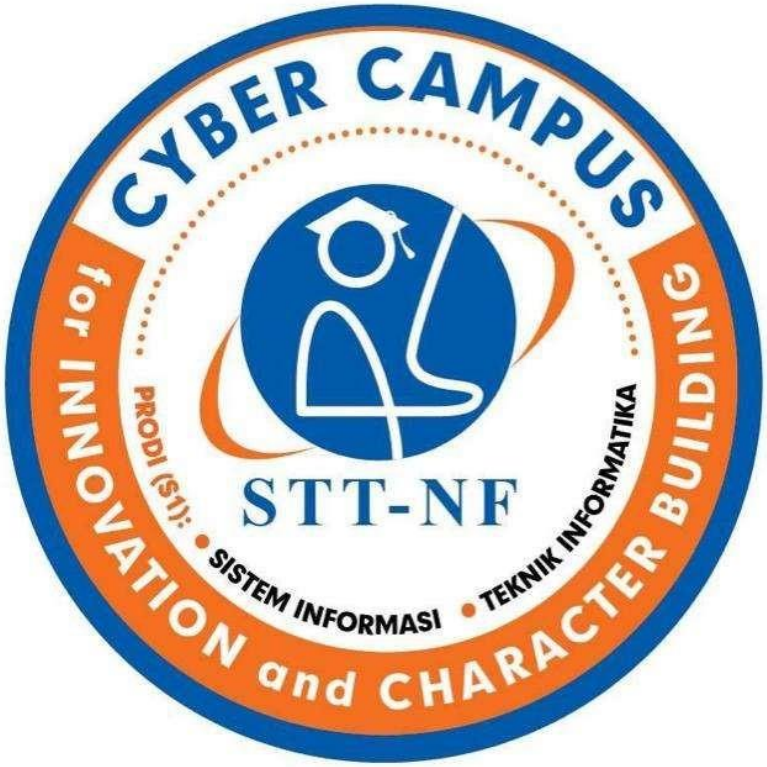


Routing and switching (TI40122)

April Rustianto, S.Komp, M.T, CCIE-IA, JNCIP-SP, MTCINE, MTCTCE, MTCUME, MTCWE, MTCIPv6E, MTCSE, ITILv3, COA, UEWA, UBWA, UBRSA, NSE2, AWS SAA

MPLS *Service* dan Implementasinya (lanjutan)

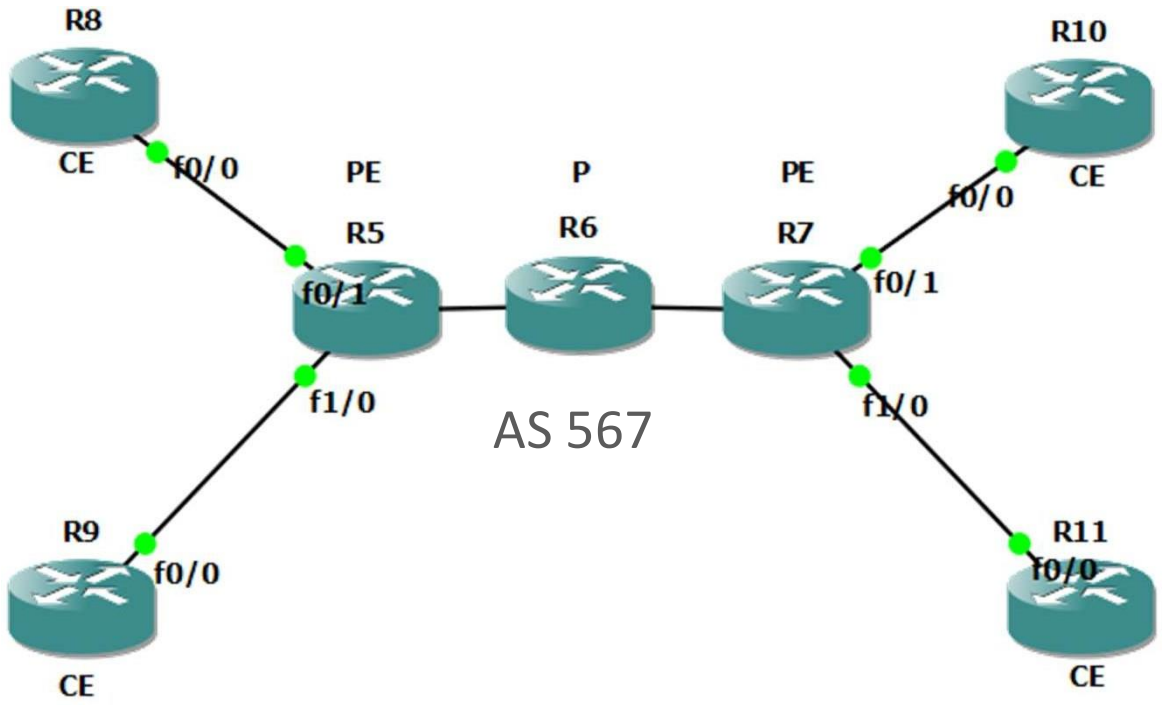
CONSISTENCY

YOU ARE WHAT YOU REPEATEDLY DO
EVERY DAY. EXCELLENCE IS NOT
AN ACT, BUT A HABIT.

#GYMAHOLIC

Studi Kasus L3VPN OSPF

- Topologi



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- Table IP Addressing (PE Router dan P Router)

R5 (PE)	R6 (P)	R7 (PE)
56.56.56.1	56.56.56.2	67.67.67.2
58.58.58.1 (vrf A)	67.67.67.1	107.107.107.1 (vrf A)
59.59.59.1 (vrf B)	6.6.6.6	117.117.117.1 (vrf B)
5.5.5.5		7.7.7.7

- Table IP Addressing (CE Router)

R8	R9	R10	R11
58.58.58.2	59.59.59.2	107.107.107.2	117.117.117.2
8.8.8.8	9.9.9.9	10.10.10.10	11.11.11.11

Studi Kasus L3VPN OSPF

- Konfigurasi OSPF (PE & P)

```
R5(config)#router ospf 10
R5(config-router)#router-id 5.5.5.5
R5(config-router)#network 5.5.5.5 0.0.0.0 area 0
R5(config-router)#network 56.56.56.0 0.0.0.255 area 0

R6(config)#router ospf 10

R6(config-router)#router-id 6.6.6.6
R6(config-router)#network 6.6.6.6 0.0.0.0 area 0
R6(config-router)#network 56.56.56.0 0.0.0.255 area 0
R6(config-router)#network 67.67.67.0 0.0.0.255 area 0

R7(config)#router ospf 10

R7(config-router)#router-id 7.7.7.7
R7(config-router)#network 7.7.7.7 0.0.0.0 area 0
R7(config-router)#network 67.67.67.0 0.0.0.255 area 0
```

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- Konfigurasi MPLS

```
R5(config)#mpls label protocol ldp
R5(config)#mpls ldp router-id lo0 force
R5(config)#int fa0/1
R5(config-if)#mpls ip
```

```
R6(config)#mpls label protocol ldp
R6(config)#mpls ldp router-id lo0 force
R6(config)#int fa0/0
R6(config-if)#mpls ip
R6(config)#int fa0/1
R6(config-if)#mpls ip
```

```
R7(config)#mpls label protocol ldp
R7(config)#mpls ldp router-id lo0 force
R7(config)#int fa0/0
R7(config-if)#mpls ip
```

show mpls ldp neighbor

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- Konfigurasi MP-BGP pada PE Router

```
R5(config)#router bgp 567
R5(config-router)#bgp router-id 5.5.5.5
R5(config-router)#no address-family ipv4 unicast
R5(config-router)#neighbor 7.7.7.7 remote-as 567
R5(config-router)#neighbor 7.7.7.7 update-source lo0
R5(config-router)#address-family vpnv4
R5(config-router)#neighbor 7.7.7.7 activate
```

```
R7(config)#router bgp 567
R7(config-router)# bgp router-id 7.7.7.7
R7(config-router)#no address-family ipv4 unicast
R7(config-router)#neighbor 5.5.5.5 remote-as 567
R7(config-router)#neighbor 5.5.5.5 update-source lo0
R7(config-router)#address-family vpnv4
R7(config-router)#neighbor 5.5.5.5 activate
```

show ip bgp vpnv4 all summary

Studi Kasus L3VPN OSPF

- Konfigurasi vrf PE Router

```
R5(config)#ip vrf A
R5(config-vrf)#rd 567:100
R5(config-vrf)#route-target export 567:200
R5(config-vrf)#route-target import 567:100
R5(config)#ip vrf B
R5(config-vrf)#rd 567:200
R5(config-vrf)#route-target export 567:300
R5(config-vrf)#route-target import 567:400
R5(config-vrf)#int fa0/1
R5(config-if)# vrf forwarding A
R5(config-if)#ip address 58.58.58.1 255.255.255.0
R5(config-vrf)#int fa1/0
R5(config-if)# vrf forwarding B
R5(config-if)#ip address 59.59.59.1 255.255.255.0
```

```
R7(config)#ip vrf A
R7(config)#rd 567:300
R7(config-vrf)#route-target export 567:100
R7(config-vrf)#route-target import 567:200
R7(config)#ip vrf B
R7(config)#rd 567:400
R7(config-vrf)#route-target export 567:400
R7(config-vrf)#route-target import 567:300
R7(config-vrf)#int fa0/1
R7(config-if)# vrf forwarding A
R7(config-if)#ip address 107.107.107.1  255.255.255.0
R7(config-vrf)#int fa1/0
R7(config-if)# vrf forwarding B
R7(config-if)#ip address 117.117.117.1  255.255.255.0
```

Studi Kasus L3VPN OSPF

- Konfigurasi OSPF PE CE vrf Redistribute iBGP

```
R5(config)#router ospf 100 vrf A
R5(config-router)#router-id 100.100.100.100
R5(config-router)#network 58.58.58.0 0.0.0.255 area 0
R5(config-router)#redistribute bgp 567 subnets
R5(config)#router ospf 200 vrf B
R5(config-router)#router-id 200.200.200.200
R5(config-router)#network 59.59.59.0 0.0.0.255 area 0
R5(config-router)#redistribute bgp 567 subnets
```

```
R7(config)#router ospf 100 vrf A
R7(config-router)#router-id 107.107.107.107
R7(config-router)#network 107.107.107.0 0.0.0.255 area 0
R7(config-router)#redistribute bgp 567 subnets
R7(config)#router ospf 117 vrf B
R7(config-router)#router-id 117.117.117.117
R(config-router)#network 117.117.117.0 0.0.0.255 area 0
R7(config-router)#redistribute bgp 567 subnets
```

Studi Kasus L3VPN OSPF

- Konfigurasi iBGP address family Redistribute OSPF

```
R5(config)#router bgp 567
R5(config-router)#address-family  ipv4 vrf A
R5(config-router)#redistribute ospf 100 vrf A match internal external 1 external 2
R5(config-router)#address-family  ipv4 vrf B
R5(config-router)#redistribute ospf 200 vrf B match internal external 1 external 2

R7(config)#router bgp 567
R7(config-router)#address-family  ipv4 vrf A
R7(config-router)#redistribute ospf 100 vrf A match internal external 1 external 2
R7(config-router)#address-family  ipv4 vrf B
R7(config-router)#redistribute ospf 117 vrf B match internal external 1 external 2
```

show ip route vrf A

Studi Kasus L3VPN OSPF

- Konfigurasi CE

```
R8(config)#router ospf 100
R8(config-router)#network 8.8.8.8 0.0.0.0 area 0
R8(config-router)#network 58.58.58.0 0.0.0.255 area 0

R9(config)#router ospf 200
R9(config-router)#network 9.9.9.9 0.0.0.0 area 0
R9(config-router)#network 59.59.59.0 0.0.0.255 area 0

R10(config)#router ospf 100
R10(config-router)#network 10.10.10.10 0.0.0.0 area 0
R10(config-router)#network 107.107.107.0 0.0.0.255 area 0

R11(config)#router ospf 200
R11(config-router)#network 11.11.11.11 0.0.0.0 area 0
R11(config-router)#network 117.117.117.0 0.0.0.255 area 0
```

Studi Kasus L3VPN OSPF

- Pengujian antar site CE R8 to R10

```
R8#sh ip ro
Codes: 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
       i - IS-IS, su - IS-IS summary, 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

     8.0.0.0/32 is subnetted, 1 subnets
C       8.8.8.8 is directly connected, Loopback0
     58.0.0.0/24 is subnetted, 1 subnets
C       58.58.58.0 is directly connected, FastEthernet0/0
     10.0.0.0/32 is subnetted, 1 subnets
O IA    10.10.10.10 [110/21] via 58.58.58.1, 00:00:06, FastEthernet0/0
     107.0.0.0/24 is subnetted, 1 subnets
O IA    107.107.107.0 [110/11] via 58.58.58.1, 00:00:06, FastEthernet0/0
R8#ping 107.107.107.2

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 107.107.107.2, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 68/80/96 ms
```

Studi Kasus L3VPN OSPF

- Pengujian antar site CE R9 to R11

```
R9#sh ip ro
Codes: 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
       i - IS-IS, su - IS-IS summary, 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

     117.0.0.0/24 is subnetted, 1 subnets
O E2    117.117.117.0 [110/1] via 59.59.59.1, 00:01:56, FastEthernet0/0
     59.0.0.0/24 is subnetted, 1 subnets
C       59.59.59.0 is directly connected, FastEthernet0/0
     9.0.0.0/32 is subnetted, 1 subnets
C       9.9.9.9 is directly connected, Loopback0
     11.0.0.0/32 is subnetted, 1 subnets
O E2    11.11.11.11 [110/2] via 59.59.59.1, 00:01:56, FastEthernet0/0
R9#ping 117.117.117.2

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 117.117.117.2, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 80/86/96 ms
```


рахмат
danke
謝謝
ngiyabonga
teşekkür ederim
Баярлалаа
спасибо
faafetai lava
mersi
barka
welalin
tack
spas
kia ora
dank je
mahalo
tapadh leat
vinaka
спасибі
blagodaram
misaotra
matondo
paldies
grazzi
thank you
gracias
kiitos
dankie
nanni
nandri
dhanyavad
mauruuru
köszönöm
dankon
aciū
akun
хвала
asante
manana
obrigada
tenki
bedankt
bayarlalaa
gràçie
hvala
enkosi
djiere dieuf
tau
mochchakkeram
murakoze
дякую
mamnun
chokrane
dziękuję
chnorakaloutioun
gratias ago
gràcies
sulpáy
taiku
go raibh maith agat
sobodi
dėkuji
sagolun
sukriya
kop khun krap
arigatô
takk
dakujem
trugarez
obrigado
mèsi
didi madloba
najis tuke
ありがとう
tanemirt
grazie
rahmet
terima kasih
rahmat
kam sah hamnida
diolch
dhanyavadagalu
shukriya
mercé
мерси
xièxie
ευχαριστώ
감사합니다
merci