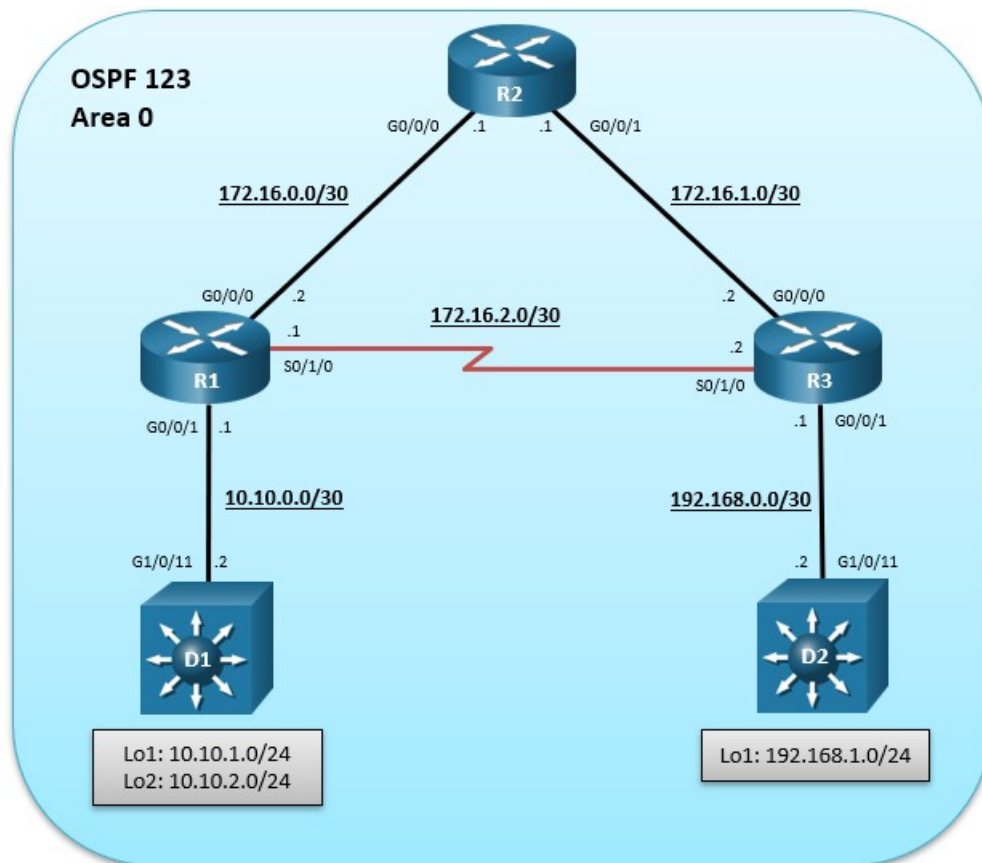


## Lab - Troubleshoot Route Maps and PBR (Instructor Version)

**Instructor Note:** Red font color or gray highlights indicate text that appears in the instructor copy only.

### Topology



### Addressing Table

Device	Interface	IPv4 Address	Subnet Mask
D1	G0/0/11	10.10.0.2	255.255.255.252
	Loopback 1	10.10.1.1	255.255.255.0
	Loopback 2	10.10.2.1	255.255.255.0
R1	G0/0/0	172.16.0.2	255.255.255.252
	G0/0/1	10.10.0.1	255.255.255.252
	S0/1/0	172.16.2.1	255.255.255.252
R2	G0/0/0	172.16.0.1	255.255.255.252
	G0/0/1	172.16.1.1	255.255.255.252

Device	Interface	IPv4 Address	Subnet Mask
R3	G0/0/0	172.16.1.2	255.255.255.252
	G0/0/1	192.168.0.1	255.255.255.252
	S0/1/0	172.16.2.2	255.255.255.252
D2	G0/0/11	192.168.0.2	255.255.255.252
	Loopback 1	192.168.1.1	255.255.255.0

## Objectives

Troubleshoot network issues related to the configuration and operation of PBR using route maps.

## Background / Scenario

PBR was recently implemented on R1 and R3. However, there have been problems.

Although the topology has a limited number of routers, you should use the appropriate troubleshooting commands to help find and solve the problems in the three trouble tickets as if this were a much more complex topology with many more routers and networks.

You will be loading configurations with intentional errors onto the network. Your tasks are to FIND the error(s), document your findings and the command(s) or method(s) used to fix them, FIX the issue(s) presented here, and then test the network to ensure both of the following conditions are met:

- 1) the complaint received in the ticket is resolved
- 2) full reachability is restored

**Note:** The routers used with CCNP hands-on labs are Cisco 4221 with Cisco IOS XE Release 16.9.4 (universalk9 image). The switches used in the labs are Cisco Catalyst 3650 with Cisco IOS XE Release 16.9.4 (universalk9 image). Other routers, switches, and Cisco IOS versions can be used. Depending on the model and Cisco IOS version, the commands available and the output produced might vary from what is shown in the labs. Refer to the Router Interface Summary Table at the end of the lab for the correct interface identifiers.

**Note:** Make sure that the devices have been erased and have no startup configurations. If you are unsure, contact your instructor.

**Instructor Note:** Refer to the Instructor Lab Manual for the procedures to initialize and reload devices.

## Required Resources

- 3 Routers (Cisco 4221 with Cisco IOS XE Release 16.9.4 universal image or comparable)
- 2 Switches (Cisco 3560 with Cisco IOS XE Release 16.9.4 universal image or comparable)
- Console cables to configure the Cisco IOS devices via the console ports
- Ethernet cables as shown in the topology

## Instructions

### Part 1: Trouble Ticket 15.1.4.1

#### Scenario:

The routing table in the OSPF area 0 topology forwards traffic between R1 and R3 via R2 because of the faster Gigabit Ethernet links between R1 and R2 and between R2 and R3. However, corporate policy states

that all traffic from the D1 loopback 2 network (i.e., 10.10.2.0/24) should be policy-based routed (PBR) directly to R3 using the R1 to R3 serial link. It was assumed that the policy was working correctly but a recent traceroute from the D1 loopback 2 interface to the D2 loopback 1 (i.e., 192.168.1.0/24) network has revealed otherwise.

```
D1# traceroute 192.168.1.1 source lo2
Type escape sequence to abort.
Tracing the route to 192.168.1.1
VRF info: (vrf in name/id, vrf out name/id)
 1 10.10.0.1 2 msec 2 msec 2 msec
 2 172.16.0.1 2 msec 2 msec 2 msec
 3 172.16.1.2 2 msec 2 msec 2 msec
 4 192.168.0.2 3 msec * 3 msec
```

Use the commands listed below to load the configuration files for this trouble ticket:

**Instructor Note:** Commands for uploading the configuration are provided at the end of this document.

Device	Command
R1	<code>copy flash:/enarsi/15.1.4.1-r1-config.txt run</code>
R2	<code>copy flash:/enarsi/15.1.4.1-r2-config.txt run</code>
R3	<code>copy flash:/enarsi/15.1.4.1-r3-config.txt run</code>
D1	<code>copy flash:/enarsi/15.1.4.1-d1-config.txt run</code>
D2	<code>copy flash:/enarsi/15.1.4.1-d2-config.txt run</code>

- Traffic from 10.10.2.0/24 going to 192.168.1.0/24 should be routed directly to R3 from R1.
- All other traffic from D1 should be propagated according to the routing table.
- When you have fixed the ticket, change the MOTD on EACH DEVICE using the following command:  
**banner motd # This is \$(hostname) FIXED from ticket <ticket number> #**
- Then save the configuration by issuing the **wri** command (on each device).
- Inform your instructor that you are ready for the next ticket.
- After the instructor approves your solution for this ticket, issue the **reset.now** privileged EXEC command This script will clear your configurations and reload the devices.

### Instructor Notes:

This trouble ticket contains one intentional error. The policy route-map was applied to the wrong interface on R1. It was incorrectly applied to the R1 G0/0/0 interface instead of the R1 G0/0/1 interface.

The commands used to fix this error should be:

```
R1(config)# interface G0/0/0
R1(config-if)# no ip policy route-map R1-to-R3
R1(config-if)# exit
R1(config)# interface G0/0/1
R1(config-if)# ip policy route-map R1-to-R3
```

After the issue is corrected, traceroutes from D1 should be as follows:

```
D1# traceroute 192.168.1.1 source 10.10.1.1
```

```
Type escape sequence to abort.
Tracing the route to 192.168.1.1
VRF info: (vrf in name/id, vrf out name/id)
  1 10.10.0.1 2 msec 2 msec 2 msec
  2 172.16.0.1 2 msec 2 msec 2 msec
  3 172.16.1.2 2 msec 2 msec 2 msec
  4 192.168.0.2 3 msec * 3 msec
```

```
D1# traceroute 192.168.1.1 source 10.10.2.1
Type escape sequence to abort.
Tracing the route to 192.168.1.1
VRF info: (vrf in name/id, vrf out name/id)
  1 10.10.0.1 2 msec 2 msec 1 msec
  2 172.16.2.2 3 msec 2 msec 2 msec
  3 192.168.0.2 3 msec * 4 msec
```

### Part 2: Trouble Ticket 15.1.4.2

#### Scenario:

The routing table in the OSPF area 0 topology forwards traffic between R1 and R3 via R2 because of the faster Gigabit Ethernet links between R1 and R2 and between R2 and R3. However, corporate policy states that all traffic from the D1 loopback 2 network (i.e., 10.10.2.0/24) should be policy-based routed (PBR) directly to R3 using the R1 to R3 serial link.

However, a traceroute from the D1 loopback 2 interface to the D2 loopback 1 (i.e., 192.168.1.0/24) network has revealed that traffic is not policy-based routed.

```
D1# traceroute 192.168.1.1 source lo2
Type escape sequence to abort.
Tracing the route to 192.168.1.1
VRF info: (vrf in name/id, vrf out name/id)
  1 10.10.0.1 2 msec 2 msec 2 msec
  2 172.16.0.1 2 msec 2 msec 2 msec
  3 172.16.1.2 2 msec 2 msec 2 msec
  4 192.168.0.2 3 msec * 3 msec
```

**Note:** This is the same issue as the previous ticket. However, the cause(s) and solution(s) are different.

Use the commands listed below to load the configuration files for this trouble ticket:

**Instructor Note:** Commands for creating these files are at the end of this document.

Device	Command
R1	<code>copy flash:/enarsi/15.1.4.2-r1-config.txt run</code>
R2	<code>copy flash:/enarsi/15.1.4.2-r2-config.txt run</code>
R3	<code>copy flash:/enarsi/15.1.4.2-r3-config.txt run</code>
D1	<code>copy flash:/enarsi/15.1.4.2-d1-config.txt run</code>
D2	<code>copy flash:/enarsi/15.1.4.2-d2-config.txt run</code>

- Traffic from 10.10.2.0/24 going to 192.168.1.0/24 should be routed directly to R3 from R1.
- All other traffic from D1 should be propagated according to the routing table.
- When you have fixed the ticket, change the MOTD on EACH DEVICE using the following command:  
**banner motd # This is \$(hostname) FIXED from ticket <ticket number> #**
- Then save the configuration by issuing the **wri** command (on each device).
- Inform your instructor that you are ready for the next ticket.
- After the instructor approves your solution for this ticket, issue the **reset.now** privileged EXEC command. This script will clear your configurations and reload the devices.

### Instructor Notes:

This trouble ticket contains one intentional error. The permit sequence which states that any traffic matching the addresses in Lo2-ACL will be policy routed to the next-hop address 172.16.2.2. However, because the **ip default next-hop** command is used, the traffic will be policy-based routed if and only if there is no specific route in the routing table.

Therefore, PBR examines the routing table, and if there is a specific route in the routing table, it is used. If there is no specific route in the routing table, the packet is routed using policy-based routing. In our scenario, R1 does have a route to the 192.168.1.0/24 network. Therefore, the packets from D1 Lo2 are not routed using policy-based routing.

The commands used to fix this error should be:

```
R1(config)# no route-map R1-to-R3 permit 10
R1(config)# route-map R1-to-R3 permit 10
R1(config-route-map)# description RM to forward Lo2 traffic to R3
R1(config-route-map)# match ip address Lo2-ACL
R1(config-route-map)# set ip next-hop 172.16.2.2
```

After the issue is corrected, traceroutes from D1 should be as follows:

```
D1# traceroute 192.168.1.1 source 10.10.1.1
Type escape sequence to abort.
Tracing the route to 192.168.1.1
VRF info: (vrf in name/id, vrf out name/id)
 1 10.10.0.1 2 msec 2 msec 2 msec
 2 172.16.0.1 2 msec 2 msec 2 msec
 3 172.16.1.2 2 msec 2 msec 2 msec
 4 192.168.0.2 3 msec * 3 msec
```

```
D1# traceroute 192.168.1.1 source 10.10.2.1
Type escape sequence to abort.
Tracing the route to 192.168.1.1
VRF info: (vrf in name/id, vrf out name/id)
 1 10.10.0.1 2 msec 2 msec 1 msec
 2 172.16.2.2 3 msec 2 msec 2 msec
 3 192.168.0.2 3 msec * 4 msec
```

### Part 3: Trouble Ticket 15.1.4.3

#### Scenario:

In this scenario, a local PBR policy was implemented on R3 to route traffic generated for the 10.10.0.0/16 directly to R1. However, a traceroute to 10.10.1.1 displays that it is being forwarded to R2 instead of R1.

```
R3# traceroute 10.10.1.1
Type escape sequence to abort.
Tracing the route to 10.10.1.1
VRF info: (vrf in name/id, vrf out name/id)
 1 172.16.1.1 2 msec 1 msec 1 msec
 2 172.16.0.2 2 msec 1 msec 1 msec
 3 10.10.0.2 4 msec * 2 msec
```

Use the commands listed below to load the configuration files for this trouble ticket:

**Instructor Note:** Commands for creating these files are at the end of this document.

Device	Command
R1	<code>copy flash:/enarsi/15.1.4.3-r1-config.txt run</code>
R2	<code>copy flash:/enarsi/15.1.4.3-r2-config.txt run</code>
R3	<code>copy flash:/enarsi/15.1.4.3-r3-config.txt run</code>
D1	<code>copy flash:/enarsi/15.1.4.3-d1-config.txt run</code>
D2	<code>copy flash:/enarsi/15.1.4.3-d2-config.txt run</code>

- Traffic generated by R3 going to the 10.10.0.0/16 networks should be sent directly to R1 as identified in the local PBR.
- When you have fixed the ticket, change the MOTD on EACH DEVICE using the following command:  
**banner motd # This is \$(hostname) FIXED from ticket <ticket number> #**
- Then save the configuration by issuing the **wri** command (on each device).
- Inform your instructor that you are ready for the next ticket.
- After the instructor approves your solution for this ticket, issue the **reset.now** privileged EXEC command. This script will clear your configurations and reload the devices.

#### Instructor Notes:

This trouble ticket contains 1 error. On R3, the route map was accidentally configured to deny traffic.

The commands used to fix these errors should be:

```
R3(config)# no route-map LOCAL-PBR deny 10
R3(config)# route-map LOCAL-PBR permit 10
R3(config-route-map)# match ip address R3-TRAFFIC
R3(config-route-map)# set ip next-hop 172.16.2.1
```

Once corrected, traceroutes from R3 to the 10.10.0.0/16 networks should be as follows:

```
R3# traceroute 10.10.1.1
Type escape sequence to abort.
Tracing the route to 10.10.1.1
```

```
VRF info: (vrf in name/id, vrf out name/id)
1 172.16.2.1 2 msec 2 msec 1 msec
2 10.10.0.2 3 msec * 2 msec
```

### Router Interface Summary Table

Router Model	Ethernet Interface #1	Ethernet Interface #2	Serial Interface #1	Serial Interface #2
1800	Fast Ethernet 0/0 (F0/0)	Fast Ethernet 0/1 (F0/1)	Serial 0/0/0 (S0/0/0)	Serial 0/0/1 (S0/0/1)
1900	Gigabit Ethernet 0/0 (G0/0)	Gigabit Ethernet 0/1 (G0/1)	Serial 0/0/0 (S0/0/0)	Serial 0/0/1 (S0/0/1)
2801	Fast Ethernet 0/0 (F0/0)	Fast Ethernet 0/1 (F0/1)	Serial 0/1/0 (S0/1/0)	Serial 0/1/1 (S0/1/1)
2811	Fast Ethernet 0/0 (F0/0)	Fast Ethernet 0/1 (F0/1)	Serial 0/0/0 (S0/0/0)	Serial 0/0/1 (S0/0/1)
2900	Gigabit Ethernet 0/0 (G0/0)	Gigabit Ethernet 0/1 (G0/1)	Serial 0/0/0 (S0/0/0)	Serial 0/0/1 (S0/0/1)
4221	Gigabit Ethernet 0/0/0 (G0/0/0)	Gigabit Ethernet 0/0/1 (G0/0/1)	Serial 0/1/0 (S0/1/0)	Serial 0/1/1 (S0/1/1)
4300	Gigabit Ethernet 0/0/0 (G0/0/0)	Gigabit Ethernet 0/0/1 (G0/0/1)	Serial 0/1/0 (S0/1/0)	Serial 0/1/1 (S0/1/1)

**Note:** To find out how the router is configured, look at the interfaces to identify the type of router and how many interfaces the router has. There is no way to effectively list all the combinations of configurations for each router class. This table includes identifiers for the possible combinations of Ethernet and Serial interfaces in the device. The table 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 Cisco IOS commands to represent the interface.

### Uploading Configuration Files

Use the commands below to create the configuration files for each trouble ticket in this lab on the lab devices. The TCL script commands help create and copy the configurations. However, the configuration commands could also be copied and pasted directly into global config mode on each device. Simply remove the TCL script commands, enter the **enable** and **configure t** commands on the device, and copy and paste the configuration commands.

**Important:** The device requires a folder in flash named **enarsi**. Use the **dir** command to verify. If the folder is missing, then create it using the **mkdir flash:/enarsi** privileged EXEC command. For all switches, make sure the **vlan.dat** file is set to the default. Use the **delete vlan.dat** privileged EXEC command, if necessary.

#### Reset scripts

These TCL scripts will completely clear and reload the device in preparation for the next ticket. Copy and paste the appropriate script to the appropriate device.

#### Router Reset Script

```
tclsh
puts [ open "flash:/enarsi/reset.tcl" w+ ] {
typeahead "\n"
copy running-config startup-config
```

```
typeahead "\n"
erase startup-config
puts "Reloading the router"
typeahead "\n"
reload
}
tclquit
```

**D1/D2 (Cisco 3650) Reset Script** - The default 3650 SDM template supports IPv6 by default, so it is not set by this script.

```
tclsh
puts [ open "flash:/enarsi/reset.tcl" w+ ] {
typeahead "\n"
copy running-config startup-config
typeahead "\n"
erase startup-config
delete /force vlan.dat
puts "Reloading the switch"
typeahead "\n"
reload
}
tclquit
```

**A1 (Cisco 2960 Script)** - The default 2960 SDM template does not support IPv6, so this script includes that setting.

```
tclsh
puts [ open "flash:reset.tcl" w+ ] {
typeahead "\n"
copy running-config startup-config
typeahead "\n"
erase startup-config
delete /force vlan.dat
delete /force multiple-fs
ios_config "sdm prefer lanbase-routing"
typeahead "\n"
puts "Reloading the switch in 1 minute, type reload cancel to halt"
typeahead "\n"
reload
}
tclquit
```

## R1 Configuration File Scripts

### !R1 - Trouble Ticket # 1

```
tclsh
puts [ open "flash:/enarsi/15.1.4.1-r1-config.txt" w+ ] {
hostname R1
```



```
no ip domain lookup
line con 0
  logging sync
  exec-time 0 0
exit
banner motd # This is R1, Troubleshoot Route Maps and PBR #
interface G0/0/0
  description Connection to R2
  ip add 172.16.0.2 255.255.255.252
  no shut
  exit
interface S0/1/0
  description Serial Connection to R3
  ip add 172.16.2.1 255.255.255.252
  no shut
  exit
interface G0/0/1
  description Connection to D1
  ip add 10.10.0.1 255.255.255.252
  no shut
  exit
router ospf 123
  router-id 1.1.1.1
  auto-cost reference-bandwidth 1000
  network 10.10.0.0 0.0.0.3 area 0
  network 172.16.0.0 0.0.0.3 area 0
  network 172.16.2.0 0.0.0.3 area 0
ip access-list standard Lo2-ACL
remark ACL matches D1 Lo2 traffic
permit 10.10.2.0 0.0.0.255
route-map R1-to-R3 permit
description RM to forward Lo2 traffic to R3
match ip address Lo2-ACL
set ip next-hop 172.16.2.2
exit
interface g0/0/0
ip policy route-map R1-to-R3
alias exec reset.now tclsh flash:/enarsi/reset.tcl
end
clear ip ospf process
yes
}
tclquit
```

### !R1 - Trouble Ticket # 2-

```
tclsh
```

```
puts [ open "flash:/enarsi/15.1.4.2-r1-config.txt" w+ ] {
hostname R1
no ip domain lookup
line con 0
  logging sync
  exec-time 0 0
  exit
banner motd # This is R1, Troubleshoot Route Maps and PBR #
interface G0/0/0
  description Connection to R2
  ip add 172.16.0.2 255.255.255.252
  no shut
  exit
interface S0/1/0
  description Serial Connection to R3
  ip add 172.16.2.1 255.255.255.252
  no shut
  exit
interface G0/0/1
  description Connection to D1
  ip add 10.10.0.1 255.255.255.252
  no shut
  exit
router ospf 123
  router-id 1.1.1.1
  auto-cost reference-bandwidth 1000
  network 10.10.0.0 0.0.0.3 area 0
  network 172.16.0.0 0.0.0.3 area 0
  network 172.16.2.0 0.0.0.3 area 0
ip access-list standard Lo2-ACL
remark ACL matches D1 Lo2 traffic
permit 10.10.2.0 0.0.0.255
route-map R1-to-R3 permit
description RM to forward Lo2 traffic to R3
match ip address Lo2-ACL
set ip default next-hop 172.16.2.2
exit
interface g0/0/1
ip policy route-map R1-to-R3
alias exec reset.now tclsh flash:/enarsi/reset.tcl
end
clear ip ospf process
yes
}
tclquit
```

### !R1 - Trouble Ticket # 3

```
tclsh
puts [ open "flash:/enarsi/15.1.4.3-r1-config.txt" w+ ] {
hostname R1
no ip domain lookup
line con 0
  logging sync
  exec-time 0 0
  exit
banner motd # This is R1, Troubleshoot Route Maps and PBR #
interface G0/0/0
  description Connection to R2
  ip add 172.16.0.2 255.255.255.252
  no shut
  exit
interface S0/1/0
  description Serial Connection to R3
  ip add 172.16.2.1 255.255.255.252
  no shut
  exit
interface G0/0/1
  description Connection to D1
  ip add 10.10.0.1 255.255.255.252
  no shut
  exit
router ospf 123
  router-id 1.1.1.1
  auto-cost reference-bandwidth 1000
  network 10.10.0.0 0.0.0.3 area 0
  network 172.16.0.0 0.0.0.3 area 0
  network 172.16.2.0 0.0.0.3 area 0
ip access-list standard Lo2-ACL
remark ACL matches D1 Lo2 traffic
permit 10.10.2.0 0.0.0.255
route-map R1-to-R3 permit
description RM to forward Lo2 traffic to R3
match ip address Lo2-ACL
set ip next-hop 172.16.2.2
exit
interface g0/0/1
ip policy route-map R1-to-R3
alias exec reset.now tclsh flash:/enarsi/reset.tcl
end
clear ip ospf process
yes
```

```
}  
tclquit
```

### R2 Configuration File Scripts

#### !R2 - Trouble Ticket # 1

```
tclsh  
puts [ open "flash:/enarsi/15.1.4.1-r2-config.txt" w+ ] {  
hostname R2  
no ip domain lookup  
line con 0  
  logging sync  
  exec-time 0 0  
exit  
banner motd # This is R2, Troubleshoot Route Maps and PBR #  
interface G0/0/0  
  description Connection to R1  
  ip add 172.16.0.1 255.255.255.252  
  no shut  
exit  
interface GigabitEthernet0/0/1  
  description Connection to R3  
  ip address 172.16.1.1 255.255.255.252  
  no shut  
exit  
router ospf 123  
  router-id 2.2.2.1  
  auto-cost reference-bandwidth 1000  
  network 172.16.0.0 0.0.0.3 area 0  
  network 172.16.1.0 0.0.0.3 area 0  
exit  
alias exec reset.now tclsh flash:/enarsi/reset.tcl  
end  
clear ip ospf process  
yes  
}  
tclquit
```

#### !R2 - Trouble Ticket # 2

```
tclsh  
puts [ open "flash:/enarsi/15.1.4.2-r2-config.txt" w+ ] {  
hostname R2  
no ip domain lookup  
line con 0  
  logging sync  
  exec-time 0 0
```

```
exit
banner motd # This is R2, Troubleshoot Route Maps and PBR #
interface G0/0/0
  description Connection to R1
  ip add 172.16.0.1 255.255.255.252
  no shut
exit
interface GigabitEthernet0/0/1
  description Connection to R3
  ip address 172.16.1.1 255.255.255.252
  no shut
exit
router ospf 123
  router-id 2.2.2.1
  auto-cost reference-bandwidth 1000
  network 172.16.0.0 0.0.0.3 area 0
  network 172.16.1.0 0.0.0.3 area 0
exit
alias exec reset.now tclsh flash:/enarsi/reset.tcl
end
clear ip ospf process
yes
}
tclquit
```

### !R2 - Trouble Ticket # 3

```
tclsh
puts [ open "flash:/enarsi/15.1.4.3-r2-config.txt" w+ ] {
hostname R2
no ip domain lookup
line con 0
  logging sync
  exec-time 0 0
exit
banner motd # This is R2, Troubleshoot Route Maps and PBR #
interface G0/0/0
  description Connection to R1
  ip add 172.16.0.1 255.255.255.252
  no shut
exit
interface GigabitEthernet0/0/1
  description Connection to R3
  ip address 172.16.1.1 255.255.255.252
  no shut
exit
router ospf 123
```

```
router-id 2.2.2.1
auto-cost reference-bandwidth 1000
network 172.16.0.0 0.0.0.3 area 0
network 172.16.1.0 0.0.0.3 area 0
exit
alias exec reset.now tclsh flash:/enarsi/reset.tcl
end
clear ip ospf process
yes
}
tclquit
```

### R3 Configuration File Scripts

#### !R3 - Trouble Ticket # 1

```
tclsh
puts [ open "flash:/enarsi/15.1.4.1-r3-config.txt" w+ ] {
hostname R3
no ip domain lookup
line con 0
  logging sync
  exec-time 0 0
exit
banner motd # This is R3, Troubleshoot Route Maps and PBR #
interface G0/0/0
  description Connection to R2
  ip add 172.16.1.2 255.255.255.252
  no shut
  exit
interface S0/1/0
  description Serial Connection to R1
  ip add 172.16.2.2 255.255.255.252
  no shut
  exit
interface G0/0/1
  description Connection to D2
  ip add 192.168.0.1 255.255.255.252
  no shut
  exit
router ospf 123
  router-id 3.3.3.1
  auto-cost reference-bandwidth 1000
  network 192.168.0.0 0.0.0.3 area 0
  network 172.16.1.0 0.0.0.3 area 0
  network 172.16.2.0 0.0.0.3 area 0
exit
```

```
alias exec reset.now tclsh flash:/enarsi/reset.tcl
end
clear ip ospf process
yes
}
tclquit
```

### !R3 - Trouble Ticket # 2

```
tclsh
puts [ open "flash:/enarsi/15.1.4.2-r3-config.txt" w+ ] {
hostname R3
no ip domain lookup
line con 0
  logging sync
  exec-time 0 0
  exit
banner motd # This is R3, Troubleshoot Route Maps and PBR #
interface G0/0/0
  description Connection to R2
  ip add 172.16.1.2 255.255.255.252
  no shut
  exit
interface S0/1/0
  description Serial Connection to R1
  ip add 172.16.2.2 255.255.255.252
  no shut
  exit
interface G0/0/1
  description Connection to D2
  ip add 192.168.0.1 255.255.255.252
  no shut
  exit
router ospf 123
  router-id 3.3.3.1
  auto-cost reference-bandwidth 1000
  network 192.168.0.0 0.0.0.3 area 0
  network 172.16.1.0 0.0.0.3 area 0
  network 172.16.2.0 0.0.0.3 area 0
  exit
alias exec reset.now tclsh flash:/enarsi/reset.tcl
end
clear ip ospf process
yes
}
tclquit
```

### !R3 - Trouble Ticket # 3

```
tclsh
puts [ open "flash:/enarsi/15.1.4.3-r3-config.txt" w+ ] {
hostname R3
no ip domain lookup
line con 0
  logging sync
  exec-time 0 0
  exit
banner motd # This is R3, Troubleshoot Route Maps and PBR #
interface G0/0/0
  description Connection to R2
  ip add 172.16.1.2 255.255.255.252
  no shut
  exit
interface S0/1/0
  description Serial Connection to R1
  ip add 172.16.2.2 255.255.255.252
  no shut
  exit
interface G0/0/1
  description Connection to D2
  ip add 192.168.0.1 255.255.255.252
  no shut
  exit
router ospf 123
  router-id 3.3.3.1
  auto-cost reference-bandwidth 1000
  network 192.168.0.0 0.0.0.3 area 0
  network 172.16.1.0 0.0.0.3 area 0
  network 172.16.2.0 0.0.0.3 area 0
  exit
ip access-list extended R3-TRAFFIC
permit ip any 10.10.0.0 0.0.255.255
exit
route-map LOCAL-PBR deny
match ip address R3-TRAFFIC
set ip next-hop 172.16.2.1
exit
ip local policy route-map LOCAL-PBR
exit
alias exec reset.now tclsh flash:/enarsi/reset.tcl
end
clear ip ospf process
yes
```



```
}  
tclquit
```

### D1 Configuration File Scripts

#### !D1 - Trouble Ticket # 1

```
tclsh  
puts [ open "flash:/enarsi/15.1.4.1-d1-config.txt" w+ ] {  
hostname D1  
no ip domain lookup  
line con 0  
exec-timeout 0 0  
logging synchronous  
exit  
banner motd # This is D1, Troubleshoot Route Maps and PBR #  
interface G1/0/11  
no switchport  
description Connects to R1  
ip address 10.10.0.2 255.255.255.252  
no shut  
exit  
interface Loopback 1  
description Interface simulates network  
ip ospf network point-to-point  
ip address 10.10.1.1 255.255.255.0  
exit  
interface Loopback 2  
description Interface simulates network  
ip ospf network point-to-point  
ip address 10.10.2.1 255.255.255.0  
exit  
int range G1/0/1 - 10, G1/0/12 - 24  
shut  
exit  
ip routing  
router ospf 123  
router-id 1.1.1.2  
auto-cost reference-bandwidth 1000  
network 10.10.0.0 0.0.0.3 area 0  
network 10.10.1.0 0.0.0.255 area 0  
network 10.10.2.0 0.0.0.255 area 0  
exit  
alias exec reset.now tclsh flash:/enarsi/reset.tcl  
end  
clear ip ospf process  
yes
```

```
}  
tclquit
```

### !D1 - Trouble Ticket # 2

```
tclsh  
puts [ open "flash:/enarsi/15.1.4.2-d1-config.txt" w+ ] {  
hostname D1  
no ip domain lookup  
line con 0  
exec-timeout 0 0  
logging synchronous  
exit  
banner motd # This is D1, Troubleshoot Route Maps and PBR #  
interface G1/0/11  
no switchport  
description Connects to R1  
ip address 10.10.0.2 255.255.255.252  
no shut  
exit  
interface Loopback 1  
description Interface simulates network  
ip ospf network point-to-point  
ip address 10.10.1.1 255.255.255.0  
exit  
interface Loopback 2  
description Interface simulates network  
ip ospf network point-to-point  
ip address 10.10.2.1 255.255.255.0  
exit  
int range G1/0/1 - 10, G1/0/12 - 24  
shut  
exit  
ip routing  
router ospf 123  
router-id 1.1.1.2  
auto-cost reference-bandwidth 1000  
network 10.10.0.0 0.0.0.3 area 0  
network 10.10.1.0 0.0.0.255 area 0  
network 10.10.2.0 0.0.0.255 area 0  
exit  
alias exec reset.now tclsh flash:/enarsi/reset.tcl  
end  
clear ip ospf process  
yes  
}  
tclquit
```

### !D1 - Trouble Ticket # 3

```
tclsh
puts [ open "flash:/enarsi/15.1.4.3-d1-config.txt" w+ ] {
hostname D1
no ip domain lookup
line con 0
exec-timeout 0 0
logging synchronous
exit
banner motd # This is D1, Troubleshoot Route Maps and PBR #
interface G1/0/11
  no switchport
  description Connects to R1
  ip address 10.10.0.2 255.255.255.252
  no shut
  exit
interface Loopback 1
  description Interface simulates network
  ip ospf network point-to-point
  ip address 10.10.1.1 255.255.255.0
  exit
interface Loopback 2
  description Interface simulates network
  ip ospf network point-to-point
  ip address 10.10.2.1 255.255.255.0
  exit
int range G1/0/1 - 10, G1/0/12 - 24
  shut
exit
ip routing
router ospf 123
  router-id 1.1.1.2
  auto-cost reference-bandwidth 1000
  network 10.10.0.0 0.0.0.3 area 0
  network 10.10.1.0 0.0.0.255 area 0
  network 10.10.2.0 0.0.0.255 area 0
exit
alias exec reset.now tclsh flash:/enarsi/reset.tcl
end
clear ip ospf process
yes
}
tclquit
```

### D2 Configuration File Scripts

#### !D2 - Trouble Ticket # 1

```
tclsh
puts [ open "flash:/enarsi/15.1.4.1-d2-config.txt" w+ ] {
hostname D2
no ip domain lookup
line con 0
logging sync
exec-time 0 0
exit
banner motd # This is D2, Troubleshoot Route Maps and PBR #
interface G1/0/11
  no switchport
  description Connects to R3
  ip address 192.168.0.2 255.255.255.252
  no shut
  exit
interface Loopback 1
  description Interface simulates network
  ip ospf network point-to-point
  ip address 192.168.1.1 255.255.255.0
  exit
int range G1/0/1 - 10, G1/0/12 - 24
  shut
exit
ip routing
router ospf 123
  router-id 3.3.3.2
  auto-cost reference-bandwidth 1000
  network 192.168.0.0 0.0.0.3 area 0
  network 192.168.1.0 0.0.0.255 area 0
exit
alias exec reset.now tclsh flash:/enarsi/reset.tcl
end
clear ip ospf process
yes
}
tclquit
```

#### !D2 - Trouble Ticket # 2

```
tclsh
puts [ open "flash:/enarsi/15.1.4.2-d2-config.txt" w+ ] {
hostname D2
no ip domain lookup
```

```
line con 0
logging sync
exec-time 0 0
exit
banner motd # This is D2, Troubleshoot Route Maps and PBR #
interface G1/0/11
  no switchport
  description Connects to R3
  ip address 192.168.0.2 255.255.255.252
  no shut
  exit
interface Loopback 1
  description Interface simulates network
  ip ospf network point-to-point
  ip address 192.168.1.1 255.255.255.0
  exit
int range G1/0/1 - 10, G1/0/12 - 24
  shut
exit
ip routing
router ospf 123
  router-id 3.3.3.2
  auto-cost reference-bandwidth 1000
  network 192.168.0.0 0.0.0.3 area 0
  network 192.168.1.0 0.0.0.255 area 0
exit
alias exec reset.now tclsh flash:/enarsi/reset.tcl
end
clear ip ospf process
yes
}
tclquit
```

### !D2 - Trouble Ticket # 3

```
tclsh
puts [ open "flash:/enarsi/15.1.4.3-d2-config.txt" w+ ] {
hostname D2
no ip domain lookup
line con 0
logging sync
exec-time 0 0
exit
banner motd # This is D2, Troubleshoot Route Maps and PBR #
interface G1/0/11
  no switchport
  description Connects to R3
```

```
ip address 192.168.0.2 255.255.255.252
no shut
exit
interface Loopback 1
description Interface simulates network
ip ospf network point-to-point
ip address 192.168.1.1 255.255.255.0
exit
int range G1/0/1 - 10, G1/0/12 - 24
shut
exit
ip routing
router ospf 123
router-id 3.3.3.2
auto-cost reference-bandwidth 1000
network 192.168.0.0 0.0.0.3 area 0
network 192.168.1.0 0.0.0.255 area 0
exit
alias exec reset.now tclsh flash:/enarsi/reset.tcl
end
clear ip ospf process
yes
}
tclquit
```

### A1 Configuration File Scripts - Not Used In This Lab