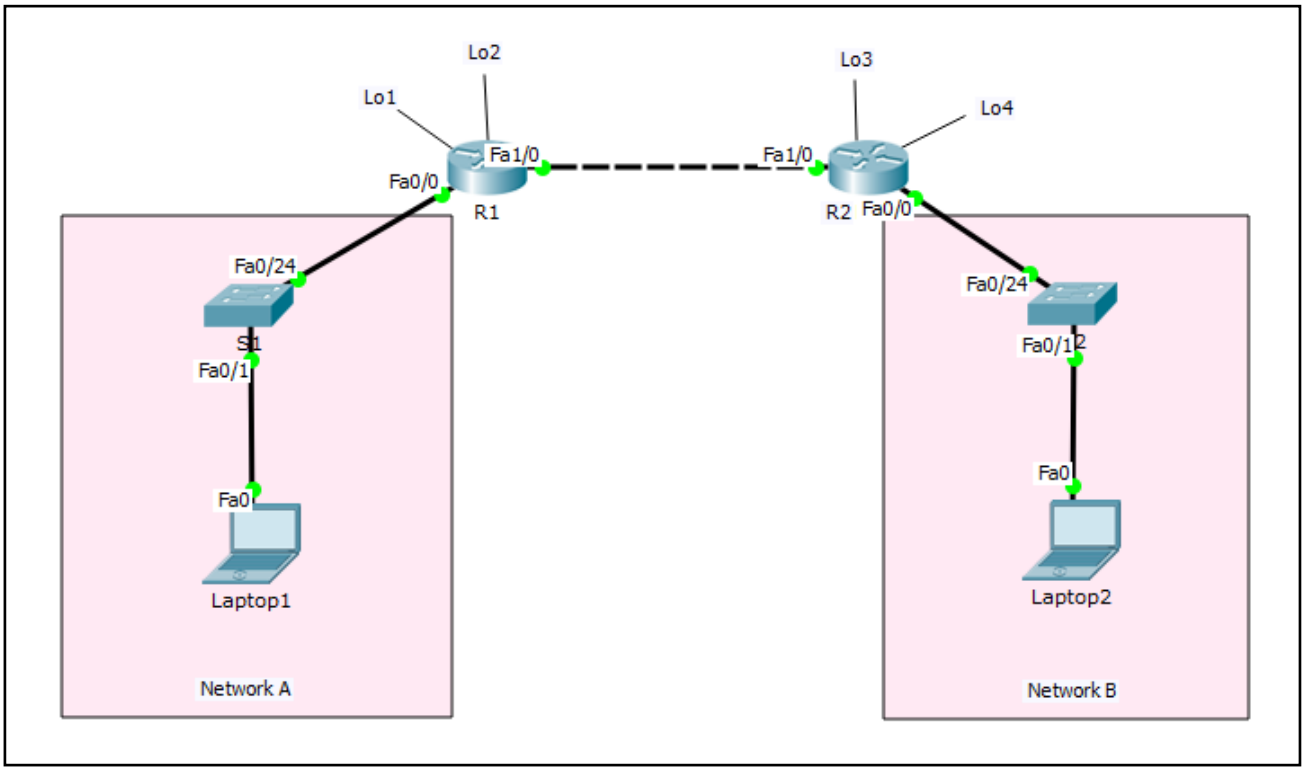
# Lab 6. RIPv2

## Topologi




### Tabel Addressing

| Device | Interface | IP Address | Subnet Mask | Default Gateway |
|---|---|---|---|---|
| R1 | Fa0/0 | 192.168.1.254 | 255.255.255.0 | N/A |
| | Fa1/0 | 12.12.12.1 | 255.255.255.0 | N/A |
| | Lo1 | 172.16.1.1 | 255.255.255.0 | N/A |
| | Lo2 | 172.16.2.2 | 255.255.255.0 | N/A |
| R2 | Fa0/0 | 192.168.2.254 | 255.255.255.0 | N/A |
| | Fa1/0 | 12.12.12.2 | 255.255.255.0 | N/A |
| | Lo3 | 172.16.3.3 | 255.255.255.0 | N/A |
| | Lo4 | 172.16.4.4 | 255.255.255.0 | N/A |
| S1 | N/A | VLAN 1 | N/A | N/A |
| S2 | N/A | VLAN 1 | N/A | N/A |
| Laptop1 | NIC | 192.168.1.1 | 255.255.255.0 | 192.168.1.254 |
| Laptop2 | NIC | 192.168.2.1 | 255.255.255.0 | 192.168.2.254 |

## Tujuan

- Setting RIPv2
- Debug RIPv2
- Setting passive-interface RIPv2

## Konsep Dasar

Keuntungan menggunakan dynamic routing dibandingkan static routing:

- Tidak perlu tahu network destination
- Perlu melakukan advertise network yang terhubung langsung
- Update perubahan topologi secara dinamis
- Pekerjaan network admin jadi berkurang
- Digunakan di industri besar
- Neighbor router melakukan pertukaran informasi routing dan membangun routing table secara otomatis
- Lebih mudah dibandingkan menggunakan static routing

**RIPv2**

- Open standar protocol (Cisco atau non-Cisco)
- Classless routing protocol (support default atau sub-networks)
- Mendukung VLSM
- Mendukung Autentikasi
- Menggunakan multicast address 224.0.0.9
- Administrative distance: 120
- Metric: hop count (terbaik = yang paling kecil)
- Hop ke-16 unreachable
- Load balancing 4 equal path
- Digunakan untuk organisasi kecil
- Update secara periodic dan pertukaran keseleruhan informasi routing tabel setiap 30 second

**Dua langkah mudah setting routing protocol dinamis secara umum:**

1. Pilih routing protocol
2. Advertise directly connected network (jaringan yang terhubung langsung dengan router)

```
Router(config)# router rip
Router(config-router)# version 2
Router(config-router)# network <Network ID>
Router(config-router)# no auto-summary
```

`network <Network-ID>` : untuk advertise network yang terhubung langsung dengan router (directly connected network).

**Keuntungan RIPv2**

- Mudah dikonfigurasi
- Tidak memerlukan design seperti OSPF
- Tidak kompleks
- Less overhead

**Kerugian RIPv2**

- Utilisasi bandwidth sangat tinggi karena diperlukan untuk broadcast setiap 30 second (RIPv1)
- Terbatas pada jumlah hop (bukan bandwidth)
- Tidak scalable, hop count hanya 15
- Konvergensi rendah

**Waktu konvergensi**: waktu yang dibutuhkan oleh router untuk menggunakan route alternative ketika best route down.

## Konfigurasi

Login console ke R1 atau R2 untuk mempraktikkan ***Lab 6-RIPv2***.

**Tampilkan routing table sebelum disetting RIPv2 di R1**

```
R1#sh ip route
Codes: C - connected, S - static, I - IGRP, 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, E - EGP
i - IS-IS, 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 not set

12.0.0.0/24 is subnetted, 1 subnets
C 12.12.12.0 is directly connected, FastEthernet1/0
172.16.0.0/24 is subnetted, 2 subnets
C 172.16.1.0 is directly connected, Loopback1
C 172.16.2.0 is directly connected, Loopback2
C 192.168.1.0/24 is directly connected, FastEthernet0/0
R1#
```

**Tampilkan routing table sebelum disetting RIPv2 di R2**

```
R2#show ip route
Codes: C - connected, S - static, I - IGRP, 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, E - EGP
i - IS-IS, 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 not set

12.0.0.0/24 is subnetted, 1 subnets
C 12.12.12.0 is directly connected, FastEthernet1/0
172.16.0.0/24 is subnetted, 2 subnets
C 172.16.3.0 is directly connected, Loopback0
C 172.16.4.0 is directly connected, Loopback1
C 192.168.2.0/24 is directly connected, FastEthernet0/0
R2#
```

### Setting RIPv2 di R1

Command untuk mensetting RIPv2.

```
R1(config)#router rip
R1(config-router)#version 2
R1(config-router)#network 12.12.12.0
R1(config-router)#network 172.16.1.0
R1(config-router)#network 172.16.2.0
R1(config-router)#network 192.168.1.0
R1(config-router)#no auto-summary
R1(config-router)#
```

### Setting RIPv2 di R2

Command untuk mensetting RIPv2.

```
R2(config)#router rip
R2(config-router)#version 2
R2(config-router)#network 12.12.12.0
R2(config-router)#network 172.16.3.0
R2(config-router)#network 172.16.4.0
R2(config-router)#network 192.168.2.0
R2(config-router)#no auto-summary
R2(config-router)#
```

## Verifikasi

### Tampilkan routing table setelah disetting RIPv2 di R1

```
R1#show ip route
Codes: C - connected, S - static, I - IGRP, 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, E - EGP
i - IS-IS, 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 not set

12.0.0.0/24 is subnetted, 1 subnets
C 12.12.12.0 is directly connected, FastEthernet1/0
172.16.0.0/16 is variably subnetted, 5 subnets, 2 masks
R 172.16.0.0/16 [120/1] via 12.12.12.2, 00:00:55, FastEthernet1/0
C 172.16.1.0/24 is directly connected, Loopback1
C 172.16.2.0/24 is directly connected, Loopback2
R 172.16.3.0/24 [120/1] via 12.12.12.2, 00:00:02, FastEthernet1/0
R 172.16.4.0/24 [120/1] via 12.12.12.2, 00:00:02, FastEthernet1/0
C 192.168.1.0/24 is directly connected, FastEthernet0/0
R 192.168.2.0/24 [120/1] via 12.12.12.2, 00:00:02, FastEthernet1/0
R1#
```

**Note: ulangi langkah yang sama diatas untuk menampilkan routing table di R2**

### Tes Ping dari Laptop1 ke Laptop2

```
Laptop1>ping 192.168.2.1

Pinging 192.168.2.1 with 32 bytes of data:

Reply from 192.168.2.1: bytes=32 time=1ms TTL=126
Reply from 192.168.2.1: bytes=32 time=1ms TTL=126
Reply from 192.168.2.1: bytes=32 time=0ms TTL=126
Reply from 192.168.2.1: bytes=32 time=0ms TTL=126

Ping statistics for 192.168.2.1:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 1ms, Average = 0ms
```

Ping dari Laptop1 ke Laptop2 berhasil.

### Traceroute dari Laptop1 ke Laptop2

```
Laptop1>tracert 192.168.2.1

Tracing route to 192.168.2.1 over a maximum of 30 hops:

1 1 ms 0 ms 0 ms 192.168.1.254
2 0 ms 0 ms 0 ms 12.12.12.2
3 0 ms 0 ms 0 ms 192.168.2.1

Trace complete.
```

Untuk menuju Laptop2 dari Laptop1 membutuhkan 3 hop.

### Tes Ping dari Laptop2 ke Laptop1

```
Laptop2>ping 192.168.1.1

Pinging 192.168.1.1 with 32 bytes of data:

Reply from 192.168.1.1: bytes=32 time=0ms TTL=126
Reply from 192.168.1.1: bytes=32 time=1ms TTL=126
Reply from 192.168.1.1: bytes=32 time=11ms TTL=126
Reply from 192.168.1.1: bytes=32 time=0ms TTL=126

Ping statistics for 192.168.1.1:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 11ms, Average = 3ms
```

Ping dari Laptop2 ke Laptop1 berhasil.