

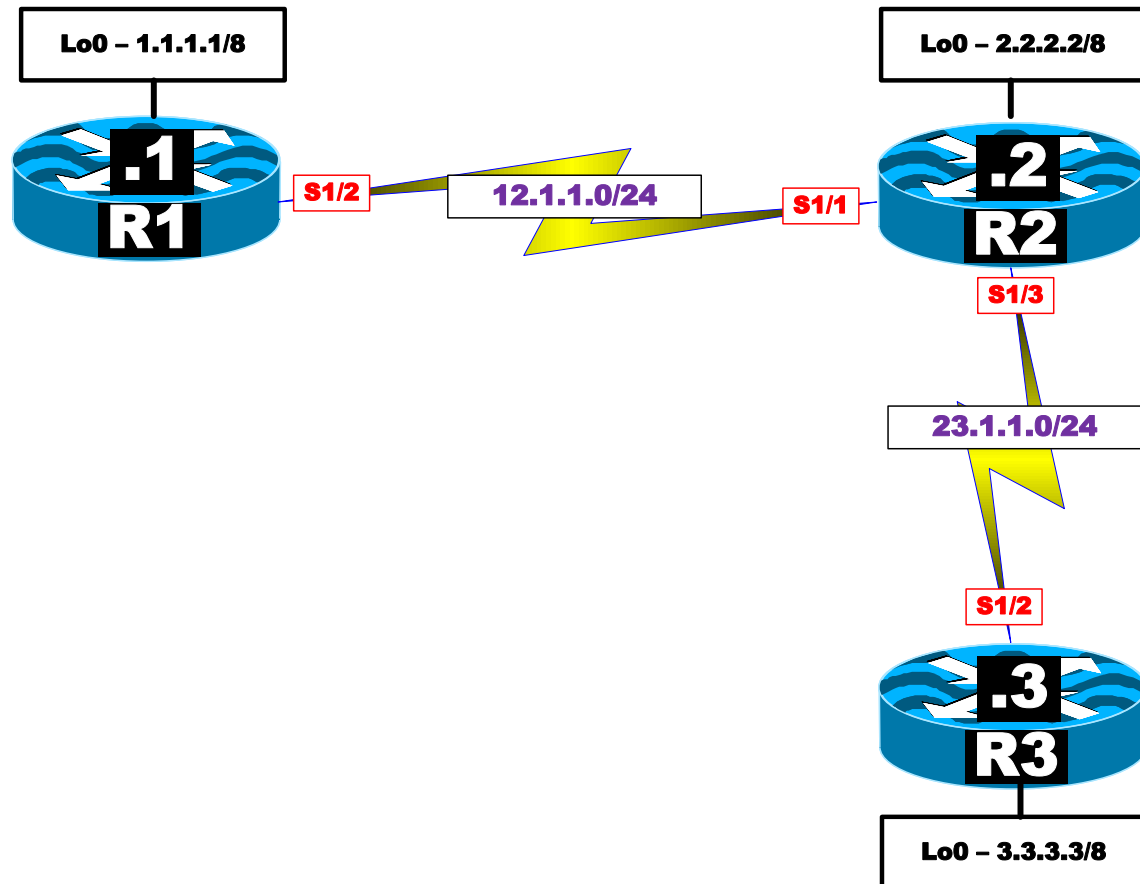
Advanced CCIE Routing & Switching 5.0

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GRE
Tunnel

Lab 1 – GRE & Recursive Loops



Lab Setup:

Configure the routers based on the above topology

Task 1

Configure RIPv2 on these routers and advertise their directly connected networks.

On R1:

```
R1 (config) #router rip
R1 (config-router) #no au
R1 (config-router) #ver 2
R1 (config-router) #netw 1.0.0.0
R1 (config-router) #netw 12.0.0.0
```

On R2:

```
R2 (config) #router rip
R2 (config-router) #no au
R2 (config-router) #ver 2
R2 (config-router) #netw 2.0.0.0
R2 (config-router) #netw 12.0.0.0
R2 (config-router) #netw 23.0.0.0
```

On R3:

```
R3 (config) #router rip
R3 (config-router) #no au
R3 (config-router) #ver 2
R3 (config-router) #netw 23.0.0.0
R3 (config-router) #netw 3.0.0.0
```

To verify the configuration:

On R1:

```
R1#show ip route rip | b Gate
Gateway of last resort is not set

R      2.0.0.0/8 [120/1] via 12.1.1.2, 00:00:04, Serial1/2
R      3.0.0.0/8 [120/2] via 12.1.1.2, 00:00:04, Serial1/2
      23.0.0.0/24 is subnetted, 1 subnets
R          23.1.1.0 [120/1] via 12.1.1.2, 00:00:04, Serial1/2
```

On R2:

```
R2#show ip route rip | b Gate
Gateway of last resort is not set

R      1.0.0.0/8 [120/1] via 12.1.1.1, 00:00:15, Serial1/1
```

```
R    3.0.0.0/8 [120/1] via 23.1.1.3, 00:00:24, Serial1/3
```

On R3:

```
R3#show ip route rip | b Gate
Gateway of last resort is not set
```

```
R    1.0.0.0/8 [120/2] via 23.1.1.2, 00:00:17, Serial1/2
R    2.0.0.0/8 [120/1] via 23.1.1.2, 00:00:17, Serial1/2
    12.0.0.0/24 is subnetted, 1 subnets
R        12.1.1.0 [120/1] via 23.1.1.2, 00:00:17, Serial1/2
```

Task 2

Configure a GRE tunnel from R1 to R3, the ip address of this tunnel interface should be 200.1.1.1 24 and 200.1.1.3/24 for R1 and R3 respectively. The tunnel source should be based on the loopback0 interface of these routers. R3 should use Lo0 interface of R1, whereas, R1 should use Lo0 interface of R3 as its tunnel destination.

On R1:

```
R1(config)#int tu13
R1(config-if)#ip addr 200.1.1.1 255.255.255.0
R1(config-if)#tunnel source lo0
R1(config-if)#tunnel destination 3.3.3.3
```

On R3:

```
R3(config)#int tu31
R3(config-if)#ip addr 200.1.1.3 255.255.255.0
R3(config-if)#tunnel source lo0
R3(config-if)#tunnel destination 1.1.1.1
```

To verify and test the configuration:

On R1:

```
R1#Ping 200.1.1.3
```

```
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 200.1.1.3, timeout is 2 seconds:
```

!!!!!

Success rate is 100 percent (5/5), round-trip min/avg/max = 48/73/100 ms

On R3:

```
R3#Ping 200.1.1.1
```

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 200.1.1.1, timeout is 2 seconds:

!!!!!

Success rate is 100 percent (5/5), round-trip min/avg/max = 32/74/136 ms

Task 3

Configure EIGRP 100 on the tunnel interfaces of R1 and R3; these routers should advertise their Loopback0 interface in this routing protocol.

On R1:

```
R1 (config)#router eigrp 100
R1 (config-router)#netw 200.1.1.0
R1 (config-router)#netw 1.0.0.0
```

On R3:

```
R3 (config)#router eigrp 100
R3 (config-router)#netw 200.1.1.0
R3 (config-router)#netw 3.0.0.0
```

Note: You should receive the following messages on these routers, the following shows the messages received on R1:

```
%DUAL-5-NBRCHANGE: EIGRP-IPv4 100: Neighbor 200.1.1.1 (Tunnel31) is up:
new adjacency
%ADJ-5-PARENT: Midchain parent maintenance for IP midchain out of
Tunnel31 - looped chain attempting to stack
%TUN-5-RECURDOWN: Tunnel31 temporarily disabled due to recursive routing
%LINEPROTO-5-UPDOWN: Line protocol on Interface Tunnel31, changed state
to down
%DUAL-5-NBRCHANGE: EIGRP-IPv4 100: Neighbor 200.1.1.1 (Tunnel31) is down:
```

interface down

The tunnel interface status depends on the IP reachability to the tunnel destination; in this case, R1 and R3 find that reachability through RIPv2. But, since the tunnel destination (Lo0) is also advertised through EIGRP, when the tunnel comes up, these routers find a better route through EIGRP to the tunnel destination (eigrp's administrative distance being lower than RIP), therefore, they find the reachability to the tunnel destination through the tunnel and that's what causes the recursive loops.

Task 4

Configure R1 and R3 such that the tunnel interface does **not** flap and it stays in UP/UP state, you should **not** configure a static route, or stop advertising their interfaces in EIGRP to accomplish this task.

To fix this problem an access-list list is configured to identify the IP address of the tunnel destination, then, the administrative distance of this route is configured to be lower than EIGRP's administrative distance.

Note: Once these commands are entered, the routers will find a better route (RIPv2) than EIGRP to the IP address of the tunnel destination.

On R1:

```
R1 (config) #access-list 1 permit 3.0.0.0
```

On R3:

```
R1 (config) #access-list 1 permit 1.0.0.0
```

On R1 and R3:

```
Rx (config) #router rip  
Rx (config-router) #distance 89 0.0.0.0 255.255.255.255 1
```

```
Rx#Clear ip route *
```

You should see the following console message:

```
%LINEPROTO-5-UPDOWN: Line protocol on Interface Tunnel13, changed state  
to up
```

```
%DUAL-5-NBRCHANGE: EIGRP-IPv4 100: Neighbor 200.1.1.3 (Tunnel13) is up:
new adjacency
```

To verify the configuration:

On R1:

```
R1#sh ip rou rip | b Gate
```

```
Gateway of last resort is not set
```

```
R    2.0.0.0/8 [120/1] via 12.1.1.2, 00:00:04, Serial1/2
```

```
R    3.0.0.0/8 [89/2] via 12.1.1.2, 00:00:04, Serial1/2
```

```
    23.0.0.0/24 is subnetted, 1 subnets
```

```
R        23.1.1.0 [120/1] via 12.1.1.2, 00:00:04, Serial1/2
```

```
R1#show ip eigrp neighbors
```

```
IP-EIGRP neighbors for process 100
```

H	Address	Interface	Hold (sec)	Uptime	SRTT (ms)	RTO	Q Cnt	Seq Num
0	200.1.1.3	Tu13	14	00:02:02	52	5000	0	21

Task 5

Erase the startup configuration and reload the routers before proceeding to the next lab.