

_____
_____
_____
_____
_____
_____
_____

Step 4: Demonstrate Telnet and SSH connectivity.

From PC-B, connect to each network device using Telnet (from the command prompt) and SSH (from an SSH client such as PuTTY) to verify remote management capability.

Note: Connecting to each device via Telnet and SSH must be successful. If not, there are issues that need to be resolved. Use ***show line vty 0, show ip ssh, show ssh***.

Remote Access Test Table

From Device	To Device/Interface/IP	Telnet (Y/N)	SSH (Y/N)
PC-B	ALS1 mgmt (172.16.100.1)		
PC-B	DLS1 mgmt (172.16.100.252)		
PC-B	DLS2 mgmt (172.16.100.253)		
PC-B	R1 Fa0/1 (172.16.2.2)		
PC-B	R2 S0/0/0 (209.165.200.226)		
PC-B	R3 Fa0/1 (172.16.2.14)		

Step 5: Demonstrate NTP functionality.

Check each network device to verify that it has synchronized with the NTP server R2.

Note: Each device must synchronize with the NTP server R2. If not, there are issues that need to be resolved. Use ***show clock, show ntp status, show ntp associations***.

NTP Synchronization Table

Device	NTP Status Synched (Y/N)
ALS1	
DLS1	
DLS2	
R1	
R2	
R3	

Step 6: Demonstrate network redundancy for PC-B after correcting errors.

a. Disable (shut down) DLS2 port channel Po2.

b. Ping from PC-B to all other devices in the network. Pings from PC-B to each of the other PCs and network devices must be successful. If not, there are issues that need to be resolved.

c. Renew and release the PC-B IP address. PC-B should be able to obtain an IP address on subnet 172.16.10.0/24. If not, there are issues that need to be resolved.

STP Redundancy Test Table

From Device/Interface/IP	To Device/Interface/IP	Result
PC-B	HSRP default gateway (172.16.10.254)	
PC-B	PC-C	
PC-B	SRV1 (172.16.50.1)	
PC-B	ALS1 mgmt (172.16.100.1)	
PC-B	DLS1 mgmt (172.16.100.252)	
PC-B	DLS2 mgmt (172.16.100.253)	
PC-B	R1 Fa0/1 (172.16.2.2)	
PC-B	R2 Lo1 (172.30.1.1)	
PC-B	R3 Fa0/1 (172.16.2.14)	

Notes: