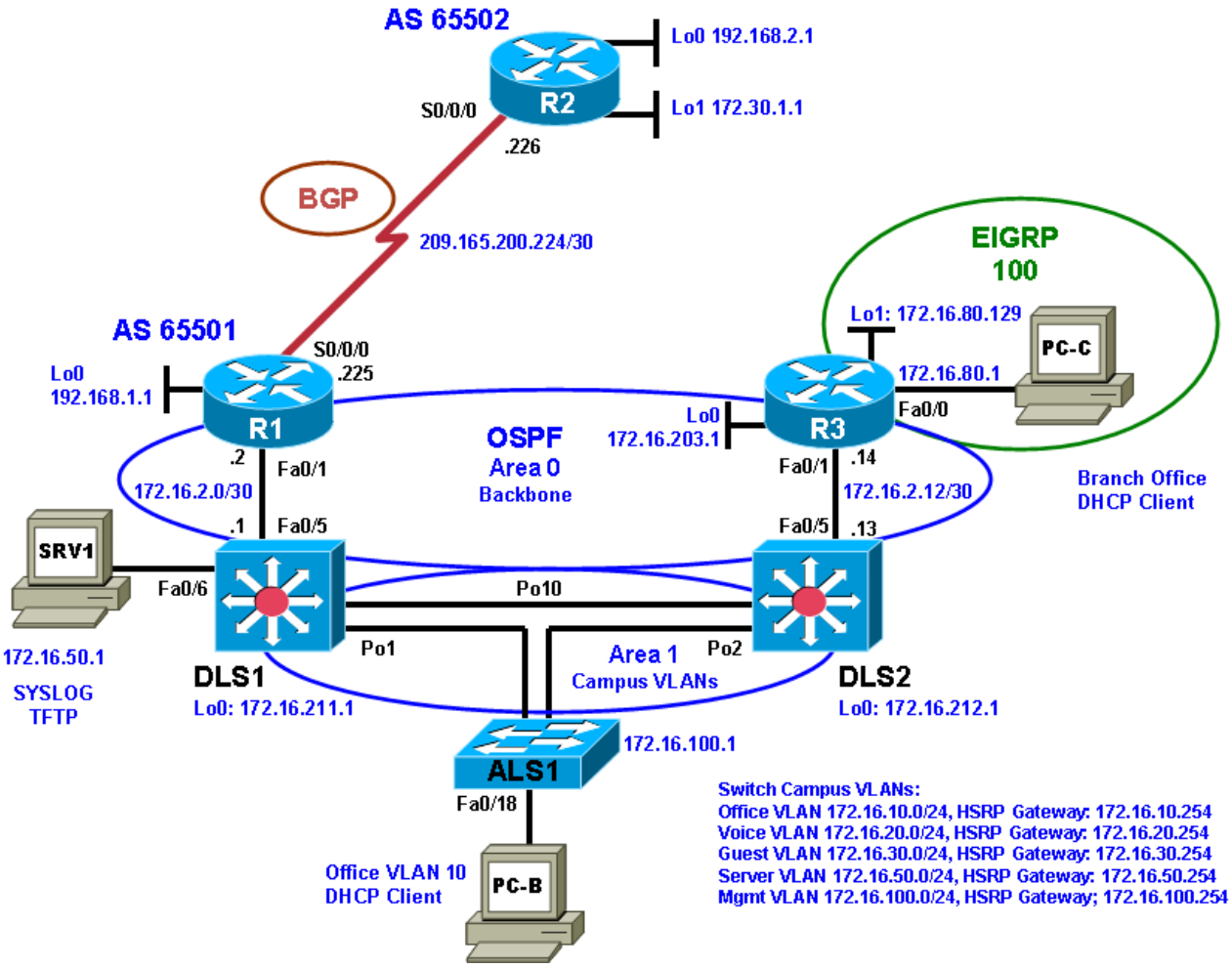
CCNPv6 TSHOOT

Laboration 2

Troubleshooting Switching and First-Hop Redundancy

Topology



Objectives

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

Part 2: Troubleshoot and correct the errors in a switched network. Use basic commands and troubleshooting of the HSRP protocol.

Laboration Overview

This Laboration is a practical exercise for the course CCNPv6 TSHOOT. In Part 1, you erase the existing configuration and load the error configs. In Part 2, you will find and correct errors related to switching. The last part in this laboration is to troubleshoot the HSRP protocol.

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 Error Configuration Files

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

The error 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 Error device configuration file to the running configuration.

The format of these files is TSHOOT-xxxx-Lab2-Error-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: Troubleshoot and Correct the Errors

Step 1: Perform connectivity tests.

Use connectivity testing tools such as ping, traceroute, tracert (PC), and Cisco Discovery Protocol to determine the extent of connectivity loss. Use the following table to record the results of the connectivity tests. Be sure to ping from each PC to each network device interface and from each network device to every other network device using the various network addresses available, as shown in the IP Addressing table you created in Laboration 1.

Note: You can use the Ping Test table in Step 3 as a starting point.

Network Connectivity Test Table

Command	From Device/Interface/IP	To Device/Interface/IP	Result

Step 2: Document, resolve, and verify the issues discovered.

Using the tools available, such as **show** and **debug** commands, discover each problem, correct it, and document the corrective action taken. Use the Problem Resolution and Verification table to document the problem discovered, the affected devices, and the solution to the problem, including the commands used.

Note: For each device, after issuing corrective commands, copy the running config to the startup config.

Tip: If connecting from one device to another via Telnet, issue the **`terminal monitor`** command so that console and debug messages generated on the remote device can be viewed on the local console.

Problem Resolution and Verification Table

Device	Problem or Error Discovered	Corrective Action (commands used)	Verification Commands (more than one command can be used)

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Step 3: Demonstrate basic network connectivity after correcting errors.

With all devices connected and all problems resolved, 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)	

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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.

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.

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)	

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Command Summary

The table lists useful commands for this lab.

Command	Key Information Displayed
clear arp-cache	Clears ARP entries and resets aging.
show arp	Displays the IP address, MAC address, and interface.
show interfaces status	Displays link status, speed, duplex, trunk or VLAN membership, and interface descriptions.
show cdp neighbors (detail)	Displays device ID and type and confirms that a link is operational at the data link layer in both directions, including the sending and receiving ports. The **detail** option gives the remote device IP address.
show spanning-tree vlan *vlan#*	Displays all essential parameters that affect the topology, such as root port, designated ports, port state, and port type, as well as the spanning-tree mode implemented.
show spanning-tree inconsistentports	Displays a more detailed description of the type of port inconsistency and what might be causing it.
show spanning-tree summary	Displays the spanning-tree mode and the VLANs for which this switch is the root bridge. VLANs are listed along with the number of ports in various STP states.
show mac address-table address *mac-addr*	Displays the MAC address and interface entry in the table for the specified host.
show mac-address-table interface *intf-id*	Displays all MAC addresses that were learned on the specified port.
show vlan brief	Displays an overview of all existing VLANs and the ports within them. Trunk ports are not listed.
show vlan id *vlan#*	Displays whether the VLAN exists and, if so, which ports are assigned to it. Includes trunk ports on which the VLAN is allowed.
show interfaces *type/#*	Displays interface status, IP address/prefix, load, duplex, speed and packet statistics and errors.
show interfaces trunk	Displays all trunk ports, the operational status, trunk encapsulation, and native VLAN, as well as the list of allowed VLANs, active VLANs, and the VLANs in Spanning Tree Forwarding state for the trunk.

show interfaces *type/#* **switchport**	Checks all VLAN-related parameters for a specific interface (access ports and trunk ports).
show etherchannel summary	Displays port channels, the member ports, and flags indicating status.
show interfaces vlan *vlan#*	Displays the SVI status, IP address, and statistics.
show ip route *ip-addr*	Displays the routing table information for a particular destination address.
show ip arp *ip-addr*	Displays the ARP table information for an IP address, including age, hardware address, and interface.
show interfaces *type/#* | **include bia**	Displays the MAC address of an interface on one output line.
show ip cef *ip-addr* **detail**	Displays the next hop and interface used for a particular destination address from the Cisco Express Forwarding table.
show adjacency *int-type/#* **detail**	Displays the information contained in the adjacency table for a next-hop IP address or interface.
show platform forward	Displays the hardware ternary content addressable memory (TCAM) information and exact forwarding behavior for a Layer 2 or Layer 3 switched frame. **Note:** Specific to the Catalyst 3560 and 3750 series of switches.
show standby vlan *vlan#* **brief**	Verify active and standby roles and IP addresses for a particular VLAN for HSRP routers.
debug standby packets	Displays real-time messages exchanged between HSRP routers.
show ip nat statistics	Displays the NAT pool configuration information, boundaries (inside and outside interfaces), translation pool size, and usage statistics.
show ip nat translations	Displays all current translations (static and dynamic), including the initiating protocol as well as inside global, inside local, outside local, and outside global addresses.
debug ip icmp	Displays real-time information related to ping (echo request and echo reply) and other protocols that make use of ICMP.
debug ip nat	Displays real-time information related to NAT translation activity (static and dynamic).
clear ip nat translations *	Clears all dynamic translations.
clear ip nat statistics *	Clears NAT counters.
show ip dhcp server statistics	Displays DHCP pool activity from hosts requesting IP addressing.
show ip dhcp pool	Displays DHCP pool information, including the address range,

	number of excluded addresses, and lease activity.
show ip dhcp conflicts	Displays conflicts resulting from assigning addresses that are already assigned to a device interface in the same subnet or network.
show ip dhcp binding	Displays the IP address, hardware (MAC) address, and lease expiration for a DHCP address assignment.
debug dhcp detail	Displays real-time information on a Cisco IOS DHCP client (router or switch).
debug ip dhcp server events	Displays real-time information for DHCP server process messages.
clear ip dhcp server statistics	Clears DHCP server statistics.
clear ip dhcp conflict *	Clears conflicted addresses.
show ip sockets	Displays the current connections for this server, including which services are running.