Lab 2-4: Configuring Layer 3 Switching

Complete this lab activity to practice what you learned in the related module.

Activity Objective

In this activity, you will log into your VDC and configure the required Layer 3 switching features between your VDC and your peer VDC in the second Cisco Nexus 7000 Switch. You will connect to your remote lab to complete your task. After completing this activity, you will be able to meet these objectives:

- Configure VRF instances with static routing and verify the configuration
- Configure VRF instances with OSPFv2 and verify the configuration
- Configure VRF instances with EIGRP and verify the configuration
- Configure BGP and verify the configuration

Command List

The table describes the commands that are used in this activity.

Command	Description
feature interface-vlan	This command enables VLAN interface mode
ip router rip instance-tag	This command associates this interface with a RIP instance.
show ip route	This command displays all routes.
show vrf	This command displays the information for all VRFs.
show vrf [vrf-name] interface	This command displays the VRF status for an interface.
vrf context vrf-name	This command creates a new VRF and enters VRF configuration mode.
vrf member vrf-name	This command adds this interface to a VRF.
ip route {ip-prefix | ip-addr ip-mask} next-hop	This command configures a static route and the interface for this static route.
feature ospf	This command enables the OSPFv2 feature.
router ospf instance-tag	This command creates a new OSPFv2 instance with the configured instance tag.
ip router ospf instance-tag area area-id	This command adds the interface to the OSPFv2 instance and area.
show ip ospf	This command displays the OSPFv2 configuration.
show ip ospf neighbors vrf vrf-name	This command displays the list of OSPFv2 neighbors.
show ip ospf database vrf vrf-name	This command displays the OSPFv2 link-state database summary.
feature eigrp	This command enables the EIGRP feature.
router eigrp instance-tag	This command creates a new EIGRP process with the configured instance tag.
ip router eigrp instance-tag	This command associates this interface with the configured EIGRP process.
show ip eigrp instance-tag	This command displays a summary of the configured EIGRP processes.
show ip eigrp instance-tag neighbors	This command displays information about all the EIGRP neighbors.

Command	Description
show license usage	This command displays license usage information.
show license usage LAN_ENTERPRISE_SERVICES_PKG	This command displays a list of licensed features that are in use for the Enterprise Services

Task 0: Lab Preparation

In this task, you will perform the steps necessary to get ready for performing the Tasks in this lab.

Activity Procedure

Complete these steps:

Step 1 Before you can perform this lab you will need a Student Server and a Pod Number assigned to you. Your instructor should provide to you the following information:

- Student Server Name or IP Address
- Student Server Username
- Student Server Password
- Pod Number
- Peer Pod Number

Step 2 From your personal/work computer use the Remote Desktop Connection (RDC) application to log in to your assigned Student Server. Refer to *Accessing the NterOne Lab Equipment* for detailed instructions regarding how to use RDC to connect to your Student Server.

Step 3 From your Student Server desktop use the PuTTY application to open SSH sessions to each of the devices in the following table.

Device Name	Device Description	IP Address	Username	Password
vdcP*	Your Pod Nexus 7004 VDC	10.0.0.8P*	admin	Nterone179

*Note	Replace “P” with your Pod Number for this lab

Step 4 Perform a configuration rollback on your Pod VDC to the checkpoint named “baseline”. Use the “best-effort” option.

```
vdcP# rollback running-config checkpoint baseline best-effort
Collecting Running-Config
#Generating Rollback Patch
Executing Rollback Patch

Rollback completed successfully.
```

Step 5 If any VLANs other than VLAN 1 are still on your Pod VDC, delete them.

Activity Verification

You have completed this activity when you have achieved these goals:

- You have made a successful connection to your Student Server.
- You have successfully used PuTTY to connect to the devices in the table above.
- You rolled back the running configuration to the state at checkpoint “baseline” on your Pod VDC.

Task 1: Configuring VRF with Static Routing

During this exercise, you will configure VRF instances with static routing and verify the configuration. While your workgroup is responsible for one Cisco Nexus 7000 VDC, your peer workgroup will configure the other VDC on the other Cisco Nexus 7000 Switch, so some coordination is required.

Activity Procedure

Complete these steps:

Step 6 Show the VRFs that exist within your VDC pod by default.

```
vdcP# show vrf
VRF-Name                           VRF-ID State   Reason
default                                 1 Up      --
management                              2 Up      --
```

Step 7 Show the details of those VRFs.

```
vdcP# show vrf detail
VRF-Name: default, VRF-ID: 1, State: Up
    VPNID: unknown
    RD: 0:0
    Max Routes: 0  Mid-Threshold: 0
    Table-ID: 0x80000003, AF: IPv6, Fwd-ID: 0x80000003, State: Up
    Table-ID: 0x00000003, AF: IPv4, Fwd-ID: 0x00000003, State: Up

VRF-Name: management, VRF-ID: 2, State: Up
    VPNID: unknown
    RD: 0:0
    Max Routes: 0  Mid-Threshold: 0
    Table-ID: 0x80000004, AF: IPv6, Fwd-ID: 0x80000004, State: Up
    Table-ID: 0x00000004, AF: IPv4, Fwd-ID: 0x00000004, State: Up
```

Step 8 Verify interfaces in the VRFs within your VDC.

```
vdcP# show vrf interface
Interface        VRF-Name                        VRF-ID  Site-of-Origin
Ethernet4/A      default                              1  --
Ethernet4/B      default                              1  --
Ethernet4/C      default                              1  --
Ethernet4/D      default                              1  --
mgmt0            management                           2  --
```

Step 9 Create a new VRF instance named “STATICvrf”.

```
vdcP# config
Enter configuration commands, one per line.  End with CNTL/Z.
vdcP(config)# vrf context STATICvrf
```

Step 10 Enable the creation of SVI interfaces.

```
vdcP(config)# feature interface-vlan
```

Step 11 Create VLAN 11.

```
vdcP(config)# vlan 11
```

Step 12 Try to place interface VLAN 11 in the VRF instance management.

```
vdcP(config-vlan)# interface vlan 11
vdcP(config-if)# vrf member management
% VRF management is reserved only for mgmt0
```

Step 13 Place interface VLAN 11 into STATICvrf and assign the IP address 172.16.11.7P/24 (where P is your Pod number) and enable the interface.

```
vdcP(config-if)# vrf member STATICvrf
% Deleted all L3 config on interface Vlan11
vdcP(config-if)# ip address 172.16.11.7P/24
vdcP(config-if)# no shutdown
```

Step 14 Confirm the status of the VLAN interface.

```
vdcP(config-if)# show interface vlan 11
Vlan11 is down (VLAN is down), line protocol is down
  Hardware is EtherSVI, address is  8478.ac57.9644
  Internet Address is 172.16.11.7P/24
  MTU 1500 bytes, BW 1000000 Kbit, DLY 10 usec,
   reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation ARPA, loopback not set
  Keepalive not supported
  ARP type: ARPA
  Last clearing of "show interface" counters never
```

Q1) Why is interface VLAN 11 in the down state?

Step 15 Create a loopback interface Loopback 11 using IP address 192.168.11.7P/32 in VRF STATICvrf.

```
vdcP(config)# interface loopback 11
vdcP(config-if)# vrf member STATICvrf
% Deleted all L3 config on interface loopback11
vdcP(config-if)# ip address 192.168.11.7P/32
```

Step 16 Verify interfaces in the VRFs within your VDC.

```
vdcP# show vrf interface
Interface        VRF-Name                        VRF-ID  Site-of-Origin
Vlan11           STATICvrf                            3  --
loopback11       STATICvrf                            3  --
Vlan1            default                              1  --
Ethernet4/A      default                              1  --
Ethernet4/B      default                              1  --
Ethernet4/C      default                              1  --
Ethernet4/D      default                              1  --
mgmt0            management                           2  --
```

Step 17 Create a static route pointing to your Peer Pod's VDC loopback using your peer's VDC VLAN 11 interface as the next hop (Q is your Peer Pod number).

```
vdcP(config)# vrf context STATICvrf
vdcP(config-vrf)# ip route 192.168.11.7Q/32 172.16.11.7Q
```

Step 18 Check the routing table for VRF STATICvrf (Q is your Peer Pod number).

```
vdcP#(config-vrf)# show ip route static vrf STATICvrf
IP Route Table for VRF "STATICvrf"
```

```
'*' denotes best ucast next-hop
'**' denotes best mcast next-hop
'[x/y]' denotes [preference/metric]
'%<string>' in via output denotes VRF <string>
```

Q2) Why is the static routing table empty?

Step 19 View the state of your interfaces.

```
vdcP(config-vrf)# show interface brief

--------------------------------------------------------------------------------
Port   VRF          Status IP Address                              Speed    MTU
--------------------------------------------------------------------------------
mgmt0  --           up     10.0.0.8P                               1000     1500

--------------------------------------------------------------------------------
Ethernet      VLAN    Type Mode   Status  Reason                   Speed     Port
Interface                                                                    Ch #
--------------------------------------------------------------------------------
Eth4/A        --      eth  routed up      none                       10G(D) --
Eth4/B        --      eth  routed up      none                       10G(D) --
Eth4/C        --      eth  routed up      none                      1000(D) --
Eth4/D        --      eth  routed up      none                      1000(D) --

--------------------------------------------------------------------------------
Interface     Status     Description
--------------------------------------------------------------------------------
Lo11          up         --

--------------------------------------------------------------------------------
Interface Secondary VLAN(Type)                    Status Reason
--------------------------------------------------------------------------------
Vlan1     --                                      down   Administratively down
Vlan11    --                                      down   VLAN is down
```

Step 20 Create a 802.1Q trunk to your Peer Pod on interface Ethernet 4/D.

```
vdcP(config)# interface ethernet 4/D
vdcP(config-if)# switchport
vdcP(config-if)# switchport mode trunk
vdcP(config-if)# end
```

Step 21 Verify that interface VLAN 11 is in an up state.

```
vdcP# show interface vlan 11 brief

--------------------------------------------------------------------------------
Interface Secondary VLAN(Type)                    Status Reason
--------------------------------------------------------------------------------
Vlan11    --                                      up     --
```

Step 22 Check the routing table for VRF STATICvrf (Q is your Peer Pod number).

```
vdcP#(config-vrf)# show ip route static vrf STATICvrf
IP Route Table for VRF "STATICvrf"
'*' denotes best ucast next-hop
'**' denotes best mcast next-hop
'[x/y]' denotes [preference/metric]
```

```
'%<string>' in via output denotes VRF <string>

192.168.11.7Q/32, ubest/mbest: 1/0
    *via 172.16.11.7Q, [1/0], 00:02:25, static
```

STOP! **Wait until your Peer Pod has completed all steps up to this point before proceeding.**

Step 23 Ping your peer's VDC loopback 11 interface (Q is your Peer Pod number).

```
vdcP# ping 172.16.11.7Q
ping 172.16.11.7Q
PING 172.16.11.7Q (172.16.11.7Q): 56 data bytes
ping: sendto 172.16.11.7Q 64 chars, No route to host
Request 0 timed out
ping: sendto 172.16.11.7Q 64 chars, No route to host
Request 1 timed out
ping: sendto 172.16.11.7Q 64 chars, No route to host
Request 2 timed out
ping: sendto 172.16.11.7Q 64 chars, No route to host
Request 3 timed out
ping: sendto 172.16.11.7Q 64 chars, No route to host
Request 4 timed out
--- 172.16.11.7Q ping statistics ---
5 packets transmitted, 0 packets received, 100.00% packet loss
```

Step 24 Ping your peer's VDC loopback 11 interface inside the VRF instance (Q is your Peer Pod number).

```
vdcP# ping 172.16.11.7Q vrf STATICvrf
PING 172.16.11.7Q (172.16.11.7Q): 56 data bytes
64 bytes from 172.16.11.7Q: icmp_seq=0 ttl=255 time=0.597 ms
64 bytes from 172.16.11.7Q: icmp_seq=1 ttl=255 time=0.364 ms
64 bytes from 172.16.11.7Q: icmp_seq=2 ttl=255 time=0.4 ms
64 bytes from 172.16.11.7Q: icmp_seq=3 ttl=255 time=10.399 ms
64 bytes from 172.16.11.7Q: icmp_seq=4 ttl=255 time=0.384 ms

--- 172.16.11.7Q ping statistics ---
5 packets transmitted, 5 packets received, 0.00% packet loss
round-trip min/avg/max = 0.364/2.428/10.399 ms
```

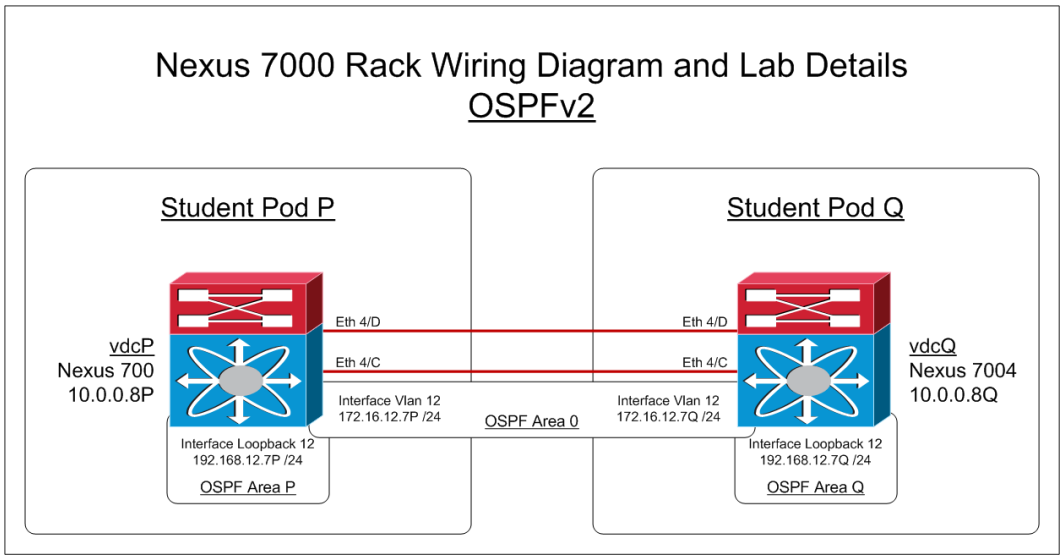
Activity Verification

You have completed this task when you attain these results:

- You have used the show commands to verify that the VRF is configured and that the static routing entries are in the correct IP routing table.

Task 2: Configuring VRFs with OSPFv2

During this exercise, you will configure VRF instances with OSPFv2 and verify the configuration.



Activity Procedure

Complete these steps:

Step 25 Create a VRF context named "OSPFvrf".

```
vdcP(config)# vrf context OSPFvrf
```

Step 26 Place interface VLAN 12 into VRF OSPFvrf and assign IP address 172.16.12.7P/24 (P is your Pod number).

```
vdcP(config-vrf)# interface vlan 12
vdcP(config-if)# vrf member OSPFvrf
% Deleted all L3 config on interface Vlan12
vdcP(config-if)# ip address 172.16.12.7P/24
vdcP(config-if)# no shutdown
vdcP(config-if)# vlan 12
```

Step 27 Create interface loopback 12, place it into VRF OSPFvrf, and assign IP address 172.16.12.7P/32 (P is your Pod number).

```
vdcP(config-if)# interface loopback 12
vdcP(config-if)# vrf member OSPFvrf
% Deleted all L3 config on interface loopback12
vdcP(config-if)# ip address 192.168.12.7P/32
vdcP(config-if)# no shutdown
```

Step 28 Enable the OSPF feature.

```
vdcP(config-if)# feature ospf
```

Step 29 Check the Cisco Nexus 7000 Switch LAN Enterprise Services license. Is it in use?

```
vdcP(config)# show license usage
Feature                      Ins  Lic   Status Expiry Date Comments
                                 Count
--------------------------------------------------------------------------------
MPLS_PKG                      No    -   Unused             -
```

```
STORAGE-ENT                    No    -   Unused            -
VDC_LICENSES                   No    0   Unused            Grace 60D 0H
ENTERPRISE_PKG                 No    -   Unused            -
FCOE-N7K-F132XP                No    0   Unused            -
FCOE-N7K-F248XP                No    0   Unused            -
ENHANCED_LAYER2_PKG            No    -   Unused            Grace 107D 11H
SCALABLE_SERVICES_PKG          No    -   Unused            -
TRANSPORT_SERVICES_PKG         No    -   Unused            Grace 116D 1H
LAN_ADVANCED_SERVICES_PKG      No    -   Unused            Grace 107D 12H
LAN_ENTERPRISE_SERVICES_PKG    No    -   In use            Grace 119D 19H
--------------------------------------------------------------------------------
```

Step 30 Check the details of the license usage.

```
vdcP(config)# show license usage LAN_ENTERPRISE_SERVICES_PKG
Application              Vdc
--------------------------------------------------------------------------------
ospf                     vdcP
--------------------------------------------------------------------------------
```

Step 31 Configure OSPF process 42 on interface VLAN 12 using OSPF area 0.

```
vdcP(config)# interface vlan 12
vdcP(config-if)# ip router ospf 42 area 0
```

Step 32 Configure OSPF process 42 on interface Loopback 12 using OSPF area P (P is your Pod number).

```
vdcP(config-if)# interface loopback 12
vdcP(config-if)# ip router ospf 42 area P
```

Step 33 Verify that the OSPF process is running.

```
vdcP(config-if)# show ip ospf
Note: OSPF process currently not running
```

Step 34 Start the OSPF process and check it again.

```
vdcP(config-if)# router ospf 42
vdcP(config-router)# show ip ospf vrf OSPFvrf
 Routing Process 42 with ID 192.168.12.7P VRF OSPFvrf
 Stateful High Availability enabled
Graceful-restart is configured
Grace period: 60 state: Inactive
Last graceful restart exit status: None
Supports only single TOS(TOS0) routes
Supports opaque LSA
This router is an area border
Administrative distance 110
Reference Bandwidth is 40000 Mbps
Initial SPF schedule delay 200.000 msecs,
minimum inter SPF delay of 1000.000 msecs,
maximum inter SPF delay of 5000.000 msecs
Initial LSA generation delay 0.000 msecs,
minimum inter LSA delay of 5000.000 msecs,
maximum inter LSA delay of 5000.000 msecs
Minimum LSA arrival 1000.000 msec
LSA group pacing timer 10 secs
Maximum paths to destination 8
Number of external LSAs 0, checksum sum 0
```

```
Number of opaque AS LSAs 0, checksum sum 0
Number of areas is 2, 2 normal, 0 stub, 0 nssa
Number of active areas is 2, 2 normal, 0 stub, 0 nssa
Area BACKBONE(0.0.0.0) (Inactive) Area has existed for 00:00:15
Interfaces in this area: 1 Active interfaces: 1
Passive interfaces: 0      Loopback interfaces: 0
No authentication available
SPF calculation has run 1 times
Last SPF ran for 0.000732s
Area ranges are
Number of LSAs: 2, checksum sum 0xa226
Area (0.0.0.P) (Inactive)
Area has existed for 00:00:15
Interfaces in this area: 1 Active interfaces: 1
Passive interfaces: 1      Loopback interfaces: 1
No authentication available
SPF calculation has run 1 times
Last SPF ran for 0.000088s
Area ranges are
Number of LSAs: 2, checksum sum 0x17750
```

STOP! **Wait until your Peer Pod has completed all steps up to this point before proceeding.**

Step 35 Check the OSPF adjacencies on VLAN 12. (Q is your Peer Pod number.)

```
vdcP# show ip ospf neighbors vrf OSPFvrf
OSPF Process ID 42 VRF OSPFvrf
 Total number of neighbors: 1
 Neighbor ID     Pri State            Up Time  Address         Interface
 192.168.12.7P     1 FULL/DR          00:00:32 172.16.12.7P    Vlan12
```

Step 36 Check the OSPF database.

```
vdcP(config-router)# show ip ospf database vrf OSPFvrf

        OSPF Router with ID (192.168.12.7P) (Process ID 42 VRF OSPFvrf)

                Router Link States (Area 0.0.0.0)

Link ID         ADV Router      Age         Seq#       Checksum Link Count
192.168.12.7P   192.168.12.7P   74          0x80000003 0xa9e4   1
192.168.12.7Q   192.168.12.7Q   75          0x80000003 0xa7e3   1

                Network Link States (Area 0.0.0.0)

Link ID         ADV Router      Age         Seq#       Checksum
172.16.12.7Q    192.168.12.7Q   75          0x80000002 0x0d03

                Summary Network Link States (Area 0.0.0.0)

Link ID         ADV Router      Age         Seq#       Checksum
192.168.12.7P   192.168.12.7P   116         0x80000002 0x6879
192.168.12.7Q   192.168.12.7Q   114         0x80000002 0x5887

                Router Link States (Area 0.0.0.1)

Link ID         ADV Router      Age         Seq#       Checksum Link Count
192.168.12.7P   192.168.12.7P   116         0x80000002 0x9287   1

                Summary Network Link States (Area 0.0.0.1)
```

```
Link ID         ADV Router      Age         Seq#       Checksum
172.16.12.0     192.168.12.7P   73          0x80000002 0xe4c9
192.168.12.7Q   192.168.12.7P   72          0x80000002 0xefc8
```

Step 37 Check the routing table and ping your peer loopback 12 IP address (Q is your Peer Pod number).

```
vdcP(config-router)# show ip route ospf-42 vrf OSPFvrf
IP Route Table for VRF "OSPFvrf"
'*' denotes best ucast next-hop
'**' denotes best mcast next-hop
'[x/y]' denotes [preference/metric]
'%<string>' in via output denotes VRF <string>

192.168.12.7Q/32, ubest/mbest: 1/0
    *via 172.16.12.7Q, Vlan12, [110/41], 00:03:46, ospf-42, inter

vdcP (config-router)# ping 192.168.12.7Q vrf OSPFvrf
PING 192.168.12.7Q (192.168.12.7Q): 56 data bytes
64 bytes from 192.168.12.7Q: icmp_seq=0 ttl=254 time=1.196 ms
64 bytes from 192.168.12.7Q: icmp_seq=1 ttl=254 time=0.698 ms
64 bytes from 192.168.12.7Q: icmp_seq=2 ttl=254 time=0.777 ms
64 bytes from 192.168.12.7Q: icmp_seq=3 ttl=254 time=0.691 ms
64 bytes from 192.168.12.7Q: icmp_seq=4 ttl=254 time=0.632 ms

--- 192.168.12.7Q ping statistics ---
5 packets transmitted, 5 packets received, 0.00% packet loss
round-trip min/avg/max = 0.681/1.239/2.912 ms
```

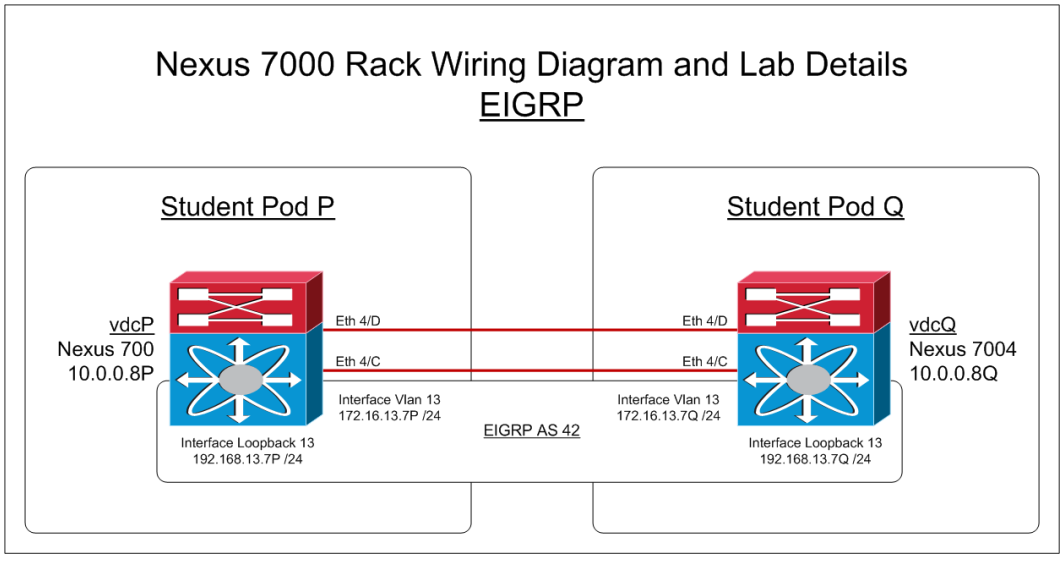
Activity Verification

You have completed this task when you attain these results:

- You have used the show and ping commands to verify that the VRF is configured, and that the OSPF routes are showing in the IP routing table and are reachable.

Task 3: Configuring VRFs and EIGRP

In this task, you will configure VRF instances with EIGRP and verify the configuration.



Activity Procedure

Complete these steps:

Step 38 Create a VRF context named “EIGRPvrf”.

```
vdcP(config)# vrf context EIGRPvrf
```

Step 39 Create VLAN 13 and interface VLAN 13 in VRF EIGRPvrf using 172.16.13.7P/24 as the IP address (P is your Pod number).

```
vdcP(config)# interface vlan 13
vdcP(config-if)# vrf member EIGRPvrf
% Deleted all L3 config on interface Vlan13
vdcP(config-if)# ip address 172.16.13.7P/24
vdcP(config-if)# no shutdown
vdcP(config-if)# vlan 13
```

Step 40 Create interface loopback 13, place it into VRF EIGRPvrf, and assign IP address 192.168.13.7P/32 (P is your Pod number).

```
vdcP(config-vlan)# interface loopback 13
vdcP(config-if)# vrf member EIGRPvrf
% Deleted all L3 config on interface loopback13
vdcP(config-if)# ip address 192.168.13.7P/32
vdcP(config-if)# no shutdown
```

Step 41 Enable the EIGRP feature.

```
vdcP(config-if)# feature eigrp
```

Step 42 Check the details of the license usage.

```
vdcP(config)# show license usage LAN_ENTERPRISE_SERVICES_PKG
Application              Vdc
--------------------------------------------------------------------------------
ospf                     vdcP
eigrp                    vdcP
--------------------------------------------------------------------------------
```

Step 43 Start the EIGRP process for AS 42.

```
vdcP(config)# router eigrp 42
```

Step 44 Configure EIGRP 42 on interface VLAN 13.

```
vdcP(config-router)# interface vlan 13
vdcP(config-if)# ip router eigrp 42
```

Step 45 Configure EIGRP 42 on interface loopback 13.

```
vdcP(config-if)# interface loopback 13
vdcP(config-if)# ip router eigrp 42
```

Step 46 Check the EIGRP process.

```
vdcP(config-if)# show ip eigrp vrf EIGRPvrf
IP-EIGRP AS 42 ID 192.168.13.7P VRF EIGRPvrf
Process-tag: 42
```

```
Status: running
Authentication mode: none
Authentication key-chain: none
Metric weights: K1=1 K2=0 K3=1 K4=0 K5=0
IP proto: 88 Multicast group: 224.0.0.10
Int distance: 90 Ext distance: 170
Max paths: 8
Number of EIGRP interfaces: 2 (1 loopbacks)
Number of EIGRP passive interfaces: 0
Number of EIGRP peers: 1
Graceful-Restart: Enabled
Stub-Routing: Disabled
NSF converge time limit/expiries: 120/0
NSF route-hold time limit/expiries: 240/0
NSF signal time limit/expiries: 20/0
Redistributed max-prefix: Disabled
```

STOP! **Wait until your Peer Pod has completed all steps up to this point before proceeding.**

Step 47 Check the EIGRP neighbor relationship (Q is your Peer Pod number).

```
vdcP# show ip eigrp neighbors vrf EIGRPvrf
IP-EIGRP neighbors for process 42 VRF EIGRPvrf
H   Address                 Interface       Hold  Uptime  SRTT   RTO  Q  Seq
                                            (sec)         (ms)       Cnt Num
0   172.16.13.7Q            Vlan13          11   00:01:03  1    200   0   4
```

Step 48 Check the routing table and ping your peer loopback 13 IP address (Q is your Peer Pod number).

```
vdcP# show ip route eigrp-42 vrf EIGRPvrf
IP Route Table for VRF "EIGRPvrf"
'*' denotes best ucast next-hop
'**' denotes best mcast next-hop
'[x/y]' denotes [preference/metric]

192.168.13.7Q/32, ubqest/mbest: 1/0
*via 172.16.13.7Q, Vlan13, [90/130816], 00:01:48, eigrp-42, internal

vdcP# ping 192.168.13.7Q vrf EIGRPvrf
PING 192.168.13.7Q (192.168.13.7Q): 56 data bytes
64 bytes from 192.168.13.7Q: icmp_seq=0 ttl=254 time=1.25 ms
64 bytes from 192.168.13.7Q: icmp_seq=1 ttl=254 time=0.808 ms
64 bytes from 192.168.13.7Q: icmp_seq=2 ttl=254 time=0.867 ms
64 bytes from 192.168.13.7Q: icmp_seq=3 ttl=254 time=0.808 ms
64 bytes from 192.168.13.7Q: icmp_seq=4 ttl=254 time=0.837 ms

--- 192.168.13.7Q ping statistics ---
5 packets transmitted, 5 packets received, 0.00% packet loss
round-trip min/avg/max = 0.808/0.913/1.25 ms
```

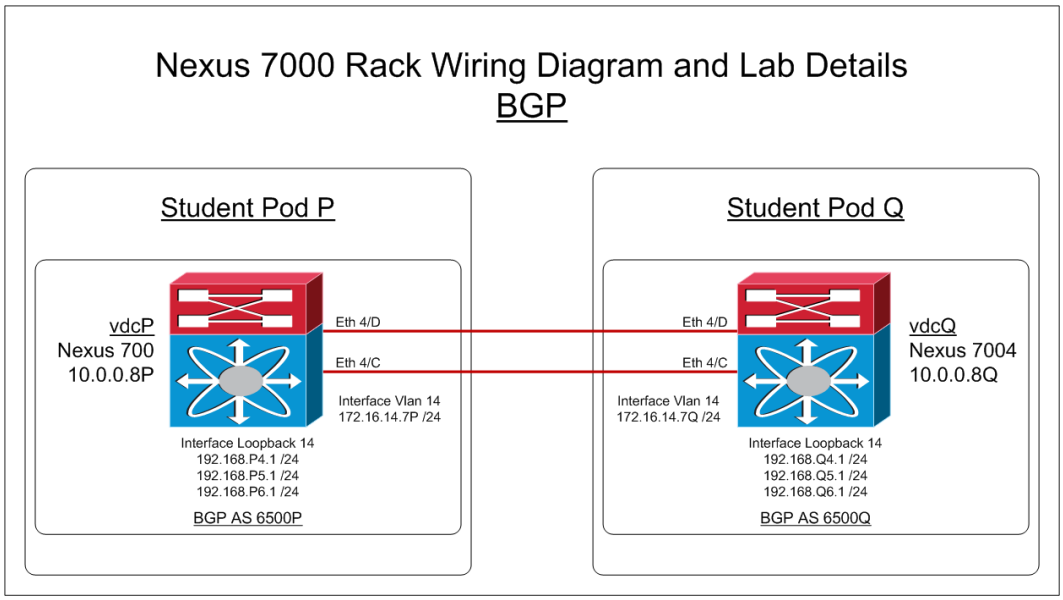
Activity Verification

You have completed this task when you attain these results:

- You have used the show commands to verify that the VRF is configured and that the EIGRP routes are showing in the IP routing table.

Task 4: Configuring BGP

In this task, you will configure BGP and verify the configuration.



Activity Procedure

Complete these steps:

Step 49 Create SVI 14 and assign IP address 172.16.14.7P/24 (P is your Pod number).

```
vdcP(config-if)# interface Vlan14
vdcP(config-if)# ip address 172.16.14.7P/24
vdcP(config-if)# no shutdown
vdcP(config-if)# vlan 14
```

Step 50 Enable the BGP feature.

```
vdcP(config)# feature bgp
```

Step 51 Configure the BGP process with AS number 6500P (P is your Pod number).

```
vdcP(config)# router bgp 6500P
```

Step 52 Configure a BGP session with your peer VDC (Q is your Peer Pod number).

```
vdcP(config-router)# neighbor 172.16.14.7Q remote-as 6500Q
vdcP(config-router-neighbor)# address-family ipv4 unicast
```

STOP! **Wait until your Peer Pod has completed all steps up to this point before proceeding.**

Step 53 Verify the BGP session with your peer VDC.

```
vdcP(config-router-neighbor-af)# show ip bgp neighbors
BGP neighbor is 172.16.14.7Q,  remote AS 65002, ebgp link,  Peer index 1
  BGP version 4, remote router ID 172.16.14.7Q
  BGP state = Established, up for 00:00:07
  Peer is directly attached, interface Vlan14
  Last read 00:00:06, hold time = 180, keepalive interval is 60 seconds
```

```
  Last written 00:00:06, keepalive timer expiry due 00:00:53
  Received 4 messages, 0 notifications, 0 bytes in queue
  Sent 4 messages, 0 notifications, 0 bytes in queue
  Connections established 1, dropped 0
  Last reset by us never, due to No error
  Last reset by peer never, due to No error

  Neighbor capabilities:
  Dynamic capability: advertised (mp, refresh, gr) received (mp, refresh, gr)
  Dynamic capability (old): advertised received
  Route refresh capability (new): advertised received
  Route refresh capability (old): advertised received
  4-Byte AS capability: advertised received
  Address family IPv4 Unicast: advertised received
  Graceful Restart capability: advertised received

  Graceful Restart Parameters:
  Address families advertised to peer:
    IPv4 Unicast
  Address families received from peer:
    IPv4 Unicast
  Forwarding state preserved by peer for:
  Restart time advertised to peer: 120 seconds
  Stale time for routes advertised by peer: 300 seconds
  Restart time advertised by peer: 120 seconds

  Message statistics:
                              Sent               Rcvd
  Opens:                         1                  1
  Notifications:                 0                  0
  Updates:                       1                  1
  Keepalives:                    2                  2
  Route Refresh:                 0                  0
  Capability:                    0                  0
  Total:                         4                  4
  Total bytes:                  42                 42
  Bytes in queue:                0                  0

  For address family: IPv4 Unicast
  BGP table version 3, neighbor version 3
  0 accepted paths consume 0 bytes of memory
  0 sent paths
  Last End-of-RIB received 00:00:01 after session start

  Local host: 172.16.14.7P, Local port: 179
  Foreign host: 172.16.14.7Q, Foreign port: 1496
  fd = 48
```

Step 54 Configure networks 192.168.P4.0/24, 192.168.P5.0/24, and 192.168.P6.0/24 to be advertised by BGP to your peer VDC (P is your Pod number).

```
vdcP(config-router-neighbor-af)# exit
vdcP(config-router-neighbor)# exit
vdcP(config-router)# address-family ipv4 unicast
vdcP(config-router-af)# network 192.168.P4.0 mask 255.255.255.0
vdcP(config-router-af)# network 192.168.P5.0 mask 255.255.255.0
vdcP(config-router-af)# network 192.168.P6.0 mask 255.255.255.0
```

Step 55 Create interface loopback 14 and assign IP addresses 192.168.P4.1/24, 192.168.P5.1/24, and 192.168.P6.1/24 (P is your Pod number).

```
vdcP(config-router-af)# interface loopback 14
```

```
vdcP(config-if)# ip address 192.168.P4.1/24
vdcP(config-if)# ip address 192.168.P5.1/24 ?
<CR>
secondary  Configure additional IP addresses on interface
tag    URIB route tag value for local/direct routes

vdcP(config-if)# ip address 192.168.P5.1/24 secondary
Disabling IP Redirects on loopback14 :secondary address configured.
vdcP(config-if)# ip address 192.168.P6.1/24 secondary
Disabling IP Redirects on loopback14 :secondary address configured.
```

STOP! **Wait until your Peer Pod has completed all steps up to this point before proceeding.**

Step 56 Verify that the BGP peering between your VDC and the Peer Pod VDC is up.

```
vdcP(config-if)# show ip bgp summary
BGP summary information for VRF default, address family IPv4 Unicast
BGP router identifier 192.168.14.P, local AS number 6500P
BGP table version is 12, IPv4 Unicast config peers 1, capable peers 1
6 network entries and 6 paths using 648 bytes of memory
BGP attribute entries [2/272], BGP AS path entries [1/6]
BGP community entries [0/0], BGP clusterlist entries [0/0]

Neighbor        V    AS MsgRcvd MsgSent   TblVer  InQ OutQ Up/Down  State/PfxRcd
172.16.14.7Q    4 6500Q       6       6       12    0    0 00:01:17 3
```

Step 57 Verify the BGP table (P is your Pod number, Q is your Peer Pod number).

```
vdcP(config-if)# show ip bgp
BGP routing table information for VRF default, address family IPv4 Unicast
BGP table version is 13, local router ID is 192.168.14.Q
Status: s-suppressed, x-deleted, S-stale, d-dampened, h-history, *-valid, >-best
Path type: i-internal, e-external, c-confed, l-local, a-aggregate, r-redist
Origin codes: i - IGP, e - EGP, ? - incomplete, | - multipath

   Network            Next Hop            Metric     LocPrf     Weight Path
*>l192.168.P4.0/24    0.0.0.0                            100      32768 i
*>l192.168.P5.0/24    0.0.0.0                            100      32768 i
*>l192.168.P6.0/24    0.0.0.0                            100      32768 i
*>e192.168.Q4.0/24    172.16.14.7Q                                    0 6500Q i
*>e192.168.Q5.0/24    172.16.14.7Q                                    0 6500Q i
*>e192.168.Q6.0/24    172.16.14.7Q                                    0 6500Q i
```

Step 58 Verify connectivity to the peer interface loopback addresses (Q is your Peer Pod number).

```
vdcP(config-if)# ping 192.168.Q4.1
PING 192.168.Q4.1 (192.168. Q4.1): 56 data bytes
64 bytes from 192.168.Q4.1: icmp_seq=0 ttl=254 time=1.091 ms
64 bytes from 192.168.Q4.1: icmp_seq=1 ttl=254 time=0.747 ms
64 bytes from 192.168.Q4.1: icmp_seq=2 ttl=254 time=0.649 ms
64 bytes from 192.168.Q4.1: icmp_seq=3 ttl=254 time=0.633 ms
64 bytes from 192.168.Q4.1: icmp_seq=4 ttl=254 time=0.673 ms

--- 192.168.Q4.1 ping statistics ---
5 packets transmitted, 5 packets received, 0.00% packet loss
round-trip min/avg/max = 0.633/0.758/1.091 ms

vdcP(config-if)# ping 192.168.Q5.1
PING 192.168.Q5.1 (192.168.Q5.1): 56 data bytes
64 bytes from 192.168.Q5.1: icmp_seq=0 ttl=254 time=1.214 ms
```

```
64 bytes from 192.168.Q5.1: icmp_seq=1 ttl=254 time=0.814 ms
64 bytes from 192.168.Q5.1: icmp_seq=2 ttl=254 time=0.838 ms
64 bytes from 192.168.Q5.1: icmp_seq=3 ttl=254 time=0.853 ms
64 bytes from 192.168.Q5.1: icmp_seq=4 ttl=254 time=0.841 ms

--- 192.168.Q5.1 ping statistics ---
5 packets transmitted, 5 packets received, 0.00% packet loss
```

Activity Verification

You have completed this task when you attain these results:

- You have used the show commands to verify that the BGP is configured and that the BGP routes are showing in the IP routing table.