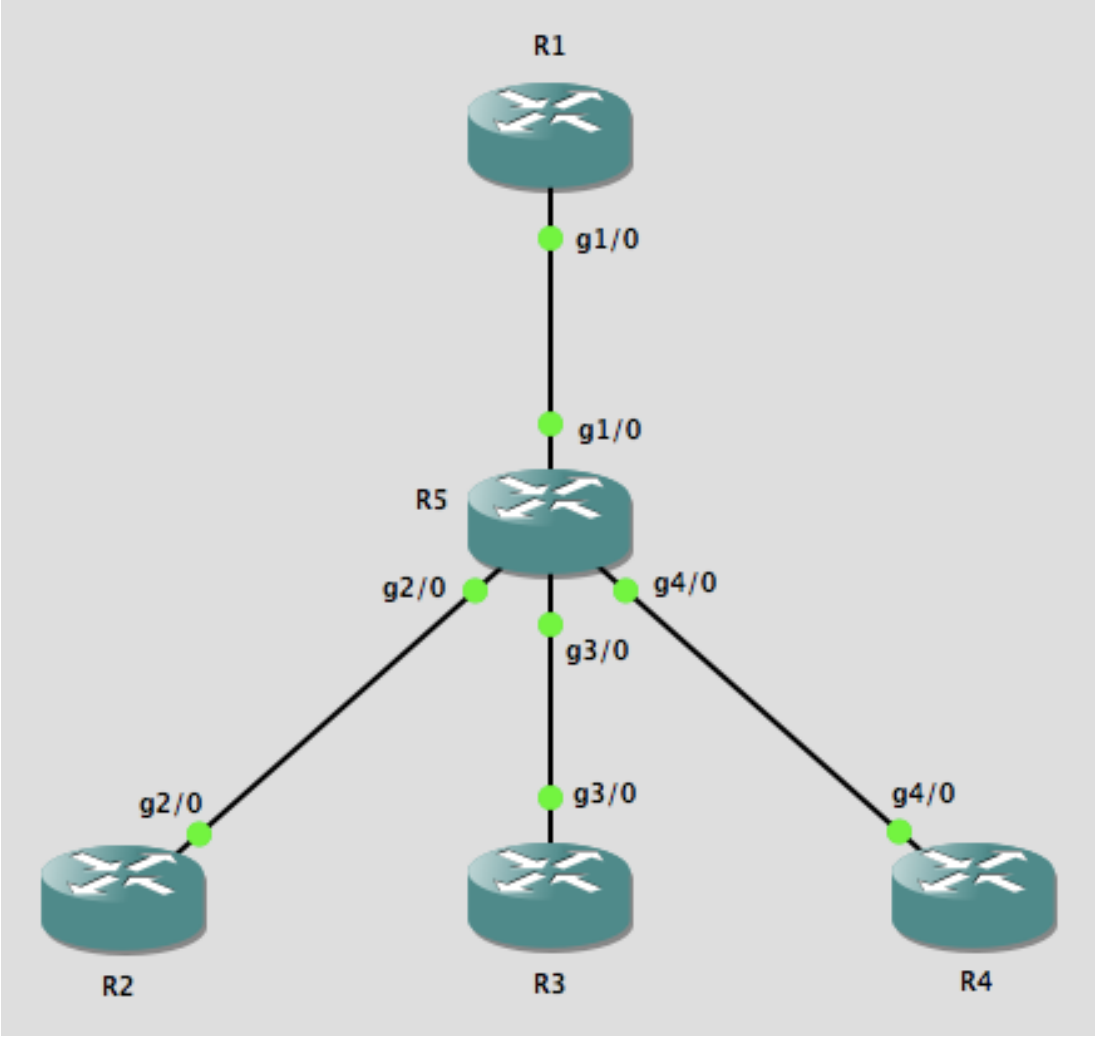
DMVPN

Lab Activity

Topology



IP Plan

- Peering IP: 100.100.XY.X(Y)/24
- Tunnel0: 10.10.10.X/24
- LAN Block: 192.168.X.0/24

Task 1.1: Basic Configuration

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- Configure all routers
  - Loopback (to demonstrate LAN Block)
  - Interface IP

Example: R1

```
interface Loopback0
 ip address 192.168.1.1 255.255.255.0
!
interface GigabitEthernet1/0
 description Connected to R5 Gi1/0
 ip address 100.100.15.1 255.255.255.0
 no shutdown
```

Task 1.2: Routing Configuration

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- NHS/Hub (R1)
  - Configure static route for spokes' P2P routes
- NHC/Spokes (R2-R4)
  - Configure default route

Example: Static Route

R1:

```
ip route 100.100.25.0 255.255.255.0 100.100.15.5
ip route 100.100.35.0 255.255.255.0 100.100.15.5
ip route 100.100.45.0 255.255.255.0 100.100.15.5
```

R2:

```
ip route 0.0.0.0 0.0.0.0 100.100.25.5
```

Task 2: DMVPN Configuration

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- Configure Tunnel Interface
  - IP Address
  - NHRP map
  - NHRP Network-ID
  - Tunnel Source
  - Tunnel Mode (mGRE)

Example: NHS (R1)

```
interface Tunnel0
 ip address 10.10.10.1 255.255.255.0
 ip nhrp map multicast dynamic
 ip nhrp network-id 1
 tunnel source gi1/0
 tunnel mode gre multipoint
```

Optional:

```
ip nhrp authentication
ip nhrp redirects
ip nhrp shortcut
tunnel key 100
```

Example: NHC (R2-R4)

```
interface Tunnel0
 ip address 10.10.10.2 255.255.255.0
 ip nhrp map 10.10.10.1 100.100.15.1
 ip nhrp map multicast 100.100.15.1
 ip nhrp network-id 1
 ip nhrp nhs 10.10.10.1
 tunnel source gi2/0
 tunnel mode gre multipoint
```

Optional:

```
ip nhrp authentication
ip nhrp shortcut
tunnel key 100
```

Task 3: Dynamic Routing Configuration

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- Configure EIGRP in NHS and NHC
  - Process
  - Network
- Disable split horizon and next-hop-self in NHS

Example: R1

```
router eigrp 1
 network 10.10.10.0 0.0.0.255
 network 192.168.1.0

int tunnel 0
 no ip split-horizon eigrp 1
 no ip next-hop-self eigrp 1
```

Example: R2

```
router eigrp 1
 network 10.10.10.0 0.0.0.255
 network 192.168.2.0
```

Verification

```
R2# show ip route eigrp
D    192.168.1.0/24 [90/27008000] via 10.10.10.1, 00:01:15, Tunnel0
D    192.168.3.0/24 [90/28288000] via 10.10.10.3, 00:01:15, Tunnel0
D    192.168.4.0/24 [90/28288000] via 10.10.10.4, 00:01:11, Tunnel0
```

Verification

awal — R1 — telnet 127.0.0.1 5000 — 76×17

```
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, W --> Waiting
        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
 ----- --------------- --------------- ----- -------- -----
     1 100.100.25.2         10.10.10.2    UP 00:51:09     D
     1 100.100.35.3         10.10.10.3    UP 00:30:11     D
     1 100.100.45.4         10.10.10.4    UP 00:29:49     D
```

Verification

awal — R2 — telnet 127.0.0.1 5001 — 78×15

```
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, W --> Waiting
        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
 ----- --------------- --------------- ----- -------- -----
     1 100.100.15.1          10.10.10.1    UP 00:52:25     S
```

Verification

awal — R2 — telnet 127.0.0.1 5001 — 78×29

```
R2#ping 192.168.3.1 source tunnel0
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.3.1, timeout is 2 seconds:
Packet sent with a source address of 10.10.10.2
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 56/75/148 ms
R2#ping 192.168.4.1 source tunnel0
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.4.1, timeout is 2 seconds:
Packet sent with a source address of 10.10.10.2
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 56/80/180 ms
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, W --> Waiting
        UpDn Time --> Up or Down Time for a Tunnel
==========================================================================

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

 # Ent  Peer NBMA Addr Peer Tunnel Add State  UpDn Tm Attrb
 ----- --------------- --------------- ----- -------- -----
     1 100.100.15.1          10.10.10.1    UP 00:03:23     S
     1 100.100.35.3          10.10.10.3    UP 00:00:08     D
     1 100.100.45.4          10.10.10.4    UP 00:00:02     D
```

Task 4: IPsec Configuration

Task 3: Dynamic Routing Configuration

- Configure IKE/ISAKMP
  - Encryption: AES/DES/3DES
  - Hash: SHA/MD5
  - Authentication: Pre-share/rsa-sig
- Configure ISAKMP Key and Transform-set
- Configure IPsec Profile
  - Set the transform-set
- Enable the IPsec profile in the tunnel interface

Example: R1

```
crypto isakmp policy 10
 hash md5
 encryption 3des
 authentication pre-share
!
crypto isakmp key LAB address 0.0.0.0 0.0.0.0
crypto ipsec transform-set DMVPN esp-3des esp-sha-
hmac
!
crypto ipsec profile IPSEC
 set transform-set DMVPN
!
interface tunnel0
 tunnel protection ipsec profile IPSEC
```

Verification

awal — R2 — telnet 127.0.0.1 5001 — 75×12

```
R2#show crypto isakmp sa
IPv4 Crypto ISAKMP SA
dst             src             state          conn-id status
100.100.25.2    100.100.35.3    QM_IDLE           1003 ACTIVE
100.100.35.3    100.100.25.2    QM_IDLE           1004 ACTIVE
100.100.15.1    100.100.25.2    QM_IDLE           1001 ACTIVE
100.100.25.2    100.100.15.1    QM_IDLE           1002 ACTIVE
100.100.25.2    100.100.45.4    QM_IDLE           1005 ACTIVE
100.100.45.4    100.100.25.2    QM_IDLE           1006 ACTIVE

IPv6 Crypto ISAKMP SA
```

Question?