

**LABORATORIO RIPv2/RIPvng - OSPF - REDISTRIBUCIÓN**



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# INTRODUCCIÓN

En el presente laboratorio se configuraron diferentes mecanismos de enrutamiento y la redistribución de rutas para una topología dada.

## OBJETIVOS

- Configurar mecanismos de enrutamiento basados en RIPv2, RIPv6, así como Enrutamiento OSPF y redistribución de rutas.
- Probar mediante el comando Ping, el funcionamiento de los mecanismos de enrutamiento que se configuraron en la topología de red.

# TOPOLOGÍA DE TRABAJO

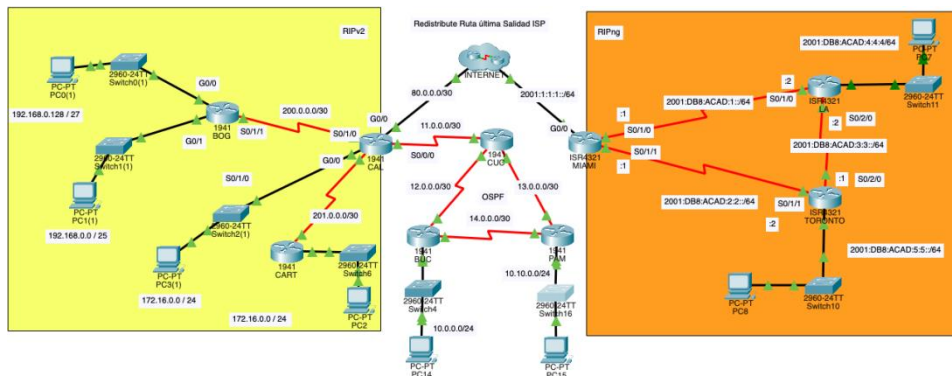


Figura 1. Topología asignada

## DESARROLLO DE LABORATORIO

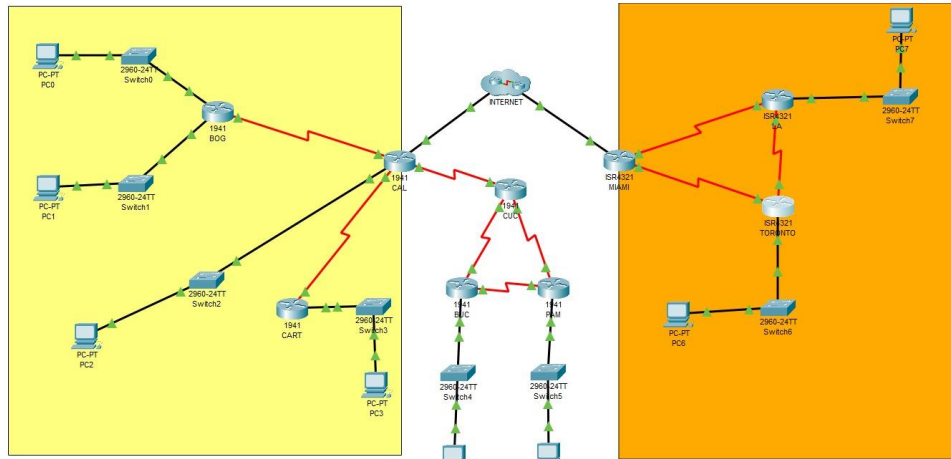


Figura 2. Montaje en Packet Tracer

## • RIP Estático

La configuración de RIP es más simple debido a que no es necesario añadir la máscara o wildcard al momento de agregar las redes que colindan.

## Despliegue

```
BOG(config)#router rip
BOG(config-router)#version 2
BOG(config-router)#no auto-summary
BOG(config-router)#network 192.168.0.0
BOG(config-router)#network 192.168.0.128
BOG(config-router)#network 200.0.0.0
BOG(config-router)#passive-interface gigabitEthernet 0/0
BOG(config-router)#passive-interface gigabitEthernet 0/1
BOG(config-router)#
```

Figura 3. Configuración Router BOG

```
CART(config)#router rip
CART(config-router)#version 2
CART(config-router)#no auto-summary
CART(config-router)#network 172.16.0.0
CART(config-router)#network 201.0.0.0
CART(config-router)#passive-interface gigabitEthernet 0/0
CART(config-router)#
```

Figura 4. Configuración Router CART

```

CAL(config)#router rip
CAL(config-router)#version 2
CAL(config-router)#no auto-summary
CAL(config-router)#network 11.0.0.0
CAL(config-router)#network 80.0.0.0
CAL(config-router)#network 172.16.0.0
CAL(config-router)#network 200.0.0.0
CAL(config-router)#network 201.0.0.0
CAL(config-router)#passive-interface gigabitEthernet 0/0
CAL(config-router)#exit
CAL(config)#ip route 0.0.0.0 0.0.0.0 gigabitEthernet 0/0
%Default route without gateway, if not a point-to-point interface, may impact performance
CAL(config)#router rip
CAL(config-router)#default-information originate
CAL(config-router)#

```

Figura 5. Configuración Router de borde CAL

- **RIPng Dinámico**

La configuración de RIPng se usa para la configuración con rutas ipv6 y su configuración se lleva a cabo directamente desde cada interface.

## Despliegue

```

LA(config)#interface GigabitEthernet0/0/0
LA(config-if)#ipv6 rip UD enable
LA(config-if)#exit
LA(config)#interface Serial0/1/0
LA(config-if)#ipv6 rip UD enable
LA(config-if)#exit
LA(config)#interface Serial0/1/1
LA(config-if)#ipv6 rip UD enable
LA(config-if)#exit
LA(config)#

```

Figura 6. Configuración Router LA

```

TORONTO(config)#interface GigabitEthernet0/0/0
TORONTO(config-if)#ipv6 rip UD enable
TORONTO(config-if)#exit
TORONTO(config)#interface Serial0/1/0
TORONTO(config-if)#ipv6 rip UD enable
TORONTO(config-if)#exit
TORONTO(config)#interface Serial0/1/1
TORONTO(config-if)#ipv6 rip UD enable
TORONTO(config-if)#exit
TORONTO(config)#

```

Figura 7. Configuración Router TORONTO

```

MIAMI(config)#interface GigabitEthernet0/0/0
MIAMI(config-if)#ipv6 rip UD enable
MIAMI(config-if)#exit
MIAMI(config)#interface Serial0/1/0
MIAMI(config-if)#ipv6 rip UD enable
MIAMI(config-if)#exit
MIAMI(config)#interface Serial0/1/1
MIAMI(config-if)#ipv6 rip UD enable
MIAMI(config-if)#exit
MIAMI(config)#

```

Figura 8. Configuración Router de Borde MIAMI

- **OSPF y Redistribución de rutas**

A la configuración es similar a la de RIPv2, sin embargo, como punto a favor de esta configuración es que podemos verificar si la conexión y configuración se ha hecho exitosamente, cuando se encuentra la adyacencia.

## Despliegue OSPF

```
CUC(config)#route ospf 10
CUC(config-router)#router-id 1.1.1.1
CUC(config-router)#network 11.0.0.0 0.0.0.3 area 0
CUC(config-router)#network 12.0.0.0 0.0.0.3 area 0
CUC(config-router)#network 13.0.0.0 0.0.0.3 area 0
CUC(config-router)#
```

Figura 9. Configuración Router CUC

```
PAM(config)#route ospf 10
PAM(config-router)#router-id 2.2.2.2
PAM(config-router)#network 10.10.0.0 0.0.0.255 area 0
PAM(config-router)#network 13.0.0.0 0.0.0.3 area 0
PAM(config-router)#network 14.0.0.0 0.0.0.3 area 0
PAM(config-router)#
02:15:27: %OSPF-5-ADJCHG: Process 10, Nbr 1.1.1.1 on Serial0/0/0 from LOADING to FULL,
Loading Done
PAM(config-router)#
```

Figura 10. Configuración Router PAM

```
BUC(config)#route ospf 10
BUC(config-router)#router-id 3.3.3.3
BUC(config-router)#network 10.0.0.0 0.0.0.255 area 0
BUC(config-router)#network 12.0.0.0 0.0.0.3 area 0
BUC(config-router)#network 14.0.0.0 0.0.0.3 area 0
BUC(config-router)#
02:20:05: %OSPF-5-ADJCHG: Process 10, Nbr 1.1.1.1 on Serial0/0/0 from LOADING to FULL,
Loading Done
02:20:07: %OSPF-5-ADJCHG: Process 10, Nbr 2.2.2.2 on Serial0/0/1 from LOADING to FULL,
Loading Done
BUC(config-router)#
```

Figura 11. Configuración Router BUC

```

CAL(config)#router rip
CAL(config-router)#version 2
CAL(config-router)#redistribute ospf 10 metric 2
CAL(config-router)#router ospf 10
CAL(config-router)#network 11.0.0.0 0.0.0.3 area 0
CAL(config-router)#
00:55:31: %OSPF-5-ADJCHG: Process 10, Nbr 13.0.0.1 on Serial0/1/0 from LOADING to FULL,
Loading Done

CAL(config-router)#redistribute rip metric 65 subnets
CAL(config-router)#

```

Figura 12. Configuración Redistribución RIPv2 a OSPF Router CAL

```

CUC(config)#router ospf 10
CUC(config-router)#redistribute rip metric 65 subnets
CUC(config-router)#
00:47:01: %OSPF-5-ADJCHG: Process 10, Nbr 201.0.0.2 on Serial0/0/0 from LOADING to FULL,
Loading Done

```

Figura 13. Configuración Redistribución RIPv2 a OSPF Router CUC

```

CAL(config)#ip route 0.0.0.0 0.0.0.0 gigabitEthernet 0/1 10

```

Figura 14. Configuración ruta estática flotante para salida a Internet

## ANALISIS DE RESULTADOS

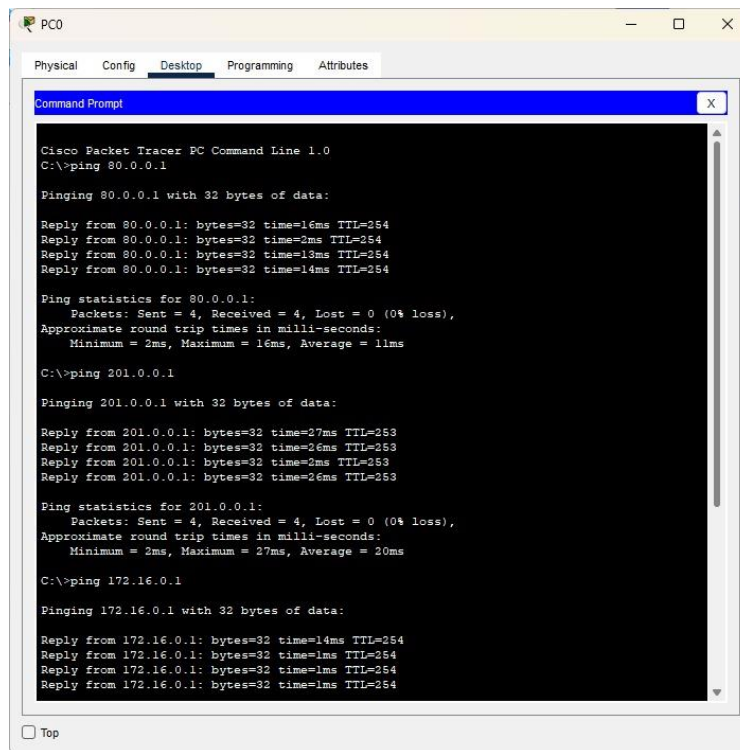


Figura 15. Prueba de funcionamiento RIPv2

```
PC7
Physical Config Desktop Programming Attributes
Command Prompt
C:\>ping 2001:DB8:ACAD:4:4::1

Pinging 2001:DB8:ACAD:4:4::1 with 32 bytes of data:

Reply from 2001:DB8:ACAD:4:4::1: bytes=32 time<1ms TTL=255
Reply from 2001:DB8:ACAD:4:4::1: bytes=32 time<1ms TTL=255
Reply from 2001:DB8:ACAD:4:4::1: bytes=32 time<1ms TTL=255
Reply from 2001:DB8:ACAD:4:4::1: bytes=32 time<1ms TTL=255

Ping statistics for 2001:DB8:ACAD:4:4::1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\>ping 2001:DB8:ACAD:2:2::1

Pinging 2001:DB8:ACAD:2:2::1 with 32 bytes of data:

Reply from 2001:DB8:ACAD:2:2::1: bytes=32 time=25ms TTL=254
Reply from 2001:DB8:ACAD:2:2::1: bytes=32 time=1ms TTL=254
Reply from 2001:DB8:ACAD:2:2::1: bytes=32 time=34ms TTL=254
Reply from 2001:DB8:ACAD:2:2::1: bytes=32 time=1ms TTL=254

Ping statistics for 2001:DB8:ACAD:2:2::1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 34ms, Average = 16ms

C:\>ping 2001:1:1:1:2

Pinging 2001:1:1:1:2 with 32 bytes of data:

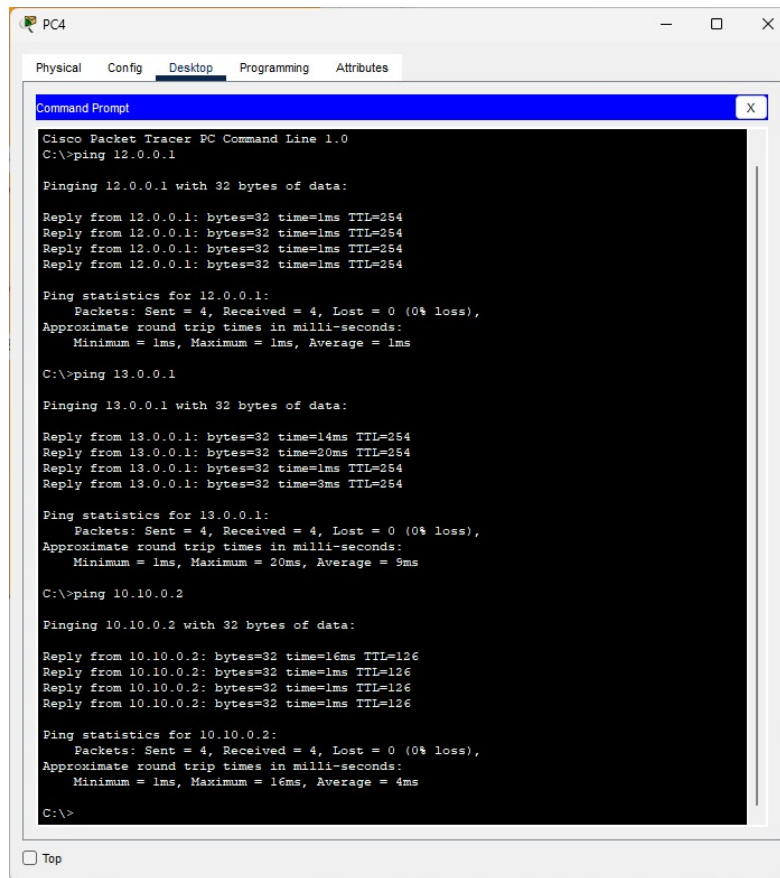
Reply from 2001:1:1:1:2: bytes=32 time=26ms TTL=126
Reply from 2001:1:1:1:2: bytes=32 time=10ms TTL=126
Reply from 2001:1:1:1:2: bytes=32 time=1ms TTL=126
Reply from 2001:1:1:1:2: bytes=32 time=1ms TTL=126

Ping statistics for 2001:1:1:1:2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 26ms, Average = 9ms

C:\>
```

Figura 16. Prueba de funcionamiento RIPng





The screenshot shows a Cisco Packet Tracer PC Command Line window for a PC named PC4. The window has tabs for Physical, Config, Desktop, Programming, and Attributes, with Desktop selected. The Command Prompt shows the following output:

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 12.0.0.1

Pinging 12.0.0.1 with 32 bytes of data:

Reply from 12.0.0.1: bytes=32 time=1ms TTL=254
Reply from 12.0.0.1: bytes=32 time=1ms TTL=254
Reply from 12.0.0.1: bytes=32 time=1ms TTL=254
Reply from 12.0.0.1: bytes=32 time=1ms TTL=254

Ping statistics for 12.0.0.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 1ms, Average = 1ms

C:\>ping 13.0.0.1

Pinging 13.0.0.1 with 32 bytes of data:

Reply from 13.0.0.1: bytes=32 time=14ms TTL=254
Reply from 13.0.0.1: bytes=32 time=20ms TTL=254
Reply from 13.0.0.1: bytes=32 time=1ms TTL=254
Reply from 13.0.0.1: bytes=32 time=3ms TTL=254

Ping statistics for 13.0.0.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 20ms, Average = 9ms

C:\>ping 10.10.0.2

Pinging 10.10.0.2 with 32 bytes of data:

Reply from 10.10.0.2: bytes=32 time=16ms TTL=126
Reply from 10.10.0.2: bytes=32 time=1ms TTL=126
Reply from 10.10.0.2: bytes=32 time=1ms TTL=126
Reply from 10.10.0.2: bytes=32 time=1ms TTL=126

Ping statistics for 10.10.0.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 16ms, Average = 4ms

C:\>
```

Figura 17. Prueba de funcionamiento OSPF

## CONCLUSIONES

- Aunque RIPv2 y RIPv6 son mecanismos de enrutamiento fáciles de configurar e implementar en packet tracer, para topologías grandes puede haber problemas de lenta convergencia y una menor escalabilidad debido a sus características de funcionamiento.
- La redistribución de rutas es importante cuando se requiere intercambiar información dentro de una topología en la que se utilizan múltiples mecanismos de enrutamiento.

## BIBLIOGRAFÍA



[1] Qué es Routing Information Protocol (RIP) y cómo funciona? CCNA desde Cero [online]. Available: <https://ccnadesdecero.es/routing-information-protocol-rip/>

[2] Qué es OSPF y Cómo Funciona OSPF. CCNA Desde Cero [online]. Available: <https://ccnadesdecero.com/curso/ospf/>

[3] Configure Protocol Redistribution por Routers. Cisco [Online]. Available: <https://www.cisco.com/c/en/us/support/docs/ip/enhanced-interior-gateway-routing-protocol-eigrp/8606-redist.html>