



**Instituto Politécnico Nacional**

Escuela Superior de Cómputo



*Ingeniería en Sistemas Computacionales*

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## **Administración de Servicios en Red**

### **Práctica 1**

Enrutamiento entre diferentes protocolos

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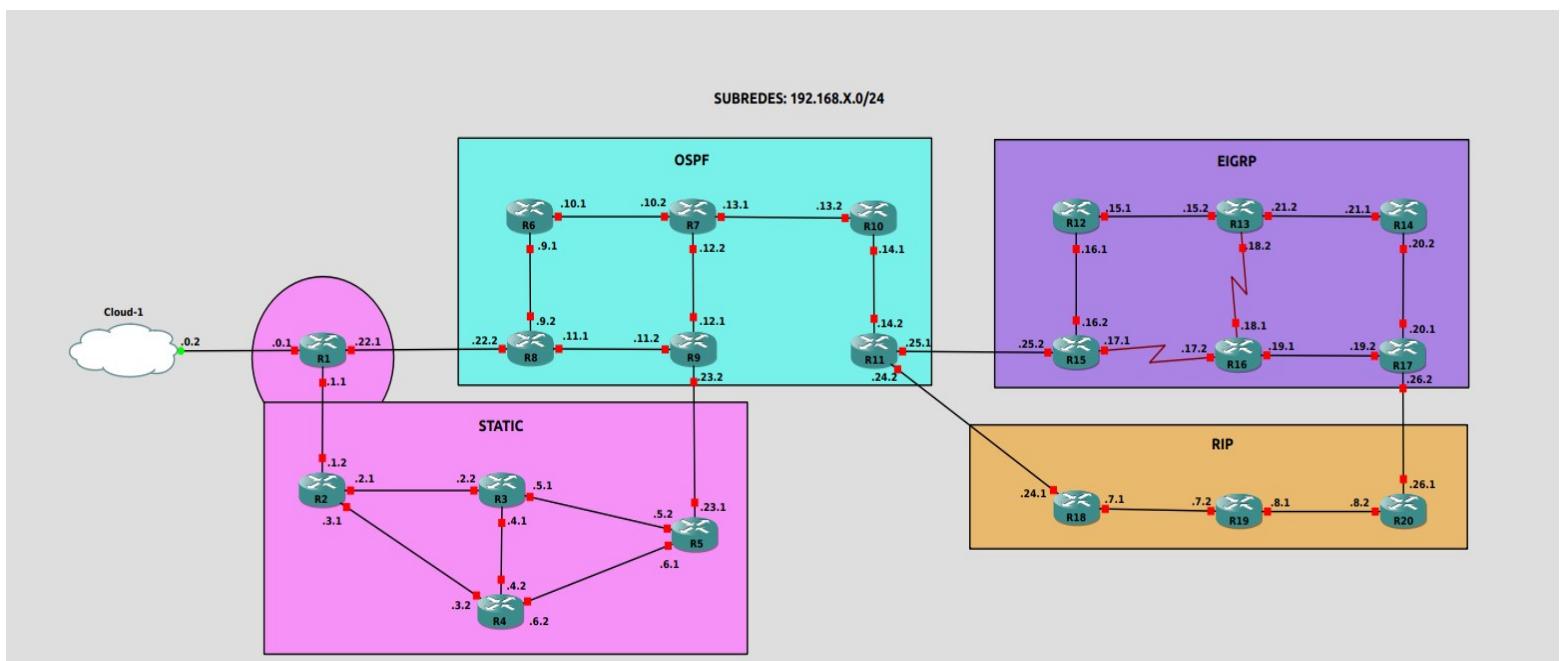
18 de Septiembre de 2019

## 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	Fa0/0	192.168.8.0	192.168.8.2
	Fa3/0	192.168.26.0	192.168.26.1
Router 19	Fa3/0	192.168.26.0	192.168.26.1
	Fa0/0	192.168.24.0	192.168.24.1
Router 20	Fa1/0	192.168.7.0	192.168.7.1
	Fa2/0	192.168.7.0	192.168.7.2

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.

```
R4
File Edit View Search Terminal Help
*Sep ernet6/0, changed state to down
o up
*Sep
et0/24#conf t
R3(cEnter configuration commands, one per line. End with CNTL/Z.
R3(c4(config)#int f0/0
R3(c4(config-if)#ip addr 192.168.5.2 255.255.255.0
R3(c4(config-if)#no sh
R3(c4(config-if)#
*Sep 17 00:25:40.251: %LINK-3-UPDOWN: Interface FastEthernet0/0, changed state t e t
o up
*Sep 17 00:25:41.251: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
et4/24(config-if)#exit
R3(c4(config)#int f2/0
R3(c4(config-if)#ip addr 192.168.6.1 255.255.255.0
R3(c4(config-if)#no sh
R3(c4(config-if)#
R3(c17 00:26:19.675: %LINK-3-UPDOWN: Interface FastEthernet2/0, changed state t e t
*Sep 17 00:26:20.675: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet2/0, changed state to up
et2/0, changed state to up
R3(config-if)#exit
R3(config-if)#end
R3#
```

## Router4.

```
R4
File Edit View Search Terminal Help
ernet6/0, 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 t o 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 t o 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)#
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)#
R12(config-if)#
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)#
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.

```
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)#exit
*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)#exit
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)#exit
*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)#exit
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)#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#
```

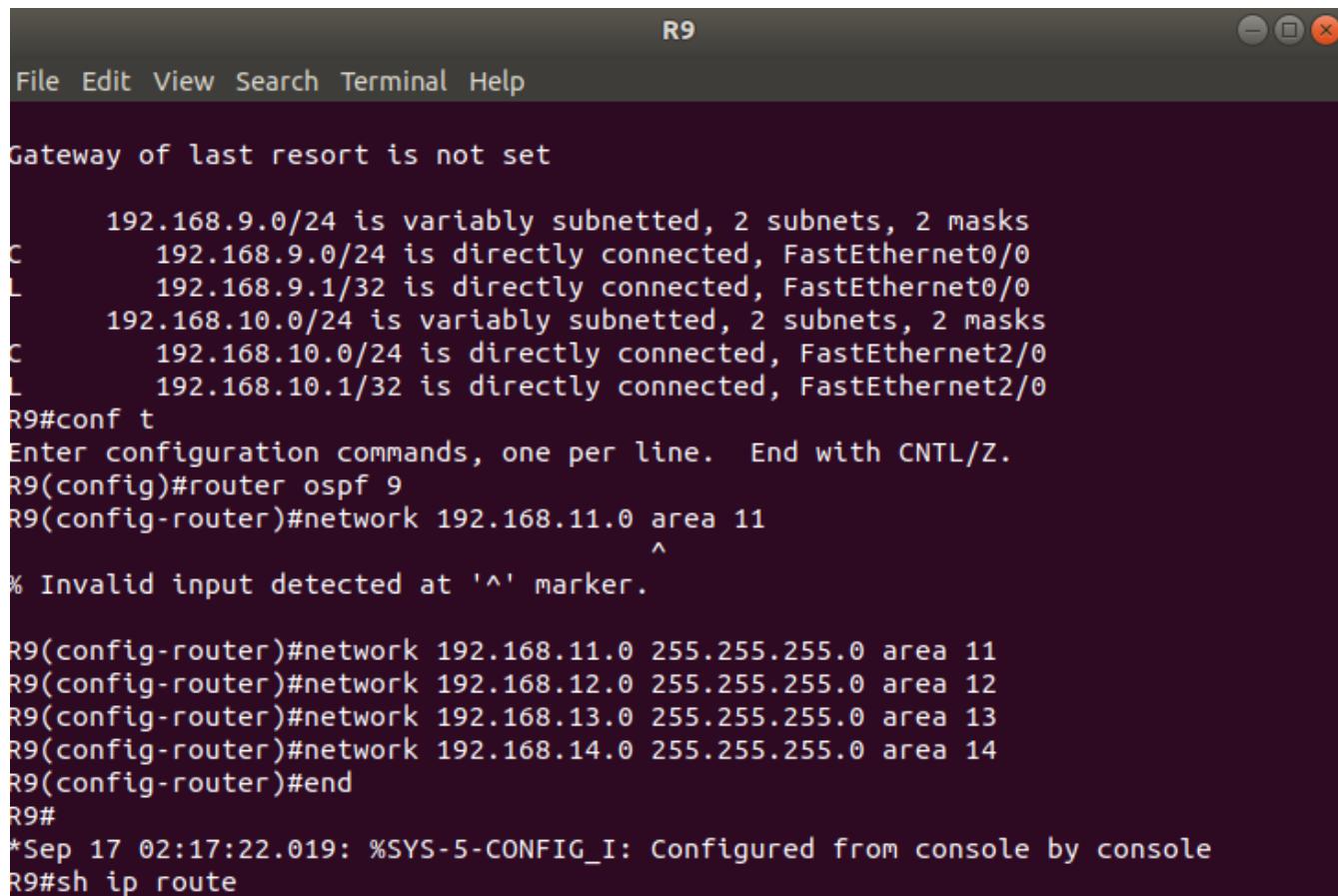
R8

```
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
FastEthernet0/0, 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#
```