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Ejercicio 1 (30%) - Configuración de dispositivos

Ha habido un incendio en una de las PYME cliente de la consultora que te tiene contratado. En lo que respecta a la red, se han quemado todos los equipos/instalaciones y lo único que se ha podido salvar ha sido la siguiente tabla de direccionamiento:

Dispositivo	Interfaz	Dirección IP	Máscara de subred
R1	Fa0/0	172.16.1.17	255.255.255.240
	S0/0/0	192.168.10.1	255.255.255.252
	S0/0/1	192.168.10.5	255.255.255.252
	Lo0	10.1.1.1	255.255.255.255
R2	Fa0/0	10.10.10.1	255.255.255.0
	S0/0/0	192.168.10.2	255.255.255.252
	S0/0/1	192.168.10.9	255.255.255.252
	Lo0	10.2.2.2	255.255.255.255
R3	Fa0/0	172.16.1.33	255.255.255.248
	S0/0/0	192.168.10.6	255.255.255.252
	S0/0/1	192.168.10.10	255.255.255.252
	Lo0	10.3.3.3	255.255.255.255
PC1	NIC	172.16.1.30	255.255.255.240
PC2	NIC	10.10.10.254	255.255.255.0
PC3	NIC	172.16.1.38	255.255.255.248

1 - Configurar los dispositivos

Tenemos 3 routers, R1, R2 y R3 ## R1
int g0/0 ip address 172.16.1.17 255.255.255.240
int s0/1/0 ip address 192.168.10.1 255.255.255.252
int s0/1/1 ip address 192.168.10.5 255.255.255.252
int lo0 ip address 10.1.1.1 255.255.255.255

R2

int g0/0 ip address 10.10.10.1 255.255.255.0
int s0/1/0 ip address 192.168.10.2 255.255.255.252
int s0/1/1 ip address 192.168.10.9 255.255.255.252
int lo0 ip address 10.2.2.2 255.255.255.255

R3

int g0/0 ip address 172.16.1.33 255.255.255.248
int s0/1/0 ip address 192.168.10.6 255.255.255.252
int s0/1/1 ip address 192.168.10.10 255.255.255.252
int lo0 ip address 10.3.3.3 255.255.255.255

PC1

int nic ip address 172.16.1.30 255.255.255.240

PC2

int nic ip address 10.10.10.254 255.255.255.0

PC3

int nic ip address 172.16.1.38 255.255.255.248

Implementar OSPF

OSPF (Open shortest path first) es un protocolo de routing de estado de enlace desarrollado como alternativa del protocolo de routing por vector de distancias, RIP.

R1

router ospf 10 network 192.168.10.1 0.0.0.3 area 0 network 192.168.10.5 0.0.0.3 area 0
network 172.16.1.17 0.0.0.15 area 0 network 10.1.1.1 0.0.0.0 area 0

R2

```
router ospf 10 network 10.10.10.1 0.0.0.255 area 0 network 192.168.10.2 0.0.0.3 area 0
network 192.168.10.9 0.0.0.3 area 0 network 10.2.2.2 0.0.0.0 area 0
```

R3

```
router ospf 10 network 172.16.1.33 0.0.0.7 area 0 network 192.168.10.6 0.0.0.3 area 0
network 192.168.10.10 0.0.0.3 area 0 network 10.3.3.3 0.0.0.0 area 0
```

Verificación

Para verificar, vamos a ejecutar los siguientes comandos en los 3 routers:

```
show ip route ospf
show ip ospf neighbor
show ip interface brief
```

En el router1:

```
Router#show ip interface brief
Interface      IP-Address      OK? Method Status      Protocol
GigabitEthernet0/0  172.16.1.17    YES manual up          up
GigabitEthernet0/1  unassigned     YES unset  administratively down down
Serial0/1/0        192.168.10.1   YES manual up          up
Serial0/1/1        192.168.10.5   YES manual up          up
Loopback0         10.1.1.1       YES manual up          up
Vlan1             unassigned     YES unset  administratively down down

Router#show ip ospf neighbor

Neighbor ID     Pri   State           Dead Time   Address        Interface
10.3.3.3         0    FULL/-         00:00:31    192.168.10.6   Serial0/1/1
10.2.2.2         0    FULL/-         00:00:35    192.168.10.2   Serial0/1/0
Router#
```

Ctrl+F6 to exit CLI focus


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☐ Top

```
Router#show ip route ospf
      10.0.0.0/8 is variably subnetted, 4 subnets, 2 masks
O       10.2.2.2 [110/65] via 192.168.10.2, 00:13:55, Serial0/1/0
O       10.3.3.3 [110/65] via 192.168.10.6, 00:13:55, Serial0/1/1
O       10.10.10.0 [110/65] via 192.168.10.2, 00:13:55,
Serial0/1/0
      172.16.0.0/16 is variably subnetted, 3 subnets, 3 masks
O       172.16.1.32 [110/65] via 192.168.10.6, 00:13:55,
Serial0/1/1
      192.168.10.0/24 is variably subnetted, 5 subnets, 2 masks
O       192.168.10.8 [110/128] via 192.168.10.2, 00:13:55,
Serial0/1/0
                                   [110/128] via 192.168.10.6, 00:13:55,
Serial0/1/1
Router#
```

En el router2:

 R2

PhysicalConfigCLIAttributes

IOS Command Line Interface

```
Router>en
Router#show ip ospf neighbor

Neighbor ID      Pri   State           Dead Time   Address
Interface
10.1.1.1          0    FULL/  -        00:00:38    192.168.10.1
Serial0/1/0
10.3.3.3          0    FULL/  -        00:00:35    192.168.10.10
Serial0/1/1
Router#show ip interface brief
Interface          IP-Address      OK? Method Status
Protocol
GigabitEthernet0/0  10.10.10.1      YES manual up
up
GigabitEthernet0/1  unassigned      YES unset
administratively down down
Serial0/1/0         192.168.10.2    YES manual up
up
Serial0/1/1         192.168.10.9    YES manual up
up
Loopback0           10.2.2.2        YES manual up
up
Loopback1           unassigned      YES unset  up
up
Vlan1               unassigned      YES unset
administratively down down
Router#
```

Ctrl+F6 to exit CLI focus

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☐ Top

```
Router#show ip route ospf
  10.0.0.0/8 is variably subnetted, 5 subnets, 2 masks
O   10.1.1.1 [110/65] via 192.168.10.1, 00:12:48, Serial0/1/0
O   10.3.3.3 [110/65] via 192.168.10.10, 00:12:48, Serial0/1/1
  172.16.0.0/16 is variably subnetted, 2 subnets, 2 masks
O   172.16.1.16 [110/65] via 192.168.10.1, 00:12:48, Serial0/1/0
O   172.16.1.32 [110/65] via 192.168.10.10, 00:12:48, Serial0/1/1
  192.168.10.0/24 is variably subnetted, 5 subnets, 2 masks
O   192.168.10.4 [110/128] via 192.168.10.10, 00:12:48, Serial0/1/1
    [110/128] via 192.168.10.1, 00:12:48, Serial0/1/0
Router#
```

En el router3:

Router7

Physical

Config

CLI

Attributes

IOS Command Line Interface

Router#

%SYS-5-CONFIG_I: Configured from console by console

Router#show ip ospf neighbor

Neighbor ID	Pri	State	Dead Time	Address
Interface				
10.1.1.1	0	FULL/ -	00:00:32	192.168.10.5
Serial0/1/0				
10.2.2.2	0	FULL/ -	00:00:34	192.168.10.9
Serial0/1/1				

Router#show ip interface brief

Interface	IP-Address	OK?	Method	Status
Protocol				
GigabitEthernet0/0	172.16.1.33	YES	manual	up
up				
GigabitEthernet0/1	unassigned	YES	unset	
administratively down	down			
Serial0/1/0	192.168.10.6	YES	manual	up
up				
Serial0/1/1	192.168.10.10	YES	manual	up
up				
Loopback0	10.3.3.3	YES	manual	up
up				
Vlan1	unassigned	YES	unset	
administratively down	down			

Router#

Ctrl+F6 to exit CLI focus

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Router#show ip route ospf

10.0.0.0/8 is variably subnetted, 4 subnets, 2 masks

O 10.1.1.1 [110/65] via 192.168.10.5, 00:13:34, Serial0/1/0

O 10.2.2.2 [110/65] via 192.168.10.9, 00:13:34, Serial0/1/1

O 10.10.10.0 [110/65] via 192.168.10.9, 00:13:34, Serial0/1/1

172.16.0.0/16 is variably subnetted, 3 subnets, 3 masks

O 172.16.1.16 [110/65] via 192.168.10.5, 00:13:34, Serial0/1/0

192.168.10.0/24 is variably subnetted, 5 subnets, 2 masks

O 192.168.10.0 [110/128] via 192.168.10.9, 00:13:34, Serial0/1/1

[110/128] via 192.168.10.5, 00:13:34, Serial0/1/0

Router#

Ctrl+F6 to exit CLI focus

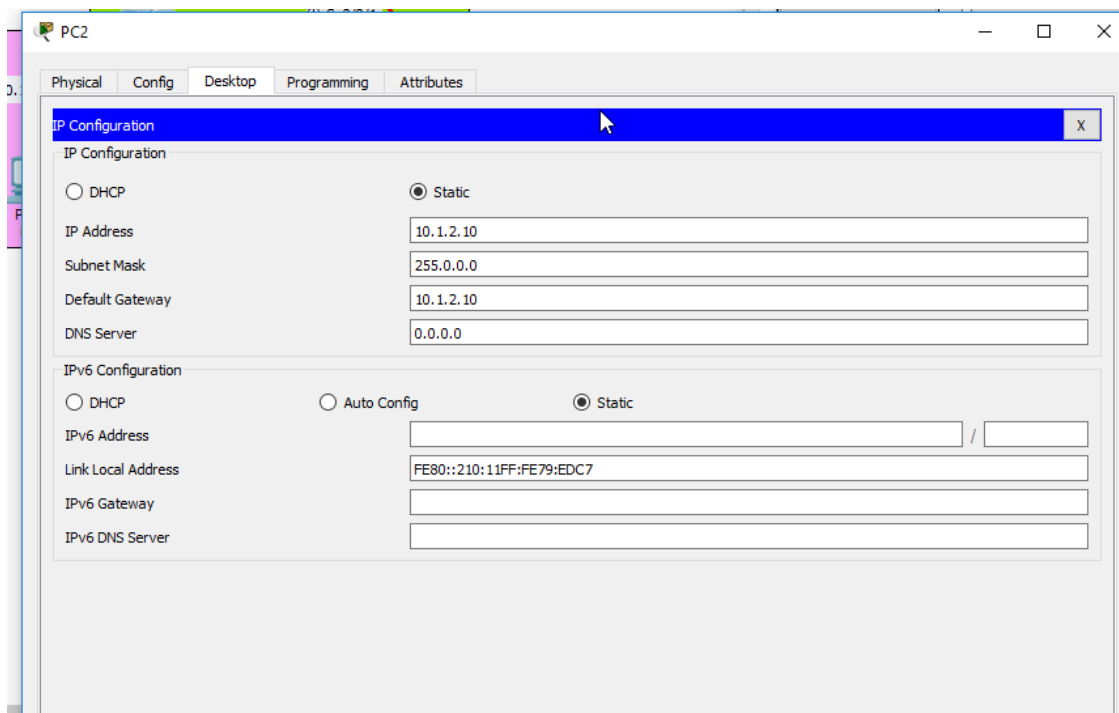
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Ejercicio 2 (30%) - Troubleshooting

Ejercicio 2 troubleshooting

La primera prueba que realizamos es hacer ping desde el PC2 al PC1. La realiza bien. Pero vemos que no la gateway IP es 10.1.2.10. Esta mal, tiene que ser 10.1.2.1. Checkeamos los otros PC, y tienen las ips y gateways correctas.



image

Vamos a intentar hacer ping del PC2 R2 (192.168.10.2). No podemos, sin embargo, si que podemos acceder al 192.168.10.1, que es la salida de R1, por lo que hay algo mal ahí.

```
C:\>ping 192.168.10.1

Pinging 192.168.10.1 with 32 bytes of data:

Reply from 192.168.10.1: bytes=32 time<1ms TTL=255
Reply from 192.168.10.1: bytes=32 time<1ms TTL=255
Reply from 192.168.10.1: bytes=32 time<1ms TTL=255
Reply from 192.168.10.1: bytes=32 time<1ms TTL=255

Ping statistics for 192.168.10.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping 192.168.10.2

Pinging 192.168.10.2 with 32 bytes of data:
```

Vamos a ver la configuracion del OSPF de los routers

El R1 no tiene neighbor:

```
Router#show ip ospf neighbor
Router#
```

Ctrl+F6 to exit CLI focus

Copy Paste

image

El R2 si que lo tiene:

```
Router#show ip ospf neighbor

Neighbor ID    Pri   State           Dead Time   Address
Interface
3.3.3.3        0     FULL/ -         00:00:31   192.168.10.6
Serial0/0/1
Router#
```

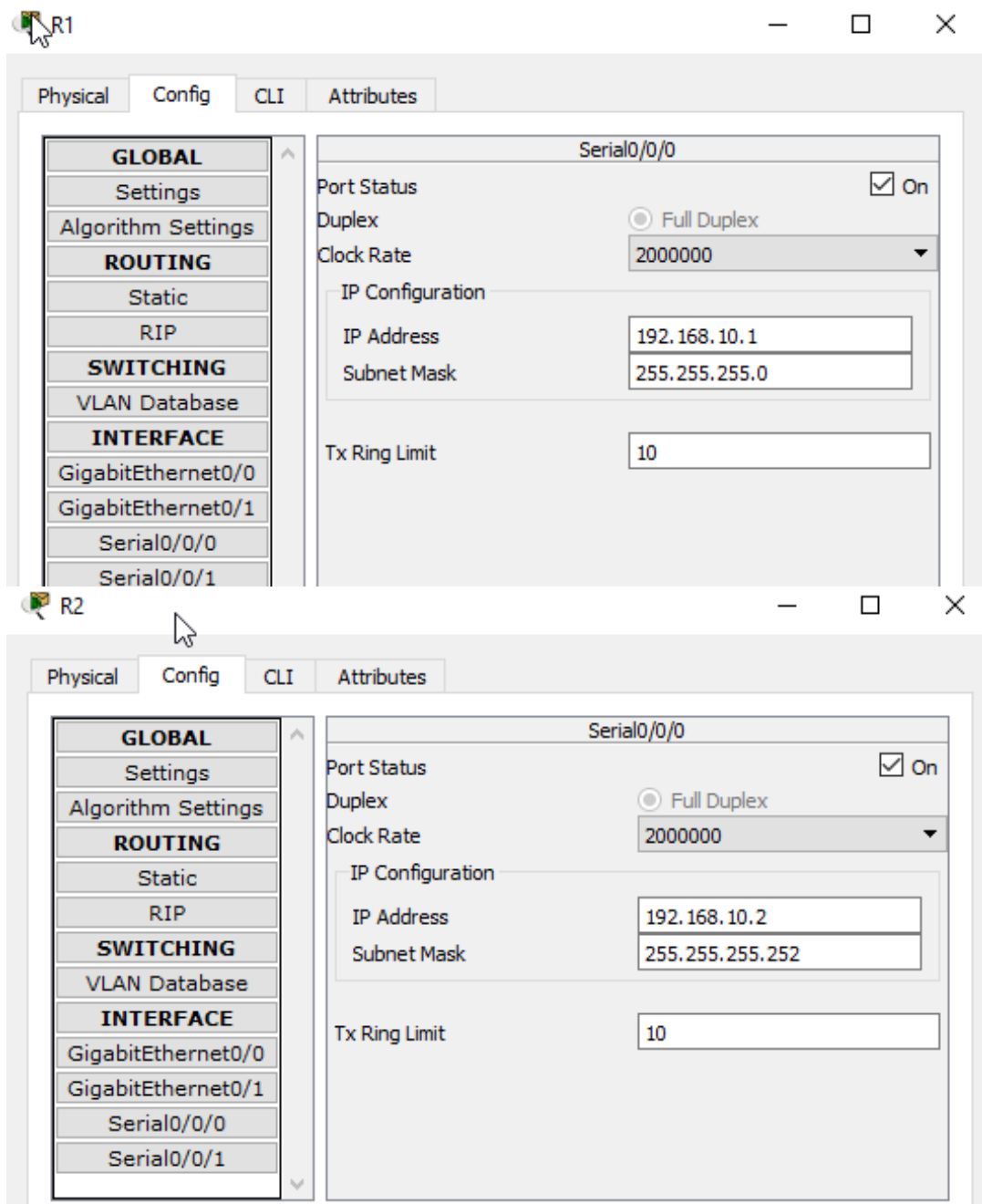
Ctrl+F6 to exit CLI focus

Copy Paste

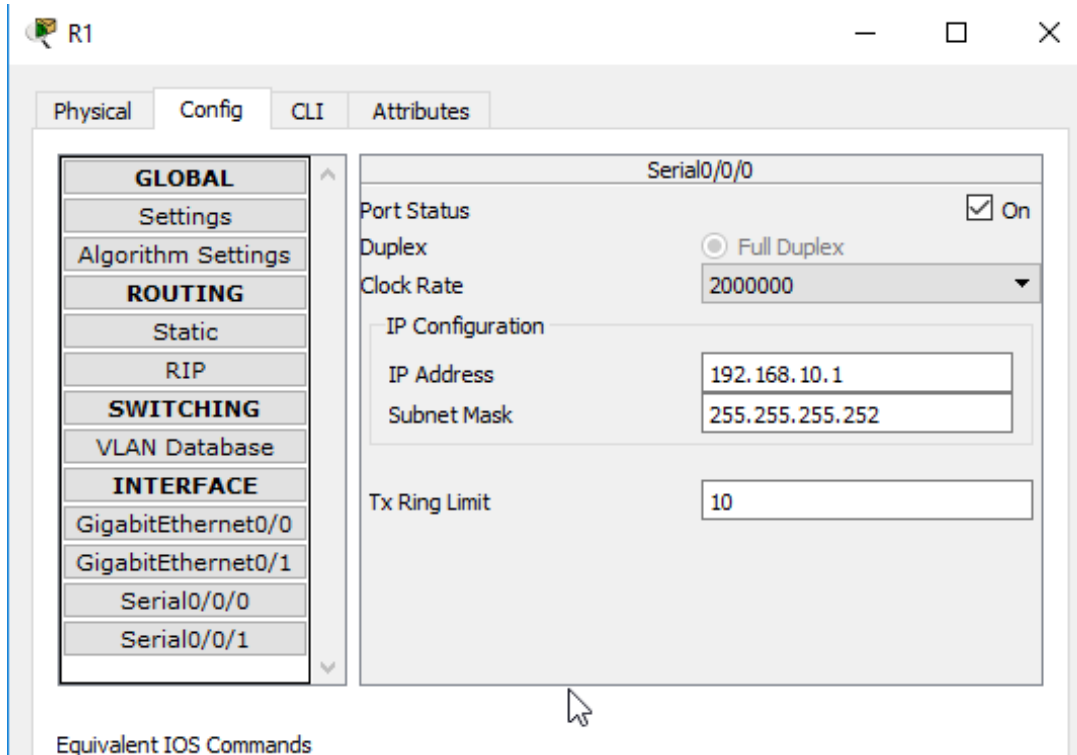
☐ Top

image

Por lo que hay que arreglar la configuracion OSPF. Pero antes vemos que R1 tiene diferente mascara de subred que R2:



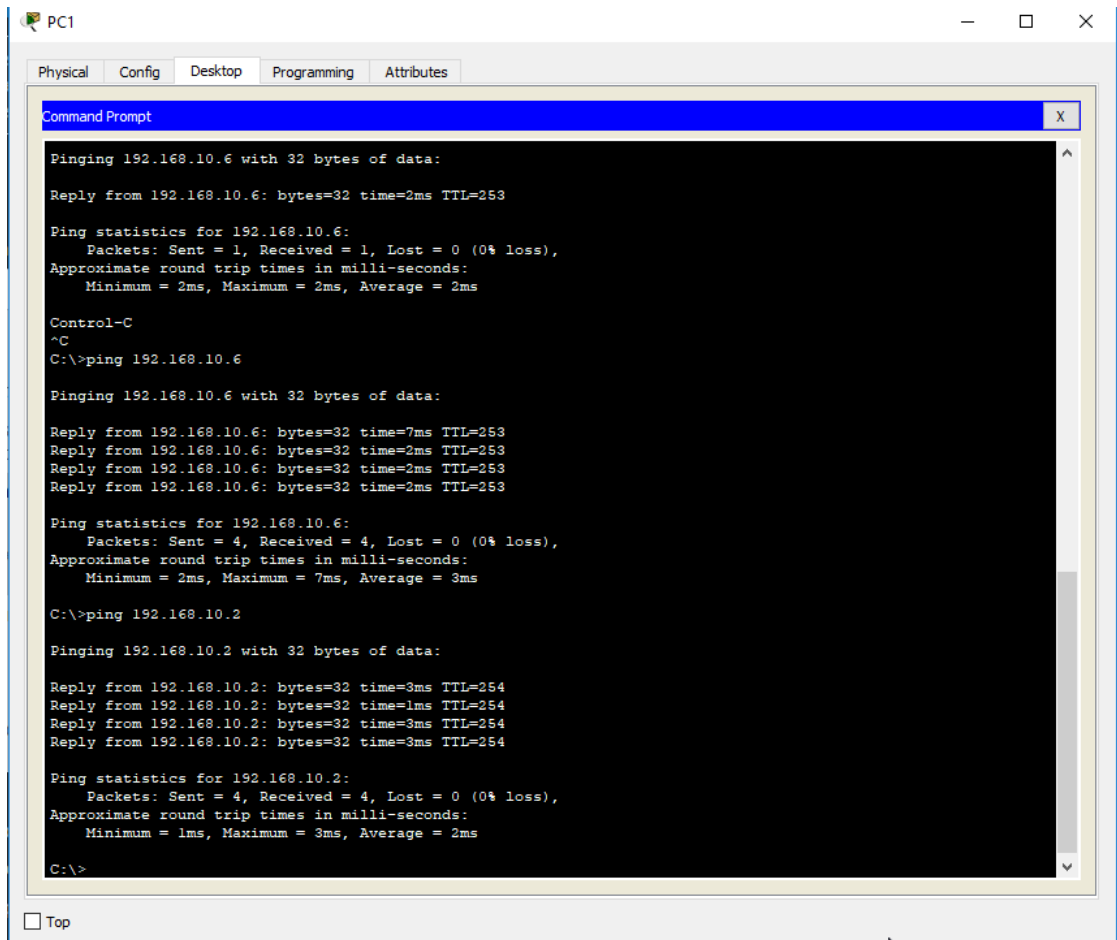
Como la red es de CIDR 30 la subnet mask tiene que ser 255.255.255.252



image

Y ya se configuro: `router ospf 10 network 192.168.10.1 0.0.0.3 area 0`

Ahora vamos a probar si podemos hacer ping desde el PC1:



The screenshot shows a Windows PC1 interface with a Command Prompt window open. The window has tabs for Physical, Config, Desktop, Programming, and Attributes. The Command Prompt displays the results of two ping commands. The first command is 'ping 192.168.10.6', which shows a successful ping with 32 bytes of data, a time of 2ms, and a TTL of 253. The second command is 'ping 192.168.10.2', which also shows a successful ping with 32 bytes of data, a time of 3ms, and a TTL of 254. The Command Prompt window is titled 'Command Prompt' and has a close button (X) in the top right corner. The PC1 window has a title bar with a minimize button, a maximize button, and a close button (X). The PC1 window also has a 'Top' button in the bottom left corner.

```
PC1
Physical Config Desktop Programming Attributes
Command Prompt
X

Pinging 192.168.10.6 with 32 bytes of data:

Reply from 192.168.10.6: bytes=32 time=2ms TTL=253

Ping statistics for 192.168.10.6:
    Packets: Sent = 1, Received = 1, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 2ms, Maximum = 2ms, Average = 2ms

Control-C
^C
C:\>ping 192.168.10.6

Pinging 192.168.10.6 with 32 bytes of data:

Reply from 192.168.10.6: bytes=32 time=7ms TTL=253
Reply from 192.168.10.6: bytes=32 time=2ms TTL=253
Reply from 192.168.10.6: bytes=32 time=2ms TTL=253
Reply from 192.168.10.6: bytes=32 time=2ms TTL=253

Ping statistics for 192.168.10.6:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 2ms, Maximum = 7ms, Average = 3ms

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=3ms TTL=254
Reply from 192.168.10.2: bytes=32 time=1ms TTL=254
Reply from 192.168.10.2: bytes=32 time=3ms TTL=254
Reply from 192.168.10.2: bytes=32 time=3ms TTL=254

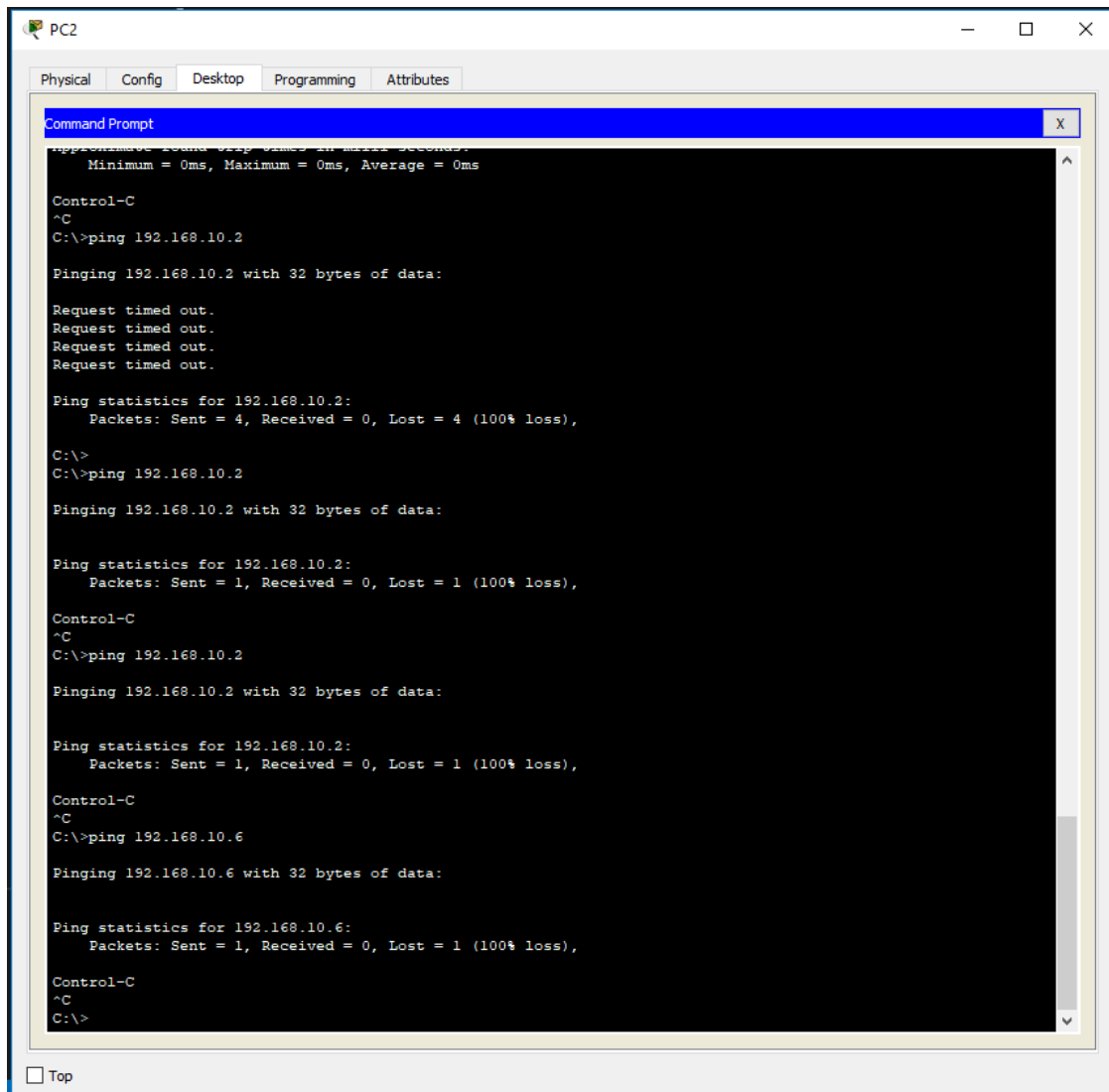
Ping statistics for 192.168.10.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 3ms, Average = 2ms

C:\>
```

image

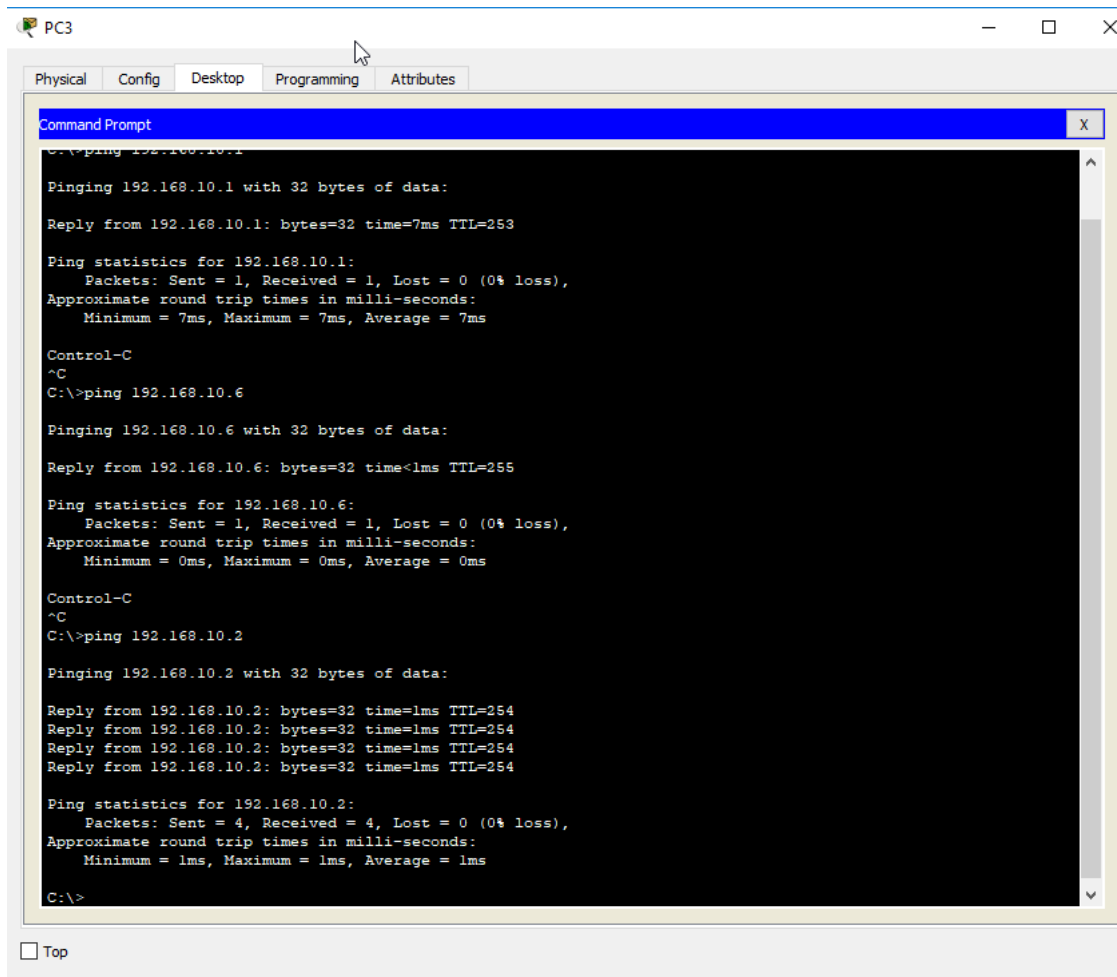
Efectivamente podemos :)

Pero sin embargo no podemos acceder desde el PC2:



image

Mientras tanto, vamos a ver si ocurre lo mismo en el area 2:



The screenshot shows a window titled "PC3" with a tabbed interface. The "Programming" tab is active, displaying a "Command Prompt" window. The Command Prompt shows the execution of three ping commands: ping 192.168.10.1, ping 192.168.10.6, and ping 192.168.10.2. Each command is followed by its respective output, including the number of bytes, time, TTL, and statistics for packets sent, received, and lost. The Command Prompt window has a blue title bar and a scroll bar on the right. Below the Command Prompt window, there is a "Top" button.

```
C:\>ping 192.168.10.1

Pinging 192.168.10.1 with 32 bytes of data:

Reply from 192.168.10.1: bytes=32 time=7ms TTL=253

Ping statistics for 192.168.10.1:
    Packets: Sent = 1, Received = 1, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 7ms, Maximum = 7ms, Average = 7ms

Control-C
^C
C:\>ping 192.168.10.6

Pinging 192.168.10.6 with 32 bytes of data:

Reply from 192.168.10.6: bytes=32 time<1ms TTL=255

Ping statistics for 192.168.10.6:
    Packets: Sent = 1, Received = 1, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

Control-C
^C
C:\>ping 192.168.10.2

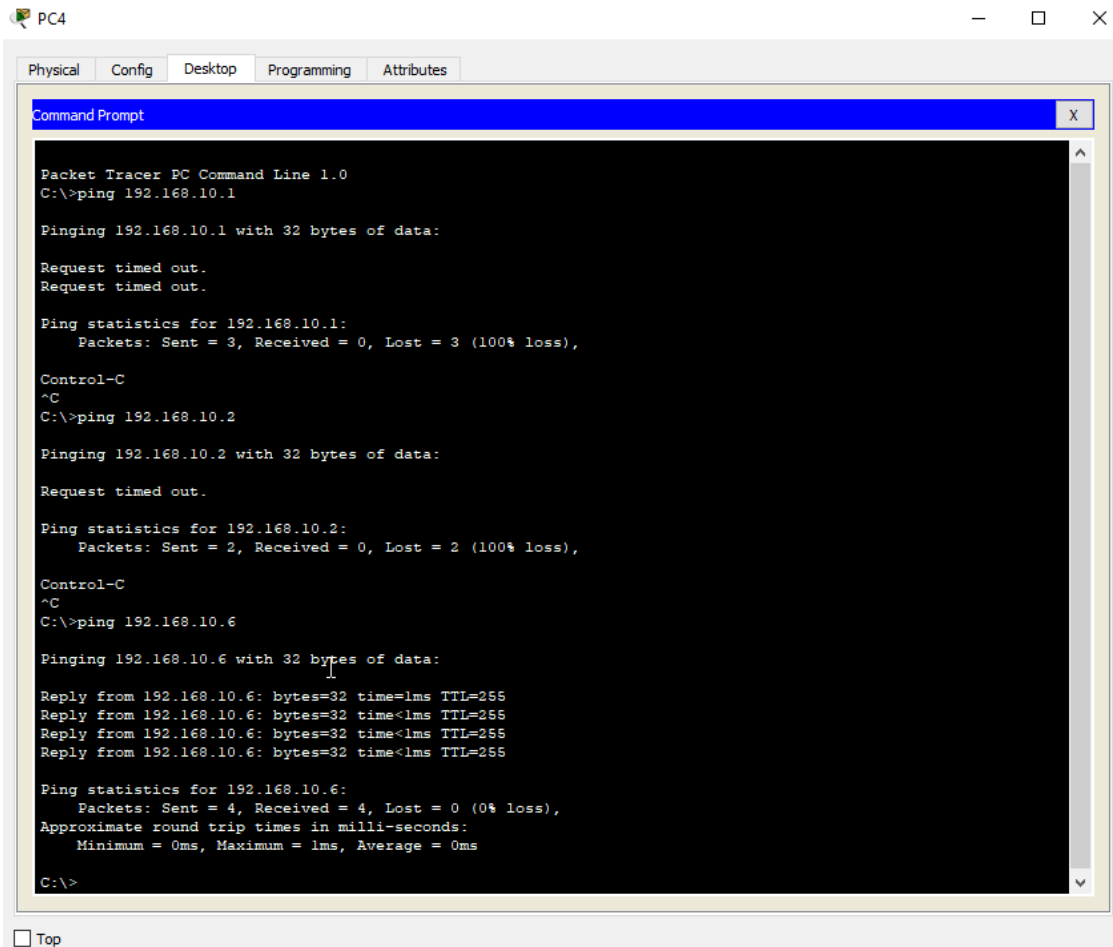
Pinging 192.168.10.2 with 32 bytes of data:

Reply from 192.168.10.2: bytes=32 time=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 192.168.10.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 1ms, Average = 1ms

C:\>
```

☐ Top



```
Packet Tracer PC Command Line 1.0
C:\>ping 192.168.10.1

Pinging 192.168.10.1 with 32 bytes of data:

Request timed out.
Request timed out.

Ping statistics for 192.168.10.1:
    Packets: Sent = 3, Received = 0, Lost = 3 (100% loss),

Control-C
^C
C:\>ping 192.168.10.2

Pinging 192.168.10.2 with 32 bytes of data:

Request timed out.

Ping statistics for 192.168.10.2:
    Packets: Sent = 2, Received = 0, Lost = 2 (100% loss),

Control-C
^C
C:\>ping 192.168.10.6

Pinging 192.168.10.6 with 32 bytes of data:

Reply from 192.168.10.6: bytes=32 time=1ms TTL=255
Reply from 192.168.10.6: bytes=32 time<1ms TTL=255
Reply from 192.168.10.6: bytes=32 time<1ms TTL=255
Reply from 192.168.10.6: bytes=32 time<1ms TTL=255

Ping statistics for 192.168.10.6:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\>
```

Pasa exactamente igual, el PC3 puede acceder, y el PC4 no. Por lo tanto cuando solucionemos el problema, lo solucionaremos en las dos areas.

Vamos a añadir ospf a la red 10.1.2.0 al R1

```
router ospf 10 network 10.1.2.1 0.0.0.255 area 1
```

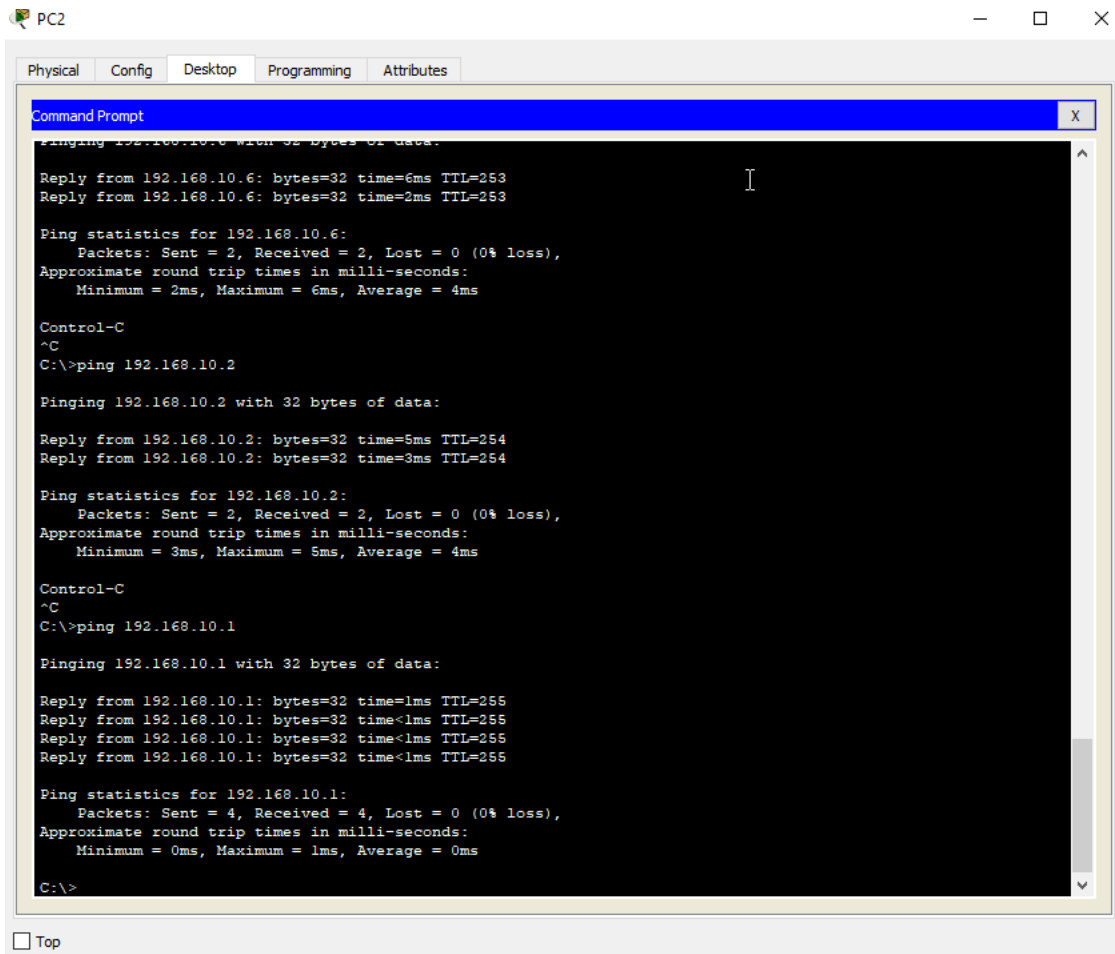
Despues ejecutamos el comando show ip ospf interface para ver si se ha guardado la ruta y vemos que es asi:

```
Router#show ip ospf interface

Serial0/0/0 is up, line protocol is up
 Internet address is 192.168.10.1/30, Area 0
 Process ID 10, Router ID 1.1.1.1, Network Type POINT-TO-POINT, Cost: 64
 Transmit Delay is 1 sec, State POINT-TO-POINT, Priority 0
 No designated router on this network
 No backup designated router on this network
 Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
   Hello due in 00:00:02
 Index 1/1, flood queue length 0
 Next 0x0(0)/0x0(0)
 Last flood scan length is 1, maximum is 1
 Last flood scan time is 0 msec, maximum is 0 msec
 Neighbor Count is 1, Adjacent neighbor count is 1
   Adjacent with neighbor 2.2.2.2
 Suppress hello for 0 neighbor(s)
GigabitEthernet0/0 is up, line protocol is up
 Internet address is 10.1.1.1/24, Area 1
 Process ID 10, Router ID 1.1.1.1, Network Type BROADCAST, Cost: 1
 Transmit Delay is 1 sec, State DR, Priority 1
 Designated Router (ID) 1.1.1.1, Interface address 10.1.1.1
 No backup designated router on this network
 Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
   Hello due in 00:00:06
 Index 2/2, flood queue length 0
 Next 0x0(0)/0x0(0)
 Last flood scan length is 1, maximum is 1
 Last flood scan time is 0 msec, maximum is 0 msec
 Neighbor Count is 0, Adjacent neighbor count is 0
 Suppress hello for 0 neighbor(s)
GigabitEthernet0/1 is up, line protocol is up
 Internet address is 10.1.2.1/24, Area 1
 Process ID 10, Router ID 1.1.1.1, Network Type BROADCAST, Cost: 1
 Transmit Delay is 1 sec, State WAITING, Priority 1
 No designated router on this network
 No backup designated router on this network
 Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
   Hello due in 00:00:06
 Index 3/3, flood queue length 0
 Next 0x0(0)/0x0(0)
 Last flood scan length is 1, maximum is 1
 Last flood scan time is 0 msec, maximum is 0 msec
 Neighbor Count is 0, Adjacent neighbor count is 0
 Suppress hello for 0 neighbor(s)
```

image

Ya podemos acceder desde el PC2:



image

Ahora vamos al R3 y vemos si es similar el problema, viendo las interfaces del OSPF:

R3

Physical Config CLI Attributes

```
Router>en
Router#sh
Router#show ip
Router#show ipos
Router#show ip os
Router#show ip ospf ?
<1-65535>      Process ID number
border-routers  Border and Boundary Router Information
database        Database summary
interface        Interface information
neighbor         Neighbor list
virtual-links    Virtual link information
<cr>
Router#show ip ospf in
Router#show ip ospf interface

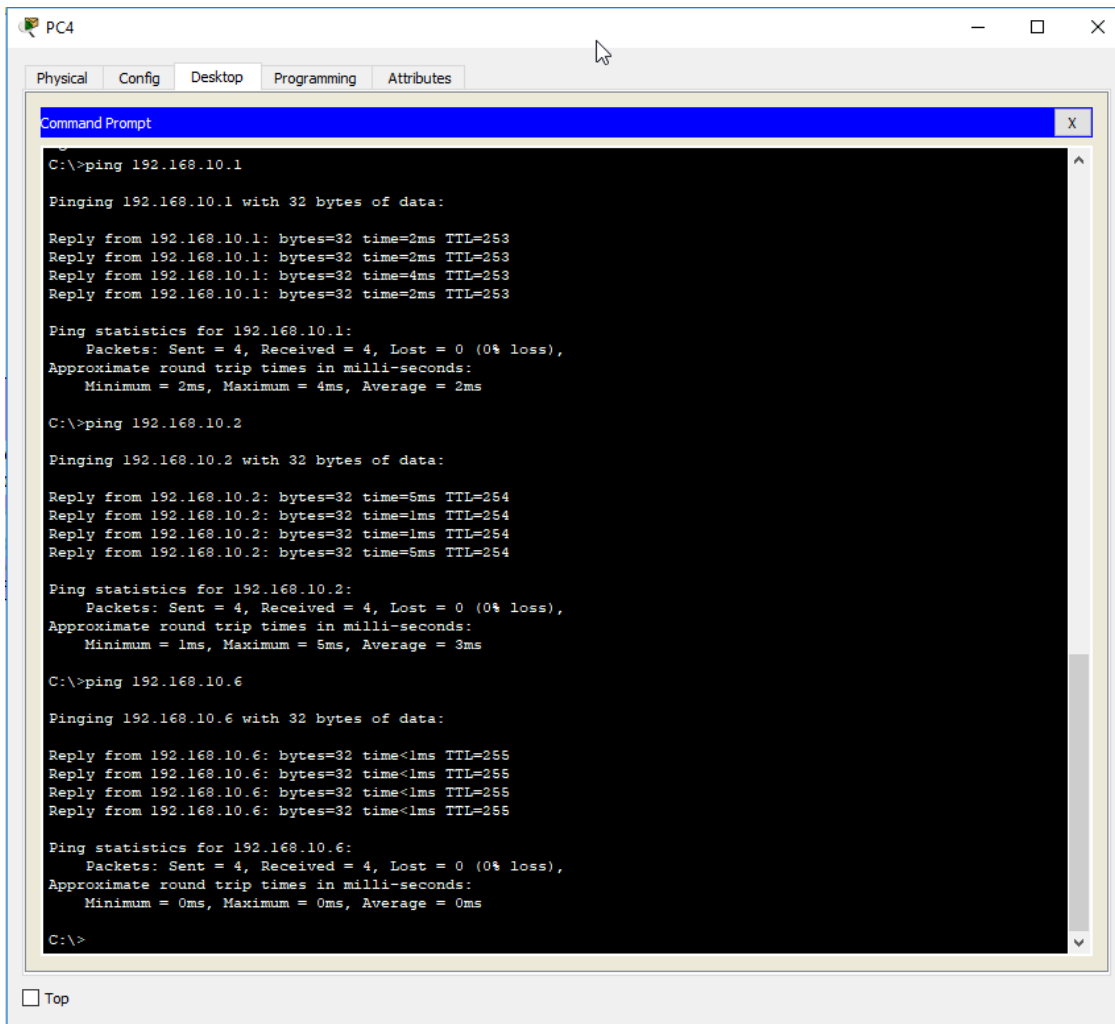
Serial0/0/1 is up, line protocol is up
 Internet address is 192.168.10.6/30, Area 0
 Process ID 10, Router ID 3.3.3.3, Network Type POINT-TO-POINT, Cost: 64
 Transmit Delay is 1 sec, State POINT-TO-POINT, Priority 0
 No designated router on this network
 No backup designated router on this network
 Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
   Hello due in 00:00:08
 Index 1/1, flood queue length 0
 Next 0x0(0)/0x0(0)
 Last flood scan length is 1, maximum is 1
 Last flood scan time is 0 msec, maximum is 0 msec
 Neighbor Count is 1 , Adjacent neighbor count is 1
   Adjacent with neighbor 2.2.2.2
 Suppress hello for 0 neighbor(s)
GigabitEthernet0/0 is up, line protocol is up
 Internet address is 192.168.1.1/24, Area 2
 Process ID 10, Router ID 3.3.3.3, Network Type BROADCAST, Cost: 1
 Transmit Delay is 1 sec, State DR, Priority 1
 Designated Router (ID) 3.3.3.3, Interface address 192.168.1.1
 No backup designated router on this network
 Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
   Hello due in 00:00:08
 Index 2/2, flood queue length 0
 Next 0x0(0)/0x0(0)
 Last flood scan length is 1, maximum is 1
 Last flood scan time is 0 msec, maximum is 0 msec
 Neighbor Count is 0, Adjacent neighbor count is 0
 Suppress hello for 0 neighbor(s)
```

image

Efectivamente, tenemos que configurarlo para que el PC4 pueda acceder:

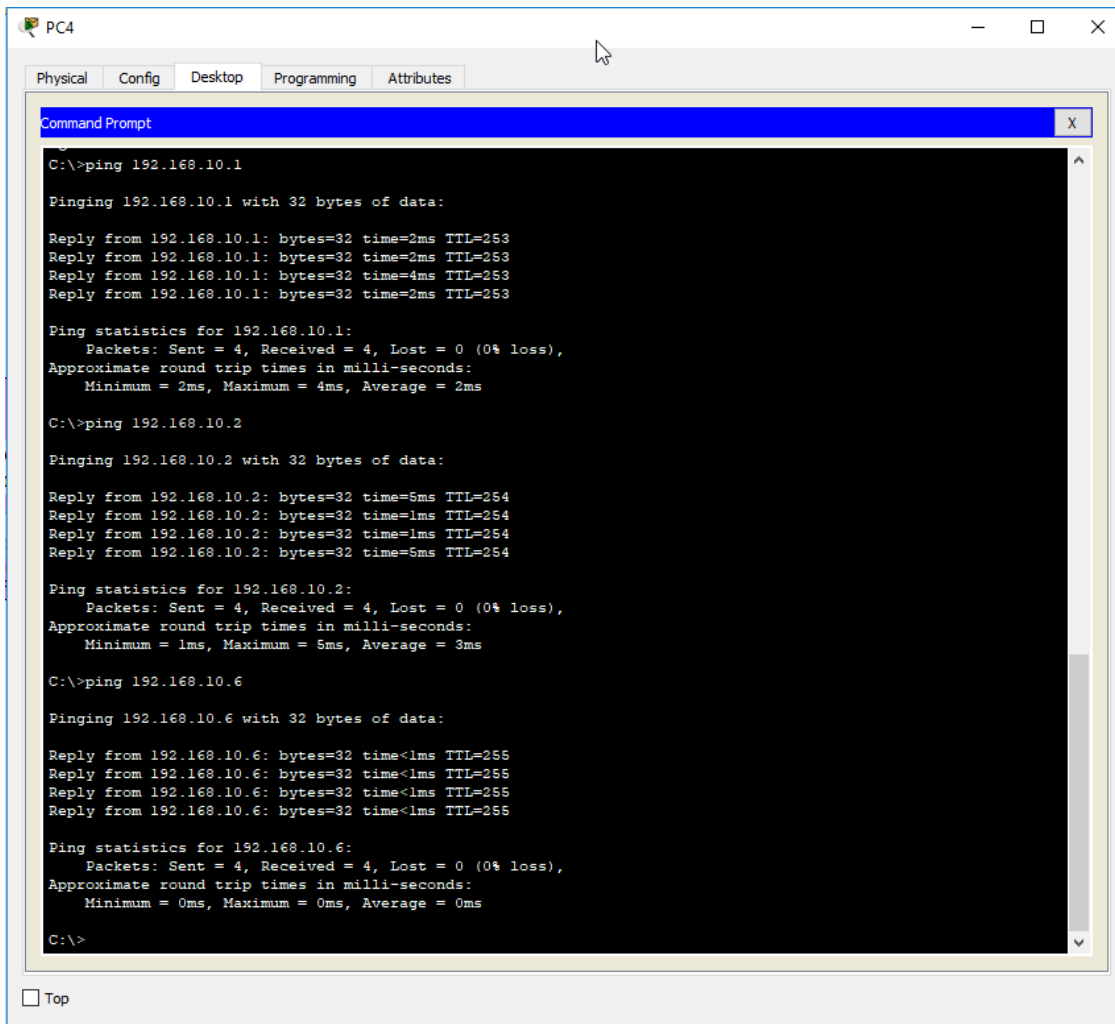
router ospf 10 network 192.168.2.1 0.0.0.255 area 2

Y ya podemos acceder al PC4:



image

Ahora nos falta el PC0, desde el cual no podemos acceder a ningun PC:



image

Vamos a ver la informacion del ospf en R2 y vemos que no tenemos la interface gig0/1 en el ospf

R2

```
Physical Config CLI Attributes
Router#show ip ospf in
Router#show ip ospf interface

Serial0/0/1 is up, line protocol is up
Internet address is 192.168.10.5/30, Area 0
Process ID 11, Router ID 2.2.2.2, Network Type POINT-TO-POINT, Cost: 64
Transmit Delay is 1 sec, State POINT-TO-POINT, Priority 0
No designated router on this network
No backup designated router on this network
Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
Hello due in 00:00:07
Index 1/1, flood queue length 0
Next 0x0(0)/0x0(0)
Last flood scan length is 1, maximum is 1
Last flood scan time is 0 msec, maximum is 0 msec
Neighbor Count is 1, Adjacent neighbor count is 1
Adjacent with neighbor 3.3.3.3
Suppress hello for 0 neighbor(s)
Serial0/0/0 is up, line protocol is up
Internet address is 192.168.10.2/30, Area 0
Process ID 11, Router ID 2.2.2.2, Network Type POINT-TO-POINT, Cost: 64
Transmit Delay is 1 sec, State POINT-TO-POINT, Priority 0
No designated router on this network
No backup designated router on this network
Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
Hello due in 00:00:08
Index 2/2, flood queue length 0
Next 0x0(0)/0x0(0)
Last flood scan length is 1, maximum is 1
Last flood scan time is 0 msec, maximum is 0 msec
Neighbor Count is 1, Adjacent neighbor count is 1
Adjacent with neighbor 1.1.1.1
Suppress hello for 0 neighbor(s)
Serial0/0/1 is up, line protocol is up
Internet address is 192.168.10.5/30, Area 1
Process ID 11, Router ID 2.2.2.2, Network Type POINT-TO-POINT, Cost: 64
Transmit Delay is 1 sec, State POINT-TO-POINT, Priority 0
No designated router on this network
No backup designated router on this network
Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
Hello due in 00:00:07
Index 3/3, flood queue length 0
Next 0x0(0)/0x0(0)
Last flood scan length is 1, maximum is 1
Last flood scan time is 0 msec, maximum is 0 msec
Suppress hello for 0 neighbor(s)
Serial0/0/0 is up, line protocol is up
Internet address is 192.168.10.2/30, Area 1
Process ID 11, Router ID 2.2.2.2, Network Type POINT-TO-POINT, Cost: 64
Transmit Delay is 1 sec, State POINT-TO-POINT, Priority 0
No designated router on this network
No backup designated router on this network
Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
Hello due in 00:00:08
Index 4/4, flood queue length 0
Next 0x0(0)/0x0(0)
Last flood scan length is 1, maximum is 1
Last flood scan time is 0 msec, maximum is 0 msec
Suppress hello for 0 neighbor(s)
Router#
Router#
```

image

Y ademas nos encontramos con que la configuracion esta realizada en gig0/0 en vez de gig0/1 Asignamos la ip 10.2.1.1 con la submascara al gig0/1

int g0/1 ip address 10.2.1.1 255.255.255.0

Vemos otra vez la informacion del OSPF y aparece gig0/1

R2

```
Physical Config CLI Attributes

% Incomplete command.
Router#show ip ospf interface

Serial0/0/1 is up, line protocol is up
 Internet address is 192.168.10.5/30, Area 0
 Process ID 11, Router ID 2.2.2.2, Network Type POINT-TO-POINT, Cost: 64
 Transmit Delay is 1 sec, State POINT-TO-POINT, Priority 0
 No designated router on this network
 No backup designated router on this network
 Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
   Hello due in 00:00:04
 Index 1/1, flood queue length 0
 Next 0x0(0)/0x0(0)
 Last flood scan length is 1, maximum is 1
 Last flood scan time is 0 msec, maximum is 0 msec
 Neighbor Count is 1 , Adjacent neighbor count is 1
   Adjacent with neighbor 3.3.3.3
 Suppress hello for 0 neighbor(s)
Serial0/0/0 is up, line protocol is up
 Internet address is 192.168.10.2/30, Area 0
 Process ID 11, Router ID 2.2.2.2, Network Type POINT-TO-POINT, Cost: 64
 Transmit Delay is 1 sec, State POINT-TO-POINT, Priority 0
 No designated router on this network
 No backup designated router on this network
 Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
   Hello due in 00:00:06
 Index 2/2, flood queue length 0
 Next 0x0(0)/0x0(0)
 Last flood scan length is 1, maximum is 1
 Last flood scan time is 0 msec, maximum is 0 msec
 Neighbor Count is 1 , Adjacent neighbor count is 1
   Adjacent with neighbor 1.1.1.1
 Suppress hello for 0 neighbor(s)
GigabitEthernet0/1 is up, line protocol is up
 Internet address is 10.2.1.1/24, Area 0
 Process ID 11, Router ID 2.2.2.2, Network Type BROADCAST, Cost: 1
 Transmit Delay is 1 sec, State DR, Priority 1
 Designated Router (ID) 2.2.2.2, Interface address 10.2.1.1
 No backup designated router on this network
 Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
   Hello due in 00:00:07
 Index 3/3, flood queue length 0
 Next 0x0(0)/0x0(0)
 Last flood scan length is 1, maximum is 1
 Last flood scan time is 0 msec, maximum is 0 msec
 Neighbor Count is 0, Adjacent neighbor count is 0
 Suppress hello for 0 neighbor(s)
Serial0/0/1 is up, line protocol is up
 Internet address is 192.168.10.5/30, Area 1
 Process ID 11, Router ID 2.2.2.2, Network Type POINT-TO-POINT, Cost: 64
 Transmit Delay is 1 sec, State POINT-TO-POINT, Priority 0
 No designated router on this network
 No backup designated router on this network
 Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
   Hello due in 00:00:04
 Index 4/4, flood queue length 0
 Next 0x0(0)/0x0(0)
 Last flood scan length is 1, maximum is 1
 Last flood scan time is 0 msec, maximum is 0 msec
 Suppress hello for 0 neighbor(s)
--More--
```

Efectivamente, vamos a ver si podemos acceder desde el PC0 al PC1,



Physical Config Desktop Programming Attributes

Command Prompt

```
Ping statistics for 192.168.10.6:
    Packets: Sent = 1, Received = 0, Lost = 1 (100% loss),
```

Control-C

^C

```
C:\>ping 192.168.10.2
```

```
Pinging 192.168.10.2 with 32 bytes of data:
```

```
Ping statistics for 192.168.10.2:
    Packets: Sent = 1, Received = 0, Lost = 1 (100% loss),
```

Control-C

^C

```
C:\>ping 192.168.10.6
```

```
Pinging 192.168.10.6 with 32 bytes of data:
```

```
Ping statistics for 192.168.10.6:
    Packets: Sent = 1, Received = 0, Lost = 1 (100% loss),
```

Control-C

^C

```
C:\>ping 192.168.10.6
```

```
Pinging 192.168.10.6 with 32 bytes of data:
```

```
Reply from 192.168.10.6: bytes=32 time=2ms TTL=254
```

```
Reply from 192.168.10.6: bytes=32 time=3ms TTL=254
```

```
Ping statistics for 192.168.10.6:
    Packets: Sent = 2, Received = 2, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 2ms, Maximum = 3ms, Average = 2ms
```

Control-C

^C

```
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<1ms TTL=255
```

```
Reply from 192.168.10.2: bytes=32 time<1ms TTL=255
```

```
Ping statistics for 192.168.10.2:
    Packets: Sent = 2, Received = 2, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

Control-C

^C

```
C:\>ping 10.1.1.1
```

```
Pinging 10.1.1.1 with 32 bytes of data:
```

```
Reply from 10.1.1.1: bytes=32 time=1ms TTL=254
```

```
Reply from 10.1.1.1: bytes=32 time=3ms TTL=254
```

```
Reply from 10.1.1.1: bytes=32 time=3ms TTL=254
```

image

Efectivamente, ya podemos, hemos solucionado los problemas de red que teníamos :)

Ejercicio 3 (20%)

Contesta a las siguientes preguntas:

```
R# show ip route
```

```
<output omitted>
```

```
10.0.0.0/24 is subnetted, 1 subnets
```

```
O          10.0.0.0 [110/1786] via 192.168.1.1, 00:00:02,  
Serial0/0/0
```

```
C    192.168.1.0/24 is directly connected, Serial0/0/0
```

```
C    192.168.2.0/24 is directly connected, FastEthernet0/0
```

1.- A la vista del output anterior, ¿cuál es el coste de la ruta hacia la red 10.0.0.0?

El coste de la ruta vía OSPF es de 1786.

2.- ¿Qué rango de redes se publicarán en las actualizaciones OSPF por el comando R(config-router)# network 192.168.0.0 0.0.15.255 area 100 ?

Al tener 0.0.15.255 la mascara de red es 255.255.240.0

EL CIDR es 192.168.0.0/20

Por lo tanto el rango de redes que se publicara será desde 192.168.0.0 a 192.168.15.255

3.- Explica qué significan las siglas DR y BDR cuando estamos trabajando con OSPF. Explica también cómo se eligen y para qué sirven.

DR significa **Designated router** y BDR significa **Backup Designated Router**.

Estos routers se eligen en base al tipo de red.

Se elegirá el DR al router que tenga más prioridad, en caso de empate, se elegirá al que más router ID tenga. Para elegir al BDR, simplemente se elige al segundo en la clasificación de la prioridad o router id en caso de empate.

```
R# show running-config
```

```
router ospf 2 log-
```

```
adjacency-changes
```

```
network 192.168.1.0
```

```
0.0.0.3 area 0 network
```

```
192.168.4.0 0.0.0.3
```

```
area 0
```

4.- A la vista del output anterior, ¿qué representa el "2" para la sentencia router ospf 2?

Es el proceso en el cual se está ejecutando en ese router.

El proceso es local, por lo que se puede tener varios router con diferente número de proceso OSPF.

5.- ¿Cuál es la distancia administrativa por defecto para OSPF?

La distancia administrativa por defecto es 110.

6.- Una red OSPF de cinco routers completamente convergentes se ha ejecutado con éxito durante varias semanas. Todas las configuraciones se han guardado y no se utilizan rutas estáticas. Si un router se apaga y se reinicia, ¿qué información habrá en la tabla de enrutamiento después de que el archivo de configuración se cargue pero antes de que OSPF haya convergido?

Ninguna, ya que no tenía ninguna ruta estática y no ha convergido.

Ejercicio 4 (20%) - Justifica la respuesta

Justifica de forma breve y clara si las siguientes afirmaciones son ciertas o falsas:

1.El modelo de diseño jerárquico de red consta de 4 capas.

Falso, el diseño jerárquico incluye las siguientes capas:

- Capa de acceso
- Capa de distribución
- Capa de núcleo

1.VTP únicamente se puede configurar en modo servidor o en modo cliente.

Falso, se puede configurar como servidor, cliente o transparente. Los VTP transparentes no participa activamente, solo envía publicaciones a los VTP clientes y servidores.

1. STP es un protocolo de nivel 3 que nos permite evitar loops de enrutamiento en una red segmentada.

Falso, STP funciona en el nivel 2. Es cierto que se asegura de que no haya bucles de enrutamiento cuando tienes rutas redundantes en tu red.

1.Cualquier implementación de OSPF debe admitir, al menos, 6 LSA diferentes.

Falso, las implementaciones OSPF multiárea deben soportar 5 tipos diferentes, del tipo al 5 incluido. Esto significa, que al menos tiene que admitir 5 tipos LSA diferentes.

1. El ancho de banda de referencia en OSPF se puede cambiar usando el comando "ospf autocost reference-bandwidth" en el modo R(config-router)#

El commando no contiene ospf, tendría que ser "auto-cost reference-bandwidth 300" donde 300 es el numero de mbits por segundo del ancho de banda de referencia del OSPF.