Configure Policy Based Redirect and IPSLA for Redundant ISP Links

Contents

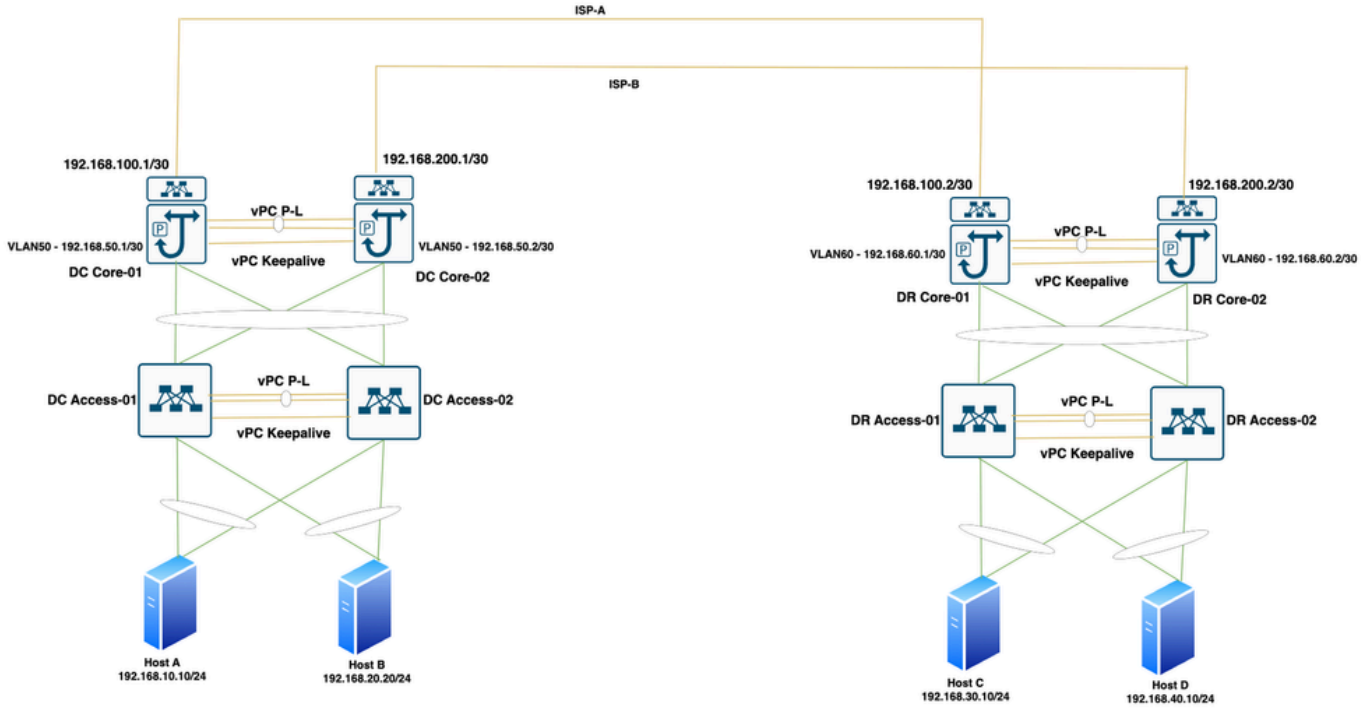
Introduction

This document describes how to configure a Policy-Based Redirect (PBR) service and IPSLA in the Nexus environment.

Dual ISP on different switches use case:

Figure 1 shows the typical DC to DR multiple ISP link connecting to different core switches.

Figure 1. DC-DR Network Topology



Design Highlights

DC and DR locations have the Nexus 9K family switches as Core and Access switches. Core and Access switches are configured as double sided vPC. DC Core switches have the Gateway for VLAN10 with HSRP. DR Core Switches have the Gateways for VLAN20 with HSRP. vPC Peer-Gateway command is configured on DC and DR Core switches. There are two ISP links between DC and DR Core switches. DC Core-01 and DC Core-02 are configured with point-to-point ip addresses with VLAN50. DR Core-01 and DR Core-02 are configured with point-to-point ip addresses with VLAN50. ISP-A is connected between DC Core-01 and DR Core-01, ISP-B is connected between DC Core-02 and DR Core-02. Servers are connected to both Access Switches in DC/DR. Server Gateways for VLAN-10 and VLAN-20 are configured on DC Core

Switches. Server Gateways for VLAN-30 and VLAN-40 are configured on DR Core Switches.

Requirement

1. Communication between Host A and Host C must use ISP-A Link. In case of ISP-A Failure, traffic must switch to ISP B.

Figure 2. Host A to Host C traffic flow through ISP-A

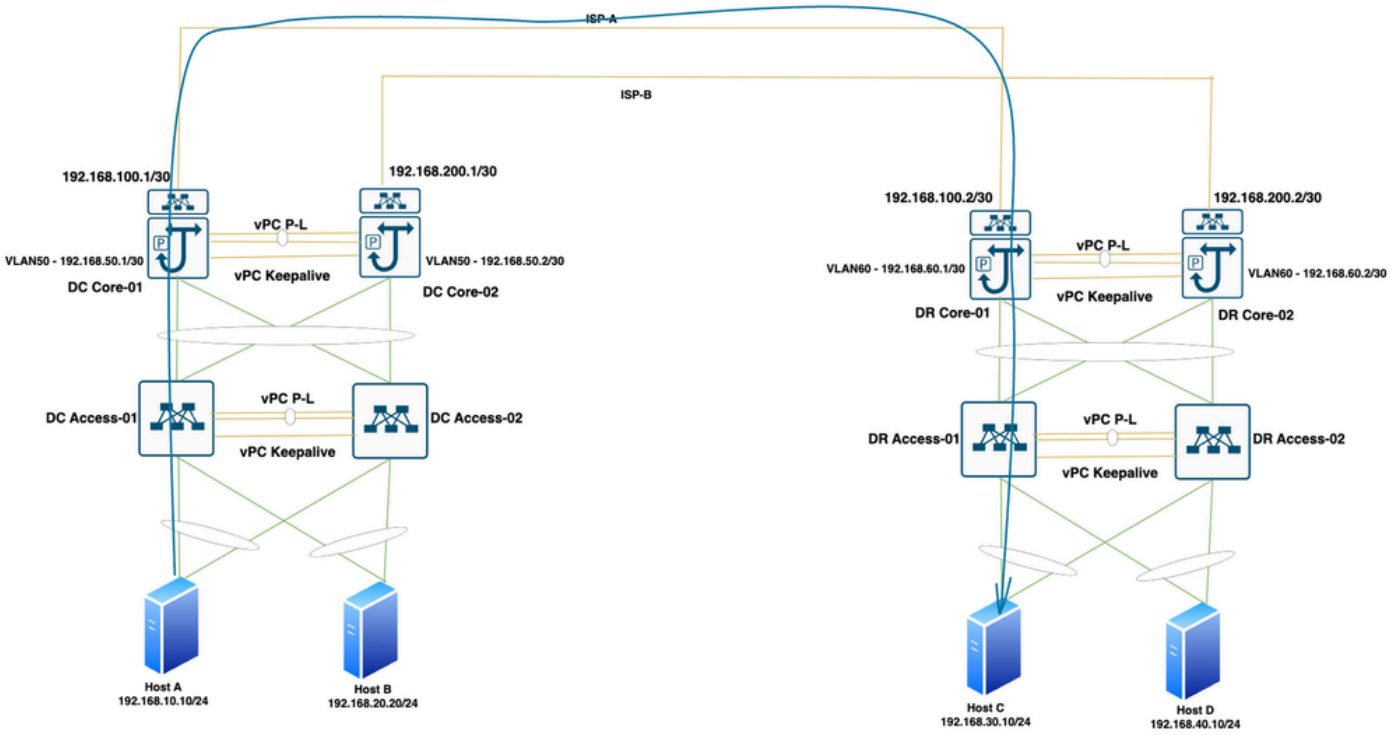
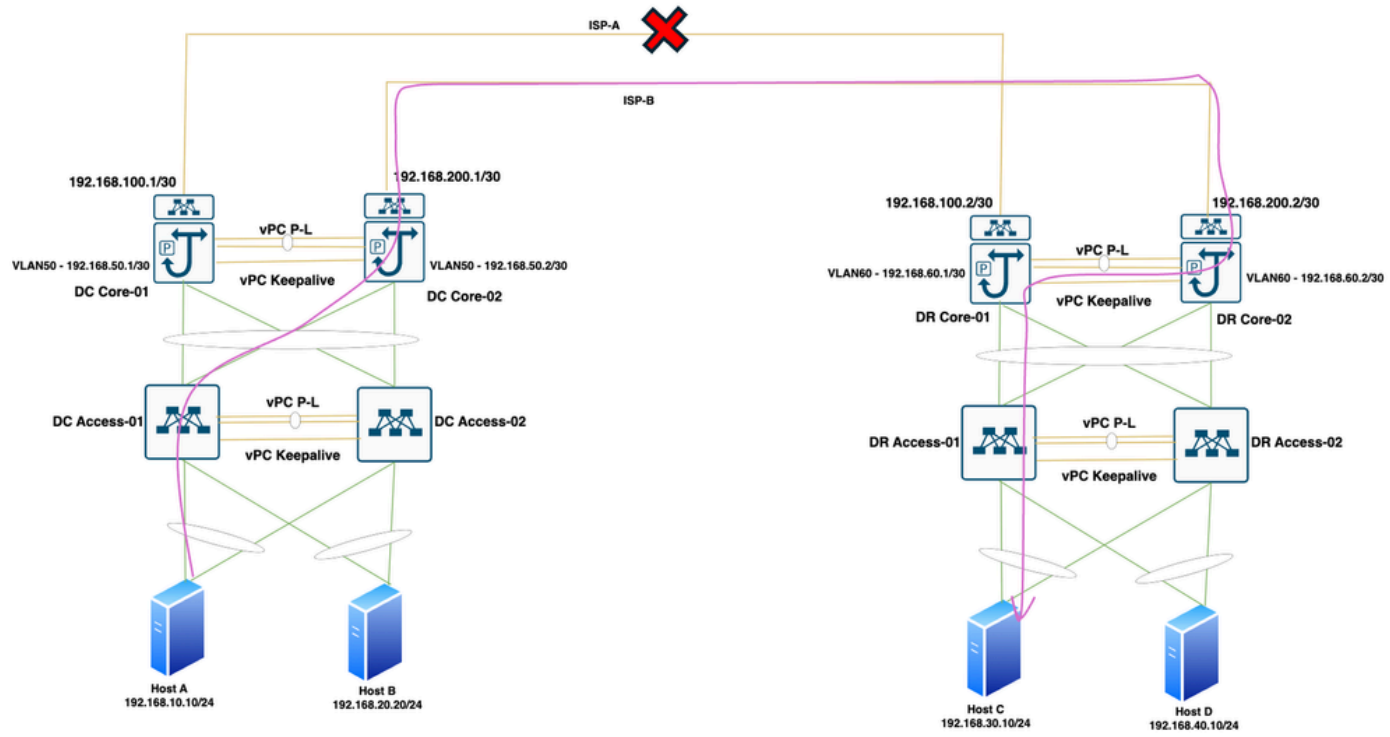


Figure 3. Host A to Host C traffic flow through ISP-B, in case of ISP-A link failure



2. Communication between Host A and Host D must use ISP-B Link. In case of ISP-B Failure, traffic must switch to ISP-A.

Figure 4 . Host A to Host D traffic flow through ISP-B

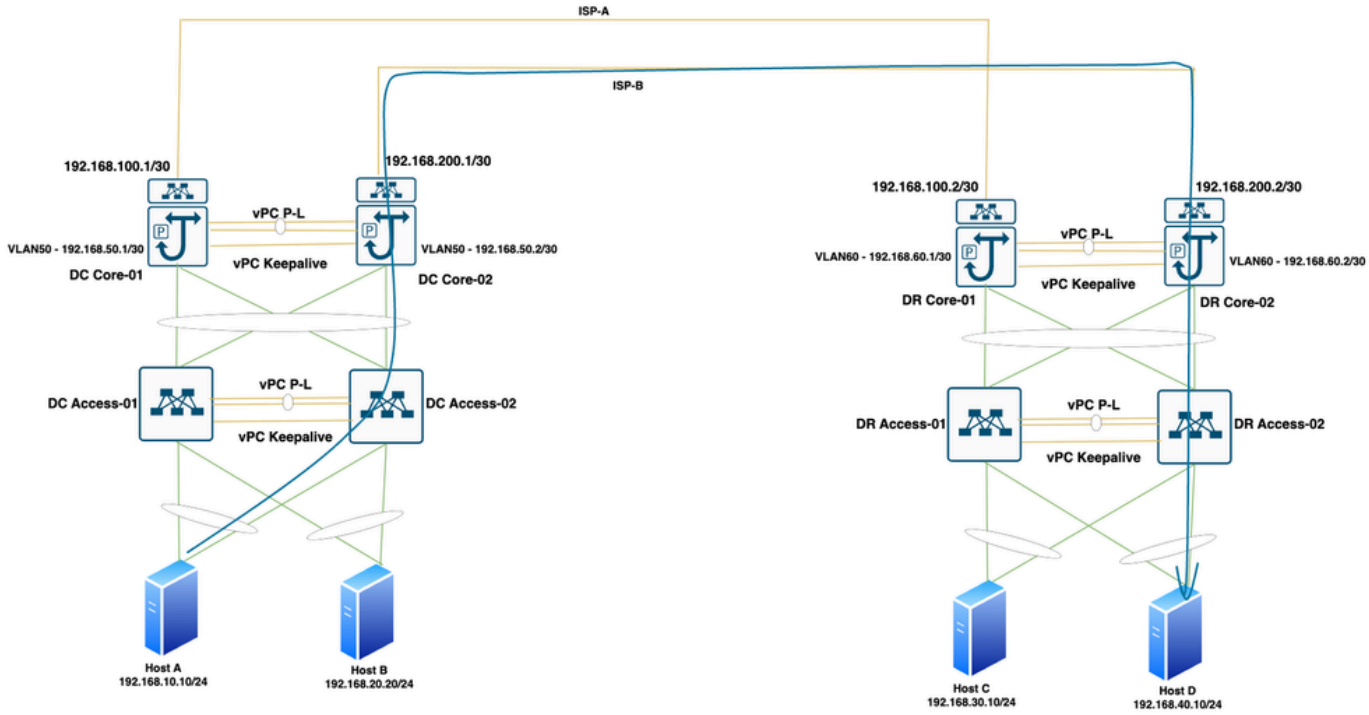
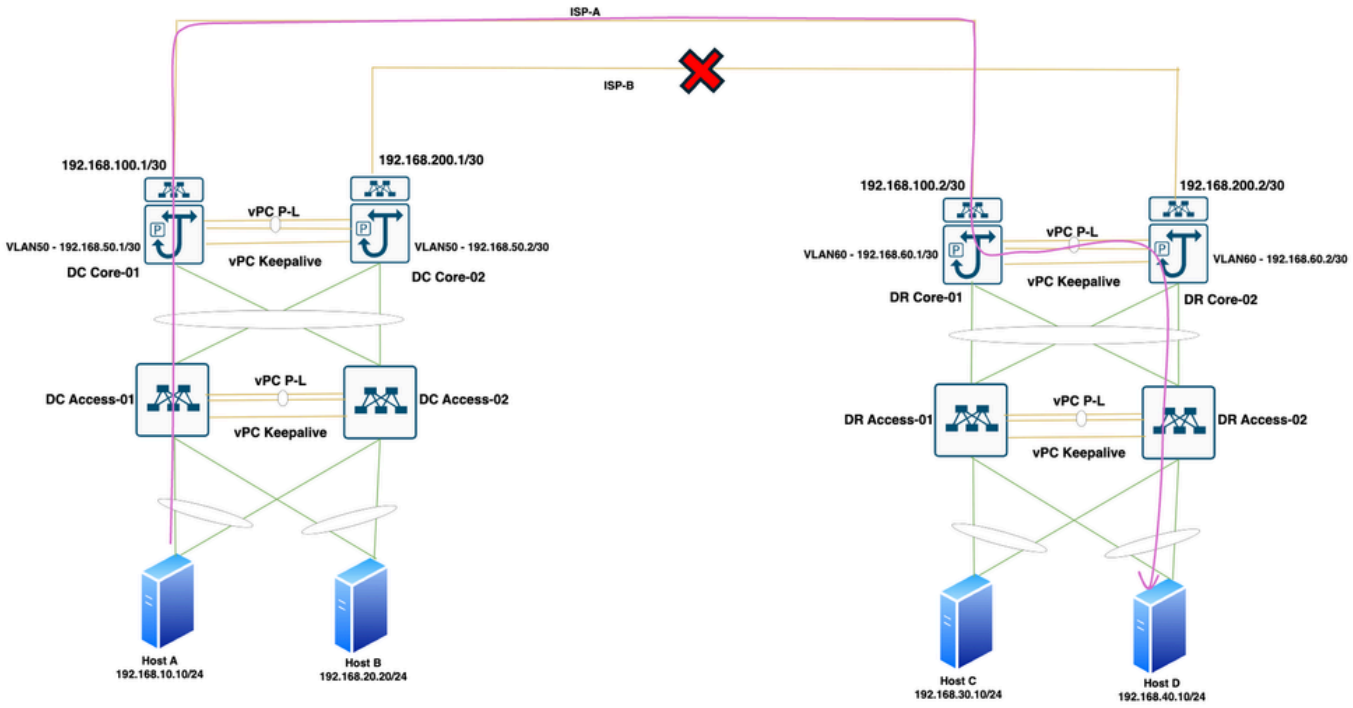


Figure 5. Host A to Host D traffic flow through ISP-A, in case of ISP-B link failure



3. Communication between Host B and Host C must use ISP-B Link. In case of ISP-B Failure, traffic must switch to ISP-A.

Figure 6. Host B to Host C traffic flow through ISP-B

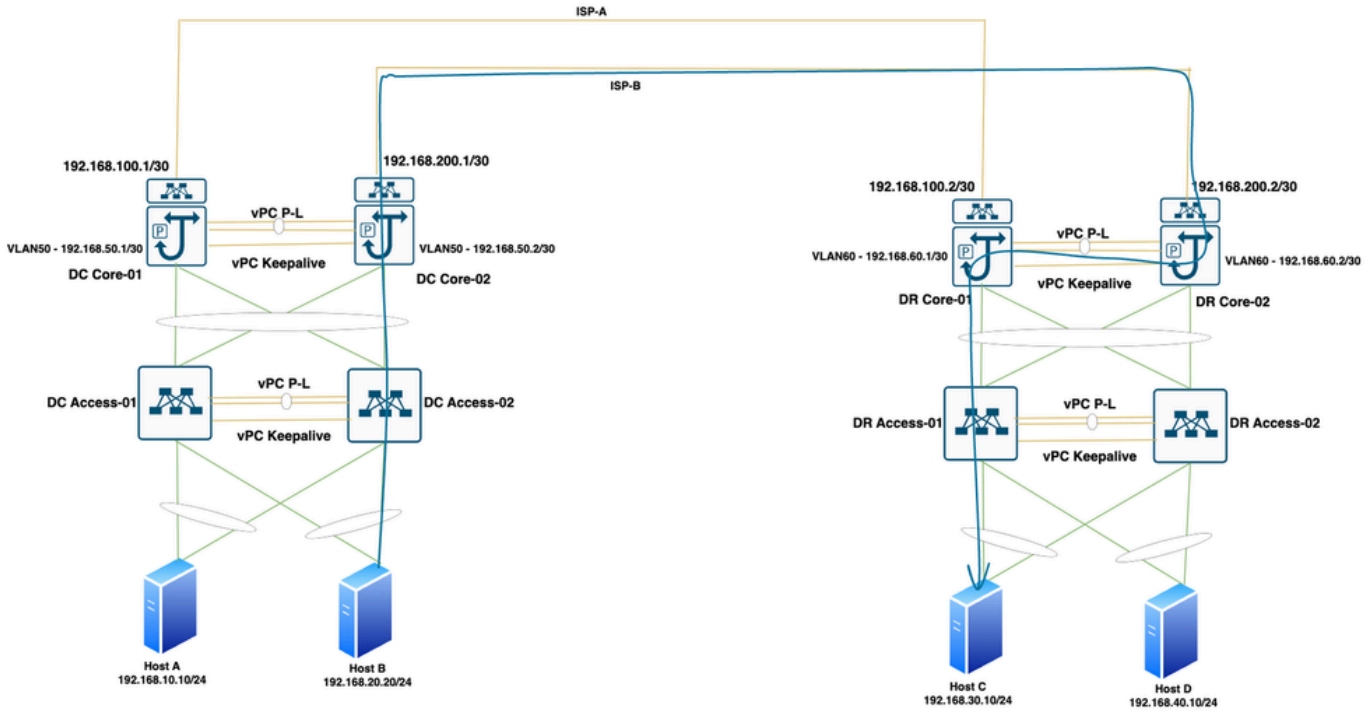
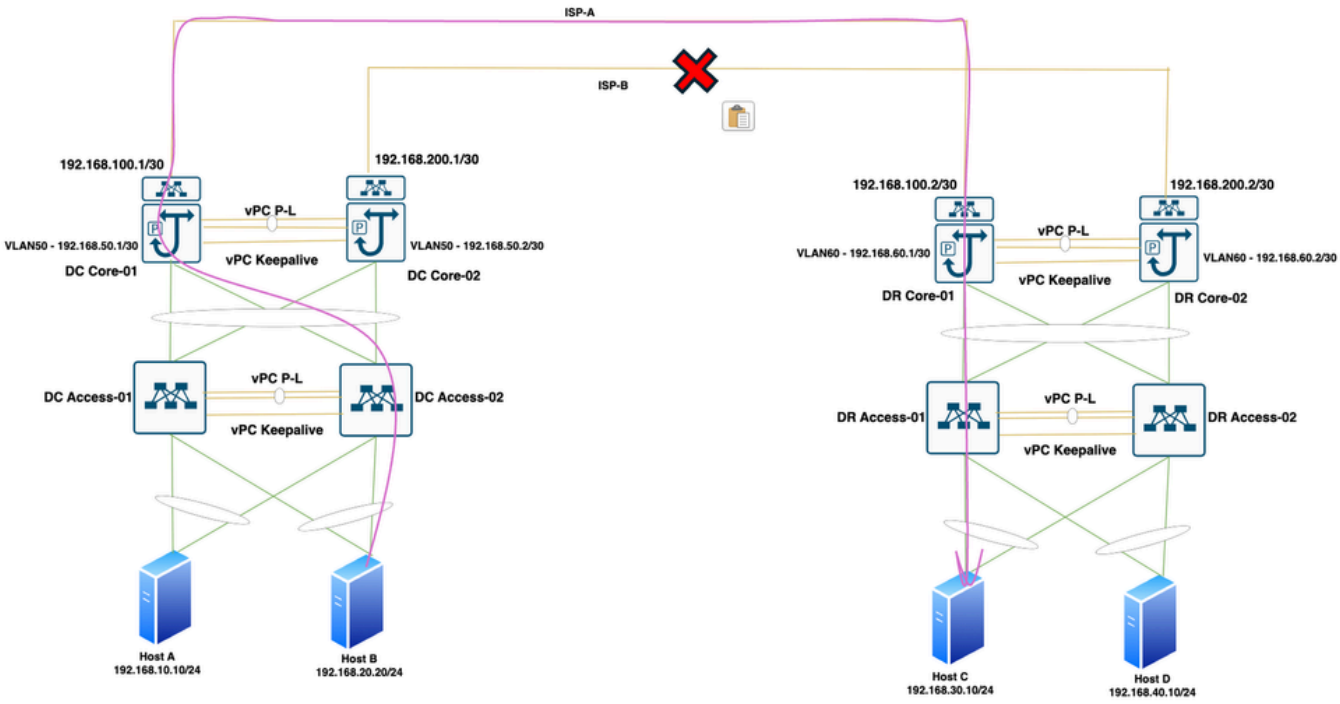


Figure 7. Host B to Host C traffic flow through through ISP-A, in case of ISP-B link failure



4. Communication between Host B and Host D must use ISP-A Link. In case of ISP-A Failure, traffic must switch to ISP-B.

Figure 8. Host B to Host D traffic flow through ISP-A

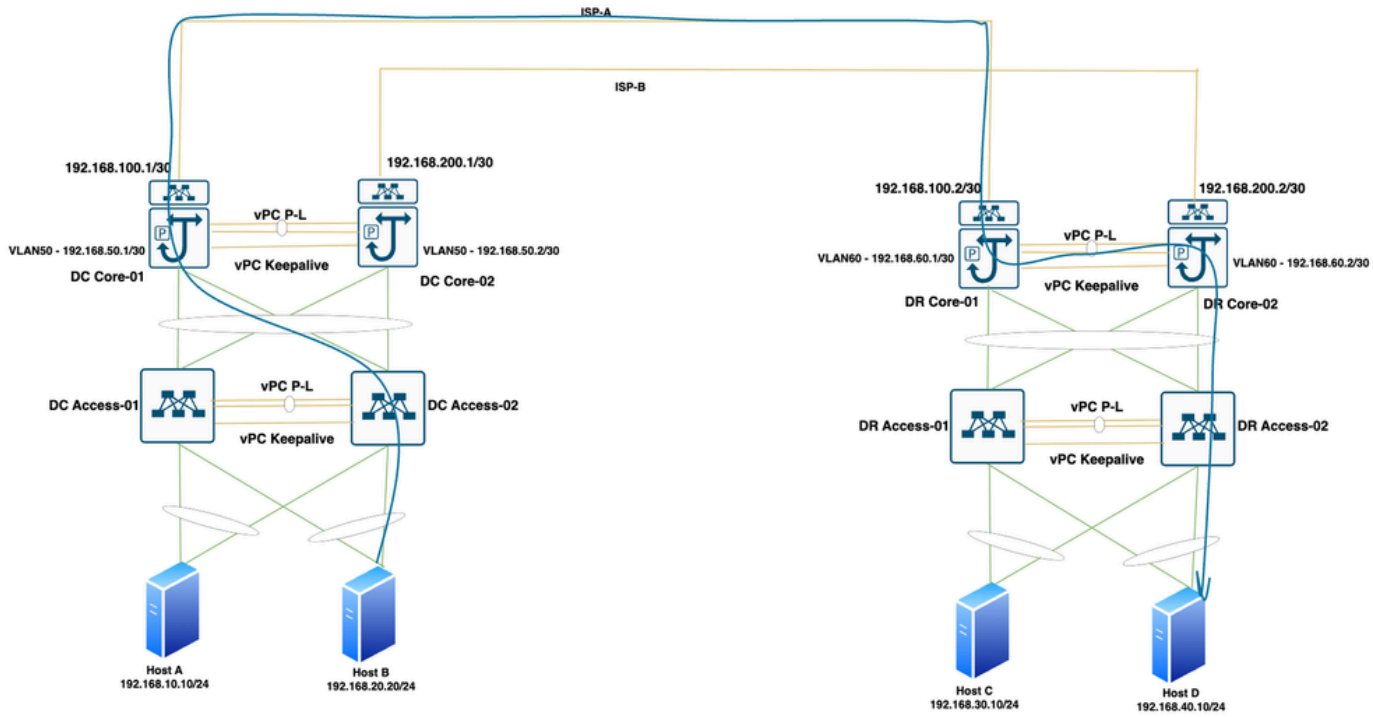
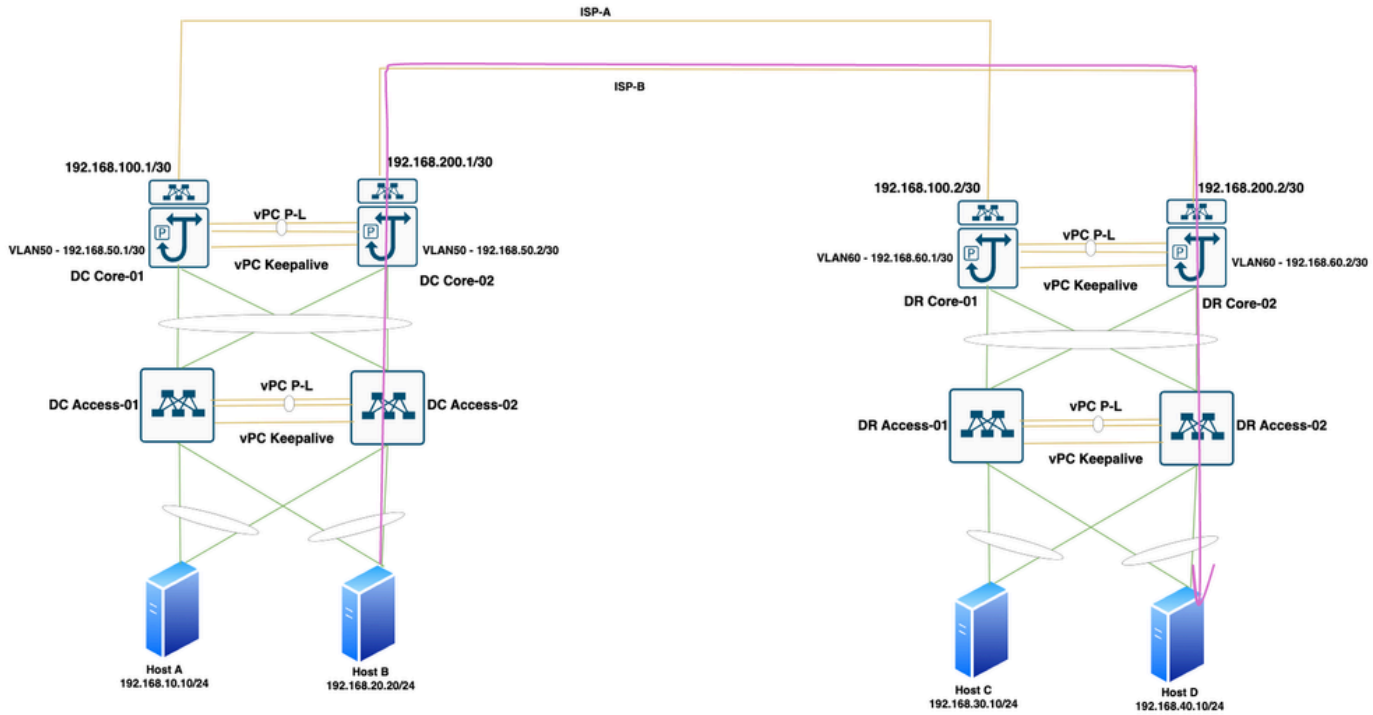


Figure 9. Host B to Host D traffic flow through ISP-B, in case of ISP-A link failure



5. In case of any link failure, link down notification has to be sent.

Challenges

1. Dynamic and static routing protocol can not do source based routing.
2. Hosts can land on any of the Core Switches, as there is HSRP and vPC Peer Gateway configured
3. ISP links are not directly terminated on Core switches. If the link fails, notification is not sent as physical interface remains UP.

4. Links are terminated on two different Core switches.

Solution

1. IP SLA track to be configured on DC and DR Core switches
2. Static routes to be configured for the reachability of remote point-to-point IP addresses
3. Policy Based Routing to be configured on DC and DR Core switches

Configuration

IPSLA Configuration

IPSLA configuration to track the both the WAN Links from Both Core Switches.

Figure 10. ISP-A and ISP-B Link Tracking from DC-CORE-01

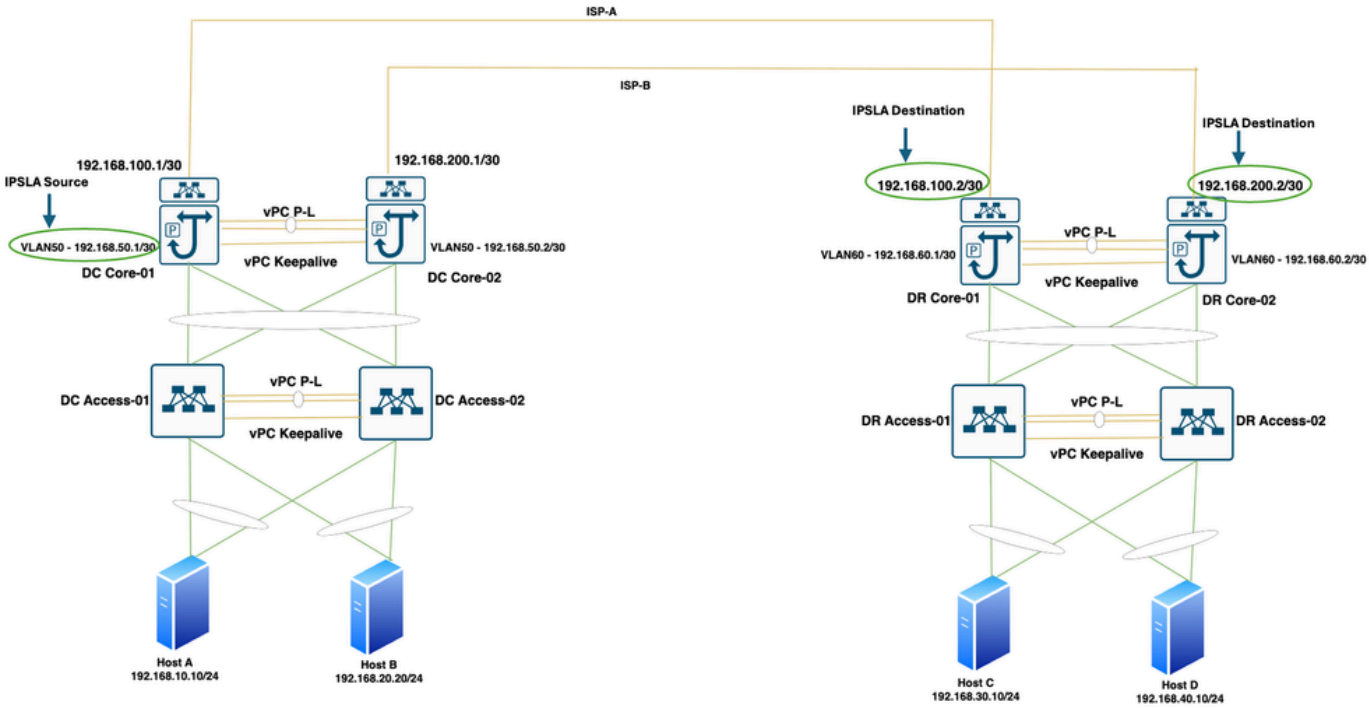


Table 1. IPSLA Configuration for ISP-A and ISP-B Link Tracking from DC-CORE-01

DC-CORE-01# show run track
track 1 ip sla 1 reachability
delay up 1 down 1
track 2 ip sla 2 reachability
delay up 1 down 1
DC-CORE-01# show run sla sender
feature sla sender

```
ip sla 1
  icmp-echo 192.168.100.2 source-ip 192.168.50.1
ip sla schedule 1 life forever start-time now
ip sla 2
  icmp-echo 192.168.200.2 source-ip 192.168.50.1
ip sla schedule 2 life forever start-time now
```

Figure 11. ISP-A and ISP-B Link Tracking from DC-CORE-02

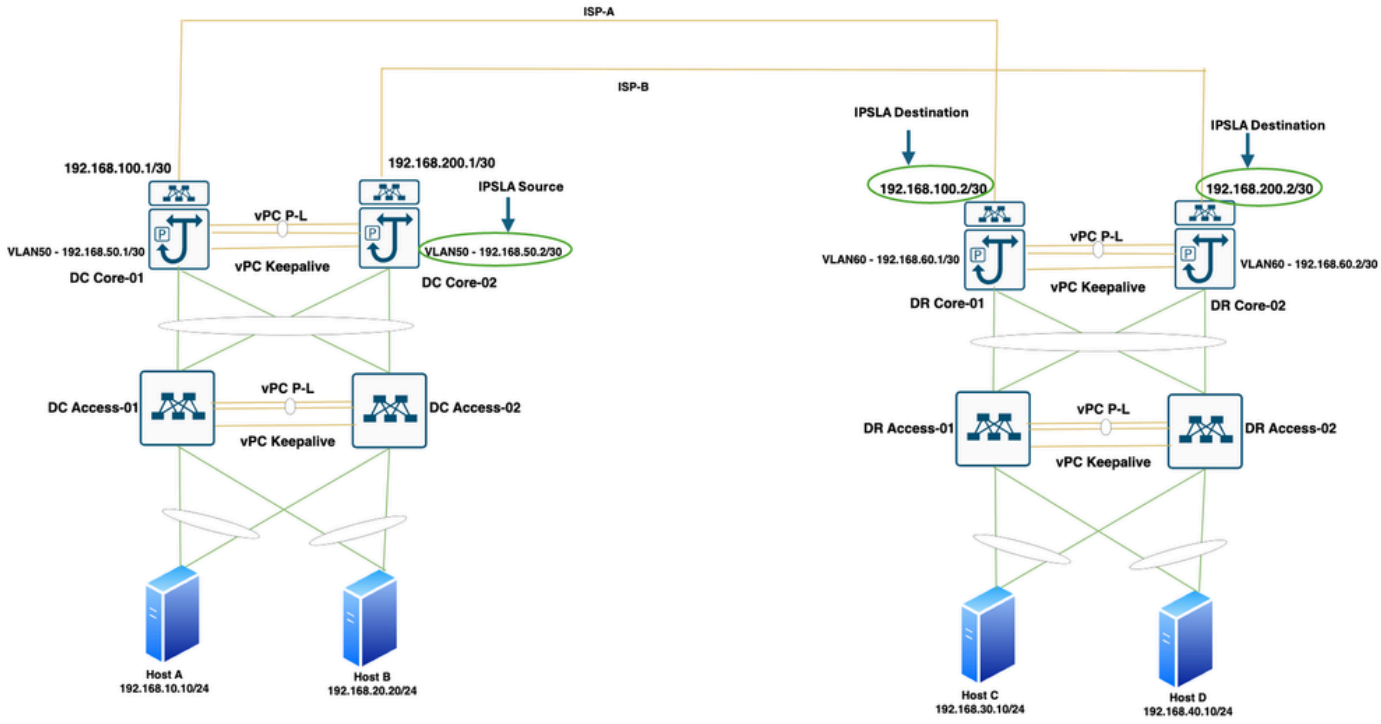


Table 2. IPSLA Configuration for ISP-A and ISP-B Link Tracking from DC-CORE-02

```
DC-CORE-02# show run track
track 1 ip sla 1 reachability
delay up 1 down 1
track 2 ip sla 2 reachability
delay up 1 down 1
DC-CORE-02# show run sla sender
feature sla sender
ip sla 1
```

```
 icmp-echo 192.168.100.2 source-ip 192.168.50.2
ip sla schedule 1 life forever start-time now
ip sla 2
 icmp-echo 192.168.200.2 source-ip 192.168.50.2
ip sla schedule 2 life forever start-time now
```

Figure 12. ISP-A and ISP-B Link Tracking from DR-CORE-01

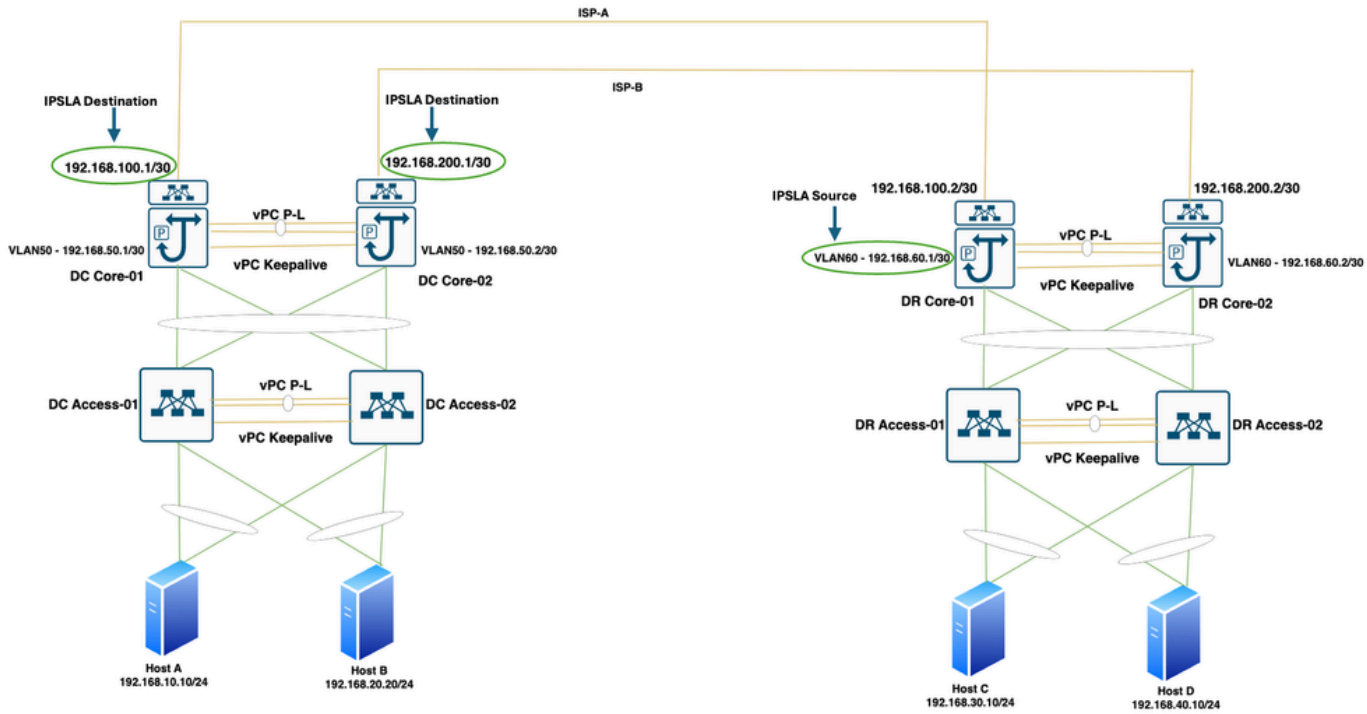


Table 3. IPSLA Configuration for ISP-A and ISP-B Link Tracking from DR-CORE-01

```
DR-CORE-01# show run track
track 1 ip sla 1 reachability
delay up 1 down 1
track 2 ip sla 2 reachability
delay up 1 down 1
DR-CORE-01# show run sla sender
feature sla sender
ip sla 1
 icmp-echo 192.168.100.2 source-ip 192.168.60.1
ip sla schedule 1 life forever start-time now
```

```
ip sla 2
  icmp-echo 192.168.200.2 source-ip 192.168.60.1
ip sla schedule 2 life forever start-time now
```

Figure 13. ISP-A and ISP-B Link Tracking from DR-CORE-02

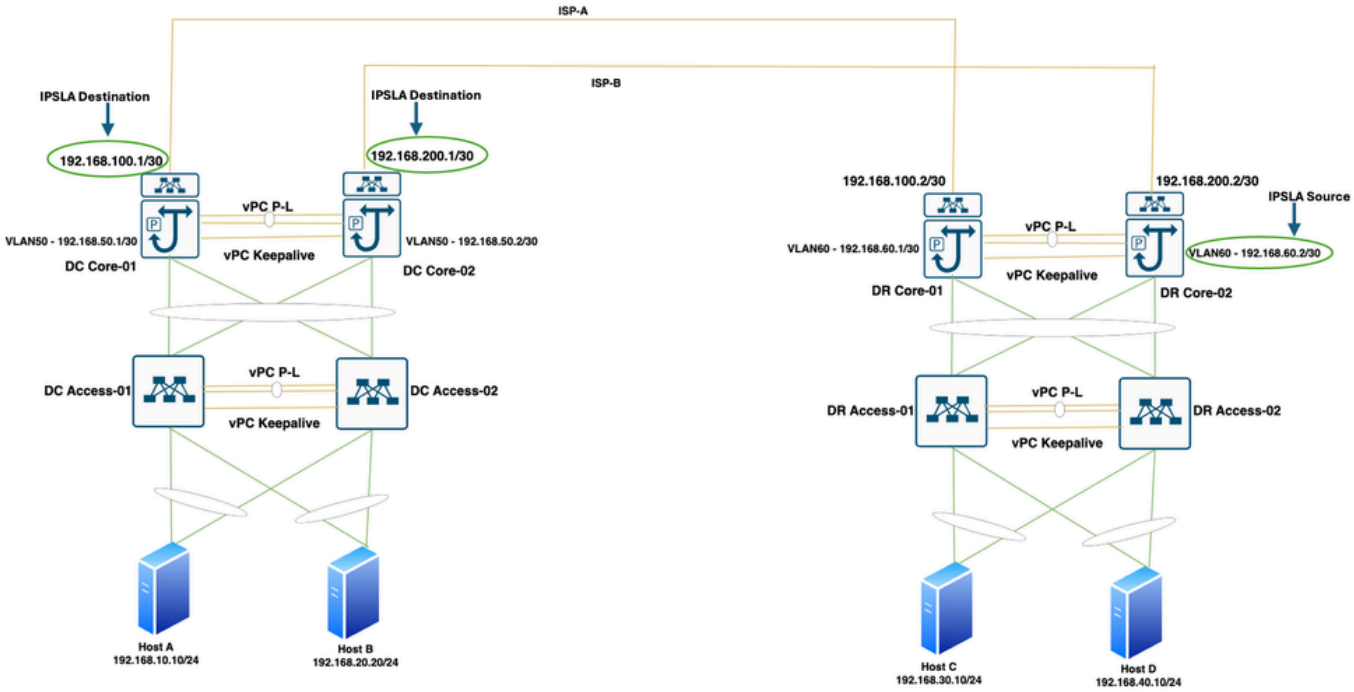


Table 4. IPSLA Configuration for ISP-A and ISP-B Link Tracking from DR-CORE-02

```
DR-CORE-02# show run track
track 1 ip sla 1 reachability
delay up 1 down 1
track 2 ip sla 2 reachability
delay up 1 down 1
DR-CORE-02# show run sla sender
feature sla sender
ip sla 1
  icmp-echo 192.168.100.2 source-ip 192.168.60.2
ip sla schedule 1 life forever start-time now
ip sla 2
  icmp-echo 192.168.200.2 source-ip 192.168.60.2
```

```
ip sla schedule 2 life forever start-time now
```

Static Route Configuration

We must configure static routes in DC-CORE-01 towards DC-CORE-02 for the destination as ISP-B DR-CORE-02 IP address. We must configure two different routes to reach to DR Core Point-to-Point IP address VLAN60, one route to be added towards DR Core ISP-A with default administrative value and another route towards DC-CORE-02 with higher AD value. We must attach the IP SLA 1 to the route towards ISP-A. If the ISP-A link fails, routing table has to be updated with DR Core Point-to-Point subnet towards DC-CORE-02.

Figure 14. Reachability from DC-CORE-SW01 to ISP-B and DR Core Point-to-Point subnet

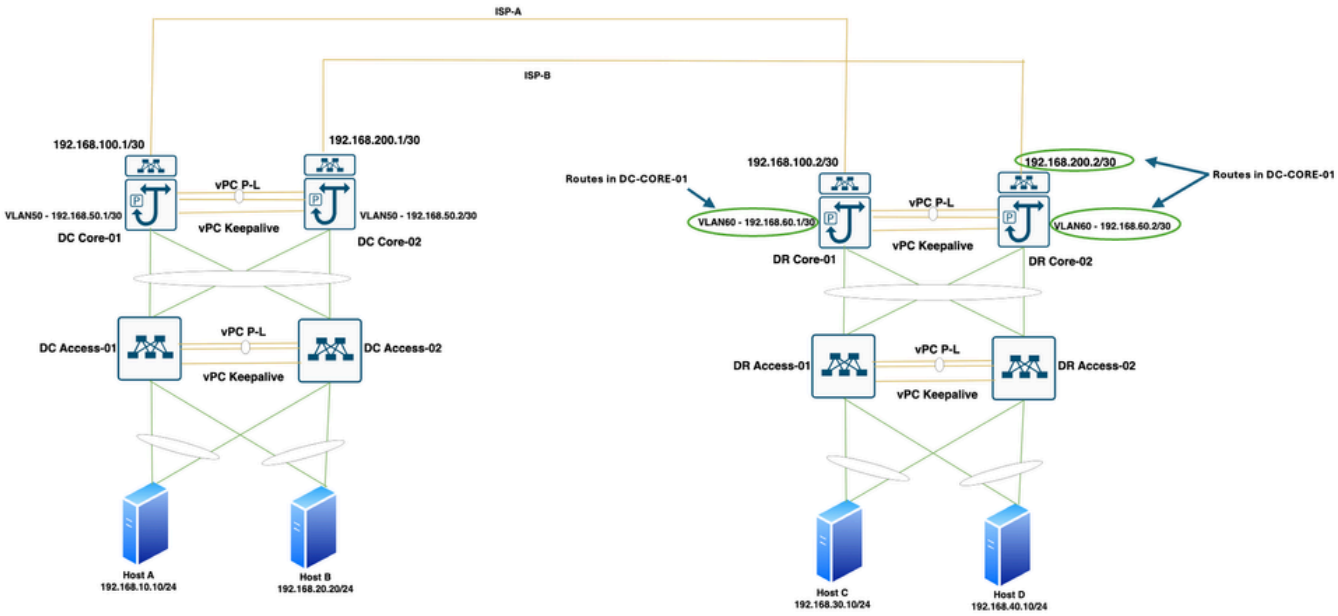


Table 5. Static routes configuration in DC-CORE-01

```
ip route 192.168.60.0/30 192.168.50.2 100

ip route 192.168.60.0/30 192.168.100.2 track 1

ip route 192.168.200.0/30 192.168.50.2
```

We must configure static routes in DC-CORE-02 towards DC-CORE-01 for the destination as ISP-A DR-CORE-01 IP address. We must configure two different routes to reach to DR Core Point-to-Point IP address VLAN60, one route to be added towards DR Core ISP-B with default administrative value and another route towards DC-CORE-01 with higher AD value. We must attach the IP SLA 2 to the route towards ISP-B. If the ISP-B link fails, routing table has to be updated with DR Core Point-to-Point subnet towards DC-CORE-01.

Figure 15. Reachability from DC-CORE-02 to ISP-A and DR Core Point-to-Point subnet

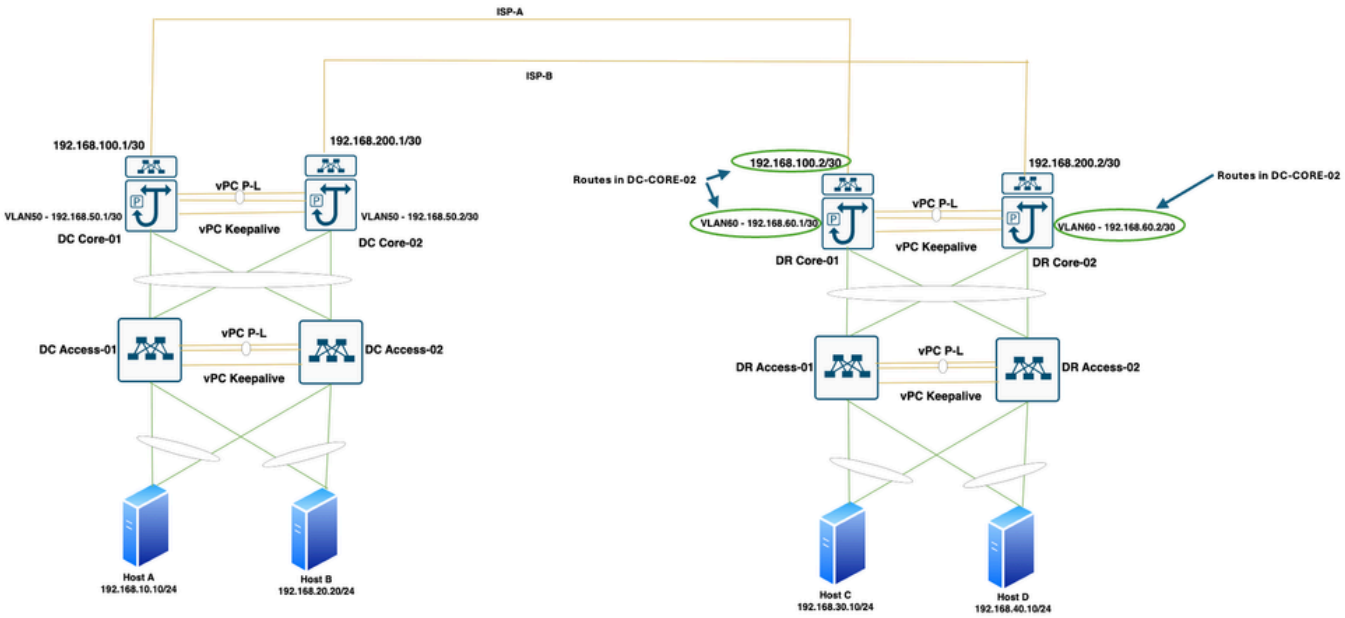


Table 6. Static routes configuration in DC-CORE-02

```
ip route 192.168.60.0/30 192.168.50.1 100

ip route 192.168.60.0/30 192.168.200.2 track 1

ip route 192.168.200.0/30 192.168.50.1
```

We must configure static routes in DR-CORE-01 towards DR-CORE-02 for the destination as ISP-B DC-CORE-02 IP address. We must configure two different routes to reach to DC Core Point-to-Point IP address VLAN50, one route to be added towards DC Core ISP-A with default administrative value and another route towards DR-CORE-02 with higher AD value. We must attach the IP SLA 1 to the route towards ISP-A. If the ISP-A link fails,routing table has to be updated with DC Core Point-to-Point subnet towards DR-CORE-02.

Figure 16. Reachability from DR-CORE-01 to ISP-B and DC Core Point-to-Point subnet

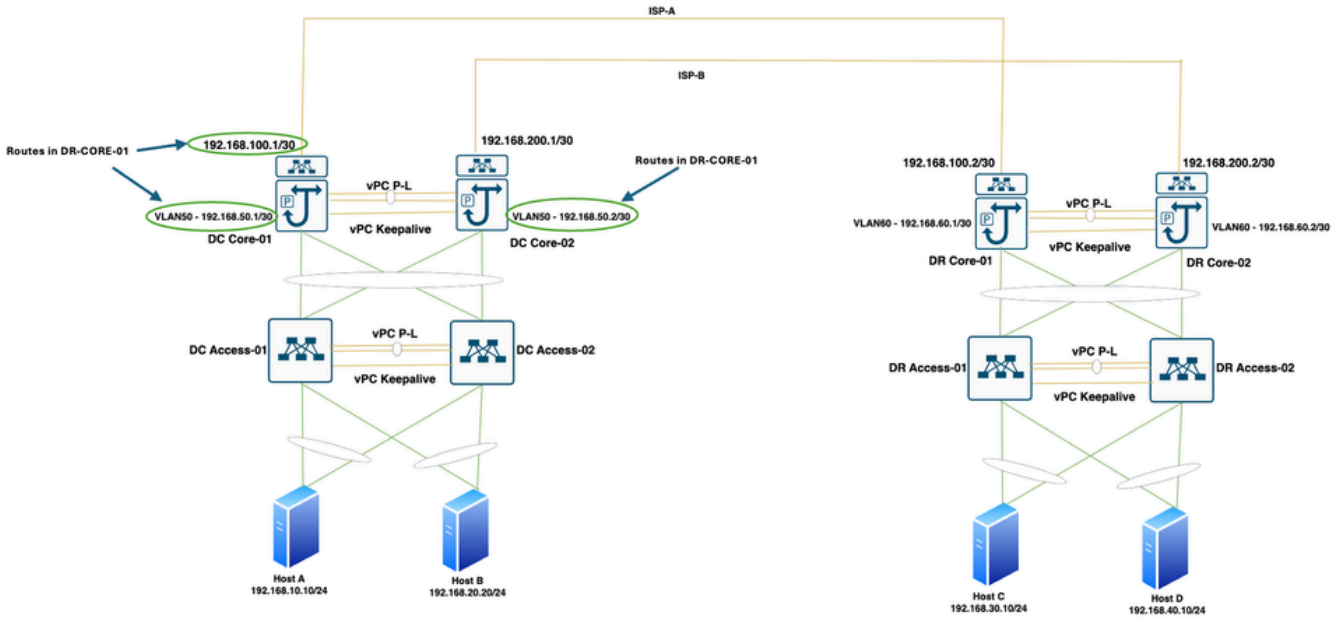


Table 7. Static routes configuration in DR-CORE-01

```
ip route 192.168.60.0/30 192.168.60.2 100

ip route 192.168.60.0/30 192.168.100.1 track 1

ip route 192.168.200.0/30 192.168.60.2
```

We must configure static routes in DR-CORE-02 towards DR-CORE-01 for the destination as ISP-A DC-CORE-01 IP address. We must configure two different routes to reach to DC Core Point-to-Point IP address VLAN50, one route to be added towards DC Core ISP-B with default administrative value and another route towards DR-CORE-01 with higher AD value. We must attach the IP SLA 2 to the route towards ISP-B. If the ISP-B link fails,routing table has to be updated with DC Core Point-to-Point IP address towards DR-CORE-01.

Figure 17. Reachability from DR-CORE-02 to ISP-A and DC Core Point-to-Point subnet

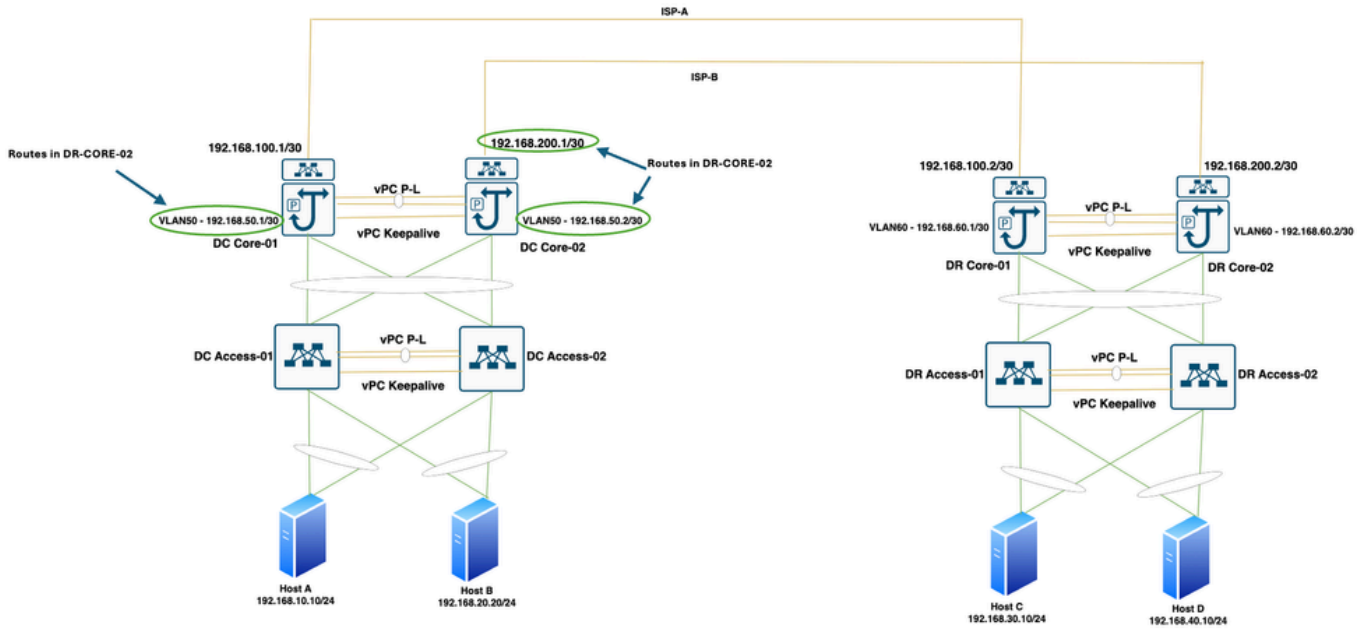


Table 8. Static routes configuration in DR-CORE-02

```
ip route 192.168.60.0/30 192.168.60.1 100
ip route 192.168.60.0/30 192.168.200.1 track 1
ip route 192.168.200.0/30 192.168.60.1
```

Table 9. Verify the tracks on all Core Switches. It applies to all the Core Switches.

```
DC-CORE-01# show track
Track 1
  IP SLA 1 Reachability
  Reachability is UP
  14 changes, last change 21:38:57
  Latest operation return code: OK
  Latest RTT (millisecs): 2
  Tracked by:
    IPv4 Static Route 1
    Route Map Configuration
  Delay up 1 secs, down 1 secs
Track 2
```

```
IP SLA 2 Reachability
Reachability is UP
12 changes, last change 07:08:56
Latest operation return code: OK
Latest RTT (millisecs): 1
Tracked by:
  Route Map Configuration
Delay up 1 secs, down 1 secs
```

Policy Based Routing Configuration

Traffic between Hosts have to be redirected to ISP-A and ISP-B based on Source-Destination IP Addresses. Multiple configurations to be done to achieve the Policy Based Redirect:

1. Access-list to be configured with source and destination Host IP addresses
2. Route-map configuration with next hop IP address
3. Associate the route-map to the interface which is near to source

Access-list Configuration

We must configure access-lists on DC-CORE-01 for the communication between HostA/HostB and HostC/HostD

Table 10. Access-list configuration on DC-CORE-01

```
ip access-list EndpointA-to-EndpointC
  10 permit ip 192.168.10.10/32 192.168.30.10/32
ip access-list EndpointA-to-EndpointD
  10 permit ip 192.168.10.10/32 192.168.40.10/32
ip access-list EndpointB-to-EndpointC
  10 permit ip 192.168.20.10/32 192.168.30.10/32
ip access-list EndpointB-to-EndpointD
  10 permit ip 192.168.20.10/32 192.168.40.10/32
track 1 ip sla 1 reachability
```

We must configure access-lists on DC-CORE-02 for the communication between HostA/HostB and HostC/HostD

Table 11. Access-list configuration on DC-CORE-02

```
ip access-list EndpointA-to-EndpointC
  10 permit ip 192.168.10.10/32 192.168.30.10/32
ip access-list EndpointA-to-EndpointD
  10 permit ip 192.168.10.10/32 192.168.40.10/32
ip access-list EndpointB-to-EndpointC
  10 permit ip 192.168.20.10/32 192.168.30.10/32
ip access-list EndpointB-to-EndpointD
  10 permit ip 192.168.20.10/32 192.168.40.10/32
```

We must configure access-lists on DR-CORE-01 for the communication between HostC/HostD and HostA/HostA

Table 12. Access-list configuration on DR-CORE-01

```
ip access-list EndpointC-to-EndpointA
  10 permit ip 192.168.30.10/32 192.168.10.10/32
ip access-list EndpointC-to-EndpointB
  10 permit ip 192.168.30.10/32 192.168.20.10/32
ip access-list EndpointD-to-EndpointA
  10 permit ip 192.168.40.10/32 192.168.10.10/32
ip access-list EndpointD-to-EndpointB
  10 permit ip 192.168.40.10/32 192.168.20.10/32
```

We must configure access-lists on DR-CORE-02 for the communication between HostC/HostD and HostA/HostA.

Table 13. Access-list configuration on DR-CORE-02

```
ip access-list EndpointC-to-EndpointA
  10 permit ip 192.168.30.10/32 192.168.10.10/32
ip access-list EndpointC-to-EndpointB
  10 permit ip 192.168.30.10/32 192.168.20.10/32
```

```
ip access-list EndpointD-to-EndpointA
  10 permit ip 192.168.40.10/32 192.168.10.10/32
ip access-list EndpointD-to-EndpointB
  10 permit ip 192.168.40.10/32 192.168.20.10/32
```

Route-Map Configuration

We must configure Route-map, attach the Access-lists and set the next-hop along with track commands on DC-CORE-01. ISP-A and ISP-B both the next-hops must be part of Route-Map.

Table 14. Route-Map configuration on DC-CORE-01

```
route-map PBR permit 10
  match ip address EndpointA-to-EndpointC
  set ip next-hop verify-availability 192.168.100.2 track 1
  set ip next-hop verify-availability 192.168.200.2 track 2 force-order
route-map PBR permit 20
  match ip address EndpointA-to-EndpointD
  set ip next-hop verify-availability 192.168.200.2 track 2
  set ip next-hop verify-availability 192.168.100.2 track 1 force-order
route-map PBR permit 30
  match ip address EndpointB-to-EndpointC
  set ip next-hop verify-availability 192.168.200.2 track 2
  set ip next-hop verify-availability 192.168.100.2 track 1 force-order
route-map PBR permit 40
  match ip address EndpointB-to-EndpointD
  set ip next-hop verify-availability 192.168.100.2 track 1
  set ip next-hop verify-availability 192.168.200.2 track 2 force-order
```

We must configure Route-map, attach the Access-lists and set the next-hop along with track commands on DC-CORE-02.ISP-A and ISP-B both the next-hops must be part of Route-Map.

Table 15. Route-Map configuration on DC-CORE-02

```
route-map PBR permit 10
  match ip address EndpointA-to-EndpointC
  set ip next-hop verify-availability 192.168.100.2 track 1
  set ip next-hop verify-availability 192.168.200.2 track 2 force-order
route-map PBR permit 20
  match ip address EndpointA-to-EndpointD
  set ip next-hop verify-availability 192.168.200.2 track 2
  set ip next-hop verify-availability 192.168.100.2 track 1 force-order
route-map PBR permit 30
  match ip address EndpointB-to-EndpointC
  set ip next-hop verify-availability 192.168.200.2 track 2
  set ip next-hop verify-availability 192.168.100.2 track 1 force-order
route-map PBR permit 40
  match ip address EndpointB-to-EndpointD
  set ip next-hop verify-availability 192.168.100.2 track 1
  set ip next-hop verify-availability 192.168.200.2 track 2 force-order
```

We must configure Route-map, attach the Access-lists and set the next-hop along with track commands on DR-CORE-01.ISP-A and ISP-B both the next-hops must be part of Route-Map.

Table 16. Route-Map configuration on DR-CORE-01

```
route-map PBR permit 10
  match ip address EndpointC-to-EndpointA
  set ip next-hop verify-availability 192.168.100.1 track 1
  set ip next-hop verify-availability 192.168.200.1 track 2 force-order
route-map PBR permit 20
  match ip address EndpointD-to-EndpointA
  set ip next-hop verify-availability 192.168.200.1 track 2
  set ip next-hop verify-availability 192.168.100.1 track 1 force-order
route-map PBR permit 30
```

```
 match ip address EndpointC-to-EndpointB
 set ip next-hop verify-availability 192.168.200.1 track 2
 set ip next-hop verify-availability 192.168.100.1 track 1 force-order
route-map PBR permit 40
 match ip address EndpointD-to-EndpointB
 set ip next-hop verify-availability 192.168.100.1 track 1
 set ip next-hop verify-availability 192.168.200.1 track 2 force-order
```

We must configure Route-map, attach the Access-lists and set the next-hop along with track commands on DR-CORE-01.ISP-A and ISP-B both the next-hops must be part of Route-Map.

Table 17. Route-Map configuration on DR-CORE-02

```
route-map PBR permit 10
 match ip address EndpointC-to-EndpointA
 set ip next-hop verify-availability 192.168.100.1 track 1
 set ip next-hop verify-availability 192.168.200.1 track 2 force-order
route-map PBR permit 20
 match ip address EndpointD-to-EndpointA
 set ip next-hop verify-availability 192.168.200.1 track 2
 set ip next-hop verify-availability 192.168.100.1 track 1 force-order
route-map PBR permit 30
 match ip address EndpointC-to-EndpointB
 set ip next-hop verify-availability 192.168.200.1 track 2
 set ip next-hop verify-availability 192.168.100.1 track 1 force-order
route-map PBR permit 40
 match ip address EndpointD-to-EndpointB
 set ip next-hop verify-availability 192.168.100.1 track 1
 set ip next-hop verify-availability 192.168.200.1 track 2 force-order
```

Apply Route-Map on Interfaces

Route-map has to be applied to Switched Virtual Interfaces (Server GWs). We also need to apply the Route-map on Core Switches Point-to-Point Interfaces to redirect the traffic in case of ISP Link failure or if the packet arrives on vPC Peer Switches which does not have the necessary ISP link.

We must apply Route-map on Interface VLAN10, Interface VLAN20 and Interface VLAN50 in DC-CORE-01.

Table 18. Apply Route-map on DC-CORE-01

```
interface Vlan10
  no shutdown
  no ip redirects
  ip address 192.168.10.2/24
  no ipv6 redirects
  ip policy route-map PBR
  hsrp 10
    ip 192.168.10.1
interface Vlan20
  no shutdown
  no ip redirects
  ip address 192.168.20.2/24
  no ipv6 redirects
  ip policy route-map PBR
  hsrp 20
    ip 192.168.20.1
interface Vlan50
  no shutdown
  no ip redirects
  ip address 192.168.50.1/30
  no ipv6 redirects
  ip policy route-map PBR
```

We must apply Route-map on Interface VLAN10, Interface VLAN20 and Interface VLAN50 in DC-CORE-02.

Table 19. Apply Route-map on DC-CORE-02

```
interface Vlan10
  no shutdown
  no ip redirects
  ip address 192.168.10.3/24
  no ipv6 redirects
  ip policy route-map PBR
  hsrp 10
    ip 192.168.10.1
interface Vlan20
  no shutdown
  no ip redirects
  ip address 192.168.20.3/24
  no ipv6 redirects
  ip policy route-map PBR
  hsrp 20
    ip 192.168.20.1
interface Vlan50
  no shutdown
  no ip redirects
  ip address 192.168.50.2/30
  no ipv6 redirects
  ip policy route-map PBR
```

We must apply Route-map on Interface VLAN30, Interface VLAN40 and Interface VLAN60 in DR-CORE-01.

Table 20. Apply Route-map on DR-CORE-01

```
interface Vlan30
  no shutdown
```

```
 no ip redirects
 ip address 192.168.30.2/24
 no ipv6 redirects
 ip policy route-map PBR
 hsrp 30
   ip 192.168.30.1
interface Vlan40
 no shutdown
 no ip redirects
 ip address 192.168.40.2/24
 no ipv6 redirects
 ip policy route-map PBR
 hsrp 40
   ip 192.168.40.1
interface Vlan60
 no shutdown
 no ip redirects
 ip address 192.168.60.1/30
 no ipv6 redirects
 ip policy route-map PBR
```

We must apply Route-map on Interface VLAN30, Interface VLAN40 and Interface VLAN60 in DR-CORE-02.

Table 21. Apply Route-map on DR-CORE-02

```
interface Vlan30
 no shutdown
 no ip redirects
 ip address 192.168.30.3/24
 no ipv6 redirects
```

```
 ip policy route-map PBR
 hsrp 30
  ip 192.168.30.1
interface Vlan40
 no shutdown
 no ip redirects
 ip address 192.168.40.3/24
 no ipv6 redirects
 ip policy route-map PBR
 hsrp 40
  ip 192.168.40.1
interface Vlan60
 no shutdown
 no ip redirects
 ip address 192.168.60.2/30
 no ipv6 redirects
 ip policy route-map PBR
```

Route-Map Verification

Verify the Route-map on DC-CORE-01, configured Access-list and track status must be UP.

Table 22. Verify Route-map on DC-CORE-01

```
DC-CORE-01# show route-map
route-map PBR, permit, sequence 10
 Match clauses:
  ip address (access-lists): EndpointA-to-EndpointC
 Set clauses:
  ip next-hop verify-availability 192.168.100.2 track 1 [ UP ]
  ip next-hop verify-availability 192.168.200.2 track 2 [ UP ]  force-order
```

```
route-map PBR, permit, sequence 20
  Match clauses:
    ip address (access-lists): EndpointA-to-EndpointD
  Set clauses:
    ip next-hop verify-availability 192.168.200.2 track 2 [ UP ]
    ip next-hop verify-availability 192.168.100.2 track 1 [ UP ]  force-order
route-map PBR, permit, sequence 30
  Match clauses:
    ip address (access-lists): EndpointB-to-EndpointC
  Set clauses:
    ip next-hop verify-availability 192.168.200.2 track 2 [ UP ]
    ip next-hop verify-availability 192.168.100.2 track 1 [ UP ]  force-order
route-map PBR, permit, sequence 40
  Match clauses:
    ip address (access-lists): EndpointB-to-EndpointD
  Set clauses:
    ip next-hop verify-availability 192.168.100.2 track 1 [ UP ]
    ip next-hop verify-availability 192.168.200.2 track 2 [ UP ]  force-order
```

Verify the Route-map on DC-CORE-02, configured Access-list and track status must be UP.

Table 23. Verify Route-map on DC-CORE-02

```
DC-CORE-02# show route-map
route-map PBR, permit, sequence 10
  Match clauses:
    ip address (access-lists): EndpointA-to-EndpointC
  Set clauses:
    ip next-hop verify-availability 192.168.100.2 track 1 [ UP ]
    ip next-hop verify-availability 192.168.200.2 track 2 [ UP ]  force-order
route-map PBR, permit, sequence 20
```

```
  Match clauses:
    ip address (access-lists): EndpointA-to-EndpointD
  Set clauses:
    ip next-hop verify-availability 192.168.200.2 track 2 [ UP ]
    ip next-hop verify-availability 192.168.100.2 track 1 [ UP ]  force-order
route-map PBR, permit, sequence 30
  Match clauses:
    ip address (access-lists): EndpointB-to-EndpointC
  Set clauses:
    ip next-hop verify-availability 192.168.200.2 track 2 [ UP ]
    ip next-hop verify-availability 192.168.100.2 track 1 [ UP ]  force-order
route-map PBR, permit, sequence 40
  Match clauses:
    ip address (access-lists): EndpointB-to-EndpointD
  Set clauses:
    ip next-hop verify-availability 192.168.100.2 track 1 [ UP ]
    ip next-hop verify-availability 192.168.200.2 track 2 [ UP ]  force-order
```

Verify the Route-map on DR-CORE-01, configured Access-list and track status must be UP.

Table 24. Verify Route-map on DR-CORE-01

```
DR-CORE-01# show route-map
route-map PBR, permit, sequence 10
  Match clauses:
    ip address (access-lists): EndpointC-to-EndpointA
  Set clauses:
    ip next-hop verify-availability 192.168.100.1 track 1 [ UP ]
    ip next-hop verify-availability 192.168.200.1 track 2 [ UP ]  force-order
route-map PBR, permit, sequence 20
  Match clauses:
```

```
    ip address (access-lists): EndpointD-to-EndpointA
  Set clauses:
    ip next-hop verify-availability 192.168.200.1 track 2 [ UP ]
    ip next-hop verify-availability 192.168.100.1 track 1 [ UP ]  force-order
route-map PBR, permit, sequence 30
  Match clauses:
    ip address (access-lists): EndpointC-to-EndpointB
  Set clauses:
    ip next-hop verify-availability 192.168.200.1 track 2 [ UP ]
    ip next-hop verify-availability 192.168.100.1 track 1 [ UP ]  force-order
route-map PBR, permit, sequence 40
  Match clauses:
    ip address (access-lists): EndpointD-to-EndpointB
  Set clauses:
    ip next-hop verify-availability 192.168.100.1 track 1 [ UP ]
    ip next-hop verify-availability 192.168.200.1 track 2 [ UP ]  force-order
```

Verify the Route-map on DR-CORE-02, configured Access-list and track status must be UP.

Table 25. Verify Route-map on DR-CORE-02

```
DR-CORE-02# show route-map
route-map PBR, permit, sequence 10
  Match clauses:
    ip address (access-lists): EndpointC-to-EndpointA
  Set clauses:
    ip next-hop verify-availability 192.168.100.1 track 1 [ UP ]
    ip next-hop verify-availability 192.168.200.1 track 2 [ UP ]  force-order
route-map PBR, permit, sequence 20
  Match clauses:
    ip address (access-lists): EndpointD-to-EndpointA
```

```
  Set clauses:
    ip next-hop verify-availability 192.168.200.1 track 2 [ UP ]
    ip next-hop verify-availability 192.168.100.1 track 1 [ UP ]  force-order
route-map PBR, permit, sequence 30
  Match clauses:
    ip address (access-lists): EndpointC-to-EndpointB
  Set clauses:
    ip next-hop verify-availability 192.168.200.1 track 2 [ UP ]
    ip next-hop verify-availability 192.168.100.1 track 1 [ UP ]  force-order
route-map PBR, permit, sequence 40
  Match clauses:
    ip address (access-lists): EndpointD-to-EndpointB
  Set clauses:
    ip next-hop verify-availability 192.168.100.1 track 1 [ UP ]
    ip next-hop verify-availability 192.168.200.1 track 2 [ UP ]  force-order
```

Verification

Ping from HostA to HostC

Table 26. Ping from HostA to HostC

```
PING 192.168.30.10 (192.168.30.10) from 192.168.10.10: 56 data bytes
64 bytes from 192.168.30.10: icmp_seq=0 ttl=251 time=1.016 ms
64 bytes from 192.168.30.10: icmp_seq=1 ttl=251 time=0.502 ms
64 bytes from 192.168.30.10: icmp_seq=2 ttl=251 time=0.455 ms
64 bytes from 192.168.30.10: icmp_seq=3 ttl=251 time=0.424 ms
64 bytes from 192.168.30.10: icmp_seq=4 ttl=251 time=0.682 ms
```

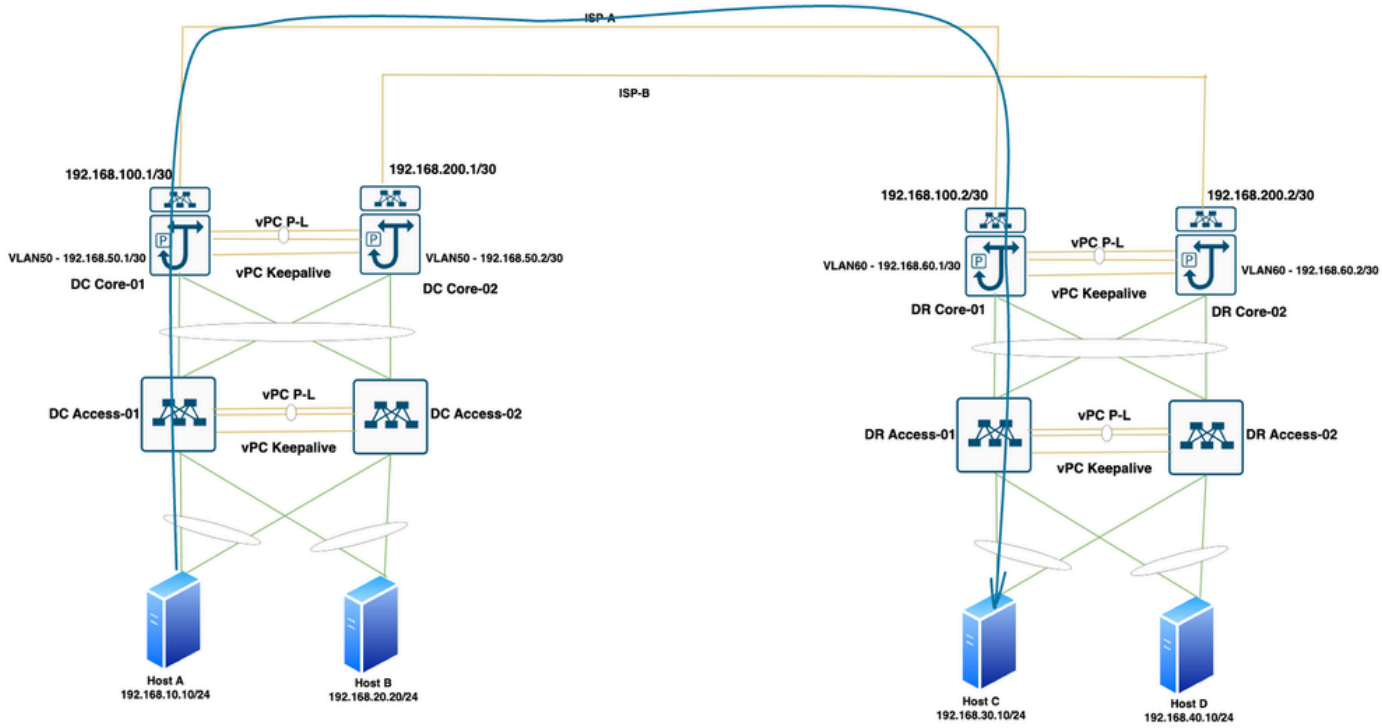
Traceroute from HostA to HostC

Table 27. Traceroute output from HostA to HostC

```
traceroute to 192.168.30.10 (192.168.30.10) from 192.168.10.10 (192.168.10.10), 30 hops max, 48 byte packets

1  192.168.10.2 (192.168.10.2)  0.634 ms  0.59 ms  0.521 ms

2  * * *

3  192.168.30.10 (192.168.30.10)  0.856 ms  0.546 ms  0.475 ms
```

Traffic flow from HostA to HostC

Figure 18. Traffic flow from HostA to HostC



Ping from HostA to HostD

Table 28. Ping from HostA to HostD

```
PING 192.168.40.10 (192.168.40.10) from 192.168.10.10: 56 data bytes

64 bytes from 192.168.40.10: icmp_seq=0 ttl=252 time=0.902 ms

64 bytes from 192.168.40.10: icmp_seq=1 ttl=252 time=0.644 ms

64 bytes from 192.168.40.10: icmp_seq=2 ttl=252 time=0.423 ms

64 bytes from 192.168.40.10: icmp_seq=3 ttl=252 time=0.565 ms

64 bytes from 192.168.40.10: icmp_seq=4 ttl=252 time=0.548 ms
```

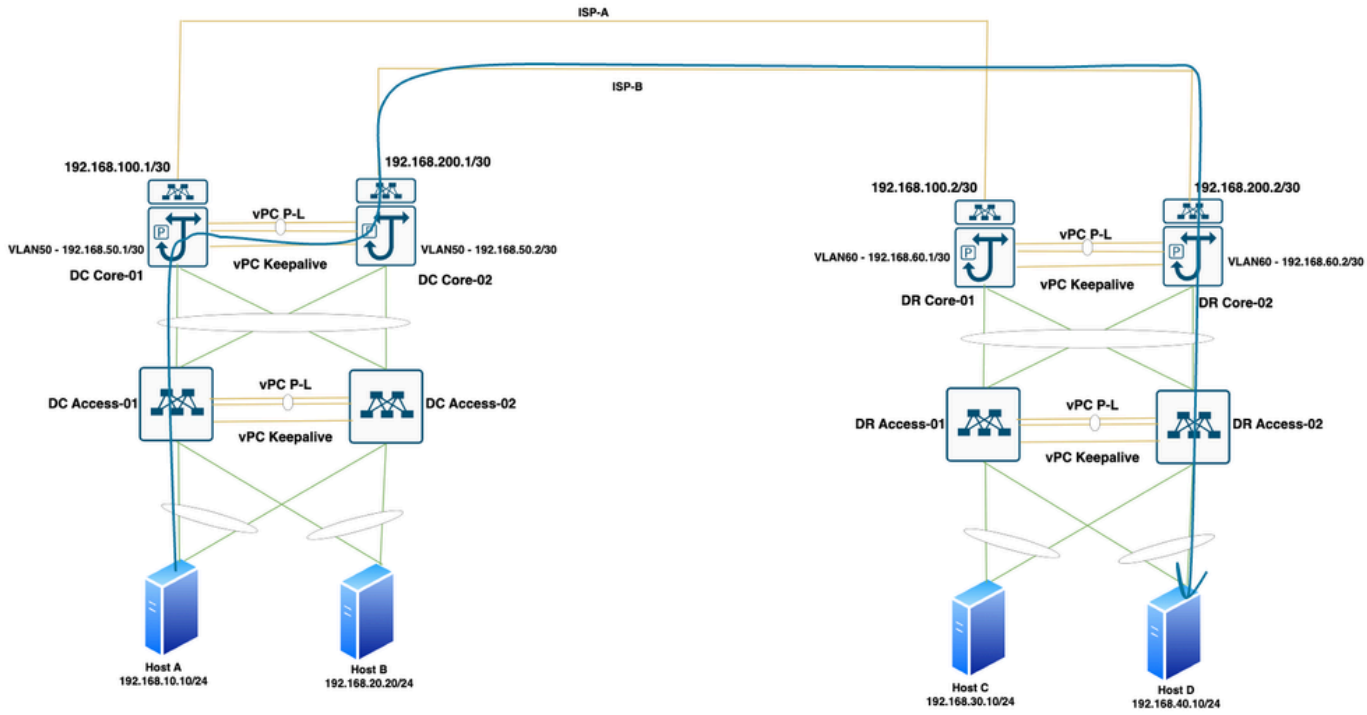
Traceroute from HostA to HostD

Table 29. Traceroute output from HostA to HostD

```
traceroute to 192.168.40.10 (192.168.40.10) from 192.168.10.10 (192.168.10.10), 30 hops max, 48 byte packets

1  192.168.50.2 (192.168.50.2)  0.963 ms  0.847 ms  0.518 ms

2  192.168.50.2 (192.168.50.2)  0.423 ms  0.383 ms  0.369 ms

3  * * *

4  192.168.40.10 (192.168.40.10)  1.094 ms  0.592 ms  0.761 ms
```

Traffic flow from HostA to HostD

Figure 19. Traffic flow from HostA to HostD



Ping from HostB to HostC

Table 30. Ping from HostB to HostC

```
PING 192.168.30.10 (192.168.30.10) from 192.168.20.10: 56 data bytes

64 bytes from 192.168.30.10: icmp_seq=0 ttl=252 time=0.773 ms

64 bytes from 192.168.30.10: icmp_seq=1 ttl=252 time=0.496 ms
```

64 bytes from 192.168.30.10: icmp_seq=2 ttl=252 time=0.635 ms

64 bytes from 192.168.30.10: icmp_seq=3 ttl=252 time=0.655 ms

64 bytes from 192.168.30.10: icmp_seq=4 ttl=252 time=0.629 ms

Traceroute from HostB to HostC

Table 31. Tracroute output from HostB to HostC

traceroute to 192.168.30.10 (192.168.30.10) from 192.168.20.10 (192.168.20.10), 30 hops max, 48 byte packets

1 192.168.50.2 (192.168.50.2) 1.272 ms 0.772 ms 0.779 ms

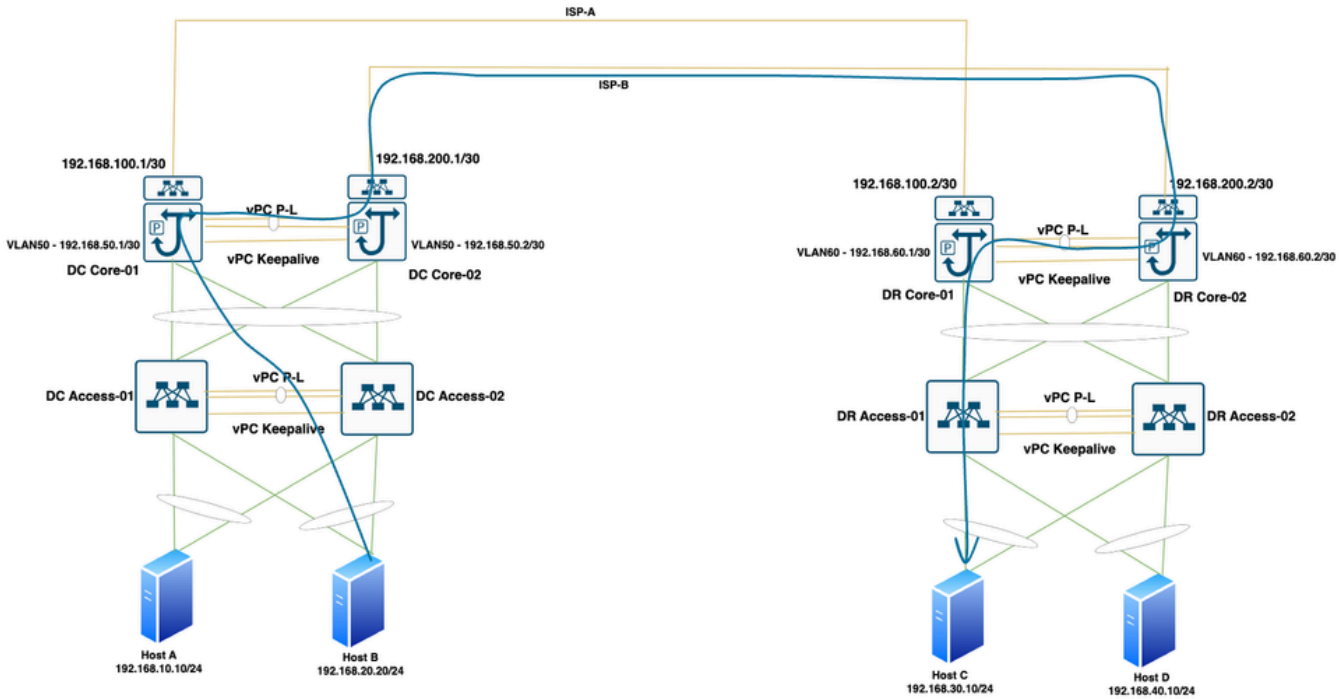
2 192.168.50.2 (192.168.50.2) 0.536 ms 0.49 ms 0.359 ms

3 * * *

4 192.168.30.10 (192.168.30.10) 0.937 ms 0.559 ms 0.446 ms

Traffic flow from HostB to HostC

Figure 20. Traffic flow from HostB to HostC



Ping from HostB to HostD

Table 32. Ping from HostB to HostD

```
PING 192.168.40.10 (192.168.40.10) from 192.168.20.10: 56 data bytes
64 bytes from 192.168.40.10: icmp_seq=0 ttl=251 time=1.052 ms
64 bytes from 192.168.40.10: icmp_seq=1 ttl=251 time=0.516 ms
64 bytes from 192.168.40.10: icmp_seq=2 ttl=251 time=0.611 ms
64 bytes from 192.168.40.10: icmp_seq=3 ttl=251 time=0.498 ms
64 bytes from 192.168.40.10: icmp_seq=4 ttl=251 time=0.487 ms
```

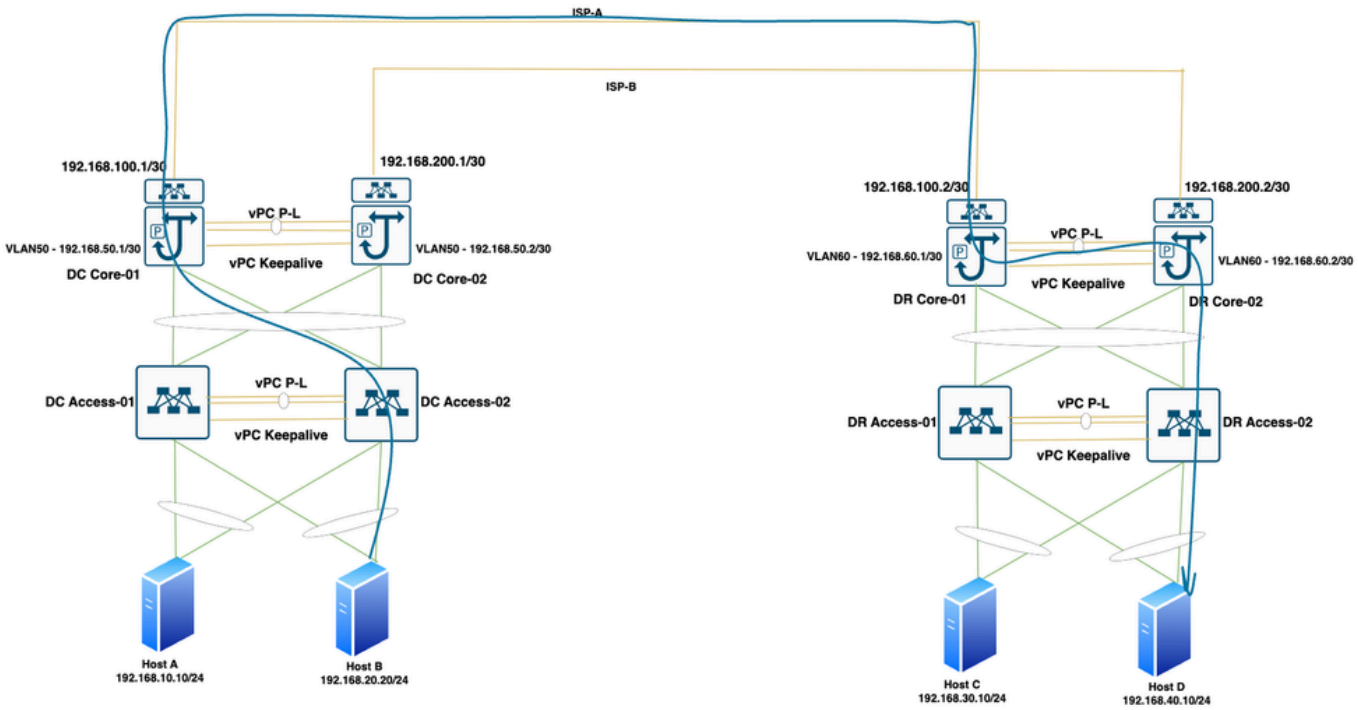
Traceroute from HostB to HostD

Table 33. Traceroute output from HostB to HostD

```
traceroute to 192.168.40.10 (192.168.40.10) from 192.168.20.10 (192.168.20.10), 30 hops max, 48 byte packets
1  192.168.20.2 (192.168.20.2)  0.804 ms  0.467 ms  0.44 ms
2  * * *
3  192.168.40.10 (192.168.40.10)  1.135 ms  0.617 ms  0.74 ms
```

Traffic flow from HostB to HostD

Figure 21. Traffic flow from HostB to HostD



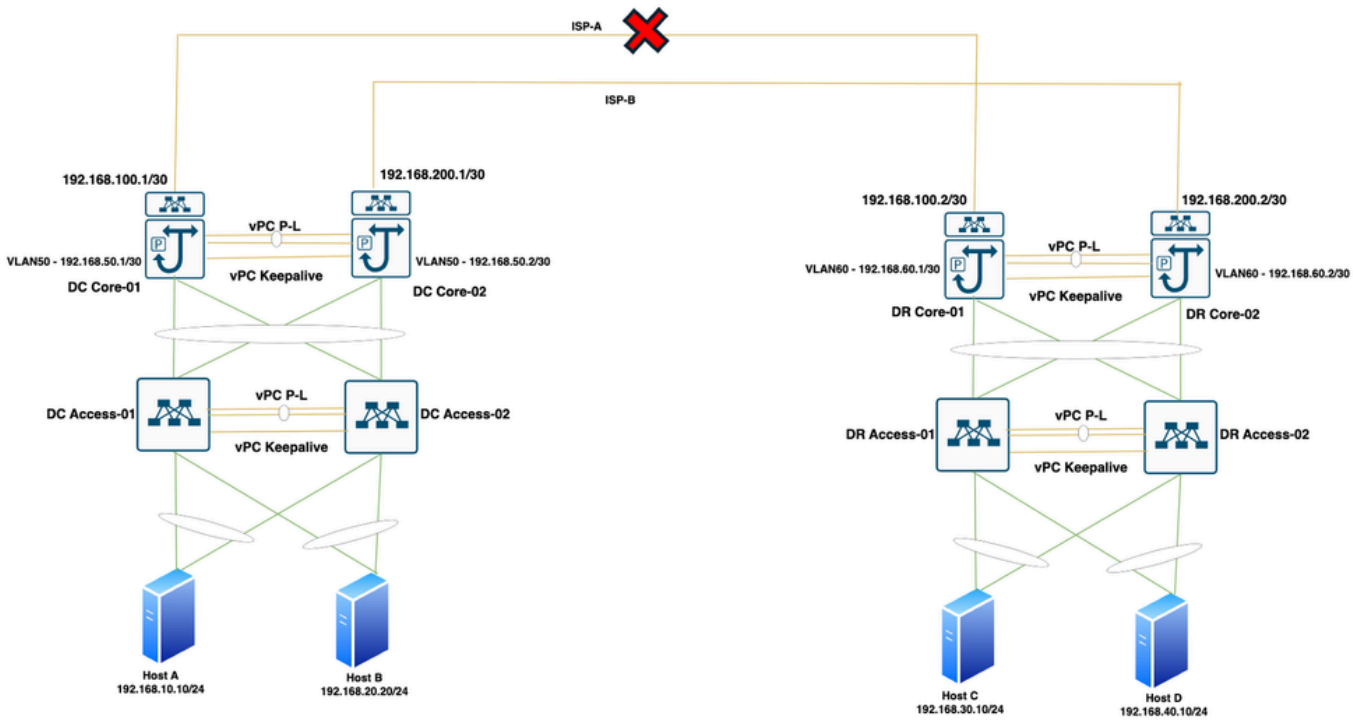
Shutdown ISP-A Link

Table 34. Shutdown ISP-A Link

```
DC-CORE-01(config)# int e1/3
DC-CORE-01(config-if)# shut
DC-CORE-01# show int e1/3
Ethernet1/3 is down (Administratively down)
admin state is down, Dedicated Interface
  Hardware: 100/1000/10000/25000 Ethernet, address: c4b2.3942.2b67 (bia c4b2.3942.2b6a)
  Internet Address is 192.168.100.1/30
```

ISP-A Link Down

Figure 22. ISP-A Link down



Verify track on All the Core Switches after ISP-A Link Down

Table 35. Track output on all the Core Switches.

```
DC-CORE-01# show track
Track 1
```

```
  IP SLA 1 Reachability
  Reachability is DOWN
  15 changes, last change 00:00:08
  Latest operation return code: Timeout
  Tracked by:
    IPv4 Static Route 1
    Route Map Configuration
  Delay up 1 secs, down 1 secs
Track 2
  IP SLA 2 Reachability
  Reachability is UP
  12 changes, last change 07:48:12
  Latest operation return code: OK
  Latest RTT (millisecs): 2
  Tracked by:
    Route Map Configuration
  Delay up 1 secs, down 1 secs
```

Verify Route-map on DC-CORE-01

Table 36. Route-map verification on DC-CORE-01

```
DC-CORE-01# show route-map
route-map PBR, permit, sequence 10
  Match clauses:
    ip address (access-lists): EndpointA-to-EndpointC
  Set clauses:
    ip next-hop verify-availability 192.168.100.2 track 1 [ DOWN ]
    ip next-hop verify-availability 192.168.200.2 track 2 [ UP ]  force-order
route-map PBR, permit, sequence 20
```

```
  Match clauses:
    ip address (access-lists): EndpointA-to-EndpointD
  Set clauses:
    ip next-hop verify-availability 192.168.200.2 track 2 [ UP ]
    ip next-hop verify-availability 192.168.100.2 track 1 [ DOWN ]  force-order
route-map PBR, permit, sequence 30
  Match clauses:
    ip address (access-lists): EndpointB-to-EndpointC
  Set clauses:
    ip next-hop verify-availability 192.168.200.2 track 2 [ UP ]
    ip next-hop verify-availability 192.168.100.2 track 1 [ DOWN ]  force-order
route-map PBR, permit, sequence 40
  Match clauses:
    ip address (access-lists): EndpointB-to-EndpointD
  Set clauses:
    ip next-hop verify-availability 192.168.100.2 track 1 [ DOWN ]
    ip next-hop verify-availability 192.168.200.2 track 2 [ UP ]  force-order
```

Verify Route-map on DC-CORE-02

Table 37. Route-map verification on DC-CORE-02

```
DC-CORE-02# show route-map
route-map PBR, permit, sequence 10
  Match clauses:
    ip address (access-lists): EndpointA-to-EndpointC
  Set clauses:
    ip next-hop verify-availability 192.168.100.2 track 1 [ DOWN ]
    ip next-hop verify-availability 192.168.200.2 track 2 [ UP ]  force-order
route-map PBR, permit, sequence 20
```

```
  Match clauses:
    ip address (access-lists): EndpointA-to-EndpointD
  Set clauses:
    ip next-hop verify-availability 192.168.200.2 track 2 [ UP ]
    ip next-hop verify-availability 192.168.100.2 track 1 [ DOWN ]  force-order
route-map PBR, permit, sequence 30
  Match clauses:
    ip address (access-lists): EndpointB-to-EndpointC
  Set clauses:
    ip next-hop verify-availability 192.168.200.2 track 2 [ UP ]
    ip next-hop verify-availability 192.168.100.2 track 1 [ DOWN ]  force-order
route-map PBR, permit, sequence 40
  Match clauses:
    ip address (access-lists): EndpointB-to-EndpointD
  Set clauses:
    ip next-hop verify-availability 192.168.100.2 track 1 [ DOWN ]
    ip next-hop verify-availability 192.168.200.2 track 2 [ UP ]  force-order
```

Verify Route-map on DR-CORE-01

Table 38. Route-map verification on DR-CORE-01

```
DR-CORE-01# show route-map
route-map PBR, permit, sequence 10
  Match clauses:
    ip address (access-lists): EndpointC-to-EndpointA
  Set clauses:
    ip next-hop verify-availability 192.168.100.1 track 1 [ DOWN ]
    ip next-hop verify-availability 192.168.200.1 track 2 [ UP ]  force-order
route-map PBR, permit, sequence 20
```

```
  Match clauses:
    ip address (access-lists): EndpointD-to-EndpointA
  Set clauses:
    ip next-hop verify-availability 192.168.200.1 track 2 [ UP ]
    ip next-hop verify-availability 192.168.100.1 track 1 [ DOWN ]  force-order
route-map PBR, permit, sequence 30
  Match clauses:
    ip address (access-lists): EndpointC-to-EndpointB
  Set clauses:
    ip next-hop verify-availability 192.168.200.1 track 2 [ UP ]
    ip next-hop verify-availability 192.168.100.1 track 1 [ DOWN ]  force-order
route-map PBR, permit, sequence 40
  Match clauses:
    ip address (access-lists): EndpointD-to-EndpointB
  Set clauses:
    ip next-hop verify-availability 192.168.100.1 track 1 [ DOWN ]
    ip next-hop verify-availability 192.168.200.1 track 2 [ UP ]  force-order
```

Verify Route-map on DR-CORE-02

Table 39. Route-map verification on DC-CORE-02

```
DR-CORE-02# show route-map
route-map PBR, permit, sequence 10
  Match clauses:
    ip address (access-lists): EndpointC-to-EndpointA
  Set clauses:
    ip next-hop verify-availability 192.168.100.1 track 1 [ DOWN ]
    ip next-hop verify-availability 192.168.200.1 track 2 [ UP ]  force-order
route-map PBR, permit, sequence 20
```

```
  Match clauses:
    ip address (access-lists): EndpointD-to-EndpointA
  Set clauses:
    ip next-hop verify-availability 192.168.200.1 track 2 [ UP ]
    ip next-hop verify-availability 192.168.100.1 track 1 [ DOWN ]  force-order
route-map PBR, permit, sequence 30
  Match clauses:
    ip address (access-lists): EndpointC-to-EndpointB
  Set clauses:
    ip next-hop verify-availability 192.168.200.1 track 2 [ UP ]
    ip next-hop verify-availability 192.168.100.1 track 1 [ DOWN ]  force-order
route-map PBR, permit, sequence 40
  Match clauses:
    ip address (access-lists): EndpointD-to-EndpointB
  Set clauses:
    ip next-hop verify-availability 192.168.100.1 track 1 [ DOWN ]
    ip next-hop verify-availability 192.168.200.1 track 2 [ UP ]  force-order
```

Ping from HostA to HostC

Table 40. Ping from HostA to HostC

```
PING 192.168.30.10 (192.168.30.10) from 192.168.10.10: 56 data bytes
64 bytes from 192.168.30.10: icmp_seq=0 ttl=252 time=0.923 ms
64 bytes from 192.168.30.10: icmp_seq=1 ttl=252 time=0.563 ms
64 bytes from 192.168.30.10: icmp_seq=2 ttl=252 time=0.591 ms
64 bytes from 192.168.30.10: icmp_seq=3 ttl=252 time=0.585 ms
64 bytes from 192.168.30.10: icmp_seq=4 ttl=252 time=0.447 ms
```

Traceroute from HostA to HostC

Table 41. Traceroute output from HostA to HostC

traceroute to 192.168.30.10 (192.168.30.10) from 192.168.10.10 (192.168.10.10), 30 hops max, 48 byte packets

1 192.168.50.2 (192.168.50.2) 1.08 ms 0.603 ms 0.559 ms

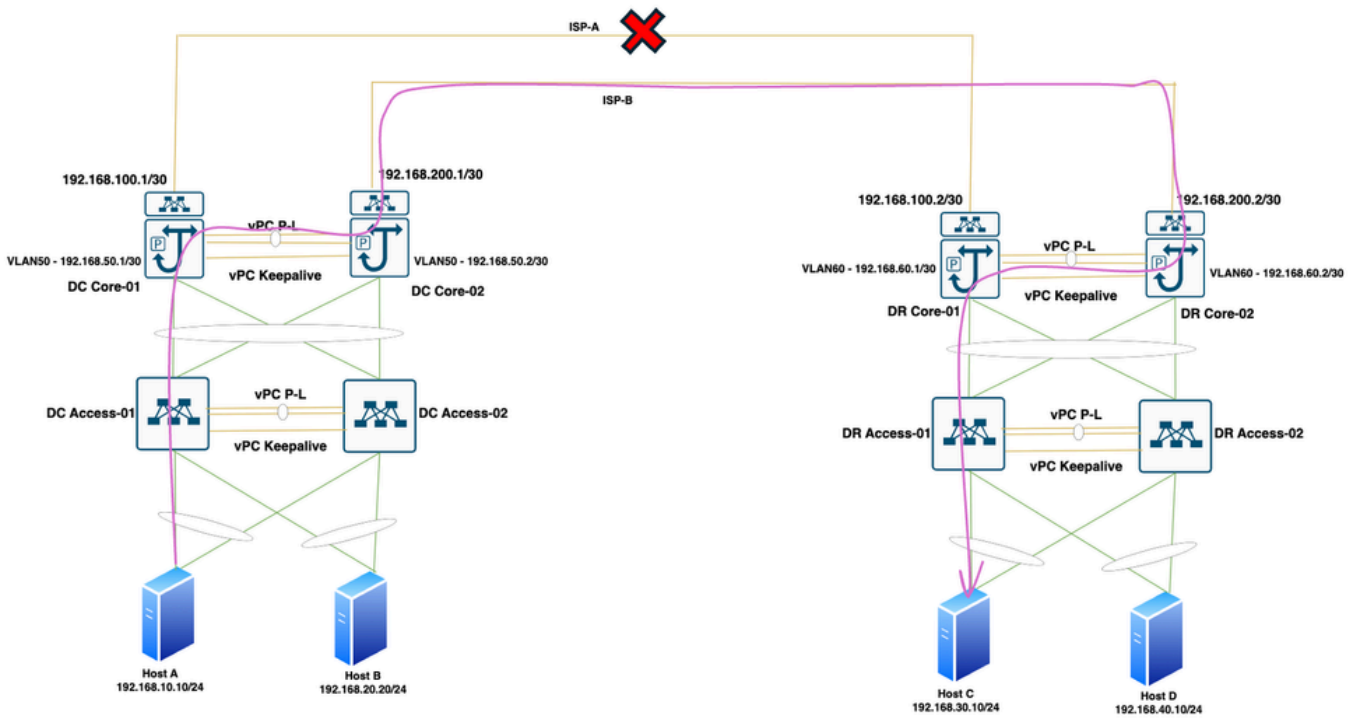
2 192.168.50.2 (192.168.50.2) 0.385 ms 0.367 ms 0.363 ms

3 * * *

4 192.168.30.10 (192.168.30.10) 1.205 ms 0.597 ms 0.45 ms

Traffic flow from HostA to HostC

Figure 23. Traffic flow from HostA to HostC



Ping HostA to HostD

Table 42. Ping from HostA to HostD

PING 192.168.40.10 (192.168.40.10) from 192.168.10.10: 56 data bytes

64 bytes from 192.168.40.10: icmp_seq=0 ttl=252 time=0.893 ms

64 bytes from 192.168.40.10: icmp_seq=1 ttl=252 time=0.459 ms

64 bytes from 192.168.40.10: icmp_seq=2 ttl=252 time=0.421 ms

64 bytes from 192.168.40.10: icmp_seq=3 ttl=252 time=0.582 ms

64 bytes from 192.168.40.10: icmp_seq=4 ttl=252 time=0.588 ms

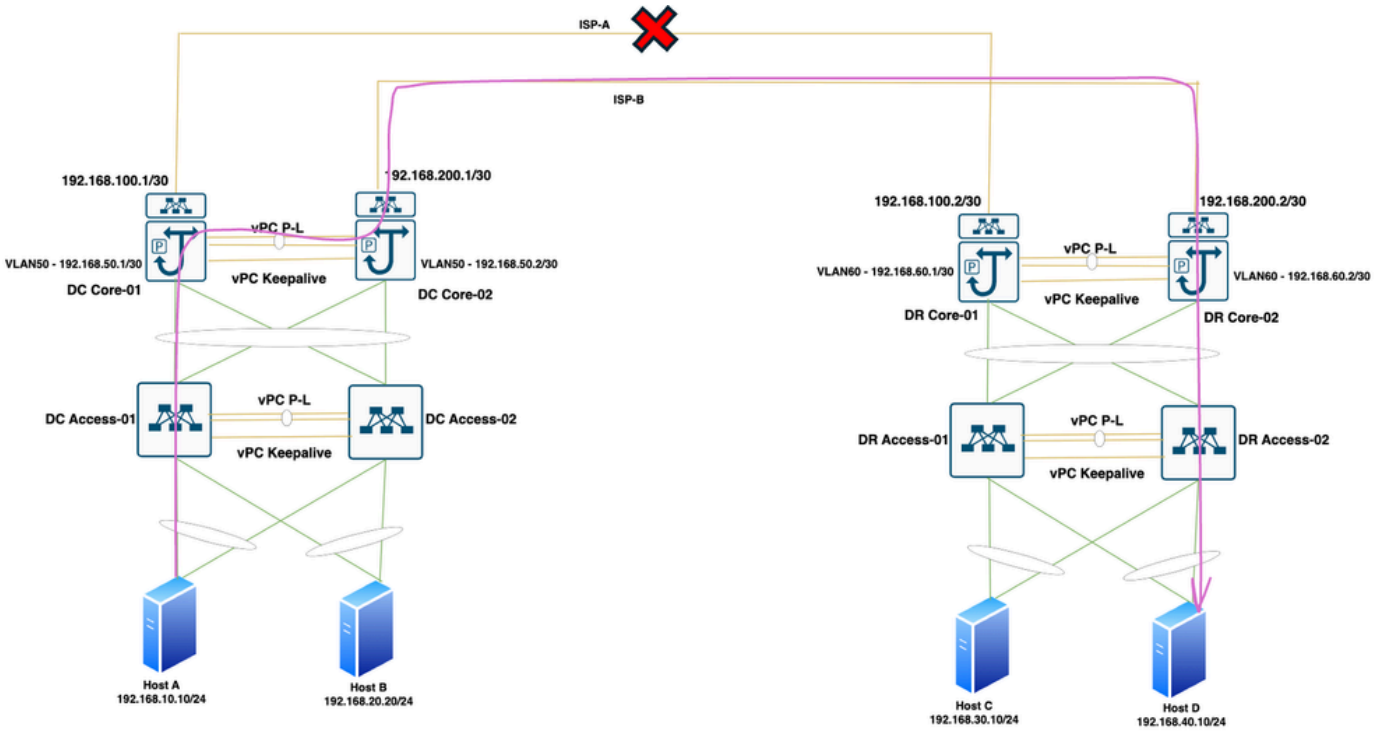
Traceroute HostA to HostD

Table 43. Traceroute output from HostA to HostD

```
traceroute to 192.168.40.10 (192.168.40.10) from 192.168.10.10 (192.168.10.10), 30 hops max, 48 byte packets

1  192.168.50.2 (192.168.50.2)  1.012 ms  0.724 ms  0.801 ms

2  192.168.50.2 (192.168.50.2)  0.567 ms  0.4 ms  0.381 ms

3  * * *

4  192.168.40.10 (192.168.40.10)  0.929 ms  0.6 ms  0.466 ms
```

Traffic flow from HostA to HostD

Figure 24. Traffic flow from HostA to HostD



Ping from HostB to HostC

Table 44. Ping from HostB to HostC

```
PING 192.168.30.10 (192.168.30.10) from 192.168.20.10: 56 data bytes

64 bytes from 192.168.30.10: icmp_seq=0 ttl=252 time=0.899 ms

64 bytes from 192.168.30.10: icmp_seq=1 ttl=252 time=0.496 ms

64 bytes from 192.168.30.10: icmp_seq=2 ttl=252 time=0.511 ms
```

```
64 bytes from 192.168.30.10: icmp_seq=3 ttl=252 time=0.447 ms

64 bytes from 192.168.30.10: icmp_seq=4 ttl=252 time=0.58 ms
```

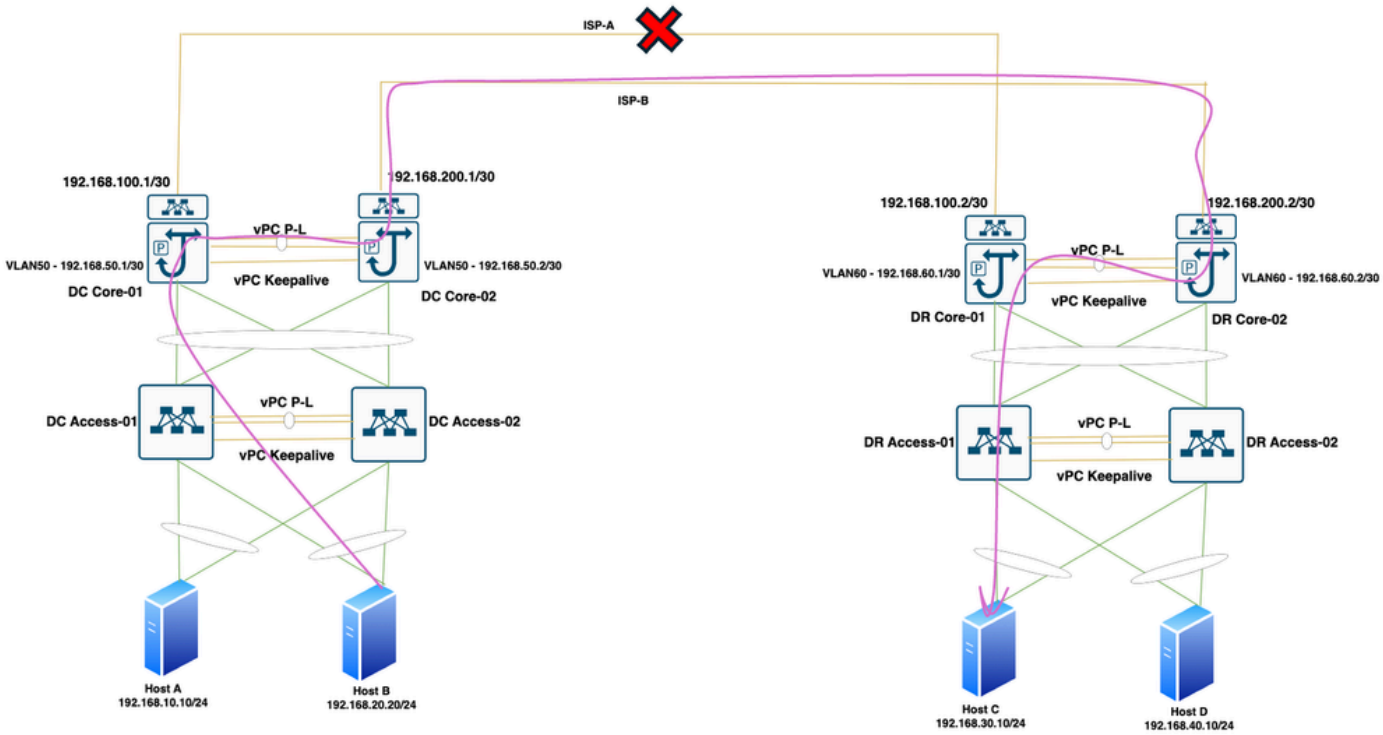
Traceroute from HostB to HostC

Table 45. Traceroute output from HostB to HostC

```
traceroute to 192.168.30.10 (192.168.30.10) from 192.168.20.10 (192.168.20.10), 30 hops max, 48 byte packets

1  192.168.50.2 (192.168.50.2)  1.147 ms  0.699 ms  0.525 ms

2  192.168.50.2 (192.168.50.2)  0.443 ms  0.415 ms  0.386 ms

3  * * *

4  192.168.30.10 (192.168.30.10)  0.731 ms  0.506 ms  0.465 ms
```

Traffic flow from HostB to HostC

Figure 25. Traffic flow from HostB to HostC



Ping from HostB to HostD

Table 46. Ping from HostB to HostD

```
PING 192.168.40.10 (192.168.40.10) from 192.168.20.10: 56 data bytes
```

64 bytes from 192.168.40.10: icmp_seq=0 ttl=252 time=0.797 ms

64 bytes from 192.168.40.10: icmp_seq=1 ttl=252 time=0.479 ms

64 bytes from 192.168.40.10: icmp_seq=2 ttl=252 time=0.439 ms

64 bytes from 192.168.40.10: icmp_seq=3 ttl=252 time=0.416 ms

64 bytes from 192.168.40.10: icmp_seq=4 ttl=252 time=0.411 ms

Traceroute from HostB to HostD

Table 47. Traceroute output from HostB to HostD

traceroute to 192.168.40.10 (192.168.40.10) from 192.168.20.10 (192.168.20.10), 30 hops max, 48 byte packets

1 192.168.50.2 (192.168.50.2) 1.092 ms 0.706 ms 0.627 ms

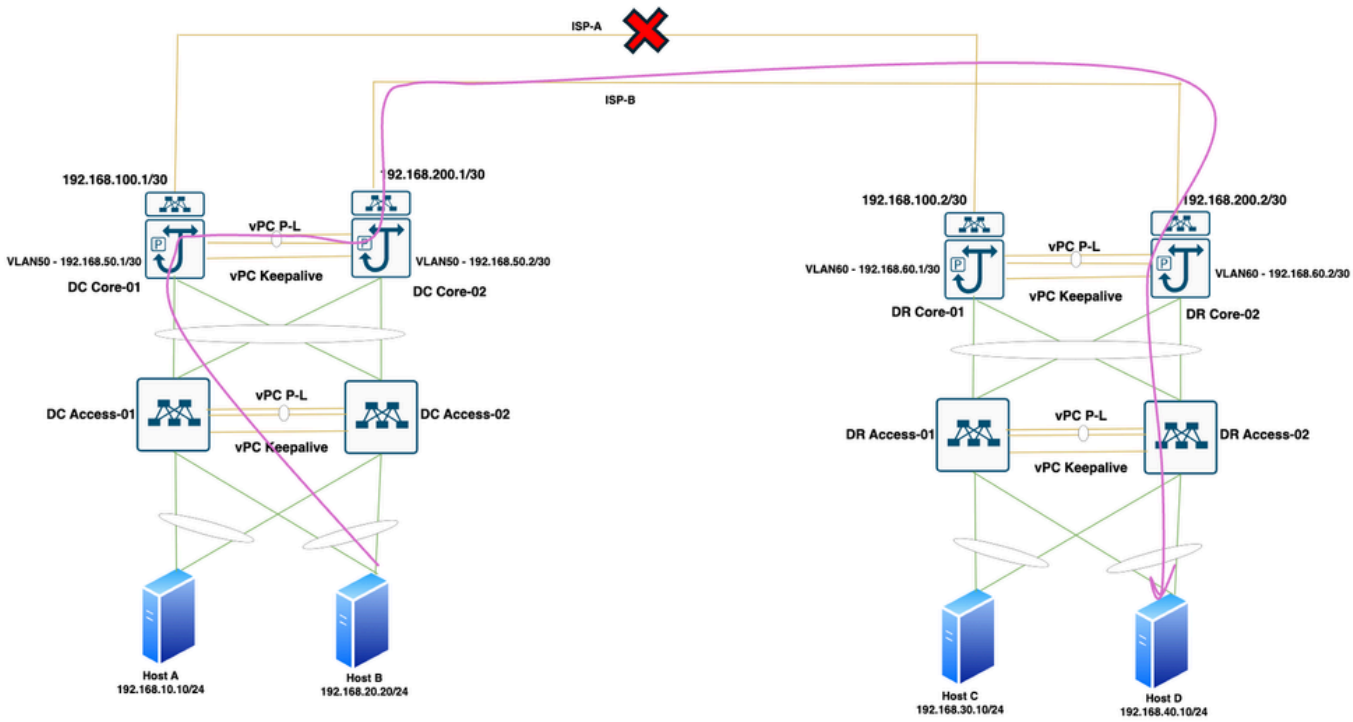
2 192.168.50.2 (192.168.50.2) 0.537 ms 0.389 ms 0.378 ms

3 * * *

4 192.168.40.10 (192.168.40.10) 0.939 ms 0.52 ms 0.459 ms

Traffic flow from HostB to HostD

Figure 26. Traffic flow from HostB to HostD



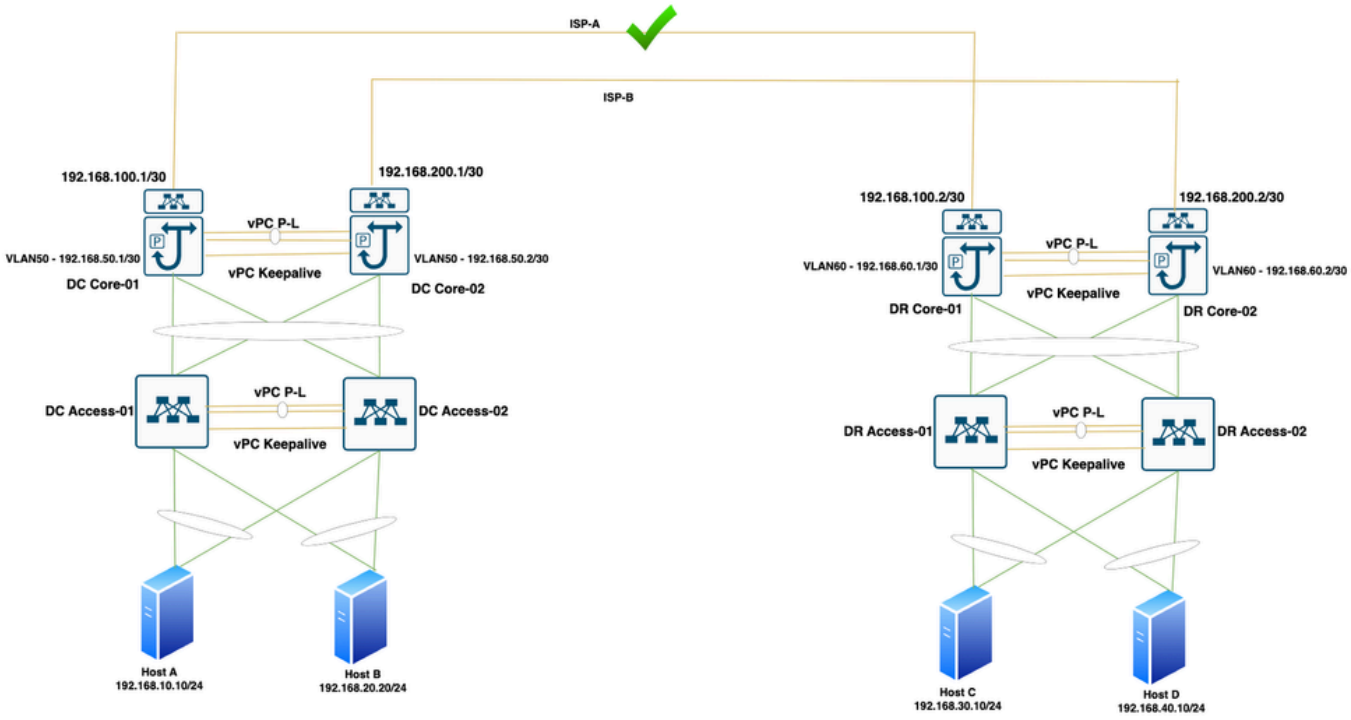
No shut ISP-A Link

Table 48. No shut ISP-A Link

```
DC-CORE-01(config)# int e1/3
DC-CORE-01(config-if)# no shut
DC-CORE-01(config-if)# exit
DC-CORE-01(config)# show int e1/3
Ethernet1/3 is up
admin state is up, Dedicated Interface
  Hardware: 100/1000/10000/25000 Ethernet, address: c4b2.3942.2b67 (bia c4b2.3942.2b6a)
  Internet Address is 192.168.100.1/30
```

ISP-A Link UP

Figure 27. ISP-A Link UP



Shutdown ISP-B Link

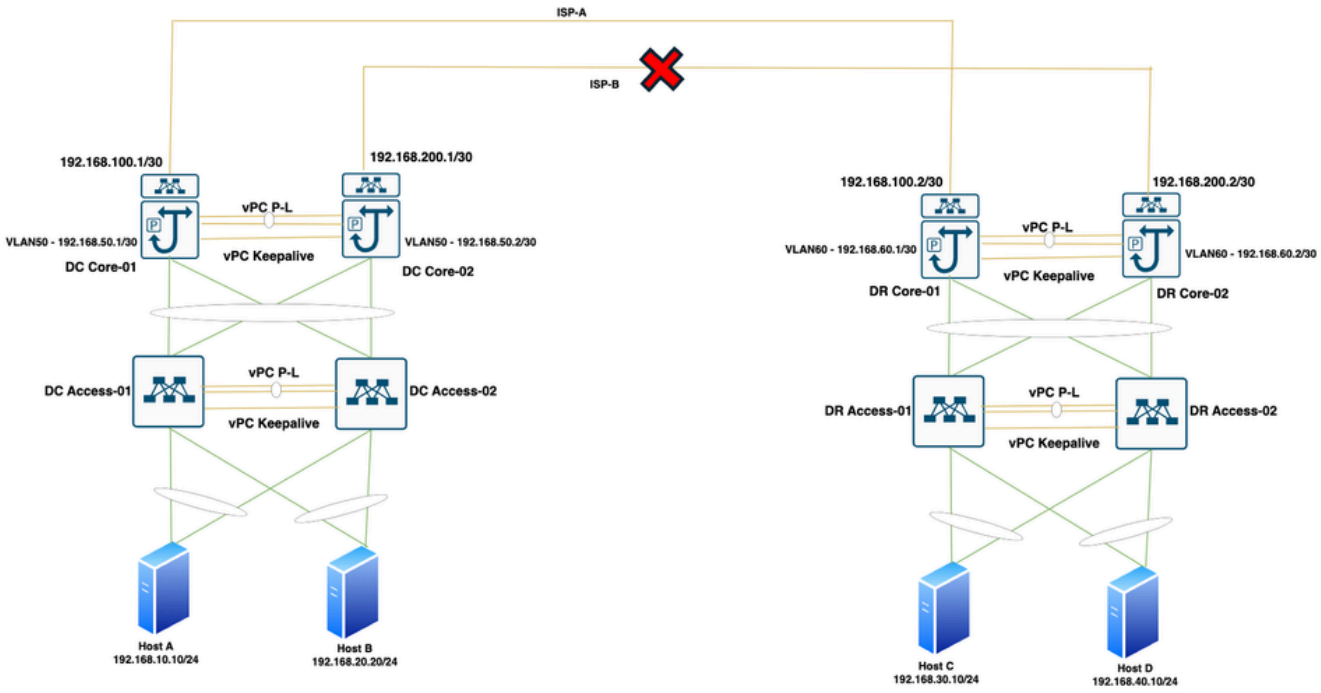
Table 49. Shutdown ISP-B Link

```
DC-CORE-02(config)# int e1/5
DC-CORE-02(config-if)# shut
```

```
DC-CORE-02(config-if)# show interface e1/5
Ethernet1/5 is down (Administratively down)
admin state is down, Dedicated Interface
  Hardware: 100/1000/10000/25000 Ethernet, address: 4ce1.7517.03c7 (bia 4ce1.7517.03cc)
  Internet Address is 192.168.200.1/30
```

ISP-B Link Down

Figure 28. ISP-B Link down



Verify track on All the Core Switches after ISP-B Link Down

Table 50. Track output on all the Core Switches.

```
DC-CORE-01# show track
Track 1
  IP SLA 1 Reachability
  Reachability is UP
  16 changes, last change 00:02:16
  Latest operation return code: OK
  Latest RTT (millisecs): 1
  Tracked by:
```

```
   IPv4 Static Route 1
   Route Map Configuration
  Delay up 1 secs, down 1 secs
Track 2
  IP SLA 2 Reachability
  Reachability is DOWN
  13 changes, last change 00:00:10
  Latest operation return code: Timeout
  Tracked by:
   Route Map Configuration
  Delay up 1 secs, down 1 secs
```

Verify Route-map on DC-CORE-01

Table 51. Route-map verification on DC-CORE-01

```
DC-CORE-01# show route-map
route-map PBR, permit, sequence 10
  Match clauses:
    ip address (access-lists): EndpointA-to-EndpointC
  Set clauses:
    ip next-hop verify-availability 192.168.100.2 track 1 [ UP ]
    ip next-hop verify-availability 192.168.200.2 track 2 [ DOWN ]  force-order
route-map PBR, permit, sequence 20
  Match clauses:
    ip address (access-lists): EndpointA-to-EndpointD
  Set clauses:
    ip next-hop verify-availability 192.168.200.2 track 2 [ DOWN ]
    ip next-hop verify-availability 192.168.100.2 track 1 [ UP ]  force-order
route-map PBR, permit, sequence 30
```

```
  Match clauses:
    ip address (access-lists): EndpointB-to-EndpointC
  Set clauses:
    ip next-hop verify-availability 192.168.200.2 track 2 [ DOWN ]
    ip next-hop verify-availability 192.168.100.2 track 1 [ UP ]  force-order
route-map PBR, permit, sequence 40
  Match clauses:
    ip address (access-lists): EndpointB-to-EndpointD
  Set clauses:
    ip next-hop verify-availability 192.168.100.2 track 1 [ UP ]
    ip next-hop verify-availability 192.168.200.2 track 2 [ DOWN ]  force-order
```

Verify Route-map on DC-CORE-02

Table 52. Route-map verification on DC-CORE-02

```
DC-CORE-02# show route-map
route-map PBR, permit, sequence 10
  Match clauses:
    ip address (access-lists): EndpointA-to-EndpointC
  Set clauses:
    ip next-hop verify-availability 192.168.100.2 track 1 [ UP ]
    ip next-hop verify-availability 192.168.200.2 track 2 [ DOWN ]  force-order
route-map PBR, permit, sequence 20
  Match clauses:
    ip address (access-lists): EndpointA-to-EndpointD
  Set clauses:
    ip next-hop verify-availability 192.168.200.2 track 2 [ DOWN ]
    ip next-hop verify-availability 192.168.100.2 track 1 [ UP ]  force-order
route-map PBR, permit, sequence 30
  Match clauses:
```

```
    ip address (access-lists): EndpointB-to-EndpointC
  Set clauses:
    ip next-hop verify-availability 192.168.200.2 track 2 [ DOWN ]
    ip next-hop verify-availability 192.168.100.2 track 1 [ UP ]  force-order
route-map PBR, permit, sequence 40
  Match clauses:
    ip address (access-lists): EndpointB-to-EndpointD
  Set clauses:
    ip next-hop verify-availability 192.168.100.2 track 1 [ UP ]
    ip next-hop verify-availability 192.168.200.2 track 2 [ DOWN ]  force-order
```

Verify Route-map on DR-CORE-01

Table 53. Route-map verification on DR-CORE-01

```
DR-CORE-01# show route-map
route-map PBR, permit, sequence 10
  Match clauses:
    ip address (access-lists): EndpointC-to-EndpointA
  Set clauses:
    ip next-hop verify-availability 192.168.100.1 track 1 [ UP ]
    ip next-hop verify-availability 192.168.200.1 track 2 [ DOWN ]  force-order
route-map PBR, permit, sequence 20
  Match clauses:
    ip address (access-lists): EndpointD-to-EndpointA
  Set clauses:
    ip next-hop verify-availability 192.168.200.1 track 2 [ DOWN ]
    ip next-hop verify-availability 192.168.100.1 track 1 [ UP ]  force-order
route-map PBR, permit, sequence 30
  Match clauses:
    ip address (access-lists): EndpointC-to-EndpointB
```

```
  Set clauses:
    ip next-hop verify-availability 192.168.200.1 track 2 [ DOWN ]
    ip next-hop verify-availability 192.168.100.1 track 1 [ UP ]  force-order
route-map PBR, permit, sequence 40
  Match clauses:
    ip address (access-lists): EndpointD-to-EndpointB
  Set clauses:
    ip next-hop verify-availability 192.168.100.1 track 1 [ UP ]
    ip next-hop verify-availability 192.168.200.1 track 2 [ DOWN ]  force-order
```

Verify Route-map on DR-CORE-02

Table 54. Route-map verification on DR-CORE-02

```
DR-CORE-02# show route-map
route-map PBR, permit, sequence 10
  Match clauses:
    ip address (access-lists): EndpointC-to-EndpointA
  Set clauses:
    ip next-hop verify-availability 192.168.100.1 track 1 [ UP ]
    ip next-hop verify-availability 192.168.200.1 track 2 [ DOWN ]  force-order
route-map PBR, permit, sequence 20
  Match clauses:
    ip address (access-lists): EndpointD-to-EndpointA
  Set clauses:
    ip next-hop verify-availability 192.168.200.1 track 2 [ DOWN ]
    ip next-hop verify-availability 192.168.100.1 track 1 [ UP ]  force-order
route-map PBR, permit, sequence 30
  Match clauses:
    ip address (access-lists): EndpointC-to-EndpointB
  Set clauses:
```

```
   ip next-hop verify-availability 192.168.200.1 track 2 [ DOWN ]
   ip next-hop verify-availability 192.168.100.1 track 1 [ UP ]  force-order
route-map PBR, permit, sequence 40
  Match clauses:
   ip address (access-lists): EndpointD-to-EndpointB
  Set clauses:
   ip next-hop verify-availability 192.168.100.1 track 1 [ UP ]
   ip next-hop verify-availability 192.168.200.1 track 2 [ DOWN ]  force-order
```

Ping from HostA to HostC

Table 55. Ping from HostA to HostC

```
PING 192.168.30.10 (192.168.30.10) from 192.168.10.10: 56 data bytes
64 bytes from 192.168.30.10: icmp_seq=0 ttl=251 time=1.011 ms
64 bytes from 192.168.30.10: icmp_seq=1 ttl=251 time=0.555 ms
64 bytes from 192.168.30.10: icmp_seq=2 ttl=251 time=0.754 ms
64 bytes from 192.168.30.10: icmp_seq=3 ttl=251 time=0.495 ms
64 bytes from 192.168.30.10: icmp_seq=4 ttl=251 time=0.484 ms
```

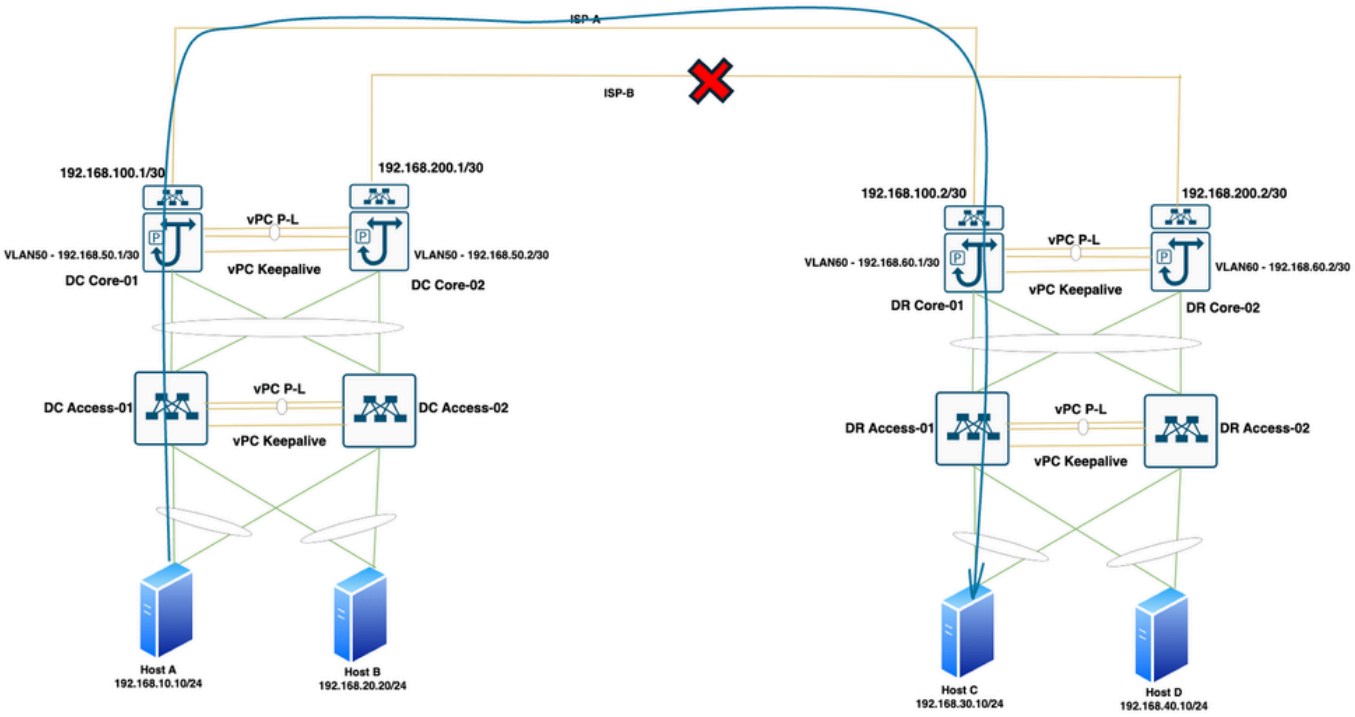
Traceroute from HostA to HostC

Table 56. Tracerout output from HostA to HostC

```
DR-CORE-01# traceroute 192.168.30.10 source 192.168.10.10 vrf DC-EPA
traceroute to 192.168.30.10 (192.168.30.10) from 192.168.10.10 (192.168.10.10), 30 hops max, 48 byte packets
1  192.168.10.2 (192.168.10.2)  0.684 ms  0.393 ms  0.38 ms
2  * * *
3  192.168.30.10 (192.168.30.10)  1.119 ms  0.547 ms  0.496 ms
```

Traffic flow from HostA to HostC

Figure 29. Traffic flow from HostA to HostC



Ping from HostA to HostD

Table 57. Ping from HostA to HostD

```
PING 192.168.40.10 (192.168.40.10) from 192.168.10.10: 56 data bytes
64 bytes from 192.168.40.10: icmp_seq=0 ttl=251 time=0.785 ms
64 bytes from 192.168.40.10: icmp_seq=1 ttl=251 time=0.606 ms
64 bytes from 192.168.40.10: icmp_seq=2 ttl=251 time=0.43 ms
64 bytes from 192.168.40.10: icmp_seq=3 ttl=251 time=0.549 ms
64 bytes from 192.168.40.10: icmp_seq=4 ttl=251 time=0.538 ms
```

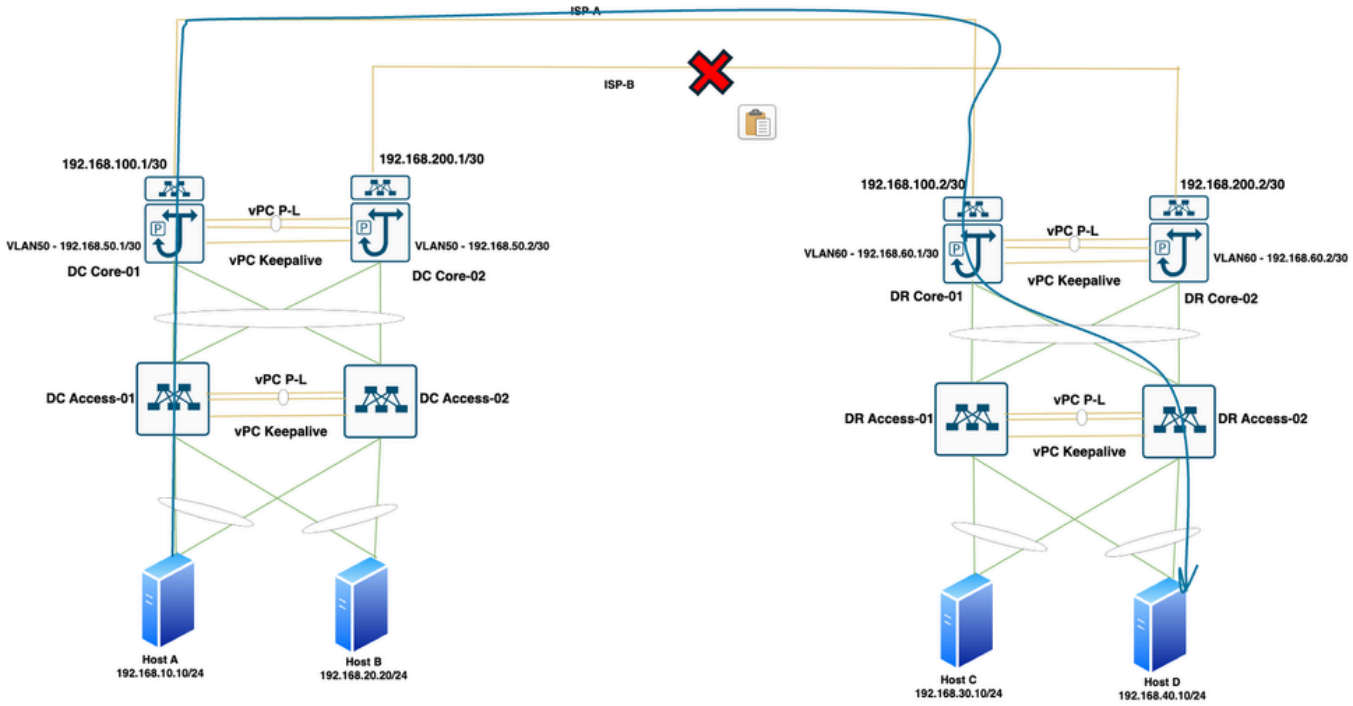
Traceroute from HostA to HostD

Table 58. Tracerout output from HostA to HostD

```
traceroute to 192.168.40.10 (192.168.40.10) from 192.168.10.10 (192.168.10.10), 30 hops max, 48 byte packets
1  192.168.10.2 (192.168.10.2)  0.746 ms  0.486 ms  0.395 ms
2  * * *
3  192.168.40.10 (192.168.40.10)  0.994 ms  0.537 ms  0.569 ms
```

Traffic flow from HostA to HostD

Figure 30. Traffic flow from HostA to HostD



Ping from HostB to HostC

Table 59. Ping from HostA to HostD

PING 192.168.30.10 (192.168.30.10) from 192.168.20.10: 56 data bytes
64 bytes from 192.168.30.10: icmp_seq=0 ttl=251 time=0.928 ms
64 bytes from 192.168.30.10: icmp_seq=1 ttl=251 time=0.539 ms
64 bytes from 192.168.30.10: icmp_seq=2 ttl=251 time=0.456 ms
64 bytes from 192.168.30.10: icmp_seq=3 ttl=251 time=0.441 ms
64 bytes from 192.168.30.10: icmp_seq=4 ttl=251 time=0.548 ms

Traceroute from HostB to HostC

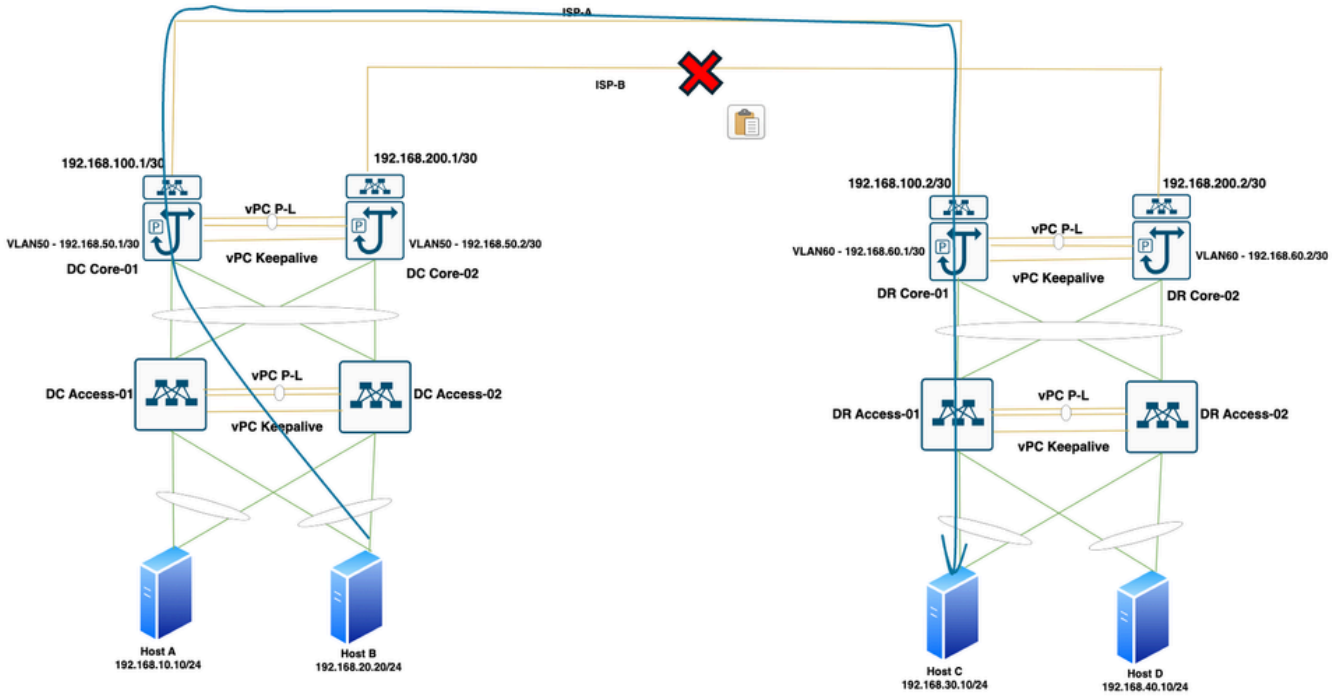
Table 60. Tracerout output from HostB to HostC

traceroute to 192.168.30.10 (192.168.30.10) from 192.168.20.10 (192.168.20.10), 30 hops max, 48 byte packets
1 192.168.20.2 (192.168.20.2) 0.764 ms 0.463 ms 0.482 ms

```
2  * * *

3  192.168.30.10 (192.168.30.10)  0.979 ms  0.697 ms  0.578 ms
```

Traffic flow from HostB to HostC

Figure 31. Traffic flow from HostB to HostC



Ping from HostB to HostD

Table 61. Ping from HostA to HostD

```
PING 192.168.40.10 (192.168.40.10) from 192.168.20.10: 56 data bytes

64 bytes from 192.168.40.10: icmp_seq=0 ttl=251 time=0.859 ms

64 bytes from 192.168.40.10: icmp_seq=1 ttl=251 time=0.623 ms

64 bytes from 192.168.40.10: icmp_seq=2 ttl=251 time=0.637 ms

64 bytes from 192.168.40.10: icmp_seq=3 ttl=251 time=0.449 ms

64 bytes from 192.168.40.10: icmp_seq=4 ttl=251 time=0.446 ms
```

Traceroute from HostB to HostD

Table 62. Tracerout output from HostB to HostC

traceroute to 192.168.40.10 (192.168.40.10) from 192.168.20.10 (192.168.20.10), 30 hops max, 48 byte packets

1 192.168.20.2 (192.168.20.2) 0.783 ms 0.446 ms 0.4 ms

2 * * *

3 192.168.40.10 (192.168.40.10) 1.216 ms 0.559 ms 0.504 ms

Traffic flow from HostB to HostD

Figure 32. Traffic flow from HostB to HostD