

## Pràctica 2 - RA3 - Configuració i administració de switches

En aquesta pràctica aplicareu els coneixements adquirits en darreres RAs respecte a la configuració bàsica d'un switch i les VLANs.

### 1. Criteris d'avaluació

La puntuació màxima assumible a cada activitat s'indica a l'enunciat respectiu.

Els criteris que es tindran en compte per avaluar el treball de l'alumnat són els següents:

- La correcció i la completesa de les respostes.
- La coherència i la bona estructuració de les respostes, així com la seva pulcritud.

### 2. Forma i data de lliurament

Un cop finalitzat la pràctica s'ha de lliurar el document al Classroom del mòdul, dins del termini establert. Tingueu en compte que el sistema no permet fer lliuraments després de la data i hora indicades.

El nom del fitxer tindrà el següent format: **"nom\_grup Pt1 370.5.pdf"**

El termini de lliurament finalitzarà a les **09:50 h** del dia **12/11/2024**.

### 3. Cas pràctic

1. Llegir el document d'ús del laboratori de xarxes. Entendre el mode normal i el mode pràctiques. (0 punts)

2. Esbrinar com reiniciar el switch gestionable del laboratori (0,5 punts)

Primerament, accedim al mode de configuració EXEC i fem un “**reload**” per reiniciar el switch.

```
Switch>EN
Switch#reload
Proceed with reload? [confirm]

*Mar 1 00:02:10.434: %SYS-5-RELOAD: Reload requested by console. Reload reason: Reload command
Boot Sector Filesystem (bs) installed, fsid: 2
Base ethernet MAC Address: 00:22:91:50:d1:80
Xmodem file system is available.
The password-recovery mechanism is enabled.
Initializing Flash...
flashfs[0]: 9 files, 1 directories
flashfs[0]: 0 orphaned files, 0 orphaned directories
flashfs[0]: Total bytes: 32514048
flashfs[0]: Bytes used: 19625984
flashfs[0]: Bytes available: 12888064
flashfs[0]: flashfs fsck took 8 seconds.
...done Initializing Flash.
done.
Loading "flash:c3560-ip-servicesk9-mz.122-55.SE1.bin"...
File "flash:c3560-ip-servicesk9-mz.122-55.SE1.bin" uncompressed and installed, entry point: 0x1000000
executing...

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/dev/ttyUSB0 9600-8-N-1
```

Un cop reiniciat el switch, ens mostra la següent pantalla.

```
Press RETURN to get started!

*Mar 1 00:01:14.063: %LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan1, changed state to up
*Mar 1 00:01:15.933: %SPANTREE-5-EXTENDED_SYSID: Extended SysId enabled for type vlan
*Mar 1 00:01:19.456: %SYS-5-CONFIG I: Configured from memory by console
*Mar 1 00:01:20.304: %SYS-5-RESTART: System restarted --
Cisco IOS Software, C3560 Software (C3560-IPSERVICESK9-M), Version 12.2(55)SE1, RELEASE SOFTWARE
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2010 by Cisco Systems, Inc.
Switch>
Compiled Thu 02-Dec-10 07:17 by prod_rel_team
*Mar 1 00:01:20.329: %SSH-5-ENABLED: SSH 1.99 has been enabled
Switch>
```

3. Feu una connexió per consola amb la utilitat del port serial (GTKTerm) i establir connexió pel port /dev/ttyUSB0 . Configureu les següents contrasenyes:
  - a. Consola: consola

Switch#show running-config

- b. Telnet: telnet

Switch#show running-config

- c. Enable secret: cisco
- d. Després des d'una màquina virtual ubicada en la màquina física accediu per telnet al dispositiu (1 punt)

#### Configuració de l'usuari Consola:

```
Switch>en
Password:
Switch#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#line con 0
Switch(config-line)#password consola
Switch(config-line)#login
```

#### “show running-config”:

```
line con 0
 password consola
 login
```

#### Configuració de l'usuari Telnet:

```
Switch#conf ter
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#line vty 0 4
Switch(config-line)#login
% Login disabled on line 1, until 'password' is set
% Login disabled on line 2, until 'password' is set
% Login disabled on line 3, until 'password' is set
% Login disabled on line 4, until 'password' is set
% Login disabled on line 5, until 'password' is set
Switch(config-line)#password telnet
Switch(config-line)#login
```

#### “show running-config”:

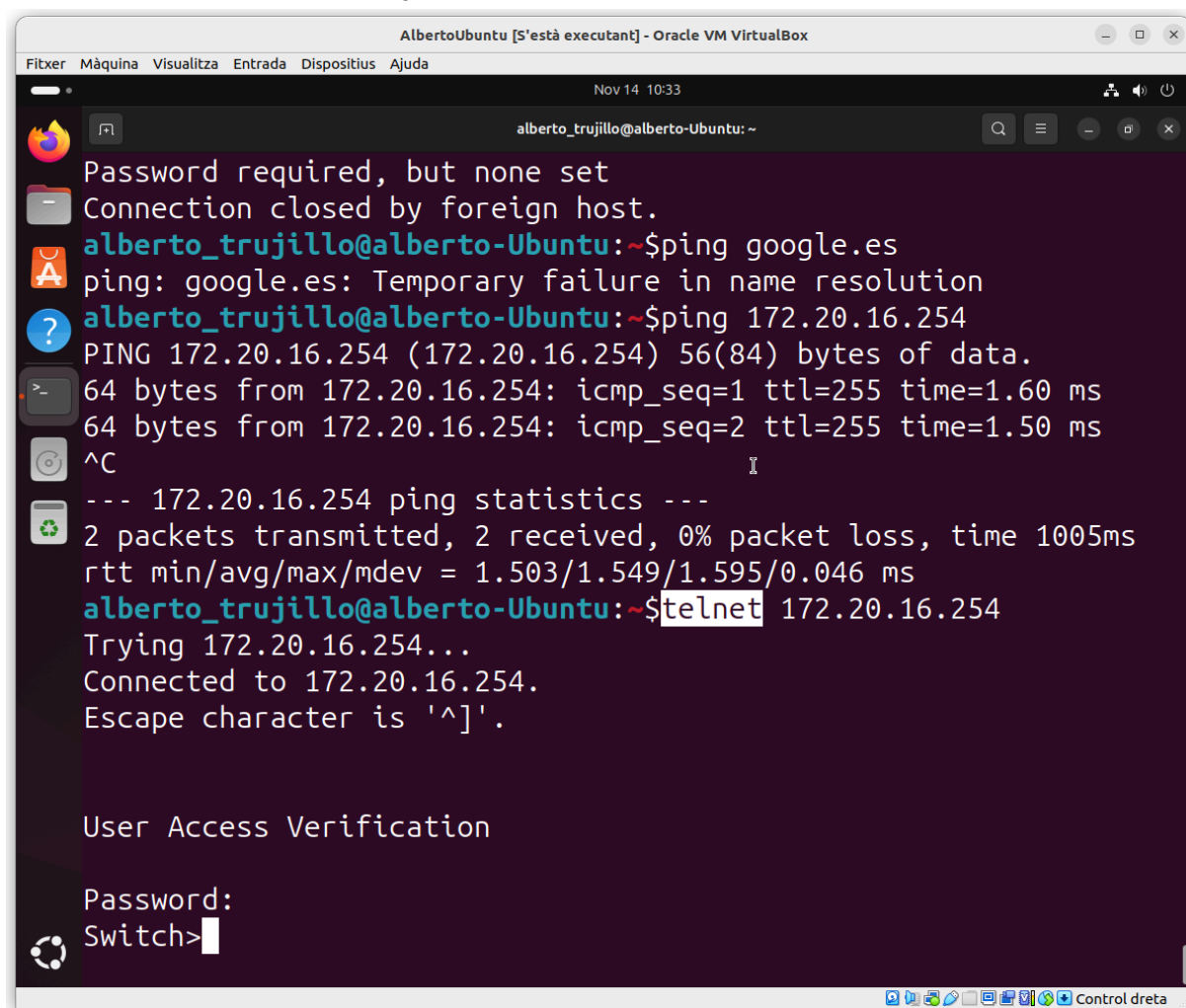
```
!
line con 0
line vty 0 4
 password telnet
 login
line vty 5 15
 login
!
end

Switch#
```

### Configuració usuari Cisco:

```
Switch#conf ter
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#ena
Switch(config)#enable se
Switch(config)#enable secret cisc
Switch(config)#enable secret cisco
Switch(config)#exit
Switch#dis
*Mar 1 00:05:41.961: %SYS-5-CONFIG_I: Configured from console by conso
% Ambiguous command: "d"
Switch#disable
Switch>enable
Password:
Switch#
```

### Accés a la maquina fisica mitjançant Telnet:



```
AlbertoUbuntu [S'està executant] - Oracle VM VirtualBox
Fitxer Màquina Visualitza Entrada Dispositius Ajuda
Nov 14 10:33
alberto_trujillo@alberto-Ubuntu: ~
Password required, but none set
Connection closed by foreign host.
alberto_trujillo@alberto-Ubuntu:~$ping google.es
ping: google.es: Temporary failure in name resolution
alberto_trujillo@alberto-Ubuntu:~$ping 172.20.16.254
PING 172.20.16.254 (172.20.16.254) 56(84) bytes of data.
64 bytes from 172.20.16.254: icmp_seq=1 ttl=255 time=1.60 ms
64 bytes from 172.20.16.254: icmp_seq=2 ttl=255 time=1.50 ms
^C
--- 172.20.16.254 ping statistics ---
2 packets transmitted, 2 received, 0% packet loss, time 1005ms
rtt min/avg/max/mdev = 1.503/1.549/1.595/0.046 ms
alberto_trujillo@alberto-Ubuntu:~$telnet 172.20.16.254
Trying 172.20.16.254...
Connected to 172.20.16.254.
Escape character is '^]'.

User Access Verification

Password:
Switch>
```

4. Amb 2 màquines virtuals (una a cada màquina física connectada al switch) verifiqueu si tenen connectivitat depenen de la subxarxa a on estan configurades les màquines virtuals. Demostrar les 2 opcions (mateixa subxarxa i diferent subxarxa) (1 punt)

Primerament fem la interface G0/1 i G0/2 en la mateixa vlan.

```
!
interface GigabitEthernet0/1
 switchport access vlan 10
 switchport mode access
!

interface GigabitEthernet0/2
 switchport access vlan 10
 switchport mode access
!
```

Fem ping entre les dues màquines i ens funciona.

```
Thu Nov 14 10:43:10 aritz-ortega@aritz-ubuntu:~$ ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
        valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host noprefixroute
        valid_lft forever preferred_lft forever
2: enp0s3: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP group default qlen 1000
    link/ether 08:00:27:9b:45:79 brd ff:ff:ff:ff:ff:ff
    inet 172.20.16.252/24 brd 172.20.16.255 scope global noprefixroute enp0s3
        valid_lft forever preferred_lft forever
    inet6 fe80::662c:f144:e6ce:dcd6/64 scope link noprefixroute
        valid_lft forever preferred_lft forever
Thu Nov 14 10:43:15 aritz-ortega@aritz-ubuntu:~$ ping 172.20.16.254
PING 172.20.16.254 (172.20.16.254) 56(84) bytes of data:
64 bytes from 172.20.16.254: icmp_seq=2 ttl=255 time=1.42 ms
64 bytes from 172.20.16.254: icmp_seq=3 ttl=255 time=2.45 ms
64 bytes from 172.20.16.254: icmp_seq=4 ttl=255 time=4.30 ms
64 bytes from 172.20.16.254: icmp_seq=5 ttl=255 time=2.79 ms
^C
--- 172.20.16.254 ping statistics ---
5 packets transmitted, 4 received, 20% packet loss, time 4088ms
rtt min/avg/max/mdev = 1.419/2.739/4.298/1.031 ms
Thu Nov 14 10:43:35 aritz-ortega@aritz-ubuntu:~$ ping 172.20.16.228
PING 172.20.16.228 (172.20.16.228) 56(84) bytes of data:
64 bytes from 172.20.16.228: icmp_seq=1 ttl=64 time=1.44 ms
64 bytes from 172.20.16.228: icmp_seq=2 ttl=64 time=1.23 ms
64 bytes from 172.20.16.228: icmp_seq=3 ttl=64 time=1.28 ms
^C
--- 172.20.16.228 ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2041ms
rtt min/avg/max/mdev = 1.230/1.317/1.440/0.089 ms
Thu Nov 14 10:43:49 aritz-ortega@aritz-ubuntu:~$
```

Ara, canviem la interface G0/2 a la vlan 20.

```
interface GigabitEthernet0/1
  switchport access vlan 10
  switchport mode access
!
interface GigabitEthernet0/2
  switchport access vlan 20
  switchport mode access
!
```

Si provem a fer ping, ens mostra que no es pot arribar a la xarxa.

```
Thu Nov 21 09:03:45 aritz-ortega@aritz-ubuntu:~$ ping 10.10.10.80
ping: connect: Network is unreachable
Thu Nov 21 09:06:29 aritz-ortega@aritz-ubuntu:~$
```



[08]

5. Configurar la seguretat del port per un equip de la subxarxa C i verificar el funcionament per fer shutdown en cas de connexió d'un altre equip utilitzant les 2 màquines virtuals anteriors (1 punt)

Configurem el port-security, apliquem el mac-address en mode sticky perquè emmagatzemi la MAC del primer dispositiu connectat automàticament fins que la eliminis manualment. A més fem un “**switchport port-security maximum 1**” i un “**switchport port-security violation shutdown**” perquè només agafi una MAC.

```
interface GigabitEthernet0/2
switchport access vlan 20
switchport mode access
switchport port-security
switchport port-security mac-address sticky
switchport port-security mac-address sticky 0800.279b.4579 vlan access
```

```
Thu Nov 21 09:11:59 aritz-ortega@aritz-ubuntu:~$ ping 10.10.10.228
PING 10.10.10.228 (10.10.10.228) 56(84) bytes of data.
64 bytes from 10.10.10.228: icmp_seq=2 ttl=255 time=1.20 ms
64 bytes from 10.10.10.228: icmp_seq=3 ttl=255 time=2.07 ms
64 bytes from 10.10.10.228: icmp_seq=4 ttl=255 time=3.20 ms
64 bytes from 10.10.10.228: icmp_seq=5 ttl=255 time=1.67 ms
64 bytes from 10.10.10.228: icmp_seq=6 ttl=255 time=2.75 ms
64 bytes from 10.10.10.228: icmp_seq=7 ttl=255 time=2.16 ms
64 bytes from 10.10.10.228: icmp_seq=8 ttl=255 time=1.37 ms
64 bytes from 10.10.10.228: icmp_seq=9 ttl=255 time=2.92 ms
^C
--- 10.10.10.228 ping statistics ---
9 packets transmitted, 8 received, 11.1111% packet loss, time 8089ms
rtt min/avg/max/mdev = 1.199/2.167/3.199/0.688 ms
Thu Nov 21 09:12:14 aritz-ortega@aritz-ubuntu:~$
```

Un cop agafa una MAC, si accedim desde un altre dispositiu no ens deixa fer ping.

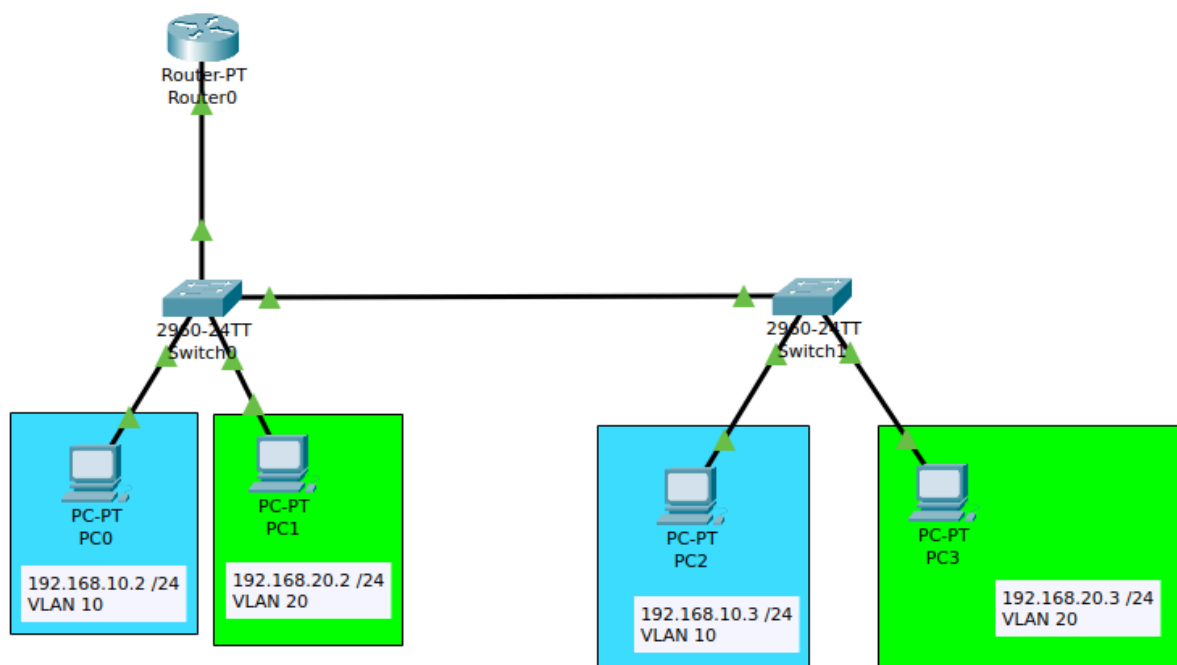
```
Thu Nov 21 09:03:45 aritz-ortega@aritz-ubuntu:~$ ping 10.10.10.80
ping: connect: Network is unreachable
Thu Nov 21 09:06:29 aritz-ortega@aritz-ubuntu:~$
```

I si cerquem el port-security ens surt que el contador del violation al port Gi0/2 ha augmentat a 1.

```

G3#sh port-security
Secure Port  MaxSecureAddr  CurrentAddr  SecurityViolation  Security Action
              (Count)        (Count)        (Count)
-----
      Gi0/2           1           1           1           Shutdown
-----
Total Addresses in System (excluding one mac per port)  : 0
Max Addresses limit in System (excluding one mac per port) : 6144
G3#
G3#
G3#sh ip int bri
G3#sh ip int brief
Interface                IP-Address      OK? Method Status      Protocol
Vlan1                    unassigned      YES NVRAM   up          down
Vlan10                   10.10.10.228    YES manual  up          down
Vlan20                   10.10.20.228    YES manual  up          down
GigabitEthernet0/1       unassigned      YES unset   down        down
GigabitEthernet0/2       unassigned      YES unset   down        down
    
```

6. Fes un escenari final, amb dos switches i un router, fent servir el mode d'accés i el mode trunk. Aquest escenari ha de tenir un total de 4 PCs, en dues subxarxes diferents, i cada switch ha de tenir dos PCs. Per aquest apartat has de lliurar:
  - a. Esquema de xarxa (pots fer servir packet tracer) (1 punt)





- b. Pla d'adreçament que has fet servir i esquemes de VLANs (1 punt)

	VLAN 10	VLAN 20
IP de la subxarxa	192.168.10.0	192.168.20.0
Gateway	192.168.10.1	192.168.20.1
Dispositius	PC0: 192.168.10.2 PC2: 192.168.10.3	PC1: 192.168.20.2 PC3: 192.168.20.3

- c. Configuració dels switches i dels PCs. Adjuntar els fitxers de configuració pels switches, en el cas dels PCs una foto de la seva configuració. (1,5 punts)

[router](#)  
[switch1](#)  
[switch2](#)

```
Device Name: PC0
Device Model: PC-PT

Port      Link  IP Address      IPv6 Address      MAC Address
FastEthernet0  Up    192.168.10.2/24 <not set>         000C.CFB6.8DD4
Bluetooth   Down  <not set>        <not set>         00E0.8FC6.BB78

Gateway: 192.168.10.1
DNS Server: <not set>
Line Number: <not set>

Physical Location: Intercity > Home City > Corporate Office > PC0
```

```
Device Name: PC1
Device Model: PC-PT

Port      Link  IP Address      IPv6 Address      MAC Address
FastEthernet0  Up    192.168.20.2/24 <not set>         00D0.BAC0.0055
Bluetooth   Down  <not set>        <not set>         00D0.FF2C.5D23

Gateway: 192.168.20.1
DNS Server: <not set>
Line Number: <not set>

Physical Location: Intercity > Home City > Corporate Office > PC1
```

```
Device Name: PC2
Device Model: PC-PT

Port      Link  IP Address      IPv6 Address      MAC Address
FastEthernet0  Up    192.168.10.3/24 <not set>         00E0.B05C.DD47
Bluetooth   Down  <not set>        <not set>         00D0.58EA.DBDB

Gateway: <not set>
DNS Server: <not set>
Line Number: <not set>

Physical Location: Intercity > Home City > Corporate Office > PC2
```

```
Device Name: PC3
Device Model: PC-PT

Port      Link  IP Address      IPv6 Address      MAC Address
FastEthernet0  Up    192.168.20.3/24 <not set>         0001.96A5.D850
Bluetooth   Down  <not set>        <not set>         000C.852D.AEE2

Gateway: <not set>
DNS Server: <not set>
Line Number: <not set>

Physical Location: Intercity > Home City > Corporate Office > PC3
```

- d. Captures que demostrí que hi ha connectivitat en equips que pertanyen a la mateixa xarxa, (0,5 punts)

192.168.10.0:

```
C:\>ipconfig

FastEthernet0 Connection:(default port)

    Connection-specific DNS Suffix...:
    Link-local IPv6 Address . . . . .: FE80::20C:CFFF:FEB6:8DD4
    IPv6 Address . . . . .: ::
    IPv4 Address . . . . .: 192.168.10.2
    Subnet Mask . . . . .: 255.255.255.0
    Default Gateway . . . . .: ::
                                   192.168.10.1

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

C:\>ping 192.168.10.3

Pinging 192.168.10.3 with 32 bytes of data:

Reply from 192.168.10.3: bytes=32 time<1ms TTL=128
Reply from 192.168.10.3: bytes=32 time<1ms TTL=128
Reply from 192.168.10.3: bytes=32 time<1ms TTL=128
Reply from 192.168.10.3: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.10.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>
```

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

FastEthernet0 Connection:(default port)

    Connection-specific DNS Suffix...:
    Link-local IPv6 Address . . . . .: FE80::2E0:B0FF:FE5C:DD47
    IPv6 Address . . . . .: ::
    IPv4 Address . . . . .: 192.168.10.3
    Subnet Mask . . . . .: 255.255.255.0
    Default Gateway . . . . .: ::
                                0.0.0.0

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

C:\>ping 192.168.10.2

Pinging 192.168.10.2 with 32 bytes of data:

Reply from 192.168.10.2: bytes=32 time=29ms TTL=128
Reply from 192.168.10.2: bytes=32 time=25ms TTL=128
Reply from 192.168.10.2: bytes=32 time<1ms TTL=128
Reply from 192.168.10.2: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.10.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 29ms, Average = 13ms

C:\>
```

**192.168.20.0:**

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

FastEthernet0 Connection:(default port)

    Connection-specific DNS Suffix...:
    Link-local IPv6 Address . . . . .: FE80::2D0:BAFF:FEC0:55
    IPv6 Address . . . . .: ::
    IPv4 Address . . . . .: 192.168.20.2
    Subnet Mask . . . . .: 255.255.255.0
    Default Gateway . . . . .: ::
                                192.168.20.1

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

C:\>ping 192.168.20.3

Pinging 192.168.20.3 with 32 bytes of data:

Reply from 192.168.20.3: bytes=32 time=6ms TTL=128
Reply from 192.168.20.3: bytes=32 time<1ms TTL=128
Reply from 192.168.20.3: bytes=32 time<1ms TTL=128
Reply from 192.168.20.3: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.20.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 6ms, Average = 1ms

C:\>
```

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

FastEthernet0 Connection:(default port)

    Connection-specific DNS Suffix...:
    Link-local IPv6 Address . . . . .: FE80::201:96FF:FEA5:D850
    IPv6 Address . . . . .: ::
    IPv4 Address . . . . .: 192.168.20.3
    Subnet Mask . . . . .: 255.255.255.0
    Default Gateway . . . . .: ::
                                0.0.0.0

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

C:\>ping 192.168.20.2

Pinging 192.168.20.2 with 32 bytes of data:

Reply from 192.168.20.2: bytes=32 time<1ms TTL=128
Reply from 192.168.20.2: bytes=32 time<1ms TTL=128
Reply from 192.168.20.2: bytes=32 time<1ms TTL=128
Reply from 192.168.20.2: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.20.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>|
```

- e. Memòria del document, amb bona redacció i presentació. (2,5 punts)

