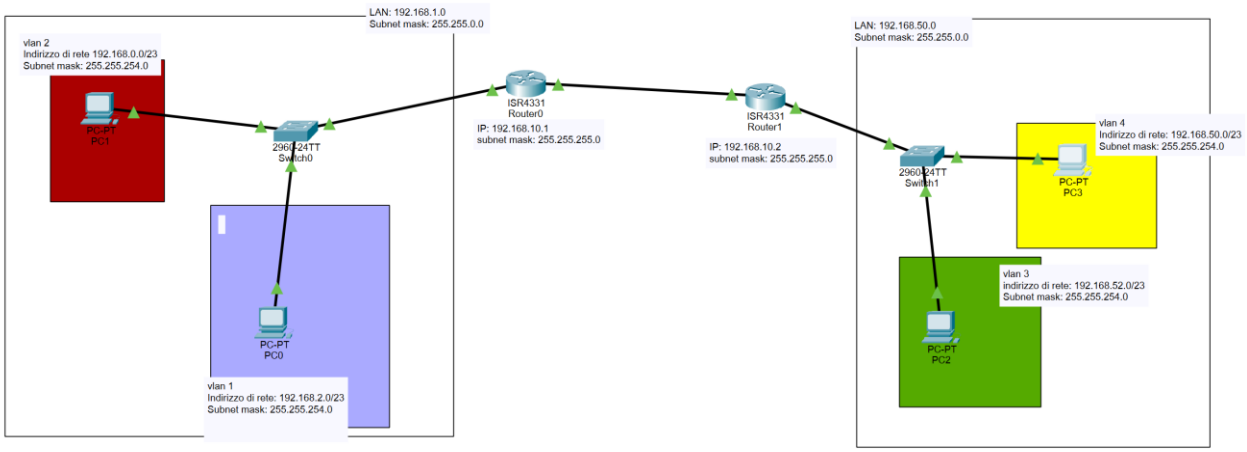
Topologia Elaborato di Reti

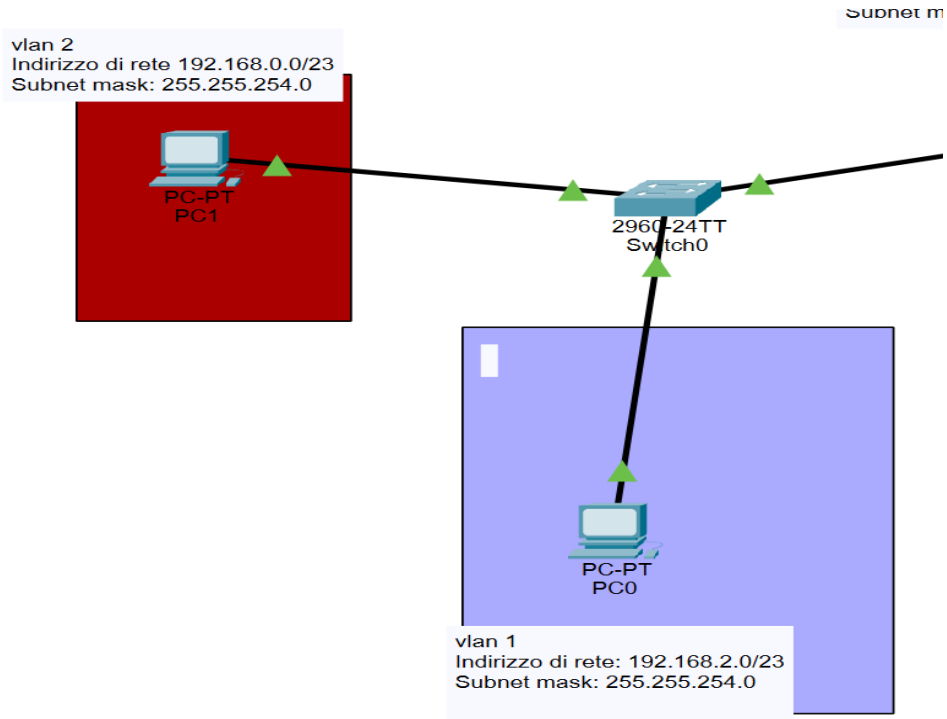


Per l'elaborato ho optato per la configurazione di una topologia di rete con due LAN con all'interno di esse due VLAN ciascuna utilizzando cisco packet tracer.

Le due LAN hanno indirizzo di rete e subnet mask:

- LAN 1
  - Indirizzo di rete: 192.168.1.0
  - Subnet mask: 255.255.0.0
- LAN 2
  - Indirizzo di rete: 192.168.50.0
  - Subnet mask: 255.255.0.0

Configurazione LAN 1



VLAN1

Alla VLAN 1 ho assegnato indirizzo di rete 192.168.2.0 con subnet mask 255.255.254.0, facendo così, so che il default gateway sarà 192.168.2**.1** e allora al PC che è all'interno ho assegnato l'indirizzo 192.168.2.2

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

FastEthernet0 Connection:(default port)

   Connection-specific DNS Suffix..:
   Link-local IPv6 Address.....: FE80::209:7CFF:FE24:5A13
   IPv6 Address.....: ::
   IPv4 Address.....: 192.168.2.2
   Subnet Mask.....: 255.255.254.0
   Default Gateway.....: ::
                                 192.168.2.1

Bluetooth Connection:

   Connection-specific DNS Suffix..:
   Link-local IPv6 Address.....: ::
   IPv6 Address.....: ::
   IPv4 Address.....: 0.0.0.0
   Subnet Mask.....: 0.0.0.0
   Default Gateway.....: ::
                                 0.0.0.0
```

Configurazione del pc0 che è all'interno della VLAN1

VLAN2

Alla VLAN 2, invece, ho assegnato indirizzo di rete 192.168.0.0 con subnet mask 255.255.254.0, facendo così, so che il default gateway sarà 192.168.0**.1** e allora al PC che è all'interno ho assegnato l'indirizzo 192.168.0.2

```
C:\>ipconfig

FastEthernet0 Connection:(default port)

   Connection-specific DNS Suffix..:
   Link-local IPv6 Address.....: FE80::2D0:58FF:FEEB:DA5A
   IPv6 Address.....: ::
   IPv4 Address.....: 192.168.0.2
   Subnet Mask.....: 255.255.254.0
   Default Gateway.....: ::
                                 192.168.0.1

Bluetooth Connection:

   Connection-specific DNS Suffix..:
   Link-local IPv6 Address.....: ::
   IPv6 Address.....: ::
   IPv4 Address.....: 0.0.0.0
   Subnet Mask.....: 0.0.0.0
   Default Gateway.....: ::
                                 0.0.0.0
```

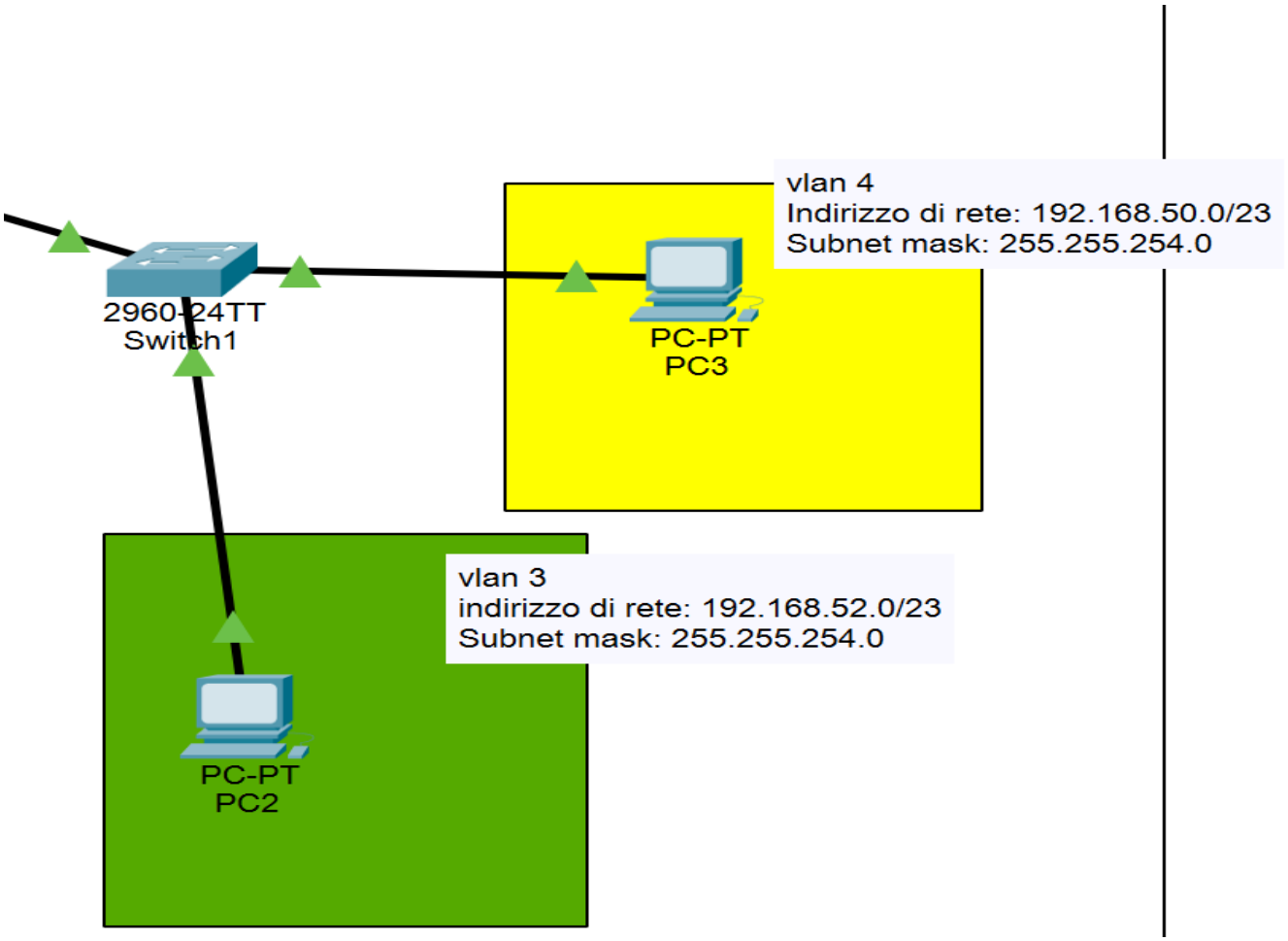
Configurazione del pc1 che è all'interno della VLAN2

Switch LAN 1

Nello switch della LAN 1 ho assegnato le prime 12 porte FastEthernet alla VLAN1 e le altre alla VLAN2

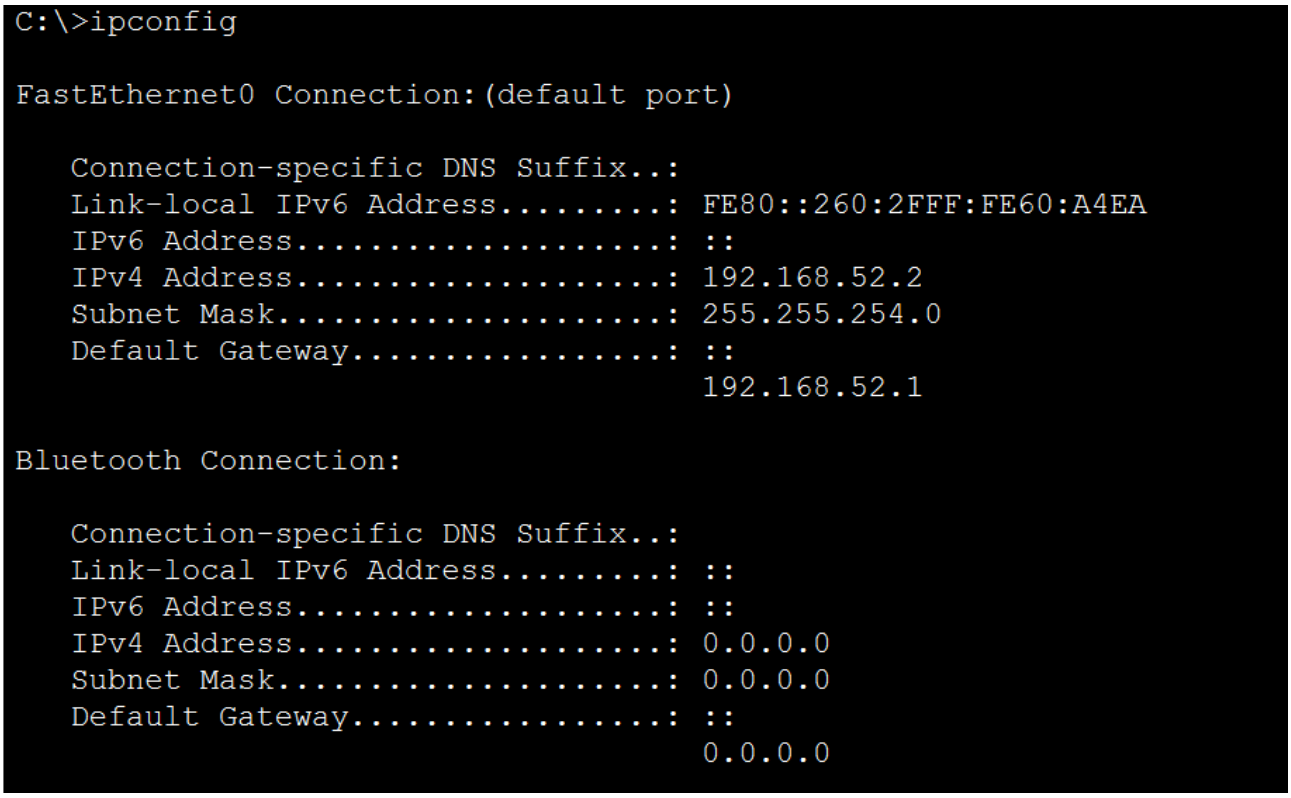
Port	Link	VLAN	IP Address	MAC Address
FastEthernet0/1	Down	2	--	00D0.5836.2701
FastEthernet0/2	Up	2	--	00D0.5836.2702
FastEthernet0/3	Down	2	--	00D0.5836.2703
FastEthernet0/4	Down	2	--	00D0.5836.2704
FastEthernet0/5	Down	2	--	00D0.5836.2705
FastEthernet0/6	Down	2	--	00D0.5836.2706
FastEthernet0/7	Down	2	--	00D0.5836.2707
FastEthernet0/8	Down	2	--	00D0.5836.2708
FastEthernet0/9	Down	2	--	00D0.5836.2709
FastEthernet0/10	Down	2	--	00D0.5836.270A
FastEthernet0/11	Down	2	--	00D0.5836.270B
FastEthernet0/12	Down	2	--	00D0.5836.270C
FastEthernet0/13	Down	3	--	00D0.5836.270D
FastEthernet0/14	Up	3	--	00D0.5836.270E
FastEthernet0/15	Down	3	--	00D0.5836.270F
FastEthernet0/16	Down	3	--	00D0.5836.2710
FastEthernet0/17	Down	3	--	00D0.5836.2711
FastEthernet0/18	Down	3	--	00D0.5836.2712
FastEthernet0/19	Down	3	--	00D0.5836.2713
FastEthernet0/20	Down	3	--	00D0.5836.2714
FastEthernet0/21	Down	3	--	00D0.5836.2715
FastEthernet0/22	Down	3	--	00D0.5836.2716
FastEthernet0/23	Down	3	--	00D0.5836.2717
FastEthernet0/24	Down	3	--	00D0.5836.2718
GigabitEthernet0/1	Up	--	--	00D0.5836.2719
GigabitEthernet0/2	Down	1	--	00D0.5836.271A

Configurazione LAN 2



VLAN 3

Alla VLAN 3 ho assegnato indirizzo di rete 192.168.52.0 con subnet mask 255.255.254.0, facendo così, so che il default gateway sarà 192.168.52**.1** e allora al PC che è all'interno ho assegnato l'indirizzo 192.168.52.2



Configurazione del pc2 che è all'interno della VLAN3

VLAN 4

Alla VLAN 3 ho assegnato indirizzo di rete 192.168.50.0 con subnet mask 255.255.254.0, facendo così, so che il default gateway sarà 192.168.50**.1** e allora al PC che è all'interno ho assegnato l'indirizzo 192.168.50.2

```
C:\>ipconfig

FastEthernet0 Connection:(default port)

   Connection-specific DNS Suffix..:
   Link-local IPv6 Address.....: FE80::2D0:BAFF:FEE7:984D
   IPv6 Address.....: ::
   IPv4 Address.....: 192.168.50.2
   Subnet Mask.....: 255.255.254.0
   Default Gateway.....: ::
                                 192.168.50.1

Bluetooth Connection:

   Connection-specific DNS Suffix..:
   Link-local IPv6 Address.....: ::
   IPv6 Address.....: ::
   IPv4 Address.....: 0.0.0.0
   Subnet Mask.....: 0.0.0.0
   Default Gateway.....: ::
                                 0.0.0.0
```

Configurazione del pc3 che è all'interno della VLAN4

Switch LAN 2

Ho fatto la stessa roba per lo switch della LAN 1 solo che le prime 12 porte le ho assegnate alla VLAN3 mentre le restanti alla VLAN 4

Port	Link	VLAN	IP Address	MAC Address
FastEthernet0/1	Down	2	--	0060.4725.0601
FastEthernet0/2	Up	2	--	0060.4725.0602
FastEthernet0/3	Down	2	--	0060.4725.0603
FastEthernet0/4	Down	2	--	0060.4725.0604
FastEthernet0/5	Down	2	--	0060.4725.0605
FastEthernet0/6	Down	2	--	0060.4725.0606
FastEthernet0/7	Down	2	--	0060.4725.0607
FastEthernet0/8	Down	2	--	0060.4725.0608
FastEthernet0/9	Down	2	--	0060.4725.0609
FastEthernet0/10	Down	2	--	0060.4725.060A
FastEthernet0/11	Down	2	--	0060.4725.060B
FastEthernet0/12	Down	2	--	0060.4725.060C
FastEthernet0/13	Up	3	--	0060.4725.060D
FastEthernet0/14	Down	3	--	0060.4725.060E
FastEthernet0/15	Down	3	--	0060.4725.060F
FastEthernet0/16	Down	3	--	0060.4725.0610
FastEthernet0/17	Down	3	--	0060.4725.0611
FastEthernet0/18	Down	3	--	0060.4725.0612
FastEthernet0/19	Down	3	--	0060.4725.0613
FastEthernet0/20	Down	3	--	0060.4725.0614
FastEthernet0/21	Down	3	--	0060.4725.0615
FastEthernet0/22	Down	3	--	0060.4725.0616
FastEthernet0/23	Down	3	--	0060.4725.0617
FastEthernet0/24	Down	3	--	0060.4725.0618
GigabitEthernet0/1	Up	--	--	0060.4725.0619
GigabitEthernet0/2	Down	1	--	0060.4725.061A

Router 0

Il router 0 è il router che connette la LAN con le proprie VLAN, collegate al router tramite uno switch, al router 1 che collega le altre 2 VLAN poste all'interno della LAN2

Ha IP: 192.168.10.1 e subnet mask 255.255.255.0

```
Device Name: Router0
Device Model: ISR4331
Hostname: Router
```

Port	Link	VLAN	IP Address	IPv6 Address	MAC Address
GigabitEthernet0/0/0	Up	--	<not set>	<not set>	0002.4AC4.9D01
GigabitEthernet0/0/0.2	Up	--	192.168.0.1/23	<not set>	0002.4AC4.9D01
GigabitEthernet0/0/0.3	Up	--	192.168.2.1/23	<not set>	0002.4AC4.9D01
GigabitEthernet0/0/1	Up	--	192.168.10.1/24	<not set>	0002.4AC4.9D02

Router 1

Il router 1, invece collega le vlan interne della LAN2 al router 0

Ha IP: 192.168.10.2 e subnet mask 255.255.255.0

```
Device Name: Router1
Device Model: ISR4331
Hostname: Router
```

Port	Link	VLAN	IP Address	IPv6 Address	MAC Address
GigabitEthernet0/0/0	Up	--	192.168.10.2/24	<not set>	00E0.B03D.3B01
GigabitEthernet0/0/1	Up	--	<not set>	<not set>	00E0.B03D.3B02
GigabitEthernet0/0/1.2	Up	--	192.168.50.1/23	<not set>	00E0.B03D.3B02
GigabitEthernet0/0/1.3	Up	--	192.168.52.1/23	<not set>	00E0.B03D.3B02

Comandi usati per le varie configurazioni

Per i pc ho usato i comandi window ipconfig di cisco packet tracer assegnando i vari IP ai vari pc delle VLAN

Per gli switch dal prompt dei comandi ho assegnato un range di porte ad ogni VLAN dividendole, utilizzando prima *name* assegnando VLAN 2 Ad una VLAN e VLAN 3 all'altra VLAN della LAN, ho usato ***interface range fa0/1-12*** e ***switchport access vlan 2*** per assegnare le porte alla VLAN 2 e ***interface range fa0/13-24*** e ***switchport access vlan 3*** per assegnare le porte alla VLAN 3, ho usato ***exit*** per uscire dalle modalità di privilegio ***wl*** per salvare il tutto.

Per collegare il router con la modalità trunk ho usato il seguente comandi sullo switch, ovviamente dopo aver spento temporaneamente la porta con ***shutdown***:

switchport trunk allowed vlan add numeroVLAN

Sul router, per garantire all'interfaccia trunk del router di poter smistare il traffico delle vlan, ho usato il comando ***interface porta.numeroVLAN*** e il comando ***ip address DG SM*** che assegna un indirizzo IP (DG = Default Gateway, SM = Subnet Mask) alla sottointerfaccia, facendo così l'indirizzo diventa il default gateway per i dispositivi nella VLAN corrispondente.

Per collegare i due router tra loro, ho deciso di utilizzare il protocollo RIP perciò ho usato i seguenti comandi per configurare le interfacce dei router:

- Sul router 0

interface GigabitEthernet0/0

ip address 192.168.2.1 255.255.254.0 (VLAN 1 DG)

ip address 192.168.0.1 255.255.254.0 (VLAN 2 DG)

no shutdown

interface GigabitEthernet0/1

ip address 192.168.10.2 255.255.255.0 (Collegamento a Router1)

no shutdown

- Sul router 1

interface GigabitEthernet0/1

ip address 192.168.50.1 255.255.254.0 (VLAN 4 DG)

ip address 192.168.52.1 255.255.254.0 (VLAN 3 DG)

no shutdown

interface GigabitEthernet0/0

ip address 192.168.10.1 255.255.255.0 (Collegamento a Router0)

no shutdown

per configurare il RIP, invece ho utilizzato questi comandi:

- Sul router 0

router rip

version 2

no auto-summary

network 192.168.2.1 255.255.254.0 (VLAN 1 DG)

network 192.168.0.1 255.255.254.0 (VLAN 2 DG)

network 192.168.10.2 # Collegamento con Router1

- Sul router 1

router rip

version 2

no auto-summary

network 192.168.50.1 255.255.254.0 (VLAN 4 DG)

network 192.168.52.1 255.255.254.0 (VLAN 3 DG)

network 192.168.10.1 # Collegamento con Router0

Screenshots dei ping verso gli altri PC da ogni PC

```
Cisco Packet Tracer PC Command Line 1.0
C:\>
C:\>ping 192.168.0.0

Pinging 192.168.0.0 with 32 bytes of data:

Reply from 192.168.2.1: bytes=32 time<1ms TTL=255
Reply from 192.168.2.1: bytes=32 time<1ms TTL=255
Reply from 192.168.2.1: bytes=32 time=13ms TTL=255
Reply from 192.168.2.1: bytes=32 time<1ms TTL=255

Ping statistics for 192.168.0.0:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 13ms, Average = 3ms

C:\>ping 192.168.52.0

Pinging 192.168.52.0 with 32 bytes of data:

Reply from 192.168.10.2: bytes=32 time<1ms TTL=254
Reply from 192.168.10.2: bytes=32 time<1ms TTL=254
Reply from 192.168.10.2: bytes=32 time<1ms TTL=254
Reply from 192.168.10.2: bytes=32 time<1ms TTL=254

Ping statistics for 192.168.52.0:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping 192.168.50.0

Pinging 192.168.50.0 with 32 bytes of data:

Reply from 192.168.10.2: bytes=32 time<1ms TTL=254
Reply from 192.168.10.2: bytes=32 time<1ms TTL=254
Reply from 192.168.10.2: bytes=32 time<1ms TTL=254
Reply from 192.168.10.2: bytes=32 time<1ms TTL=254

Ping statistics for 192.168.50.0:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

Screenshot dei ping dal PC0

```
C:\>ping 192.168.2.0

Pinging 192.168.2.0 with 32 bytes of data:

Reply from 192.168.0.1: bytes=32 time<1ms TTL=255
Reply from 192.168.0.1: bytes=32 time<1ms TTL=255
Reply from 192.168.0.1: bytes=32 time<1ms TTL=255
Reply from 192.168.0.1: bytes=32 time<1ms TTL=255

Ping statistics for 192.168.2.0:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping 192.168.52.0

Pinging 192.168.52.0 with 32 bytes of data:

Reply from 192.168.10.2: bytes=32 time<1ms TTL=254
Reply from 192.168.10.2: bytes=32 time<1ms TTL=254
Reply from 192.168.10.2: bytes=32 time<1ms TTL=254
Reply from 192.168.10.2: bytes=32 time<1ms TTL=254

Ping statistics for 192.168.52.0:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping 192.168.50.0

Pinging 192.168.50.0 with 32 bytes of data:

Reply from 192.168.10.2: bytes=32 time=24ms TTL=254
Reply from 192.168.10.2: bytes=32 time<1ms TTL=254
Reply from 192.168.10.2: bytes=32 time<1ms TTL=254
Reply from 192.168.10.2: bytes=32 time<1ms TTL=254

Ping statistics for 192.168.50.0:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 24ms, Average = 6ms
```

Screenshot dei ping dal PC1

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.168.0.0

Pinging 192.168.0.0 with 32 bytes of data:

Reply from 192.168.10.1: bytes=32 time<1ms TTL=254
Reply from 192.168.10.1: bytes=32 time<1ms TTL=254
Reply from 192.168.10.1: bytes=32 time<1ms TTL=254
Reply from 192.168.10.1: bytes=32 time<1ms TTL=254

Ping statistics for 192.168.0.0:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping 192.168.2.0

Pinging 192.168.2.0 with 32 bytes of data:

Reply from 192.168.10.1: bytes=32 time<1ms TTL=254
Reply from 192.168.10.1: bytes=32 time<1ms TTL=254
Reply from 192.168.10.1: bytes=32 time<1ms TTL=254
Reply from 192.168.10.1: bytes=32 time<1ms TTL=254

Ping statistics for 192.168.2.0:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping 192.168.50.0

Pinging 192.168.50.0 with 32 bytes of data:

Reply from 192.168.52.1: bytes=32 time<1ms TTL=255
Reply from 192.168.52.1: bytes=32 time<1ms TTL=255
Reply from 192.168.52.1: bytes=32 time<1ms TTL=255
Reply from 192.168.52.1: bytes=32 time<1ms TTL=255

Ping statistics for 192.168.50.0:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

Screenshot dei ping dal PC2

```
C:\>ping 192.168.0.0

Pinging 192.168.0.0 with 32 bytes of data:

Reply from 192.168.10.1: bytes=32 time<1ms TTL=254
Reply from 192.168.10.1: bytes=32 time<1ms TTL=254
Reply from 192.168.10.1: bytes=32 time<1ms TTL=254
Reply from 192.168.10.1: bytes=32 time<1ms TTL=254

Ping statistics for 192.168.0.0:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping 192.168.2.0

Pinging 192.168.2.0 with 32 bytes of data:

Reply from 192.168.10.1: bytes=32 time<1ms TTL=254
Reply from 192.168.10.1: bytes=32 time<1ms TTL=254
Reply from 192.168.10.1: bytes=32 time=36ms TTL=254
Reply from 192.168.10.1: bytes=32 time<1ms TTL=254

Ping statistics for 192.168.2.0:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 36ms, Average = 9ms

C:\>ping 192.168.52.0

Pinging 192.168.52.0 with 32 bytes of data:

Reply from 192.168.50.1: bytes=32 time<1ms TTL=255
Reply from 192.168.50.1: bytes=32 time<1ms TTL=255
Reply from 192.168.50.1: bytes=32 time<1ms TTL=255
Reply from 192.168.50.1: bytes=32 time<1ms TTL=255

Ping statistics for 192.168.52.0:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

Screenshot dei ping dal PC3