

LAPORAN PRAKTIKUM

TUGAS 5

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Link Repository: <https://github.com/verinaaard/TUGAS-DMJK>

1. Alamat Menentukan Topologi dan Alamat IP

a. Topologi

- Router 0:
 - Terhubung ke Subnet 10.0.1.0/24 (interface ke jaringan lokal).
 - Terhubung ke Router 1 melalui link point-to-point (misalnya 192.168.12.0/30).
- Router 1:
 - Terhubung ke Router 0 (link 192.168.12.0/30).
 - Terhubung ke Router 2 melalui link point-to-point (misalnya 192.168.23.0/30).
 - Terhubung ke Subnet 10.0.2.0/24 (jaringan lokal).
- Router 2:
 - Terhubung ke Router 1 (link 192.168.23.0/30).
 - Terhubung ke Subnet 10.0.3.0/24 (jaringan lokal).

b. Alokasi IP

- Link 0-1:
 - Gunakan subnet /30 (mask 255.255.255.252).
 - IP untuk Router 0: 192.168.12.1
 - IP untuk Router 1: 192.168.12.2
- Link 1-2:
 - Gunakan subnet /30.
 - IP untuk Router 1: 192.168.23.1
 - IP untuk Router 2: 192.168.23.2
- Subnet Lokal:
 - PC0, Subnet 10.0.1.0/24, IP interface: 10.0.1.1

PC0

Physical Config Desktop Programming Attributes

IP Configuration

Interface FastEthernet0

IP Configuration

☐ DHCP ☒ Static

IPv4 Address 10.0.1.2

Subnet Mask 255.255.255.0

Default Gateway 10.0.1.1

DNS Server 0.0.0.0

IPv6 Configuration

☐ Automatic ☒ Static

IPv6 Address /

Link Local Address FE80:20B:BEFF:FEA0:1CD0

Default Gateway

DNS Server

802.1X

☐ Use 802.1X Security

Authentication MD5

Username

Password

☐ Top

- PC1, Subnet 10.0.2.0/24, IP interface: 10.0.2.1

PC1

Physical Config Desktop Programming Attributes

IP Configuration

Interface FastEthernet0

IP Configuration

☐ DHCP ☒ Static

IPv4 Address 10.0.2.2

Subnet Mask 255.255.255.0

Default Gateway 10.0.2.1

DNS Server 0.0.0.0

IPv6 Configuration

☐ Automatic ☒ Static

IPv6 Address /

Link Local Address FE80:201:C7FF:FE2E:691

Default Gateway

DNS Server

802.1X

☐ Use 802.1X Security

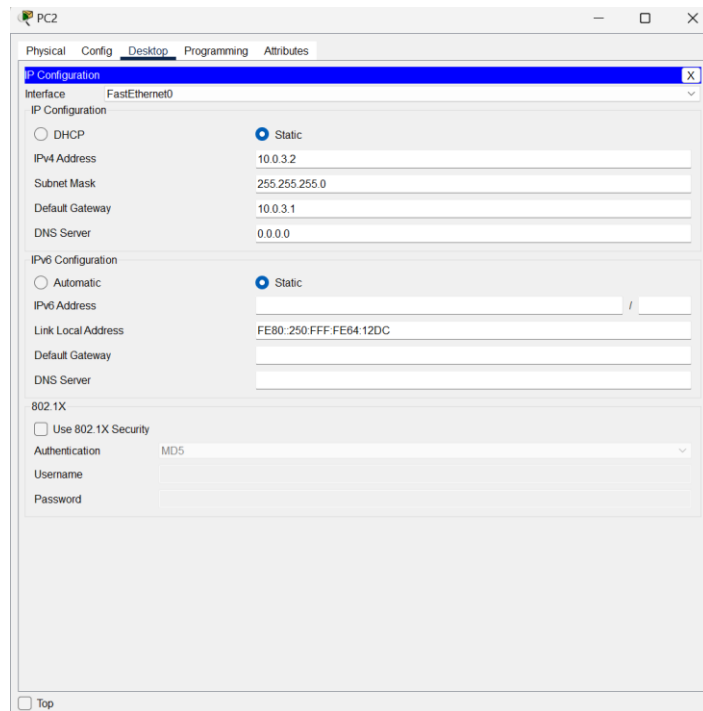
Authentication MD5

Username

Password

☐ Top

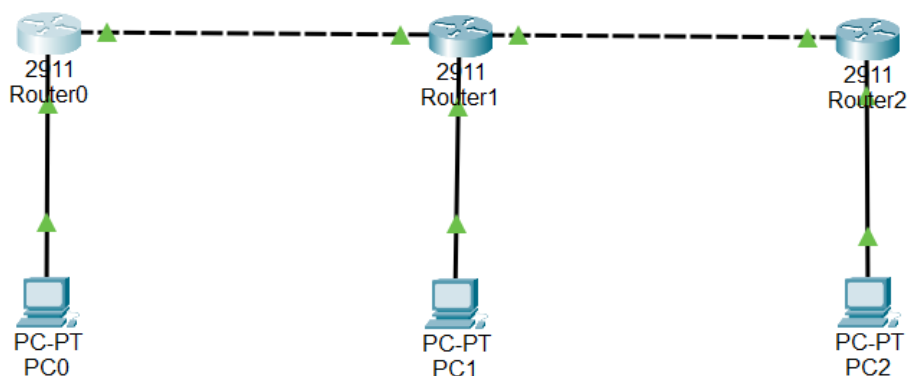
- PC2, Subnet 10.0.3.0/24, IP interface: 10.0.3.1



2. Konfigurasi Fisik di Router

a. Pilih Router dan Periksa Interface

Gunakan tiga router (misalnya Cisco 2911) dan pastikan masing-masing router memiliki interface yang diperlukan. Gunakan interface GigabitEthernet untuk link point-to-point dan interface lainnya untuk subnet lokal.



- Hubungkan Router ke PC dengan kabel straight:
 - Router 0 → PC0 (gunakan port GigabitEthernet0/0).
 - Router 1 → PC1 (gunakan port GigabitEthernet0/1).
 - Router 2 → PC2 (gunakan port GigabitEthernet0/1).
- Hubungkan Router ke Router dengan kabel cross:

- Router 0 → Router 1 (gunakan port GigabitEthernet0/1 pada Router 0 ke GigabitEthernet0/0 pada Router 1).
- Router 1 → Router 2 (gunakan port GigabitEthernet0/2 pada Router 1 ke GigabitEthernet0/0 pada Router 2).

b. Tabel Konfigurasi Router

Router	Interface	Deskripsi	Alamat IP	Subnet Mask
Router 0	GigabitEthernet0/0	Subnet Lokal	10.0.1.1	255.255.255.0
	GigabitEthernet0/1	Link ke Router 1	192.168.12.1	255.255.255.252
Router 1	GigabitEthernet0/0	Link ke Router 0	192.168.12.2	255.255.255.252
	GigabitEthernet0/1	Subnet Lokal	10.0.2.1	255.255.255.0
	GigabitEthernet0/2	Link ke Router 2	192.168.23.1	255.255.255.252
Router 2	GigabitEthernet0/0	Link ke Router 1	192.168.23.2	255.255.255.252
	GigabitEthernet0/1	Subnet Lokal	10.0.3.1	255.255.255.0

c. Konfigurasi Interface pada Setiap Router

- Router 0

Router0

Physical Config CLI Attributes

IOS Command Line Interface

```
C 10.0.0.0/30 is directly connected, GigabitEthernet0/1
L 10.0.0.1/32 is directly connected, GigabitEthernet0/1
 192.168.1.0/24 is variably subnetted, 2 subnets, 2 masks
C 192.168.1.0/24 is directly connected, GigabitEthernet0/0
L 192.168.1.1/32 is directly connected, GigabitEthernet0/0

Router#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, 2 subnets, 2 masks
C 10.0.0.0/30 is directly connected, GigabitEthernet0/1
L 10.0.0.1/32 is directly connected, GigabitEthernet0/1
 192.168.1.0/24 is variably subnetted, 2 subnets, 2 masks
C 192.168.1.0/24 is directly connected, GigabitEthernet0/0
L 192.168.1.1/32 is directly connected, GigabitEthernet0/0

Router#
Router#configure terminal
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/1, changed state to down
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/1, changed state to up

Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface GigabitEthernet0/0
Router(config-if)#ip address 10.0.1.1 255.255.255.0
Router(config-if)#no shutdown
Router(config-if)#exit
Router(config)#interface GigabitEthernet0/1
Router(config-if)#ip address 192.168.12.1 255.255.255.252
Router(config-if)#no shutdown
Router(config-if)#exit
Router(config)#end
Router#
%SYS-5-CONFIG_I: Configured from console by console
wr
Building configuration...
[OK]
Router#
```

Copy Paste

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➤ Router 1

Router1

Physical Config CLI Attributes

IOS Command Line Interface

```
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, 3 masks
R 10.0.0.0/8 [120/1] via 192.168.23.2, 00:00:14, GigabitEthernet0/2
  [120/1] via 192.168.12.1, 00:00:06, GigabitEthernet0/0
C 10.0.2.0/24 is directly connected, GigabitEthernet0/1
L 10.0.2.1/32 is directly connected, GigabitEthernet0/1
 192.168.12.0/24 is variably subnetted, 2 subnets, 2 masks
C 192.168.12.0/30 is directly connected, GigabitEthernet0/0
L 192.168.12.2/32 is directly connected, GigabitEthernet0/0
 192.168.23.0/24 is variably subnetted, 2 subnets, 2 masks
C 192.168.23.0/30 is directly connected, GigabitEthernet0/2
L 192.168.23.1/32 is directly connected, GigabitEthernet0/2

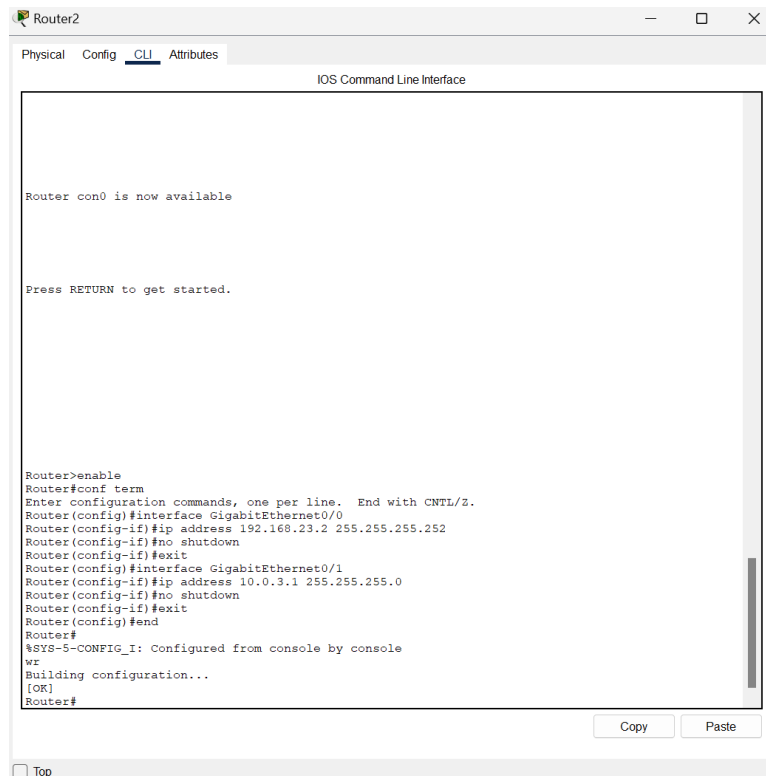
Router#interface GigabitEthernet0/0
^
% Invalid input detected at '^' marker.

Router#conf term
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface GigabitEthernet0/0
Router(config-if)#ip address 192.168.12.2 255.255.255.252
Router(config-if)#no shutdown
Router(config-if)#exit
Router(config)#interface GigabitEthernet0/1
Router(config-if)#ip address 10.0.2.1 255.255.255.0
Router(config-if)#no shutdown
Router(config-if)#exit
Router(config)#interface GigabitEthernet0/2
Router(config-if)#ip address 192.168.23.1 255.255.255.252
Router(config-if)#no shutdown
Router(config-if)#exit
Router(config)#end
Router#
%SYS-5-CONFIG_I: Configured from console by console
wr
Building configuration...
[OK]
Router#
```

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➤ Router 2



3. Konfigurasi Dynamic Routing

Menggunakan konfigurasi RIP untuk mengatur protokol routing dinamis pada router agar dapat berbagi informasi rute secara otomatis dengan router lain dalam jaringan. RIP menggunakan algoritma Distance Vector yang menentukan jalur terbaik berdasarkan jumlah hop atau lompatan ke tujuan. Konfigurasi RIP dilakukan dengan mengaktifkan protokol ini pada router menggunakan perintah `router rip`, kemudian memilih versi 2 dengan `version 2` agar mendukung subnet mask.

a. Router 0

Router0

Physical Config CLI Attributes

IOS Command Line Interface

```
P - periodic downloaded static route
Gateway of last resort is not set

  10.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C   10.0.0.0/30 is directly connected, GigabitEthernet0/1
L   10.0.0.1/32 is directly connected, GigabitEthernet0/1
C   192.168.1.0/24 is variably subnetted, 2 subnets, 2 masks
L   192.168.1.0/24 is directly connected, GigabitEthernet0/0
L   192.168.1.1/32 is directly connected, GigabitEthernet0/0

Router#
Router#configure terminal
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/1, changed state to down
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/1, changed state to up

Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#interface GigabitEthernet0/0
Router(config-if)#ip address 10.0.1.1 255.255.255.0
Router(config-if)#no shutdown
Router(config-if)#exit
Router(config)#interface GigabitEthernet0/1
Router(config-if)#ip address 192.168.12.1 255.255.255.252
Router(config-if)#no shutdown
Router(config-if)#exit
Router(config)#end
Router#
%SYS-5-CONFIG_I: Configured from console by console
wr
Building configuration...
[OK]
Router#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#route rip
Router(config-router)#version 2
Router(config-router)#network 10.0.1.0
Router(config-router)#network 192.168.12.0
Router(config-router)#exit
Router(config)#end
Router#
%SYS-5-CONFIG_I: Configured from console by console
wr
Building configuration...
[OK]
Router#
```

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b. Router 1

Router1

Physical Config CLI Attributes

IOS Command Line Interface

```
  192.168.12.0/24 is variably subnetted, 2 subnets, 2 masks
C   192.168.12.0/30 is directly connected, GigabitEthernet0/0
L   192.168.12.2/32 is directly connected, GigabitEthernet0/0
C   192.168.23.0/24 is variably subnetted, 2 subnets, 2 masks
L   192.168.23.0/30 is directly connected, GigabitEthernet0/2
L   192.168.23.1/32 is directly connected, GigabitEthernet0/2

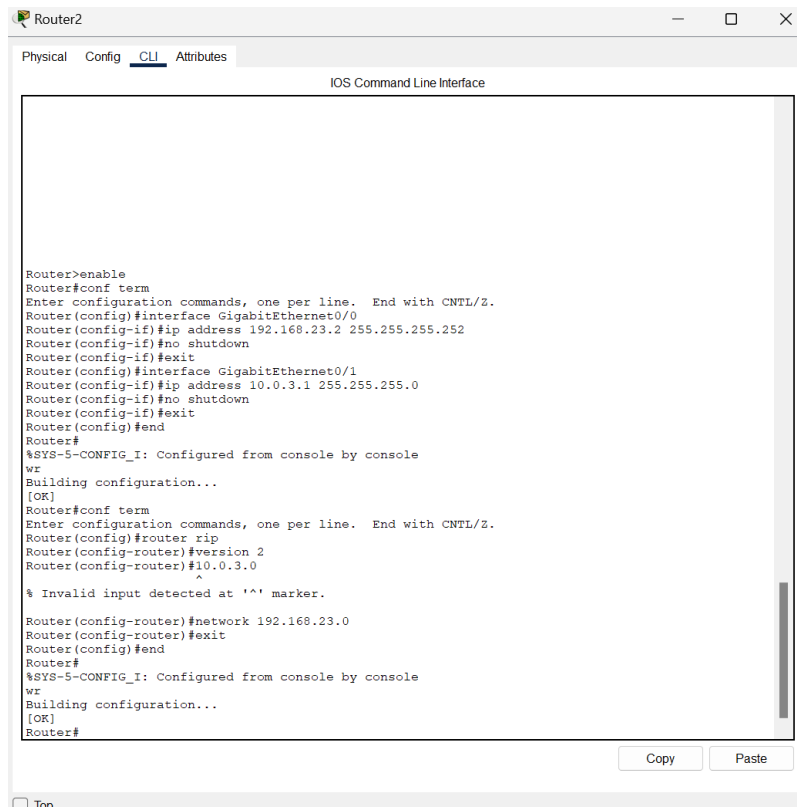
Router#interface GigabitEthernet0/0
^
% Invalid input detected at '^' marker.

Router#conf term
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#interface GigabitEthernet0/0
Router(config-if)#ip address 192.168.12.2 255.255.255.252
Router(config-if)#no shutdown
Router(config-if)#exit
Router(config)#interface GigabitEthernet0/1
Router(config-if)#ip address 10.0.2.1 255.255.255.0
Router(config-if)#no shutdown
Router(config-if)#exit
Router(config)#interface GigabitEthernet0/2
Router(config-if)#ip address 192.168.23.1 255.255.255.252
Router(config-if)#no shutdown
Router(config-if)#exit
Router(config)#end
Router#
%SYS-5-CONFIG_I: Configured from console by console
wr
Building configuration...
[OK]
Router#conf term
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#route rip
Router(config-router)#version 2
Router(config-router)#network 10.0.2.0
Router(config-router)#network 192.168.12.0
Router(config-router)#network 192.168.23.0
Router(config-router)#exit
Router(config)#end
Router#
%SYS-5-CONFIG_I: Configured from console by console
wr
Building configuration...
[OK]
Router#
```

Copy Paste

☐ Top

c. Router 2



The screenshot shows a window titled 'Router2' with tabs for 'Physical', 'Config', 'CLI', and 'Attributes'. The 'CLI' tab is active, displaying the 'IOS Command Line Interface'. The terminal shows the following commands and output:

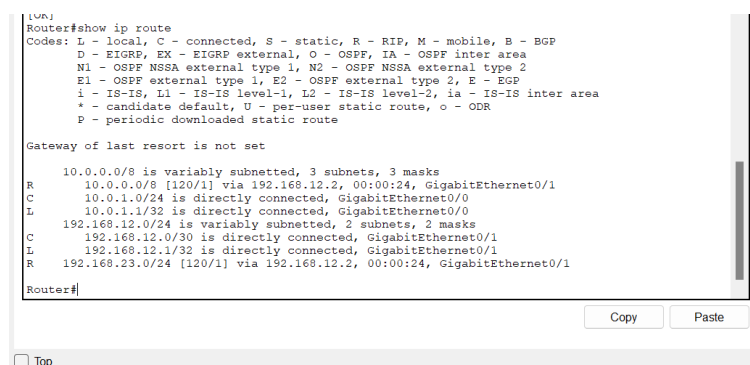
```
Router>enable
Router#conf term
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface GigabitEthernet0/0
Router(config-if)#ip address 192.168.23.2 255.255.255.252
Router(config-if)#no shutdown
Router(config-if)#exit
Router(config)#interface GigabitEthernet0/1
Router(config-if)#ip address 10.0.3.1 255.255.255.0
Router(config-if)#no shutdown
Router(config-if)#exit
Router(config)#end
Router#
%SYS-5-CONFIG_I: Configured from console by console
wr
Building configuration...
[OK]
Router#conf term
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#router rip
Router(config-router)#version 2
Router(config-router)#10.0.3.0
^
% Invalid input detected at '^' marker.
Router(config-router)#network 192.168.23.0
Router(config-router)#exit
Router(config)#end
Router#
%SYS-5-CONFIG_I: Configured from console by console
wr
Building configuration...
[OK]
Router#
```

Buttons for 'Copy' and 'Paste' are visible at the bottom right of the terminal area.

4. Verifikasi dan Pengujian Routing

a. Verifikasi Routing Table

➤ Router 0



The screenshot shows a window titled 'Router0' with tabs for 'Physical', 'Config', 'CLI', and 'Attributes'. The 'CLI' tab is active, displaying the 'IOS Command Line Interface'. The terminal shows the following commands and output:

```
Router0#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, 3 masks
R    10.0.0.0/8 [120/1] via 192.168.12.2, 00:00:24, GigabitEthernet0/1
C    10.0.1.0/24 is directly connected, GigabitEthernet0/0
L    10.0.1.1/32 is directly connected, GigabitEthernet0/0
C    192.168.12.0/24 is variably subnetted, 2 subnets, 2 masks
C    192.168.12.0/30 is directly connected, GigabitEthernet0/1
L    192.168.12.1/32 is directly connected, GigabitEthernet0/1
R    192.168.23.0/24 [120/1] via 192.168.12.2, 00:00:24, GigabitEthernet0/1

Router0#
```

Buttons for 'Copy' and 'Paste' are visible at the bottom right of the terminal area.

➤ Router 1


```
Router#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, 3 masks
R   10.0.0.0/8 [120/1] via 192.168.23.2, 00:00:02, GigabitEthernet0/2
C   10.0.0.0/8 [120/1] via 192.168.12.1, 00:00:26, GigabitEthernet0/0
C   10.0.2.0/24 is directly connected, GigabitEthernet0/1
L   10.0.2.1/32 is directly connected, GigabitEthernet0/1
R   192.168.12.0/24 is variably subnetted, 2 subnets, 2 masks
C   192.168.12.0/30 is directly connected, GigabitEthernet0/0
L   192.168.12.2/32 is directly connected, GigabitEthernet0/0
R   192.168.23.0/24 is variably subnetted, 2 subnets, 2 masks
C   192.168.23.0/30 is directly connected, GigabitEthernet0/2
L   192.168.23.1/32 is directly connected, GigabitEthernet0/2

Router#
```

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☐ Top

➤ Router 2

```
Router#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, 3 masks
R   10.0.0.0/8 [120/1] via 192.168.23.1, 00:00:25, GigabitEthernet0/0
C   10.0.3.0/24 is directly connected, GigabitEthernet0/1
L   10.0.3.1/32 is directly connected, GigabitEthernet0/1
R   192.168.12.0/24 [120/1] via 192.168.23.1, 00:00:25, GigabitEthernet0/0
R   192.168.23.0/24 is variably subnetted, 2 subnets, 2 masks
C   192.168.23.0/30 is directly connected, GigabitEthernet0/0
L   192.168.23.2/32 is directly connected, GigabitEthernet0/0

Router#
```

Copy Paste

☐ Top

b. Pengujian Konektivitas (Ping dan Traceroute)

Pengujian Konektivitas (Ping dan Traceroute) digunakan untuk memastikan bahwa konfigurasi RIP (Routing Information Protocol) berfungsi dengan baik dan perangkat dalam jaringan dapat berkomunikasi satu sama lain.

➤ Ping

- PC0

```
PC0
Physical Config Desktop Programming Attributes
Command Prompt
Request timed out.
Request timed out.

Ping statistics for 10.0.2.3:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
C:\>ping 10.0.2.2

Pinging 10.0.2.2 with 32 bytes of data:
Reply from 10.0.2.2: bytes=32 time=1ms TTL=126
Reply from 10.0.2.2: bytes=32 time=1ms TTL=124
Reply from 10.0.2.2: bytes=32 time=1ms TTL=124
Reply from 10.0.2.2: bytes=32 time=1ms TTL=124

Ping statistics for 10.0.2.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
C:\>ping 10.0.1.1

Pinging 10.0.1.1 with 32 bytes of data:
Reply from 10.0.1.1: bytes=32 time=1ms TTL=255
Reply from 10.0.1.1: bytes=32 time=1ms TTL=255
Reply from 10.0.1.1: bytes=32 time=1ms TTL=255
Reply from 10.0.1.1: bytes=32 time=1ms TTL=255

Ping statistics for 10.0.1.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
C:\>ping 10.0.3.2

Pinging 10.0.3.2 with 32 bytes of data:
Request timed out.
Reply from 10.0.3.2: bytes=32 time=1ms TTL=125
Reply from 10.0.3.2: bytes=32 time=1ms TTL=125
Reply from 10.0.3.2: bytes=32 time=1ms TTL=125
Reply from 10.0.3.2: bytes=32 time=1ms TTL=125

Ping statistics for 10.0.3.2:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms
C:\>
```

■ PC1

```
PC1
Physical Config Desktop Programming Attributes
Command Prompt
Ping statistics for 10.0.3.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 4ms, Average = 1ms
C:\>ping 10.0.1.2

Pinging 10.0.1.2 with 32 bytes of data:
Reply from 10.0.1.2: bytes=32 time=1ms TTL=126
Reply from 10.0.1.2: bytes=32 time=1ms TTL=126
Reply from 10.0.1.2: bytes=32 time=1ms TTL=126
Reply from 10.0.1.2: bytes=32 time=1ms TTL=126

Ping statistics for 10.0.1.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms
C:\>ping 10.0.2.1

Pinging 10.0.2.1 with 32 bytes of data:
Reply from 10.0.2.1: bytes=32 time=1ms TTL=255
Reply from 10.0.2.1: bytes=32 time=1ms TTL=255
Reply from 10.0.2.1: bytes=32 time=1ms TTL=255
Reply from 10.0.2.1: bytes=32 time=1ms TTL=255

Ping statistics for 10.0.2.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
C:\>ping 10.0.3.2

Pinging 10.0.3.2 with 32 bytes of data:
Reply from 10.0.3.2: bytes=32 time=1ms TTL=126
Reply from 10.0.3.2: bytes=32 time=1ms TTL=126
Reply from 10.0.3.2: bytes=32 time=1ms TTL=126
Reply from 10.0.3.2: bytes=32 time=1ms TTL=126

Ping statistics for 10.0.3.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
C:\>
```

■ PC2

```
PC2
Physical Config Desktop Programming Attributes
Command Prompt
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 10.0.3.1

Pinging 10.0.3.1 with 32 bytes of data:
Reply from 10.0.3.1: bytes=32 time=1ms TTL=255
Reply from 10.0.3.1: bytes=32 time=1ms TTL=255
Reply from 10.0.3.1: bytes=32 time=1ms TTL=255
Reply from 10.0.3.1: bytes=32 time=1ms TTL=255

Ping statistics for 10.0.3.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping 10.0.1.2

Pinging 10.0.1.2 with 32 bytes of data:
Reply from 10.0.1.2: bytes=32 time=1ms TTL=125
Reply from 10.0.1.2: bytes=32 time=1ms TTL=125
Reply from 10.0.1.2: bytes=32 time=1ms TTL=125
Reply from 10.0.1.2: bytes=32 time=1ms TTL=125

Ping statistics for 10.0.1.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping 10.0.2.2

Pinging 10.0.2.2 with 32 bytes of data:
Reply from 10.0.2.2: bytes=32 time=1ms TTL=124
Reply from 10.0.2.2: bytes=32 time=1ms TTL=124
Reply from 10.0.2.2: bytes=32 time=1ms TTL=124
Reply from 10.0.2.2: bytes=32 time=1ms TTL=124

Ping statistics for 10.0.2.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>
```

➤ Traceroute

```
C:\>tracert 10.0.2.1

Tracing route to 10.0.2.1 over a maximum of 30 hops:
  0  0 ms    0 ms    0 ms    10.0.1.1
  1  *        0 ms    *        Request timed out.
  2  *        0 ms    *        Request timed out.

Trace complete.

C:\>tracert 10.0.1.1

Tracing route to 10.0.1.1 over a maximum of 30 hops:
  0  0 ms    0 ms    0 ms    10.0.1.1
  1  0 ms    0 ms    0 ms    10.0.1.1

Trace complete.

C:\>tracert 10.0.3.1

Tracing route to 10.0.3.1 over a maximum of 30 hops:
  0  0 ms    0 ms    3 ms    10.0.1.1
  1  0 ms    *        0 ms    192.168.12.2
  2  0 ms    0 ms    0 ms    10.0.3.1

Trace complete.

C:\>
```

5. RIP (Routing Information Protocol)

RIP adalah protokol routing jenis distance-vector yang sederhana dan sudah lama digunakan. RIP menentukan rute terbaik berdasarkan jumlah hop (lompatan) antara jaringan.

Karakteristik RIP:

- Menggunakan algoritma Bellman-Ford
- Metrik routing berdasarkan hop count (jumlah router yang dilalui)
- Batas maksimum 15 hop
- Update routing dikirim secara periodik (setiap 30 detik)

- Cocok untuk jaringan kecil

6. OSPF (Open Shortest Path First)

OSPF adalah protokol routing jenis link-state yang lebih canggih. OSPF membangun peta topologi lengkap dari jaringan dan menghitung rute terbaik berdasarkan bandwidth.

Karakteristik OSPF:

- Menggunakan algoritma Dijkstra (SPF)
- Metrik routing berdasarkan cost (biasanya bandwidth)
- Tidak ada batasan hop count
- Update hanya saat ada perubahan topologi
- Mendukung jaringan besar dengan hierarchical routing
- Mendukung VLSM (Variable Length Subnet Masking)

7. Perbedaan RIP dan OSPF

Aspek	RIP (Routing Information Protocol)	OSPF (Open Shortest Path First)
Tipe Protokol	Distance Vector	Link State
Metode Pemilihan Rute	Berdasarkan jumlah hop (maksimal 15 hop)	Berdasarkan cost (menghitung bandwidth terbaik)
Kecepatan Konvergensi	Lambat karena mengandalkan pembaruan periodik	Cepat karena hanya mengirim perubahan topologi
Skalabilitas	Cocok untuk jaringan kecil hingga menengah	Cocok untuk jaringan besar dan kompleks
Tabel Routing	Menyimpan daftar rute berdasarkan hop count	Membentuk topologi lengkap jaringan dalam bentuk SPF tree
Algoritma yang Digunakan	Algoritma Bellman-Ford	Algoritma Dijkstra
Tipe Update Routing	Mengirim seluruh tabel routing secara berkala	Mengirim perubahan topologi saja (LSA - Link State Advertisement)
Penggunaan Bandwidth	Lebih besar karena update dikirim secara periodik	Lebih efisien karena hanya mengirim perubahan
Autentikasi	Tidak memiliki autentikasi yang kuat	Mendukung autentikasi untuk keamanan lebih baik
Konfigurasi	Sederhana dan mudah dikonfigurasi	Lebih kompleks tetapi lebih optimal