

LAPORAN PRAKTIKUM

Routing OSPF Lanjutan



Oleh:

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KEMENTRIAN RISET, TEKNOLOGI DAN PERGURUAN TINGGI
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A. Tujuan Praktikum

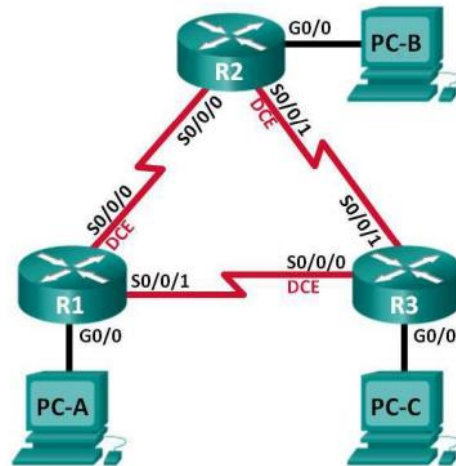
1. Mempelajari prinsip kerja dan cara konfigurasi OSPF untuk memastikan paket dirutekan secara optimal dalam jaringan yang dibagi berdasarkan area.
2. Mahasiswa mampu mendesain jaringan dengan menerapkan konsep OSPF.

B. Alat dan Bahan

- Router Cisco
- PC atau laptop
- Kabel UTP
- Kabel Serial
- Software Packet Tracer

Langkah Praktikum

Topology



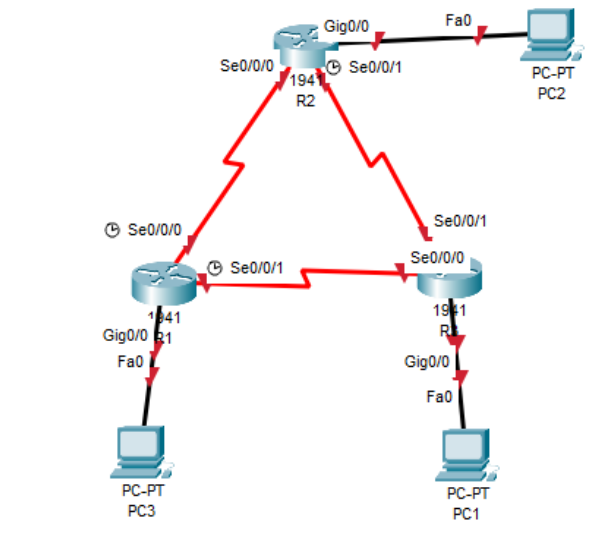
Addressing Table

Device	OSPF Router ID	Interface	IP Address	Default Gateway
R1	1.1.1.1	G0/0	192.168.1.1/24	N/A
			2001:DB8:ACAD:A::1/64	
			FE80::1 link-local	
		S0/0/0	192.168.12.1/30	N/A
			2001:DB8:ACAD:12::1/64	
			FE80::1 link-local	
		S0/0/1	192.18.13.1/30	N/A
			2001:DB8:ACAD:13::1/64	
			FE80::1 link-local	
R2	2.2.2.2	G0/0	192.168.2.1/24	N/A
			2001:DB8:ACAD:B::2/64	
			FE80::2 link-local	
		S0/0/0	192.168.12.2/30	N/A
			2001:DB8:ACAD:12::2/64	
			FE80::2 link-local	
		S0/0/1	192.168.23.1/30	N/A
			2001:DB8:ACAD:23::2/64	
			FE80::2 link-local	
R3	3.3.3.3	G0/0	192.168.3.1/24	N/A

			2001:DB8:ACAD:C::3/64	
			FE80::3 link-local	
		S0/0/0	192.168.13.2/30	N/A
			2001:DB8:ACAD:13::3/64	
			FE80::3 link-local	
		S0/0/1	192.168.23.2/30	N/A
			2001:DB8:ACAD:23::3/64	
			FE80::3 link-local	
PC-A		NIC	192.168.1.3/24	192.168.1.1
			2001:DB8:ACAD:A::A/64	FE80::1
PC-B		NIC	192.168.2.3/24	192.168.2.1
			2001:DB8:ACAD:B::B/64	FE80::2
PC-C		NIC	192.168.3.3/24	192.168.3.1
			2001:DB8:ACAD:C::C/64	FE80::3

Bagian 1: Membangun Jaringan dan Memuat Konfigurasi Perangkat

Langkah 1: Sambungkan kabel jaringan seperti yang ditunjukkan dalam topologi.



Langkah 2: Konfigurasi host PC.

PC-A

Physical Config **Desktop** Programming Attributes

IP Configuration

Interface: FastEthernet0

☐ DHCP ☒ Static

IPv4 Address: 192.168.1.3

Subnet Mask: 255.255.255.0

Default Gateway: 192.168.1.1

DNS Server: 0.0.0.0

IPv6 Configuration

☐ Automatic ☒ Static

IPv6 Address: 2001:DB8:ACAD:A::A /

Link Local Address: FE80::260:2FFF:FEEA:61B8

Default Gateway: FE80::1

PC-B

Physical Config **Desktop** Programming Attributes

IP Configuration X

Interface: FastEthernet0

IP Configuration

☐ DHCP ☒ Static

IPv4 Address: 192.168.2.3

Subnet Mask: 255.255.255.0

Default Gateway: 192.168.2.1

DNS Server: 0.0.0.0

IPv6 Configuration

☐ Automatic ☒ Static

IPv6 Address: 2001:DB8:ACAD:B::B /

Link Local Address: FE80::207:ECFF:FE6D:6376

Default Gateway: FE80::2

DNS Server:

PC-C

Interface: FastEthernet0

IP Configuration

☐ DHCP ☒ Static

IPv4 Address: 192.168.3.3

Subnet Mask: 255.255.255.0

Default Gateway: 192.168.3.1

DNS Server: 0.0.0.0

IPv6 Configuration

☐ Automatic ☒ Static

IPv6 Address: /

Link Local Address: FE80::2E0:A3FF:FE41:1C53

Default Gateway: FE80::3

DNS Server:

Langkah 3: Memuat konfigurasi router.

Router R1 Configuration:

```
conf t
service password-encryption
no ip domain lookup
hostname R1
enable secret class
line con 0
logging synchronous
password cisco
login
line vty 0
password cisco
login
banner motd @Unauthorized Access is Prohibited!@
ipv6 unicast-routing
ipv6 router ospf 1
router-id 1.1.1.1
passive-interface g0/0
interface g0/0
ip address 192.168.1.1 255.255.255.0
ipv6 address 2001:db8:acad:a::1/64
ipv6 address fe80::1 link-local
interface s0/0/0
clock rate 128000
ip address 192.168.12.1 255.255.255.0
ipv6 address 2001:db8:acad:12::1/64
ipv6 address fe80::1 link-local
ipv6 ospf 1 area 0
no shutdown
interface s0/0/1
ip address 192.168.13.1 255.255.255.0
ipv6 address 2001:db8:acad:13::1/64
ipv6 address fe80::1 link-local
```



```

ipv6 ospf 1 area 0
no shutdown
router ospf 1
network 192.168.1.0 0.0.0.255 area 0
network 129.168.12.0 0.0.0.3 area 0
network 192.168.13.0 0.0.0.3 area 0
passive-interface g0/0
end

```

Router R2 Configuration:

```

conf t
service password-encryption
no ip domain lookup
hostname R2
enable secret class
line con 0
logging synchronous
password cisco
login
line vty 0
password cisco
login
banner motd @Unauthorized Access is Prohibited!@
ipv6 unicast-routing
ipv6 router ospf 1
router-id 2.2.2.2
interface g0/0
ip address 192.168.2.1 255.255.255.0
ipv6 address 2001:db8:acad:B::2/64
ipv6 address fe80::1 link-local
no shutdown
interface s0/0/0
ip address 192.168.12.2 255.255.255.252
ipv6 address 2001:db8:acad:12::2/64
ipv6 address fe80::2 link-local

```

```

ipv6 ospf 1 area 0
no shutdown
interface s0/0/1
clock rate 128000
ipv6 address 2001:db8:acad:23::2/64
ipv6 address fe80::2 link-local
no shutdown
router ospf 1
network 192.168.2.0 0.0.0.255 area 0
network 192.168.12.0 0.0.0.3 area 0
network 192.168.23.0 0.0.0.3 area 0
end

```

Router R3 Configuration:

```

conf t
service password-encryption
no ip domain lookup
enable secret class
hostname R3
line con 0
logging synchronous
password cisco
login
line vty 0
password cisco
login
banner motd @Unauthorized Access is Prohibited!@
interface g0/0
ipv6 address 2001:db8:acad:c::3/64
ipv6 address fe80::3 link-local
interface s0/0/0
clock rate 128000
ip address 192.168.13.1 255.255.255.252
ipv6 address 2001:db8:acad:13::3/64
ipv6 address fe80::3 link-local

```

```

no shutdown
interface s0/0/1
ip address 192.168.23.2 255.255.255.252
ipv6 address 2001:db8:acad:23::3/64
ipv6 address fe80::3 link-local
router ospf 1
network 192.168.3.0 0.0.0.255 area 0
passive-interface g0/0
end

```

Langkah 3: Melakukan tes ping

Ping Pc 1 ke Pc 3

```

C:\>ping 192.168.3.3

Pinging 192.168.3.3 with 32 bytes of data:

Reply from 192.168.3.3: bytes=32 time=1ms TTL=126
Reply from 192.168.3.3: bytes=32 time=27ms TTL=126
Reply from 192.168.3.3: bytes=32 time=1ms TTL=126
Reply from 192.168.3.3: bytes=32 time=29ms TTL=126

Ping statistics for 192.168.3.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 29ms, Average = 14ms

C:\>

```

Ping Pc 2 ke 3

```

C:\>ping 192.168.3.3

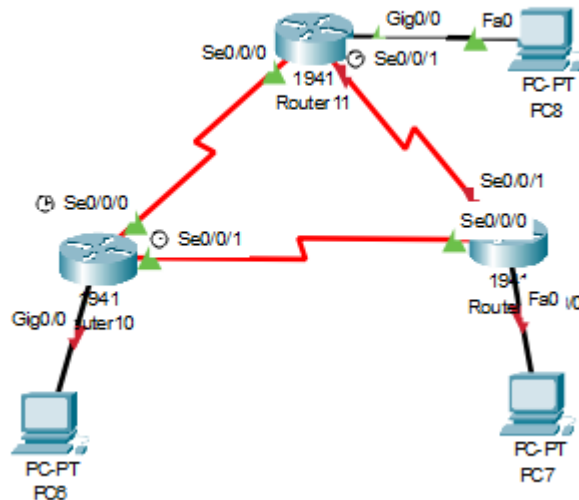
Pinging 192.168.3.3 with 32 bytes of data:

Reply from 192.168.3.3: bytes=32 time=1ms TTL=126
Reply from 192.168.3.3: bytes=32 time=26ms TTL=126
Reply from 192.168.3.3: bytes=32 time=3ms TTL=126
Reply from 192.168.3.3: bytes=32 time=3ms TTL=126

Ping statistics for 192.168.3.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 26ms, Average = 8ms

```

Bagian 2 : Topologi Ospf Lanjutan



Konfigurasi R1

```
Router>en
```

```
Router#conf t
```

Konfigurasi Keamanan

```
Router(config)#service password-encryption
```

```
Router(config)#no ip domain lookup
```

```
Router(config)#hostname R1
```

```
R1(config)#enable secret class
```

Konfigurasi Konsol dan Akses Remote Konsol :

```
R1(config)#line con 0
```

```
R1(config-line)#logging synchronous
```

```
R1(config-line)#password cisco
```

```
R1(config-line)#login
```

Virtual Terminal (VTY):

```
R1(config)#line vty 0
```

```
R1(config-line)#password cisco
```

```
R1(config-line)#login
```

Pesan Banner

```
R1(config)#banner motd @Unauthorized Access is Prohibited!@
```

Konfigurasi IPv6 dan Routing OSPF IPv6 Unicast Routing:

```
R1(config)#ipv6 unicast-routing
```

OSPFv3 (IPv6):

```
R1(config)#ipv6 router ospf 1
```

```
R1(config-rtr)#router-id 1.1.1.1
```

```
R1(config-rtr)#passive-interface g0/0
```

Konfigurasi Interface Interface GigabitEthernet 0/0:

```
R1(config)#interface g0/0
```

```
R1(config-if)#ip add 192.168.1.1 255.255.255.0
```

```
R1(config-if)#ipv6 address 2001:db8:acad:a::1/64
```

```
R1(config-if)#ipv6 address fe80::1 link-local
```

Interface Serial 0/0/0:

```
R1(config)#int s0/0/0
```

```
R1(config-if)#clock rate 128000
```

```
R1(config-if)#ip add 192.168.12.1 255.255.255.252
```

```
R1(config-if)#ipv6 add 2001:db8:acad:12::1/64
```

```
R1(config-if)#ipv6 ospf 1 area 0
```

```
R1(config-if)#no sh
```

Interface Serial 0/0/1:

```
R1(config)#int s0/0/1
```

```
R1(config-if)#ip add 192.168.13.1 255.255.255.252
```

```
R1(config-if)#ipv6 add 2001:db8:acad:13::1/64
```

```
R1(config-if)#ipv6 ospf 1 area 0
```

```
R1(config-if)#no sh
```

OSPFv2 (IPv4)

```
R1(config)#router ospf 1
```

```
R1(config-router)#network 192.168.1.0 0.0.0.255 area 0
```

```
R1(config-router)#network 192.168.12.0 0.0.0.3 area 0
```

```
R1(config-router)#network 192.168.13.0 0.0.0.3 area 0
```

R1(config-router)#passive-interface g0/0

Konfigurasi R2

Router(config)#hostname R2

Service Password Encryption:

Router(config)#service password-encryption

Disable IP Domain Lookup:

Router(config)#no ip domain lookup

Password dan Login

Enable Secret Password:

R2(config)#enable secret class

Console Line Configuration:

R2(config-line)#password cisco

R2(config-line)#login

R2(config-line)#logging synchronous

VTY Line Configuration:

R2(config-line)#password cisco

R2(config-line)#login

Banner

R2(config)#banner motd @Unauthorized Access is Prohibited!@

IPv6 Routing dan OSPFv3

Enable IPv6 Routing:

R2(config)#ipv6 unicast-routing

Konfigurasi OSPFv3:

R2(config)#ipv6 router ospf 1

R2(config-rtr)#router-id 2.2.2.2

Interface Configuration

GigabitEthernet 0/0:

R2(config-if)#ip add 192.168.2.1 255.255.255.0

R2(config-if)#ipv6 add 2001:db8:acad:B::2/64

R2(config-if)#no shutdown

Serial 0/0/0:

R2(config-if)#ip add 192.168.12.2 255.255.255.252

R2(config-if)#ipv6 add 2001:db8:acad:12::2/64

R2(config-if)#no shutdown

Serial 0/0/1:

R2(config-if)#clock rate 128000

R2(config-if)#ipv6 add 2001:db8:acad:23::2/64

R2(config-if)#no shutdown

Konfigurasi OSPF untuk IPv4**Router OSPF Configuration:**

R2(config-router)#network 192.168.2.0 0.0.0.255 area 0

R2(config-router)#network 192.168.12.0 0.0.0.3 area 0

R2(config-router)#network 192.168.23.0 0.0.0.3 area 0

Konfigurasi R3

Router>enable

Router#configure terminal

! Pengamanan dasar router

service password-encryption

no ip domain lookup

enable secret class

! Memberikan nama pada router

hostname R3

! Konfigurasi keamanan akses console

line console 0

logging synchronous

password cisco

login

exit

! Konfigurasi keamanan akses VTY

line vty 0 4

password cisco

login

exit

! Banner MOTD (Message of the Day)

banner motd @

Unauthorized Access is Prohibited!

@

! Mengaktifkan IPv6 routing

ipv6 unicast-routing

! Konfigurasi interface GigabitEthernet 0/0

interface GigabitEthernet0/0

ip address 192.168.3.1 255.255.255.0

ipv6 address 2001:db8:acad:c::3/64

ipv6 address fe80::3 link-local

no shutdown

exit

! Konfigurasi interface Serial 0/0/0

interface Serial0/0/0

clock rate 128000

ip address 192.168.13.1 255.255.255.252

ipv6 address 2001:db8:acad:13::3/64

ipv6 address fe80::3 link-local

no shutdown

exit

! Konfigurasi interface Serial 0/0/1

interface Serial0/0/1

ip address 192.168.23.2 255.255.255.252

ipv6 address 2001:db8:acad:23::3/64

ipv6 address fe80::3 link-local

no shutdown

exit

! Konfigurasi OSPF untuk IPv4

```
router ospf 1
network 192.168.3.0 0.0.0.255 area 0
network 192.168.13.0 0.0.0.3 area 0
network 192.168.23.0 0.0.0.3 area 0
passive-interface GigabitEthernet0/0
exit
```

! Konfigurasi OSPF untuk IPv6

```
ipv6 router ospf 1
router-id 3.3.3.3
exit
```

! Mengaktifkan OSPF untuk IPv6 pada interface

```
interface GigabitEthernet0/0
ipv6 ospf 1 area 0
exit
interface Serial0/0/0
ipv6 ospf 1 area 0
exit
interface Serial0/0/1
ipv6 ospf 1 area 0
exit
```

! Menyimpan konfigurasi

```
end
write memory
```