

Routing
Switching
Tigers
Forum

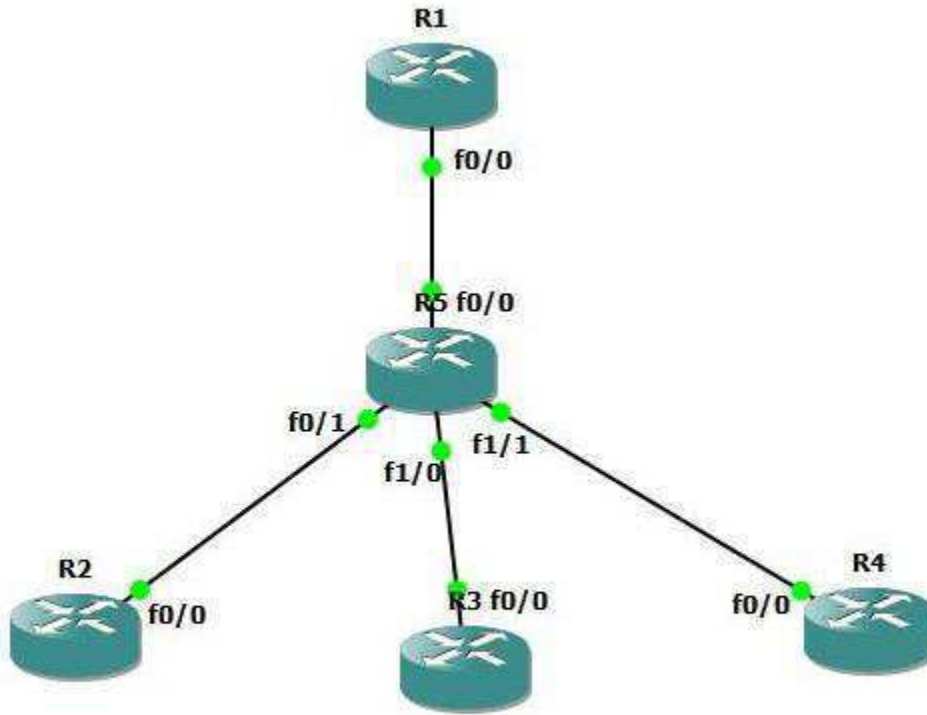


DMVPN



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DMVPN Topology



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LAB 2: Configure EIGRP over DMVPN:

Task 1: Configure EIGRP over DMVPN Process

Step 1 In the configuration mode of router configure EIGRP over DMVPN by following command:

R1:

```
router eigrp 100
network 192.168.0.0 255.255.0.0
network 11.0.0.0 255.0.0.0
exit
```

R2:

```
router eigrp 100
network 192.168.0.0
network 22.0.0.0 255.0.0.0
exit
```

R3:

```
router eigrp 100
network 192.168.0.0
network 33.0.0.0 255.0.0.0
exit
```

R4:

```
router eigrp 100
network 192.168.0.0
network 44.0.0.0 255.0.0.0
exit
```

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Task 2: EIGRP over DMVPN Verification

Step 1 Verify routing table and EIGRP routes entries

```
R2# show ip route
```

```
Codes: C - connected, S - static, R - RIP, M - mobile, B - BGP  
D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area  
N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
```

Gateway of last resort is 172.16.2.1 to network 0.0.0.0

```
172.16.0.0/30 is subnetted, 1 subnets  
C    172.16.2.0 is directly connected, FastEthernet0/0  
22.0.0.0/8 is variably subnetted, 2 subnets, 2 masks  
C    22.22.22.0/24 is directly connected, Loopback1  
D    22.0.0.0/8 is a summary, 00:02:33, Null0  
D    11.0.0.0/8 [90/27008000] via 192.168.0.1, 00:02:45, Tunnel0  
C    192.168.0.0/24 is directly connected, Tunnel0  
S*  0.0.0.0/0 [1/0] via 172.16.2.1
```

Spoke router 2 is not receiving routes from other Spoke routers. This is due to ip split-horizon enable on hub router, thus not allowing the hub to send routes via same interface

```
R3# show ip route
```

```
Codes: C - connected, S - static, R - RIP, M - mobile, B - BGP  
D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area  
N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2  
E1 - OSPF external type 1, E2 - OSPF external type 2
```

Gateway of last resort is 172.16.3.1 to network 0.0.0.0

```
33.0.0.0/24 is subnetted, 1 subnets  
C    33.33.33.0 is directly connected, Loopback1  
172.16.0.0/30 is subnetted, 1 subnets  
C    172.16.3.0 is directly connected, FastEthernet0/0  
11.0.0.0/24 is subnetted, 1 subnets  
D    11.11.11.0 [90/27008000] via 192.168.0.1, 00:00:10, Tunnel0  
C    192.168.0.0/24 is directly connected, Tunnel0  
S*  0.0.0.0/0 [1/0] via 172.16.3.1
```

Spoke router 3 is not receiving routes from other Spoke routers. This is due to ip split-horizon enable on hub router, thus not allowing the hub to send routes via same interface

R1:

```
interface tunnel 0
no ip split-horizon eigrp 100
exit
```

To receive routes from one Spoke router to other spoke router, disable Split Horizon by configuring following command 'no ip split-horizon eigrp 100' on Hub router

R2#show ip route

Codes: C - connected, S - static, R - RIP, M - mobile, B - BGP

D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area

N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2

E1 - OSPF external type 1, E2 - OSPF external type 2

i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2

ia - IS-IS inter area, * - candidate default, U - per-user static route

o - ODR, P - periodic downloaded static route

Gateway of last resort is 172.16.2.1 to network 0.0.0.0

```
33.0.0.0/24 is subnetted, 1 subnets
D   33.33.33.0 [90/28288000] via 192.168.0.1, 00:00:36, Tunnel0
172.16.0.0/30 is subnetted, 1 subnets
C   172.16.2.0 is directly connected, FastEthernet0/0
22.0.0.0/24 is subnetted, 1 subnets
C   22.22.22.0 is directly connected, Loopback1
11.0.0.0/24 is subnetted, 1 subnets
D   11.11.11.0 [90/27008000] via 192.168.0.1, 00:05:43, Tunnel0
C   192.168.0.0/24 is directly connected, Tunnel0
44.0.0.0/24 is subnetted, 1 subnets
D   44.44.44.0 [90/28288000] via 192.168.0.1, 00:00:36, Tunnel0
S*  0.0.0.0/0 [1/0] via 172.16.2.1
```

Routes learned from Hub as well as every Spoke router dynamically using EIGRP

R4#show ip route

Codes: C - connected, S - static, R - RIP, M - mobile, B - BGP
D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
E1 - OSPF external type 1, E2 - OSPF external type 2
i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
ia - IS-IS inter area, * - candidate default, U - per-user static route
o - ODR, P - periodic downloaded static route

Gateway of last resort is 172.16.4.1 to network 0.0.0.0

33.0.0.0/24 is subnetted, 1 subnets
D 33.33.33.0 [90/28288000] via 192.168.0.1, 00:28:36, Tunnel0
172.16.0.0/30 is subnetted, 1 subnets
C 172.16.4.0 is directly connected, FastEthernet0/0
22.0.0.0/24 is subnetted, 1 subnets
D 22.22.22.0 [90/28288000] via 192.168.0.1, 00:25:04, Tunnel0
11.0.0.0/24 is subnetted, 1 subnets
D 11.11.11.0 [90/27008000] via 192.168.0.1, 00:33:43, Tunnel0
C 192.168.0.0/24 is directly connected, Tunnel0
44.0.0.0/24 is subnetted, 1 subnets
C 44.44.44.0 is directly connected, Loopback1
S* 0.0.0.0/0 [1/0] via 172.16.4.1

Routes learned from Hub as well as every Spoke router dynamically using EIGRP

Step 2 Verify DMVPN Tunnel creation

R1:

R1#show dmvpn

Legend: Attrb --> S - Static, D - Dynamic, I - Incomplete
N - NATed, L - Local, X - No Socket
Ent --> Number of NHRP entries with same NBMA peer
NHS Status: E --> Expecting Replies, R --> Responding
UpDn Time --> Up or Down Time for a Tunnel

=====

Interface: Tunnel0, IPv4 NHRP Details
Type:Hub, NHRP Peers:3,

# Ent	Peer NBMA Addr	Peer Tunnel Add	State	UpDn Tm	Attrb
1	172.16.2.2	192.168.0.2	UP	00:28:47	D
1	172.16.3.2	192.168.0.3	UP	00:13:36	D
1	172.16.4.2	192.168.0.4	UP	00:16:46	D

R2#show dmvpn

Legend: Attrb --> S - Static, D - Dynamic, I - Incomplete

N - NATed, L - Local, X - No Socket

Ent --> Number of NHRP entries with same NBMA peer

NHS Status: E --> Expecting Replies, R --> Responding

UpDn Time --> Up or Down Time for a Tunnel

Interface: Tunnel0, IPv4 NHRP Details

Type:Spoke, NHRP Peers:1,

Ent Peer NBMA Addr Peer Tunnel Add State UpDn Tm Attrb

1 172.16.1.2 192.168.0.1 UP 00:34:07 S

R4#show dmvpn

Legend: Attrb --> S - Static, D - Dynamic, I - Incomplete

N - NATed, L - Local, X - No Socket

Interface: Tunnel0, IPv4 NHRP Details

Type:Spoke, NHRP Peers:1,

Ent Peer NBMA Addr Peer Tunnel Add State UpDn Tm Attrb

1 172.16.1.2 192.168.0.1 UP 00:01:20 S

R4#traceroute 192.168.0.2 source loopback 1

Type escape sequence to abort.

Tracing the route to 192.168.0.2

1 192.168.0.1 396 msec 508 msec

192.168.0.2 392 msec

Spoke router R4 is able to reach R2 via Hub router.

A packet destined from R4 to R2 would need to be routed through R1, to exit the R4 tunnel and the get re-encapsulated to enter the R2 tunnel

```
R4#sh dmvpn
```

Legend: Attrb --> S - Static, D - Dynamic, I - Incomplete

N - NATed, L - Local, X - No Socket

Ent --> Number of NHRP entries with same NBMA peer

NHS Status: E --> Expecting Replies, R --> Responding

UpDn Time --> Up or Down Time for a Tunnel

```
=====
```

Interface: Tunnel0, IPv4 NHRP Details

Type:Spoke, NHRP Peers:2,

```
# Ent Peer NBMA Addr Peer Tunnel Add State UpDn Tm Attrb
```

```
-----
```

1	172.16.1.2	192.168.0.1	UP	00:02:12	S
1	172.16.2.2	192.168.0.2	UP	00:00:12	D

Notice that the tunnel to R4 has been flagged as dynamic, in contrast to the static tunnel to the hub/NHS.

```
R4#traceroute 192.168.0.2 source loopback 1
```

Type escape sequence to abort.

Tracing the route to 192.168.0.2

```
1 192.168.0.2 396 msec 508 msec
```

Once the dynamically tunnel is formed between spoke to spoke router, DMVPN allows to Spoke to Spoke directly communication at next hop thus bypassing the Hub router completely


```
R2#show dmvpn
```

Legend: Attrb --> S - Static, D - Dynamic, I - Incomplete

N - NATed, L - Local, X - No Socket

Ent --> Number of NHRP entries with same NBMA peer

NHS Status: E --> Expecting Replies, R --> Responding

UpDn Time --> Up or Down Time for a Tunnel

```
=====
```

Interface: Tunnel0, IPv4 NHRP Details

Type:Spoke, NHRP Peers:2,

```
# Ent Peer NBMA Addr Peer Tunnel Add State UpDn Tm Attrb
```

```
-----
```

1	172.16.1.2	192.168.0.1	UP	00:03:03	S
1	172.16.4.2	192.168.0.4	UP	00:00:45	D

Notice that the tunnel to R4 has been flagged as dynamic, in contrast to the static tunnel to the hub/NHS.

```
R2#traceroute 192.168.0.4 source loopback 1
```

Type escape sequence to abort.

Tracing the route to 192.168.0.4

```
1 192.168.0.4 396 msec 508 msec
```

Once the dynamically tunnel is formed between spoke to spoke router, DMVPN allows to Spoke to Spoke directly communication at next hop thus bypassing the Hub router completely