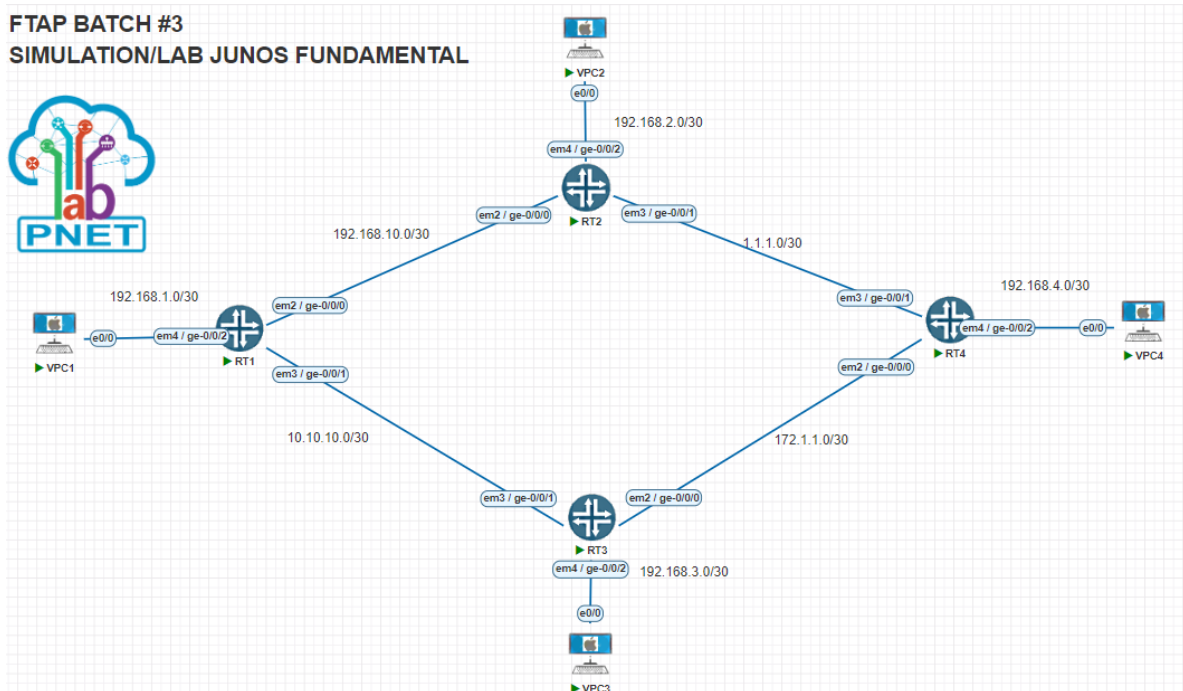# JUNIPER

03 – SIMULATION/LAB JUNOS FUNDAMENTAL

- ✓ Konfigurasi Dynamic Routing OSPF.

- ✓ Uji Konektivitas.

- ✓ Verifikasi OSPF.

Annisa Hadita

Mentor: Dito Prasetya

1. Topology

FTAP BATCH #3
SIMULATION/LAB JUNOS FUNDAMENTAL

2. Task

- Konfigurasi dynamic routing OSPF.

  Konfigurasi ini dilakukan untuk memungkinkan penentuan jalur terbaik secara otomatis dalam jaringan yang besar, sehingga router dapat berkomunikasi satu sama lain. Berbeda dengan task sebelumnya (task 1 & task 2) yang menggunakan static route, di mana jalur ditentukan secara manual.

  Sebelum melakukan konfigurasi menggunakan dynamic routing OSPF, konfigurasi static routing harus dinonaktifkan. Konfigurasi static routing bisa dinonaktifkan tanpa harus menghapusnya dengan menggunakan script sebagai berikut:

  #Deactive Configuration Static Routing R1

  ```
  deactivate routing-options static route 192.168.2.0/30
  deactivate routing-options static route 1.1.1.0/30
  deactivate routing-options static route 192.168.4.0/30
  deactivate routing-options static route 192.168.3.0/30
  ```

```
routing-options {
    static {
        inactive: route 192.168.2.0/30 next-hop 192.168.10.2;
        inactive: route 1.1.1.0/30 next-hop 192.168.10.2;
        inactive: route 192.168.4.0/30 next-hop 192.168.10.2;
        inactive: route 192.168.3.0/30 next-hop 10.10.10.2;
    }
}
```

#Deactive Configuration Static Routing R2

> deactivate routing-options static route 192.168.1.0/30
>
> deactivate routing-options static route 10.10.10.0/30
>
> deactivate routing-options static route 192.168.3.0/30
>
> deactivate routing-options static route 192.168.4.0/30

```
routing-options {
    static {
        inactive: route 192.168.1.0/30 next-hop 192.168.10.1;
        inactive: route 10.10.10.0/30 next-hop 192.168.10.1;
        inactive: route 192.168.3.0/30 next-hop 192.168.10.1;
        inactive: route 192.168.4.0/30 next-hop 1.1.1.2;
    }
}
```

#Deactive Configuration Static Routing R3

> deactivate routing-options static route 192.168.1.0/30
>
> deactivate routing-options static route 192.168.10.0/30
>
> deactivate routing-options static route 192.168.2.0/30
>
> deactivate routing-options static route 192.168.4.0/30

```
routing-options {
    static {
        inactive: route 192.168.1.0/30 next-hop 10.10.10.1;
        inactive: route 192.168.10.0/30 next-hop 10.10.10.1;
        inactive: route 192.168.2.0/30 next-hop 10.10.10.1;
        inactive: route 192.168.4.0/30 next-hop 172.1.1.2;
    }
}
```

#Deactive Configuration Static Routing R4

```
deactivate routing-options static route 192.168.2.0/30

deactivate routing-options static route 192.168.10.0/30

deactivate routing-options static route 192.168.1.0/30

deactivate routing-options static route 192.168.3.0/30
```

```
routing-options {
    static {
        inactive: route 192.168.2.0/30 next-hop 1.1.1.1;
        inactive: route 192.168.10.0/30 next-hop 1.1.1.1;
        inactive: route 192.168.1.0/30 next-hop 1.1.1.1;
        inactive: route 192.168.3.0/30 next-hop 172.1.1.1;
    }
}
```

Setelah melakukan deactivate pada konfigurasi static routing, langkah selanjutnya adalah melakukan konfigurasi dynamic routing pada setiap router. Berbeda dengan static routing yang konfigurasinya dilakukan secara manual, dynamic routing ini dilakukan secara otomatis. Dengan dynamic routing, router akan bertukar informasi dengan router lainnya dalam jaringan secara otomatis menentukan jalur terbaik ke tujuan yang ditentukan. Protokol dynamic routing yang digunakan pada simulasi lab kali ini adalah OSPF (Open Shortest Path First). Konfigurasi set protocols ospf area 0.0.0.0 digunakan untuk memberitahu router untuk menjadi bagian dari area tertentu dalam sistem OSPF.

#Konfigurasi R1

```
set protocols ospf area 0.0.0.0 interfaces ge-0/0/0

set protocols ospf area 0.0.0.0 interfaces ge-0/0/1
```

```
root@RT1> show ospf neighbor
Address          Interface        State    ID          Pri Dead
192.168.10.2     ge-0/0/0.0       Full     1.1.1.1     128   32
10.10.10.2       ge-0/0/1.0       Full     10.10.10.2  128   34
```

#Konfigurasi R2

```
set protocols ospf area 0.0.0.0 interfaces ge-0/0/0

set protocols ospf area 0.0.0.0 interfaces ge-0/0/1
```

```
root@RT2> show ospf neighbor
Address          Interface        State    ID          Pri Dead
192.168.10.1     ge-0/0/0.0       Full     10.10.10.1  128   34
1.1.1.2          ge-0/0/1.0       Full     1.1.1.2     128   36
```

#Konfigurasi R3

```
set protocols ospf area 0.0.0.0 interfaces ge-0/0/0
set protocols ospf area 0.0.0.0 interfaces ge-0/0/1
```

```
root@RT3> show ospf neighbor
Address          Interface          State     ID               Pri  Dead
172.1.1.2        ge-0/0/0.0         Full      1.1.1.2          128   37
10.10.10.1       ge-0/0/1.0         Full      10.10.10.1       128   33
```

#Konfigurasi R4

```
set protocols ospf area 0.0.0.0 interfaces ge-0/0/0
set protocols ospf area 0.0.0.0 interfaces ge-0/0/1
```

```
root@RT4> show ospf neighbor
Address          Interface          State     ID               Pri  Dead
172.1.1.1        ge-0/0/0.0         Full      10.10.10.2       128   32
1.1.1.1          ge-0/0/1.0         Full      1.1.1.1          128   26
```

Setelah melakukan konfigurasi dynamic routing OSPF, selanjutnya melakukan konfigurasi Policy Options For Redistribute Protocol Direct disemua router untuk mengatur rute atau jalur yang terhubung ke router dan akan dibagikan ke dalam protokol dynamic routing.

```
set protocols ospf export EXP_DIRECT
```

Perintah ini digunakan untuk mengekspor (export) rute yang dipelajari melalui protokol OSPF.

```
set policy-options policy-statement EXP_DIRECT term 1 from protocol direct
```

Perintah ini digunakan untuk membuat ketentuan. Ketentuan yang dibuat akan menentukan bahwa hanya rute yang dipelajari secara langsung (direct) yang akan diproses.

```
set policy-options policy-statement EXP_DIRECT term 1 then accept
```

Perintah ini digunakan untuk menerima ketentuan yang dibuat sebelumnya "protocol direct". Jika rute memenuhi kondisi dari protocol direct, maka rute tersebut akan diterima.

```
set policy-options policy-statement EXP_DIRECT term default then reject
```

Perintah ini digunakan untuk menolak ketentuan yang tidak cocok dari protocol

direct, maka rute tersebut akan ditolak.

```
set protocols ospf export EXP_DIRECT
set protocols ospf area 0.0.0.0 interface ge-0/0/0.0
set protocols ospf area 0.0.0.0 interface ge-0/0/1.0
set policy-options policy-statement EXP_DIRECT term 1 from protocol direct
set policy-options policy-statement EXP_DIRECT term 1 then accept
set policy-options policy-statement EXP_DIRECT term default then reject
```

3. **Pengujian Konektivitas**

Pengujian ini dilakukan untuk memastikan konektivitas berhasil antara VPC dengan

VPC lainnya yang telah dikonfigurasi dengan dynamic routing.

- **VPC1 to VPC2**

```
VPC1>ping 192.168.2.2
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.2.2, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 4/5/7 ms
```

- **VPC1 to VPC3**

```
VPC1>ping 192.168.3.2
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.3.2, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 4/5/7 ms
```

- **VPC1 to VPC4**

```
VPC1>ping 192.168.4.2
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.4.2, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 6/7/12 ms
```

- **VPC2 to VPC1**

```
VPC2>ping 192.168.1.2
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.1.2, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 4/5/6 ms
```

- **VPC2 to VPC3**

```
VPC2>ping 192.168.3.2
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.3.2, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 20/23/29 ms
```

- **VPC2 to VPC4**

```
VPC2>ping 192.168.4.2
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.4.2, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 5/5/7 ms
```

- **VPC3 to VPC1**

```
VPC3>ping 192.168.1.2
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.1.2, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 5/7/11 ms
```

- **VPC3 to VPC2**

```
VPC3>ping 192.168.2.2
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.2.2, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 6/6/8 ms
```

- **VPC3 to VPC4**

```
VPC3>ping 192.168.4.2
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.4.2, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 4/6/8 ms
```

- **VPC4 to VPC1**

```
VPC4>ping 192.168.1.2
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.1.2, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 6/7/9 ms
```

- **VPC4 to VPC2**

```
VPC4>ping 192.168.2.2
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.2.2, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 4/6/13 ms
```

- **VPC4 to VPC3**

```
VPC4>ping 192.168.3.2
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.3.2, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 4/6/10 ms
```

4. **Pengujian Jalur Path/Hop**

Pengujian ini dilakukan untuk mengidentifikasi atau mencari tahu jalur yang dilalui oleh paket dari satu titik ke titik lain.

- **VPC1 to VPC2**

```
VPC1>traceroute 192.168.2.2
Type escape sequence to abort.
Tracing the route to 192.168.2.2
VRF info: (vrf in name/id, vrf out name/id)
  1 192.168.1.1 7 msec 3 msec 1 msec
  2 192.168.10.2 9 msec 4 msec 3 msec
  3 192.168.2.2 5 msec 6 msec *
```

- **VPC1 to VPC3**

```
VPC1>traceroute 192.168.3.2
Type escape sequence to abort.
Tracing the route to 192.168.3.2
VRF info: (vrf in name/id, vrf out name/id)
  1 192.168.1.1 16 msec 3 msec 2 msec
  2 10.10.10.2 22 msec 4 msec 3 msec
  3 192.168.3.2 5 msec 6 msec *
```

- **VPC1 to VPC4**

```
VPC1>traceroute 192.168.4.2
Type escape sequence to abort.
Tracing the route to 192.168.4.2
VRF info: (vrf in name/id, vrf out name/id)
  1 192.168.1.1 8 msec 1 msec 1 msec
  2 192.168.10.2 63 msec 4 msec 4 msec
  3 1.1.1.2 20 msec 8 msec 5 msec
  4 192.168.4.2 7 msec 8 msec *
```

- **VPC2 to VPC1**

```
VPC2>traceroute 192.168.1.2
Type escape sequence to abort.
Tracing the route to 192.168.1.2
VRF info: (vrf in name/id, vrf out name/id)
  1 192.168.2.1 2 msec 3 msec 2 msec
  2 192.168.10.1 4 msec 4 msec 6 msec
  3 192.168.1.2 5 msec 6 msec *
```

- **VPC2 to VPC3**

```
VPC2>traceroute 192.168.3.2
Type escape sequence to abort.
Tracing the route to 192.168.3.2
VRF info: (vrf in name/id, vrf out name/id)
  1 192.168.2.1 2 msec 2 msec 2 msec
  2 1.1.1.2 4 msec 5 msec 3 msec
  3 172.1.1.1 15 msec 7 msec 7 msec
  4 192.168.3.2 7 msec 8 msec *
```

- **VPC2 to VPC4**

```
VPC2>traceroute 192.168.4.2
Type escape sequence to abort.
Tracing the route to 192.168.4.2
VRF info: (vrf in name/id, vrf out name/id)
  1 192.168.2.1 3 msec 3 msec 2 msec
  2 1.1.1.2 5 msec 5 msec 3 msec
  3 192.168.4.2 5 msec 6 msec *
```

- **VPC3 to VPC1**

```
VPC3>traceroute 192.168.1.2
Type escape sequence to abort.
Tracing the route to 192.168.1.2
VRF info: (vrf in name/id, vrf out name/id)
  1 192.168.3.1 3 msec 3 msec 2 msec
  2 10.10.10.1 4 msec 5 msec 3 msec
  3 192.168.1.2 5 msec 6 msec *
```

- **VPC3 to VPC2**

```
VPC3>traceroute 192.168.2.2
Type escape sequence to abort.
Tracing the route to 192.168.2.2
VRF info: (vrf in name/id, vrf out name/id)
  1 192.168.3.1 3 msec 3 msec 3 msec
  2 172.1.1.2 3 msec 5 msec 3 msec
  3 1.1.1.1 10 msec 7 msec 7 msec
  4 192.168.2.2 6 msec 9 msec *
```

- **VPC3 to VPC4**

```
VPC3>traceroute 192.168.4.2
Type escape sequence to abort.
Tracing the route to 192.168.4.2
VRF info: (vrf in name/id, vrf out name/id)
  1 192.168.3.1 2 msec 3 msec 2 msec
  2 172.1.1.2 3 msec 7 msec 4 msec
  3 192.168.4.2 5 msec 75 msec *
```

- **VPC4 to VPC1**

```
VPC4>traceroute 192.168.1.2
Type escape sequence to abort.
Tracing the route to 192.168.1.2
VRF info: (vrf in name/id, vrf out name/id)
  1 192.168.4.1 4 msec 4 msec 2 msec
  2 1.1.1.1 4 msec 5 msec 4 msec
  3 192.168.10.1 25 msec 6 msec 6 msec
  4 192.168.1.2 12 msec 7 msec *
```

- **VPC4 to VPC2**

```
VPC4>traceroute 192.168.2.2
Type escape sequence to abort.
Tracing the route to 192.168.2.2
VRF info: (vrf in name/id, vrf out name/id)
  1 192.168.4.1 2 msec 3 msec 2 msec
  2 1.1.1.1 4 msec 5 msec 3 msec
  3 192.168.2.2 5 msec 7 msec *
```

- **VPC4 to VPC3**

```
VPC4>traceroute 192.168.3.2
Type escape sequence to abort.
Tracing the route to 192.168.3.2
VRF info: (vrf in name/id, vrf out name/id)
  1 192.168.4.1 2 msec 4 msec 1 msec
  2 172.1.1.1 4 msec 5 msec 3 msec
  3 192.168.3.2 5 msec 6 msec *
```

5. **Pengujian Akses Remote SSH VPC to Router**

Pengujian SSH dilakukan untuk memastikan apakah dapat mengakses router secara remote atau jarak jauh dari perangkat VPC.

- **VPC1 to R2**

```
VPC1>ssh -l ftap.annisa 192.168.10.2
Password:
--- JUNOS 14.1R4.8 built 2015-01-28 03:38:12 UTC
ftap.annisa@RT2>
```

- **VPC1 to R3**

```
VPC1>ssh -l ftap.annisa 10.10.10.2
Password:
--- JUNOS 14.1R4.8 built 2015-01-28 03:38:12 UTC
ftap.annisa@RT3>
```

- **VPC1 to R4**

```
VPC1>ssh -l ftap.annisa 1.1.1.2
Password:
--- JUNOS 14.1R4.8 built 2015-01-28 03:38:12 UTC
ftap.annisa@RT4>
```

- **VPC2 to R1**

```
VPC2>ssh -l ftap.annisa 192.168.10.1
Password:
--- JUNOS 14.1R4.8 built 2015-01-28 03:38:12 UTC
ftap.annisa@RT1>
```

- **VPC2 to R3**

```
VPC2>ssh -l ftap.annisa 10.10.10.2
Password:
--- JUNOS 14.1R4.8 built 2015-01-28 03:38:12 UTC
ftap.annisa@RT3>
```

- **VPC2 to R4**

```
VPC2>ssh -l ftap.annisa 1.1.1.2
Password:
--- JUNOS 14.1R4.8 built 2015-01-28 03:38:12 UTC
ftap.annisa@RT4>
```

- **VPC3 to R1**

```
VPC3>ssh -l ftap.annisa 10.10.10.1
Password:
--- JUNOS 14.1R4.8 built 2015-01-28 03:38:12 UTC
ftap.annisa@RT1>
```

- **VPC3 to R2**

```
VPC3>ssh -l ftap.annisa 192.168.10.2
Password:
--- JUNOS 14.1R4.8 built 2015-01-28 03:38:12 UTC
ftap.annisa@RT2>
```

- **VPC3 to R4**

```
VPC3>ssh -l ftap.annisa 172.1.1.2
Password:
--- JUNOS 14.1R4.8 built 2015-01-28 03:38:12 UTC
ftap.annisa@RT4>
```

- **VPC4 to R1**

```
VPC4>ssh -l ftap.annisa 192.168.10.1
Password:
--- JUNOS 14.1R4.8 built 2015-01-28 03:38:12 UTC
ftap.annisa@RT1>
```

- **VPC4 to R2**

```
VPC4>ssh -l ftap.annisa 1.1.1.1
Password:
--- JUNOS 14.1R4.8 built 2015-01-28 03:38:12 UTC
ftap.annisa@RT2>
```

- **VPC4 to R3**

```
VPC4>ssh -l ftap.annisa 172.1.1.1
Password:
--- JUNOS 14.1R4.8 built 2015-01-28 03:38:12 UTC
ftap.annisa@RT3>
```

6. **Pengujian Akses Remote Telnet VPC to VPC**

Pengujian Telnet dilakukan untuk memastikan apakah dapat mengakses VPC lain secara remote atau jarak jauh dari perangkat VPC.

- **VPC1 to VPC2**

```
VPC1>telnet 192.168.2.2
Trying 192.168.2.2 ... Open

User Access Verification

Username: ftap.annisa
Password:
VPC2#
```

- **VPC1 to VPC3**

```
VPC1>telnet 192.168.3.2
Trying 192.168.3.2 ... Open


User Access Verification

Username: ftap.annisa
Password:
VPC3#
```

- **VPC1 to VPC4**

```
VPC1>telnet 192.168.4.2
Trying 192.168.4.2 ... Open


User Access Verification

Username: ftap.annisa
Password:
VPC4#
```

- **VPC2 to VPC1**

```
VPC2>telnet 192.168.1.2
Trying 192.168.1.2 ... Open


User Access Verification

Username: ftap.annisa
Password:
VPC1#
```

- **VPC2 to VPC3**

```
VPC2>telnet 192.168.3.2
Trying 192.168.3.2 ... Open


User Access Verification


Username: ftap.annisa
Password:
VPC3#
```

- **VPC2 to VPC4**

```
VPC2>telnet 192.168.4.2
Trying 192.168.4.2 ... Open



User Access Verification


Username: ftap.annisa
Password:
VPC4#
```

- **VPC3 to VPC1**

```
VPC3>telnet 192.168.1.2
Trying 192.168.1.2 ... Open


User Access Verification


Username: ftap.annisa
Password:
VPC1#
```

- **VPC3 to VPC2**

```
VPC3>telnet 192.168.2.2
Trying 192.168.2.2 ... Open


User Access Verification


Username: ftap.annisa
Password:
VPC2#
```

- **VPC3 to VPC4**

```
VPC3>telnet 192.168.4.2
Trying 192.168.4.2 ... Open


User Access Verification

Username: ftap.annisa
Password:
VPC4#
```

- **VPC4 to VPC1**

```
VPC4>telnet 192.168.1.2
Trying 192.168.1.2 ... Open

User Access Verification

Username: ftap.annisa
Password:
VPC1#
```

- **VPC4 to VPC2**

```
VPC4>telnet 192.168.2.2
Trying 192.168.2.2 ... Open

User Access Verification

Username: ftap.annisa
Password:
VPC2#
```

- **VPC4 to VPC3**

```
VPC4>telnet 192.168.3.2
Trying 192.168.3.2 ... Open

User Access Verification

Username: ftap.annisa
Password:
VPC3#
```

7. **Show Route**

Perintah ini digunakan untuk menampilkan informasi pada perangkat jaringan seperti router, sehingga memungkinkan untuk memverifikasi konfigurasi rute.

- **R1**

```
root@RT1> show route

inet.0: 12 destinations, 12 routes (12 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both

1.1.1.0/30         *[OSPF/10] 20:31:17, metric 2
                    > to 192.168.10.2 via ge-0/0/0.0
10.10.10.0/30      *[Direct/0] 20:31:35
                    > via ge-0/0/1.0
10.10.10.1/32      *[Local/0] 20:31:37
                      Local via ge-0/0/1.0
172.1.1.0/30       *[OSPF/10] 07:43:12, metric 2
                    > to 10.10.10.2 via ge-0/0/1.0
192.168.1.0/30     *[Direct/0] 20:31:35
                    > via ge-0/0/2.0
192.168.1.1/32     *[Local/0] 20:31:37
                      Local via ge-0/0/2.0
192.168.2.0/30     *[OSPF/150] 20:31:17, metric 0, tag 0
                    > to 192.168.10.2 via ge-0/0/0.0
192.168.3.0/30     *[OSPF/150] 01:04:29, metric 0, tag 0
                    > to 10.10.10.2 via ge-0/0/1.0
192.168.4.0/30     *[OSPF/150] 01:04:18, metric 0, tag 0
                    > to 192.168.10.2 via ge-0/0/0.0
                      to 10.10.10.2 via ge-0/0/1.0
192.168.10.0/30    *[Direct/0] 20:31:35
                    > via ge-0/0/0.0
192.168.10.1/32    *[Local/0] 20:31:37
                      Local via ge-0/0/0.0
224.0.0.5/32       *[OSPF/10] 20:32:59, metric 1
                      MultiRecv
```

- **R2**

```
root@RT2> show route

inet.0: 12 destinations, 12 routes (12 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both

1.1.1.0/30          *[Direct/0] 22:04:38
                     > via ge-0/0/1.0
1.1.1.1/32          *[Local/0] 22:04:40
                      Local via ge-0/0/1.0
10.10.10.0/30       *[OSPF/10] 18:13:20, metric 2
                     > to 192.168.10.1 via ge-0/0/0.0
172.1.1.0/30        *[OSPF/10] 06:52:09, metric 2
                     > to 1.1.1.2 via ge-0/0/1.0
192.168.1.0/30      *[OSPF/150] 18:13:20, metric 0, tag 0
                     > to 192.168.10.1 via ge-0/0/0.0
192.168.2.0/30      *[Direct/0] 22:04:38
                     > via ge-0/0/2.0
192.168.2.1/32      *[Local/0] 22:04:40
                      Local via ge-0/0/2.0
192.168.3.0/30      *[OSPF/150] 00:57:32, metric 0, tag 0
                      to 192.168.10.1 via ge-0/0/0.0
                     > to 1.1.1.2 via ge-0/0/1.0
192.168.4.0/30      *[OSPF/150] 00:57:22, metric 0, tag 0
                     > to 1.1.1.2 via ge-0/0/1.0
192.168.10.0/30     *[Direct/0] 22:04:38
                     > via ge-0/0/0.0
192.168.10.2/32     *[Local/0] 22:04:40
                      Local via ge-0/0/0.0
224.0.0.5/32        *[OSPF/10] 22:00:05, metric 1
                      MultiRecv
```

- **R3**

```
root@RT3> show route

inet.0: 12 destinations, 12 routes (12 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both

1.1.1.0/30          *[OSPF/10] 07:59:40, metric 2
                     > to 172.1.1.2 via ge-0/0/0.0
10.10.10.0/30       *[Direct/0] 07:59:54
                     > via ge-0/0/1.0
10.10.10.2/32       *[Local/0] 07:59:56
                        Local via ge-0/0/1.0
172.1.1.0/30        *[Direct/0] 07:59:54
                     > via ge-0/0/0.0
172.1.1.1/32        *[Local/0] 07:59:56
                        Local via ge-0/0/0.0
192.168.1.0/30      *[OSPF/150] 07:59:35, metric 0, tag 0
                     > to 10.10.10.1 via ge-0/0/1.0
192.168.2.0/30      *[OSPF/150] 07:59:35, metric 0, tag 0
                     > to 172.1.1.2 via ge-0/0/0.0
                        to 10.10.10.1 via ge-0/0/1.0
192.168.3.0/30      *[Direct/0] 07:59:54
                     > via ge-0/0/2.0
192.168.3.1/32      *[Local/0] 07:59:56
                        Local via ge-0/0/2.0
192.168.4.0/30      *[OSPF/150] 01:07:01, metric 0, tag 0
                     > to 172.1.1.2 via ge-0/0/0.0
192.168.10.0/30     *[OSPF/10] 07:59:35, metric 2
                     > to 10.10.10.1 via ge-0/0/1.0
224.0.0.5/32        *[OSPF/10] 08:01:31, metric 1
                        MultiRecv
```

- **R4**

```
root@RT4> show route

inet.0: 12 destinations, 12 routes (12 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both

1.1.1.0/30          *[Direct/0] 14:05:48
                     > via ge-0/0/1.0
1.1.1.2/32          *[Local/0] 14:05:53
                       Local via ge-0/0/1.0
10.10.10.0/30       *[OSPF/10] 14:04:25, metric 2
                     > to 172.1.1.1 via ge-0/0/0.0
172.1.1.0/30        *[Direct/0] 14:05:48
                     > via ge-0/0/0.0
172.1.1.2/32        *[Local/0] 14:05:53
                       Local via ge-0/0/0.0
192.168.1.0/30      *[OSPF/150] 14:04:15, metric 0, tag 0
                       to 172.1.1.1 via ge-0/0/0.0
                     > to 1.1.1.1 via ge-0/0/1.0
192.168.2.0/30      *[OSPF/150] 14:05:33, metric 0, tag 0
                     > to 1.1.1.1 via ge-0/0/1.0
192.168.3.0/30      *[OSPF/150] 01:58:34, metric 0, tag 0
                     > to 172.1.1.1 via ge-0/0/0.0
192.168.4.0/30      *[Direct/0] 14:05:48
                     > via ge-0/0/2.0
192.168.4.1/32      *[Local/0] 14:05:53
                       Local via ge-0/0/2.0
192.168.10.0/30     *[OSPF/10] 14:05:33, metric 2
                     > to 1.1.1.1 via ge-0/0/1.0
224.0.0.5/32        *[OSPF/10] 14:08:06, metric 1
                       MultiRecv
```

8. **Show OSPF Neighbor**

   Perintah ini digunakan untuk memverifikasi bahwa OSPF sudah berjalan dan memberikan informasi tentang tetangga OSPF yang terhubung dengan router saat ini, seperti alamat IP, Interface, ID.

   - **R1**

   ```
   root@RT1> show ospf neighbor
   Address          Interface          State     ID           Pri  Dead
   192.168.10.2     ge-0/0/0.0         Full      1.1.1.1      128   30
   10.10.10.2       ge-0/0/1.0         Full      10.10.10.2   128   36
   ```

   - **R2**

   ```
   root@RT2> show ospf neighbor
   Address          Interface          State     ID           Pri  Dead
   192.168.10.1     ge-0/0/0.0         Full      10.10.10.1   128   33
   1.1.1.2          ge-0/0/1.0         Full      1.1.1.2      128   37
   ```

   - **R3**

   ```
   root@RT3> show ospf neighbor
   Address          Interface          State     ID           Pri  Dead
   172.1.1.2        ge-0/0/0.0         Full      1.1.1.2      128   35
   10.10.10.1       ge-0/0/1.0         Full      10.10.10.1   128   33
   ```

   - **R4**

   ```
   root@RT4> show ospf neighbor
   Address          Interface          State     ID           Pri  Dead
   172.1.1.1        ge-0/0/0.0         Full      10.10.10.2   128   24
   1.1.1.1          ge-0/0/1.0         Full      1.1.1.1      128   32
   ```

9. **Show OSPF Data Base**

Perintah ini digunakan untuk menampilkan daftar informasi tentang jaringan yang diatur oleh protokol OSPF

- **R1**

```
root@RT1> show ospf database

    OSPF database, Area 0.0.0.0
 Type       ID              Adv Rtr          Seq        Age  Opt  Cksum  Len
Router    1.1.1.1         1.1.1.1         0x80000032   367  0x22 0x32c2  48
Router    1.1.1.2         1.1.1.2         0x8000001a   335  0x22 0x2370  48
Router   *10.10.10.1      10.10.10.1      0x80000032   332  0x22 0xaeda  48
Router    10.10.10.2      10.10.10.2      0x80000015   126  0x22 0xa983  48
Network   1.1.1.1         1.1.1.1         0x80000011   367  0x22 0x8398  32
Network  *10.10.10.1      10.10.10.1      0x80000011   332  0x22 0x832c  32
Network   172.1.1.2       1.1.1.2         0x80000014   884  0x22 0x54a   32
Network   192.168.10.2    1.1.1.1         0x8000001e  1663  0x22 0x9ae8  32
    OSPF AS SCOPE link state database
 Type       ID              Adv Rtr          Seq        Age  Opt  Cksum  Len
Extern   *192.168.1.0      10.10.10.1      0x80000028  1296  0x22 0xec18  36
Extern    192.168.2.0      1.1.1.1         0x80000025  1113  0x22 0xc061  36
Extern    192.168.3.0      10.10.10.2      0x80000005   126  0x22 0x170e  36
Extern    192.168.4.0      1.1.1.2         0x80000005  1434  0x22 0xe45a  36
```

- **R2**

```
root@RT2> show ospf database

    OSPF database, Area 0.0.0.0
 Type       ID              Adv Rtr          Seq        Age  Opt  Cksum  Len
Router   *1.1.1.1         1.1.1.1         0x80000032   334  0x22 0x32c2  48
Router    1.1.1.2         1.1.1.2         0x8000001a   306  0x22 0x2370  48
Router    10.10.10.1      10.10.10.1      0x80000032   305  0x22 0xaeda  48
Router    10.10.10.2      10.10.10.2      0x80000015   123  0x22 0xa983  48
Network  *1.1.1.1         1.1.1.1         0x80000011   334  0x22 0x8398  32
Network   10.10.10.1      10.10.10.1      0x80000011   305  0x22 0x832c  32
Network   172.1.1.2       1.1.1.2         0x80000014   794  0x22 0x54a   32
Network  *192.168.10.2    1.1.1.1         0x8000001e  1485  0x22 0x9ae8  32
    OSPF AS SCOPE link state database
 Type       ID              Adv Rtr          Seq        Age  Opt  Cksum  Len
Extern    192.168.1.0      10.10.10.1      0x80000028  1163  0x22 0xec18  36
Extern   *192.168.2.0      1.1.1.1         0x80000025   997  0x22 0xc061  36
Extern    192.168.3.0      10.10.10.2      0x80000005   123  0x22 0x170e  36
Extern    192.168.4.0      1.1.1.2         0x80000005  1282  0x22 0xe45a  36
```

- **R3**

```
root@RT3> show ospf database

    OSPF database, Area 0.0.0.0
 Type        ID               Adv Rtr          Seq        Age  Opt  Cksum   Len
Router    1.1.1.1          1.1.1.1          0x80000032   413  0x22 0x32c2   48
Router    1.1.1.2          1.1.1.2          0x8000001a   378  0x22 0x2370   48
Router    10.10.10.1       10.10.10.1       0x80000032   377  0x22 0xaeda   48
Router   *10.10.10.2       10.10.10.2       0x80000015   163  0x22 0xa983   48
Network   1.1.1.1          1.1.1.1          0x80000011   413  0x22 0x8398   32
Network   10.10.10.1       10.10.10.1       0x80000011   377  0x22 0x832c   32
Network   172.1.1.2        1.1.1.2          0x80000014   946  0x22 0x54a    32
Network   192.168.10.2     1.1.1.1          0x8000001e  1753  0x22 0x9ae8   32
    OSPF AS SCOPE link state database
 Type        ID               Adv Rtr          Seq        Age  Opt  Cksum   Len
Extern    192.168.1.0      10.10.10.1       0x80000028  1374  0x22 0xec18   36
Extern    192.168.2.0      1.1.1.1          0x80000025  1185  0x22 0xc061   36
Extern   *192.168.3.0      10.10.10.2       0x80000005   163  0x22 0x170e   36
Extern    192.168.4.0      1.1.1.2          0x80000005  1514  0x22 0xe45a   36
```

- **R4**

```
root@RT4> show ospf database

    OSPF database, Area 0.0.0.0
 Type        ID               Adv Rtr          Seq        Age  Opt  Cksum   Len
Router    1.1.1.1          1.1.1.1          0x80000032   757  0x22 0x32c2   48
Router   *1.1.1.2          1.1.1.2          0x8000001a   694  0x22 0x2370   48
Router    10.10.10.1       10.10.10.1       0x80000032   695  0x22 0xaeda   48
Router    10.10.10.2       10.10.10.2       0x80000015   319  0x22 0xa983   48
Network   1.1.1.1          1.1.1.1          0x80000011   757  0x22 0x8398   32
Network   10.10.10.1       10.10.10.1       0x80000011   695  0x22 0x832c   32
Network  *172.1.1.2        1.1.1.2          0x80000014  1694  0x22 0x54a    32
Network   192.168.10.2     1.1.1.1          0x8000001e  3115  0x22 0x9ae8   32
    OSPF AS SCOPE link state database
 Type        ID               Adv Rtr          Seq        Age  Opt  Cksum   Len
Extern    192.168.1.0      10.10.10.1       0x80000028  2450  0x22 0xec18   36
Extern    192.168.2.0      1.1.1.1          0x80000025  2115  0x22 0xc061   36
Extern    192.168.3.0      10.10.10.2       0x80000005   319  0x22 0x170e   36
Extern   *192.168.4.0      1.1.1.2          0x80000005  2694  0x22 0xe45a   36
```