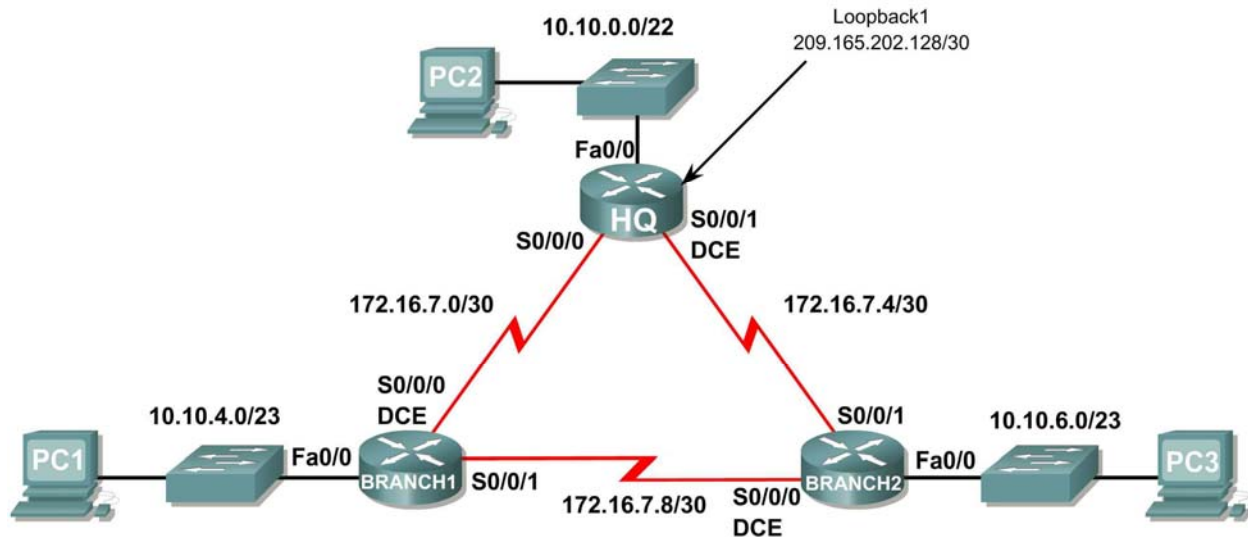


Lab 11.6.3: OSPF Troubleshooting Lab

Topology Diagram



Addressing Table

Device	Interface	IP Address	Subnet Mask	Default Gateway
HQ	Fa0/0	10.10.0.1	255.255.252.0	N/A
	S0/0/0	172.16.7.1	255.255.255.252	N/A
	S0/0/1	172.16.7.5	255.255.255.252	N/A
	Lo1	209.165.202.129	255.255.255.252	N/A
Branch1	Fa0/0	10.10.4.1	255.255.254.0	N/A
	S0/0/0	172.16.7.2	255.255.255.252	N/A
	S0/0/1	172.16.7.9	255.255.255.252	N/A
Branch2	Fa0/0	10.10.6.1	255.255.254.0	N/A
	S0/0/0	172.16.7.10	255.255.255.252	N/A
	S0/0/1	172.16.7.6	255.255.255.252	N/A
PC1	NIC	10.10.5.254	255.255.254.0	10.10.4.1
PC2	NIC	10.10.3.254	255.255.252.0	10.10.0.1
PC3	NIC	10.10.7.254	255.255.254.0	10.10.6.1

Learning Objectives

Upon completion of this lab, you will be able to:

- Cable a network according to the Topology Diagram.
- Erase the startup configuration and reload a router to the default state.
- Load the routers with supplied scripts.
- Discover where communication is not possible.
- Gather information about the misconfigured portion of the network along with any other errors.
- Analyze information to determine why communication is not possible.
- Propose solutions to network errors.
- Implement solutions to network errors.
- Document the corrected network.

Scenario

In this lab, you will begin by loading configuration scripts on each of the routers. These scripts contain errors that will prevent end-to-end communication across the network. You will need to troubleshoot each router to determine the configuration errors, and then use the appropriate commands to correct the configurations. When you have corrected all of the configuration errors, all of the hosts on the network should be able to communicate with each other.

The network should also have the following requirements met:

- OSPF routing is configured on the Branch1 router.
- OSPF routing is configured on the Branch2 router.
- OSPF routing is configured on the HQ router.
- OSPF updates must be disabled on the LAN and Loopback interfaces.
- The HQ router must redistribute the default route to the Loopback interface in the routing updates.
- All OSPF routers must use a process ID of 1.
- All OSPF routers must be in area 0.

Task 1: Cable, Erase, and Reload the Routers.

Step 1: Cable a network.

Cable a network that is similar to the one in the Topology Diagram.

Step 2: Clear the configuration on each router.

Clear the configuration on each of the routers using the `erase startup-config` command and then `reload` the routers. Answer **no** if asked to save changes.

Task 2: Load Routers with the Supplied Scripts

Step 1: Load the following script onto the Branch1 router:

```
hostname Branch1
!
no ip domain-lookup
!
```

```
interface FastEthernet0/0
ip address 10.10.4.1 255.255.254.0
duplex auto
speed auto
no shutdown
!
interface Serial0/0/0
ip address 172.16.7.2 255.255.255.252
clock rate 64000
no shutdown
!
interface Serial0/0/1
ip address 172.16.7.9 255.255.255.252
no shutdown
!
router ospf 1
passive-interface FastEthernet0/0
network 10.10.4.0 0.0.1.255 area 0
network 172.16.7.0 0.0.0.3 area 0
network 172.16.7.8 0.0.0.3 area 0
!
ip classless
!
line con 0
line vty 0 4
login
!
end
```

Step 2: Load the following script onto the Branch2 router.

```
hostname Branch2
!
interface FastEthernet0/0
ip address 10.10.6.1 255.255.254.0
duplex auto
speed auto
no shutdown
!
interface Serial0/0/0
ip address 172.16.7.10 255.255.255.252
clock rate 64000
no shutdown
!
interface Serial0/0/1
ip address 172.16.7.6 255.255.255.252
!
router ospf 1
log-adjacency-changes
passive-interface Serial0/0/1
network 172.16.7.4 0.0.0.3 area 0
network 172.16.7.8 0.0.0.3 area 0
network 10.10.6.0 0.0.3.255 area 0
!
ip classless
!
```

```
line con 0
line vty 0 4
  login
!
end
```

Step 3: Load the following script onto the HQ router.

```
hostname HQ
!
no ip domain-lookup
!
interface FastEthernet0/0
  ip address 10.10.10.1 255.255.252.0
  duplex auto
  speed auto
  no shutdown
!
interface Serial0/0/0
  ip address 172.16.7.1 255.255.255.252
  no shutdown
!
interface Serial0/0/1
  ip address 172.16.7.5 255.255.255.252
  clock rate 64000
  no shutdown
!
interface Loopback1
  ip address 209.165.202.129 255.255.255.252
!
router ospf 1
  log-adjacency-changes
  passive-interface FastEthernet0/0
  passive-interface Loopback1
  network 172.16.7.0 0.0.0.3 area 0
  network 172.16.7.4 0.0.0.3 area 0
  network 10.10.0.0 0.0.7.255 area 0
!
ip classless
ip route 0.0.0.0 0.0.0.0 loopback1
!
line con 0
line vty 0 4
  login
!
end
```

Task 3: Troubleshoot the Branch1 Router

Step 1: Begin troubleshooting at the Host connected to the Branch1 router.

From the host PC1, is it possible to ping PC2? _____

From the host PC1, is it possible to ping PC3? _____

From the host PC1, is it possible to ping the default gateway? _____

Step 2: Examine the Branch1 router to find possible configuration errors.

Begin by viewing the summary of status information for each interface on the router.

Are there any problems with the status of the interfaces?

If there are any problems with the configuration of the interfaces, record any commands that will be necessary to correct the configuration errors.

Step 3: If you have recorded any commands above, apply them to the router configuration now.

Step 4: View summary of the status information.

If any changes were made to the configuration in the previous step, view the summary of the status information for the router interfaces again.

Does the information in the interface status summary indicate any configuration errors on the Branch1 router? _____

If the answer is **yes**, troubleshoot the interface status of the interfaces again.

Step 5: Troubleshoot the routing configuration on the Branch1 router.

What routes are shown in the routing table?

Are there any problems with the routing table?

Does the information in routing table indicate any configuration errors on the Branch1 router, or will it be necessary to troubleshoot the configurations on the other two routers to correct the errors?

Step 6: Attempt to ping between the hosts again.

From the host PC1, is it possible to ping PC2? _____

From the host PC1, is it possible to ping PC3? _____

From the host PC1, is it possible to ping the Serial 0/0/0 interface of the HQ router? _____

From the host PC1, is it possible to ping the Serial 0/0/1 interface of the HQ router? _____

Task 4: Troubleshoot the HQ Router

Step 1: Begin troubleshooting at the host PC2.

From the host PC2, is it possible to ping PC1? _____

From the host PC2, is it possible to ping PC3? _____

From the host PC2, is it possible to ping the default gateway? _____

Step 2: Examine the HQ router to find possible configuration errors.

Begin by viewing the summary of status information for each interface on the router.

Are there any problems with the status of the interfaces?

If there are any problems with the configuration of the interfaces, record any commands that will be necessary to correct the configuration errors.

Are there any problems with the interface status that could be due to errors on other parts of the network?

Step 3: If you have recorded any commands above, apply them to the router configuration now.

Step 4: View summary of the status information.

If any changes were made to the configuration in the previous step, view the summary of the status information for the router interfaces again.

Does the information in the interface status summary indicate any configuration errors on the HQ router?

If the answer is **yes**, troubleshoot the interface status of the interfaces again.

Step 5: Troubleshoot the routing configuration on the HQ router.

What routes are shown in the routing table?

Are there any problems with the routing table?

Use the `show running-configuration`, `show ip protocols`, and `show ip ospf neighbor` commands to view information about the OSPF configuration on the HQ router. Are there any additional problems with the OSPF configuration?

If there are any problems with the OSPF configuration, record any commands that will be necessary to correct the configuration errors.

Are there any problems on the HQ router that could be due to errors on other parts of the network?

Step 6: If you have recorded any commands above; apply them to the router configuration now.

Step 7: View the routing information.

If any changes were made to the configuration in the previous steps, view the routing information again.

Does the information in routing table indicate any configuration errors on the HQ router? _____

If the answer to either of this is **yes**, troubleshoot the routing configuration again.

Step 8: Attempt to ping between the hosts again.

From the host PC2, is it possible to ping PC1? _____

From the host PC2, is it possible to ping PC3? _____

From the host PC2, is it possible to ping the Serial 0/0/0 interface of the Branch2 router? _____

From the host PC2, is it possible to ping the Serial 0/0/1 interface of the Branch2 router? _____

Task 5: Troubleshoot the Branch2 Router

Step 1: Begin troubleshooting at the Host PC3.

From the host PC3, is it possible to ping PC1? _____

From the host PC3, is it possible to ping PC2? _____

From the host PC3, is it possible to ping the default gateway? _____

From the host PC3, is it possible to ping the Serial0/0/1 interface of the Branch 2 router? _____

Step 2: Examine the Branch2 router to find possible configuration errors.

Begin by viewing the summary of status information for each interface on the router.

Are there any problems with the status of the interfaces?

If there are any problems with the configuration of the interfaces, record any commands that will be necessary to correct the configuration errors.

Step 3: If you have recorded any commands above, apply them to the router configuration now.

Step 4: View summary of the status information.

If any changes were made to the configuration in the previous step, view the summary of the status information for the router interfaces again.

Does the information in the interface status summary indicate any configuration errors on the Branch router? _____

If the answer is **yes**, troubleshoot the interface status of the interfaces again.

Step 5: Troubleshoot the routing configuration on the Branch2 router.

What routes are shown in the routing table?

Are there any problems with the routing table?

Use the `show running-configuration`, `show ip protocols`, and `show ip ospf neighbor` commands to view information about the OSPF configuration on the Branch2 router. Are there any problems with the OSPF configuration?

If there are any problems with the OSPF configuration, record any commands that will be necessary to correct the configuration errors.

Step 6: If you have recorded any commands above; apply them to the router configuration now.

Step 7: View the routing information.

If any changes were made to the configuration in the previous steps, view the routing information again.

Does the information in routing table indicate any configuration errors on the Branch2 router? _____

If the answer to this question is **yes**, troubleshoot the routing configuration again.

What routes are shown in the routing table?

Step 8: Attempt to ping between the hosts again.

From the host PC3, is it possible to ping PC1? _____

From the host PC3, is it possible to ping PC2? _____

From the host PC3, is it possible to ping the Serial 0/0/0 interface of the Branch1 router? _____

From the host PC3, is it possible to ping the Serial 0/0/1 interface of the Branch1 router? _____

Task 6: Reflection

There were a number of configuration errors in the scripts that were provided for this lab. Use the space below to write a brief description of the errors that you found.

Task 7: Documentation

On each router, capture the following command output to a text (.txt) file and save for future reference.

- `show running-config`
- `show ip route`
- `show ip interface brief`
- `show ip protocols`

If you need to review the procedures for capturing command output, refer to Lab 1.5.1

Task 8: Clean Up

Erase the configurations and reload the routers. Disconnect and store the cabling. For PC hosts that are normally connected to other networks (such as the school LAN or to the Internet), reconnect the appropriate cabling and restore the TCP/IP settings.