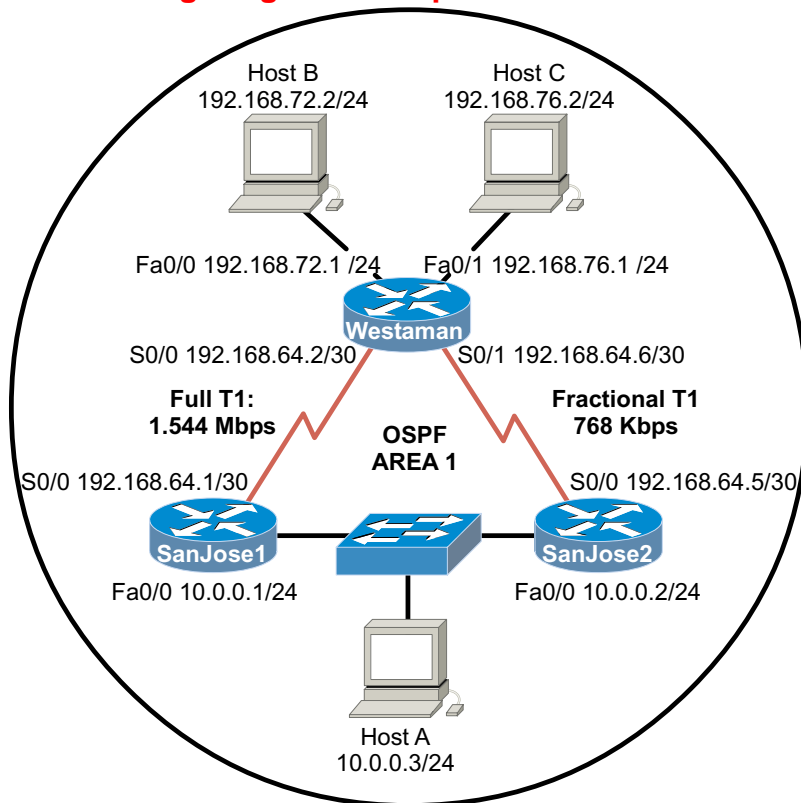


7.5.2: Configuring Route Maps



Objective

In this lab, you apply a routing policy by configuring a route map.

Scenario

International Travel Agency maintains two WAN links from the West Tasman (i.e., Westaman) site to its core network 10.0.0.0/24. One link is full T1 (1.544 Mbps), and the other is a fractional T1 with a capacity of 768 Kbps. Under OSPF, West Tasman prefers the Full T1 link by virtue of its higher bandwidth (and lower cost). However, the Network Operations Center has decreed that all traffic from the 192.168.72.0 LAN bound to 10.0.0.0/24 should use the slower fractional T1 link until further notice. You are to apply this policy by configuring a route map on the West Tasman router.

Step 1

Build and configure the network according to the diagram, but do not change the any interface bandwidth settings yet. Configure all interfaces for OSPF area 0. Configure Host A and Host B with IP addresses and default gateways as indicated in the diagram. Initially configure the serial links for equal-cost share. i.e., do not configure the serial link bandwidth statements at this time. **Note:** Use SanJose1 as Host A's gateway.

Use ping and `show ip route` to verify your work and test connectivity between all interfaces and hosts.

Step 2

Check the routing table on Westasman:

```
Westasman#show ip route

Gateway of last resort is not set

C    192.168.72.0/24 is directly connected, FastEthernet0/0
C    192.168.76.0/24 is directly connected, FastEthernet0/1
     192.168.64.0/30 is subnetted, 2 subnets
C      192.168.64.0 is directly connected, Serial0/0
C      192.168.64.4 is directly connected, Serial0/1
     10.0.0.0/24 is subnetted, 1 subnets
O      10.0.0.0 [110/65] via 192.168.64.1, 00:00:17, Serial0/0
          [110/65] via 192.168.64.5, 00:00:17, Serial0/1
```

1. How many routes does it have to 10.0.0.0 /24?
-

Two equal-cost routes are in the routing table.

Configure Westasman's S0/1 and SanJose2's S0/0 to accurately reflect the bandwidth of the WAN link:

```
Westasman(config)#interface serial0/1
Westasman(config-if)#bandwidth 768

Westasman(config)#interface serial0/0
Westasman(config-if)#bandwidth 1544
```

After setting the bandwidth, check the routing table on Westasman:

```
Westasman#show ip route

Gateway of last resort is not set

C    192.168.72.0/24 is directly connected, FastEthernet0/0
C    192.168.76.0/24 is directly connected, FastEthernet0/1
     192.168.64.0/30 is subnetted, 2 subnets
C      192.168.64.0 is directly connected, Serial0/0
C      192.168.64.4 is directly connected, Serial0/1
     10.0.0.0/24 is subnetted, 1 subnets
O      10.0.0.0 [110/65] via 192.168.64.1, 00:00:01, Serial0/0
```

2. How many routes are there to 10.0.0.0 /24?
 3. Which interface is OSPF using to route to 10.0.0.0 /24?
-

Westasman should have one route to the core FastEthernet network using S0/0. OSPF uses bandwidth to derive cost for each route. With unequal costs, only the preferred lower-cost route is placed in the routing table.

Step 3

Configure a route map to force Westasman to use S0/1 to route traffic from 192.168.72.0 /24 bound for 10.0.0.0 /24. Before you configure the route map, you must create an access list that will match the traffic that needs to be policy-routed. Because you want to affect traffic sourced from 192.168.72.0/24, you will create the following access list on Westasman:

```
Westasman (config)#access-list 1 permit 192.168.72.0 0.0.0.255
```

Next, create the route map, which you will call slow4u. The route map will reference access list 1, which you just created. Use the following commands:

```
Westasman(config)#route-map slow4u permit 10
Westasman(config-route-map)#match ip address 1
Westasman(config-route-map)#set interface serial 0/1
```

This policy will be applied to Westasman's FastEthernet 0/0, because this is the interface that will accept the traffic that is to be policy-routed. On FastEthernet 0/0, enter the following commands:

```
Westasman(config)#interface fastethernet 0/0
Westasman(config-if)#ip policy route-map slow4u
```

Route map slow4u is now applied to FastEthernet 0/0.

After you complete this configuration, use **show ip route** to verify that S0/0 is still the exit interface for Westasman's route to 10.0.0.0 /24.

Step 4

Verify that your policy has taken effect. First, issue the **debug ip policy** command on Westasman's console. Leave this window open.

From Host B, use a trace-route program (such as **tracert**) to trace the route to 10.0.0.1.

During the trace, you should see output from the **debug ip policy** command indicating that packets are being policy-routed:

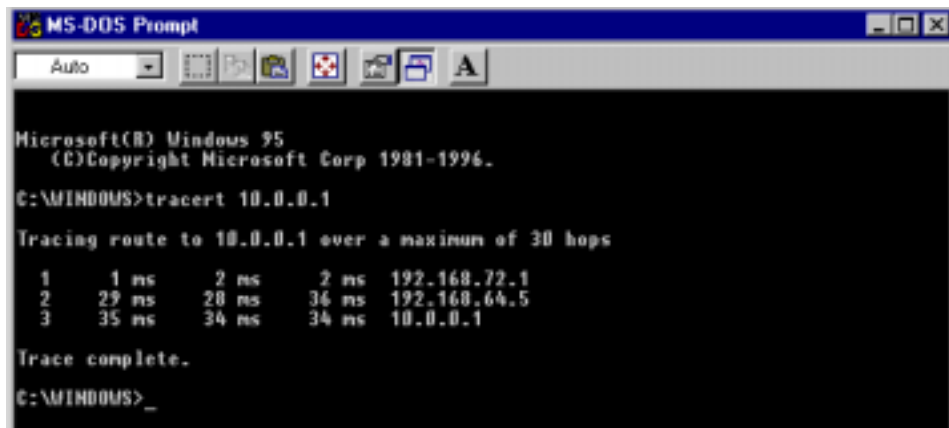
```
Westasman#debug ip policy

01:02:06: IP: s=192.168.72.2 (FastEthernet0/0), d=1.0.0.10, len
78, policy match01:02:06: IP: route map slow4u, item 10,
permit

01:02:06: IP: s=192.168.72.2 (FastEthernet0/0), d=1.0.0.10
(Serial0/1), len 78,policy routed
```

Examine the output from Host B's trace route.

1. Did this trace hop through 192.168.64.5?
-



```
MS-DOS Prompt
Auto
Microsoft(R) Windows 95
(C)Copyright Microsoft Corp 1981-1996.
C:\WINDOWS>tracert 10.0.0.1

Tracing route to 10.0.0.1 over a maximum of 30 hops

  1    1 ms    2 ms    2 ms    192.168.72.1
  2   29 ms   28 ms   34 ms   192.168.64.5
  3   35 ms   34 ms   34 ms   10.0.0.1

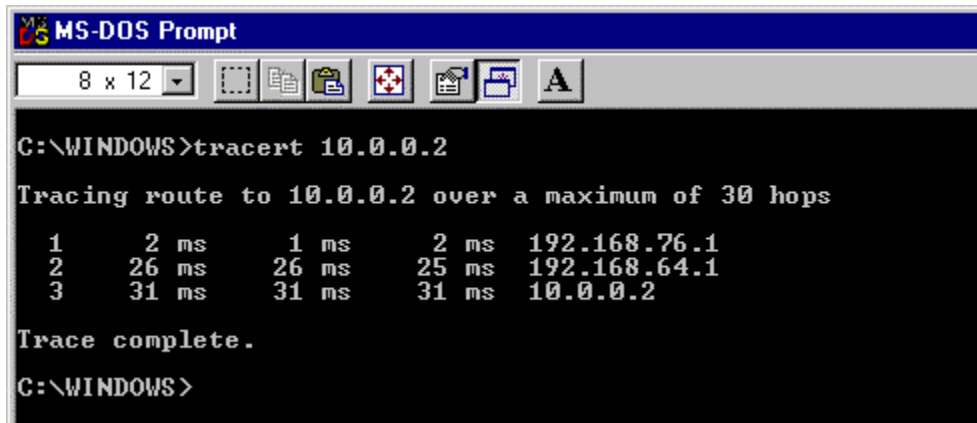
Trace complete.
C:\WINDOWS>_
```

The next hop should have been 192.168.64.5.

2. Which of Westasman's interfaces did this packet exit from?
-

The exit interface should have been S0/1.

From Host C, use a trace-route program to trace the route to 10.0.0.2 and examine the output from Host C's trace route.



```
MS-DOS Prompt
8 x 12
C:\WINDOWS>tracert 10.0.0.2

Tracing route to 10.0.0.2 over a maximum of 30 hops

  1     2 ms     1 ms     2 ms    192.168.76.1
  2    26 ms    26 ms    25 ms    192.168.64.1
  3    31 ms    31 ms    31 ms    10.0.0.2

Trace complete.
C:\WINDOWS>
```

3. Did this trace hop through 192.168.64.1?
 4. Which of Westasman's interfaces did this packet exit from?
-

Host C's ICMP packets took a different route to network 10.0.0.0/24. Host C's IP address was denied by the access list associated with the route map. It was not permitted to be policy-routed.

Finally, issue the **show route-map** command on Westasman:

```
Westasman#show route-map slow4u
route-map slow4u, permit, sequence 10
  Match clauses:
    ip address (access-lists): 1
  Set clauses:
    interface Serial0/1
  Policy routing matches: 33 packets, 4149 bytes
```

5. How many packets have been matches for policy routing?
