



Instituto Politécnico Nacional

Escuela Superior de Cómputo



Ingeniería en Sistemas Computacionales

Administración de Servicios en Red

Práctica 2

Enrutamiento entre diferentes protocolos

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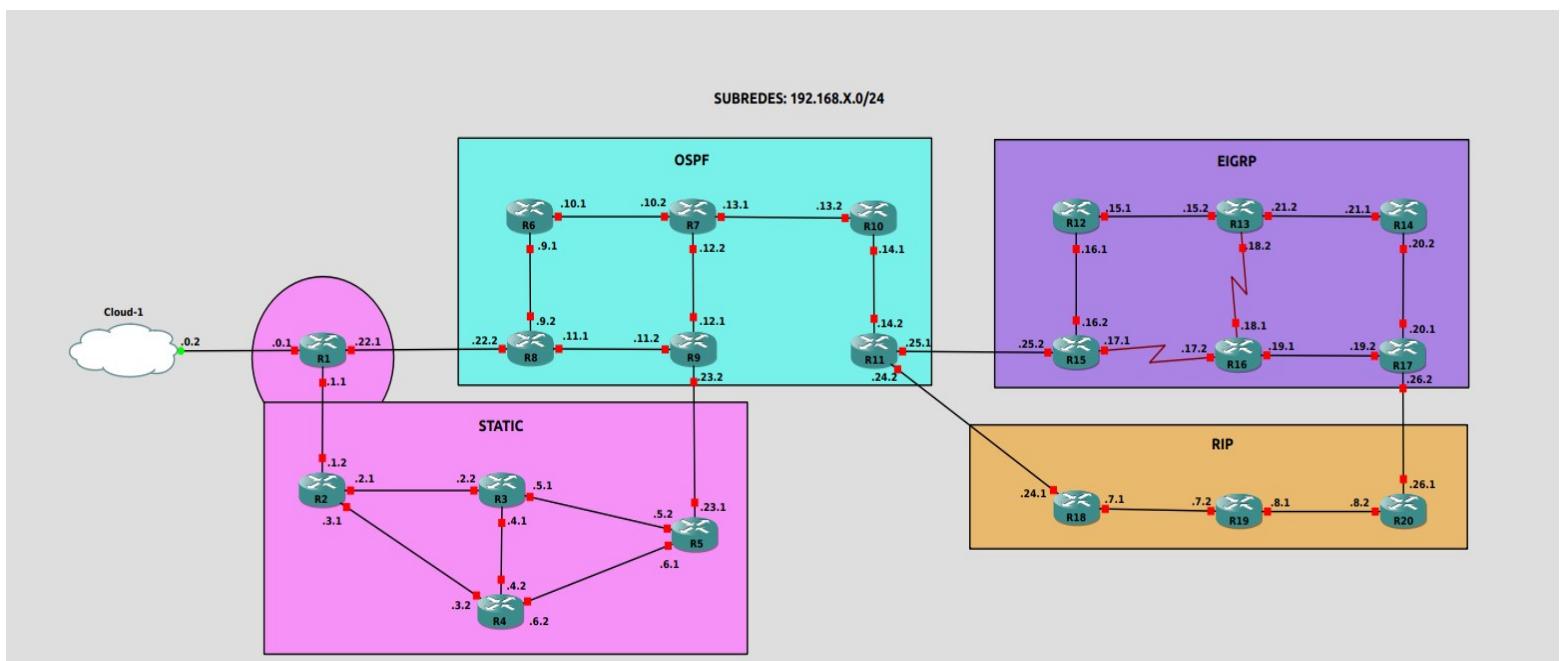
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1. Desarrollo

El objetivo de esta práctica es trabajar con los diferentes protocolos de enrutamiento, tales como Estático, RIP, OSPF y EIGRP. Además de hacer la comunicación entre ellos.

2. Topología

A continuación, creamos la topología con los elementos que necesitamos para el desarrollo de nuestra práctica.



3. Configuración

1. Routers

A continuación haremos la configuración de todos los Routers para agregarles las direcciones IP que le corresponden a cada uno.

En las siguientes tablas observamos las direcciones que utilizamos.

Dispositivo	Interfaz	Subred	Dirección IP
Cloud-1	NIC	192.168.0.0	192.168.0.2
Router 1	Fa0/0	192.168.0.0	192.168.0.1
	Fa1/0	192.168.1.0	192.168.1.1
	Fa2/0	192.168.22.0	192.168.22.1
	Fa1/0	192.168.3.0	192.168.3.1
Router 2	Fa2/0	192.168.2.0	192.168.2.1
	Fa3/0	192.168.1.0	192.168.1.2
	Fa0/0	192.168.2.0	192.168.2.2
Router 3	Fa1/0	192.168.4.0	192.168.4.1
	Fa2/0	192.168.5.0	192.168.5.1
	Fa0/0	192.168.3.0	192.168.3.2
Router 4	Fa2/0	192.168.6.0	192.168.6.2
	Fa3/0	192.168.4.0	192.168.4.2
	Fa0/0	192.168.5.0	192.168.5.2
Router 5	Fa1/0	192.168.6.0	192.168.6.1
	Fa3/0	192.168.23.0	192.168.23.1
	Fa1/0	192.168.9.0	192.168.9.1
Router 6	Fa2/0	192.168.10.0	192.168.10.1
	Fa0/0	192.168.10.0	192.168.10.2
Router 7	Fa1/0	192.168.12.0	192.168.12.2
	Fa2/0	192.168.13.0	192.168.13.1
	Fa0/0	192.168.22.0	192.168.22.2
Router 8	Fa2/0	192.168.11.0	192.168.11.1
	Fa3/0	192.168.9.0	192.168.9.2
	Fa0/0	192.168.11.0	192.168.11.2
Router 9	Fa1/0	192.168.23.0	192.168.23.2
	Fa3/0	192.168.12.0	192.168.12.1

Dispositivo	Interfaz	Subred	Dirección IP
Router 10	Fa0/0	192.168.13.0	192.168.13.2
	Fa1/0	192.168.14.0	192.168.14.1
	Fa1/0	192.168.24.0	192.168.24.2
	Fa2/0	192.168.25.0	192.168.25.1
Router 11	Fa3/0	192.168.14.0	192.168.14.2
	Fa1/0	192.168.16.0	192.168.16.1
	Fa2/0	192.168.15.0	192.168.15.1
	Fa0/0	192.168.15.0	192.168.15.2
Router 12	Fa1/0	192.168.18.0	192.168.18.2
	Fa2/0	192.168.21.0	192.168.21.2
	Fa0/0	192.168.21.0	192.168.21.1
Router 13	Fa1/0	192.168.20.0	192.168.20.2
	Fa2/0	192.168.25.0	192.168.25.2
	Fa3/0	192.168.17.0	192.168.17.1
Router 14	Fa3/0	192.168.16.0	192.168.16.2
	Fa0/0	192.168.17.0	192.168.17.2
	Fa2/0	192.168.19.0	192.168.19.1
Router 15	Fa3/0	192.168.18.0	192.168.18.1
	Fa0/0	192.168.19.0	192.168.19.2
	Fa2/0	192.168.26.0	192.168.26.2
Router 16	Fa3/0	192.168.20.0	192.168.20.1
	Fa0/0	192.168.24.0	192.168.24.1
	Fa2/0	192.168.7.0	192.168.7.1
Router 17	Fa3/0	192.168.7.0	192.168.7.2
	Fa0/0	192.168.8.0	192.168.8.1
	Fa2/0	192.168.8.0	192.168.8.2
Router 18	Fa3/0	192.168.26.0	192.168.26.1
	Fa0/0	192.168.24.0	192.168.24.1
Router 19	Fa2/0	192.168.7.0	192.168.7.2
	Fa0/0	192.168.8.0	192.168.8.1
Router 20	Fa2/0	192.168.8.0	192.168.8.2
	Fa3/0	192.168.26.0	192.168.26.1

Los comandos para asignar una IP a un Router son los siguientes:

```
> conf t
> int fx/x
> ip addr xxx.xxx.xxx.xxx [mask]
> no sh
> end
> wr
```

A continuación mostraremos las asignaciones de cada Router.

Router1.

```
R1

File Edit View Search Terminal Help
*Sep 17 00:11:11.543: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial1/3,
changed state to down
*Sep 17 00:11:11.547: %LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet3/0,
changed state to down
*Sep 17 00:11:11.547: %LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet6/0,
changed state to down
R1#
R1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#int f0/0
R1(config-if)#ip addr 192.168.1.1 255.255.255.0
R1(config-if)#no sh
R1(config-if)#en
*Sep 17 00:13:20.511: %LINK-3-UPDOWN: Interface FastEthernet0/0, changed state to
up
*Sep 17 00:13:21.511: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0,
changed state to up
R1(config-if)#end
R1#
```

Router2.

```
R2

File Edit View Search Terminal Help
      ia - IS-IS inter area, * - candidate default, U - per-user static route
      o - ODR, P - periodic downloaded static route, H - NHRP, l - LIS
      + - replicated route, % - next hop override

Gateway of last resort is not set

      192.168.1.0/24 is variably subnetted, 2 subnets, 2 masks
      |      192.168.1.0/24 is directly connected, FastEthernet0/0
      |
      192.168.1.2/32 is directly connected, FastEthernet0/0
R2#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#int f2/0
R2(config-if)#ip addr 192.168.2.1 255.255.255.0
R2(config-if)#no sh
R2(config-if)#
*Sep 17 00:19:02.483: %LINK-3-UPDOWN: Interface FastEthernet2/0, changed state to
up
*Sep 17 00:19:03.483: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet2/0,
changed state to up
R2(config-if)#end
```

Router3.

```
R3
File Edit View Search Terminal Help
*Sep 17 00:22:03.979: %LINK-3-UPDOWN: Interface FastEthernet0/0, changed state to up
*Sep 17 00:22:04.979: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
R3(config-if)#exit
R3(config)#int f4/0
R3(config-if)#ip addr 192.168.4.1 255.255.255.0
R3(config-if)#no sh
R3(config-if)#
*Sep 17 00:22:51.187: %LINK-3-UPDOWN: Interface FastEthernet4/0, changed state to up
*Sep 17 00:22:52.187: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet4/0, changed state to up
R3(config-if)#exit
R3(config)#int f2/0
R3(config-if)#ip addr 192.168.5.1 255.255.255.0
R3(config-if)#no sh
R3(config-if)#
*Sep 17 00:23:14.959: %LINK-3-UPDOWN: Interface FastEthernet2/0, changed state to up
*Sep 17 00:23:15.959: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet2/0, changed state to up
R3(config-if)#end
R3#
```

Router4.

```
R4
File Edit View Search Terminal Help
FastEthernet6/0, changed state to down
R4#
R4#
R4#
R4#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R4(config)#int f0/0
R4(config-if)#ip addr 192.168.5.2 255.255.255.0
R4(config-if)#no sh
R4(config-if)#
*Sep 17 00:25:40.251: %LINK-3-UPDOWN: Interface FastEthernet0/0, changed state to up
*Sep 17 00:25:41.251: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
R4(config-if)#exit
R4(config)#int f2/0
R4(config-if)#ip addr 192.168.6.1 255.255.255.0
R4(config-if)#no sh
R4(config-if)#
*Sep 17 00:26:19.675: %LINK-3-UPDOWN: Interface FastEthernet2/0, changed state to up
*Sep 17 00:26:20.675: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet2/0, changed state to up
R4(config-if)#exit
```

Router5.

```
R5

File Edit View Search Terminal Help
o up
*Sep 17 00:29:07.983: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet4/0, changed state to up
R5(config-if)#exit
R5(config)#int f2/0
R5(config-if)#ip addr 192.168.4.2 255.255.255.0
R5(config-if)#no sh
R5(config-if)#
*Sep 17 00:29:56.219: %LINK-3-UPDOWN: Interface FastEthernet2/0, changed state to up
*Sep 17 00:29:57.219: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet2/0, changed state to up
R5(config-if)#exit
R5(config)#int f0/0
R5(config-if)#ip addr 192.168.3.2 255.255.255.0
R5(config-if)#no sh
R5(config-if)#
*Sep 17 00:30:25.883: %LINK-3-UPDOWN: Interface FastEthernet0/0, changed state to up
*Sep 17 00:30:26.883: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
R5(config-if)#end
R5#
*Sep 17 00:30:29.675: %SYS-5-CONFIG_I: Configured from console by console
```

Router6.

```
R6

File Edit View Search Terminal Help
changed state to down
*Sep 17 01:09:24.323: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial1/2, changed state to down
*Sep 17 01:09:24.323: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial1/3, changed state to down
*Sep 17 01:09:24.335: %LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet3/0, changed state to down
*Sep 17 01:09:24.347: %LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet6/0, changed state to down
R6#
R6#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R6(config)#int f0/0
R6(config-if)#ip addr 192.168.7.1 255.255.255.0
R6(config-if)#no sh
R6(config-if)#end
R6#
*Sep 17 01:09:59.303: %SYS-5-CONFIG_I: Configured from console by console
R6#
*Sep 17 01:09:59.439: %LINK-3-UPDOWN: Interface FastEthernet0/0, changed state to up
*Sep 17 01:10:00.439: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
R6#
```

Router7.

```
R7

File Edit View Search Terminal Help
Administratively down
*Sep 17 01:09:25.531: %LINK-5-CHANGED: Interface Serial1/3, changed state to adm
inistratively down
*Sep 17 01:09:25.535: %LINK-5-CHANGED: Interface FastEthernet2/0, changed state
to administratively down
*Sep 17 01:09:25.535: %LINK-5-CHANGED: Interface GigabitEthernet3/0, changed sta
te to administratively down
*Sep 17 01:09:25.539: %LINK-5-CHANGED: Interface GigabitEthernet6/0, changed sta
te to administratively down
R7#
R7#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R7(config)#int f0/0
R7(config-if)#ip addr 192.168.7.2 255.255.255.0
R7(config-if)#no sh
R7(config-if)#
*Sep 17 01:12:21.663: %LINK-3-UPDOWN: Interface FastEthernet0/0, changed state t
o up
*Sep 17 01:12:22.663: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthern
et0/0, changed state to up
R7(config-if)#end
R7#
*Sep 17 01:12:25.023: %SYS-5-CONFIG_I: Configured from console by console
R7#
```

Router8.

```
R8

File Edit View Search Terminal Help
changed state to down
*Sep 17 01:09:40.531: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial1/2,
changed state to down
*Sep 17 01:09:40.543: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial1/3,
changed state to down
*Sep 17 01:09:40.563: %LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEth
ernet3/0, changed state to down
*Sep 17 01:09:40.595: %LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEth
ernet6/0, changed state to down
R8#
R8#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R8(config)#int f0/0
R8(config-if)#ip addr 192.168.8.2 255.255.255.0
R8(config-if)#no sh
R8(config-if)#
*Sep 17 01:15:12.455: %LINK-3-UPDOWN: Interface FastEthernet0/0, changed state t
o up
*Sep 17 01:15:13.455: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthern
et0/0, changed state to up
R8(config-if)#end
R8#
*Sep 17 01:15:19.387: %SYS-5-CONFIG_I: Configured from console by console
R8#
```

Router9.

```
R9

File Edit View Search Terminal Help
Enter configuration commands, one per line. End with CNTL/Z.
R9(config)#int f0/0
R9(config-if)#ip addr 192.168.9.1 255.255.255.0
R9(config-if)#exit
R9(config)#int f2/0
R9(config-if)#ip addr 192.168.10.1 255.255.255.0
R9(config-if)#no sh
R9(config-if)#exit
*Sep 17 02:00:04.723: %LINK-3-UPDOWN: Interface FastEthernet2/0, changed state to up
*Sep 17 02:00:05.723: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet2/0, changed state to up
R9(config-if)#exit
R9(config)#int f0/0
R9(config-if)#no sh
R9(config-if)#end
R9#
*Sep 17 02:00:15.087: %SYS-5-CONFIG_I: Configured from console by console
R9#
*Sep 17 02:00:15.379: %LINK-3-UPDOWN: Interface FastEthernet0/0, changed state to up
*Sep 17 02:00:16.379: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
R9#
```

Router10.

```
R10

File Edit View Search Terminal Help
R10#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R10(config)#int f0/0
R10(config-if)#ip addr 192.168.9.2 255.255.255.0
R10(config-if)#no sh
R10(config-if)#
*Sep 17 02:02:11.031: %LINK-3-UPDOWN: Interface FastEthernet0/0, changed state to up
*Sep 17 02:02:12.031: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
R10(config-if)#exit
R10(config)#int f2/0
R10(config-if)#ip addr 192.168.11.1 255.255.255.0
R10(config-if)#no sh
R10(config-if)#end
*Sep 17 02:02:34.675: %LINK-3-UPDOWN: Interface FastEthernet2/0, changed state to up
R10(config-if)#end
R10#
*Sep 17 02:02:35.675: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet2/0, changed state to up
R10#
*Sep 17 02:02:37.395: %SYS-5-CONFIG_I: Configured from console by console
R10#wr
```

Router11.

```
R11
File Edit View Search Terminal Help
R11(config)#int f2/0
R11(config-if)#ip addr 192.168.12.2 255.255.255.0
R11(config-if)#no sh
R11(config-if)#
*Sep 17 02:08:33.975: %LINK-3-UPDOWN: Interface FastEthernet2/0, changed state to up
*Sep 17 02:08:34.975: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet2/0, changed state to up
R11(config-if)#exit
R11(config)#int f0/0
R11(config-if)#ip addr 192.168.10.2 255.255.255.0
R11(config-if)#no sh
R11(config-if)#
*Sep 17 02:08:52.107: %LINK-3-UPDOWN: Interface FastEthernet0/0, changed state to up
*Sep 17 02:08:53.107: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
R11(config-if)#
R11(config)#int f4/0
R11(config-if)#
*Sep 17 02:09:10.367: %LINK-3-UPDOWN: Interface FastEthernet4/0, changed state to up
```

Router12.

```
R12
File Edit View Search Terminal Help
R12#
R12#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R12(config)#int f0/0
R12(config-if)#
*Sep 17 02:05:10.015: %LINK-3-UPDOWN: Interface FastEthernet0/0, changed state to up
*Sep 17 02:05:11.015: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
R12(config-if)#
R12(config)#int f2/0
R12(config-if)#
*Sep 17 02:05:37.979: %LINK-3-UPDOWN: Interface FastEthernet2/0, changed state to up
*Sep 17 02:05:38.979: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet2/0, changed state to up
R12(config-if)#
R12#
*Sep 17 02:05:43.891: %SYS-5-CONFIG_I: Configured from console by console
R12#
```

Router13.

```
R13
File Edit View Search Terminal Help
R13#
R13#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R13(config)#int f0/0
R13(config-if)#ip addr 192.168.13.2 255.255.255.0
R13(config-if)#no sh
R13(config-if)#exit
*Sep 17 02:11:30.419: %LINK-3-UPDOWN: Interface FastEthernet0/0, changed state to up
*Sep 17 02:11:31.419: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
R13(config-if)#exit
R13(config)#int f2/0
R13(config-if)#ip addr 192.168.14.1 255.255.255.0
R13(config-if)#no sh
R13(config-if)#end
*Sep 17 02:11:53.667: %LINK-3-UPDOWN: Interface FastEthernet2/0, changed state to up
*Sep 17 02:11:54.667: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet2/0, changed state to up
R13(config-if)#end
R13#
*Sep 17 02:11:55.747: %SYS-5-CONFIG_I: Configured from console by console
R13#
```

Router14.

```
R14
File Edit View Search Terminal Help
FastEthernet3/0, changed state to down
*Sep 17 01:54:09.615: %LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet6/0, changed state to down
R14#
R14#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R14(config)#int f0/0
R14(config-if)#ip addr 192.168.14.2 255.255.255.0
R14(config-if)#no sh
R14(config-if)#end
R14#
*Sep 17 02:13:15.707: %SYS-5-CONFIG_I: Configured from console by console
R14#
*Sep 17 02:13:15.715: %LINK-3-UPDOWN: Interface FastEthernet0/0, changed state to up
*Sep 17 02:13:16.715: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
R14#wr
Warning: Attempting to overwrite an NVRAM configuration previously written
by a different version of the system image.
Overwrite the previous NVRAM configuration?[confirm]
Building configuration...
[OK]
R14#
```

Router15.

```
R15

File Edit View Search Terminal Help
ernet3/0, changed state to down
*Sep 17 04:50:39.855: %LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEth
ernet6/0, changed state to down
R15#
R15#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R15(config)#int f0/0
R15(config-if)#ip addr 192.168.15.1 255.255.255.0
R15(config-if)#no sh
R15(config-if)#exit
*Sep 17 04:51:14.399: %LINK-3-UPDOWN: Interface FastEthernet0/0, changed state t
o up
*Sep 17 04:51:15.399: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthern
et0/0, changed state to up
R15(config-if)#exit
R15(config)#int f2/0
R15(config-if)#ip addr 192.168.16.1 255.255.255.0
R15(config-if)#no sh
R15(config-if)#exi
*Sep 17 04:52:04.511: %LINK-3-UPDOWN: Interface FastEthernet2/0, changed state t
o up
*Sep 17 04:52:05.511: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthern
et2/0, changed state to up
R15(config-if)#end
```

Router16.

```
R16

File Edit View Search Terminal Help
R16#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R16(config)#int f2/0
R16(config-if)#ip addr 192.168.21.2 255.255.255.0
R16(config-if)#no sh
R16(config-if)#exit
*Sep 17 05:03:55.431: %LINK-3-UPDOWN: Interface FastEthernet2/0, changed state t
o up
*Sep 17 05:03:56.431: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthern
et2/0, changed state to up
R16(config-if)#exit
R16(config)#int f4/0
R16(config-if)#ip addr 192.168.18.2 255.255.255.0
R16(config-if)#no sh
R16(config-if)#exit
*Sep 17 05:04:11.519: %LINK-3-UPDOWN: Interface FastEthernet4/0, changed state t
o up
*Sep 17 05:04:12.519: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthern
et4/0, changed state to up
R16(config-if)#exit
R16(config)#int f0/0
R16(config-if)#ip addr 192.168.15.2 255.255.255.0
R16(config-if)#no sh
R16(config-if)#end
```

Router17.

```
R17

File Edit View Search Terminal Help
*Sep 17 04:50:48.307: %LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet3/0, changed state to down
*Sep 17 04:50:48.307: %LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet6/0, changed state to down
R17#
R17#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R17(config)#int f0/0
R17(config-if)#ip addr 192.168.16.2 255.255.255.0
R17(config-if)#no sh
R17(config-if)#exit
*Sep 17 04:54:05.487: %LINK-3-UPDOWN: Interface FastEthernet0/0, changed state to up
*Sep 17 04:54:06.487: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
R17(config-if)#exit
R17(config)#int f2/0
R17(config-if)#ip addr 192.168.17.1 255.255.255.0
R17(config-if)#no sh
R17(config-if)#end
*Sep 17 04:54:26.167: %LINK-3-UPDOWN: Interface FastEthernet2/0, changed state to up
*Sep 17 04:54:27.167: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet2/0, changed state to up
```

Router18.

```
R18

File Edit View Search Terminal Help
*Sep 17 04:51:06.659: %LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet6/0, changed state to down
R18#
R18#
R18#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R18(config)#int f2/0
R18(config-if)#ip addr 192.168.20.2 255.255.255.0
R18(config-if)#no sh
R18(config-if)#exit
*Sep 17 05:02:19.615: %LINK-3-UPDOWN: Interface FastEthernet2/0, changed state to up
*Sep 17 05:02:20.615: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet2/0, changed state to up
R18(config-if)#exit
R18(config)#int f0/0
R18(config-if)#ip addr 192.168.21.1 255.255.255.0
R18(config-if)#no sh
R18(config-if)#end
*Sep 17 05:02:43.603: %LINK-3-UPDOWN: Interface FastEthernet0/0, changed state to up
*Sep 17 05:02:44.603: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
R18(config-if)#end
```

Router19.

```
R19
File Edit View Search Terminal Help
R19#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R19(config)#int f2/0
R19(config-if)#ip addr 192.168.17.2 255.255.255.0
R19(config-if)#no sh
R19(config-if)#
*Sep 17 04:56:20.015: %LINK-3-UPDOWN: Interface FastEthernet2/0, changed state to up
R19(config-if)#
*Sep 17 04:56:21.015: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet2/0, changed state to up
R19(config-if)#exit
R19(config)#int f0/0
R19(config-if)#ip addr 192.168.18.1 255.255.255.0
R19(config-if)#no sh
R19(config-if)#
*Sep 17 04:58:21.755: %LINK-3-UPDOWN: Interface FastEthernet0/0, changed state to up
*Sep 17 04:58:22.755: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
R19(config-if)#
R19(config)#int f4/0
R19(config-if)#ip addr 192.168.19.1 255.255.255.0
R19(config-if)#no sh
```

Router20.

```
R20
File Edit View Search Terminal Help
changed state to down
*Sep 17 04:51:01.339: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial1/1, changed state to down
R20#
R20#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R20(config)#int f2/0
R20(config-if)#ip addr 192.168.19.2 255.255.255.0
R20(config-if)#no sh
R20(config-if)#
*Sep 17 05:00:19.363: %LINK-3-UPDOWN: Interface FastEthernet2/0, changed state to up
*Sep 17 05:00:20.363: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet2/0, changed state to up
R20(config-if)#
R20(config)#int f0/0
R20(config-if)#ip addr 192.168.20.1 255.255.255.0
R20(config-if)#no sh
R20(config-if)#
*Sep 17 05:00:47.307: %LINK-3-UPDOWN: Interface FastEthernet0/0, changed state to up
*Sep 17 05:00:48.307: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
R20(config-if)#
R20(config-if)#end
```

Enrutamiento Estático

Ahora procederemos a hacer el enrutamiento estático, los comandos son:

```
> conf t  
> ip route [IP] [mask] [Interface]
```

R1

```
File Edit View Search Terminal Help  
Success rate is 0 percent (0/5)  
R1#conf t  
Enter configuration commands, one per line. End with CNTL/Z.  
R1(config)#ip route 192.168.2.1 255.255.255.0 f0/0  
%Inconsistent address and mask  
R1(config)#  
R1(config)#  
R1(config)#ip route 192.168.2.1 255.255.255.0 f0/0  
%Inconsistent address and mask  
R1(config)#ip route 192.168.3.1 255.255.255.0 f0/0  
%Inconsistent address and mask  
R1(config)#ip route 192.168.2.0 255.255.255.0 f0/0  
R1(config)#ip route 192.168.3.0 255.255.255.0 f0/0  
R1(config)#ip route 192.168.4.0 255.255.255.0 f0/0  
R1(config)#ip route 192.168.5.0 255.255.255.0 f0/0  
R1(config)#ip route 192.168.6.0 255.255.255.0 f0/0  
R1(config)#end  
R1#
```

R2

```
File Edit View Search Terminal Help  
      192.168.2.0/24 is variably subnetted, 2 subnets, 2 masks  
C        192.168.2.0/24 is directly connected, FastEthernet2/0  
L        192.168.2.1/32 is directly connected, FastEthernet2/0  
      192.168.3.0/24 is variably subnetted, 2 subnets, 2 masks  
C        192.168.3.0/24 is directly connected, FastEthernet4/0  
L        192.168.3.1/32 is directly connected, FastEthernet4/0  
R2#  
R2#conf t  
Enter configuration commands, one per line. End with CNTL/Z.  
R2(config)#ip route 192.168.4.0 255.255.255.0 f2/0  
R2(config)#ip route 192.168.5.0 255.255.255.0 f2/0  
R2(config)#ip route 192.168.6.0 255.255.255.0 f4/0  
R2(config)#end  
R2#
```

R3

```
L      192.168.2.2/32 is directly connected, FastEthernet0/0
C      192.168.4.0/24 is variably subnetted, 2 subnets, 2 masks
L          192.168.4.0/24 is directly connected, FastEthernet4/0
L              192.168.4.1/32 is directly connected, FastEthernet4/0
C          192.168.5.0/24 is variably subnetted, 2 subnets, 2 masks
C              192.168.5.0/24 is directly connected, FastEthernet2/0
L                  192.168.5.1/32 is directly connected, FastEthernet2/0
R3#
R3#
R3#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R3(config)#ip route 192.168.1.0 255.255.255.0
% Incomplete command.

R3(config)#ip route 192.168.1.0 255.255.255.0 f0/0
R3(config)#ip route 192.168.3.0 255.255.255.0 f0/0
R3(config)#ip route 192.168.6.0 255.255.255.0 f2/0
R3(config)#end
R3#conf t
*Sep 17 00:42:23.135: %SYS-5-CONFIG_I: Configured from console by console
R3#sh ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
```

R4

```
File Edit View Search Terminal Help

L      192.168.5.0/24 is variably subnetted, 2 subnets, 2 masks
C          192.168.5.0/24 is directly connected, FastEthernet0/0
L          192.168.5.2/32 is directly connected, FastEthernet0/0
L      192.168.6.0/24 is variably subnetted, 2 subnets, 2 masks
C          192.168.6.0/24 is directly connected, FastEthernet2/0
L              192.168.6.1/32 is directly connected, FastEthernet2/0
R4#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R4(config)#ip route 192.168.1.0 255.255.255.0 f2/0
R4(config)#ip route 192.168.2.0 255.255.255.0 f2/0
R4(config)#ip route 192.168.3.0 255.255.255.0 f2/0
R4(config)#ip route 192.168.4.0 255.255.255.0 f0/0
R4(config)#end
R4#conf t
*Sep 17 00:44:49.563: %SYS-5-CONFIG_I: Configured from console by console
R4#sh ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2
       i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
       ia - IS-IS inter area, * - candidate default, U - per-user static route
       o - ODR, P - periodic downloaded static route, H - NHRP, L - LTSP
```

```
R5
File Edit View Search Terminal Help
    192.168.4.0/24 is variably subnetted, 2 subnets, 2 masks
C      192.168.4.0/24 is directly connected, FastEthernet2/0
L      192.168.4.2/32 is directly connected, FastEthernet2/0
    192.168.6.0/24 is variably subnetted, 2 subnets, 2 masks
C      192.168.6.0/24 is directly connected, FastEthernet4/0
L      192.168.6.2/32 is directly connected, FastEthernet4/0
R5#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R5(config)#ip route 192.168.1.0 255.255.255.0 f0/0
R5(config)#ip route 192.168.2.0 255.255.255.0 f0/0
R5(config)#ip route 192.168.5.0 255.255.255.0 f2/0
R5(config)#end
R5#
*Sep 17 00:46:16.351: %SYS-5-CONFIG_I: Configured from console by console
R5#sh ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
      D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
      N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
      E1 - OSPF external type 1, E2 - OSPF external type 2
      i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
      ia - IS-IS inter area, * - candidate default, U - per-user static route
      o - ODR, P - periodic downloaded static route, H - NHRP, l - LIS
      + - replicated route, % - next hop override
```

Enrutamiento RIP

Los comandos para configurar el Protocolo RIP en su versión 2, son:

```
> conf t
> router rip
> version 2
> network [IP]
```

A continuación, la configuración de los routers.

R6

```
File Edit View Search Terminal Help
R6(config-if)#no sh
R6(config-if)#end
R6#
*Sep 17 01:09:59.303: %SYS-5-CONFIG_I: Configured from console by console
R6#
*Sep 17 01:09:59.439: %LINK-3-UPDOWN: Interface FastEthernet0/0, changed state to up
*Sep 17 01:10:00.439: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
R6#
R6#
R6#
R6#
R6#
R6#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R6(config)#router rip
R6(config-router)#version 2
R6(config-router)#no auto-summary
R6(config-router)#network 192.168.8.0
R6(config-router)#end
R6#
*Sep 17 01:19:16.699: %SYS-5-CONFIG_I: Configured from console by console
R6#
```

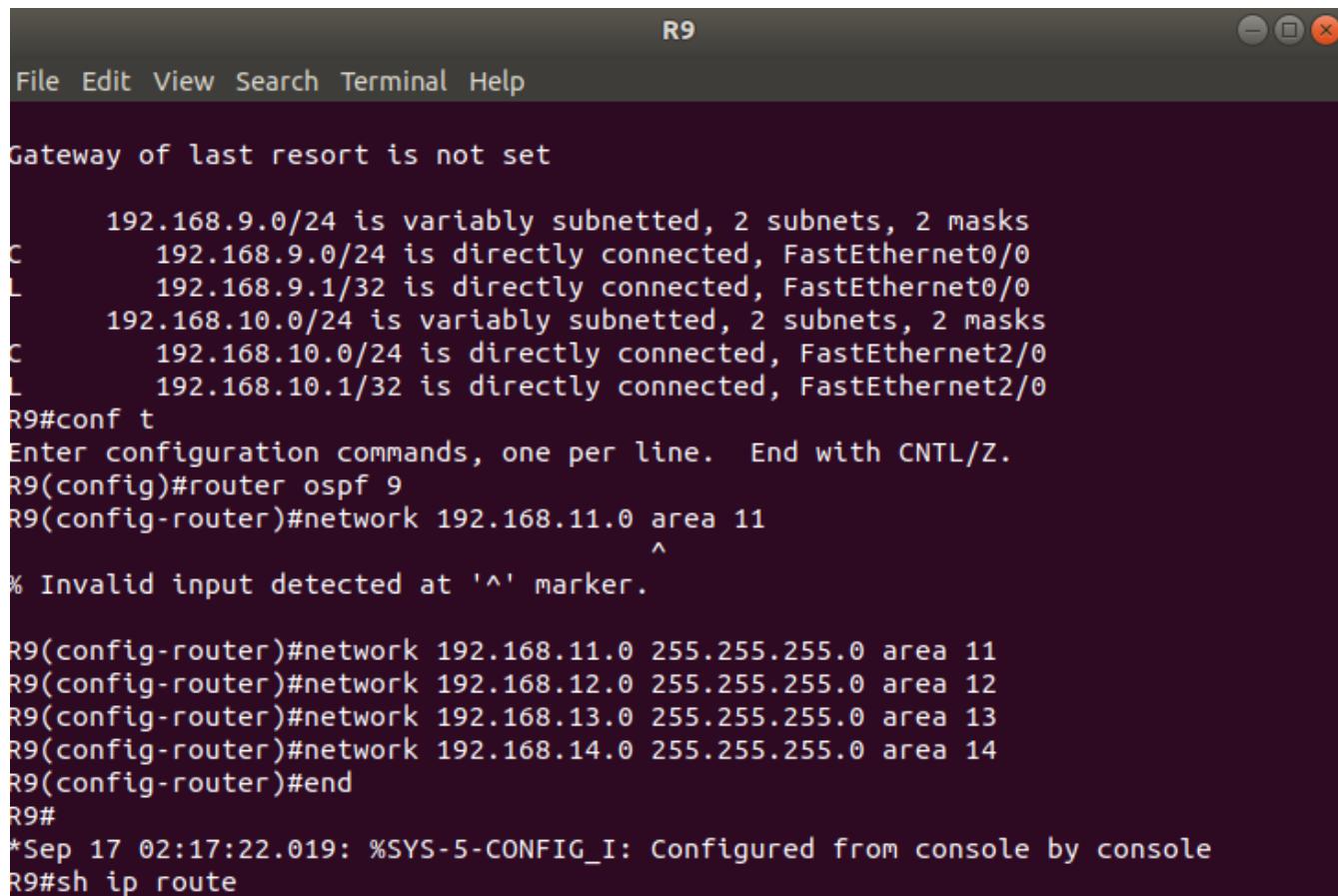
R8

```
File Edit View Search Terminal Help
R8(config-if)#
*Sep 17 01:15:12.455: %LINK-3-UPDOWN: Interface FastEthernet0/0, changed state to up
*Sep 17 01:15:13.455: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
R8(config-if)#end
R8#
*Sep 17 01:15:19.387: %SYS-5-CONFIG_I: Configured from console by console
R8#}t
R8#
R8#
R8#
R8#
R8#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R8(config)#router rip
R8(config-router)#version 2
R8(config-router)#no auto-su
R8(config-router)#no auto-summary
R8(config-router)#network 192.168.7.0
R8(config-router)#end
R8#
*Sep 17 01:20:56.503: %SYS-5-CONFIG_I: Configured from console by console
R8#
```

Enrutamiento OSPF

Los comandos para el protocolo OSPF, son:

```
> conf t  
> router ospf 1  
> network [IP] [mask] area 0  
> end
```



The image shows a terminal window titled "R9". The menu bar includes File, Edit, View, Search, Terminal, and Help. The main window displays the following configuration commands:

```
Gateway of last resort is not set

 192.168.9.0/24 is variably subnetted, 2 subnets, 2 masks
 C     192.168.9.0/24 is directly connected, FastEthernet0/0
 L     192.168.9.1/32 is directly connected, FastEthernet0/0
 192.168.10.0/24 is variably subnetted, 2 subnets, 2 masks
 C     192.168.10.0/24 is directly connected, FastEthernet2/0
 L     192.168.10.1/32 is directly connected, FastEthernet2/0
R9#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R9(config)#router ospf 9
R9(config-router)#network 192.168.11.0 area 11
^
% Invalid input detected at '^' marker.

R9(config-router)#network 192.168.11.0 255.255.255.0 area 11
R9(config-router)#network 192.168.12.0 255.255.255.0 area 12
R9(config-router)#network 192.168.13.0 255.255.255.0 area 13
R9(config-router)#network 192.168.14.0 255.255.255.0 area 14
R9(config-router)#end
R9#
*Sep 17 02:17:22.019: %SYS-5-CONFIG_I: Configured from console by console
R9#sh ip route
```

R10

```
File Edit View Search Terminal Help
FastEthernet2/0, changed state to up
R10#
*Sep 17 02:02:37.395: %SYS-5-CONFIG_I: Configured from console by console
R10#wr
Warning: Attempting to overwrite an NVRAM configuration previously written
by a different version of the system image.
Overwrite the previous NVRAM configuration?[confirm]
Building configuration...
[OK]
R10#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R10(config)#router ospf 10
R10(config-router)#network 192.168.10.0 255.255.255.0 area 10
^
6 Invalid input detected at '^' marker.

R10(config-router)#network 192.168.10.0 255.255.255.0 area 10
R10(config-router)#network 192.168.12.0 255.255.255.0 area 12
R10(config-router)#network 192.168.13.0 255.255.255.0 area 13
R10(config-router)#network 192.168.14.0 255.255.255.0 area 14
R10(config-router)#end
R10#
*Sep 17 02:22:43.671: %SYS-5-CONFIG_I: Configured from console by console
R10#
```

R11

```
File Edit View Search Terminal Help
R11(config-if)#end
*Sep 17 02:09:10.367: %LINK-3-UPDOWN: Interface FastEthernet4/0, changed state to up
*Sep 17 02:09:11.367: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet4/0, changed state to up
R11(config-if)#end
R11#
*Sep 17 02:09:12.515: %SYS-5-CONFIG_I: Configured from console by console
R11#wr
Warning: Attempting to overwrite an NVRAM configuration previously written
by a different version of the system image.
Overwrite the previous NVRAM configuration?[confirm]
Building configuration...
[OK]
R11#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R11(config)#router ospf 11
R11(config-router)#network 192.168.9.0 255.255.255.0 area 9
R11(config-router)#network 192.168.11.0 255.255.255.0 area 11
R11(config-router)#network 192.168.14.0 255.255.255.0 area 14
R11(config-router)#end
R11#
*Sep 17 02:25:42.283: %SYS-5-CONFIG_I: Configured from console by console
R11#
```

R12

```
File Edit View Search Terminal Help
*Sep 17 02:05:37.979: %LINK-3-UPDOWN: Interface FastEthernet2/0, changed state to up
*Sep 17 02:05:38.979: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet2/0, changed state to up
R12(config-if)#end
R12#
*Sep 17 02:05:43.891: %SYS-5-CONFIG_I: Configured from console by console
R12#wr
Warning: Attempting to overwrite an NVRAM configuration previously written
by a different version of the system image.
Overwrite the previous NVRAM configuration?[confirm]
Building configuration...
[OK]
R12#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R12(config)#router ospf 12
R12(config-router)#network 192.168.9.0 255.255.255.0 area 9
R12(config-router)#network 192.168.10.0 255.255.255.0 area 10
R12(config-router)#network 192.168.13.0 255.255.255.0 area 13
R12(config-router)#network 192.168.14.0 255.255.255.0 area 14
R12(config-router)#end
R12#
*Sep 17 02:24:23.859: %SYS-5-CONFIG_I: Configured from console by console
R12#
```

R13

```
File Edit View Search Terminal Help
*Sep 17 02:11:53.667: %LINK-3-UPDOWN: Interface FastEthernet2/0, changed state to up
*Sep 17 02:11:54.667: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet2/0, changed state to up
R13(config-if)#end
R13#
*Sep 17 02:11:55.747: %SYS-5-CONFIG_I: Configured from console by console
R13#wr
Warning: Attempting to overwrite an NVRAM configuration previously written
by a different version of the system image.
Overwrite the previous NVRAM configuration?[confirm]
Building configuration...
[OK]
R13#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R13(config)#router ospf 13
R13(config-router)#network 192.168.9.0 255.255.255.0 area 9
R13(config-router)#network 192.168.10.0 255.255.255.0 area 10
R13(config-router)#network 192.168.11.0 255.255.255.0 area 11
R13(config-router)#network 192.168.12.0 255.255.255.0 area 12
R13(config-router)#end
R13#
*Sep 17 02:27:07.351: %SYS-5-CONFIG_I: Configured from console by console
R13#
```

R14

```
File Edit View Search Terminal Help
*Sep 17 02:13:15.707: %SYS-5-CONFIG_I: Configured from console by console
R14#
*Sep 17 02:13:15.715: %LINK-3-UPDOWN: Interface FastEthernet0/0, changed state to up
*Sep 17 02:13:16.715: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
R14#wr
Warning: Attempting to overwrite an NVRAM configuration previously written
by a different version of the system image.
Overwrite the previous NVRAM configuration?[confirm]
Building configuration...
[OK]
R14#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R14(config)#router ospf 14
R14(config-router)#network 192.168.9.0 255.255.255.0 area 9
R14(config-router)#network 192.168.10.0 255.255.255.0 area 10
R14(config-router)#network 192.168.11.0 255.255.255.0 area 11
R14(config-router)#network 192.168.12.0 255.255.255.0 area 12
R14(config-router)#network 192.168.13.0 255.255.255.0 area 13
R14(config-router)#end
R14#
*Sep 17 02:29:01.951: %SYS-5-CONFIG_I: Configured from console by console
R14#
```

Enrutamiento EIGRP

Los comandos para este protocolo son:

```
> conf t
> router eigrp 10
> network [IP] [mask]
> no auto-summary
> end
```

R15

File Edit View Search Terminal Help

```
R15#
R15#
R15#
R15#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R15(config)#router eigr
R15(config)#router eigrp 10
R15(config-router)#net
R15(config-router)#network 192.168.15.0 0.0.0.255
R15(config-router)#network 192.168.16.0 0.0.0.255
R15(config-router)#network 192.168.17.0 0.0.0.255
R15(config-router)#network 192.168.18.0 0.0.0.255
R15(config-router)#network 192.168.19.0 0.0.0.255
R15(config-router)#network 192.168.20.0 0.0.0.255
R15(config-router)#network 192.168.21.0 0.0.0.255
R15(config-router)#no au
R15(config-router)#no auto-summary
R15(config-router)#end
R15#
*Sep 17 05:11:47.439: %SYS-5-CONFIG_I: Configured from console by console
R15#
*Sep 17 05:12:58.907: %DUAL-5-NBRCHANGE: EIGRP-IPv4 10: Neighbor 192.168.16.2 (FastEthernet2/0) is up: new adjacency
R15#
```

R16

File Edit View Search Terminal Help

```
R16(config)#router eigrp 10
R16(config-router)#net
R16(config-router)#network 192.168.15.0 0.0.0.255
R16(config-router)#network 192.168.15.0 0.0.0.255
*Sep 17 05:20:46.247: %DUAL-5-NBRCHANGE: EIGRP-IPv4 10: Neighbor 192.168.15.1 (FastEthernet0/0) is up: new adjacency
R16(config-router)#network 192.168.16.0 0.0.0.255
R16(config-router)#network 192.168.17.0 0.0.0.255
R16(config-router)#network 192.168.18.0 0.0.0.255
R16(config-router)#network 192.168.18.0 0.0.0.255
*Sep 17 05:20:58.371: %DUAL-5-NBRCHANGE: EIGRP-IPv4 10: Neighbor 192.168.18.1 (FastEthernet4/0) is up: new adjacency
R16(config-router)#network 192.168.19.0 0.0.0.255
R16(config-router)#network 192.168.20.0 0.0.0.255
R16(config-router)#network 192.168.21.0 0.0.0.255
R16(config-router)#no
*Sep 17 05:21:09.123: %DUAL-5-NBRCHANGE: EIGRP-IPv4 10: Neighbor 192.168.21.1 (FastEthernet2/0) is up: new adjacency
R16(config-router)#no au
R16(config-router)#no auto-summary
R16(config-router)#end
R16#
*Sep 17 05:21:12.303: %SYS-5-CONFIG_I: Configured from console by console
R16#
```

R17

```
File Edit View Search Terminal Help
R17#
R17#
R17#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R17(config)#router eigrp
R17(config)#router eigrp 10
R17(config-router)#netw
R17(config-router)#network 192.168.15.0 0.0.0.255
R17(config-router)#network 192.168.16.0 0.0.0.255
R17(config-router)#network 192.168.16.0 0.0.0.255
*Sep 17 05:12:59.591: %DUAL-5-NBRCHANGE: EIGRP-IPv4 10: Neighbor 192.168.16.1 (FastEthernet0/0) is up: new adjacency
R17(config-router)#network 192.168.17.0 0.0.0.255
R17(config-router)#network 192.168.18.0 0.0.0.255
R17(config-router)#network 192.168.19.0 0.0.0.255
R17(config-router)#network 192.168.20.0 0.0.0.255
R17(config-router)#network 192.168.21.0 0.0.0.255
R17(config-router)#no au
R17(config-router)#no auto-summary
R17(config-router)#end
R17#
*Sep 17 05:13:36.671: %SYS-5-CONFIG_I: Configured from console by console
R17#sh ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
```

R18

```
File Edit View Search Terminal Help
[OK]
R18#
R18#
R18#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R18(config)#router ei
R18(config)#router eigrp 10
R18(config-router)#net
R18(config-router)#network 192.168.15.0 0.0.0.255
R18(config-router)#network 192.168.16.0 0.0.0.255
R18(config-router)#network 192.168.17.0 0.0.0.255
R18(config-router)#network 192.168.18.0 0.0.0.255
R18(config-router)#network 192.168.19.0 0.0.0.255
R18(config-router)#network 192.168.20.0 0.0.0.255
R18(config-router)#network 192.168.20.0 0.0.0.255
*Sep 17 05:19:49.087: %DUAL-5-NBRCHANGE: EIGRP-IPv4 10: Neighbor 192.168.20.1 (FastEthernet2/0) is up: new adjacency
R18(config-router)#network 192.168.21.0 0.0.0.255
R18(config-router)#no au
R18(config-router)#no auto-summary
R18(config-router)#end
R18#
*Sep 17 05:19:56.511: %SYS-5-CONFIG_I: Configured from console by console
R18#
```

R19

```
File Edit View Search Terminal Help
OK]
R19#
R19#
R19#
R19#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R19(config)#router ei
R19(config)#router eigrp 10
R19(config-router)#network 192.168.15.0 0.0.0.255
R19(config-router)#network 192.168.16.0 0.0.0.255
R19(config-router)#network 192.168.17.0 0.0.0.255
R19(config-router)#network 192.168.17.0 0.0.0.255
*Sep 17 05:16:44.251: %DUAL-5-NBRCHANGE: EIGRP-IPv4 10: Neighbor 192.168.17.1 (FastEthernet2/0) is up: new adjacency
R19(config-router)#network 192.168.18.0 0.0.0.255
R19(config-router)#network 192.168.19.0 0.0.0.255
R19(config-router)#network 192.168.20.0 0.0.0.255
R19(config-router)#network 192.168.21.0 0.0.0.255
R19(config-router)#no au
R19(config-router)#no auto-summary
R19(config-router)#end
R19#
*Sep 17 05:17:05.563: %SYS-5-CONFIG_I: Configured from console by console
R19#
```

R20

```
File Edit View Search Terminal Help
[OK]
R20#
R20#
R20#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R20(config)#router ei
R20(config)#router eigrp 10
R20(config-router)#net
R20(config-router)#network 192.168.15.0 0.0.0.255
R20(config-router)#network 192.168.16.0 0.0.0.255
R20(config-router)#network 192.168.17.0 0.0.0.255
R20(config-router)#network 192.168.18.0 0.0.0.255
R20(config-router)#network 192.168.19.0 0.0.0.255
R20(config-router)#network 192.168.19.0 0.0.0.255
*Sep 17 05:18:08.531: %DUAL-5-NBRCHANGE: EIGRP-IPv4 10: Neighbor 192.168.19.1 (FastEthernet2/0) is up: new adjacency
R20(config-router)#network 192.168.20.0 0.0.0.255
R20(config-router)#network 192.168.21.0 0.0.0.255
R20(config-router)#no au
R20(config-router)#no auto-summary
R20(config-router)#end
R20#
*Sep 17 05:18:19.195: %SYS-5-CONFIG_I: Configured from console by console
R20#
```

Redistribución entre Protocolos

A continuación, mostraremos la asignación de direcciones IP a las conexiones entre Routers con diferentes protocolos, así como los comandos para redistribuir los protocolos y puedan comunicarse entre ellos.

Comandos para redistribuir:

RIP

```
> router rip  
# OSPF  
> redistribute ospf 1 metric 2  
# EIGRP  
> redistribute eigrp 10 metric 2
```

EIGRP

```
> router eigrp 10  
# RIP  
> redistribute rip metric 10000 10 255 1 1500  
# OSPF  
> redistribute ospf 1 metric 10000 100 255 1 1500
```

OSPF

```
> router ospf 1  
# EIGRP  
> redistribute eigrp 10 subnets  
# RIP  
> redistribute rip subnets
```

R1

```
File Edit View Search Terminal Help
*Sep 17 05:45:43.431: %LINK-5-CHANGED: Interface GigabitEthernet6/0, changed state to administratively down
R1#
R1#
R1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#int f2/0
R1(config-if)#ip addr 192.168.22.1 255.255.255.0
R1(config-if)#no sh
R1(config-if)#end
R1#wr
Warning: Attempting to overwrite an NVRAM configuration previously written by a different version of the system image.
Overwrite the previous NVRAM configuration?[confirm]
*Sep 17 05:47:20.127: %SYS-5-CONFIG_I: Configured from console by console [confirm]
*Sep 17 05:47:20.983: %LINK-3-UPDOWN: Interface FastEthernet2/0, changed state to up
*Sep 17 05:47:21.983: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet2/0, changed state to up [confirm]
Building configuration...
[OK]
R1#
```

R4

```
File Edit View Search Terminal Help
et4/0, changed state to down
*Sep 17 05:52:53.467: %LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet6/0, changed state to down
R4#
R4#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R4(config)#int f4/0
R4(config-if)#ip addr 192.168.23.1 255.255.255.0
R4(config-if)#no sh
R4(config-if)#end
*Sep 17 05:53:37.615: %LINK-3-UPDOWN: Interface FastEthernet4/0, changed state to up
*Sep 17 05:53:38.615: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet4/0, changed state to up
R4(config-if)#end
R4#wr
*Sep 17 05:53:39.967: %SYS-5-CONFIG_I: Configured from console by console
R4#wr
Warning: Attempting to overwrite an NVRAM configuration previously written by a different version of the system image.
Overwrite the previous NVRAM configuration?[confirm]
Building configuration...
[OK]
R4#
```

R6

```
File Edit View Search Terminal Help
Ethernet3/0, changed state to down
*Sep 17 06:01:19.743: %LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet6/0, changed state to down
R6#
R6#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R6(config)#int f2/0
R6(config-if)#ip addr 192.168.24.1 255.255.255.0
R6(config-if)#no sh
R6(config-if)#end
*Sep 17 06:02:06.415: %LINK-3-UPDOWN: Interface FastEthernet2/0, changed state to up
*Sep 17 06:02:07.415: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet2/0, changed state to up
R6(config-if)#end
R6#wr
*Sep 17 06:02:09.327: %SYS-5-CONFIG_I: Configured from console by console
R6#wr
Warning: Attempting to overwrite an NVRAM configuration previously written
by a different version of the system image.
Overwrite the previous NVRAM configuration?[confirm]
Building configuration...
[OK]
R6#
```

R1

```
File Edit View Search Terminal Help
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#router os
R1(config)#router ospf 1
R1(config-router)#netw
R1(config-router)#network 192.168.22.0 0.0.0.255 area 0
R1(config-router)#end
R1#wr
*Sep 18 05:44:18.947: %SYS-5-CONFIG_I: Configured from console by console
R1#wr
Warning: Attempting to overwrite an NVRAM configuration previously written
by a different version of the system image.
Overwrite the previous NVRAM configuration?[confirm]
Building configuration...
[OK]
R1#
*Sep 18 05:44:26.723: %OSPF-5-ADJCHG: Process 1, Nbr 192.168.11.1 on FastEthernet2/0 from LOADING to FULL, Loading Done
R1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#ip route 192.168.22.0 255.255.255.0 f2/0
R1(config)#end
R1#w
*Sep 18 05:45:53.579: %SYS-5-CONFIG_I: Configured from console by console
R1#wr
```

R6

```
File Edit View Search Terminal Help
R6#
R6#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R6(config)#router rip
R6(config-router)#version 2
R6(config-router)#netw
R6(config-router)#network 192.168.24.0
R6(config-router)#end
R6#
*Sep 18 05:00:39.699: %SYS-5-CONFIG_I: Configured from console by console
R6#wr
Warning: Attempting to overwrite an NVRAM configuration previously written
by a different version of the system image.
Overwrite the previous NVRAM configuration?[confirm]
Building configuration...
[OK]
R6#
R6#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R6(config)#router rip
R6(config-router)#redi
R6(config-router)#redistribute os
R6(config-router)#redistribute ospf 1 metric 2
R6(config-router)#end
```

R10

```
File Edit View Search Terminal Help
et4/0, changed state to down
*Sep 17 05:45:50.887: %LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEth
ernet6/0, changed state to down
R10#
R10#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R10(config)#int f4/0
R10(config-if)#ip addr 192.168.22.2 255.255.255.0
R10(config-if)#no sh
R10(config-if)#end
*Sep 17 05:49:59.943: %LINK-3-UPDOWN: Interface FastEthernet4/0, changed state t
o up
*Sep 17 05:50:00.943: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet
et4/0, changed state to up
R10(config-if)#end
R10#wr
*Sep 17 05:50:02.547: %SYS-5-CONFIG_I: Configured from console by console
R10#wr
Warning: Attempting to overwrite an NVRAM configuration previously written
by a different version of the system image.
Overwrite the previous NVRAM configuration?[confirm]
Building configuration...
[OK]
R10#
```

R10

```
File Edit View Search Terminal Help
FastEthernet4/0, changed state to down
*Sep 17 05:45:50.887: %LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet6/0, changed state to down
R10#
R10#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R10(config)#int f4/0
R10(config-if)#ip addr 192.168.22.2 255.255.255.0
R10(config-if)#no sh
R10(config-if)#end
*Sep 17 05:49:59.943: %LINK-3-UPDOWN: Interface FastEthernet4/0, changed state to up
*Sep 17 05:50:00.943: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet4/0, changed state to up
R10(config-if)#end
R10#wr
*Sep 17 05:50:02.547: %SYS-5-CONFIG_I: Configured from console by console
R10#wr
Warning: Attempting to overwrite an NVRAM configuration previously written
by a different version of the system image.
Overwrite the previous NVRAM configuration?[confirm]
Building configuration...
[OK]
R10#
```

R12

```
File Edit View Search Terminal Help
GigabitEthernet6/0, changed state to administratively down
*Sep 17 05:52:57.115: %LINK-5-CHANGED: Interface GigabitEthernet6/0, changed state to administratively down
R12#
R12#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R12(config)#int f4/0
R12(config-if)#ip addr 192.168.23.2 255.255.255.0
R12(config-if)#no sh
R12(config-if)#end
*Sep 17 05:55:19.395: %LINK-3-UPDOWN: Interface FastEthernet4/0, changed state to up
*Sep 17 05:55:20.395: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet4/0, changed state to up
R12(config-if)#end
R12#
*Sep 17 05:55:22.355: %SYS-5-CONFIG_I: Configured from console by console
R12#wr
Warning: Attempting to overwrite an NVRAM configuration previously written
by a different version of the system image.
Overwrite the previous NVRAM configuration?[confirm]
Building configuration...
[OK]
R12#
```

R14

```
File Edit View Search Terminal Help
et4/0, changed state to down
*Sep 17 06:01:11.651: %LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet6/0, changed state to down
R14#
R14#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R14(config)#int f2/0
R14(config-if)#ip addr 192.168.24.2 255.255.255.0
R14(config-if)#no sh
R14(config-if)#end
*Sep 17 06:10:01.883: %LINK-3-UPDOWN: Interface FastEthernet2/0, changed state to up
*Sep 17 06:10:02.883: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet2/0, changed state to up
R14(config-if)#end
R14#w
*Sep 17 06:10:05.151: %SYS-5-CONFIG_I: Configured from console by console
R14#wr
Warning: Attempting to overwrite an NVRAM configuration previously written
by a different version of the system image.
Overwrite the previous NVRAM configuration?[confirm]
Building configuration...
[OK]
R14#
```

R17

```
File Edit View Search Terminal Help
et4/0, changed state to down
*Sep 17 06:01:25.239: %LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet6/0, changed state to down
R17#
R17#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R17(config)#int f4/0
R17(config-if)#ip addr 192.168.25.2 255.255.255.0
R17(config-if)#no sh
R17(config-if)#end
*Sep 17 06:03:26.379: %LINK-3-UPDOWN: Interface FastEthernet4/0, changed state to up
*Sep 17 06:03:27.379: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet4/0, changed state to up
R17(config-if)#end
R17#
*Sep 17 06:03:28.803: %SYS-5-CONFIG_I: Configured from console by console
R17#wr
Warning: Attempting to overwrite an NVRAM configuration previously written
by a different version of the system image.
Overwrite the previous NVRAM configuration?[confirm]
Building configuration...
[OK]
R17#
```

R20

```
File Edit View Search Terminal Help
to administratively down
*Sep 17 06:14:11.215: %LINK-5-CHANGED: Interface GigabitEthernet6/0, changed state to administratively down
R20#
R20#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R20(config)#int f4/0
R20(config-if)#ip addr 192.168.26.2 255.255.255.0
R20(config-if)#no sh
R20(config-if)#end
*Sep 17 06:16:15.379: %LINK-3-UPDOWN: Interface FastEthernet4/0, changed state to up
*Sep 17 06:16:16.379: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet4/0, changed state to up
R20(config-if)#end
R20#w
*Sep 17 06:16:18.467: %SYS-5-CONFIG_I: Configured from console by console
R20#wr
Warning: Attempting to overwrite an NVRAM configuration previously written
by a different version of the system image.
Overwrite the previous NVRAM configuration?[confirm]
Building configuration...
[OK]
R20#
```

R14

```
File Edit View Search Terminal Help
R14#
R14#
R14#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R14(config)#router ospf 1
R14(config-router)#redi
R14(config-router)#redistribute rip subnet
R14(config-router)#redistribute rip subnets
R14(config-router)#end
R14#conf
*Sep 18 05:03:41.871: %SYS-5-CONFIG_I: Configured from console by console
R14#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R14(config)#router rip
R14(config-router)#redi
R14(config-router)#redistribute os
R14(config-router)#redistribute ospf 1 metric 2
R14(config-router)#end
R14#wr
*Sep 18 05:04:06.311: %SYS-5-CONFIG_I: Configured from console by console
R14#wr
Warning: Attempting to overwrite an NVRAM configuration previously written
by a different version of the system image.
Overwrite the previous NVRAM configuration?[confirm]
```

R14

```
File Edit View Search Terminal Help
R14#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R14(config)#router ei
R14(config)#router eigrp 10
R14(config-router)#redi
R14(config-router)#redistribute os
R14(config-router)#redistribute ospf 1 metric 10000 100 255 1 1500
R14(config-router)#end
R14#ro
*Sep 18 05:17:34.287: %SYS-5-CONFIG_I: Configured from console by console
R14#router os
R14#router osp
R14#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R14(config)#rou
R14(config)#router osp
R14(config)#router ospf 1
R14(config-router)#redi
R14(config-router)#redistribute eig
R14(config-router)#redistribute eigrp 10 subn
R14(config-router)#redistribute eigrp 10 subnets
R14(config-router)#end
R14#wr
Building configuration...
```

R1

```
File Edit View Search Terminal Help
Sending 5, 100-byte ICMP Echos to 192.168.11.2, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 20/32/56 ms
R1#ping 192.168.12.1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.12.1, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 24/32/44 ms
R1#ping 192.168.12.2
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.12.2, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 36/46/76 ms
R1#ping 192.168.13.1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.13.1, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 32/43/60 ms
R1#ping 192.168.13.2
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.13.2, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 56/76/116 ms
R1#
```

R1

```
File Edit View Search Terminal Help
Sending 5, 100-byte ICMP Echos to 192.168.11.2, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 20/32/56 ms
R1#ping 192.168.12.1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.12.1, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 24/32/44 ms
R1#ping 192.168.12.2
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.12.2, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 36/46/76 ms
R1#ping 192.168.13.1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.13.1, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 32/43/60 ms
R1#ping 192.168.13.2
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.13.2, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 56/76/116 ms
R1#
```

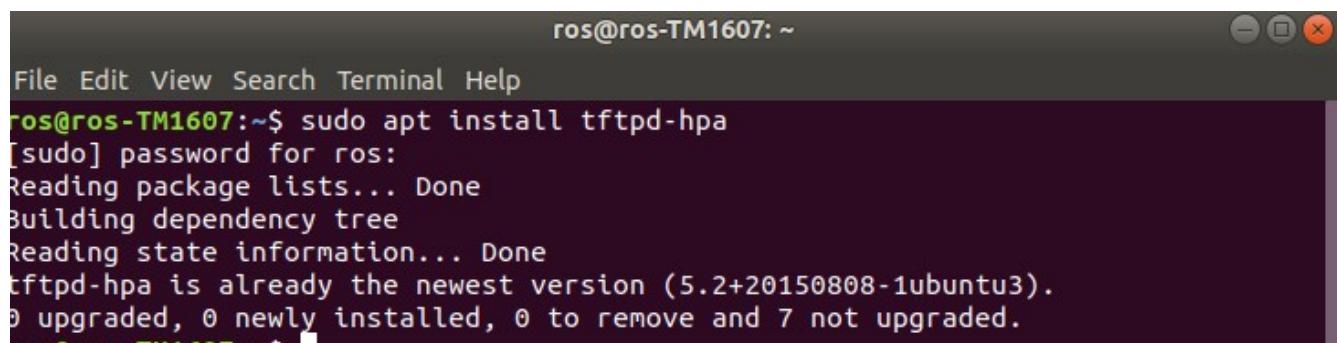
R13

```
File Edit View Search Terminal Help
Overwrite the previous NVRAM configuration?[confirm]
Building configuration...
[OK]
R13#ping 192.168.25.1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.25.1, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 12/37/60 ms
R13#ping 192.168.25.2
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.25.2, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 16/37/68 ms
R13#ping 192.168.16.1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.16.1, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 52/65/84 ms
R13#ping 192.168.15.1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.15.1, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 48/59/72 ms
R13#
```

Servidor

A continuación mostraremos la instalación y configuración del servidor tftp.

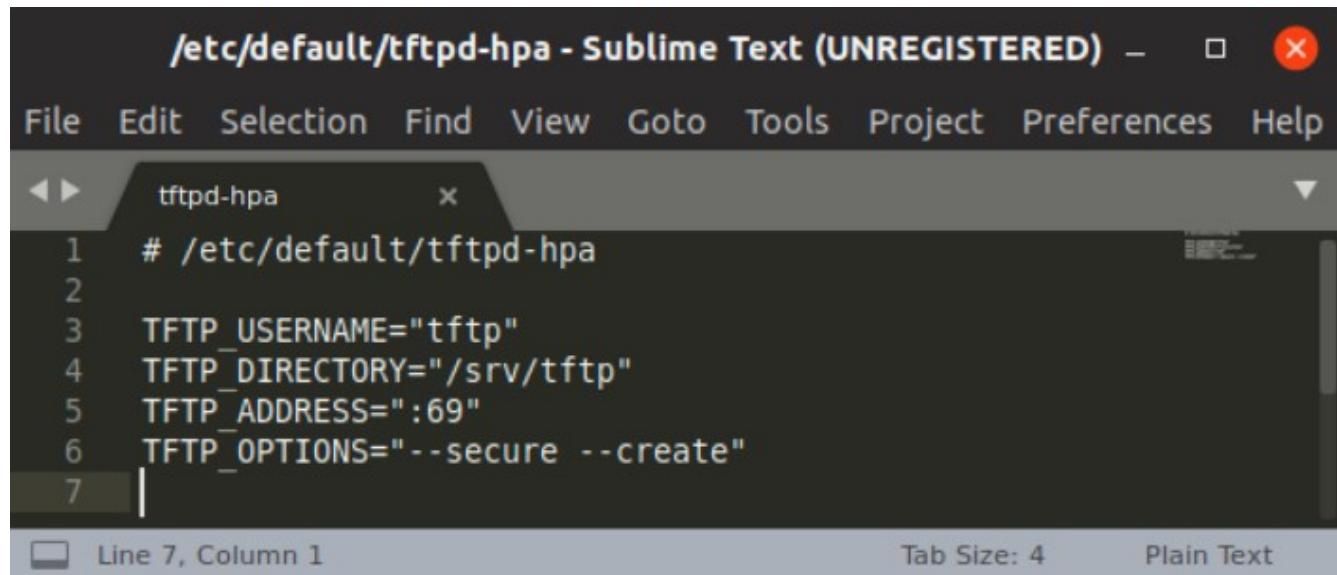
1. Instalación



```
ros@ros-TM1607: ~
File Edit View Search Terminal Help
ros@ros-TM1607:~$ sudo apt install tftpd-hpa
[sudo] password for ros:
Reading package lists... Done
Building dependency tree
Reading state information... Done
tftpd-hpa is already the newest version (5.2+20150808-1ubuntu3).
0 upgraded, 0 newly installed, 0 to remove and 7 not upgraded.
```

2. Configuración

Para activar la creación al servidor tftp, se debe configurar el archivo tftpd-hpa, dejando como directorio de los archivos la dirección “/srv/tftp” y las opciones como “--secure --create”.



```
/etc/default/tftpd-hpa - Sublime Text (UNREGISTERED) - □ X
File Edit Selection Find View Goto Tools Project Preferences Help
tftpd-hpa x
1 # /etc/default/tftpd-hpa
2
3 TFTP_USERNAME="tftp"
4 TFTP_DIRECTORY="/srv/tftp"
5 TFTP_ADDRESS=:69"
6 TFTP_OPTIONS="--secure --create"
7 |
```

```
edgrfa@EdgrDesktop: ~
Archivo Editar Ver Buscar Terminal Ayuda
● tftpd-hpa.service - LSB: HPA's tftp server
  Loaded: loaded (/etc/init.d/tftpd-hpa; generated)
  Active: active (running) since Fri 2019-09-20 01:14:04 CDT; 19min ago
    Docs: man:systemd-sysv-generator(8)
 Process: 1216 ExecStart=/etc/init.d/tftpd-hpa start (code=exited, status=0/SUCCESS)
  Tasks: 1 (limit: 4915)
 CGroup: /system.slice/tftpd-hpa.service
         └─1260 /usr/sbin/in.tftpd --listen --user tftp --address :69 --secure --create /srv/tftp

sep 20 01:14:04 EdgrDesktop systemd[1]: Starting LSB: HPA's tftp server...
sep 20 01:14:04 EdgrDesktop tftpd-hpa[1216]: * Starting HPA's tftpd in.tftpd
sep 20 01:14:04 EdgrDesktop tftpd-hpa[1216]: ...done.
sep 20 01:14:04 EdgrDesktop systemd[1]: Started LSB: HPA's tftp server.
~
~
~
```

Telnet

A continuación mostraremos la configuración que deben llevar todos los routers, para poder hacer la comunicación Telnet.

Comandos:

```
> conf t  
> line vty 0 4  
> password 123  
> login
```

R8

```
File Edit View Search Terminal Help
*Sep 20 08:37:18.779: %LINK-5-CHANGED: Interface Serial4/3, changed state to administratively down
*Sep 20 08:37:58.263: %OSPF-5-ADJCHG: Process 1, Nbr 192.168.22.1 on FastEthernet0/0 from LOADING to FULL, Loading Done
R8#
R8#
R8#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R8(config)#line vty 0 4
R8(config-line)#password 123
R8(config-line)#login
R8(config-line)#end
R8#we
6 Incomplete command.

R8#
*Sep 20 09:06:25.283: %SYS-5-CONFIG_I: Configured from console by console
R8#wr
Warning: Attempting to overwrite an NVRAM configuration previously written
by a different version of the system image.
Overwrite the previous NVRAM configuration?[confirm]
Building configuration...
[OK]
R8#
```

R5

```
File Edit View Search Terminal Help
changed state to down
*Sep 20 09:07:42.019: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial4/1,
changed state to down
*Sep 20 09:07:42.079: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial4/2,
changed state to down
*Sep 20 09:07:42.091: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial4/3,
changed state to down
R5#
R5#
R5#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R5(config)#line vty 0 4
R5(config-line)#password 123
R5(config-line)#login
R5(config-line)#end
R5#wr
Warning: Attempting to overwrite an NVRAM configuration previously written
by a different version of the system image.
Overwrite the previous NVRAM configuration?[confirm]
*Sep 20 09:08:26.247: %SYS-5-CONFIG_I: Configured from console by console
[confirm]
Building configuration...
[OK]
R5#
```

The screenshot shows two terminal windows side-by-side. The left window is titled 'R18' and the right window is titled 'R15'. Both windows have a standard Linux-style menu bar at the top: 'File Edit View Search Terminal Help'. The main area of each window displays configuration commands being entered.

R18 Window Content:

```
*Sep 20 09:10:48.131: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial4/1, changed state to down
*Sep 20 09:10:48.215: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial4/2, changed state to down
*Sep 20 09:10:48.239: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial4/3, changed state to down
*Sep 20 09:11:03.263: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial4/0, changed state to down
R18#
R18#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R18(config)#line vty 0 4
R18(config-line)#password 123
R18(config-line)#login
R18(config-line)#end
R18#wr
Warning: Attempting to overwrite an NVRAM configuration previously written by a different version of the system image.
Overwrite the previous NVRAM configuration?[confirm]
*Sep 20 09:18:26.115: %SYS-5-CONFIG_I: Configured from console by console [confirm]
Building configuration...
[OK]
R18#
```

Script

Para poder modificar automáticamente el archivo de configuración de los routers, es necesario hacer uso de scripts, los cuales son pequeños programas que al ejecutar, enviarán comandos que hagan automático un proceso. En este caso, hicimos dos scripts, uno para el Router 1 y otro para el Router 5, que en este caso no debían ser configurados manualmente.

La función de estos scripts es extraer el archivo de configuración de cada router, modificarlo y después devolverlo a su ubicación y así poder ejecutarlo.

A continuación, el código de cada uno de ellos:

edgrfa@EdgrDesktop: /media/edgrfa/DATA/UbuntuFiles/Practica2TelnetTFTP/Scripts

Archivo Editar Ver Buscar Terminal Ayuda

```
edgrfa@EdgrDesktop:/media/edgrfa/DATA/UbuntuFiles/Practica2TelnetTFTP/Scripts$ python3 r5-conf.py
Telnet(b'192.168.5.2',23): recv b'\xff\xfb\x01\xff\xfb\x03\xff\xfd\x18\xff\xfd\x1f\r\n\r\nUser Acces
s Verification\r\n\r\nPasswo'
Telnet(b'192.168.5.2',23): IAC WILL 1
Telnet(b'192.168.5.2',23): IAC WILL 3
Telnet(b'192.168.5.2',23): IAC DO 24
Telnet(b'192.168.5.2',23): IAC DO 31
Telnet(b'192.168.5.2',23): recv b'rd: '
Telnet(b'192.168.5.2',23): send b'1234\n'
Telnet(b'192.168.5.2',23): recv b'\xff\xfc\x01'
Telnet(b'192.168.5.2',23): IAC WONT 1
Telnet(b'192.168.5.2',23): recv b'\xff\xfc\x03\xff\xfe\x18\xff\xfe\x1f\r\nR5>'
Telnet(b'192.168.5.2',23): IAC WONT 3
Telnet(b'192.168.5.2',23): IAC DONT 24
Telnet(b'192.168.5.2',23): IAC DONT 31
Telnet(b'192.168.5.2',23): send b'enable\n'
Telnet(b'192.168.5.2',23): recv b'e'
Telnet(b'192.168.5.2',23): recv b'nable\r\nPassword: '
Telnet(b'192.168.5.2',23): send b'1234\n'
Telnet(b'192.168.5.2',23): recv b'\r\nR5#'
Telnet(b'192.168.5.2',23): send b'copy running-config tftp:\n'
Telnet(b'192.168.5.2',23): recv b'cop'
Telnet(b'192.168.5.2',23): recv b'y running'
Telnet(b'192.168.5.2',23): recv b'-config '
Telnet(b'192.168.5.2',23): recv b'tf'
```

The screenshot shows a code editor window with the following details:

- File Path:** r1-conf (1).py
~/Downloads
- Toolbar:** Open ▾, Save, Minimize, Maximize, Close.

The code itself is a Python script for connecting to a Cisco router via Telnet, performing configuration tasks, and modifying its running configuration. It includes comments explaining the steps:

```
HostAnfitrion = '192.168.0.2'.encode('utf-8')
HostR1 = '192.168.0.1'.encode('utf-8')
PasswordTelnetR1 = '1234'.encode('utf-8')
PasswordEnableR1 = '1234'.encode('utf-8')

#Conectar Telnet R1
tn = telnetlib.Telnet(HostR1)
tn.set_debuglevel(9)
tn.read_until(b'Password: ', 5)
tn.write(PasswordTelnetR1 + b'\n')

#Activar el modo enable en R1
tn.read_until(b'R1>', 5)
tn.write(b'enable\n')

tn.read_until(b'Password: ', 5)
tn.write(PasswordEnableR1 + b'\n')

#Obtener el archivo de configuracion
tn.read_until(b'R1#', 5)
tn.write(b'copy running-config tftp:\n')

tn.read_until(b'Address or name of remote host []? ', 5)
tn.write(HostAnfitrion + b'\n')

tn.read_until(b'Destination filename ', 5)
tn.write(b'running-config-r1\n')
tn.read_until(b'R1#', 5)

#Modificar archivo de configuracion
fin = open("/srv/tftp/running-config-r1", "rt")
data = fin.read()
data = data.replace('interface FastEthernet2/0\n no ip address\n shutdown', 'interface FastEthernet2/0\n ip address 192.168.22.1 255.255.255.0\n no shutdown')
data = data.replace('ip forward-protocol nd', 'router ospf 1\n redistribute static\n network 192.168.22.0 0.0.0.255 area 0\n!\nip forward-protocol nd')
#data = data.replace('no ip address\nshutdown', '!')
fin.close()

fin = open("/srv/tftp/modified-running-config-r1", "wt")
fin.write(data)
fin.close()

#Reemplazar archivo de configuracion
tn.write(b'copy tftp: running-config\n')

tn.read_until(b'Address or name of remote host []? ', 5)
tn.write(HostAnfitrion + b'\n')

tn.read_until(b'Source filename []? ', 5)
tn.write(b'modified-running-config-r1\n')
```

```
Open ▾  r5-conf.py ~/Downloads Save     
HostAnfitrion = '192.168.0.2'.encode('utf-8')  
HostR2 = '192.168.5.2'.encode('utf-8')  
PasswordTelnetR2 = '1234'.encode('utf-8')  
PasswordEnableR2 = '1234'.encode('utf-8')  
  
#Conectar Telnet R1  
tn = telnetlib.Telnet(HostR2)  
tn.set_debuglevel(9)  
tn.read_until(b'Password: ', 5)  
tn.write(PasswordTelnetR2 + b'\n')  
  
#Activar el modo enable en R1  
tn.read_until(b'R5>', 5)  
tn.write(b'enable\n')  
  
tn.read_until(b'Password: ', 5)  
tn.write(PasswordEnableR2 + b'\n')  
  
#Obtener el archivo de configuracion  
tn.read_until(b'R5#', 5)  
tn.write(b'copy running-config tftp:\n')  
  
tn.read_until(b'Address or name of remote host []? ', 5)  
tn.write(HostAnfitrion + b'\n')  
  
tn.read_until(b'Destination filename ', 5)  
tn.write(b'running-config-r5\n')  
tn.read_until(b'R5#', 5)  
  
#Modificar archivo de configuracion  
fin = open("/srv/tftp/running-config-r5", "rt")  
data = fin.read()  
data = data.replace('interface FastEthernet3/0\n no ip address\n shutdown', 'interface FastEthernet3/0\n ip address 192.168.23.1 255.255.255.0\n no shutdown')  
data = data.replace('ip forward-protocol nd', 'router ospf 1\n redistribute static\n network 192.168.23.0  
0.0.0.255 area 0\n!nip forward-protocol nd')  
#data = data.replace('no ip address\nshutdown', '!')  
fin.close()  
  
fin = open("/srv/tftp/modified-running-config-r5", "wt")  
fin.write(data)  
fin.close()  
  
#Remplazar archivo de configuracion  
tn.write(b'copy tftp: running-config\n')  
  
tn.read_until(b'Address or name of remote host []? ', 5)  
tn.write(HostAnfitrion + b'\n')  
  
tn.read_until(b'Source filename []? ', 5)  
tn.write(b'modified-running-config-r5\n')  
  
tn.read_until(b'Destination filename ', 5)
```