

# UJIAN AKHIR SEMESTER GENAP TA. 2020 / 2021



Oleh:

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## **Dosen:**

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## I. Deskripsi Projek

menyusun desain dan konfigurasi jaringan di gedung baru PT. Amikom. Pada gedung baru tersebut terdapat 9 ruang yang terbagi dari ruang Pertemuan, Kantin, Dept\_ManajemenPerkantoran, Dept\_Pemasaran, Dept\_Keuangan, Dept\_Produksi, Dept\_Elektrikal, Dept\_TI, dan Data Center yang berisi IoT dan Server. Setiap ruang divisi tersebut terbagi menjadi beberapa network menggunakan vlan. Dalam desain jaringan ini menggunakan konsep hierarchy (Edge, Core, Distribution, Access), high availability (redundant device/redundant link) dan high performance (EtherChannel), serta memanfaatkan IoT untuk mengatur Data Center.

## II. Tujuan

Tujuan yang ingin dicapai dari kegiatan ini adalah;

1. Memahami konsep High Availability dan High Performance
2. Desain Topologi baik fisik maupun logic.
3. Design IP Network
4. Routing dengan dinamis dan statis
5. Memahami konsep desain jaringan Hirarki
6. Segmentasi dengan VLAN
7. Memahami akses jarak jauh

## III. Software yang Digunakan

1. Draw.io , untuk desain arsitektur jaringan
2. Packet tracert, untuk pembuktian secara teknikal

## IV. Perangkat Jaringan

No	Perangkat	Jumlah
1.	PC	7
2.	Smartphone	1
3.	Laptop	8

No	Perangkat	Jumlah
4.	Router	6
5.	Switch	11
6.	Multi Layer Switch	2
7.	Server	5
8.	CCTV IoT	1
9.	AC IoT	1
10.	Pendeteksi Asap IoT	1
11.	Sensor Gerak IoT	1

## V. Teknologi Jaringan

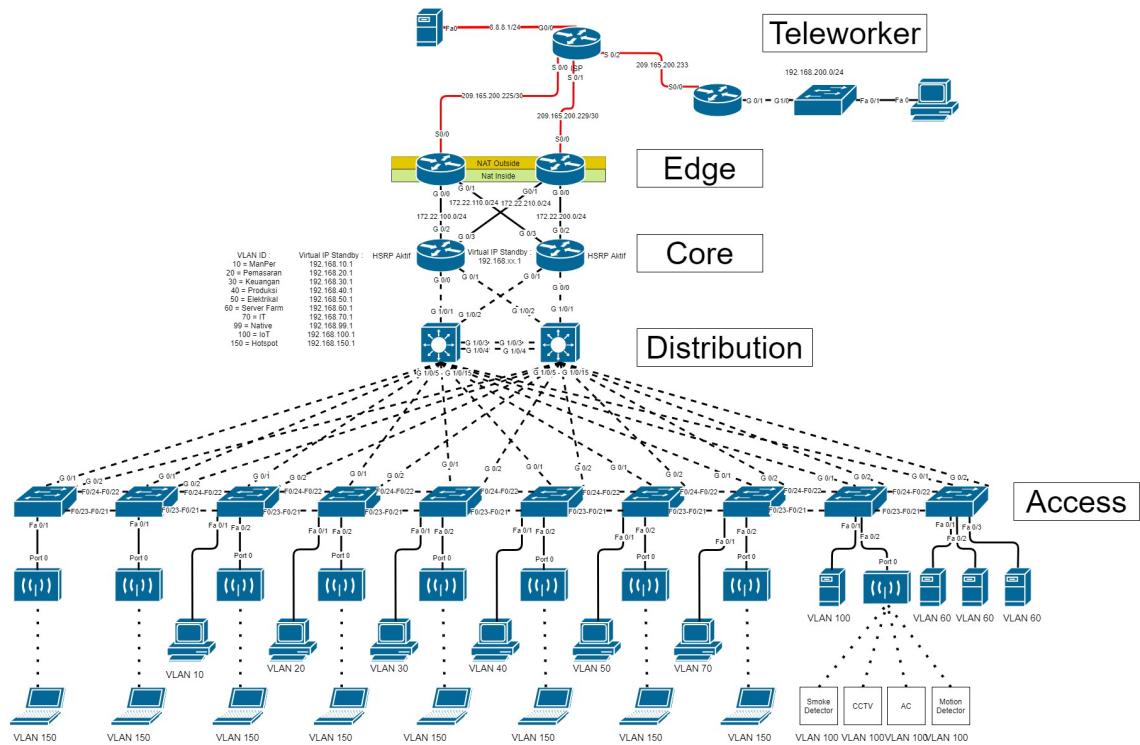
1. VLAN,
2. Inter-VLAN
3. STP
4. HSRP
5. NAT
6. Subneting
7. Virtual Private Network

## VI. Desain Jaringan dan Penjabaran

### A. Topologi Fisik dan Logik

#### 1. Topologi Logic

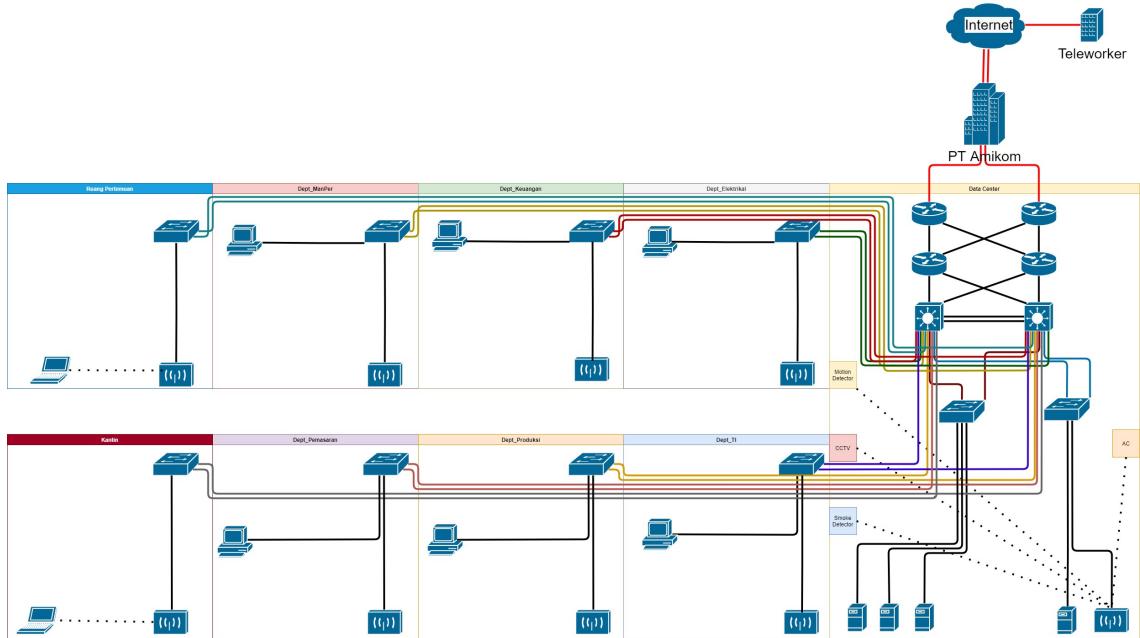
Dalam topologi fisik dibawah ini akan ditampilkan detail perangkat yang digunakan hingga kearah interface setiap perangkat. Setiap jalur backbone menggunakan Gigabit Ethernet dan untuk interkoneksi ke end device menggunakan fast Ethernet. Setiap divisi terpisah network dan memiliki alamat Vlan yang berbeda. Jaringan terbagi menjadi dua yaitu inbound dan outbound. Router edge menjadi penghubung antara jaringan inbound dan outbound. Device IoT ditransmisikan menggunakan Wireless dengan akses poin yang dihubungkan pada IoT server dan DHCP server untuk IoT sendiri. Dari ISP menuju ke user menggunakan interface serial, dan ISP ke server menggunakan interface GigabitEthernet dengan kabel Fiber.



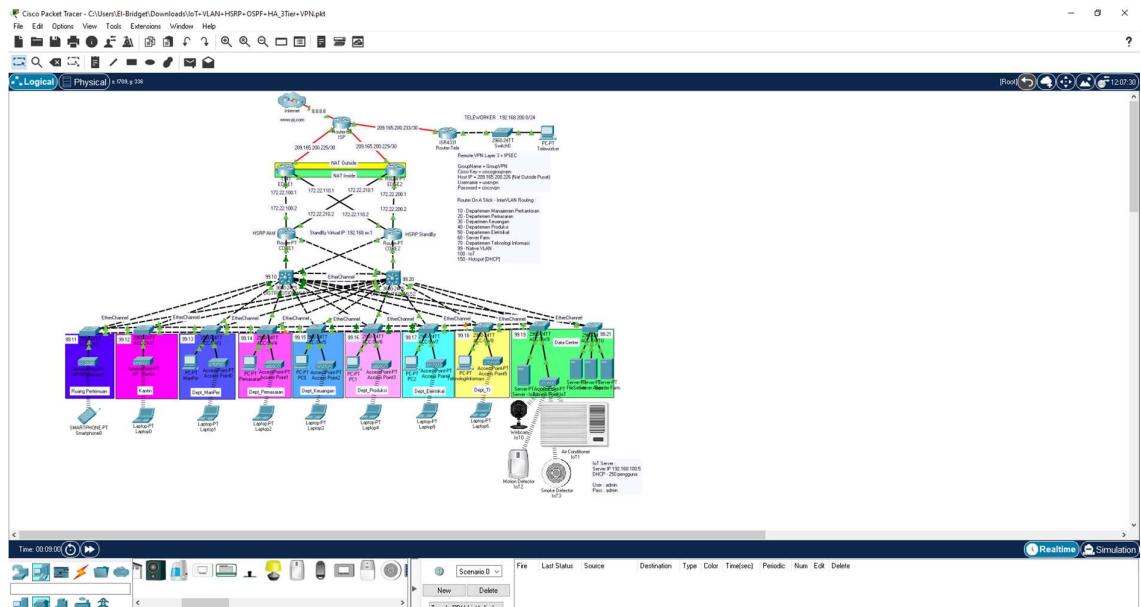
#### 2. Topologi Fisik

1. Setiap switch access terletak di setiap ruangan perbagian departemen.
2. Setiap ruangan terdapat access point yang terletak di atas atau di langit-langit ruangan.
3. Didalam data center terdapat :

- Router Edge
  - Router Core
  - Swith layer 3 ( Distribution )
  - Switch Server Farm
  - Switch Server IoT
  - Perangkat IoT seperti : AC, CCTV, Motion Detector, Smoke Detector
4. Perangkat tersebut diletakan secara bersusun pada rack server jenis open  
 Ruangan data center dilengkapi AC agar suhu tetap terjaga. IoT ditransmisikan melalui Wireless.



## B. Topologi Packet Tracer



Screenshot topologi packet tracer setelah konfigurasi selesai.

## C. Desain IP Network, IP host dan VLAN

### 1. Desain IP Network

IP Network	Interkoneksi Antar Perangkat
209.165.200.225/30	EdgeRouter1 dg ISPRouter
209.165.200.229/30	EdgeRouter2 dg ISPRouter
209.165.200.233/30	Teleworker Router dg ISP Router
172.22.100.0/24	Edge Router1 dg Core Router1
172.22.110.0/24	Edge Router 1 dg Core Router2
172.22.200.0/24	Edge Router 2 dg Core router 2
172.22.210.0/24	Edge Router 2 dg Core router 1
192.168.10.0/24	Core Router dg Vlan Dept_ManPer
192.168.20.0/24	Core Router dg Vlan Dept_Pemasaran
192.168.30.0/24	Core Router dg Vlan Dept_Keuangan
192.168.40.0/24	Core Router dg Vlan Dept_Produksi

192.168.50.0/24	Core Router dg Vlan Dept_Elektrikal
192.168.60.0/24	Core Router dg Vlan Server Render Farm
192.168.70.0/24	Core Router dg Vlan TI
192.168.150.0/24	Core Router dg Vlan Hotspot
192.168.99.0/24	Switch Dist dg Switch Acc
192.168.100.0/24	Core Router dg Vlan IoT
192.168.200.0/24	Teleworker Router dengan Jaringan Teleworker
8.8.8.0/24	Ruter ISP dengan Server ISP

## 2. Desain IP Host

Jenis Perangkat	Nama Perangkat	Interface	IP Address
Router	ISP	S 0/0	209.165.200.225
		S 0/1	209.165.200.229
		S 0/2	209.165.200.233
		G 3/0	8.8.8.1
Server	<a href="http://www.pj.com">www.pj.com</a>	G 0/0	8.8.8.8
Router	Teleworker	S 0/0	209.165.200.234
		G 0/0	192.168.200.1
PC	PC-Teleworker	F 0	192.168.200.2
Router	RouterEdge1	S 0/0	209.165.200.226
		G 0/0	172.22.100.1
		G 0/1	172.22.110.1
Router	RouterEdge2	S 0/0	209.165.200.230
		G 0/0	172.22.200.1
		G 0/1	172.22.210.1
Router	RouterCore1	G 0/0.10	192.168.10.2
		G 0/0.20	192.168.20.2
		G 0/0.30	192.168.30.2

		G 0/0.40	192.168.40.2
		G 0/0.99	192.168.99.2
		G 0/1.50	192.168.50.2
		G 0/1.60	192.168.60.2
		G 0/1.70	192.168.70.2
		G 0/1.100	192.168.100.2
		G 0/1.150	192.168.150.2
		G 0/2	172.22.100.2
		G 0/3	172.22.210.2
Router	RouterCore2	G 0/0.10	192.168.10.3
		G 0/0.20	192.168.20.3
		G 0/0.30	192.168.30.3
		G 0/0.40	192.168.40.3
		G 0/0.99	192.168.99.3
		G 0/1.50	192.168.50.3
		G 0/1.60	192.168.60.3
		G 0/1.70	192.168.70.3
		G 0/1.100	192.168.100.3
		G 0/1.150	192.168.150.3
		G 0/2	172.22.200.2
		G 0/3	172.22.110.2
Multi Layer Switch	MLSDistribution1	Vlan 99	192.168.99.10
Multi Layer Switch	MLSDistribution2	Vlan 99	192.168.99.20
Switch	Acc-SW1	Vlan 99	192.168.99.11
Switch	Acc-SW2	Vlan 99	192.168.99.12
Switch	Acc-SW3	Vlan 99	192.168.99.13
Switch	Acc-SW4	Vlan 99	192.168.99.14
Switch	Acc-SW5	Vlan 99	192.168.99.15
Switch	Acc-SW6	Vlan 99	192.168.99.16
Switch	Acc-SW7	Vlan 99	192.168.99.17

Switch	Acc-SW8	Vlan 99	192.168.99.18
Switch	Acc-SW9	Vlan 99	192.168.99.19
Switch	Acc-SW10	Vlan 99	192.168.99.21
PC	Dept_ManPer	Vlan 10	192.168.10.10
PC	Dept_Pemasaran	Vlan 20	192.168.20.10
PC	Dept_Keuangan	Vlan 30	192.168.30.10
PC	Dept_Produksi	Vlan 40	192.168.40.10
PC	Dept_Elektrikal	Vlan 50	192.168.50.10
Server	Render Farm	Vlan 60	192.168.60.10
		Vlan 60	192.168.60.11
		Vlan 60	192.168.60.12
PC	Dept_TI	Vlan 70	192.168.70.10
Server	IoT	Vlan 100	192.168.100.5
CCTV		Vlan 100	DHCP
AC		Vlan 100	DHCP
Sensor Gerak		Vlan 100	DHCP
Sensor Asap		Vlan 100	DHCP
Smartphone	Smartphone	Vlan 150	DHCP
Laptop	Laptop	Vlan 150	DHCP

### 3. Desain VLAN

VLAN ID	Nama VLAN	IP Network
10	Dept_ManPer	192.168.10.0/24
20	Dept_Pemasaran	192.168.20.0/24
30	Dept_Keuangan	192.168.30.0/24
40	Dept_Produksi	192.168.40.0/24
50	Dept_Elektrikal	192.168.50.0/24
60	Render Farm	192.168.60.0/24
70	Dept_TI	192.168.70.0/24
99	Native	192.168.99.0/24

100	IoT	192.168.100.0/24
150	Hotspot	192.168.150.0/24

## VII. Tahapan Konfigurasi Jaringan

### A. Router ISP

#### 1. Hostname dan IP Address

```
interface Serial0/0
ip address 209.165.200.225 255.255.255.252

interface Serial1/0
ip address 209.165.200.229 255.255.255.252

interface Serial2/0
ip address 209.165.200.233 255.255.255.252

interface GigabitEthernet3/0
ip address 8.8.8.1 255.0.0.0
```

### B. Router Teleworker

#### 1. Hostname dan IP Address + NAT

```
interface GigabitEthernet0/0/0
ip address 192.168.200.1 255.255.255.0
ip nat inside
duplex auto
speed auto
!
interface Serial0/1/0
ip address 209.165.200.234 255.255.255.252
ip nat outside
clock rate 2000000
!
```

#### 2. NAT POOL

```
ip nat inside source list ACL_NAT interface Serial0/1/0 overload
ip access-list standard ACL_NAT
permit 192.168.200.0 0.0.0.255
```

#### 3. Routing

```
ip route 0.0.0.0 0.0.0.0 Serial0/1/0
```

## C. R-Edge1

### 1. Setting VPN Tunnel pada Layer 3 Router

```
aaa new-model
aaa authentication login UserVPN local
aaa authorization network GroupVPN local
username uservpn secret 5 $1$mERr$Hz.95IyOHimhrSwO9HzIo/
license udi pid CISCO1941/K9 sn FTX1524045C-
license boot module c1900 technology-package securityk9
crypto isakmp policy 100
encr aes 256
authentication pre-share
group 5
crypto isakmp client configuration group GroupVPN
key ciscogroupvpn
pool PoolVPN
crypto ipsec transform-set SetVPN esp-aes esp-sha-hmac
crypto dynamic-map DynamicVPN 100
set transform-set SetVPN
reverse-route
crypto map StaticMap client authentication list UserVPN
crypto map StaticMap isakmp authorization list GroupVPN
crypto map StaticMap client configuration address respond
crypto map StaticMap 20 ipsec-isakmp dynamic DynamicVPN
```

### 2. Hostname dan IP Address

```
interface GigabitEthernet0/0
ip address 172.22.100.1 255.255.255.0
ip nat inside
duplex auto
speed auto
!
interface GigabitEthernet0/1
ip address 172.22.110.1 255.255.255.0
ip nat inside
duplex auto
speed auto
!
interface Serial0/0/0
ip address 209.165.200.226 255.255.255.252
ip nat outside
clock rate 4000000
crypto map StaticMap
!
```

### 3. NAT

```
ip local pool PoolVPN 192.168.60.100 192.168.60.115
ip nat inside source list ACL_NAT interface Serial0/0/0 overload
ip access-list standard ACL_NAT
```

```
permit any
```

#### 4. Routing

```
ip route 0.0.0.0 0.0.0.0 172.22.100.2
ip route 0.0.0.0 0.0.0.0 172.22.110.2
ip route 0.0.0.0 0.0.0.0 Serial0/0/0
```

### D. R-Edge2

#### 1. Hostname dan IP Address

```
interface GigabitEthernet0/0
ip address 172.22.200.1 255.255.255.0
ip nat inside
duplex auto
speed auto
!
interface GigabitEthernet0/1
ip address 172.22.210.1 255.255.255.0
ip nat inside
duplex auto
speed auto
!
interface Serial0/0/0
ip address 209.165.200.230 255.255.255.252
ip nat outside
clock rate 4000000
crypto map StaticMap
!
```

#### 2. NAT

```
ip local pool PoolVPN 192.168.60.100 192.168.60.115
ip nat inside source list ACL_NAT interface Serial0/0/0 overload
ip access-list standard ACL_NAT
permit any
```

#### 3. Routing

```
ip route 0.0.0.0 0.0.0.0 172.22.200.2
ip route 0.0.0.0 0.0.0.0 172.22.210.2
ip route 0.0.0.0 0.0.0.0 Serial0/0/0
```

### E. R-Core1

#### 1. DHCP pool

```
ip dhcp excluded-address 192.168.150.1 192.168.150.4
```

```
ip dhcp pool vlan150
network 192.168.150.0 255.255.255.0
```

```
default-router 192.168.150.1
dns-server 8.8.8.8
```

## 2. IP address + HSRP + InterVLAN Routing

```
interface GigabitEthernet0/0
no ip address
duplex auto
speed auto
!
interface GigabitEthernet0/0.10
encapsulation dot1Q 10
ip address 192.168.10.2 255.255.255.0
standby 10 ip 192.168.10.1
standby 10 priority 110
standby 10 preempt
!
interface GigabitEthernet0/0.20
encapsulation dot1Q 20
ip address 192.168.20.2 255.255.255.0
standby 20 ip 192.168.20.1
standby 20 priority 110
standby 20 preempt
!
interface GigabitEthernet0/0.30
encapsulation dot1Q 30
ip address 192.168.30.2 255.255.255.0
standby 30 ip 192.168.30.1
standby 30 priority 110
standby 30 preempt
!
interface GigabitEthernet0/0.99
encapsulation dot1Q 99
ip address 192.168.99.2 255.255.255.0
standby 99 ip 192.168.99.1
standby 99 priority 110
standby 99 preempt
!
interface GigabitEthernet0/0.100
encapsulation dot1Q 100
ip address 192.168.100.2 255.255.255.0
standby 100 ip 192.168.100.1
standby 100 priority 110
standby 100 preempt
!
interface GigabitEthernet1/0.40
encapsulation dot1Q 40
ip address 192.168.40.2 255.255.255.0
standby 40 ip 192.168.40.1
standby 40 priority 110
```

```

standby 40 preempt
!
interface GigabitEthernet1/0.50
encapsulation dot1Q 50
ip address 192.168.50.2 255.255.255.0
standby 50 ip 192.168.50.1
standby 50 preempt
!
interface GigabitEthernet1/0.60
encapsulation dot1Q 60
ip address 192.168.60.2 255.255.255.0
standby 60 ip 192.168.60.1
standby 60 priority 110
standby 60 preempt
!
interface GigabitEthernet1/0.70
encapsulation dot1Q 70
ip address 192.168.70.2 255.255.255.0
standby 70 ip 192.168.70.1
standby 70 priority 110
standby 70 preempt
!
interface GigabitEthernet1/0.150
encapsulation dot1Q 150
ip address 192.168.150.2 255.255.255.0
standby 150 ip 192.168.150.1
standby 150 priority 110
standby 150 preempt
!
interface GigabitEthernet2/0
ip address 172.22.100.2 255.255.255.0
duplex auto
speed auto
!
interface GigabitEthernet3/0
ip address 172.22.210.2 255.255.255.0
duplex auto
speed auto

```

### 3. Routing

```

ip route 0.0.0.0 0.0.0.0 172.22.100.1
ip route 0.0.0.0 0.0.0.0 172.22.210.1

```

## F. R-Core2

### 1. DHCP Pool

```

ip dhcp excluded-address 192.168.150.1 192.168.150.4
!
ip dhcp pool vlan150

```

```
network 192.168.150.0 255.255.255.0
default-router 192.168.150.1
dns-server 8.8.8.8
```

## 2. IP address + HSRP + InterVLAN Routing

```
interface GigabitEthernet0/0
no ip address
duplex auto
speed auto
!
interface GigabitEthernet0/0.10
encapsulation dot1Q 10
ip address 192.168.10.3 255.255.255.0
standby 10 ip 192.168.10.1
!
interface GigabitEthernet0/0.20
encapsulation dot1Q 20
ip address 192.168.20.3 255.255.255.0
standby 20 ip 192.168.20.1
!
interface GigabitEthernet0/0.30
encapsulation dot1Q 30
ip address 192.168.30.3 255.255.255.0
standby 30 ip 192.168.30.1
!
interface GigabitEthernet0/0.99
encapsulation dot1Q 99
ip address 192.168.99.3 255.255.255.0
standby 99 ip 192.168.99.1
!
interface GigabitEthernet0/0.100
encapsulation dot1Q 100
ip address 192.168.100.3 255.255.255.0
standby 100 ip 192.168.100.1
!
interface GigabitEthernet1/0.40
encapsulation dot1Q 40
ip address 192.168.40.3 255.255.255.0
standby 40 ip 192.168.40.1
!
interface GigabitEthernet1/0.50
encapsulation dot1Q 50
ip address 192.168.50.3 255.255.255.0
standby 50 ip 192.168.50.1
!
interface GigabitEthernet1/0.60
encapsulation dot1Q 60
ip address 192.168.60.3 255.255.255.0
standby 60 ip 192.168.60.1
```

```

!
interface GigabitEthernet1/0.70
encapsulation dot1Q 70
ip address 192.168.70.3 255.255.255.0
standby 70 ip 192.168.70.1
!
interface GigabitEthernet1/0.150
encapsulation dot1Q 150
ip address 192.168.150.3 255.255.255.0
standby 150 ip 192.168.150.1
!
interface GigabitEthernet2/0
ip address 172.22.200.2 255.255.255.0
duplex auto
speed auto
!
interface GigabitEthernet3/0
ip address 172.22.110.2 255.255.255.0
duplex auto
speed auto

```

### 3. Routing

```

ip route 0.0.0.0 0.0.0.0 172.22.200.1
ip route 0.0.0.0 0.0.0.0 172.22.110.1

```

## G. SW-DIS1

### 1. Switch Port mode Trunk

```

spanning-tree vlan 10 priority 20480
spanning-tree vlan 20,30,40,50,60,70,99-100,150 priority 24576
!
interface GigabitEthernet1/0/1
switchport trunk allowed vlan 10,20,30,40,50,60,70,99-100,150
switchport trunk encapsulation dot1q
switchport mode trunk
!
interface GigabitEthernet1/0/2
switchport trunk allowed vlan 10,20,30,40,50,60,70,99-100,150
switchport trunk encapsulation dot1q
switchport mode trunk
!
interface GigabitEthernet1/0/3
switchport trunk allowed vlan 10,20,30,40,50,60,70,99-100,150
switchport trunk encapsulation dot1q
switchport mode trunk
!
interface GigabitEthernet1/0/4
switchport trunk allowed vlan 10,20,30,40,50,60,70,99-100,150
switchport trunk encapsulation dot1q
switchport mode trunk

```

```
!
interface GigabitEthernet1/0/5
switchport trunk allowed vlan 10,20,30,40,50,60,70,99-100,150
switchport trunk encapsulation dot1q
switchport mode trunk
!
interface GigabitEthernet1/0/6
switchport trunk allowed vlan 10,20,30,40,50,60,70,99-100,150
switchport trunk encapsulation dot1q
switchport mode trunk
!
interface GigabitEthernet1/0/7
switchport trunk allowed vlan 10,20,30,40,50,60,70,99-100,150
switchport trunk encapsulation dot1q
switchport mode trunk
!
interface GigabitEthernet1/0/8
switchport trunk allowed vlan 10,20,30,40,50,60,70,99-100,150
switchport trunk encapsulation dot1q
switchport mode trunk
!
interface GigabitEthernet1/0/9
switchport trunk allowed vlan 10,20,30,40,50,60,70,99-100,150
switchport trunk encapsulation dot1q
switchport mode trunk
!
interface GigabitEthernet1/0/10
switchport trunk allowed vlan 10,20,30,40,50,60,70,99-100,150
switchport trunk encapsulation dot1q
switchport mode trunk
!
interface GigabitEthernet1/0/11
switchport trunk allowed vlan 10,20,30,40,50,60,70,99-100,150
switchport trunk encapsulation dot1q
switchport mode trunk
!
interface GigabitEthernet1/0/12
switchport trunk allowed vlan 10,20,30,40,50,60,70,99-100,150
switchport trunk encapsulation dot1q
switchport mode trunk
!
interface GigabitEthernet1/0/13
switchport trunk allowed vlan 10,20,30,40,50,60,70,99-100,150
switchport trunk encapsulation dot1q
switchport mode trunk
!
interface GigabitEthernet1/0/14
switchport trunk allowed vlan 10,20,30,40,50,60,70,99-100,150
switchport trunk encapsulation dot1q
switchport mode trunk
```

```
!
interface GigabitEthernet1/0/15
switchport trunk allowed vlan 10,20,30,40,50,60,70,99-100,150
switchport trunk encapsulation dot1q
switchport mode trunk
!
2. Setting Ip + VLAN
interface Vlan99
mac-address 0030.a3ae.e501
ip address 192.168.99.10 255.255.255.0
ip default-gateway 192.168.99.1
```

## H. SW-DIS2

### 1. Switch Port mode Trunk

```
spanning-tree vlan 10 priority 20480
spanning-tree vlan 20,30,40,50,60,70,99-100,150 priority 24576
!
interface GigabitEthernet1/0/1
switchport trunk allowed vlan 10,20,30,40,50,60,70,99-100,150
switchport trunk encapsulation dot1q
switchport mode trunk
!
interface GigabitEthernet1/0/2
switchport trunk allowed vlan 10,20,30,40,50,60,70,99-100,150
switchport trunk encapsulation dot1q
switchport mode trunk
!
interface GigabitEthernet1/0/3
switchport trunk allowed vlan 10,20,30,40,50,60,70,99-100,150
switchport trunk encapsulation dot1q
switchport mode trunk
!
interface GigabitEthernet1/0/4
switchport trunk allowed vlan 10,20,30,40,50,60,70,99-100,150
switchport trunk encapsulation dot1q
switchport mode trunk
!
interface GigabitEthernet1/0/5
switchport trunk allowed vlan 10,20,30,40,50,60,70,99-100,150
switchport trunk encapsulation dot1q
switchport mode trunk
!
interface GigabitEthernet1/0/6
switchport trunk allowed vlan 10,20,30,40,50,60,70,99-100,150
switchport trunk encapsulation dot1q
switchport mode trunk
!
interface GigabitEthernet1/0/7
```

```
switchport trunk allowed vlan 10,20,30,40,50,60,70,99-100,150
switchport trunk encapsulation dot1q
switchport mode trunk
!
interface GigabitEthernet1/0/8
switchport trunk allowed vlan 10,20,30,40,50,60,70,99-100,150
switchport trunk encapsulation dot1q
switchport mode trunk
!
interface GigabitEthernet1/0/9
switchport trunk allowed vlan 10,20,30,40,50,60,70,99-100,150
switchport trunk encapsulation dot1q
switchport mode trunk
!
interface GigabitEthernet1/0/10
switchport trunk allowed vlan 10,20,30,40,50,60,70,99-100,150
switchport trunk encapsulation dot1q
switchport mode trunk
!
interface GigabitEthernet1/0/11
switchport trunk allowed vlan 10,20,30,40,50,60,70,99-100,150
switchport trunk encapsulation dot1q
switchport mode trunk
!
interface GigabitEthernet1/0/12
switchport trunk allowed vlan 10,20,30,40,50,60,70,99-100,150
switchport trunk encapsulation dot1q
switchport mode trunk
!
interface GigabitEthernet1/0/13
switchport trunk allowed vlan 10,20,30,40,50,60,70,99-100,150
switchport trunk encapsulation dot1q
switchport mode trunk
!
interface GigabitEthernet1/0/14
switchport trunk allowed vlan 10,20,30,40,50,60,70,99-100,150
switchport trunk encapsulation dot1q
switchport mode trunk
!
interface GigabitEthernet1/0/15
switchport trunk allowed vlan 10,20,30,40,50,60,70,99-100,150
switchport trunk encapsulation dot1q
switchport mode trunk
```

## 2. Setting Ip + VLAN

```
interface Vlan99
mac-address 0030.a3ae.e501
ip address 192.168.99.20 255.255.255.0
ip default-gateway 192.168.99.1
```

## I. SW-ACC 1-10

### 1. Setting Access Mode

```
spanning-tree mode rapid-pvst
spanning-tree portfast default
spanning-tree extend system-id
!
interface FastEthernet0/1
switchport access vlan 10 - 150
!
interface FastEthernet0/2
!
interface FastEthernet0/3
!
```

### 2. Setting Trunk Mode Etherchannel

```
interface FastEthernet0/21
switchport trunk allowed vlan 10,20,30,40,50,60,70,99-100,150
switchport mode trunk
!
interface FastEthernet0/22
switchport trunk allowed vlan 10,20,30,40,50,60,70,99-100,150
switchport mode trunk
!
interface FastEthernet0/23
switchport trunk allowed vlan 10,20,30,40,50,60,70,99-100,150
switchport mode trunk
!
interface FastEthernet0/24
switchport trunk allowed vlan 10,20,30,40,50,60,70,99-100,150
switchport mode trunk
!
interface GigabitEthernet0/1
switchport trunk allowed vlan 10,20,30,40,50,60,70,99-100,150
switchport mode trunk
!
interface GigabitEthernet0/2
switchport trunk allowed vlan 10,20,30,40,50,60,70,99-100,150
switchport mode trunk
!
```

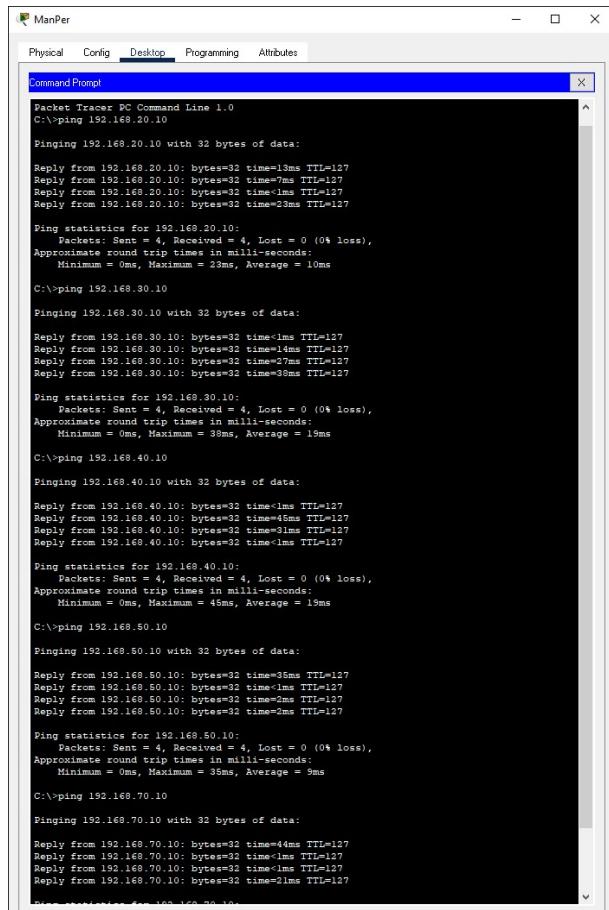
### 3. Setting IP + VLAN

```
interface Vlan99
ip address 192.168.99.11 – 19 255.255.255.0
!
ip default-gateway 192.168.99.1
```

## VIII. Uji Akhir Interkoneksi

1. PC-PC antar departemen dapat berkomunikasi (antar VLAN Departemen), dengan perintah ping.

### a. Dept\_ManPer



```
ManPer
Physical Config Desktop Programming Attributes
Command Prompt
Packet Tracer PC Command Line 1.0
C:\>ping 192.168.20.10

Pinging 192.168.20.10 with 32 bytes of data:
Reply from 192.168.20.10: bytes=32 time<1ms TTL=127
Reply from 192.168.20.10: bytes=32 time=7ms TTL=127
Reply from 192.168.20.10: bytes=32 time=1ms TTL=127
Reply from 192.168.20.10: bytes=32 time=23ms TTL=127

Ping statistics for 192.168.20.10:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 23ms, Average = 10ms

C:\>ping 192.168.30.10

Pinging 192.168.30.10 with 32 bytes of data:
Reply from 192.168.30.10: bytes=32 time<1ms TTL=127
Reply from 192.168.30.10: bytes=32 time=1ms TTL=127
Reply from 192.168.30.10: bytes=32 time=27ms TTL=127
Reply from 192.168.30.10: bytes=32 time=38ms TTL=127

Ping statistics for 192.168.30.10:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 38ms, Average = 19ms

C:\>ping 192.168.40.10

Pinging 192.168.40.10 with 32 bytes of data:
Reply from 192.168.40.10: bytes=32 time<1ms TTL=127
Reply from 192.168.40.10: bytes=32 time=4ms TTL=127
Reply from 192.168.40.10: bytes=32 time=31ms TTL=127
Reply from 192.168.40.10: bytes=32 time=1ms TTL=127

Ping statistics for 192.168.40.10:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 45ms, Average = 15ms

C:\>ping 192.168.50.10

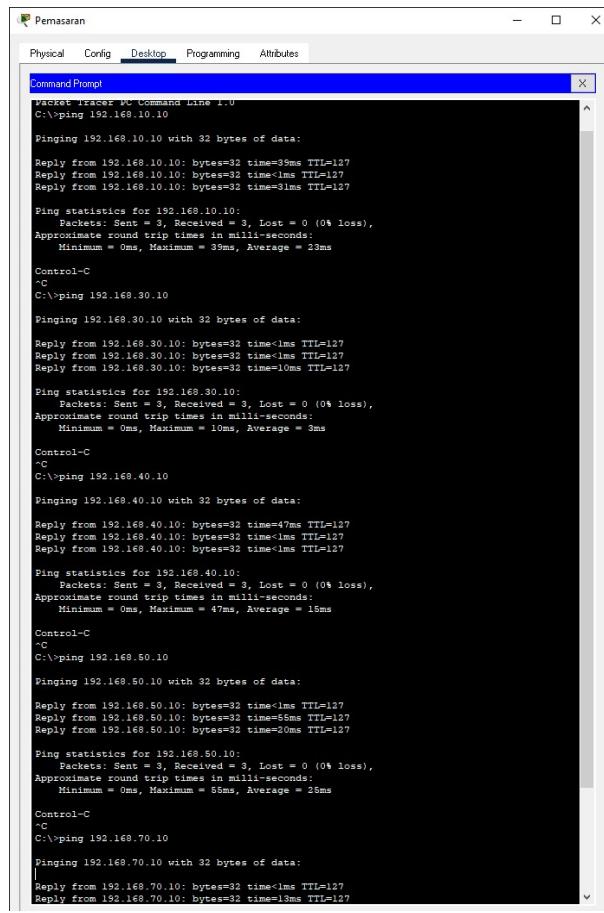
Pinging 192.168.50.10 with 32 bytes of data:
Reply from 192.168.50.10: bytes=32 time=3ms TTL=127
Reply from 192.168.50.10: bytes=32 time=1ms TTL=127
Reply from 192.168.50.10: bytes=32 time=2ms TTL=127
Reply from 192.168.50.10: bytes=32 time=2ms TTL=127

Ping statistics for 192.168.50.10:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 35ms, Average = 9ms

C:\>ping 192.168.70.10

Pinging 192.168.70.10 with 32 bytes of data:
Reply from 192.168.70.10: bytes=32 time=4ms TTL=127
Reply from 192.168.70.10: bytes=32 time=1ms TTL=127
Reply from 192.168.70.10: bytes=32 time=1ms TTL=127
Reply from 192.168.70.10: bytes=32 time=21ms TTL=127
```

## b. Dept\_Pemasaran



```
Dept_Pemasaran
Physical Config Desktop Programming Attributes
Command Prompt
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=3ms TTL=127
Reply from 192.168.10.10: bytes=32 time=1ms TTL=127
Reply from 192.168.10.10: bytes=32 time=31ms TTL=127

Ping statistics for 192.168.10.10:
    Packets: Sent = 3, Received = 3, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 39ms, Average = 23ms

Control-C
C:\>ping 192.168.30.10

Pinging 192.168.30.10 with 32 bytes of data:
Reply from 192.168.30.10: bytes=32 time=1ms TTL=127
Reply from 192.168.30.10: bytes=32 time=1ms TTL=127
Reply from 192.168.30.10: bytes=32 time=10ms TTL=127

Ping statistics for 192.168.30.10:
    Packets: Sent = 3, Received = 3, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 10ms, Average = 3ms

Control-C
C:\>ping 192.168.40.10

Pinging 192.168.40.10 with 32 bytes of data:
Reply from 192.168.40.10: bytes=32 time=47ms TTL=127
Reply from 192.168.40.10: bytes=32 time=1ms TTL=127
Reply from 192.168.40.10: bytes=32 time=1ms TTL=127

Ping statistics for 192.168.40.10:
    Packets: Sent = 3, Received = 3, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 47ms, Average = 15ms

Control-C
C:\>ping 192.168.50.10

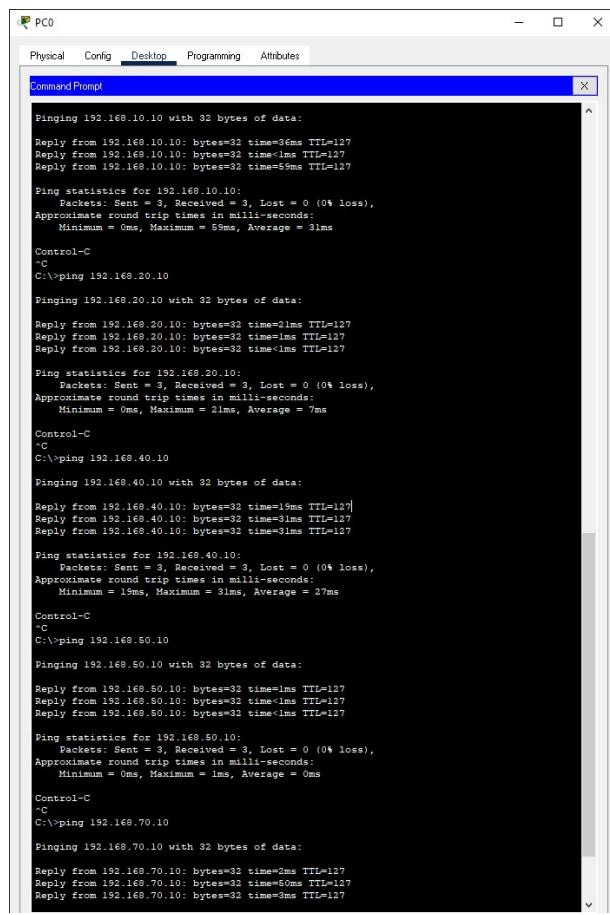
Pinging 192.168.50.10 with 32 bytes of data:
Reply from 192.168.50.10: bytes=32 time=1ms TTL=127
Reply from 192.168.50.10: bytes=32 time=5ms TTL=127
Reply from 192.168.50.10: bytes=32 time=20ms TTL=127

Ping statistics for 192.168.50.10:
    Packets: Sent = 3, Received = 3, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 58ms, Average = 25ms

Control-C
C:\>ping 192.168.70.10

Pinging 192.168.70.10 with 32 bytes of data:
Reply from 192.168.70.10: bytes=32 time=1ms TTL=127
Reply from 192.168.70.10: bytes=32 time=13ms TTL=127
```

### c. Dept\_Keuangan



```
PC0
Physical Config Desktop Programming Attributes
Command Prompt X
Ping 192.168.10.10 with 32 bytes of data:
Reply from 192.168.10.10: bytes=32 time=3ms TTL=127
Reply from 192.168.10.10: bytes=32 time<1ms TTL=127
Reply from 192.168.10.10: bytes=32 time=59ms TTL=127

Ping statistics for 192.168.10.10:
Packets: Sent = 3, Received = 3, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 59ms, Average = 31ms

Control-C
C:\>ping 192.168.20.10

Ping 192.168.20.10 with 32 bytes of data:
Reply from 192.168.20.10: bytes=32 time=21ms TTL=127
Reply from 192.168.20.10: bytes=32 time<1ms TTL=127
Reply from 192.168.20.10: bytes=32 time<1ms TTL=127

Ping statistics for 192.168.20.10:
Packets: Sent = 3, Received = 3, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 21ms, Average = 7ms

Control-C
C:\>ping 192.168.40.10

Ping 192.168.40.10 with 32 bytes of data:
Reply from 192.168.40.10: bytes=32 time=19ms TTL=127
Reply from 192.168.40.10: bytes=32 time=31ms TTL=127
Reply from 192.168.40.10: bytes=32 time=31ms TTL=127

Ping statistics for 192.168.40.10:
Packets: Sent = 3, Received = 3, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 19ms, Maximum = 31ms, Average = 27ms

Control-C
C:\>ping 192.168.50.10

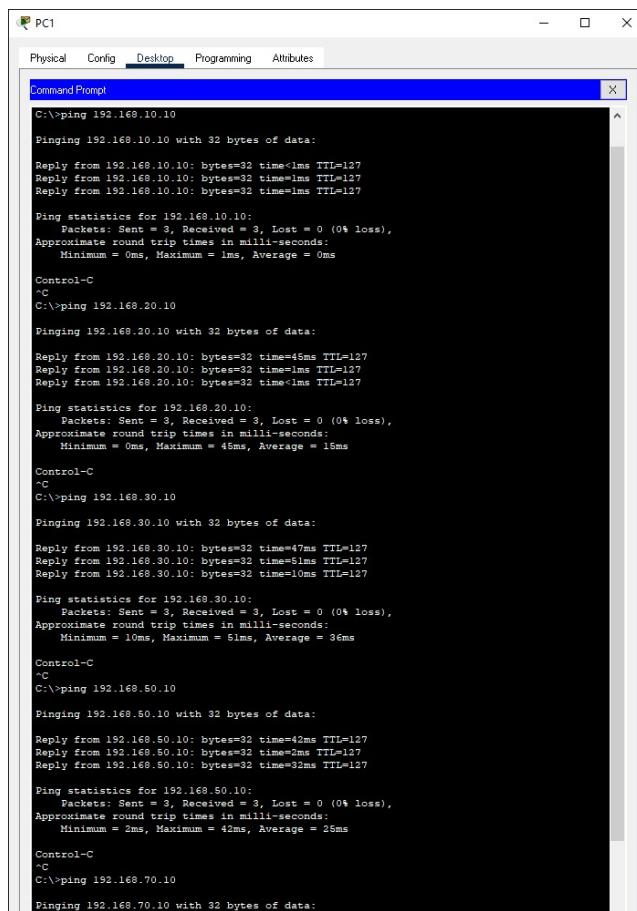
Ping 192.168.50.10 with 32 bytes of data:
Reply from 192.168.50.10: bytes=32 time=1ms TTL=127
Reply from 192.168.50.10: bytes=32 time<1ms TTL=127
Reply from 192.168.50.10: bytes=32 time<1ms TTL=127

Ping statistics for 192.168.50.10:
Packets: Sent = 3, Received = 3, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms

Control-C
C:\>ping 192.168.70.10

Ping 192.168.70.10 with 32 bytes of data:
Reply from 192.168.70.10: bytes=32 time=2ms TTL=127
Reply from 192.168.70.10: bytes=32 time=50ms TTL=127
Reply from 192.168.70.10: bytes=32 time=3ms TTL=127
```

#### d. Dept\_Produksi



```
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<1ms TTL=127
Reply from 192.168.10.10: bytes=32 time<1ms TTL=127
Reply from 192.168.10.10: bytes=32 time<1ms TTL=127

Ping statistics for 192.168.10.10:
    Packets: Sent = 3, Received = 3, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms

Control-C
^C
C:\>ping 192.168.20.10

Pinging 192.168.20.10 with 32 bytes of data:
Reply from 192.168.20.10: bytes=32 time=45ms TTL=127
Reply from 192.168.20.10: bytes=32 time<1ms TTL=127
Reply from 192.168.20.10: bytes=32 time<1ms TTL=127

Ping statistics for 192.168.20.10:
    Packets: Sent = 3, Received = 3, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 45ms, Average = 15ms

Control-C
^C
C:\>ping 192.168.30.10

Pinging 192.168.30.10 with 32 bytes of data:
Reply from 192.168.30.10: bytes=32 time=47ms TTL=127
Reply from 192.168.30.10: bytes=32 time=51ms TTL=127
Reply from 192.168.30.10: bytes=32 time=10ms TTL=127

Ping statistics for 192.168.30.10:
    Packets: Sent = 3, Received = 3, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 10ms, Maximum = 51ms, Average = 36ms

Control-C
^C
C:\>ping 192.168.50.10

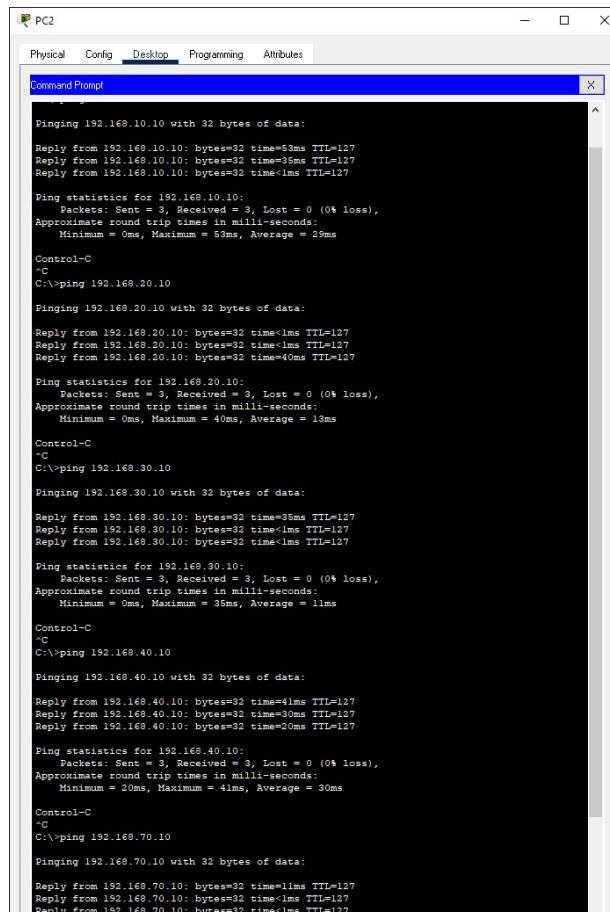
Pinging 192.168.50.10 with 32 bytes of data:
Reply from 192.168.50.10: bytes=32 time=42ms TTL=127
Reply from 192.168.50.10: bytes=32 time=2ms TTL=127
Reply from 192.168.50.10: bytes=32 time=32ms TTL=127

Ping statistics for 192.168.50.10:
    Packets: Sent = 3, Received = 3, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 2ms, Maximum = 42ms, Average = 25ms

Control-C
^C
C:\>ping 192.168.70.10

Pinging 192.168.70.10 with 32 bytes of data:
```

## e. Dept\_Elektrikal



```
PC2
Physical Config Desktop Programming Attributes
Command Prompt X
Ping statistics for 192.168.10.10 with 32 bytes of data:
Reply from 192.168.10.10: bytes=32 time=53ms TTL=127
Reply from 192.168.10.10: bytes=32 time=35ms TTL=127
Reply from 192.168.10.10: bytes=32 time<1ms TTL=127

Ping statistics for 192.168.10.10:
Packets: Sent = 3, Received = 3, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 53ms, Average = 29ms

Control-C
C:\>ping 192.168.20.10

Ping statistics for 192.168.20.10 with 32 bytes of data:
Reply from 192.168.20.10: bytes=32 time<1ms TTL=127
Reply from 192.168.20.10: bytes=32 time<1ms TTL=127
Reply from 192.168.20.10: bytes=32 time=40ms TTL=127

Ping statistics for 192.168.20.10:
Packets: Sent = 3, Received = 3, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 40ms, Average = 13ms

Control-C
C:\>ping 192.168.30.10

Ping statistics for 192.168.30.10 with 32 bytes of data:
Reply from 192.168.30.10: bytes=32 time=35ms TTL=127
Reply from 192.168.30.10: bytes=32 time<1ms TTL=127
Reply from 192.168.30.10: bytes=32 time<1ms TTL=127

Ping statistics for 192.168.30.10:
Packets: Sent = 3, Received = 3, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 35ms, Average = 11ms

Control-C
C:\>ping 192.168.40.10

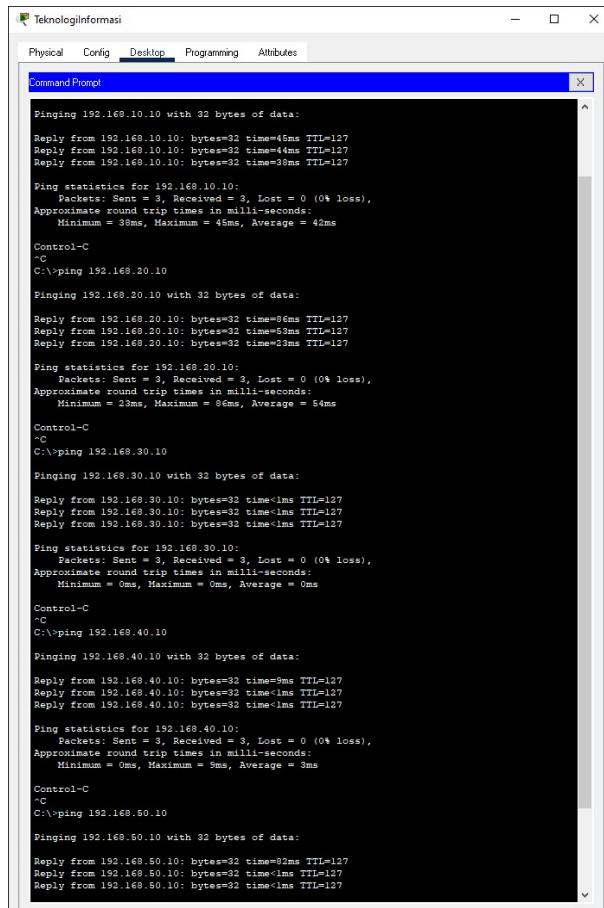
Ping statistics for 192.168.40.10 with 32 bytes of data:
Reply from 192.168.40.10: bytes=32 time=41ms TTL=127
Reply from 192.168.40.10: bytes=32 time=30ms TTL=127
Reply from 192.168.40.10: bytes=32 time=20ms TTL=127

Ping statistics for 192.168.40.10:
Packets: Sent = 3, Received = 3, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 20ms, Maximum = 41ms, Average = 30ms

Control-C
C:\>ping 192.168.70.10

Ping statistics for 192.168.70.10 with 32 bytes of data:
Reply from 192.168.70.10: bytes=32 time=1ms TTL=127
Reply from 192.168.70.10: bytes=32 time<1ms TTL=127
Reply from 192.168.70.10: bytes=32 time<1ms TTL=127
```

## f. Dept\_TI



```
Pinging 192.168.10.10 with 32 bytes of data:
Reply from 192.168.10.10: bytes=32 time=4ms TTL=127
Reply from 192.168.10.10: bytes=32 time=4ms TTL=127
Reply from 192.168.10.10: bytes=32 time=8ms TTL=127

Ping statistics for 192.168.10.10:
Packets: Sent = 3, Received = 3, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 4ms, Maximum = 8ms, Average = 4ms

Control-C
C:\>ping 192.168.20.10

Pinging 192.168.20.10 with 32 bytes of data:
Reply from 192.168.20.10: bytes=32 time=8ms TTL=127
Reply from 192.168.20.10: bytes=32 time=5ms TTL=127
Reply from 192.168.20.10: bytes=32 time=3ms TTL=127

Ping statistics for 192.168.20.10:
Packets: Sent = 3, Received = 3, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 3ms, Maximum = 8ms, Average = 5ms

Control-C
C:\>ping 192.168.30.10

Pinging 192.168.30.10 with 32 bytes of data:
Reply from 192.168.30.10: bytes=32 time<1ms TTL=127
Reply from 192.168.30.10: bytes=32 time<1ms TTL=127
Reply from 192.168.30.10: bytes=32 time<1ms TTL=127

Ping statistics for 192.168.30.10:
Packets: Sent = 3, Received = 3, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms

Control-C
C:\>ping 192.168.40.10

Pinging 192.168.40.10 with 32 bytes of data:
Reply from 192.168.40.10: bytes=32 time=9ms TTL=127
Reply from 192.168.40.10: bytes=32 time<1ms TTL=127
Reply from 192.168.40.10: bytes=32 time<1ms TTL=127

Ping statistics for 192.168.40.10:
Packets: Sent = 3, Received = 3, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 9ms, Average = 3ms

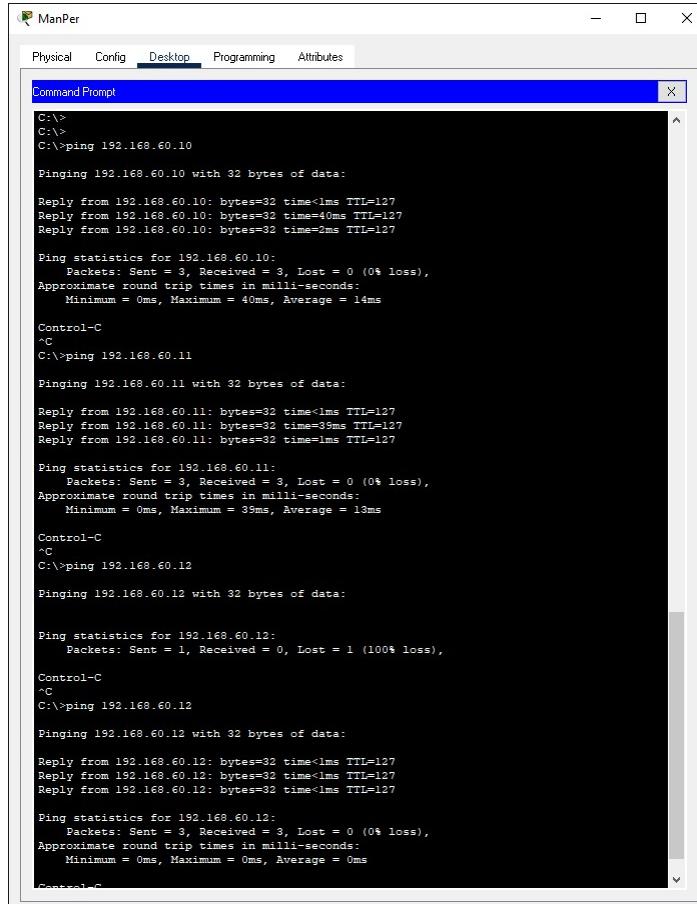
Control-C
C:\>ping 192.168.50.10

Pinging 192.168.50.10 with 32 bytes of data:
Reply from 192.168.50.10: bytes=32 time=82ms TTL=127
Reply from 192.168.50.10: bytes=32 time<1ms TTL=127
Reply from 192.168.50.10: bytes=32 time<1ms TTL=127
```

2. PC-PC di tiap departemen dapat mengakses ke ServerFarm, dengan perintah ping.

IP ServerFarm = 192.168.60.10, 192.168.60.11, 192.168.60.12

### 1. Dept\_ManPer



```
C:\>
C:\>
C:\>ping 192.168.60.10

Pinging 192.168.60.10 with 32 bytes of data:
Reply from 192.168.60.10: bytes=32 time<1ms TTL=127
Reply from 192.168.60.10: bytes=32 time=40ms TTL=127
Reply from 192.168.60.10: bytes=32 time=2ms TTL=127

Ping statistics for 192.168.60.10:
    Packets: Sent = 3, Received = 3, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 40ms, Average = 14ms

Control-C
^C
C:\>ping 192.168.60.11

Pinging 192.168.60.11 with 32 bytes of data:
Reply from 192.168.60.11: bytes=32 time<1ms TTL=127
Reply from 192.168.60.11: bytes=32 time=39ms TTL=127
Reply from 192.168.60.11: bytes=32 time=1ms TTL=127

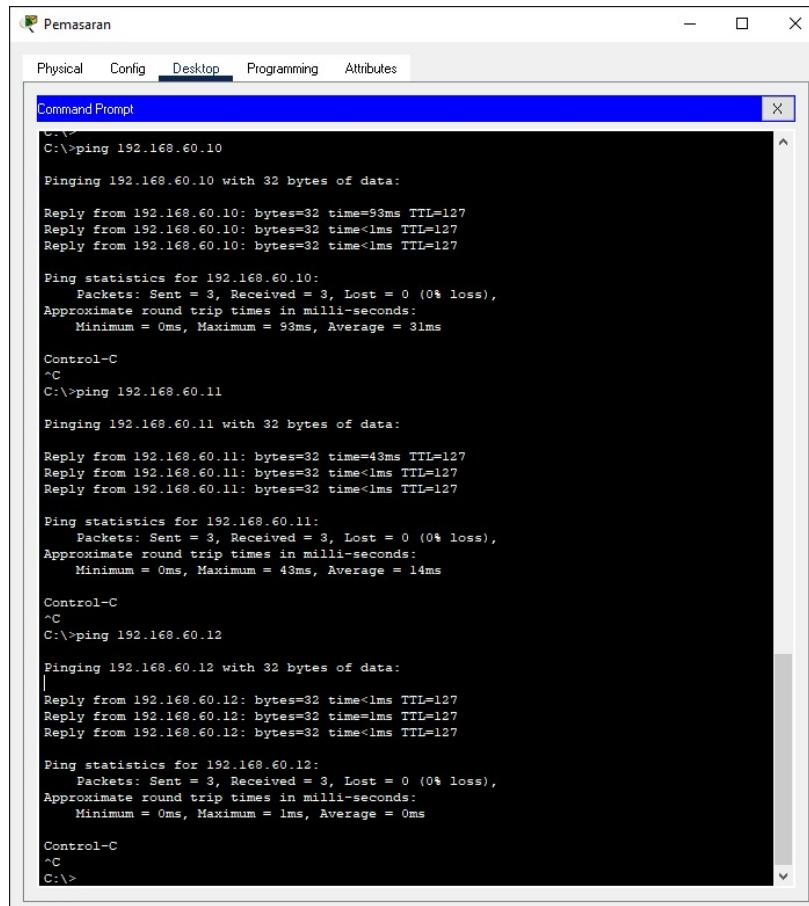
Ping statistics for 192.168.60.11:
    Packets: Sent = 3, Received = 3, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 39ms, Average = 13ms

Control-C
^C
C:\>ping 192.168.60.12

Pinging 192.168.60.12 with 32 bytes of data:
Reply from 192.168.60.12: bytes=32 time<1ms TTL=127
Reply from 192.168.60.12: bytes=32 time=1ms TTL=127
Reply from 192.168.60.12: bytes=32 time<1ms TTL=127

Ping statistics for 192.168.60.12:
    Packets: Sent = 3, Received = 3, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms
Control-C
```

## 2. Dept\_Pemasaran



Pemasaran

Physical Config Desktop Programming Attributes

Command Prompt

```
C:\>ping 192.168.60.10

Pinging 192.168.60.10 with 32 bytes of data:

Reply from 192.168.60.10: bytes=32 time=93ms TTL=127
Reply from 192.168.60.10: bytes=32 time<1ms TTL=127
Reply from 192.168.60.10: bytes=32 time<1ms TTL=127

Ping statistics for 192.168.60.10:
    Packets: Sent = 3, Received = 3, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 93ms, Average = 31ms

Control-C
^C
C:\>ping 192.168.60.11

Pinging 192.168.60.11 with 32 bytes of data:

Reply from 192.168.60.11: bytes=32 time=43ms TTL=127
Reply from 192.168.60.11: bytes=32 time<1ms TTL=127
Reply from 192.168.60.11: bytes=32 time<1ms TTL=127

Ping statistics for 192.168.60.11:
    Packets: Sent = 3, Received = 3, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 43ms, Average = 14ms

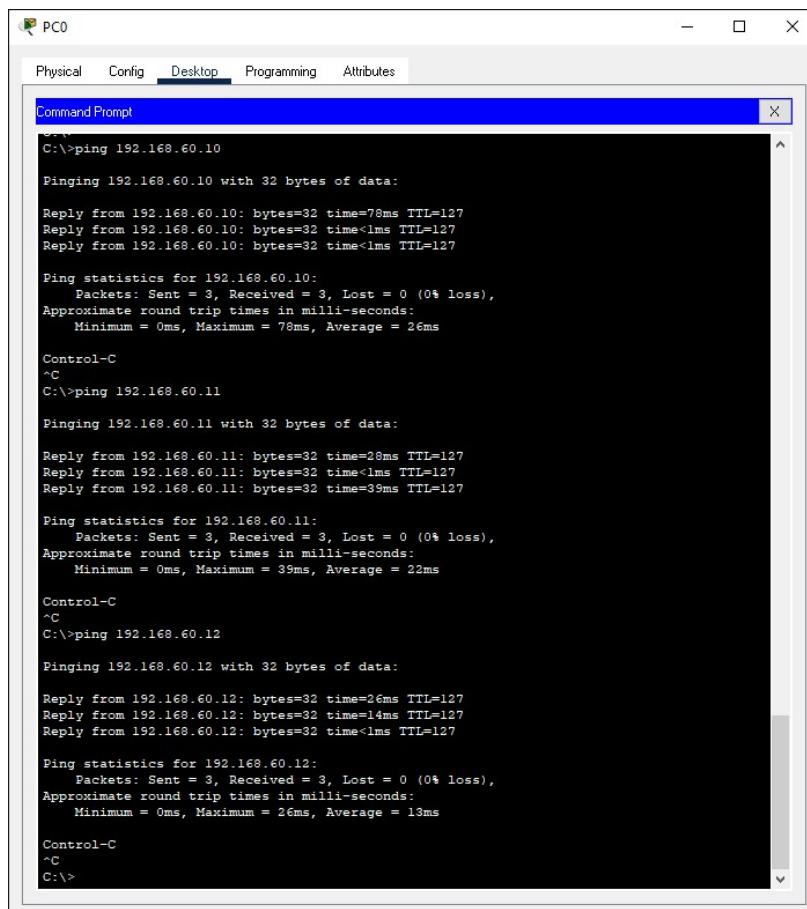
Control-C
^C
C:\>ping 192.168.60.12

Pinging 192.168.60.12 with 32 bytes of data:
|Reply from 192.168.60.12: bytes=32 time<1ms TTL=127
|Reply from 192.168.60.12: bytes=32 time=1ms TTL=127
|Reply from 192.168.60.12: bytes=32 time<1ms TTL=127

Ping statistics for 192.168.60.12:
    Packets: Sent = 3, Received = 3, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms

Control-C
^C
C:\>
```

### 3. Dept\_Keuangan



The screenshot shows a Windows desktop environment with a window titled "PC0". Inside the window, there is a tab bar with "Physical", "Config", "Desktop" (which is selected), "Programming", and "Attributes". Below the tab bar is a "Command Prompt" window. The command prompt displays the following output:

```
C:\>ping 192.168.60.10
Pinging 192.168.60.10 with 32 bytes of data:
Reply from 192.168.60.10: bytes=32 time=78ms TTL=127
Reply from 192.168.60.10: bytes=32 time<1ms TTL=127
Reply from 192.168.60.10: bytes=32 time<1ms TTL=127

Ping statistics for 192.168.60.10:
    Packets: Sent = 3, Received = 3, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 78ms, Average = 26ms

Control-C
^C
C:\>ping 192.168.60.11
Pinging 192.168.60.11 with 32 bytes of data:
Reply from 192.168.60.11: bytes=32 time=28ms TTL=127
Reply from 192.168.60.11: bytes=32 time<1ms TTL=127
Reply from 192.168.60.11: bytes=32 time=39ms TTL=127

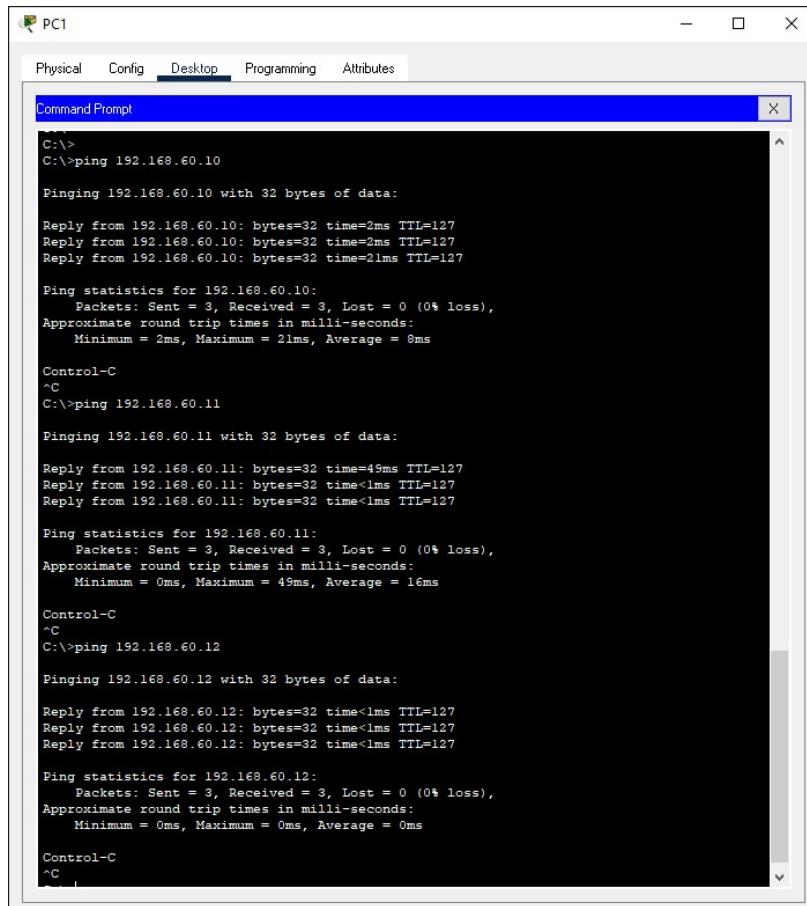
Ping statistics for 192.168.60.11:
    Packets: Sent = 3, Received = 3, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 39ms, Average = 22ms

Control-C
^C
C:\>ping 192.168.60.12
Pinging 192.168.60.12 with 32 bytes of data:
Reply from 192.168.60.12: bytes=32 time=26ms TTL=127
Reply from 192.168.60.12: bytes=32 time=14ms TTL=127
Reply from 192.168.60.12: bytes=32 time<1ms TTL=127

Ping statistics for 192.168.60.12:
    Packets: Sent = 3, Received = 3, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 26ms, Average = 13ms

Control-C
^C
C:\>
```

#### 4. Dept\_Produksi



```
PC1

Physical Config Desktop Programming Attributes

Command Prompt X

C:\>
C:\>ping 192.168.60.10

Pinging 192.168.60.10 with 32 bytes of data:

Reply from 192.168.60.10: bytes=32 time=2ms TTL=127
Reply from 192.168.60.10: bytes=32 time=2ms TTL=127
Reply from 192.168.60.10: bytes=32 time=1ms TTL=127

Ping statistics for 192.168.60.10:
    Packets: Sent = 3, Received = 3, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 2ms, Maximum = 2ms, Average = 8ms

Control-C
^C
C:\>ping 192.168.60.11

Pinging 192.168.60.11 with 32 bytes of data:

Reply from 192.168.60.11: bytes=32 time=49ms TTL=127
Reply from 192.168.60.11: bytes=32 time<1ms TTL=127
Reply from 192.168.60.11: bytes=32 time<1ms TTL=127

Ping statistics for 192.168.60.11:
    Packets: Sent = 3, Received = 3, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 49ms, Average = 16ms

Control-C
^C
C:\>ping 192.168.60.12

Pinging 192.168.60.12 with 32 bytes of data:

Reply from 192.168.60.12: bytes=32 time<1ms TTL=127
Reply from 192.168.60.12: bytes=32 time<1ms TTL=127
Reply from 192.168.60.12: bytes=32 time<1ms TTL=127

Ping statistics for 192.168.60.12:
    Packets: Sent = 3, Received = 3, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

Control-C
^C
```

## 5. Dept\_Elektrikal

PC2

Physical Config Desktop Programming Attributes

Command Prompt

```
C:\>ping 192.168.60.10

Pinging 192.168.60.10 with 32 bytes of data:

Reply from 192.168.60.10: bytes=32 time=43ms TTL=127
Reply from 192.168.60.10: bytes=32 time=23ms TTL=127
Reply from 192.168.60.10: bytes=32 time<1ms TTL=127

Ping statistics for 192.168.60.10:
    Packets: Sent = 3, Received = 3, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 43ms, Average = 22ms

Control-C
^C
C:\>ping 192.168.60.11

Pinging 192.168.60.11 with 32 bytes of data:

Reply from 192.168.60.11: bytes=32 time=48ms TTL=127
Reply from 192.168.60.11: bytes=32 time<1ms TTL=127
Reply from 192.168.60.11: bytes=32 time=9ms TTL=127

Ping statistics for 192.168.60.11:
    Packets: Sent = 3, Received = 3, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 48ms, Average = 19ms

Control-C
^C
C:\>ping 192.168.60.12

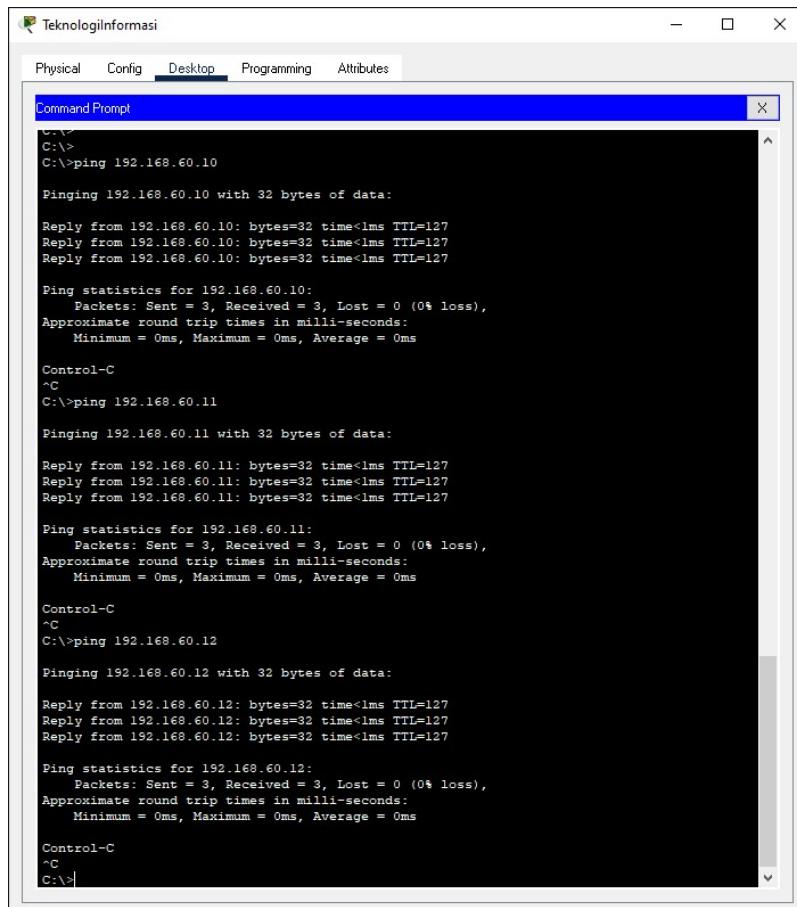
Pinging 192.168.60.12 with 32 bytes of data:

Reply from 192.168.60.12: bytes=32 time=1ms TTL=127
Reply from 192.168.60.12: bytes=32 time<1ms TTL=127
Reply from 192.168.60.12: bytes=32 time=3ms TTL=127

Ping statistics for 192.168.60.12:
    Packets: Sent = 3, Received = 3, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 3ms, Average = 1ms

Control-C
^C
C:\>
```

## 6. Dept\_TI



The screenshot shows a Windows Command Prompt window titled "Tecnologinformasi". The window has tabs at the top: Physical, Config, Desktop, Programming, and Attributes. The "Desktop" tab is selected. Below the tabs is a title bar labeled "Command Prompt". The main area of the window displays the following command-line session:

```
C:\>
C:\>ping 192.168.60.10

Pinging 192.168.60.10 with 32 bytes of data:
Reply from 192.168.60.10: bytes=32 time<1ms TTL=127
Reply from 192.168.60.10: bytes=32 time<1ms TTL=127
Reply from 192.168.60.10: bytes=32 time<1ms TTL=127

Ping statistics for 192.168.60.10:
    Packets: Sent = 3, Received = 3, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

Control-C
^C
C:\>ping 192.168.60.11

Pinging 192.168.60.11 with 32 bytes of data:
Reply from 192.168.60.11: bytes=32 time<1ms TTL=127
Reply from 192.168.60.11: bytes=32 time<1ms TTL=127
Reply from 192.168.60.11: bytes=32 time<1ms TTL=127

Ping statistics for 192.168.60.11:
    Packets: Sent = 3, Received = 3, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

Control-C
^C
C:\>ping 192.168.60.12

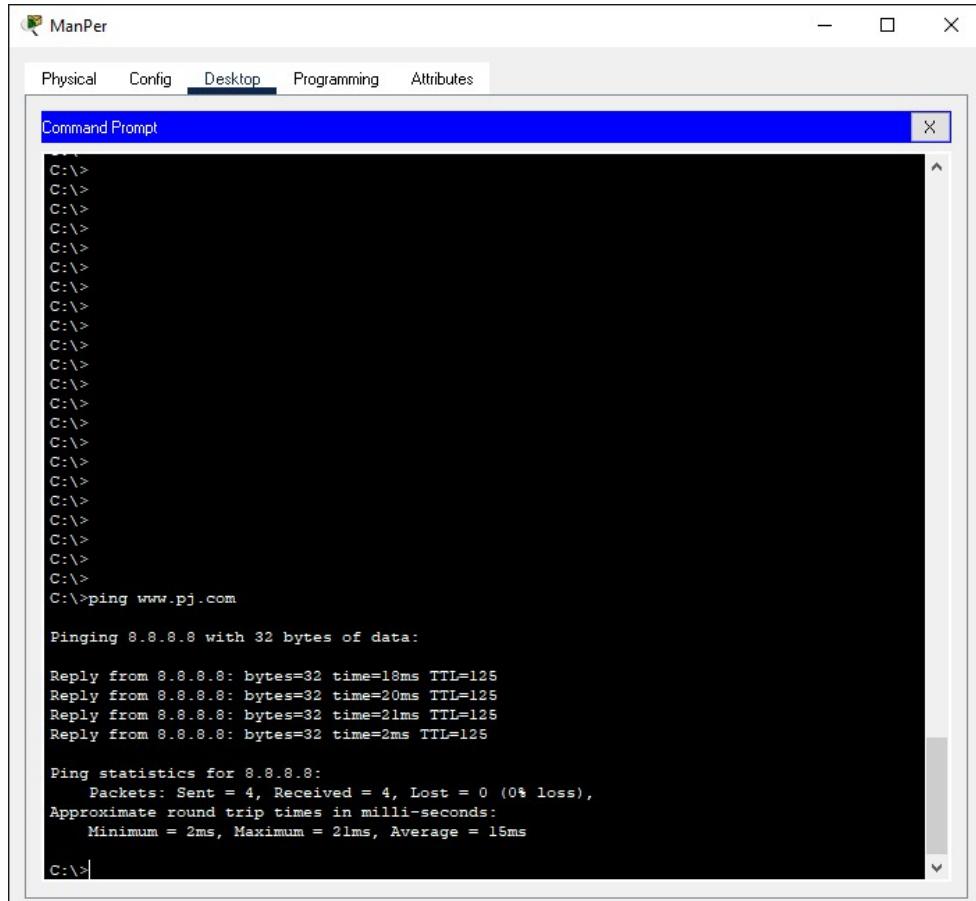
Pinging 192.168.60.12 with 32 bytes of data:
Reply from 192.168.60.12: bytes=32 time<1ms TTL=127
Reply from 192.168.60.12: bytes=32 time<1ms TTL=127
Reply from 192.168.60.12: bytes=32 time<1ms TTL=127

Ping statistics for 192.168.60.12:
    Packets: Sent = 3, Received = 3, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

Control-C
^C
C:\>
```

3. PC-PC dapat ping ke pj.com

1. Dept\_ManPer



The screenshot shows a Windows Command Prompt window titled "ManPer". The window has tabs at the top: Physical, Config, Desktop (which is selected), Programming, and Attributes. The main area of the window displays the following command-line session:

```
C:\>
C:\>ping www.pj.com

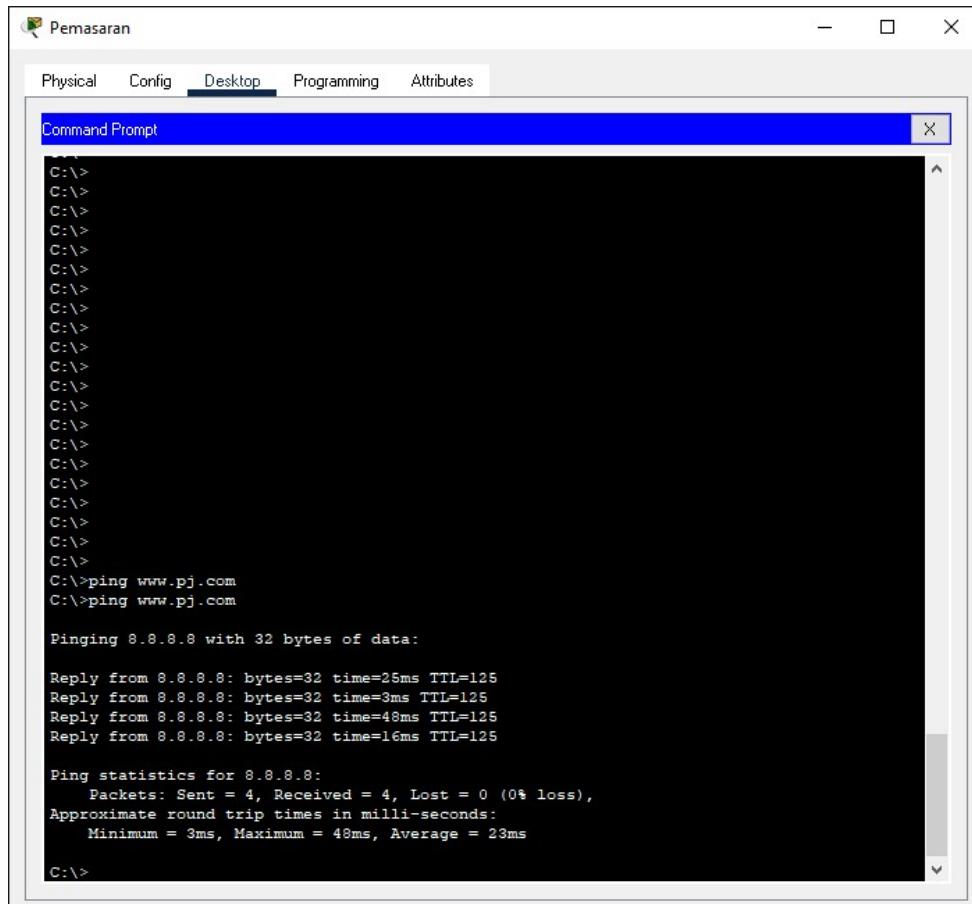
Pinging 8.8.8.8 with 32 bytes of data:

Reply from 8.8.8.8: bytes=32 time=18ms TTL=125
Reply from 8.8.8.8: bytes=32 time=20ms TTL=125
Reply from 8.8.8.8: bytes=32 time=21ms TTL=125
Reply from 8.8.8.8: bytes=32 time=2ms TTL=125

Ping statistics for 8.8.8.8:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 2ms, Maximum = 21ms, Average = 15ms

C:\>
```

## 2. Dept\_Pemasaran



The screenshot shows a Windows Command Prompt window titled "Pemasaran". The window has tabs at the top: Physical, Config, Desktop (which is selected), Programming, and Attributes. The command prompt itself displays the following text:

```
C:\>
C:\>ping www.pj.com
C:\>ping www.pj.com

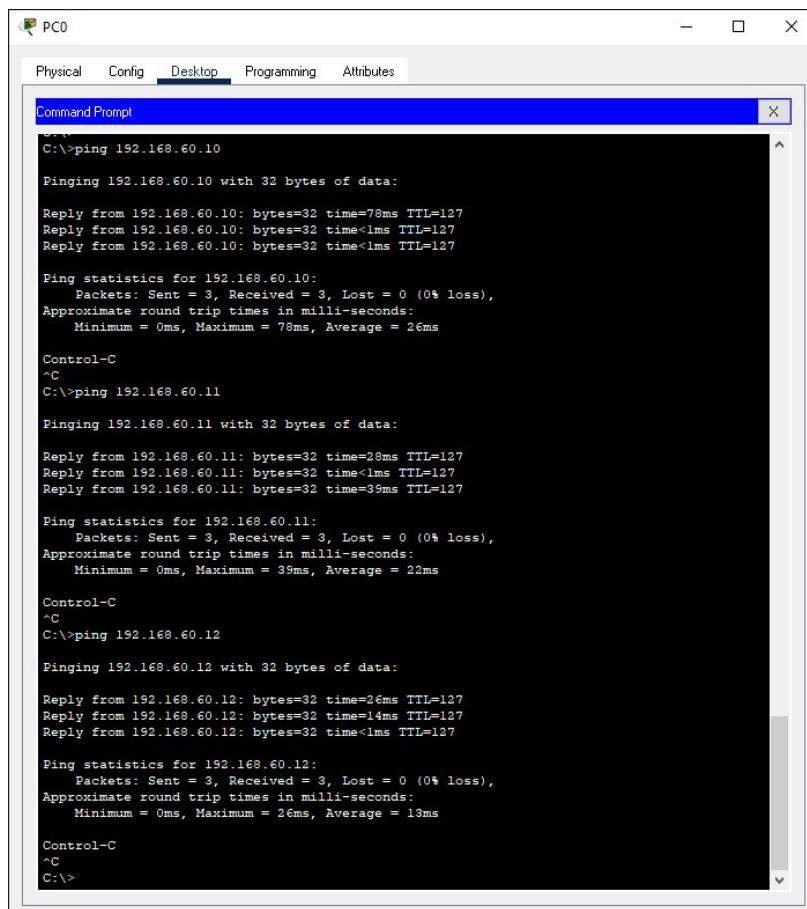
Pinging 8.8.8.8 with 32 bytes of data:

Reply from 8.8.8.8: bytes=32 time=25ms TTL=125
Reply from 8.8.8.8: bytes=32 time=3ms TTL=125
Reply from 8.8.8.8: bytes=32 time=48ms TTL=125
Reply from 8.8.8.8: bytes=32 time=16ms TTL=125

Ping statistics for 8.8.8.8:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 3ms, Maximum = 48ms, Average = 23ms

C:\>
```

### 3. Dept\_Keuangan



```
C:\>ping 192.168.60.10

Pinging 192.168.60.10 with 32 bytes of data:

Reply from 192.168.60.10: bytes=32 time=78ms TTL=127
Reply from 192.168.60.10: bytes=32 time<1ms TTL=127
Reply from 192.168.60.10: bytes=32 time<1ms TTL=127

Ping statistics for 192.168.60.10:
    Packets: Sent = 3, Received = 3, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 78ms, Average = 26ms

Control-C
^C
C:\>ping 192.168.60.11

Pinging 192.168.60.11 with 32 bytes of data:

Reply from 192.168.60.11: bytes=32 time=28ms TTL=127
Reply from 192.168.60.11: bytes=32 time<1ms TTL=127
Reply from 192.168.60.11: bytes=32 time=39ms TTL=127

Ping statistics for 192.168.60.11:
    Packets: Sent = 3, Received = 3, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 39ms, Average = 22ms

Control-C
^C
C:\>ping 192.168.60.12

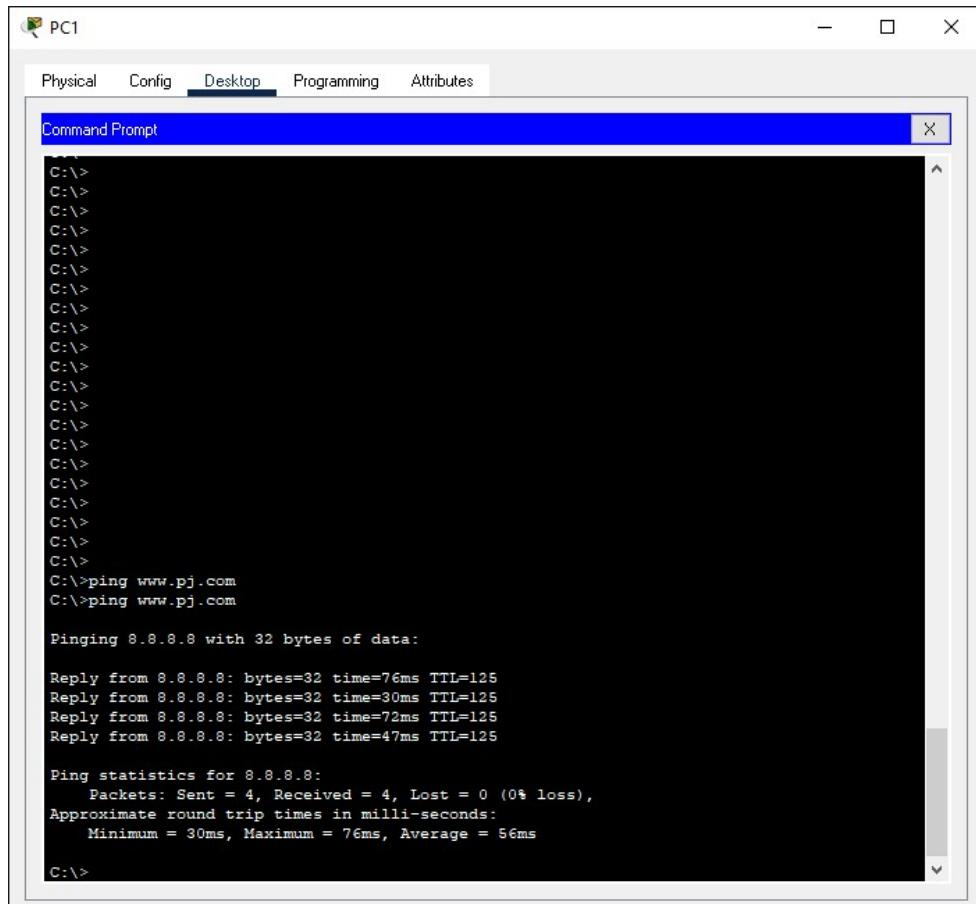
Pinging 192.168.60.12 with 32 bytes of data:

Reply from 192.168.60.12: bytes=32 time=26ms TTL=127
Reply from 192.168.60.12: bytes=32 time=14ms TTL=127
Reply from 192.168.60.12: bytes=32 time<1ms TTL=127

Ping statistics for 192.168.60.12:
    Packets: Sent = 3, Received = 3, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 26ms, Average = 13ms

Control-C
^C
C:\>
```

#### 4. Dept\_Produksi



```
C:\>
C:\>ping www.pj.com
C:\>ping www.pj.com

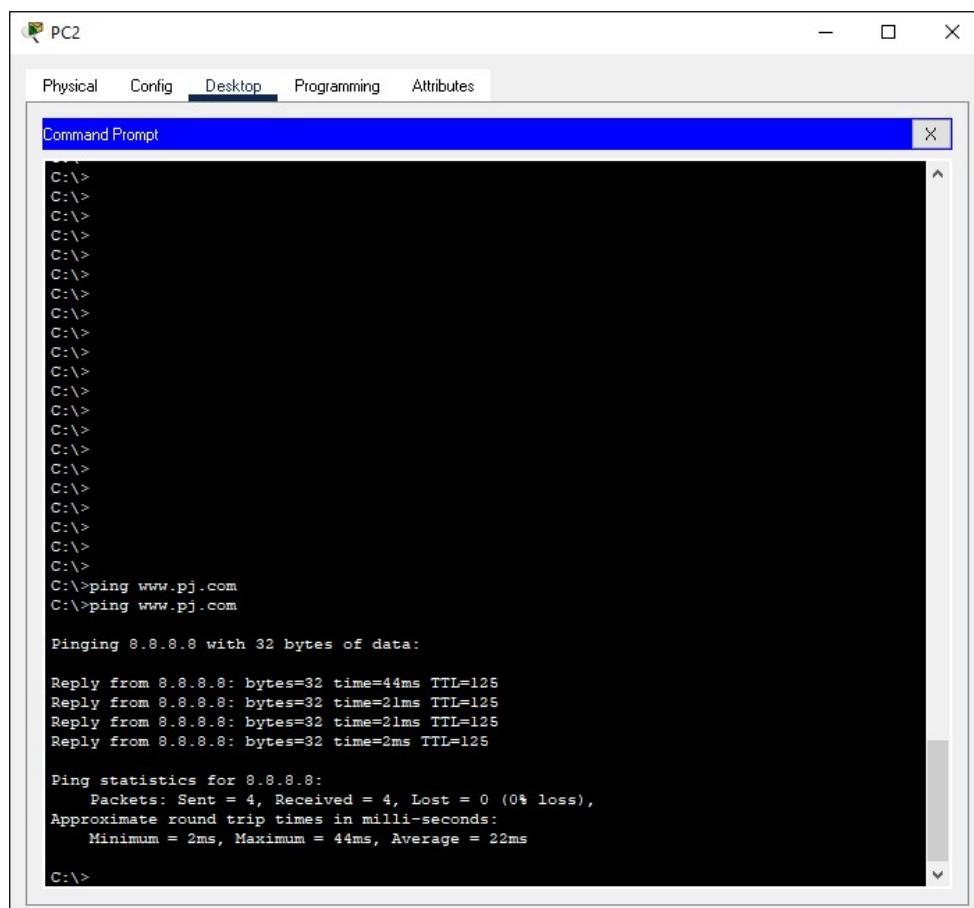
Pinging 8.8.8.8 with 32 bytes of data:

Reply from 8.8.8.8: bytes=32 time=76ms TTL=125
Reply from 8.8.8.8: bytes=32 time=30ms TTL=125
Reply from 8.8.8.8: bytes=32 time=72ms TTL=125
Reply from 8.8.8.8: bytes=32 time=47ms TTL=125

Ping statistics for 8.8.8.8:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 30ms, Maximum = 76ms, Average = 56ms

C:\>
```

## 5. Dept\_Elektrikal



The screenshot shows a Windows-style Command Prompt window titled "PC2". The window has tabs at the top: Physical, Config, Desktop (which is selected), Programming, and Attributes. The main area of the window displays the following command-line session:

```
C:\>
C:\>ping www.pj.com
C:\>ping www.pj.com

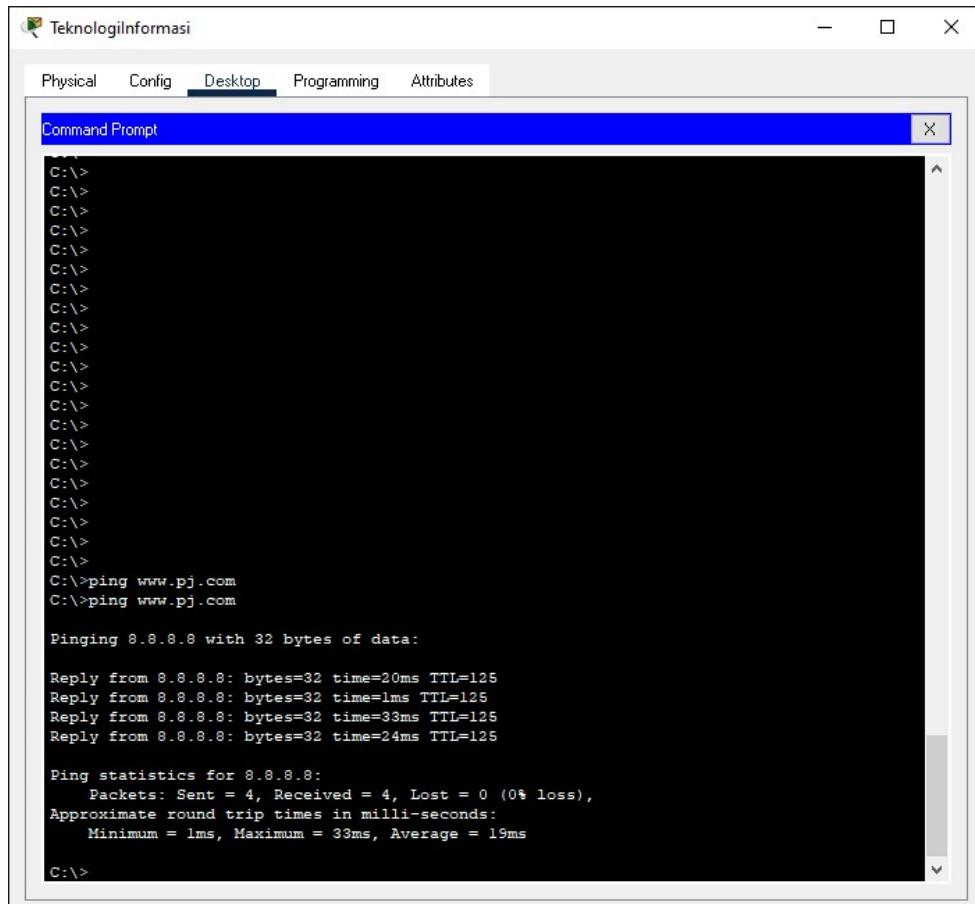
Pinging 8.8.8.8 with 32 bytes of data:

Reply from 8.8.8.8: bytes=32 time=44ms TTL=125
Reply from 8.8.8.8: bytes=32 time=21ms TTL=125
Reply from 8.8.8.8: bytes=32 time=21ms TTL=125
Reply from 8.8.8.8: bytes=32 time=2ms TTL=125

Ping statistics for 8.8.8.8:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 2ms, Maximum = 44ms, Average = 22ms

C:\>
```

## 6. Dept\_TI



```
C:\>
C:\>ping www.pj.com
C:\>ping www.pj.com

Pinging 8.8.8.8 with 32 bytes of data:

Reply from 8.8.8.8: bytes=32 time=20ms TTL=125
Reply from 8.8.8.8: bytes=32 time=1ms TTL=125
Reply from 8.8.8.8: bytes=32 time=33ms TTL=125
Reply from 8.8.8.8: bytes=32 time=24ms TTL=125

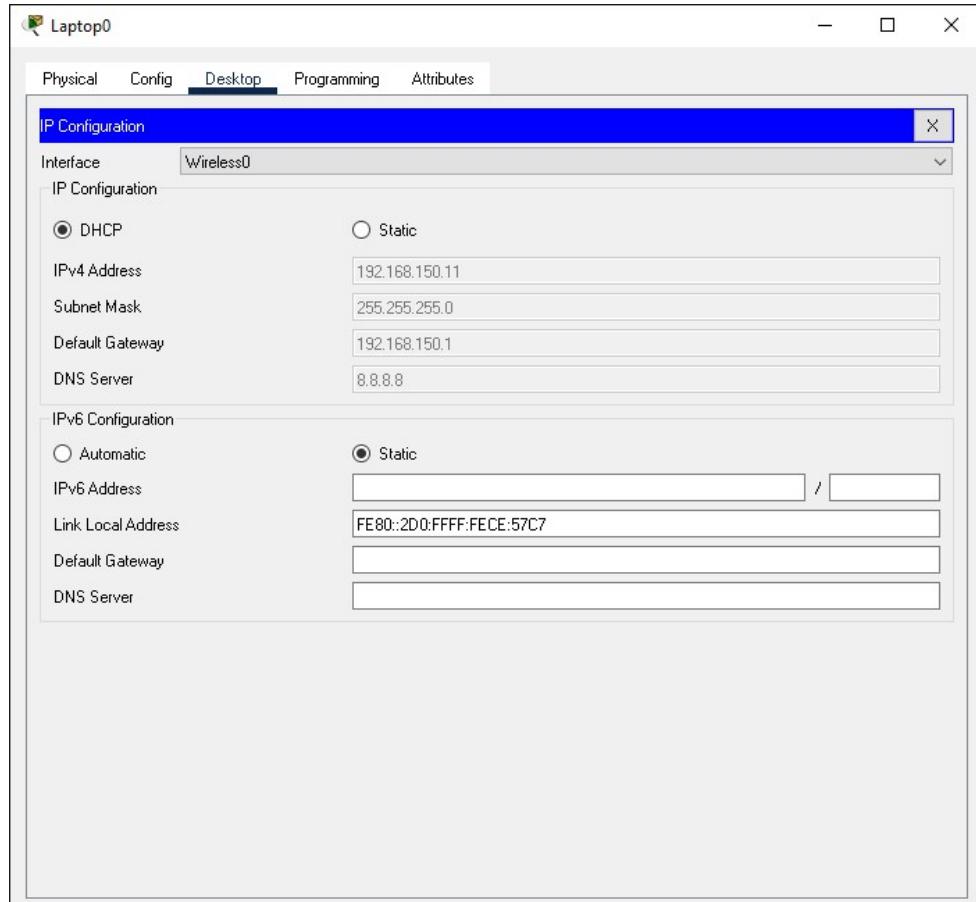
Ping statistics for 8.8.8.8:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 33ms, Average = 19ms

C:\>
```

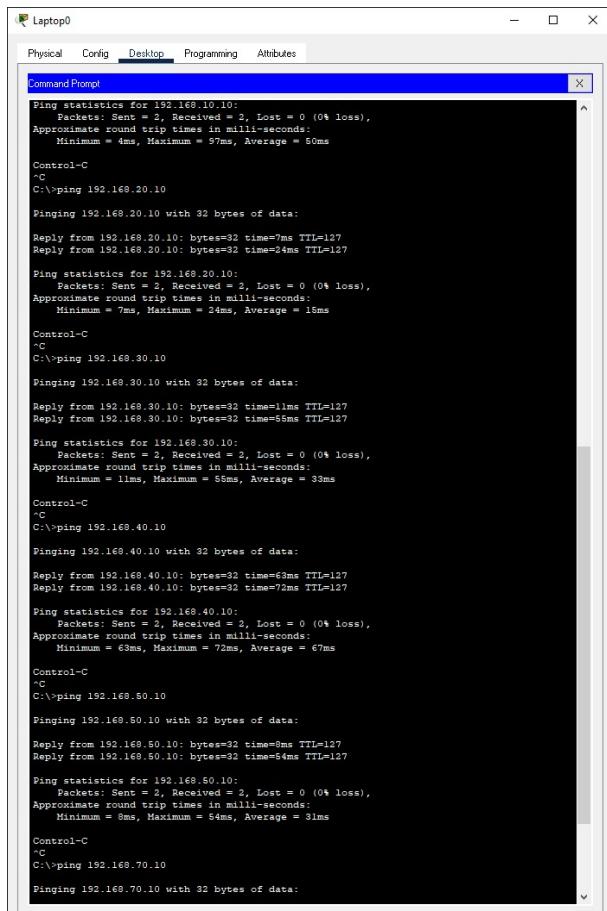
4. Laptop atau SmartPhone dapat terkoneksi ke wifi, mendapatkan IP DHCP dan dapat ping ke PC-PC Departemen serta dapat ping ke pj.com.

1. Laptop

a. Terkoneksi ke Wifi dengan DHCP



b. Ping ke PC



```
Laptop0
Physical Config Desktop Programming Attributes
Command Prompt
Ping statistics for 192.168.10.10:
Packets: Sent = 2, Received = 2, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 4ms, Maximum = 97ms, Average = 60ms
Control-C
^C
C:\>ping 192.168.20.10

Pinging 192.168.20.10 with 32 bytes of data:
Reply from 192.168.20.10: bytes=32 time=7ms TTL=127
Reply from 192.168.20.10: bytes=32 time=24ms TTL=127

Ping statistics for 192.168.20.10:
Packets: Sent = 2, Received = 2, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 7ms, Maximum = 24ms, Average = 15ms
Control-C
^C
C:\>ping 192.168.30.10

Pinging 192.168.30.10 with 32 bytes of data:
Reply from 192.168.30.10: bytes=32 time=1ms TTL=127
Reply from 192.168.30.10: bytes=32 time=55ms TTL=127

Ping statistics for 192.168.30.10:
Packets: Sent = 2, Received = 2, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 55ms, Average = 35ms
Control-C
^C
C:\>ping 192.168.40.10

Pinging 192.168.40.10 with 32 bytes of data:
Reply from 192.168.40.10: bytes=32 time=6ms TTL=127
Reply from 192.168.40.10: bytes=32 time=72ms TTL=127

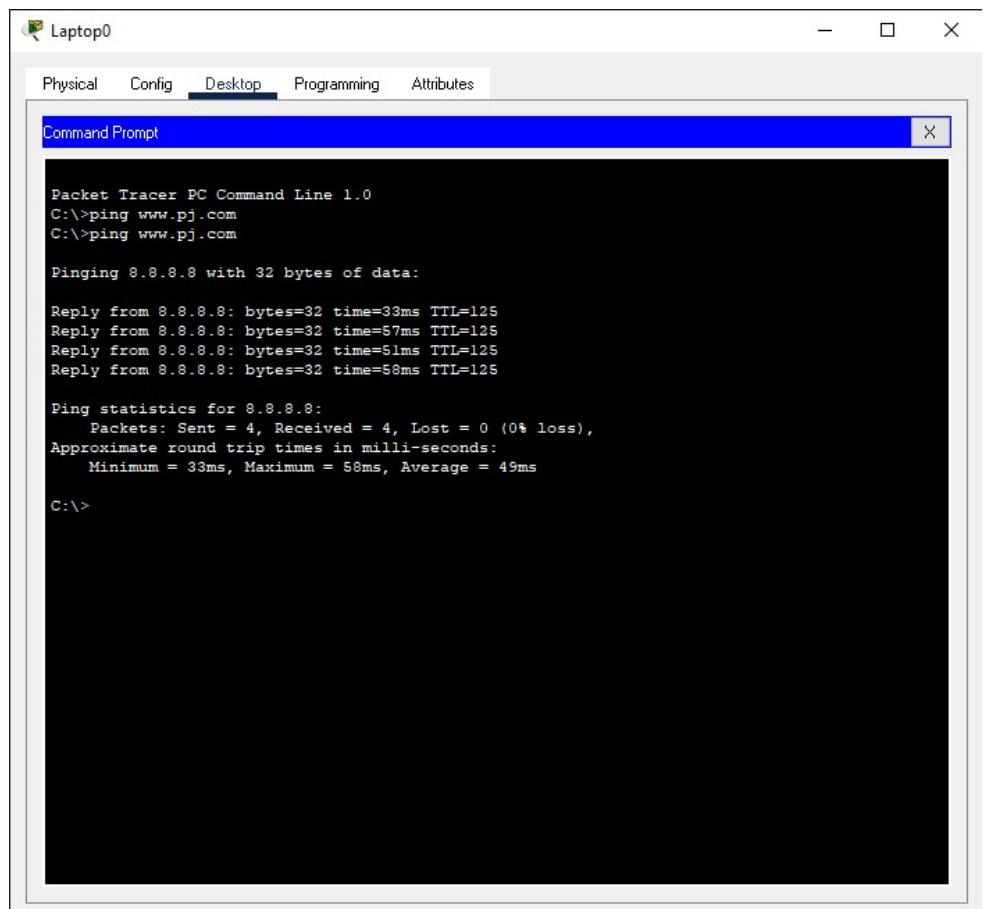
Ping statistics for 192.168.40.10:
Packets: Sent = 2, Received = 2, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 6ms, Maximum = 72ms, Average = 67ms
Control-C
^C
C:\>ping 192.168.50.10

Pinging 192.168.50.10 with 32 bytes of data:
Reply from 192.168.50.10: bytes=32 time=6ms TTL=127
Reply from 192.168.50.10: bytes=32 time=54ms TTL=127

Ping statistics for 192.168.50.10:
Packets: Sent = 2, Received = 2, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 6ms, Maximum = 54ms, Average = 31ms
Control-C
^C
C:\>ping 192.168.70.10

Pinging 192.168.70.10 with 32 bytes of data:
```

c. Ping ke [www.pj.com](http://www.pj.com)



Laptop0

Physical Config Desktop Programming Attributes

Command Prompt

```
Packet Tracer PC Command Line 1.0
C:\>ping www.pj.com
C:\>ping www.pj.com

Pinging 8.8.8.8 with 32 bytes of data:

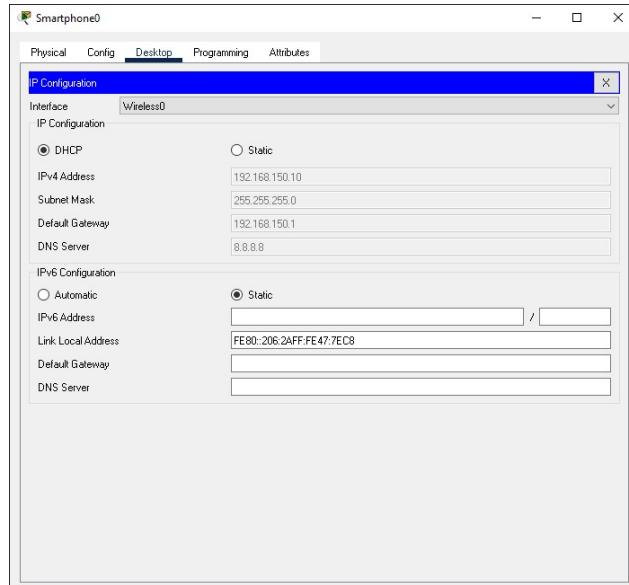
Reply from 8.8.8.8: bytes=32 time=33ms TTL=125
Reply from 8.8.8.8: bytes=32 time=57ms TTL=125
Reply from 8.8.8.8: bytes=32 time=51ms TTL=125
Reply from 8.8.8.8: bytes=32 time=58ms TTL=125

Ping statistics for 8.8.8.8:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 33ms, Maximum = 58ms, Average = 49ms

C:\>
```

## 2. Smartphone

### a. Terkoneksi ke Wifi dengan DHCP



### b. Ping ke PC

```
Ping statistics for 192.168.10.10:
Packets: Sent = 2, Received = 2, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 54ms, Maximum = 74ms, Average = 64ms
Control-C
C:\>ping 192.168.20.10

Pinging 192.168.20.10 with 32 bytes of data:
Reply from 192.168.20.10: bytes=32 time=85ms TTL=127
Reply from 192.168.20.10: bytes=32 time=94ms TTL=127

Ping statistics for 192.168.20.10:
Packets: Sent = 2, Received = 2, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 54ms, Maximum = 85ms, Average = 69ms
Control-C
C:\>ping 192.168.30.10

Pinging 192.168.30.10 with 32 bytes of data:
Reply from 192.168.30.10: bytes=32 time=148ms TTL=127
Reply from 192.168.30.10: bytes=32 time=144ms TTL=127

Ping statistics for 192.168.30.10:
Packets: Sent = 2, Received = 2, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 44ms, Maximum = 148ms, Average = 94ms
Control-C
C:\>ping 192.168.40.10

Pinging 192.168.40.10 with 32 bytes of data:
Reply from 192.168.40.10: bytes=32 time=18ms TTL=127
Reply from 192.168.40.10: bytes=32 time=44ms TTL=127

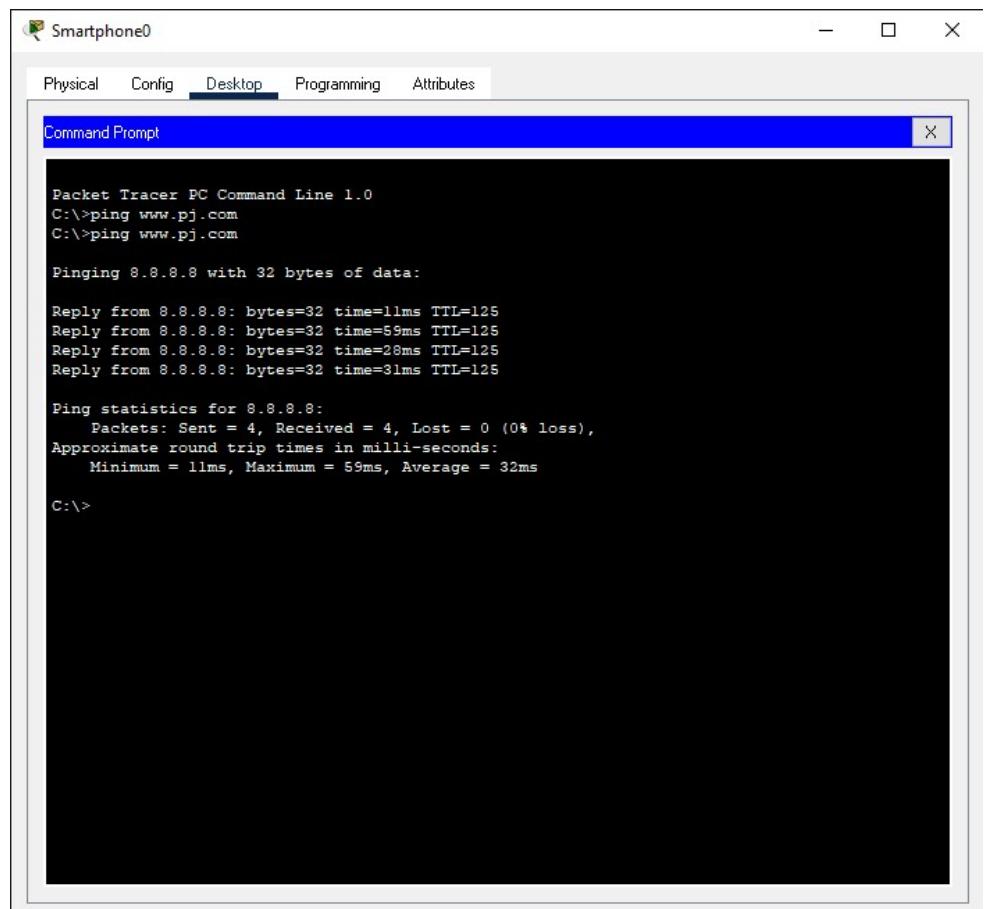
Ping statistics for 192.168.40.10:
Packets: Sent = 2, Received = 2, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 18ms, Maximum = 44ms, Average = 31ms
Control-C
C:\>ping 192.168.50.10

Pinging 192.168.50.10 with 32 bytes of data:
Reply from 192.168.50.10: bytes=32 time=67ms TTL=127
Reply from 192.168.50.10: bytes=32 time=110ms TTL=127

Ping statistics for 192.168.50.10:
Packets: Sent = 2, Received = 2, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 67ms, Maximum = 110ms, Average = 88ms
Control-C
C:\>ping 192.168.70.10

Pinging 192.168.70.10 with 32 bytes of data:
```

c. Ping ke [www.pj.com](http://www.pj.com)



```
Packet Tracer PC Command Line 1.0
C:\>ping www.pj.com
C:\>ping www.pj.com

Pinging 8.8.8.8 with 32 bytes of data:

Reply from 8.8.8.8: bytes=32 time=11ms TTL=125
Reply from 8.8.8.8: bytes=32 time=59ms TTL=125
Reply from 8.8.8.8: bytes=32 time=28ms TTL=125
Reply from 8.8.8.8: bytes=32 time=31ms TTL=125

Ping statistics for 8.8.8.8:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 11ms, Maximum = 59ms, Average = 32ms

C:\>
```

5. Teleworker dapat melakukan VPN dan dapat akses ke storage server (File server)

