

ROUTING DAN KEAMANAN JARINGAN

FINAL PROJECT

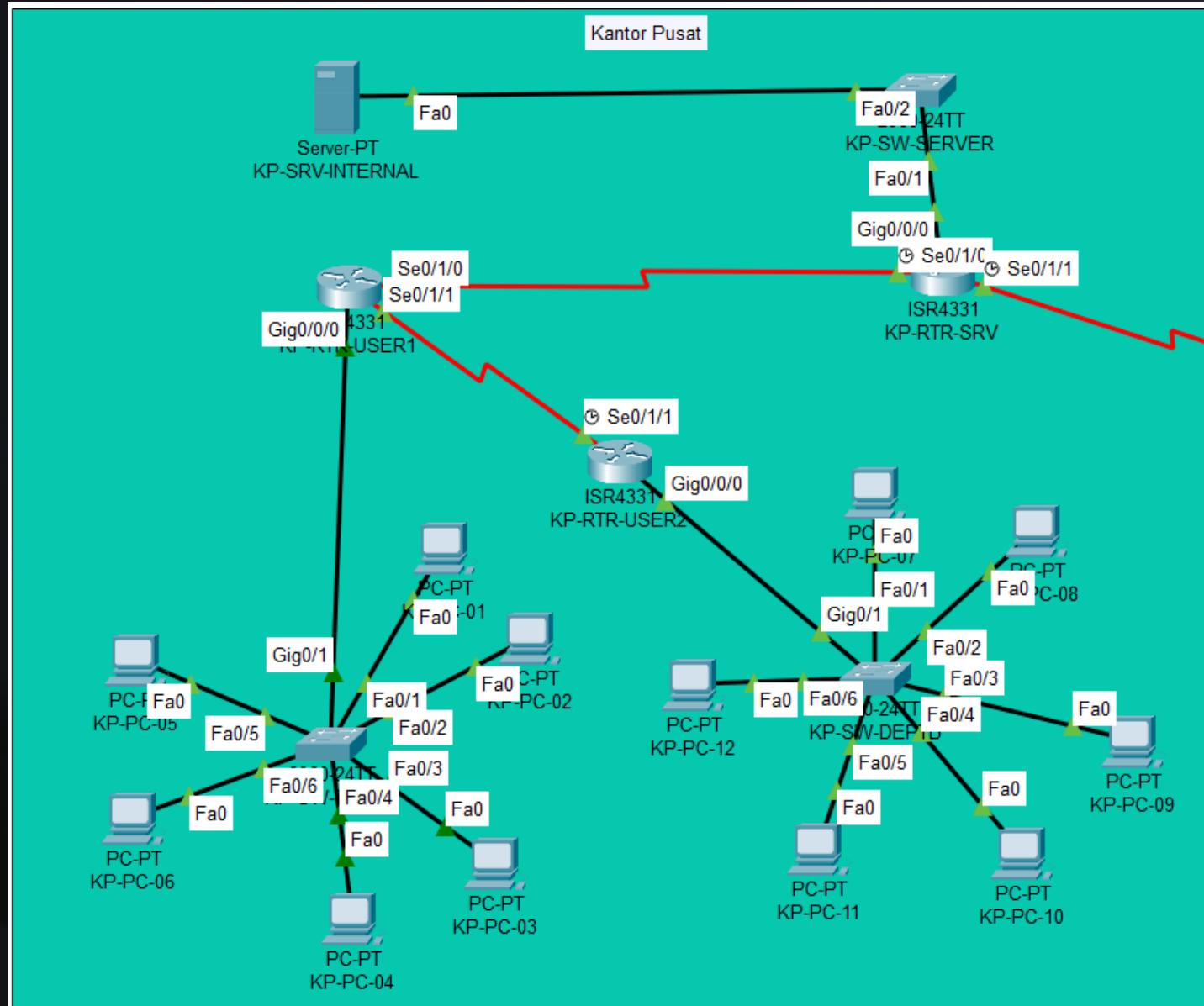
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Latar Belakang

Proyek ini merancang dan mengimplementasikan infrastruktur jaringan untuk perusahaan dengan 1 Kantor Pusat dan 2 Kantor Cabang (A & B), yang saling terhubung melalui simulasi jaringan Internet Publik (ISP) di Cisco Packet Tracer.

Kantor Pusat



Terdiri dari 3 router :

- **KP-RTR-SRV (server)** Menghubungkan jaringan internal ke server pusat dan ke WAN (internet).
- **KP-RTR-USER1** Mengelola VLAN pengguna utama.
- **KP-RTR-USER2** Mengelola VLAN tambahan untuk divisi tertentu.

6 VLAN & Gateway yang dibagi

VLAN 10 → 192.168.10.1

VLAN 20 → 192.168.20.1

VLAN 30 → 192.168.30.1

VLAN 40 → 192.168.40.1

VLAN 50 → 192.168.50.1

VLAN 60 → 192.168.60.1

VLAN 99 → 10.10.1.1

Kantor Cabang A

KCA-RTR-USER adalah Router pengguna untuk VLAN kantor cabang A.

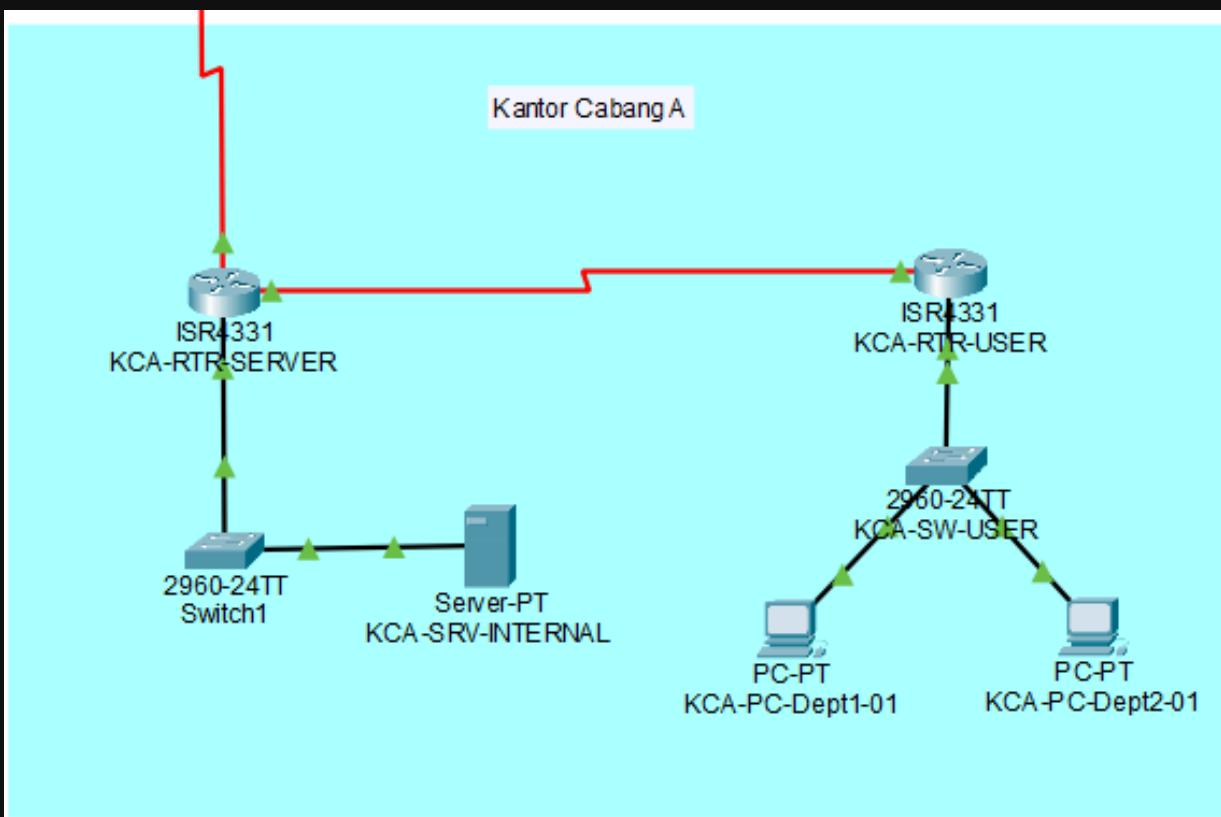
VLAN & Gateway:

VLAN 100 → 10.10.10.1

VLAN 110 → 192.168.110.1

VLAN 120 → 192.168.120.1

Koneksi ke server yang Mengarah ke KCA-RTR-SERVER via serial (Se0/1/0)



Kantor Cabang B

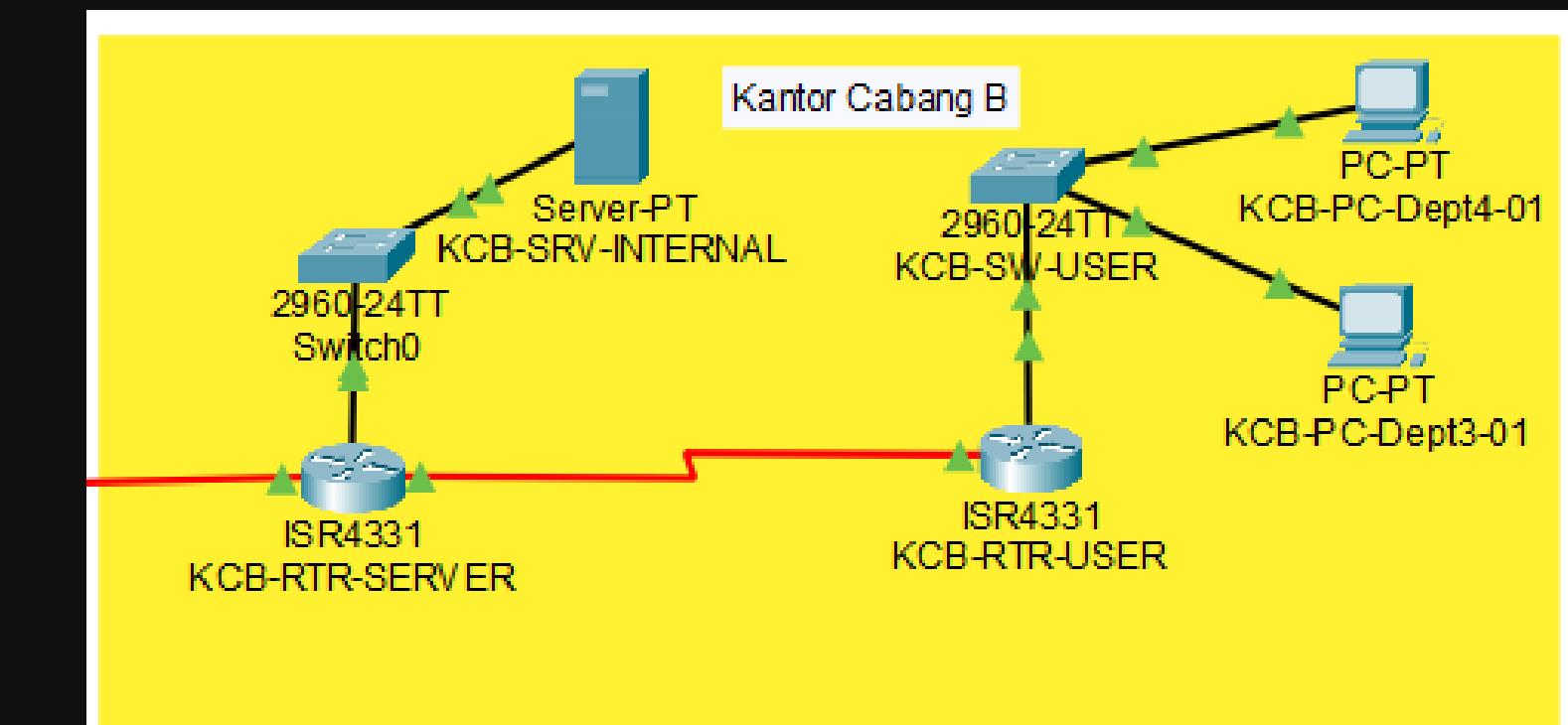
KCB-RTR-USER adalah Router pengguna untuk VLAN kantor cabang B.

VLAN & Gateway:

VLAN 100 → 10.10.20.1

VLAN 210 → 192.168.210.1

VLAN 220 → 192.168.220.1



ADDRESSING TABLE

Tabel IP Address-Kantor Pusat					
Device Name	Interface	IP Address	Subnet Mask	Default Gateway	Keterangan
KP-RTR-USER	Gig0/0/0.10	192.168.10.1	255.255.255.0	-	Gateway VLAN 10
	Gig0/0/0.20	192.168.20.1	255.255.255.0	-	Gateway VLAN 20
	Gig0/0/0.30	192.168.30.1	255.255.255.0	-	Gateway VLAN 30
	Se0/1/0	172.16.1.5	255.255.255.252	-	Link ke KP-RTR-SERVER
	Se0/1/1	172.16.1.1	255.255.255.252	-	Link ke KP-RTR-USER1
	Gig0/0/0.40	192.168.40.1	255.255.255.0		Gateway VLAN 40
	Gig0/0/0.50	192.168.50.1	255.255.255.0		Gateway VLAN 50
	Gig0/0/0.60	192.168.60.1	255.255.255.0		Gateway VLAN 60
	Se0/1/0	172.16.1.2	255.255.255.252		Link ke KP-RTR-USER
	Gig0/0/0.99	10.10.1.1	255.255.255.0	-	Gateway VLAN 99 (Server)
KP-RTR-SERVER	Se0/1/0	172.16.1.6	255.255.255.252	-	Link ke KP-RTR-USER
	Gig0/0/1	-	-	-	Link ke Jaringan WAN/Cabang

Device Name	VLAN	Interface	IP Address	Subnet Mask	Default Gateway
KP-SRV-INTERNAL	99	Fa0	10.10.1.100	255.255.255.0	10.10.1.1
KP-PC-01	10	Fa0	192.168.10.10	255.255.255.0	192.168.10.1
KP-PC-02	10	Fa0	192.168.10.11	255.255.255.0	192.168.10.1
KP-PC-03	20	Fa0	192.168.20.10	255.255.255.0	192.168.20.1
KP-PC-04	20	Fa0	192.168.20.11	255.255.255.0	192.168.20.1
KP-PC-05	30	Fa0	192.168.30.10	255.255.255.0	192.168.30.1
KP-PC-06	30	Fa0	192.168.30.11	255.255.255.0	192.168.30.1
KP-PC-07	40	Fa0	192.168.40.10	255.255.255.0	192.168.40.1
KP-PC-08	40	Fa0	192.168.40.11	255.255.255.0	192.168.40.1
KP-PC-09	50	Fa0	192.168.50.10	255.255.255.0	192.168.50.1
KP-PC-10	50	Fa0	192.168.50.11	255.255.255.0	192.168.50.1
KP-PC-11	60	Fa0	192.168.60.10	255.255.255.0	192.168.60.1
KP-PC-12	60	Fa0	192.168.60.11	255.255.255.0	192.168.60.1

Tabel IP Address - Kantor Cabang A					
Device Name	Interface	IP Address	Subnet Mask	Default Gateway	Keterangan
KCA-RTR-USER	Gig0/0/0.110	192.168.110.1	255.255.255.0		Gateway VLAN 110
	Gig0/0/0.120	192.168.120.1	255.255.255.0		Gateway VLAN 120 (Dept 2)
	Se0/1/0	172.16.10.1	255.255.255.252		Link ke KCA-RTR-SERVER
	Gig0/0/0	10.10.10.1	255.255.255.0		Gateway Jaringan Server
	Se0/1/0	172.16.10.2	255.255.255.252		Link ke KCA-RTR-USER
	Gig0/0/1	10.255.0.2	255.255.255.252		Link WAN ke Kantor Pusat
KCA-SRV-INTERNAL	Fa0	10.10.10.100	255.255.255.0	10.10.10.1	Server Cabang A
KCA-PC-Dept1-01	Fa0	192.168.110.10	255.255.255.0	192.168.110.1	PC VLAN 110
KCA-PC-Dept2-01	Fa0	192.168.120.10	255.255.255.0	192.168.120.1	PC VLAN 120

Tabel IP Address - Kantor Cabang B					
Device Name	Interface	IP Address	Subnet Mask	Default Gateway	Keterangan
KCB-RTR-USER	Gig0/0/0.210	192.168.210.1	255.255.255.0		Gateway VLAN 210 (Dept 1)
	Gig0/0/0.220	192.168.220.1	255.255.255.0		Gateway VLAN 220 (Dept 2)
	Se0/1/0	172.16.20.1	255.255.255.252		Link ke KCA-RTR-SERVER
KCA-RTR-SERVER	Gig0/0/0	10.10.20.1	255.255.255.0		Gateway Jaringan Server
	Se0/1/0	172.16.20.2	255.255.255.252		Link ke KCB-RTR-USER
	Gig0/0/1	10.255.0.6	255.255.255.252		Link WAN ke Kantor Pusat
KCA-SRV-INTERNAL	Fa0	10.10.20.100	255.255.255.0	10.10.20.1	Server Cabang B
KCA-PC-Dept1-01	Fa0	192.168.210.10	255.255.255.0	192.168.210.1	PC VLAN 210
KCA-PC-Dept2-01	Fa0	192.168.220.10	255.255.255.0	192.168.220.1	PC VLAN 220

OSPF

Kantor Pusat

```
KP-RTR-SRV>show ip route ospf
  172.16.0.0/16 is variably subnetted, 3 subnets, 2 masks
O    172.16.1.0 [110/128] via 172.16.1.5, 00:00:01, Serial0/1/0
O    192.168.10.0 [110/65] via 172.16.1.5, 00:00:01, Serial0/1/0
O    192.168.20.0 [110/65] via 172.16.1.5, 00:00:01, Serial0/1/0
O    192.168.30.0 [110/65] via 172.16.1.5, 00:00:01, Serial0/1/0
O    192.168.40.0 [110/129] via 172.16.1.5, 00:00:01, Serial0/1/0
O    192.168.50.0 [110/129] via 172.16.1.5, 00:00:01, Serial0/1/0
O    192.168.60.0 [110/129] via 172.16.1.5, 00:00:01, Serial0/1/0
```

Kantor Cabang B

```
KCB-RTR-SERVER>show ip route ospf
O    192.168.210.0 [110/65] via 172.16.21.1, 00:01:09, Serial0/1/0
O    192.168.220.0 [110/65] via 172.16.21.1, 00:01:09, Serial0/1/0
```

Kantor Cabang A

```
KCA-RTR-SERVER>show ip route ospf
O    192.168.110.0 [110/65] via 172.16.10.1, 00:02:24, Serial0/1/0
O    192.168.120.0 [110/65] via 172.16.10.1, 00:02:24, Serial0/1/0
```

Access List

Kantor Pusat

```
KP-RTR-SRV#show access-lists
Extended IP access list 100
  10 permit ip 192.168.0.0 0.0.255.255 any
  20 permit ip 10.10.1.0 0.0.0.255 any
  30 permit ip 172.16.1.0 0.0.0.255 any
```

Kantor Cabang A

```
KCA-RTR-SERVER#show access-lists
Extended IP access list 110
  10 permit ip 192.168.110.0 0.0.0.255 any
  20 permit ip 192.168.120.0 0.0.0.255 any
  30 permit ip 10.10.10.0 0.0.0.255 any
  40 permit ip 172.16.10.0 0.0.0.3 any
  50 permit ip 192.168.0.0 0.0.255.255 any
```

Kantor Cabang B

```
Extended IP access list 120
  10 permit ip 192.168.210.0 0.0.0.255 any
  20 permit ip 192.168.220.0 0.0.0.255 any
  30 permit ip 10.10.20.0 0.0.0.255 any
  40 permit ip 172.16.21.0 0.0.0.3 any
```

NAT

Kantor Pusat

```
KP-RTR-SRV>show ip nat translations
Pro Inside global      Inside local
--- 200.100.10.100    10.10.1.100
```

	Outside local	Outside global
---	---	---

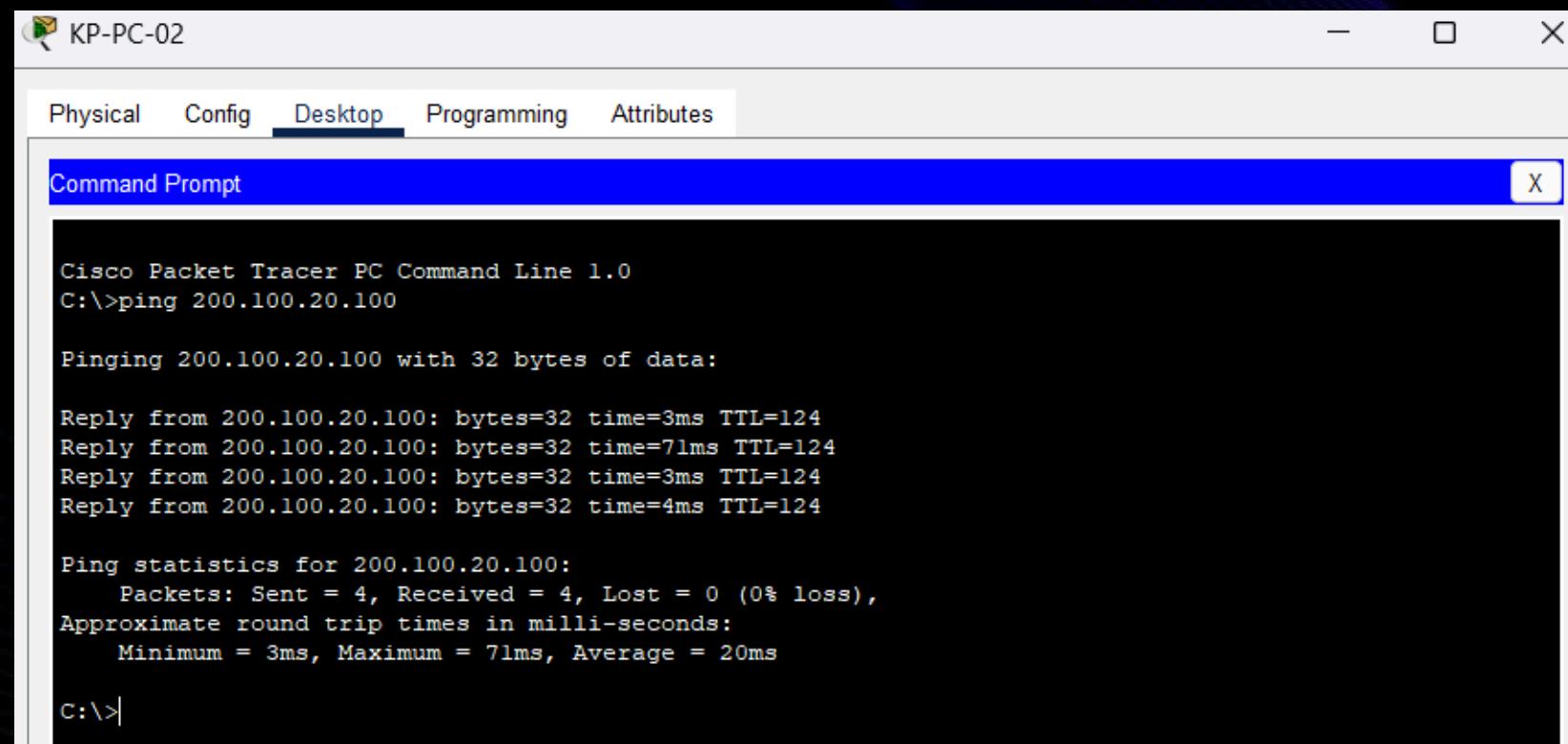
Kantor Cabang A

```
KCA-RTR-SERVER>show ip nat translations
Pro Inside global      Inside local      Outside local      Outside global
--- 200.100.20.100    10.10.10.100   ---           ---
```

Kantor Cabang B

```
KCB-RTR-SERVER>show ip nat translations
Pro Inside global      Inside local      Outside local      Outside global
--- 200.100.30.100    10.10.20.100   ---           ---
```

HASIL PING PC PUSAT KE SERVER CABANG



KP-PC-02

Physical Config Desktop Programming Attributes

Command Prompt

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 200.100.20.100

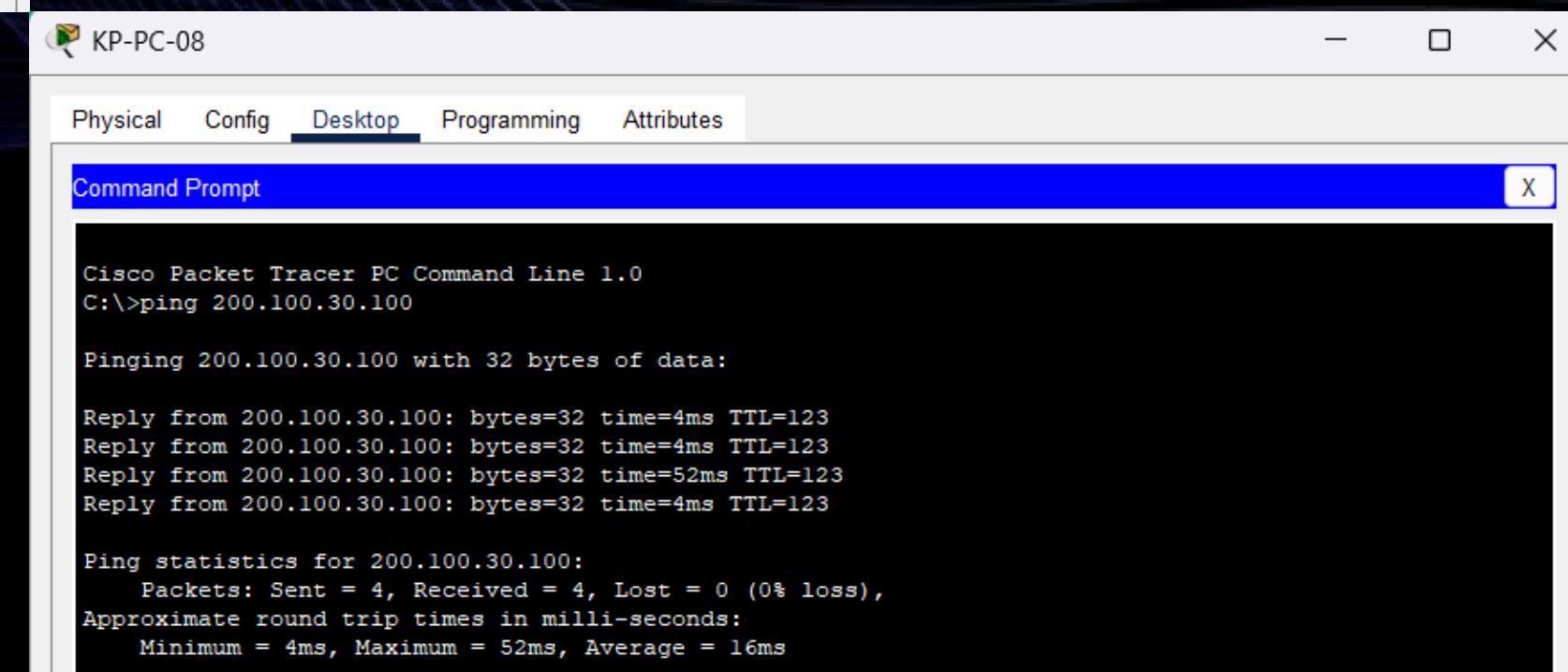
Pinging 200.100.20.100 with 32 bytes of data:

Reply from 200.100.20.100: bytes=32 time=3ms TTL=124
Reply from 200.100.20.100: bytes=32 time=71ms TTL=124
Reply from 200.100.20.100: bytes=32 time=3ms TTL=124
Reply from 200.100.20.100: bytes=32 time=4ms TTL=124

Ping statistics for 200.100.20.100:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 3ms, Maximum = 71ms, Average = 20ms

C:\>
```

KP-PC-02 Ping Ke Server Cabang A



KP-PC-08

Physical Config Desktop Programming Attributes

Command Prompt

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 200.100.30.100

Pinging 200.100.30.100 with 32 bytes of data:

Reply from 200.100.30.100: bytes=32 time=4ms TTL=123
Reply from 200.100.30.100: bytes=32 time=4ms TTL=123
Reply from 200.100.30.100: bytes=32 time=52ms TTL=123
Reply from 200.100.30.100: bytes=32 time=4ms TTL=123

Ping statistics for 200.100.30.100:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 4ms, Maximum = 52ms, Average = 16ms
```

KP-PC-08 Ping Ke Server Cabang B

KESIMPULAN

- Proyek ini berhasil mengimplementasikan jaringan enterprise multi-situs yang fungsional sesuai topologi dan skema pengalamatan yang diberikan.
- Kombinasi VLAN, OSPF, Static Routing, dan NAT terbukti efektif untuk menciptakan jaringan yang terstruktur, efisien, dan aman.
- Konektivitas penuh antar lokasi telah diverifikasi, menunjukkan bahwa desain dan seluruh konfigurasi yang diterapkan sudah benar dan valid.

TERIMA KASIH