

### TUGAS 3 DESAIN DAN MANAJEMEN JARINGAN KOMPUTER

NAMA : RISKY NUR FATIMAH BAHAR

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a. Menentukan kebutuhan jaringan

- Jumlah VLAN : 2 VLAN (VLAN 10 dan VLAN 20) ~30 host
- Alamat dasar : 192.168.10.0/24
- Subnet mask : /27 (255.255.255.224) 30 host
- Skema Alamat IP :
  - o VLAN 10: 192.168.10.0/27 (Network 192.168.10.0, Broadcast 192.168.10.31)
  - o VLAN 20: 192.168.10.32/27 (Network 192.168.10.32, Broadcast 192.168.10.63)

b. Melakukan perhitungan subnet

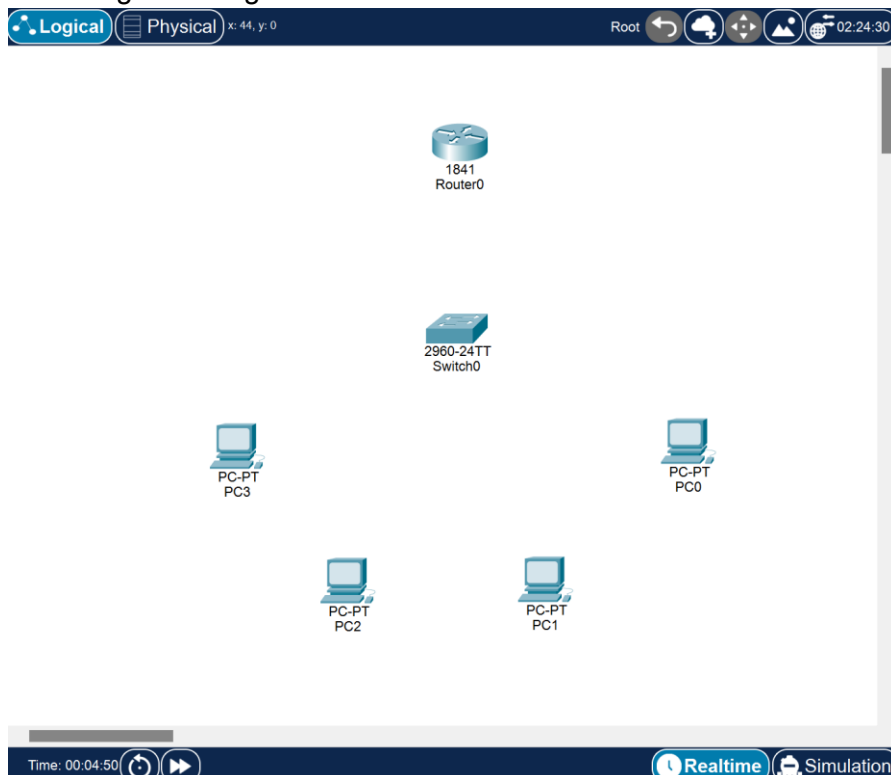
Subnet	Host Needed	Subnet Mask	Network Address	Broadcast Address	Host Range
1	30	/27 (255.255.255.224)	192.168.100.0	192.168.100.31	192.168.10.1 – 192.168.10.30
2	30	/27 (255.255.255.224)	192.168.100.32	192.168.100.63	192.168.10.33 – 192.168.10.62

c. Membangun topologi packet tracer

- Skenario 1

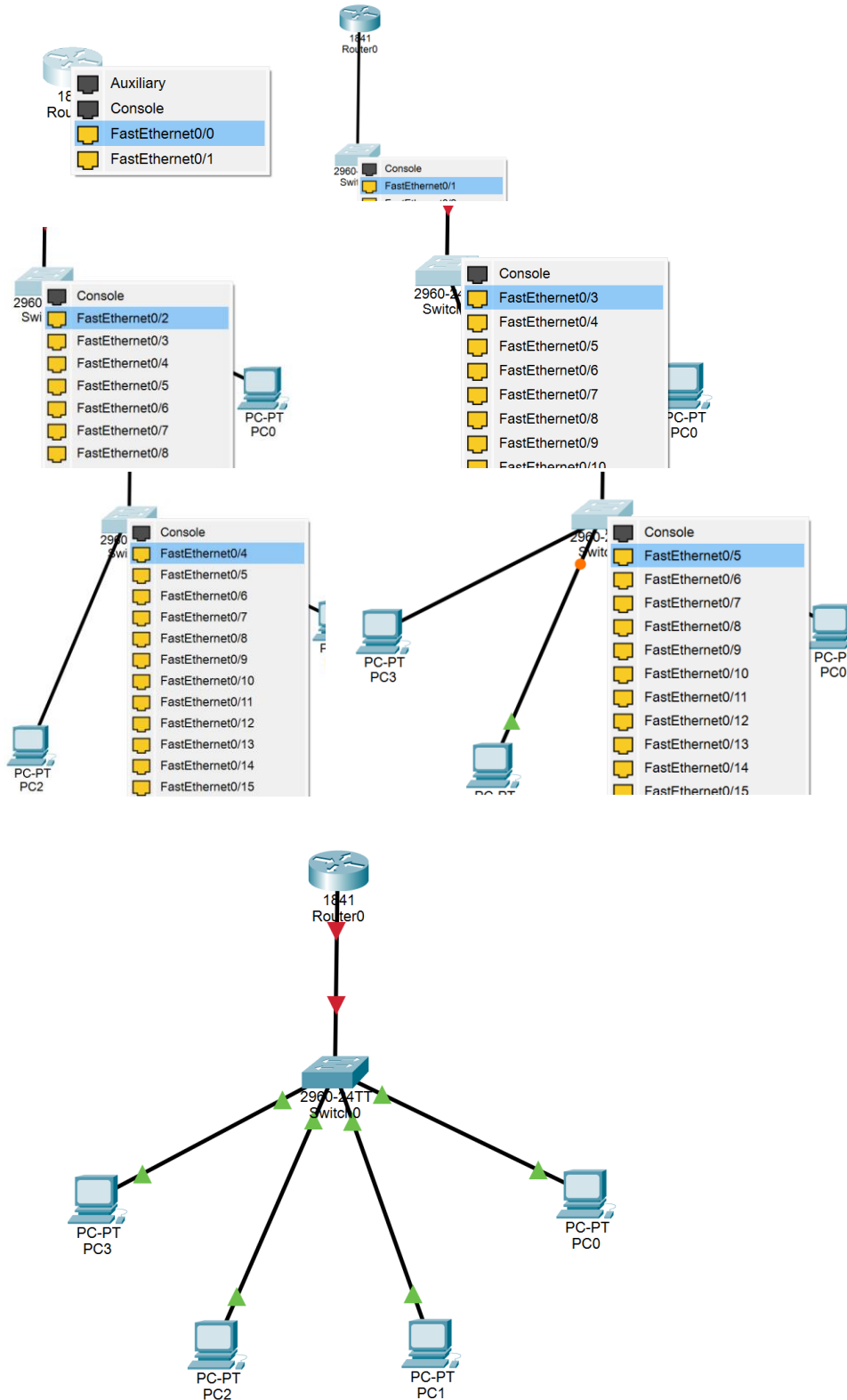
Menyiapkan komponen yang diperlukan, yaitu:

- 1 Router (Cisco Router 1841)
- 1 Switch (Cisco Catalyst 2960)
- 4 PC (PC0, PC1, PC2, PC3)
- Straight-Through Cable



Menghubungkan komponen dengan kabel Straight-Through dengan rincian:

- Router (FastEthernet0/0) ke Switch (FastEthernet0/1).
- PC0 dan PC1 ke Switch (port FastEthernet0/2 dan FastEthernet0/3).
- PC2 dan PC3 ke Switch (port FastEthernet0/4 dan FastEthernet0/5).



Melakukan konfigurasi VLAN pada switch, memasukkan PC0 dan PC1 ke VLAN 10 (Subnet 192.168.10.0/27) dan PC2 dan PC3 ke VLAN 20 (Subnet 192.168.10.32/27).

```
Switch0
Physical Config CLI Attributes
IOS Command Line Interface

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/3, changed
%LINK-5-CHANGED: Interface FastEthernet0/4, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/4, changed
%LINK-5-CHANGED: Interface FastEthernet0/5, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/5, changed

Switch>en
Switch#configure terminal
Switch(config)#vlan 10
Switch(config-vlan)#name VLAN_10
Switch(config-vlan)#vlan 20
Switch(config-vlan)#name VLAN_20
Switch(config-vlan)#exit
Switch(config)#interface range fa0/2-3
Switch(config-if-range)#switchport mode access
Switch(config-if-range)#switchport access vlan 10
Switch(config-if-range)#exit
Switch(config)#interface range fa0/4-5
Switch(config-if-range)#switchport mode access
Switch(config-if-range)#switchport access vlan 20
Switch(config-if-range)#exit
Switch(config)#interface fa0/1
Switch(config-if)#switchport mode trunk
Switch(config-if)#exit
Switch(config)#
```

Melakukan konfigurasi pada router.

```
Router0
Physical Config CLI Attributes
IOS Command Line Interface

--- System Configuration Dialog ---

Would you like to enter the initial configuration dialog? [yes/no]: no

Press RETURN to get started!

Router>en
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface fa0/0
Router(config-if)#no shutdown

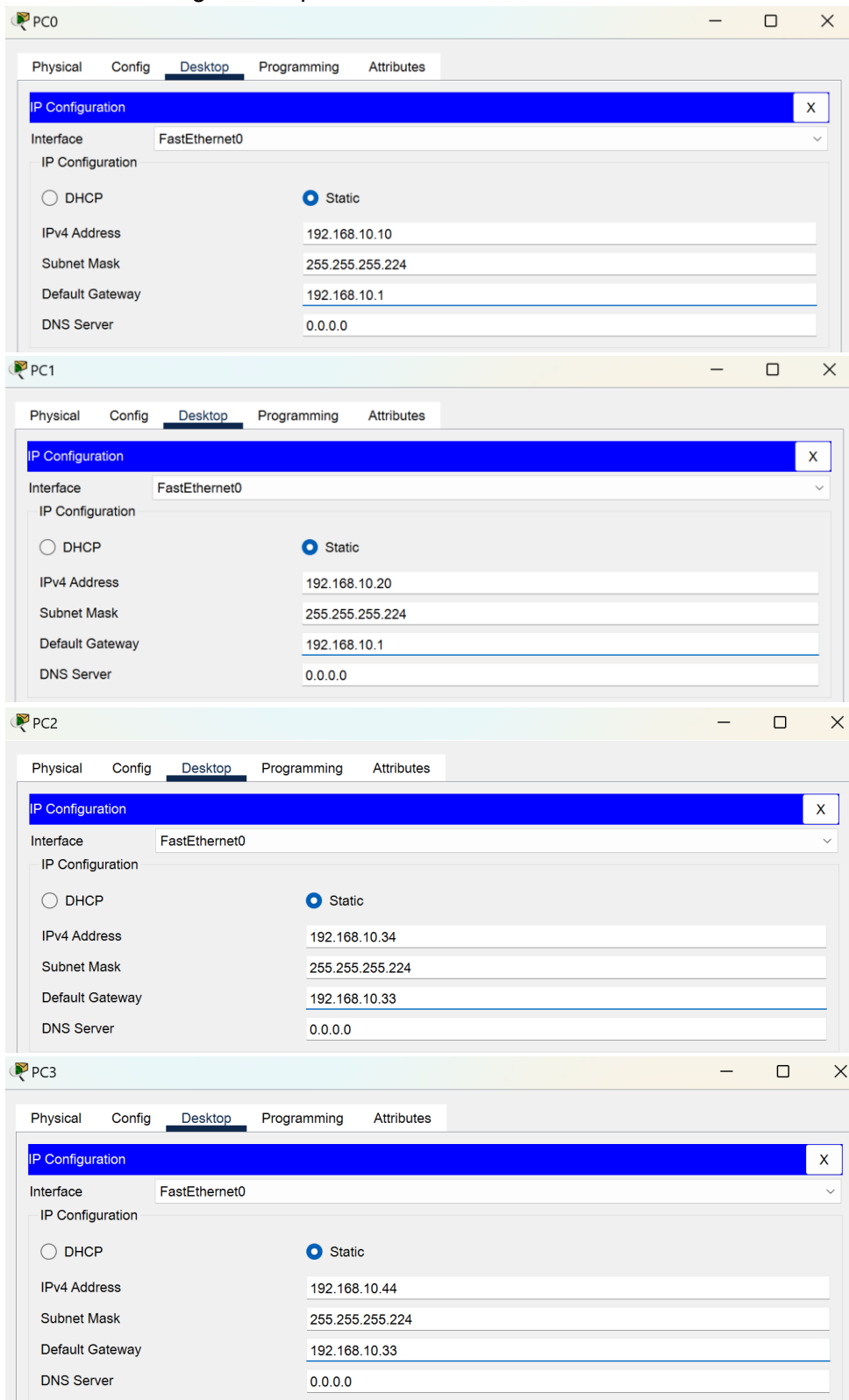
Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
exit
Router(config)#interface fa0/0.10
Router(config-subif)#
%LINK-5-CHANGED: Interface FastEthernet0/0.10, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0.10, changed state to up
encapsulation dot1Q 10
Router(config-subif)#ip address 192.168.10.1 255.255.255.224
Router(config-subif)#no shutdown
Router(config-subif)#exit
Router(config)#interface fa0/0.20
Router(config-subif)#
%LINK-5-CHANGED: Interface FastEthernet0/0.20, changed state to up

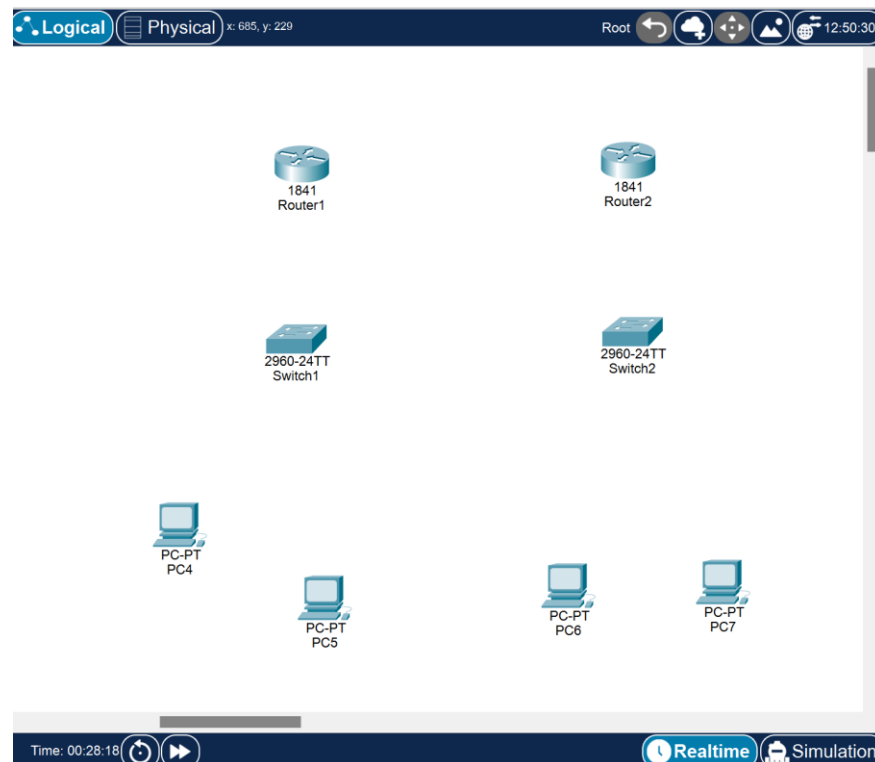
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0.20, changed state to up
encapsulation dot1Q 20
Router(config-subif)#ip address 192.168.10.33 255.255.255.224
Router(config-subif)#no shutdown
Router(config-subif)#exit
Router(config)#
```

Melakukan konfigurasi IP pada PC.



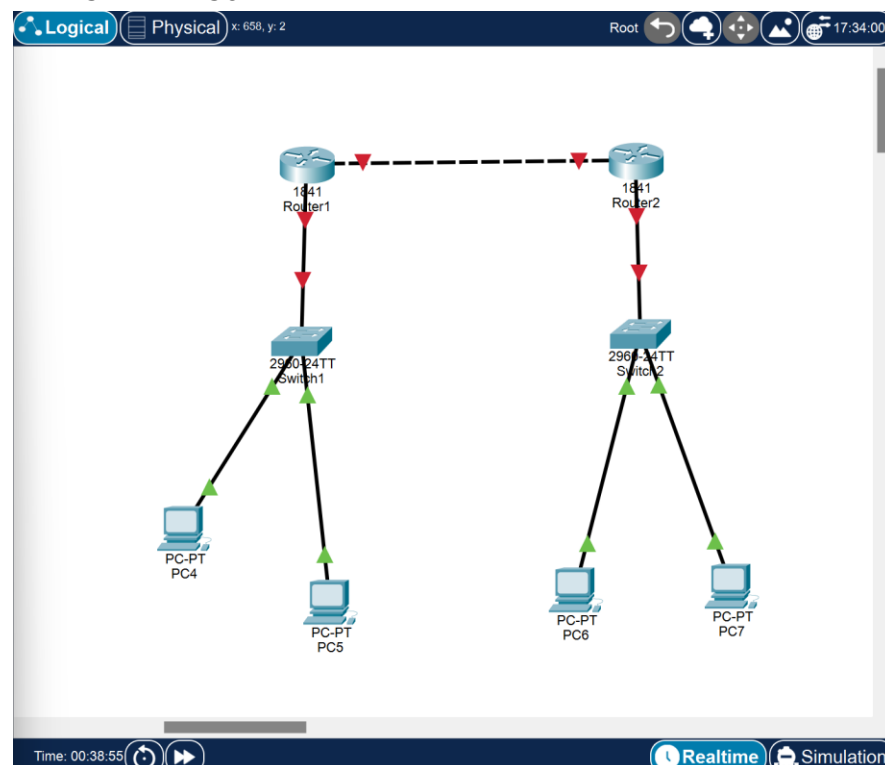
- Skenario 2  
Menyiampakn komponen yang diperlukan, yaitu:
  - 2 Router (Cisco Router 1841)
  - 2 Switch (Cisco Catalyst 2960)
  - 4 PC

- Straight-Through Cable: Router ke Switch, Switch ke PC
- Serial Cable atau Cross-Over Cable: Router ke Router




Menghubungkan komponen dengan kabel Straight-Through dan Cross-Over, dengan:

- Router 1 (FastEthernet0/0) ke Switch 1 (FastEthernet0/1)
- Router 2 (FastEthernet0/0) ke Switch 2 (FastEthernet0/1)
- Router 1 dan Router 2 menggunakan serial link atau cross-over cable
- PC0 dan PC1 ke Switch 1
- PC2 dan PC3 ke Switch 2



## Melakukan konfigurasi router 1 dan router 2.

 Router1

Physical

Config

CLI

Attributes

IOS Command Line Interface

```
M860 processor: part number 0, mask 49
2 FastEthernet/IEEE 802.3 interface(s)
191K bytes of NVRAM.
63488K bytes of ATA CompactFlash (Read/Write)
Cisco IOS Software, 1841 Software (C1841-ADVIPSERVICESK9-M), Version 12.4(15)T1, R
SOFTWARE (fc2)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2007 by Cisco Systems, Inc.
Compiled Wed 18-Jul-07 04:52 by pt_team

--- System Configuration Dialog ---

Would you like to enter the initial configuration dialog? [yes/no]: no


Press RETURN to get started!

Router>en
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface g0/0
%Invalid interface type and number
Router(config)#interface fa0/0
Router(config-if)#ip address 192.168.10.1 255.255.255.224
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to u
interface fa0/1
Router(config-if)#ip address 10.10.10.1 255.255.255.252
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/1, changed state to up
```

 Router2

Physical

Config

CLI

Attributes

IOS Command Line Interface

```
M860 processor: part number 0, mask 49
2 FastEthernet/IEEE 802.3 interface(s)
191K bytes of NVRAM.
63488K bytes of ATA CompactFlash (Read/Write)
Cisco IOS Software, 1841 Software (C1841-ADVIPSERVICESK9-M), Version 12.4(15)T1, RELEASE
SOFTWARE (fc2)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2007 by Cisco Systems, Inc.
Compiled Wed 18-Jul-07 04:52 by pt_team

--- System Configuration Dialog ---

Would you like to enter the initial configuration dialog? [yes/no]: no

Press RETURN to get started!

Router>en
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface fa0/0
Router(config-if)#ip address 192.168.10.33 255.255.255.224
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
interface fa0/1
Router(config-if)#ip address 10.10.10.2 255.255.255.252
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/1, changed state to up

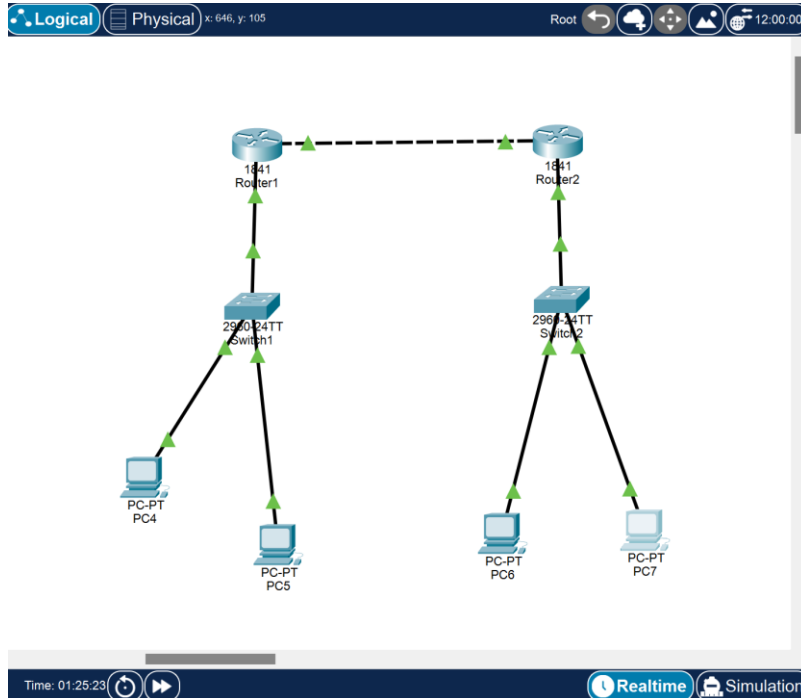
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up
```

## Melakukan routing antar router.

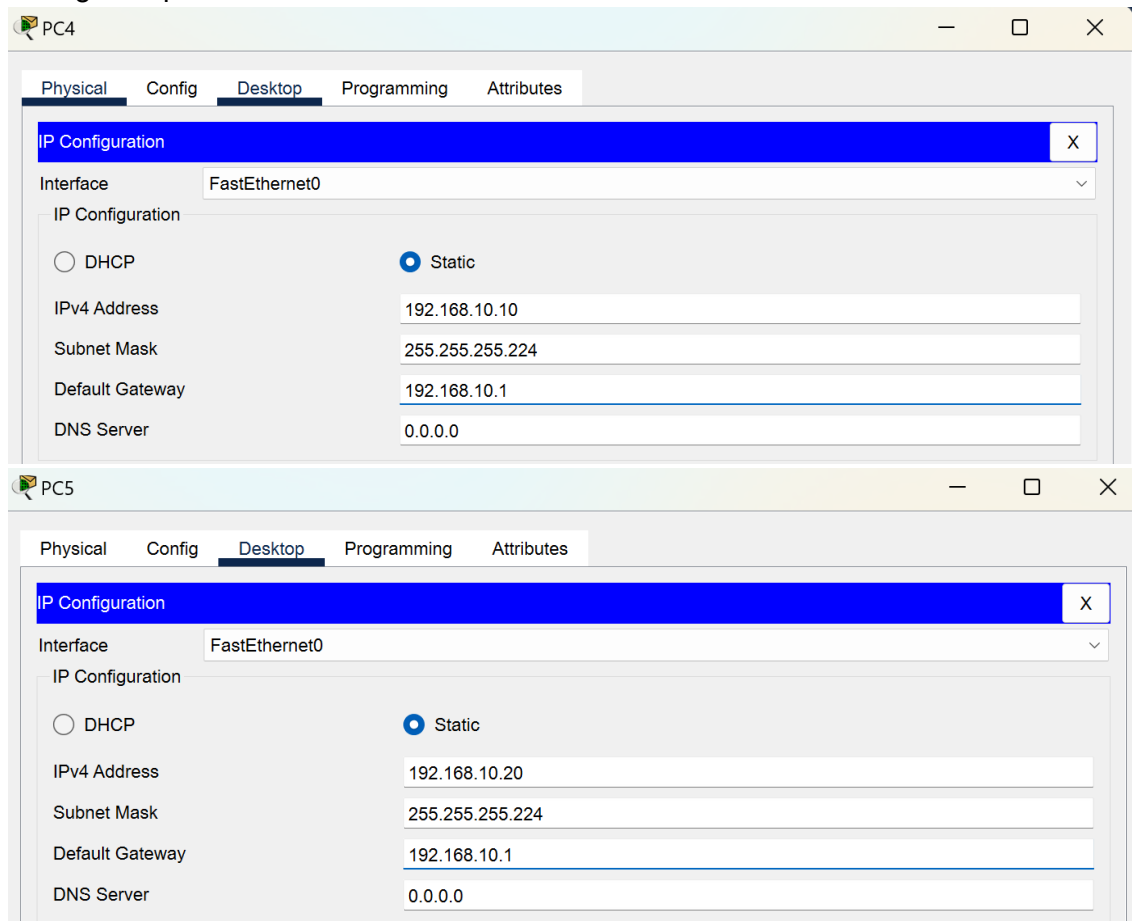
```
Router(config-if)#exit
Router(config)#ip route 192.168.10.32 255.255.255.224 10.10.10.2
Router(config)#
```

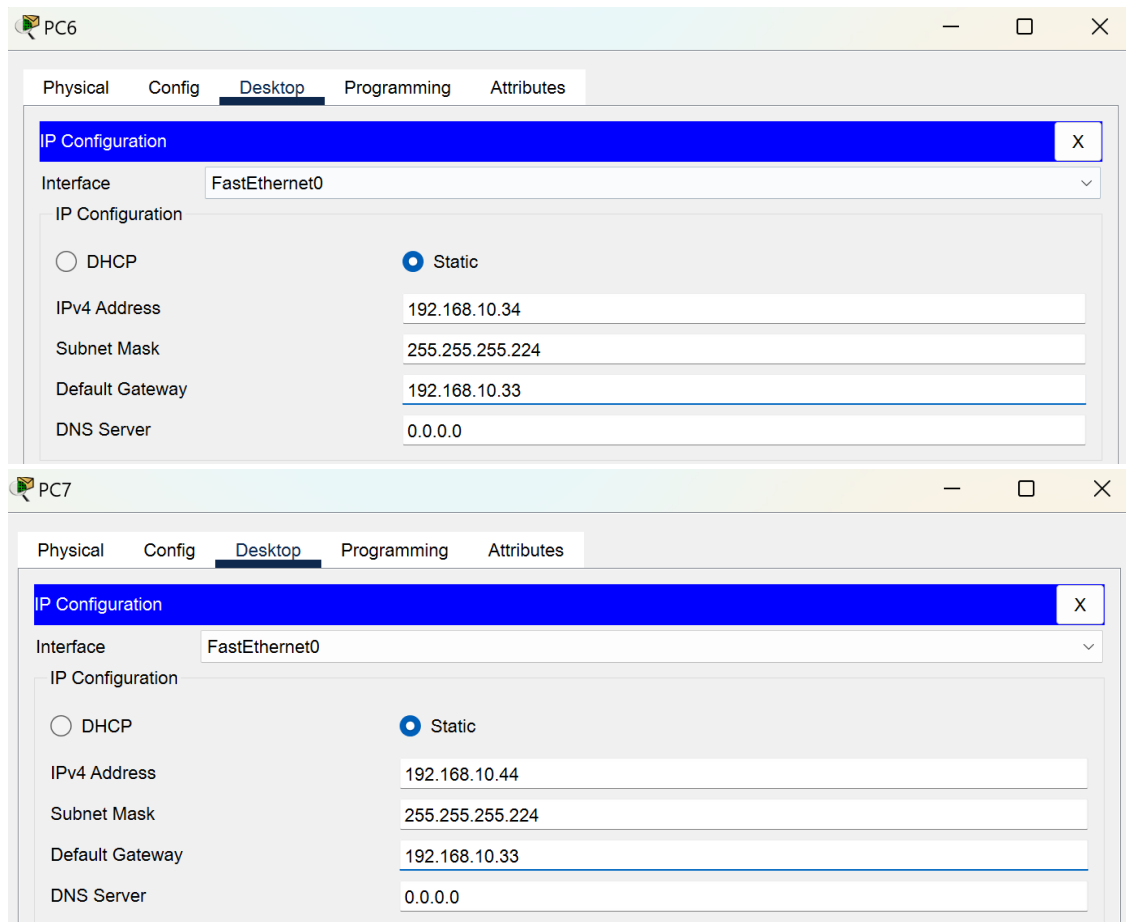
```
Router(config-if)#exit
Router(config)#ip route 192.168.10.0 255.255.255.224 10.10.10.1
Router(config)#
```

Skema Ketika konfigurasi sudah dipasang.



Konfigurasi pada PC.

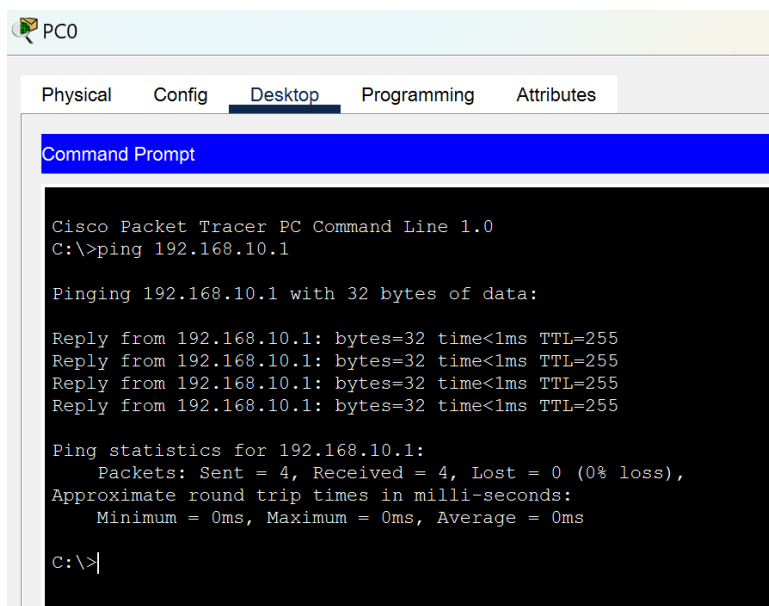




#### d. Uji konektivitas (Ping)

Ping Gateway.

- Skenario 1





PC2

Physical Config **Desktop** Programming Attributes

Command Prompt

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.168.10.33

Pinging 192.168.10.33 with 32 bytes of data:

Reply from 192.168.10.33: bytes=32 time<1ms TTL=255
Reply from 192.168.10.33: bytes=32 time<1ms TTL=255
Reply from 192.168.10.33: bytes=32 time<1ms TTL=255
Reply from 192.168.10.33: bytes=32 time<1ms TTL=255

Ping statistics for 192.168.10.33:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>
```

- Skenario 2

PC4

Physical Config **Desktop** Programming Attributes

Command Prompt

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.168.10.1

Pinging 192.168.10.1 with 32 bytes of data:

Reply from 192.168.10.1: bytes=32 time<1ms TTL=255
Reply from 192.168.10.1: bytes=32 time<1ms TTL=255
Reply from 192.168.10.1: bytes=32 time<1ms TTL=255
Reply from 192.168.10.1: bytes=32 time<1ms TTL=255

Ping statistics for 192.168.10.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>
```

PC6

Physical Config **Desktop** Programming Attributes

Command Prompt

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.168.10.33

Pinging 192.168.10.33 with 32 bytes of data:

Reply from 192.168.10.33: bytes=32 time<1ms TTL=255
Reply from 192.168.10.33: bytes=32 time<1ms TTL=255
Reply from 192.168.10.33: bytes=32 time<1ms TTL=255
Reply from 192.168.10.33: bytes=32 time<1ms TTL=255

Ping statistics for 192.168.10.33:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>|
```

Ping lintas VLAN.

- Skenario 1

Dari PC0 ping PC2

```
C:\>ping 192.168.10.34

Pinging 192.168.10.34 with 32 bytes of data:

Reply from 192.168.10.34: bytes=32 time<1ms TTL=127
Reply from 192.168.10.34: bytes=32 time<1ms TTL=127
Reply from 192.168.10.34: bytes=32 time<1ms TTL=127
Reply from 192.168.10.34: bytes=32 time<1ms TTL=127

Ping statistics for 192.168.10.34:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>|
```

Dari PC3 ping PC0

```
C:\>ping 192.168.10.20

Pinging 192.168.10.20 with 32 bytes of data:

Reply from 192.168.10.20: bytes=32 time<1ms TTL=127
Reply from 192.168.10.20: bytes=32 time<1ms TTL=127
Reply from 192.168.10.20: bytes=32 time=11ms TTL=127
Reply from 192.168.10.20: bytes=32 time=1ms TTL=127

Ping statistics for 192.168.10.20:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 11ms, Average = 3ms

C:\>
```

- Skenario 2

Dari PC0 (PC4 di skenario 2) ping PC2 (PC6 di skenario 2)

```
C:\>ping 192.168.10.34

Pinging 192.168.10.34 with 32 bytes of data:

Reply from 192.168.10.34: bytes=32 time<1ms TTL=126
Reply from 192.168.10.34: bytes=32 time<1ms TTL=126
Reply from 192.168.10.34: bytes=32 time=1ms TTL=126
Reply from 192.168.10.34: bytes=32 time<1ms TTL=126

Ping statistics for 192.168.10.34:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\>
```

Dari PC3 (PC7 di scenario 2) ping PC0 (PC4 di scenario 2)

```
C:\>ping 192.168.10.10

Pinging 192.168.10.10 with 32 bytes of data:

Reply from 192.168.10.10: bytes=32 time=20ms TTL=126
Reply from 192.168.10.10: bytes=32 time<1ms TTL=126
Reply from 192.168.10.10: bytes=32 time<1ms TTL=126
Reply from 192.168.10.10: bytes=32 time<1ms TTL=126

Ping statistics for 192.168.10.10:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 20ms, Average = 5ms

C:\>|
```

e. Penjelasan singkat terkait FLSM dan CIDR

FLSM (Fixed Length Subnet Mask) dan CIDR (Classless Inter-Domain Routing) adalah dua metode subnetting dengan perbedaan utama dalam fleksibilitas dan efisiensi alokasi IP. FLSM menggunakan subnet dengan ukuran yang sama untuk semua jaringan, sehingga setiap subnet memiliki jumlah host tetap dan subnet mask yang identik. Pendekatan ini lebih sederhana, tetapi sering kali menyebabkan pemborosan alamat IP karena tidak mempertimbangkan kebutuhan host yang berbeda di setiap subnet. Sebaliknya, CIDR memungkinkan penggunaan subnet dengan ukuran bervariasi, menyesuaikan jumlah host sesuai kebutuhan. Hal ini membuat CIDR lebih efisien dalam penggunaan IP, terutama dalam jaringan besar seperti internet.

Selain efisiensi, CIDR juga lebih fleksibel dibandingkan FLSM karena dapat mengalokasikan subnet dengan berbagai ukuran, misalnya /28 untuk 14 host atau /26 untuk 62 host. Sementara itu, FLSM kurang fleksibel karena semua subnet harus memiliki ukuran yang sama. Meskipun lebih mudah dikelola dalam jaringan kecil, FLSM kurang cocok untuk sistem modern yang membutuhkan optimasi alamat IP. Oleh karena itu, CIDR menjadi pilihan utama dalam jaringan saat ini meskipun lebih kompleks dalam perhitungan dan pengelolaannya.

Kendala yang terjadi ketika melakukan praktikum adalah hasil ping berupa request time out. Sehingga mengharuskan untuk melakukan troubleshooting dengan menggunakan show vlan brief pada switch dan show ip interface brief pada router. Hasilnya ternyata terdapat kesalahan dalam penulisan ip (typo) sehingga terdapat request time out Ketika mencoba melakukan ping. Terdapat juga kendala request time out pada percobaan ping pertama, tetapi Ketika kembali dicoba, hasil ping tetap berhasil.

f. Link GITHUB

<https://github.com/kyfraaa/DMJK-TASK>