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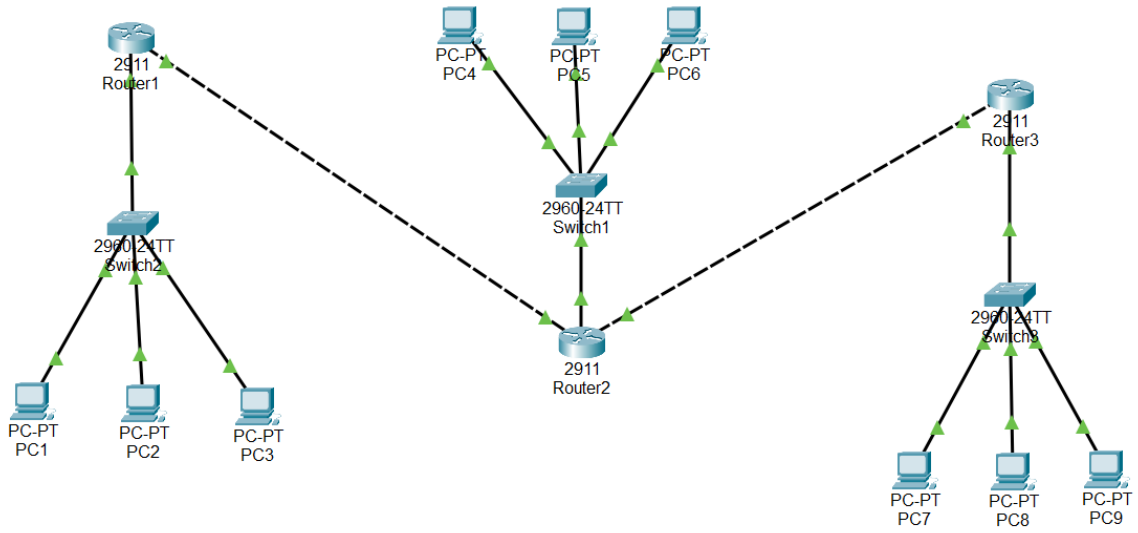
# PRAKTIKUM JARINGAN KOMPUTER

# DYNAMIC ROUTING




## Konfigurasi setiap router

- Router1

```
Router>enable
Router#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#Hostname 09010282327037_R1
09010282327037_R1(config)#interface gigabitEthernet 0/0
09010282327037_R1(config-if)#ip address 192.168.2.1
% Incomplete command.
09010282327037_R1(config-if)#ip address 192.168.2.1 255.255.255.0
09010282327037_R1(config-if)#no shutdown

09010282327037_R1(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0, changed state to up

09010282327037_R1(config-if)#exit
09010282327037_R1(config)#interface gigabitEthernet 0/1
09010282327037_R1(config-if)#ip address 10.10.10.1 255.255.255.252
09010282327037_R1(config-if)#no shutdown

09010282327037_R1(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/1, changed state to up

09010282327037_R1(config-if)#exit
09010282327037_R1(config)#exit
09010282327037_R1#
%SYS-5-CONFIG_I: Configured from console by console

09010282327037_R1#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
```

- Router2

```
Router>enable
Router#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#Hostname 09010282327037_R2
09010282327037_R2(config)#interface gigabitEthernet 0/0
09010282327037_R2(config-if)#ip address 192.168.20.1 255.255.255.0
09010282327037_R2(config-if)#no shutdown

09010282327037_R2(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0, changed state to up

09010282327037_R2(config-if)#exit
09010282327037_R2(config)#interface gigabitEthernet 0/1
09010282327037_R2(config-if)#ip address 10.10.10.2 255.255.255.252
09010282327037_R2(config-if)#no shutdown

09010282327037_R2(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/1, changed state to up

09010282327037_R2(config-if)#exit
09010282327037_R2(config)#interface gigabitEthernet 0/2
09010282327037_R2(config-if)#ip address 10.20.10.1 255.255.255.252
09010282327037_R2(config-if)#no shutdown

09010282327037_R2(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/2, changed state to up

09010282327037_R2(config-if)#exit
09010282327037_R2(config)#exit
09010282327037_R2#
%SYS-5-CONFIG_I: Configured from console by console

09010282327037_R2#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
```

- Router3

```
Router>enable
Router#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#Hostname 09010282327037_R3
09010282327037_R3(config)#interface gigabitEthernet 0/0
09010282327037_R3(config-if)#ip address 192.168.40.1 255.255.255.0
09010282327037_R3(config-if)#no shutdown

09010282327037_R3(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0, changed state to up

09010282327037_R3(config-if)#exit
09010282327037_R3(config)#interface gigabitEthernet 0/2
09010282327037_R3(config-if)#ip address 10.20.10.2 255.255.255.252
09010282327037_R3(config-if)#no shutdown

09010282327037_R3(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/2, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/2, changed state to up

09010282327037_R3(config-if)#exit
09010282327037_R3(config)#exit
09010282327037_R3#
%SYS-5-CONFIG_I: Configured from console by console

09010282327037_R3#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
```

## Konfigurasi Dynamic Routing

- Router1

```
09010282327037_R1(config)#router rip
09010282327037_R1(config-router)#version 2
09010282327037_R1(config-router)#network 192.168.2.0
09010282327037_R1(config-router)#network 10.10.10.0
```

- Router2

```
09010282327037_R2(config)#router rip
09010282327037_R2(config-router)#version 2
09010282327037_R2(config-router)#network 192.168.20.0
09010282327037_R2(config-router)#network 10.10.10.0
09010282327037_R2(config-router)#network 10.20.10.0
```

- Router3

```
09010282327037_R3(config)#router rip
09010282327037_R3(config-router)#version 2
09010282327037_R3(config-router)#network 192.168.40.0
09010282327037_R3(config-router)#network 10.20.10.0
```

**Melihat hasil tabel routing**

- Router1

```
09010282327037_R1#show ip route
Codes: L - local, 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, 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

     10.0.0.0/8 is variably subnetted, 3 subnets, 2 masks
C       10.10.10.0/30 is directly connected, GigabitEthernet0/1
L       10.10.10.1/32 is directly connected, GigabitEthernet0/1
R       10.20.10.0/30 [120/1] via 10.10.10.2, 00:00:23, GigabitEthernet0/1
     192.168.2.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.2.0/24 is directly connected, GigabitEthernet0/0
L       192.168.2.1/32 is directly connected, GigabitEthernet0/0
R    192.168.20.0/24 [120/1] via 10.10.10.2, 00:00:23, GigabitEthernet0/1
R    192.168.40.0/24 [120/2] via 10.10.10.2, 00:00:23, GigabitEthernet0/1
```

- Router2

```
09010282327037_R2#show ip route
Codes: L - local, 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, 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

     10.0.0.0/8 is variably subnetted, 4 subnets, 2 masks
C       10.10.10.0/30 is directly connected, GigabitEthernet0/1
L       10.10.10.2/32 is directly connected, GigabitEthernet0/1
C       10.20.10.0/30 is directly connected, GigabitEthernet0/2
L       10.20.10.1/32 is directly connected, GigabitEthernet0/2
R    192.168.2.0/24 [120/1] via 10.10.10.1, 00:00:17, GigabitEthernet0/1
     192.168.20.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.20.0/24 is directly connected, GigabitEthernet0/0
L       192.168.20.1/32 is directly connected, GigabitEthernet0/0
R    192.168.40.0/24 [120/1] via 10.20.10.2, 00:00:19, GigabitEthernet0/2
```

- Router3

```
09010282327037_R3#show ip route
Codes: L - local, 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, 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

     10.0.0.0/8 is variably subnetted, 3 subnets, 2 masks
R       10.10.10.0/30 [120/1] via 10.20.10.1, 00:00:04, GigabitEthernet0/2
C       10.20.10.0/30 is directly connected, GigabitEthernet0/2
L       10.20.10.2/32 is directly connected, GigabitEthernet0/2
R    192.168.2.0/24 [120/2] via 10.20.10.1, 00:00:04, GigabitEthernet0/2
R    192.168.20.0/24 [120/1] via 10.20.10.1, 00:00:04, GigabitEthernet0/2
     192.168.40.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.40.0/24 is directly connected, GigabitEthernet0/0
L       192.168.40.1/32 is directly connected, GigabitEthernet0/0
```

**Tes koneksi ICMP**

| No | Sumber | Tujuan | Hasil | |
|---|---|---|---|---|
| | | | Ya | Tidak |
| 1. | PC1 | PC2 | Ya | |
| | | PC3 | Ya | |
| | | PC4 | Ya | |
| | | PC5 | Ya | |
| | | PC6 | Ya | |
| | | PC7 | Ya | |
| | | PC8 | Ya | |
| | | PC9 | Ya | |
| 2. | PC4 | PC1 | Ya | |
| | | PC2 | Ya | |
| | | PC3 | Ya | |
| | | PC5 | Ya | |
| | | PC6 | Ya | |
| | | PC7 | Ya | |
| | | PC8 | Ya | |
| | | PC9 | Ya | |
| 3. | PC7 | PC1 | Ya | |
| | | PC2 | Ya | |
| | | PC3 | Ya | |
| | | PC4 | Ya | |
| | | PC5 | Ya | |
| | | PC6 | Ya | |
| | | PC8 | Ya | |
| | | PC9 | Ya | |

**Screenshot hasil Ping pada cmd PC:**

- PC1 -> PC5

```
C:\>ping 192.168.20.3

Pinging 192.168.20.3 with 32 bytes of data:

Reply from 192.168.20.3: bytes=32 time<1ms TTL=126
Reply from 192.168.20.3: bytes=32 time<1ms TTL=126
Reply from 192.168.20.3: bytes=32 time<1ms TTL=126
Reply from 192.168.20.3: bytes=32 time<1ms TTL=126

Ping statistics for 192.168.20.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

- PC1 -> PC7

```
C:\>ping 192.168.40.2

Pinging 192.168.40.2 with 32 bytes of data:

Reply from 192.168.40.2: bytes=32 time<1ms TTL=125
Reply from 192.168.40.2: bytes=32 time<1ms TTL=125
Reply from 192.168.40.2: bytes=32 time<1ms TTL=125
Reply from 192.168.40.2: bytes=32 time<1ms TTL=125

Ping statistics for 192.168.40.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

- PC4 -> PC2

```
C:\>ping 192.168.2.3

Pinging 192.168.2.3 with 32 bytes of data:

Reply from 192.168.2.3: bytes=32 time<1ms TTL=126
Reply from 192.168.2.3: bytes=32 time<1ms TTL=126
Reply from 192.168.2.3: bytes=32 time<1ms TTL=126
Reply from 192.168.2.3: bytes=32 time<1ms TTL=126

Ping statistics for 192.168.2.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

- PC4 -> PC8

```
C:\>ping 192.168.40.3

Pinging 192.168.40.3 with 32 bytes of data:

Reply from 192.168.40.3: bytes=32 time<1ms TTL=126
Reply from 192.168.40.3: bytes=32 time<1ms TTL=126
Reply from 192.168.40.3: bytes=32 time<1ms TTL=126
Reply from 192.168.40.3: bytes=32 time<1ms TTL=126

Ping statistics for 192.168.40.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

- PC7 -> PC3

```
C:\>ping 192.168.2.4

Pinging 192.168.2.4 with 32 bytes of data:

Reply from 192.168.2.4: bytes=32 time<1ms TTL=125
Reply from 192.168.2.4: bytes=32 time<1ms TTL=125
Reply from 192.168.2.4: bytes=32 time<1ms TTL=125
Reply from 192.168.2.4: bytes=32 time=1ms TTL=125

Ping statistics for 192.168.2.4:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms
```

- PC7 -> PC9

```
C:\>ping 192.168.40.4

Pinging 192.168.40.4 with 32 bytes of data:

Reply from 192.168.40.4: bytes=32 time<1ms TTL=128
Reply from 192.168.40.4: bytes=32 time<1ms TTL=128
Reply from 192.168.40.4: bytes=32 time<1ms TTL=128
Reply from 192.168.40.4: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.40.4:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

**Analisis**

Topologi jaringan yang diuji terdiri dari tiga router (R1, R2, R3) yang terhubung dengan beberapa jaringan IP. Setiap router diberi nama dan dikonfigurasi dengan alamat IP yang spesifik. Proses konfigurasi pada setiap router meliputi pengaturan nama router, banner, dan penyimpanan konfigurasi ke NVRAM. Protokol yang digunakan adalah **RIP versi 2 (RIPv2)**, yang merupakan protokol routing kategori distance-vector dan interior gateway (IGP). RIP menggunakan **hop count** sebagai metrik untuk menentukan jalur terpendek menuju jaringan tujuan. Batas maksimum hop count yang didukung oleh RIP adalah 15, yang berarti protokol ini cocok untuk jaringan kecil hingga menengah. Setelah konfigurasi routing selesai, dilakukan pengujian konektivitas menggunakan ICMP (ping) antara berbagai PC yang terhubung ke jaringan melalui router.

**Kesimpulan**

Protokol RIP v2 dapat diterapkan dengan mudah pada jaringan dengan topologi sederhana hingga menengah. Namun, karena batasan hop count maksimal, protokol ini tidak cocok untuk jaringan yang sangat besar. Selain itu, konfigurasi routing dinamis dengan RIP memudahkan router dalam bertukar informasi routing, sehingga tabel routing dapat diperbarui secara otomatis tanpa intervensi manual.