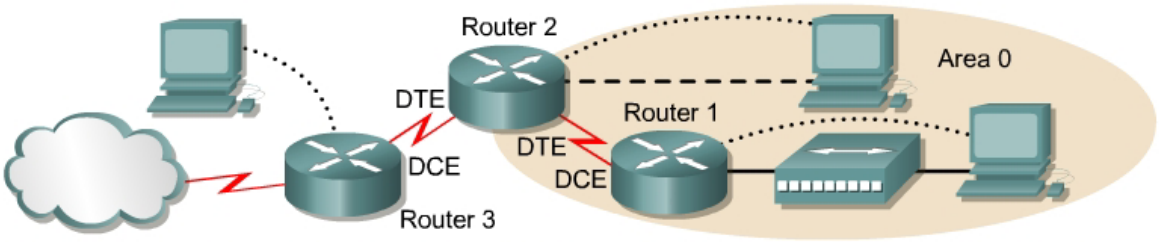
Lab 2.3.6 Propagating Default Routes in an OSPF Domain



Router Designation	Router Name	Enable Secret Password	Enable, VTY, and Console Passwords	Routing Protocol	Network Statements	Loopback 0 Address/Subnet Mask
Router 1	Tokyo	class	cisco	OSPF	192.168.1.0	192.168.31.11/32
Router 2	Madrid	class	cisco	OSPF	192.168.1.0 192.168.0.0	192.168.31.22/32

Router Designation	IP Host Table Entry	FastEthernet 0 Address/ Subnet Mask	Interface Type Serial 0	Serial 0 Address/Subnet Mask	Interface Type Serial 1	Serial 1 Address/Subnet Mask
Router 1	Madrid	192.168.1.129/24	DCE	192.168.1.1/30	NA	NA
Router 2	Tokyo	192.168.0.1/24	DTE	192.168.1.2/30	DTE	200.20.20.2/30

Note: The IP Host Table Entry column contents indicate the name(s) of the other router(s) in the IP host table.

Objective

- Setup an IP addressing scheme for OSPF area.
- Configure and verify Open Shortest Path First (OSPF) routing.
- Configure the OSPF network so that all hosts in OSPF area can connect to outside networks.

Background/Preparation

Cable a network similar to the one shown in the diagram. Any router that meets the interface requirements displayed on the above diagram may be used. For example, router series 800, 1600, 1700, 2500, and 2600 or any such combination can be used. Please refer to the chart at the end of the lab to correctly identify the interface identifiers to be used based on the equipment in the lab. The configuration output used in this lab is produced from 1721 series routers. Any other router used may produce slightly different output. Perform the following steps on each router unless specifically instructed otherwise.

Start a HyperTerminal session.

Note: Go to the erase and reload instructions at the end of this lab. Perform those steps on all routers in this lab assignment before continuing.

Step 1 Configure the ISP router

Normally the ISP router would be configured by the Internet service provider (ISP). For the purpose of this lab, after erasing the old configuration, configure the ISP router (Router 3) this way by typing:

```
Router>enable
Router#configure terminal
Router(config)#hostname ISP
ISP(config)#line vty 0 4
ISP(config-line)#password cisco
ISP(config-line)#login
ISP(config-line)#interface serial 1
ISP(config-if)#ip address 200.20.20.1 255.255.255.252
ISP(config-if)#clock rate 64000
ISP(config-if)#no shutdown
ISP(config-if)#interface loopback 0
ISP(config-if)#ip address 138.25.6.33 255.255.255.255
ISP(config-if)#exit
ISP(config)#ip route 192.168.1.0 255.255.255.0 200.20.20.2
ISP(config)#ip route 192.168.0.0 255.255.255.0 200.20.20.2
ISP(config)#end
ISP#copy running-config startup-config
Destination filename [startup-config]? [Enter]
Building configuration...
[OK]
ISP#
```

Step 2 Configure the Area 0 OSPF routers

On the routers, enter the global configuration mode and configure the hostname, console, virtual terminal and enable passwords. Next configure the interfaces and IP hostnames according to the chart. Do not configure the routing protocol until specifically told to. If there are any problems configuring the router basics, refer to the lab “Review of Basic Router Configuration with RIP”.

Step 3 Save the configuration information from the privileged EXEC command mode

```
Tokyo#copy running-config startup-config
Destination filename [startup-config]? [Enter]

Madrid#copy running-config startup-config
Destination filename [startup-config]? [Enter]
```

Why save the running configuration to the startup configuration?

_____

Step 4 Configure the hosts with the proper IP address, subnet mask and default gateway

a. Each workstation should be able to ping the attached router. Troubleshoot as necessary. Remember to assign a specific IP address and default gateway to the workstation. If running Windows 9x/ME, check by using **Start** > **Run** > **winipcfg**. If running Windows NT/2000/XP, check by using the **ipconfig** command in a DOS window.

b. At this point the workstations will not be able to communicate with each other. The following steps will demonstrate the process required to get communication working using OSPF as the routing protocol.

Step 5 Verify connectivity

a. Ping from the Madrid router to both the Tokyo and the ISP routers.

b. Were the pings successful? _____

c. If the ping was not successful, troubleshoot the router configurations, until the ping is successful.

Step 6 Configure OSPF routing on both area 0 routers

a. Configure OSPF routing on each router. Use OSPF process number 1 and ensure all networks are in area 0. Refer to the lab "Configuring loopback interfaces" for review on configuring OSPF routing if necessary.

b. Did the IOS version automatically add any lines under router OSPF 1? _____

c. Show the routing table for the Tokyo router.

```
Tokyo#show ip route
```

d. Are there any entries in the routing table? _____

Step 7 Test network connectivity

a. Ping the Tokyo host from the Madrid host. Was it successful? _____

b. If not troubleshoot as necessary.

Step 8 Observe OSPF traffic

a. At privileged EXEC mode type the command **debug ip ospf events** and observe the output.

b. Is there OSPF traffic? _____

c. Turn off debugging by typing **no debug ip ospf events** or **undebug all**.

Step 9 Create a default route to the ISP

On the Madrid router only, type in a static default route through Serial 1 interface.

```
Madrid(config)#ip route 0.0.0.0 0.0.0.0 200.20.20.1
```

Step 10 Verify the default static route

a. Verify the default static route by looking at the Madrid routing table.

b. Is the default route in the routing table? _____

Step 11 Verify connectivity from the Madrid router

a. Verify connectivity from the Madrid router by pinging the ISP Serial 1 interface from the Madrid router.

b. Can the interface be pinged? _____

c. Next, on the host attached to Madrid, open a Command Prompt and ping the serial 1 interface on the ISP router.

d. Can the interface be pinged? _____

e. This time, ping the loopback address of the ISP router, which represents the ISP connection to the Internet.

f. Can the loopback interface be pinged? _____

g. All of these pings should be successful. If they are not, troubleshoot the configurations on the host and the Madrid and ISP routers.

Step 12 Verify connectivity from the Tokyo router

a. Verify the connection between the ISP and the Tokyo by pinging the serial 1 interface of the ISP router on the Tokyo router.

b. Can the interface be pinged? _____

c. If yes, why? If not, why not? _____

Step 13 Redistribute the static default route

a. Propagate the gateway of last resort to the other routers in the OSPF domain. At the configure router prompt on the Madrid router type **default-information originate**.

```
Madrid(config-router)#default-information originate
```

b. Is there now a default route on the Tokyo router? _____

c. What is the address of the Gateway of last resort? _____

d. There is an O*E2 entry in the routing table. What type of route it is? _____

e. Can the ISP server address at 138.25.6.33 be pinged from both workstations? _____

f. If no, troubleshoot both hosts and all three routers.

Once the previous steps are completed, log off by typing **exit** and turn the router off. Then remove and store the cables and adapter.

Erasing and reloading the router

Enter into the privileged EXEC mode by typing **enable**.

If prompted for a password, enter **class**. If that does not work, ask the instructor for assistance.

```
Router>enable
```

At the privileged EXEC mode, enter the command **erase startup-config**.

```
Router#erase startup-config
```

The responding line prompt will be:

```
Erasing the nvram filesystem will remove all files! Continue?
[confirm]
```

Press **Enter** to confirm.

The response should be:

```
Erase of nvram: complete
```

Now at the privileged EXEC mode, enter the command **reload**.

```
Router(config)#reload
```

The responding line prompt will be:

```
System configuration has been modified. Save? [yes/no]:
```

Type **n** and then press **Enter**.

The responding line prompt will be:

```
Proceed with reload? [confirm]
```

Press **Enter** to confirm.

In the first line of the response will be:

```
Reload requested by console.
```

After the router has reloaded the line prompt will be:

```
Would you like to enter the initial configuration dialog? [yes/no]:
```

Type **n** and then press **Enter**.

The responding line prompt will be:

```
Press RETURN to get started!
```

Press **Enter**.

Now the router is ready for the assigned lab to be performed.

Router Interface Summary				
Router Model	Ethernet Interface #1	Ethernet Interface #2	Serial Interface #1	Serial Interface #2
800 (806)	Ethernet 0 (E0)	Ethernet 1 (E1)		
1600	Ethernet 0 (E0)	Ethernet 1 (E1)	Serial 0 (S0)	Serial 1 (S1)
1700	FastEthernet 0 (FA0)	FastEthernet 1 (FA1)	Serial 0 (S0)	Serial 1 (S1)
2500	Ethernet 0 (E0)	Ethernet 1 (E1)	Serial 0 (S0)	Serial 1 (S1)
2600	FastEthernet 0/0 (FA0/0)	FastEthernet 0/1 (FA0/1)	Serial 0/0 (S0/0)	Serial 0/1 (S0/1)
In order to find out exactly how the router is configured, look at the interfaces. This will identify what type and how many interfaces the router has. There is no way to effectively list all of the combinations of configurations for each router class. What is provided are the identifiers for the possible combinations of interfaces in the device. This interface chart does not include any other type of interface even though a specific router may contain one. An example of this might be an ISDN BRI interface. The string in parenthesis is the legal abbreviation that can be used in IOS command to represent the interface.				

