

DIPLOMADO DE PROFUNDIZACION CISCO
PRUEBA DE HABILIDADES PRÁCTICAS CCNP

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UNIVERSIDAD NACIONAL ABIERTA Y A DISTANCIA - UNAD ESCUELA DE
CIENCIAS BÁSICAS, TECNOLOGÍA E INGENIERÍA - ECBTI
INGENIERÍA ELECTRONICA
BARRANCAMERMEJA
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ELECTRONICO

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NOTA DE ACEPTACIÓN

Firma del Presidente del Jurado

Firma del Jurado

Firma del Jurado

BARRANCAMERMEJA, 22 de mayo de 2020

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GLOSARIO

ADSL - Línea digital de suscriptor asíncrona:

Tecnología que permite la conexión a Internet mediante el uso de la línea telefónica tradicional, transmitiendo la información digital de modo analógico a través del cable de pares simétricos de cobre.

Enrutador:

Dispositivo físico de red que facilita y establece una conexión entre una red local e Internet pasando información a y desde las redes de conmutación de paquetes.

Internet

Red de redes que permite la interconexión descentralizada de computadoras a través de un conjunto de protocolos denominado TCP/IP.

LAN

Red de área local (por sus siglas en inglés Local Area Network), interconexión de varios ordenadores y periféricos.

Red de área amplia (WAN)

Red de computadoras que une varias redes locales, aunque sus miembros no estén todos en una misma ubicación física.

Switch

Dispositivo de interconexión de redes informáticas

RESUMEN

Para desarrollar la prueba de habilidades prácticas en el diplomado de profundización CISCO CCNP vamos a recopilar toda la información, conceptos teóricos y prácticos vistos en los laboratorios desarrollados durante todo el proceso de aprendizaje, para esta actividad tenemos dos escenarios con topologías diferentes en el primer escenario vamos a tener un enrutamiento con una relación vecino BGP en cuatro routers, con conexiones seriales y fastethernet, con direcciones de Loopback en BGP; codificando los ID para los routers BGP para las redes.

En el escenario dos vamos a realizar una conmutación para usar VTP para las actualizaciones de VLAN, usaremos diferentes tipos de switches, dispositivos eléctricos usados como servidores o clientes.

ABSTRACT

To develop the practical skills test in the CISCO CCNP depth diploma, we will collect all the information, technical and practical concepts seen in the laboratories developed throughout the learning process, for this activity we have two with different topologies in the first scenario. to have a routing with a BGP neighbor relation in four routers, with serial and fastethernet connections, with Loopback addresses in BGP; encrypt IDs for BGP routers for networks.

In scenario two we are going to perform a switch to use VTP for VLAN updates, we will use different types of switches, electrical devices used as servers or clients.

INTRODUCCIÓN

El documento contiene el desarrollo de la Prueba de Habilidades Practicas, la cual forma parte de las actividades evaluativas del Diplomado de Profundización CISCO CCNP, y busca identificar el grado de desarrollo de competencias y habilidades que logramos adquirir a lo largo del diplomado. Mediante los 2 escenarios propuestos se busca poner a prueba los niveles de comprensión y solución de problemas relacionados con diversos aspectos de Networking.

Para cumplir con los propósitos mencionados, se abordan temáticas como el enrutamiento dinámico a través de los protocolos EIGRP, así como la configuración de áreas y sistemas autónomos respectivamente, el enrutamiento a través del protocolo BGP y el proceso de creación de adyacenticas en función del protocolo IPv4, del Router ID e interfaces Loopback. Por último, se evidencia la configuración de una pequeña red basada en Switches capa 2 y PCs, en la cual se configura el enrutamiento IPv4 respectivo, se implementa protocolos como VLAN Trunking Protocol y Dynamic Trunking Protocol, así como una parte inicial del enrutamiento InterVLAN.

En consecuencia, a continuación, se encuentra una descripción detallada del paso a paso necesario para cada una de las etapas realizadas durante el desarrollo de los dos escenarios, además, del registro de los procesos de verificación de conectividad mediante el uso de comandos como ***ping, show ip route, show vtp status, show interfaces trunk***, entre otros.

DESARROLLO

1. ESCENARIO 1

Figura 1. Escenario 1

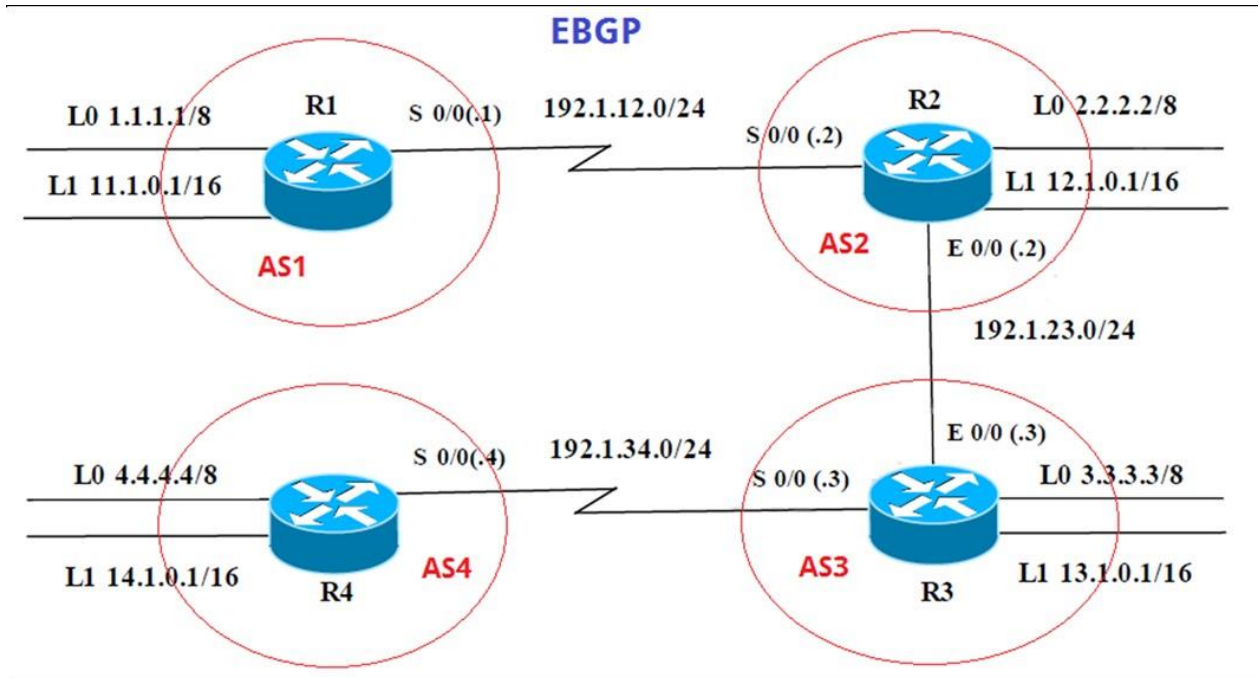
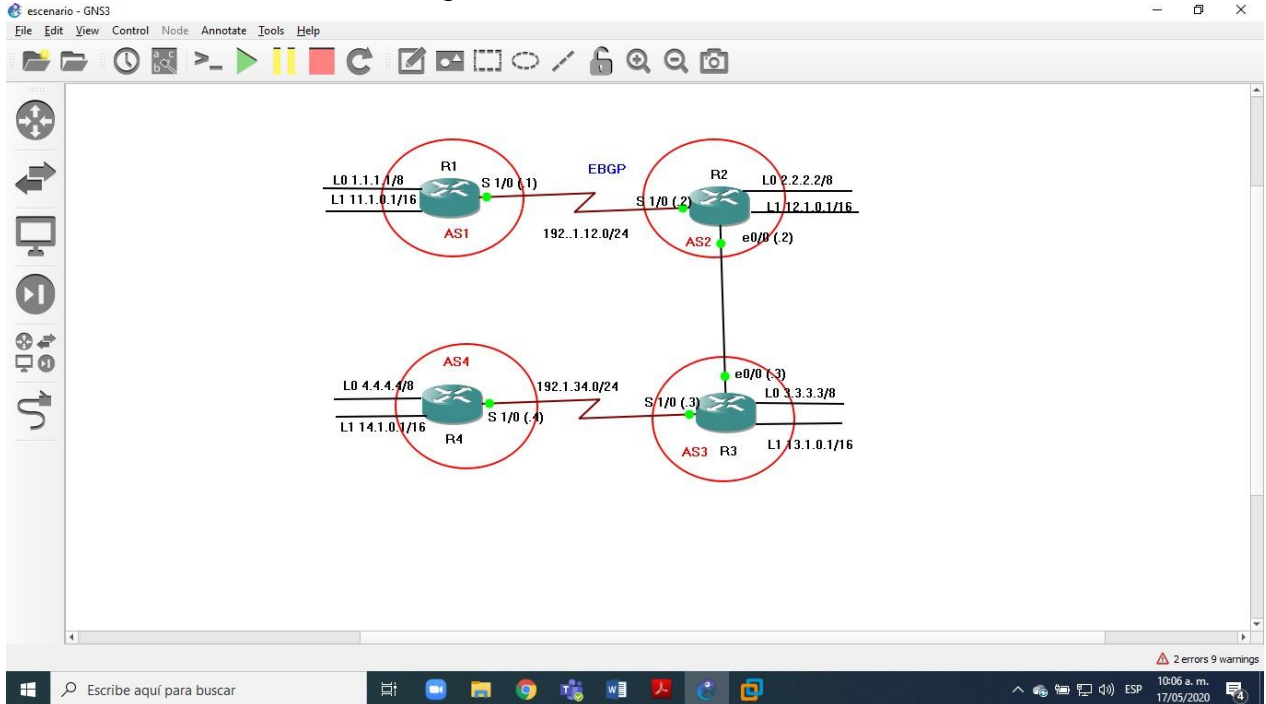


Figura 2. Simulación de escenario 1



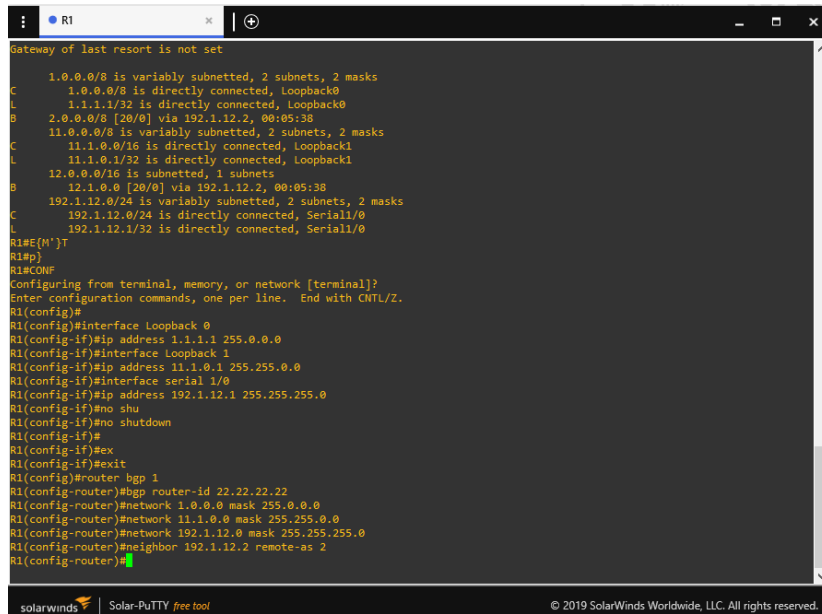
1. Configure una relación de vecino BGP entre R1 y R2. R1 debe estar en **AS1** y R2 debe estar en **AS2**. Anuncie las direcciones de Loopback en BGP. Codifique los ID para los routers BGP como 22.22.22.22 para R1 y como 33.33.33.33 para R2. Presente el paso a con los comandos utilizados y la salida del comando **show ip route**.

Se adjunta código y pantallazos

ROUTER 1.

```
R1#configure terminal
R1(config)#interface Loopback 0
R1(config-if)#ip address 1.1.1.1 255.0.0.0
R1(config-if)#interface Loopback 1
R1(config-if)#ip address 11.1.0.1 255.255.0.0
R1(config-if)#interface serial 1/0
R1(config-if)#ip address 192.1.12.1 255.255.255.0
R1(config-if)#no shutdown
R1(config-if)#exit
R1(config)#router bgp 1
R1(config-router)#bgp router-id 22.22.22.22
R1(config-router)#network 1.0.0.0 mask 255.0.0.0
R1(config-router)#network 11.1.0.0 mask 255.255.0.0
R1(config-router)#network 192.1.12.0 mask 255.255.255.0
R1(config-router)#neighbor 192.1.12.2 remote-as 2
```

Figura 3. Simulación de escenario 1



```
Gateway of last resort is not set

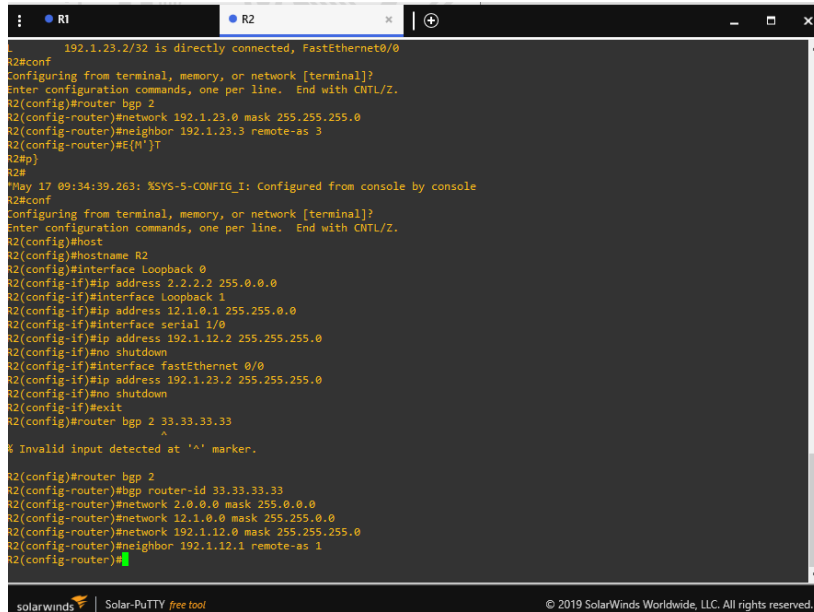
  1.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C    1.0.0.0/8 is directly connected, Loopback0
L    1.1.1.1/32 is directly connected, Loopback0
B    2.0.0.0/8 [20/0] via 192.1.12.2, 00:05:38
  11.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C    11.1.0.0/16 is directly connected, Loopback1
L    11.1.0.1/32 is directly connected, Loopback1
L    12.0.0.0/16 is subnetted, 1 subnets
B    12.1.0.0 [20/0] via 192.1.12.2, 00:05:38
  192.1.12.0/24 is variably subnetted, 2 subnets, 2 masks
C    192.1.12.0/24 is directly connected, Serial1/0
L    192.1.12.1/32 is directly connected, Serial1/0

R1#E(N'I)T
R1#p]
R1#CONF
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.

R1(config)#
R1(config)#interface Loopback 0
R1(config-if)#ip address 1.1.1.1 255.0.0.0
R1(config-if)#interface Loopback 1
R1(config-if)#ip address 11.1.0.1 255.255.0.0
R1(config-if)#interface serial 1/0
R1(config-if)#ip address 192.1.12.1 255.255.255.0
R1(config-if)#no shu
R1(config-if)#no shutdown
R1(config-if)#
R1(config-if)#ex
R1(config-if)#exit
R1(config)#router bgp 1
R1(config-router)#bgp router-id 22.22.22.22
R1(config-router)#network 1.0.0.0 mask 255.0.0.0
R1(config-router)#network 11.1.0.0 mask 255.255.0.0
R1(config-router)#network 192.1.12.0 mask 255.255.255.0
R1(config-router)#neighbor 192.1.12.2 remote-as 2
R1(config-router)#
```

```
R2#configure terminal
R2 (config) #interface Loopback 0
R2 (config-if) #ip address 2.2.2.2 255.0.0.0
R2 (config-if) #interface Loopback 1
R2 (config-if) #ip address 12.1.0.1 255.255.0.0
R2 (config-if) #interface serial 1/0
R2 (config-if) #ip address 192.1.12.2 255.255.255.0
R2 (config-if) #no shutdown
R2 (config-if) #interface fastEthernet 0/0
R2 (config-if) #ip address 192.1.23.2 255.255.255.0
R2 (config-if) #no shutdown
R2 (config-if) #exit
R2 (config) #router bgp 2
R2 (config-router) #bgp router-id 33.33.33.33
R2 (config-router) #network 2.0.0.0 mask 255.0.0.0
R2 (config-router) #network 12.1.0.0 mask 255.255.0.0
R2 (config-router) #network 192.1.12.0 mask 255.255.255.0
R2 (config-router) #neighbor 192.1.12.1 remote-as 1
```

Figura 4. Simulación de escenario 1



```
R1 192.1.23.2/32 is directly connected, FastEthernet0/0
R2#conf
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#router bgp 2
R2(config-router)#network 192.1.23.0 mask 255.255.255.0
R2(config-router)#neighbor 192.1.23.3 remote-as 3
R2(config-router)#E{M}T
R2#
May 17 09:34:39.263: %SYS-5-CONFIG_I: Configured from console by console
R2#conf
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#host
R2(config)#hostname R2
R2(config)#interface Loopback 0
R2(config-if)#ip address 2.2.2.2 255.0.0.0
R2(config-if)#interface Loopback 1
R2(config-if)#ip address 12.1.0.1 255.255.0.0
R2(config-if)#interface serial 1/0
R2(config-if)#ip address 192.1.12.2 255.255.255.0
R2(config-if)#no shutdown
R2(config-if)#interface fastEthernet 0/0
R2(config-if)#ip address 192.1.23.2 255.255.255.0
R2(config-if)#no shutdown
R2(config-if)#exit
R2(config)#router bgp 2 33.33.33.33
^
% Invalid input detected at '^' marker.
R2(config)#router bgp 2
R2(config-router)#bgp router-id 33.33.33.33
R2(config-router)#network 2.0.0.0 mask 255.0.0.0
R2(config-router)#network 12.1.0.0 mask 255.255.0.0
R2(config-router)#network 192.1.12.0 mask 255.255.255.0
R2(config-router)#neighbor 192.1.12.1 remote-as 1
R2(config-router)#
```

Para verificar usamos el comando `show ip route`, que tanto el router R1 como el router R2 contienen en su tabla de enrutamiento las direcciones de Loopback y las direcciones de las redes a las cuales se encuentran conectados de forma directa, además, de las redes configuradas en las interfaces Loopback de su respectivo router vecino. Estas últimas se pueden identificar mediante el código B que las precede, lo cual indica que ambas fueron aprendidas a través del protocolo BGP. Así también, se puede ver en la tabla de enrutamiento que cada router reconoce como vía para alcanzar estas rutas, la red 192.1.12.0/24 conectada a través de la interfaz serial 1/0, ya que este es el enlace que comunica físicamente ambos dispositivos.

Figura 5. Simulación de escenario 1

```
R1
R1(config-if)#
R1(config-if)#exit
R1(config-if)#exit
R1(config)#router bgp 1
R1(config-router)#bgp router-id 22.22.22.22
R1(config-router)#network 1.0.0.0 mask 255.0.0.0
R1(config-router)#network 11.1.0.0 mask 255.255.0.0
R1(config-router)#network 192.1.12.0 mask 255.255.255.0
R1(config-router)#neighbor 192.1.12.2 remote-as 2
R1(config-router)#end
R1#
*May 17 10:40:11.671: XSYS-5-CONFIG_I: Configured from console by console
R1#show 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, I - LISP
       + - replicated route, % - next hop override

Gateway of last resort is not set

  1.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
    C   1.0.0.0/8 is directly connected, Loopback0
    L   1.1.1.1/32 is directly connected, Loopback0
    B   2.0.0.0/8 [20/0] via 192.1.12.2, 02:04:58
    B   11.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
    C   11.1.0.0/16 is directly connected, Loopback1
    L   11.1.0.1/32 is directly connected, Loopback1
    B   12.0.0.0/16 is subnetted, 1 subnets
    B   12.1.0.0 [20/0] via 192.1.12.2, 02:04:58
    C   192.1.12.0/24 is variably subnetted, 2 subnets, 2 masks
    C   192.1.12.0/24 is directly connected, Serial1/0
    L   192.1.12.1/32 is directly connected, Serial1/0
    B   192.1.23.0/24 [20/0] via 192.1.12.2, 01:49:23
R1#
```

Figura 6. Simulación de escenario 1

```
R2
R2(config)#router bgp 2
R2(config-router)#bgp router-id 33.33.33.33
R2(config-router)#network 2.0.0.0 mask 255.0.0.0
R2(config-router)#network 12.1.0.0 mask 255.255.0.0
R2(config-router)#network 192.1.12.0 mask 255.255.255.0
R2(config-router)#neighbor 192.1.12.1 remote-as 1
R2(config-router)#end
R2#
*May 17 10:41:44.387: XSYS-5-CONFIG_I: Configured from console by console
R2#show 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, I - LISP
       + - replicated route, % - next hop override

Gateway of last resort is not set

  1.0.0.0/8 [20/0] via 192.1.12.1, 02:06:27
  2.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
    C   2.0.0.0/8 is directly connected, Loopback0
    L   2.2.2.2/32 is directly connected, Loopback0
    B   11.0.0.0/16 is subnetted, 1 subnets
    B   11.1.0.0 [20/0] via 192.1.12.1, 02:06:27
    B   12.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
    C   12.1.0.0/16 is directly connected, Loopback1
    L   12.1.0.1/32 is directly connected, Loopback1
    C   192.1.12.0/24 is variably subnetted, 2 subnets, 2 masks
    C   192.1.12.0/24 is directly connected, Serial1/0
    L   192.1.12.2/32 is directly connected, Serial1/0
    B   192.1.23.0/24 is variably subnetted, 2 subnets, 2 masks
    C   192.1.23.0/24 is directly connected, FastEthernet0/0
    L   192.1.23.2/32 is directly connected, FastEthernet0/0
R2#
```

2. Configure una relación de vecino BGP entre R2 y R3. R2 ya debería estar configurado en **AS2** y R3 debería estar en **AS3**. Anuncie las direcciones de Loopback de R3 en BGP. Codifique el ID del router R3 como 44.44.44.44. Presente el paso a con los comandos utilizados y la salida del comando **show ip route**.

R2#configure terminal

```

R2(config)#router bgp 2
R2(config-router)#network 192.1.23.0 mask 255.255.255.0
R2(config-router)#neighbor 192.1.23.3 remote-as 3

```

Figura 7. Simulación de escenario 1

```

R2
R2(config-router)#network 192.1.12.0 mask 255.255.255.0
R2(config-router)#neighbor 192.1.12.1 remote-as 1
R2(config-router)#end
R2#
May 17 10:41:44.387: %SYS-5-CONFIG_I: Configured from console by console
R2#show 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 - LISP
+ - replicated route, % - next hop override

Gateway of last resort is not set

B 1.0.0.0/8 [20/0] via 192.1.12.1, 02:06:27
C 2.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
L 2.2.2.2/32 is directly connected, Loopback0
L 11.0.0.0/16 is subnetted, 1 subnets
B 11.1.0.0 [20/0] via 192.1.12.1, 02:06:27
C 12.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C 12.1.0.0/16 is directly connected, Loopback1
L 12.1.0.1/32 is directly connected, Loopback1
L 192.1.12.0/24 is variably subnetted, 2 subnets, 2 masks
C 192.1.12.0/24 is directly connected, Serial1/0
L 192.1.12.2/32 is directly connected, Serial1/0
C 192.1.23.0/24 is variably subnetted, 2 subnets, 2 masks
L 192.1.23.0/24 is directly connected, FastEthernet0/0
L 192.1.23.2/32 is directly connected, FastEthernet0/0
R2#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#router bgp 2
R2(config-router)#network 192.1.23.0 mask 255.255.255.0
R2(config-router)#neighbor 192.1.23.3 remote-as 3
R2(config-router)#

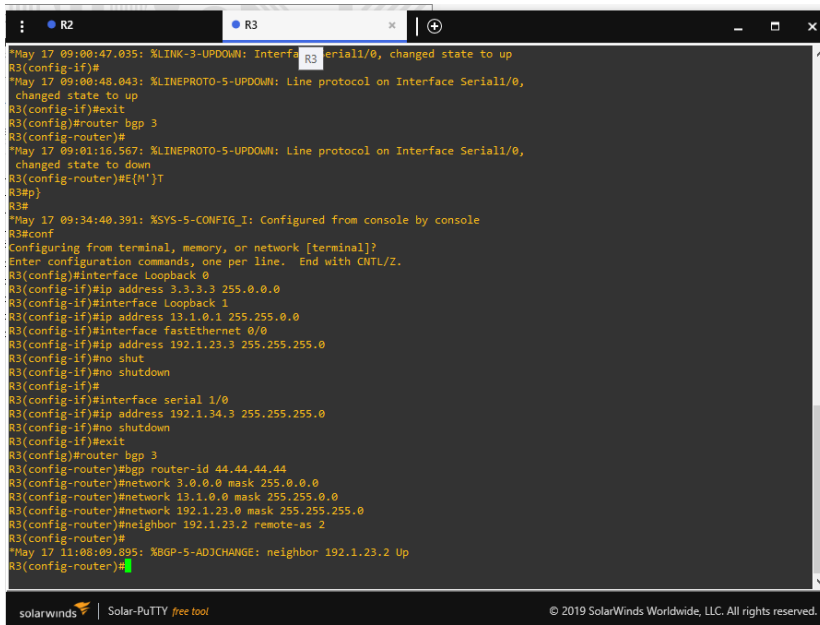
```

```

R3#configure terminal
R3(config)#interface Loopback 0
R3(config-if)#ip address 3.3.3.3 255.0.0.0
R3(config-if)#interface Loopback 1
R3(config-if)#ip address 13.1.0.1 255.255.0.0
R3(config-if)#interface fastEthernet 0/0
R3(config-if)#ip address 192.1.23.3 255.255.255.0
R3(config-if)#no shutdown
R3(config-if)#interface serial 1/0
R3(config-if)#ip address 192.1.34.3 255.255.255.0
R3(config-if)#no shutdown
R3(config-if)#exit
R3(config)#router bgp 3
R3(config-router)#bgp router-id 44.44.44.44
R3(config-router)#network 3.0.0.0 mask 255.0.0.0
R3(config-router)#network 13.1.0.0 mask 255.255.0.0
R3(config-router)#network 192.1.23.0 mask 255.255.255.0
R3(config-router)#neighbor 192.1.23.2 remote-as 2

```

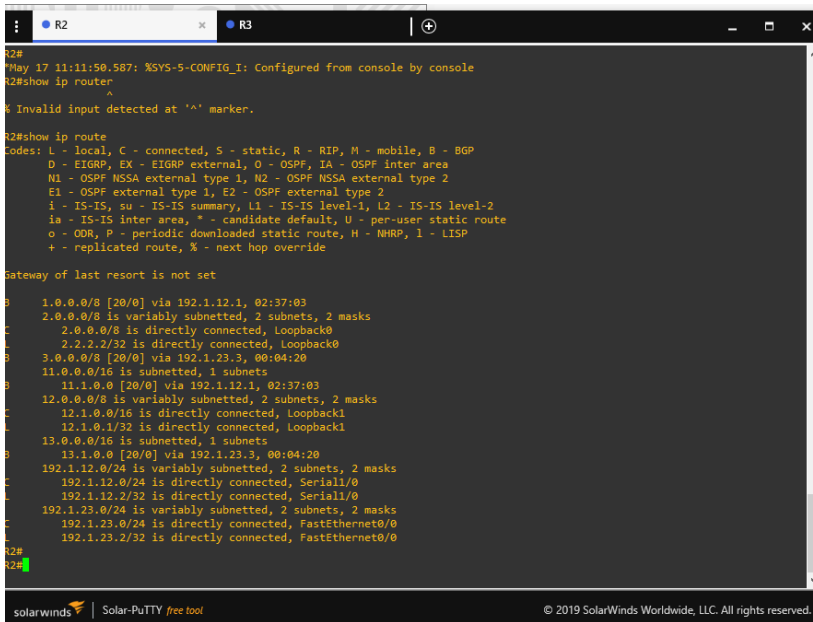
Figura 8. Simulación de escenario 1



```
May 17 09:00:47.035: %LINK-3-UPDOWN: Interface Serial1/0, changed state to up
R3(config-if)#
May 17 09:00:48.043: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial1/0,
changed state to up
R3(config-if)#exit
R3(config)#router bgp 3
R3(config-router)#
May 17 09:01:16.567: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial1/0,
changed state to down
R3(config-router)#E(')T
R3#p)
R3#
May 17 09:34:40.391: %SYS-5-CONFIG_I: Configured from console by console
R3#conf
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line. End with CNTL/Z.
R3(config)#interface Loopback 0
R3(config-if)#ip address 3.3.3.3 255.0.0.0
R3(config-if)#interface Loopback 1
R3(config-if)#ip address 13.1.0.1 255.255.0.0
R3(config-if)#interface fastEthernet 0/0
R3(config-if)#ip address 192.1.23.3 255.255.255.0
R3(config-if)#no shut
R3(config-if)#no shutdown
R3(config-if)#
R3(config-if)#interface serial 1/0
R3(config-if)#ip address 192.1.34.3 255.255.255.0
R3(config-if)#no shutdown
R3(config-if)#exit
R3(config)#router bgp 3
R3(config-router)#bgp router-id 44.44.44.44
R3(config-router)#network 3.0.0.0 mask 255.0.0.0
R3(config-router)#network 13.1.0.0 mask 255.255.0.0
R3(config-router)#network 192.1.23.0 mask 255.255.255.0
R3(config-router)#neighbor 192.1.23.2 remote-as 2
R3(config-router)#
May 17 11:08:09.895: %BGP-5-ADJCHANGE: neighbor 192.1.23.2 Up
R3(config-router)#
```

Para verificar usamos el comando show ip route, que el router R2 ha actualizado su tabla de enrutamiento y ahora contiene también las direcciones de Loopback configuradas en el router R3, por tanto, este dispositivo ha aprendido hasta este momento 4 rutas a través del protocolo BGP las cuales identifica con el código B. De otro lado, el router R3 contiene en su tabla de enrutamiento las redes que reconoce conectadas directamente, es decir, las configuradas en sus interfaces Loopback y las redes que lo comunican con los routers R3 y R4 mediante las interfaces fastEthernet 0/0 y serial 1/0 respectivamente. Además, este router (R3) ha actualizado su tabla de enrutamiento con las direcciones de red correspondientes a las interfaces Loopback que se configuraron en R2 y R1, rutas que aprendió mediante el protocolo BGP gracias a su relación de adyacencia con R2 y a que dichas redes se anunciaron en cada uno de los routers, así también, R3 contiene la dirección de red que conecta los routers R1 y R2 la cual aprendió mediante el protocolo BGP como lo evidencia el código B que la precede. Por último, se identifica que R3 alcanza todas estas redes a través de la interfaz fastEthernet 0/0 que lo conecta con R2 (192.1.23.0/24)

Figura 8. Simulación de escenario 1



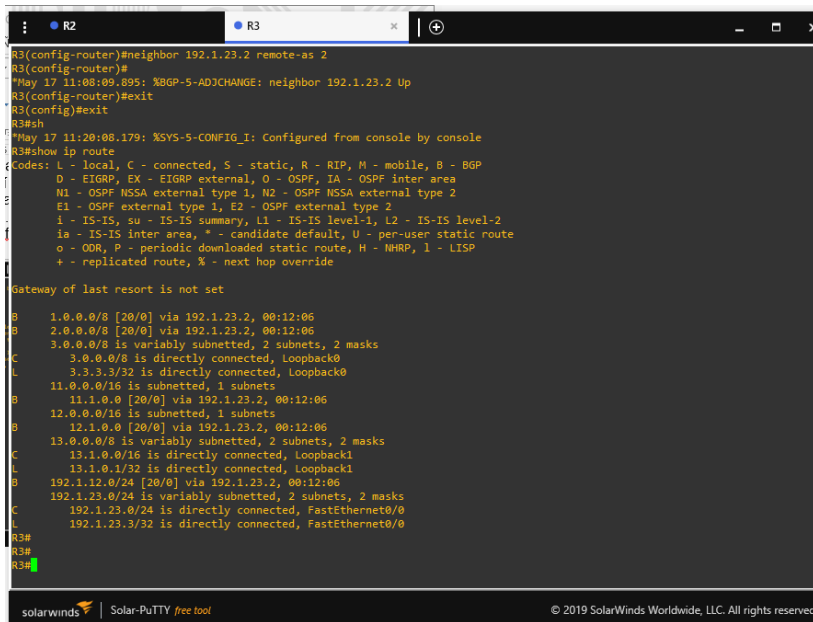
```
R2#
*May 17 11:11:50.587: %SYS-5-CONFIG_I: Configured from console by console
R2#show ip router
% Invalid input detected at '^' marker.

R2#show 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, I - LISP
+ - replicated route, % - next hop override

Gateway of last resort is not set

R# 1.0.0.0/8 [20/0] via 192.1.12.1, 02:37:03
R# 2.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
R# 2.0.0.0/8 is directly connected, Loopback0
R# 2.2.2.2/32 is directly connected, Loopback0
R# 3.0.0.0/8 [20/0] via 192.1.23.3, 00:04:20
R# 11.0.0.0/16 is subnetted, 1 subnets
R# 11.1.0.0 [20/0] via 192.1.12.1, 02:37:03
R# 12.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
R# 12.1.0.0/16 is directly connected, Loopback1
R# 12.1.0.1/32 is directly connected, Loopback1
R# 13.0.0.0/16 is subnetted, 1 subnets
R# 13.1.0.0 [20/0] via 192.1.23.3, 00:04:20
R# 192.1.12.0/24 is variably subnetted, 2 subnets, 2 masks
R# 192.1.12.0/24 is directly connected, Serial1/0
R# 192.1.23.0/24 is variably subnetted, 2 subnets, 2 masks
R# 192.1.23.0/24 is directly connected, FastEthernet0/0
R# 192.1.23.2/32 is directly connected, FastEthernet0/0
R2#
R2#
```

Figura 9. Simulación de escenario 1



```
R3(config-router)#neighbor 192.1.23.2 remote-as 2
R3(config-router)#
*May 17 11:08:09.895: %BGP-5-ADJCHANGE: neighbor 192.1.23.2 Up
R3(config-router)#exit
R3(config)#exit
R3#sh
*May 17 11:20:08.179: %SYS-5-CONFIG_I: Configured from console by console
R3#show 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, I - LISP
+ - replicated route, % - next hop override

Gateway of last resort is not set

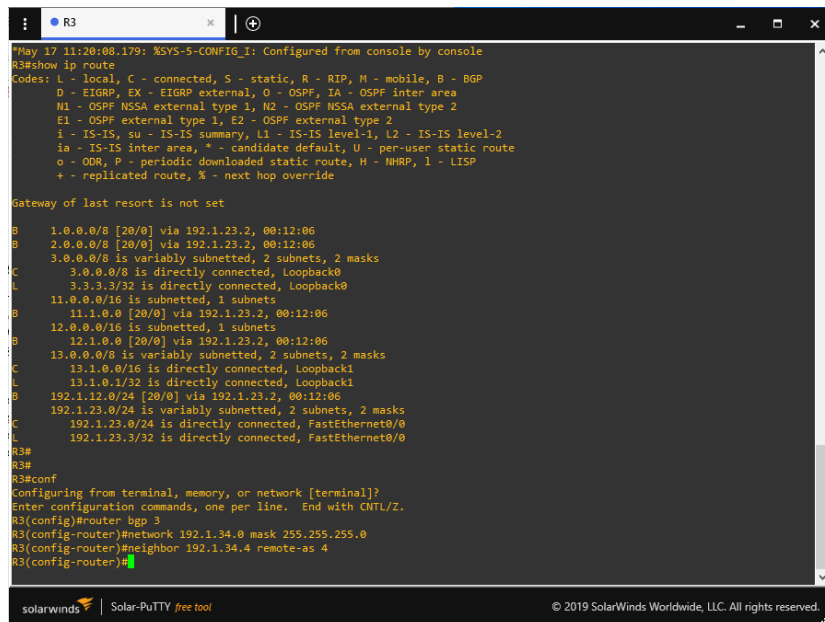
R# 1.0.0.0/8 [20/0] via 192.1.23.2, 00:12:06
R# 2.0.0.0/8 [20/0] via 192.1.23.2, 00:12:06
R# 3.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
R# 3.0.0.0/8 is directly connected, Loopback0
R# 3.3.3.3/32 is directly connected, Loopback0
R# 11.0.0.0/16 is subnetted, 1 subnets
R# 11.1.0.0 [20/0] via 192.1.23.2, 00:12:06
R# 12.0.0.0/16 is subnetted, 1 subnets
R# 12.1.0.0 [20/0] via 192.1.23.2, 00:12:06
R# 13.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
R# 13.1.0.0/16 is directly connected, Loopback1
R# 13.1.0.1/32 is directly connected, Loopback1
R# 192.1.12.0/24 [20/0] via 192.1.23.2, 00:12:06
R# 192.1.23.0/24 is variably subnetted, 2 subnets, 2 masks
R# 192.1.23.0/24 is directly connected, FastEthernet0/0
R# 192.1.23.3/32 is directly connected, FastEthernet0/0
R3#
R3#
R3#
```

3. Configure una relación de vecino BGP entre R3 y R4. R3 ya debería estar configurado en AS3 y R4 debería estar en AS4. Anuncie las direcciones de Loopback de R4 en BGP. Codifique el ID del router R4 como 66.66.66.66. Establezca las relaciones de vecino con base en las direcciones de Loopback 0.

Cree rutas estáticas para alcanzar la Loopback 0 del otro router. No anuncie la Loopback 0 en BGP. Anuncie la red Loopback de R4 en BGP. Presente el paso a con los comandos utilizados y la salida del comando show ip route.

```
R3#configure terminal
R3(config)#router bgp 3
R3(config-router)#network 192.1.34.0 mask 255.255.255.0
R3(config-router)#neighbor 192.1.34.4 remote-as 4
```

Figura 10. Simulación de escenario 1



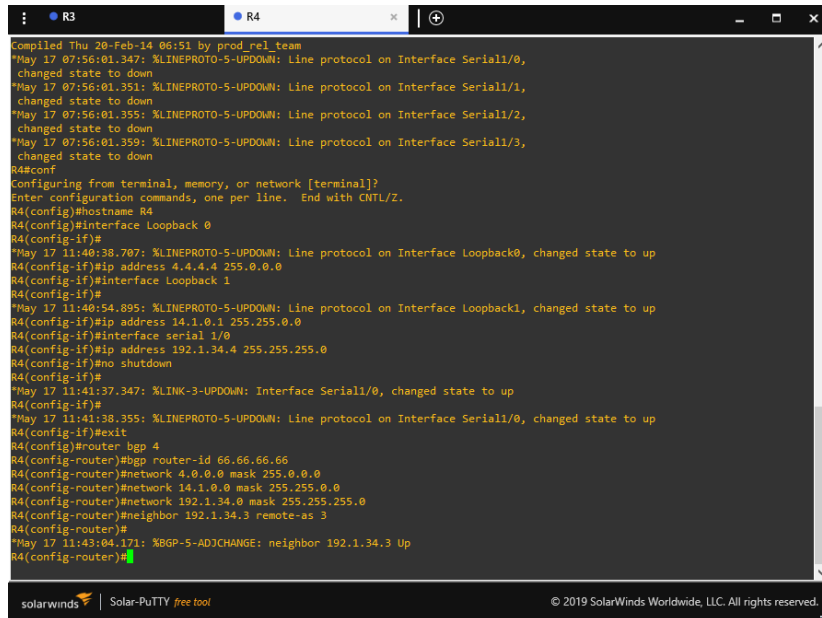
```
May 17 11:20:00.179: XSYS-5-CONFIG_I: Configured from console by console
R3#show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external 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 - LISP
       + - replicated route, % - next hop override
Gateway of last resort is not set

R  1.0.0.0/8 [20/0] via 192.1.23.2, 00:12:06
R  2.0.0.0/8 [20/0] via 192.1.23.2, 00:12:06
C  3.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
   C   3.0.0.0/8 is directly connected, Loopback0
   L   3.3.3.3/32 is directly connected, Loopback0
L  11.0.0.0/16 is subnetted, 1 subnets
   B   11.1.0.0 [20/0] via 192.1.23.2, 00:12:06
   L   12.0.0.0/16 is subnetted, 1 subnets
   B   12.1.0.0 [20/0] via 192.1.23.2, 00:12:06
C  13.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
   C   13.1.0.0/16 is directly connected, Loopback1
   L   13.1.0.1/32 is directly connected, Loopback1
B  192.1.12.0/24 [20/0] via 192.1.23.2, 00:12:06
C  192.1.23.0/24 is variably subnetted, 2 subnets, 2 masks
   L   192.1.23.0/24 is directly connected, FastEthernet0/0
   L   192.1.23.3/32 is directly connected, FastEthernet0/0
R3#
R3#
R3#conf
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line. End with CNTL/Z.
R3(config)#router bgp 3
R3(config-router)#network 192.1.34.0 mask 255.255.255.0
R3(config-router)#neighbor 192.1.34.4 remote-as 4
R3(config-router)#
```

```
R4#configure terminal
R4(config)#interface Loopback 0
R4(config-if)#ip address 4.4.4.4 255.0.0.0
R4(config-if)#interface Loopback 1
R4(config-if)#ip address 14.1.0.1 255.255.0.0
R4(config-if)#interface serial 1/0
R4(config-if)#ip address 192.1.34.4 255.255.255.0
R4(config-if)#no shutdown
R4(config-if)#exit
R4(config)#router bgp 4
R4(config-router)#bgp router-id 66.66.66.66
R4(config-router)#network 4.0.0.0 mask 255.0.0.0
R4(config-router)#network 14.1.0.0 mask 255.255.0.0
R4(config-router)#network 192.1.34.0 mask 255.255.255.0
```

```
R4(config-router)#neighbor 192.1.34.3 remote-as 3
```

Figura 11. Simulación de escenario 1

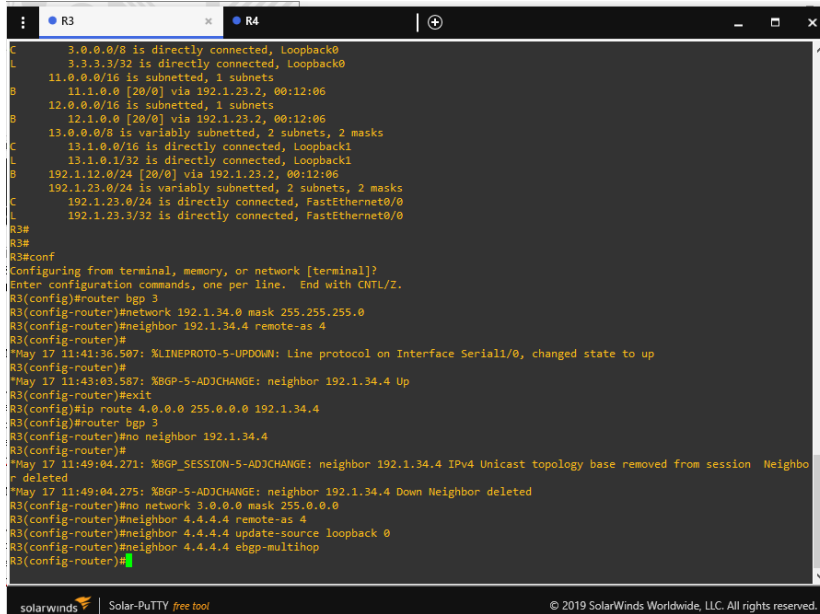


```
Compiled Thu 20-Feb-14 06:51 by prod_rel_team
*May 17 07:56:01.347: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial1/0,
changed state to down
*May 17 07:56:01.351: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial1/1,
changed state to down
*May 17 07:56:01.355: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial1/2,
changed state to down
*May 17 07:56:01.359: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial1/3,
changed state to down
R4#conf
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line. End with CNTL/Z.
R4(config)#hostname R4
R4(config)#interface Loopback 0
R4(config-if)#
*May 17 11:40:38.797: %LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback0, changed state to up
R4(config-if)#ip address 4.4.4.4 255.0.0.0
R4(config-if)#interface Loopback 1
R4(config-if)#
*May 17 11:40:54.895: %LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback1, changed state to up
R4(config-if)#ip address 14.1.0.1 255.255.0.0
R4(config-if)#interface serial 1/0
R4(config-if)#ip address 192.1.34.4 255.255.255.0
R4(config-if)#no shutdown
R4(config-if)#
*May 17 11:41:37.347: %LINK-3-UPDOWN: Interface Serial1/0, changed state to up
R4(config-if)#
*May 17 11:41:38.355: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial1/0, changed state to up
R4(config-if)#exit
R4(config)#router bgp 4
R4(config-router)#bgp router-id 66.66.66.66
R4(config-router)#network 4.0.0.0 mask 255.0.0.0
R4(config-router)#network 14.1.0.0 mask 255.255.0.0
R4(config-router)#network 192.1.34.0 mask 255.255.255.0
R4(config-router)#neighbor 192.1.34.3 remote-as 3
R4(config-router)#
*May 17 11:45:04.171: %BGP-5-ADJCHANGE: neighbor 192.1.34.3 Up
R4(config-router)#
```

Para establecer las relaciones de adyacencia mediante las direcciones de Loopback, el router vecino necesita informar sobre el uso de esta interfaz en lugar de una interfaz física y, por tanto, se requiere una configuración adicional para establecer los vecinos:

```
R3#configure terminal
R3(config)#ip route 4.0.0.0 255.0.0.0 192.1.34.4
R3(config)#router bgp 3
R3(config-router)#no neighbor 192.1.34.4
R3(config-router)#no network 3.0.0.0 mask 255.0.0.0
R3(config-router)#neighbor 4.4.4.4 remote-as 4
R3(config-router)#neighbor 4.4.4.4 update-source loopback 0
R3(config-router)# neighbor 4.4.4.4 ebgp-multihop
```

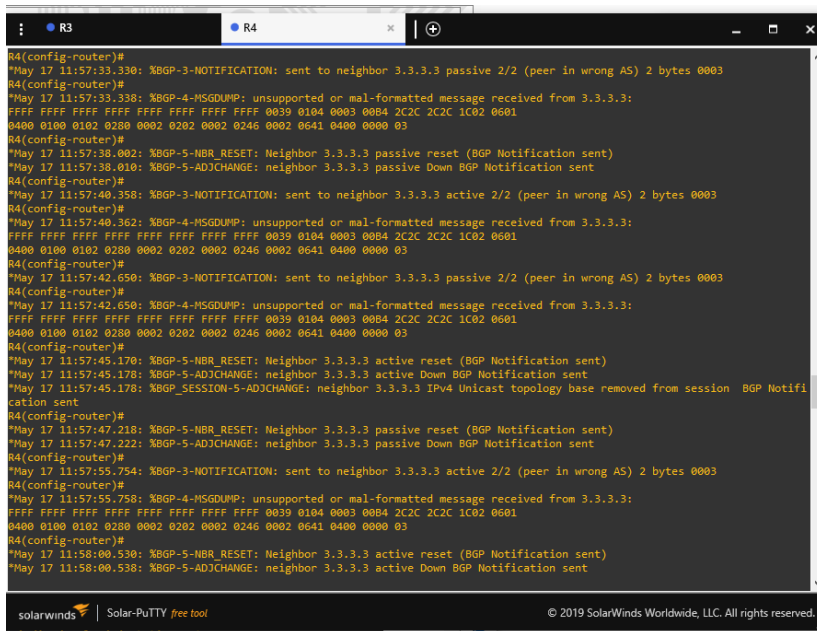
Figura 12. Simulación de escenario 1



```
C 3.0.0/8 is directly connected, Loopback0
L 3.3.3/32 is directly connected, Loopback0
B 11.0.0/16 is subnetted, 1 subnets
  11.0.0 [20/0] via 192.1.23.2, 00:12:06
B 12.0.0/16 is subnetted, 1 subnets
  12.1.0.0 [20/0] via 192.1.23.2, 00:12:06
B 13.0.0/8 is variably subnetted, 2 subnets, 2 masks
  13.1.0.0/16 is directly connected, Loopback1
  13.1.0.1/32 is directly connected, Loopback1
B 192.1.12.0/24 [20/0] via 192.1.23.2, 00:12:06
  192.1.23.0/24 is variably subnetted, 2 subnets, 2 masks
  192.1.23.0/24 is directly connected, FastEthernet0/0
  192.1.23.3/32 is directly connected, FastEthernet0/0
R3#
R3#
R3#conf
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line. End with CNTL/Z.
R3(config)#router bgp 3
R3(config-router)#network 192.1.34.0 mask 255.255.255.0
R3(config-router)#neighbor 192.1.34.4 remote-as 4
R3(config-router)#
*May 17 11:41:36.507: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial1/0, changed state to up
R3(config-router)#
*May 17 11:43:03.587: %BGP-5-ADJCHANGE: neighbor 192.1.34.4 Up
R3(config-router)#exit
R3(config)#ip route 4.0.0.0 255.0.0.0 192.1.34.4
R3(config)#router bgp 3
R3(config-router)#no neighbor 192.1.34.4
R3(config-router)#
*May 17 11:49:04.271: %BGP_SESSION-5-ADJCHANGE: neighbor 192.1.34.4 IPv4 Unicast topology base removed from session Neighbor deleted
*May 17 11:49:04.275: %BGP-5-ADJCHANGE: neighbor 192.1.34.4 Down Neighbor deleted
R3(config-router)#no network 3.0.0.0 mask 255.0.0.0
R3(config-router)#neighbor 4.4.4.4 remote-as 4
R3(config-router)#neighbor 4.4.4.4 update-source loopback 0
R3(config-router)#neighbor 4.4.4.4 ebgp-multihop
R3(config-router)#
```

```
R4 (config) #ip route 3.0.0.0 255.0.0.0 192.1.34.3
R4 (config) #router bgp 4
R4 (config-router) #no neighbor 192.1.34.3
R4 (config-router) #neighbor 3.3.3.3 remote-as 4
R4 (config-router) #neighbor 3.3.3.3 update-source loopback 0
R4 (config-router) # neighbor 3.3.3.3 ebgp-multihop
```

Figura 13. Simulación de escenario 1



```
R3 R4
R4(config-router)#
*May 17 11:57:33.338: XGBP-3-NOTIFICATION: sent to neighbor 3.3.3.3 passive 2/2 (peer in wrong AS) 2 bytes 0003
R4(config-router)#
*May 17 11:57:33.338: XGBP-4-MSGDUMP: unsupported or mal-formatted message received from 3.3.3.3:
FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF 0039 0104 0003 00B4 2C2C 2C2C 1C02 0601
0400 0100 0102 0280 0002 0202 0002 0246 0002 0641 0400 0000 03
R4(config-router)#
*May 17 11:57:38.002: XGBP-5-NBR_RESET: Neighbor 3.3.3.3 passive reset (BGP Notification sent)
*May 17 11:57:38.010: XGBP-5-ADJCHANGE: neighbor 3.3.3.3 passive Down BGP Notification sent
R4(config-router)#
*May 17 11:57:40.358: XGBP-3-NOTIFICATION: sent to neighbor 3.3.3.3 active 2/2 (peer in wrong AS) 2 bytes 0003
R4(config-router)#
*May 17 11:57:40.362: XGBP-4-MSGDUMP: unsupported or mal-formatted message received from 3.3.3.3:
FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF 0039 0104 0003 00B4 2C2C 2C2C 1C02 0601
0400 0100 0102 0280 0002 0202 0002 0246 0002 0641 0400 0000 03
R4(config-router)#
*May 17 11:57:42.650: XGBP-3-NOTIFICATION: sent to neighbor 3.3.3.3 passive 2/2 (peer in wrong AS) 2 bytes 0003
R4(config-router)#
*May 17 11:57:42.650: XGBP-4-MSGDUMP: unsupported or mal-formatted message received from 3.3.3.3:
FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF 0039 0104 0003 00B4 2C2C 2C2C 1C02 0601
0400 0100 0102 0280 0002 0202 0002 0246 0002 0641 0400 0000 03
R4(config-router)#
*May 17 11:57:45.170: XGBP-5-NBR_RESET: Neighbor 3.3.3.3 active reset (BGP Notification sent)
*May 17 11:57:45.178: XGBP-5-ADJCHANGE: neighbor 3.3.3.3 active Down BGP Notification sent
*May 17 11:57:45.178: XGBP_SESSION-5-ADJCHANGE: neighbor 3.3.3.3 IPv4 Unicast topology base removed from session BGP Notifi
cation sent
R4(config-router)#
*May 17 11:57:47.218: XGBP-5-NBR_RESET: Neighbor 3.3.3.3 passive reset (BGP Notification sent)
*May 17 11:57:47.222: XGBP-5-ADJCHANGE: neighbor 3.3.3.3 passive Down BGP Notification sent
R4(config-router)#
*May 17 11:57:55.754: XGBP-3-NOTIFICATION: sent to neighbor 3.3.3.3 active 2/2 (peer in wrong AS) 2 bytes 0003
R4(config-router)#
*May 17 11:57:55.758: XGBP-4-MSGDUMP: unsupported or mal-formatted message received from 3.3.3.3:
FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF 0039 0104 0003 00B4 2C2C 2C2C 1C02 0601
0400 0100 0102 0280 0002 0202 0002 0246 0002 0641 0400 0000 03
R4(config-router)#
*May 17 11:58:00.530: XGBP-5-NBR_RESET: Neighbor 3.3.3.3 active reset (BGP Notification sent)
*May 17 11:58:00.538: XGBP-5-ADJCHANGE: neighbor 3.3.3.3 active Down BGP Notification sent
```

Verificamos con el comando `show ip route`, que el router R3 ha actualizado su tabla de enrutamiento y la dirección de red que conecta este dispositivo con R4 ha cambiado y ahora corresponde a la dirección de Loopback 0, la cual aparece como una dirección estática dado que así se estableció en el paso anterior, sin embargo, pese a que se usa la dirección lógica Loopback 0 para establecer la adyacencia, la vía de conexión física sigue siendo la red 192.1.4.0/24 correspondiente a la interfaz serial 1/0. Así también, se puede identificar que la dirección de red de la interfaz Loopback 1 se sigue aprendiendo mediante el protocolo BGP, pero ahora se alcanza mediante la interfaz Loopback 0 de R4 (4.4.4.4). Los demás vecinos no se alteraron, por tanto, las demás entradas de la tabla de enrutamiento permanecen iguales. De otro lado, en la tabla de enrutamiento del router R4 se puede evidenciar que la dirección mediante la cual este se comunica con sus vecinos BGP ha cambiado y ahora corresponde a la dirección de la interfaz Loopback 0 de R3. Se muestra, además, en el resultado del comando `show ip route`, la ruta estática que se creó hacia R3.

Figura 14. Simulación de escenario 1

```

R3
May 17 12:04:07.934: XSYS-5-CONFIG I: Configured from console by console
May 17 12:04:08.134: XBG-3-NOTIFICATION: received from neighbor 4.4.4.4 passive 2/2 (peer in wrong AS) 2 bytes 0003
R3#sho
May 17 12:04:08.134: XBG-5-NBR_RESET: Neighbor 4.4.4.4 passive reset (BGP Notification received)
May 17 12:04:08.134: XBG-5-ADJCHANGE: neighbor 4.4.4.4 passive Down BGP Notification received
May 17 12:04:08.134: XBG_SESSION-5-ADJCHANGE: neighbor 4.4.4.4 IPv4 Unicast topology base removed from session BGP Notifi
cation received
R3#show ip route
May 17 12:04:19.562: XBG-3-NOTIFICATION: received from neighbor 4.4.4.4 active 2/2 (peer in wrong AS) 2 bytes 0003
R3#show 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 - LISP
       + - replicated route, % - next hop override

Gateway of last resort is not set

B    1.0.0.0/8 [20/0] via 192.1.23.2, 00:56:11
B    2.0.0.0/8 [20/0] via 192.1.23.2, 00:56:11
B    3.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C    3.0.0.0/8 is directly connected, Loopback0
L    3.3.3.3/32 is directly connected, Loopback0
S    4.0.0.0/8 [1/0] via 192.1.34.4
S    11.0.0.0/16 is subnetted, 1 subnets
B    11.1.0.0 [20/0] via 192.1.23.2, 00:56:11
B    12.0.0.0/16 is subnetted, 1 subnets
B    12.1.0.0 [20/0] via 192.1.23.2, 00:56:11
B    13.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
--More--
May 17 12:04:19.566: XBG-5-NBR_RESET: Neighbor 4.4.4.4 active reset (BGP Notification received)
May 17 12:04:19.570: XBG-5-ADJCHANGE: neighbor 4.4.4.4 active Down BGP Notification received
May 17 12:04:19.570: XBG_SESSION-5-ADJCHANGE: neighbor 4.4.4.4 IPv4 Unicast topology base removed from session BGP Notifi
cation received
--More--
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```

Figura 15. Simulación de escenario 1

```

R3
0400 0100 0102 0280 0002 0202 0002 0246 0002 0641 0400 0000 03
R4#show ip
May 17 12:05:06.626: XBG-5-NBR_RESET: Neighbor 3.3.3.3 active reset (BGP Notification sent)
May 17 12:05:06.630: XBG-5-ADJCHANGE: neighbor 3.3.3.3 active Down BGP Notification sent
May 17 12:05:06.634: XBG_SESSION-5-ADJCHANGE: neighbor 3.3.3.3 IPv4 Unicast topology base removed from session BGP Notifi
cation sent
May 17 12:05:07.110: XBG-3-NOTIFICATION: sent to neighbor 3.3.3.3 passive 2/2 (peer in wrong AS) 2 bytes 0003
R4#show ip route
May 17 12:05:07.114: XBG-4-MSGDUMP: unsupported or mal-formatted message received from 3.3.3.3:
FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF 0039 0104 0003 00B4 2C2C 2C2C 1C02 0601
0400 0100 0102 0280 0002 0202 0002 0246 0002 0641 0400 0000 03
R4#show 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 - LISP
       + - replicated route, % - next hop override

Gateway of last resort is not set

S    3.0.0.0/8 [1/0] via 192.1.34.3
S    4.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C    4.0.0.0/8 is directly connected, Loopback0
L    4.4.4.4/32 is directly connected, Loopback0
S    14.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C    14.1.0.0/16 is directly connected, Loopback1
L    14.1.0.1/32 is directly connected, Loopback1
S    192.1.34.0/24 is variably subnetted, 2 subnets, 2 masks
C    192.1.34.0/24 is directly connected, Serial1/0
L    192.1.34.4/32 is directly connected, Serial1/0
R4#
R4#
May 17 12:05:11.746: XBG-5-NBR_RESET: Neighbor 3.3.3.3 passive reset (BGP Notification sent)
May 17 12:05:11.754: XBG-5-ADJCHANGE: neighbor 3.3.3.3 passive Down BGP Notification sent
R4#
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```

ESCENARIO 2

Figura 16. Escenario 2

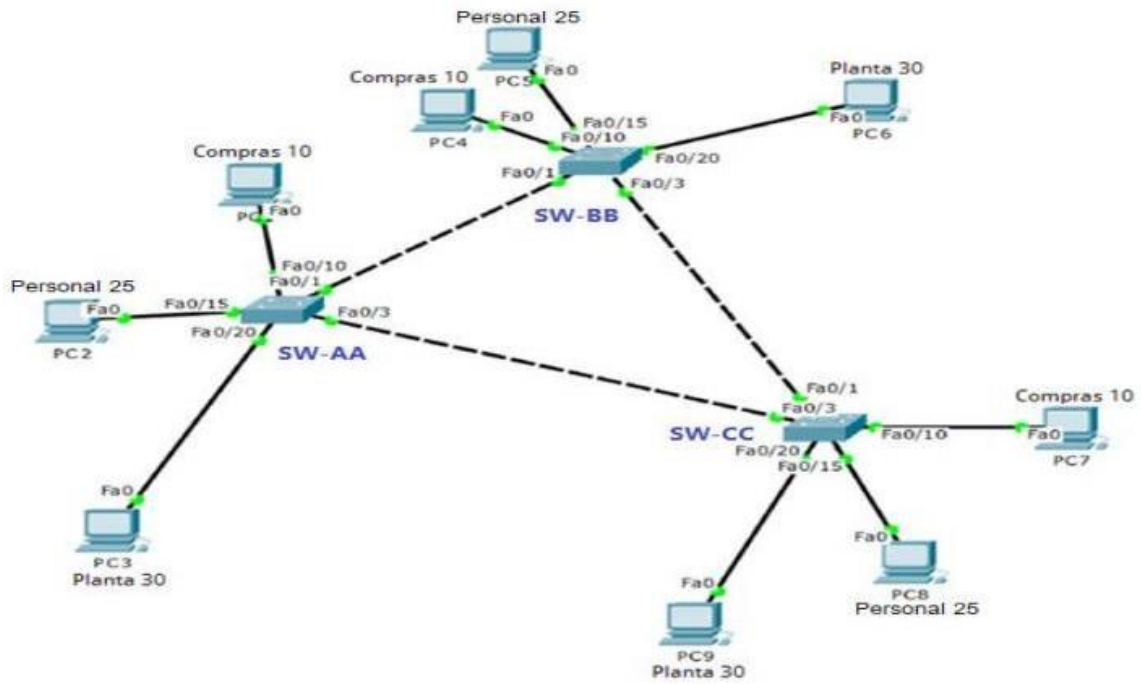
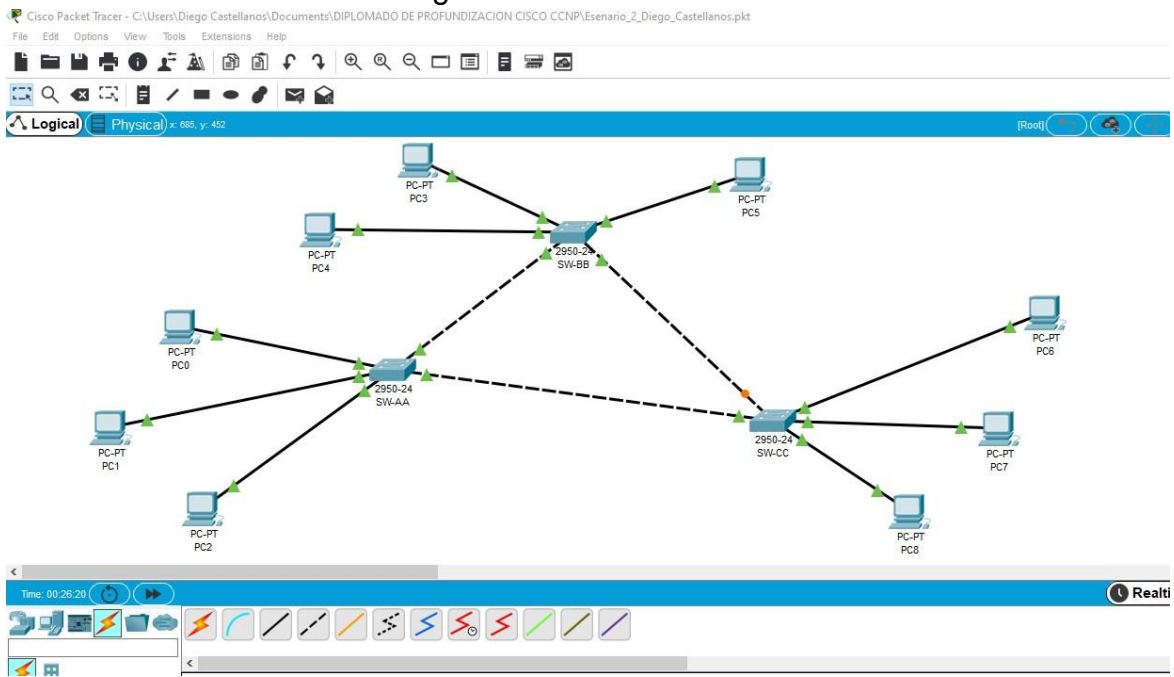


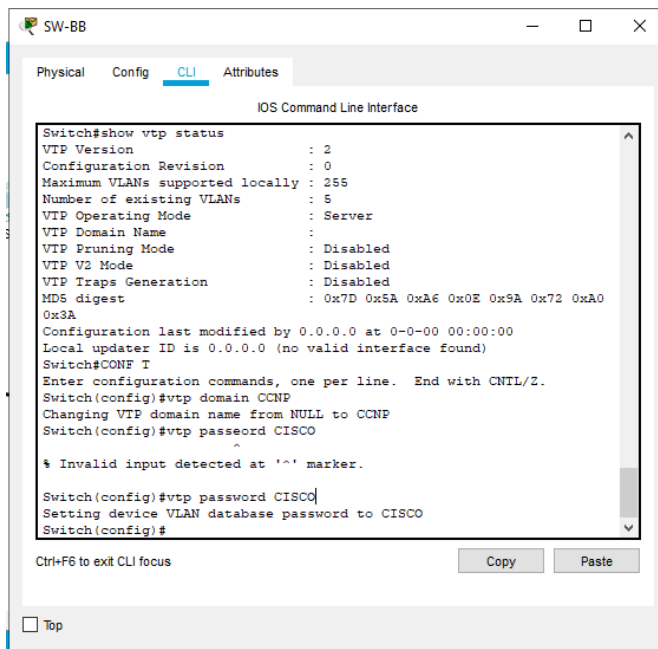
Figura 17 Simulación del escenario 2



A. Configurar VTP

2.1. Todos los switches se configurarán para usar VTP para las actualizaciones de VLAN. El switch SW-BB se configurará como el servidor. Los switches SW-AA y SW-CC se configurarán como clientes. Los switches estarán en el dominio VPT llamado CCNP y usando la contraseña cisco.

Figura 18. Configuración switch SW-BB



El switch SW-BB se configuro como el servidor en el dominio VPT llamado CCNP y usando la contraseña CISCO, se configura la VLAN 10 y 20. Los puertos que van del 0/1-3 los convertimos en modo troncal.

```
Switch#
Switch#show vtp status
VTP Version : 2
Configuration Revision : 0
```

```

Maximum VLANs supported locally : 255
Number of existing VLANs : 5
VTP Operating Mode : Server
VTP Domain Name :
VTP Pruning Mode : Disabled
VTP V2 Mode : Disabled
VTP Traps Generation : Disabled
MD5 digest : 0x7D 0x5A 0xA6 0x0E 0x9A 0x72 0xA0 0x3A
Configuration last modified by 0.0.0.0 at 0-0-00 00:00:00
Local updater ID is 0.0.0.0 (no valid interface found)
Switch#CONF T
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#vtp domain CCNP
Changing VTP domain name from NULL to CCNP
Switch(config)#vtp passeord CISCO
Switch(config)#vtp password CISCO
Setting device VLAN database password to CISCO
Switch(config)#do wr
Building configuration...
[OK]
Switch(config)#vlan 10
Switch(config-vlan)#name AAA
Switch(config-vlan)#exit
Switch(config)#vlan 20
Switch(config-vlan)#name BBB
Switch(config-vlan)#exit
Switch(config)#interface
% Incomplete command.
Switch(config)#inter
Switch(config)#interface rage
Switch(config)#interface rage fas
Switch(config)#interface rage fase
Switch(config)#interface range f
Switch(config)#interface range fastEthernet 0/1-3
Switch(config-if-range)#swit
Switch(config-if-range)#switchport mode tr
Switch(config-if-range)#switchport mode trunk

Switch(config-if-range)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1,
changed state to down

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1,
changed state to up

```

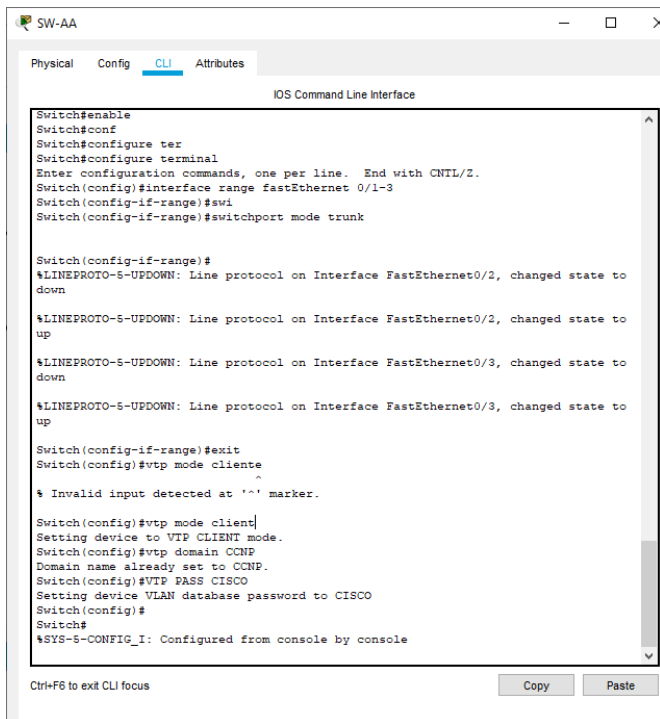
```
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/2,
changed state to down
```

```
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/2,
changed state to up
```

```
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/3,
changed state to down
```

```
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/3,
changed state to up
```

Figura 19. Configuración switch SW-AA



```
SW-AA
Physical Config CLI Attributes
IOS Command Line Interface
Switch#enable
Switch#conf
Switch#configure ter
Switch#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#interface range fastEthernet 0/1-3
Switch(config-if-range)#swi
Switch(config-if-range)#switchport mode trunk

Switch(config-if-range)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/2, changed state to
down
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/2, changed state to
up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/3, changed state to
down
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/3, changed state to
up
Switch(config-if-range)#exit
Switch(config)#vtp mode cliente
% Invalid input detected at '^' marker.
Switch(config)#vtp mode client
Setting device to VTP CLIENT mode.
Switch(config)#vtp domain CCNP
Domain name already set to CCNP.
Switch(config)#VTP PASS CISCO
Setting device VLAN database password to CISCO
Switch(config)#
Switch#
%SYS-5-CONFIG_I: Configured from console by console

Ctrl+F6 to exit CLI focus
Copy Paste
```

El switch SW-AA se configuro como Los puertos que van del 0/1-3 los convertimos en modo troncal, Tambien su configuración VPT como dodo cliente llamado CCNP y usando la contraseña CISCO.

```
Switch#en
Switch#enable
Switch#conf
Switch#configure ter
Switch#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
```

```
Switch(config)#interface range fastEthernet 0/1-3
Switch(config-if-range)#swi
Switch(config-if-range)#switchport mode trunk
```

```
Switch(config-if-range)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/2,
changed state to down
```

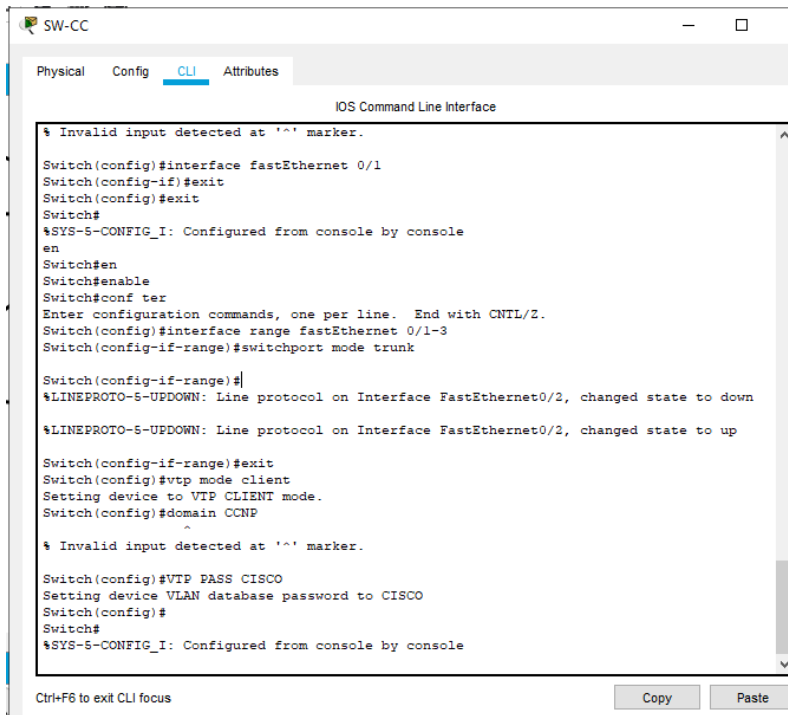
```
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/2,
changed state to up
```

```
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/3,
changed state to down
```

```
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/3,
changed state to up
```

```
Switch(config-if-range)#exit
Switch(config)#vtp mode cliente
Switch(config)#vtp mode client
Setting device to VTP CLIENT mode.
Switch(config)#vtp domain CCNP
Domain name already set to CCNP.
Switch(config)#VTP PASS CISCO
Setting device VLAN database password to CISCO
Switch(config)#
Switch#
%SYS-5-CONFIG_I: Configured from console by console
```

Figura 19. Configuración switch SW-CC



```
SW-CC
Physical Config CLI Attributes
IOS Command Line Interface
% Invalid input detected at '^' marker.
Switch(config)#interface fastEthernet 0/1
Switch(config-if)#exit
Switch(config)#exit
Switch#
%SYS-5-CONFIG_I: Configured from console by console
en
Switch#en
Switch#enable
Switch#conf ter
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#interface range fastEthernet 0/1-3
Switch(config-if-range)#switchport mode trunk

Switch(config-if-range)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/2, changed state to down
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/2, changed state to up

Switch(config-if-range)#exit
Switch(config)#vtp mode client
Setting device to VTP CLIENT mode.
Switch(config)#domain CCNP
% Invalid input detected at '^' marker.

Switch(config)#VTP PASS CISCO
Setting device VLAN database password to CISCO
Switch(config)#
Switch#
%SYS-5-CONFIG_I: Configured from console by console

Ctrl+F6 to exit CLI focus
Copy Paste
```

El switch SW-CC se configuro como Los puertos que van del 0/1-3 los convertimos en modo troncal, También su configuración VPT como dodo cliente llamado CCNP y usando la contraseña CISCO.

```
Switch#en
Switch#enable
Switch#conf ter
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#interface range fastEthernet 0/1-3
Switch(config-if-range)#switchport mode trunk

Switch(config-if-range)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/2,
changed state to down

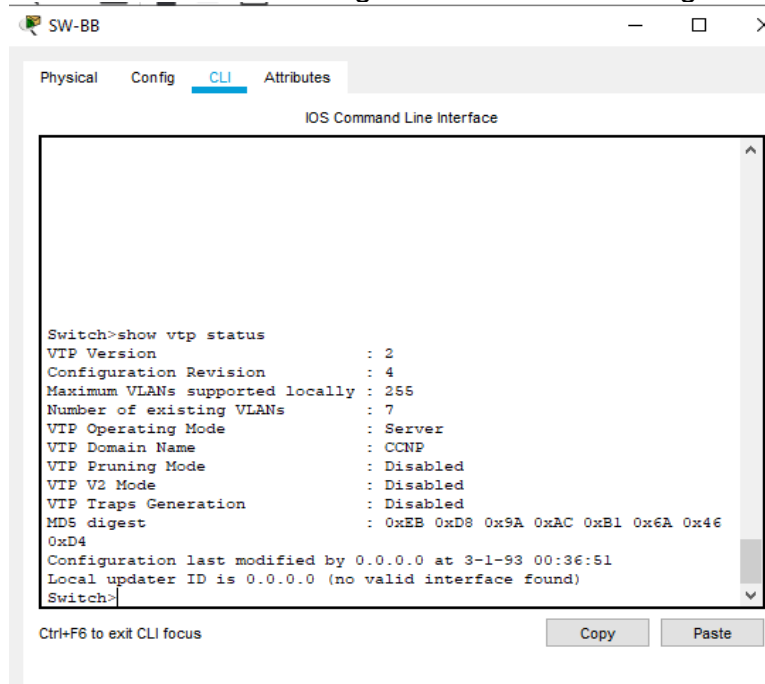
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/2,
changed state to up

Switch(config-if-range)#exit
Switch(config)#vtp mode client
Setting device to VTP CLIENT mode.
Switch(config)#domain CCNP
```

```
Switch(config)#VTP PASS CISCO
Setting device VLAN database password to CISCO
Switch(config)#
Switch#
%SYS-5-CONFIG_I: Configured from console by console
```

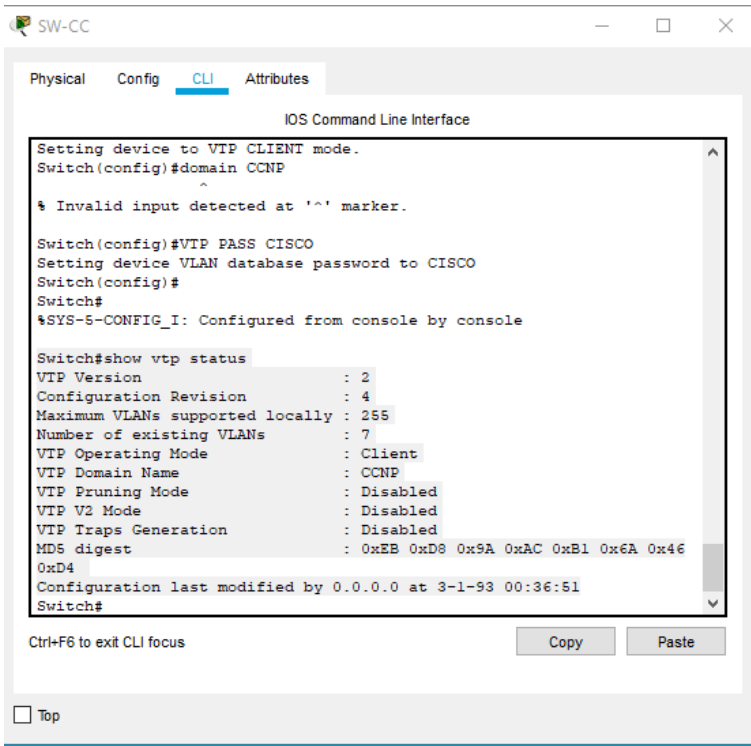
2.2 Verifique las configuraciones mediante el comando show vtp status

Figura 20. Correcta configuración de SW-BB



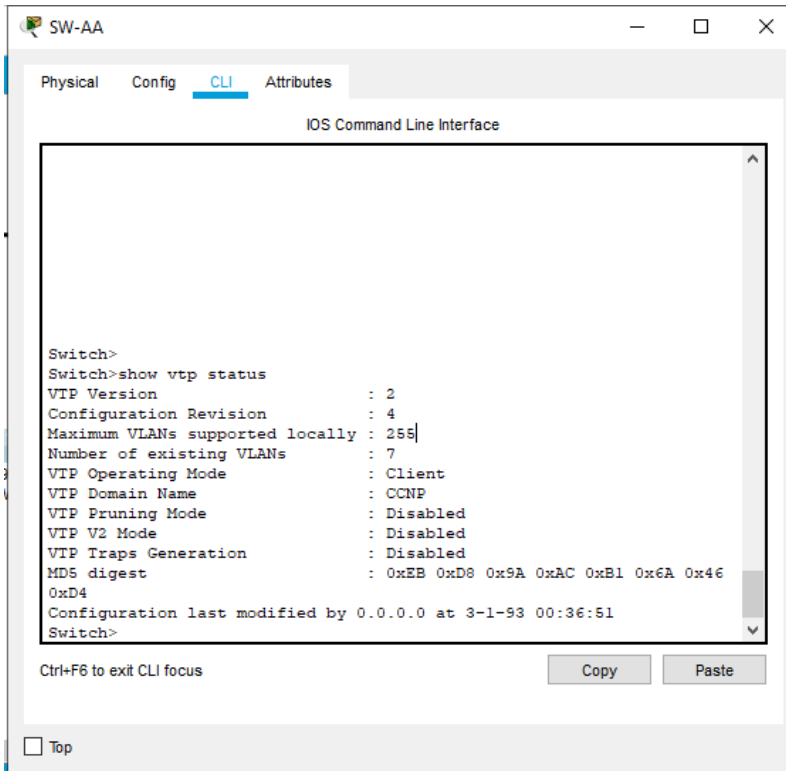
```
Switch>show vtp status
VTP Version : 2
Configuration Revision : 4
Maximum VLANs supported locally : 255
Number of existing VLANs : 7
VTP Operating Mode : Server
VTP Domain Name : CCNP
VTP Pruning Mode : Disabled
VTP V2 Mode : Disabled
VTP Traps Generation : Disabled
MD5 digest : 0xEB 0xD8 0x9A 0xAC 0xB1 0x6A 0x46 0xD4
Configuration last modified by 0.0.0.0 at 3-1-93 00:36:51
Local updater ID is 0.0.0.0 (no valid interface found)
```

Figura 21. Correcta configuración de SW-CC



```
Switch#show vtp status
VTP Version : 2
Configuration Revision : 4
Maximum VLANs supported locally : 255
Number of existing VLANs : 7
VTP Operating Mode : Client
VTP Domain Name : CCNP
VTP Pruning Mode : Disabled
VTP V2 Mode : Disabled
VTP Traps Generation : Disabled
MD5 digest : 0xEB 0xD8 0x9A 0xAC 0xB1 0x6A 0x46 0xD4
Configuration last modified by 0.0.0.0 at 3-1-93 00:36:51
```

Figura 22. Correcta configuración de SW-AA



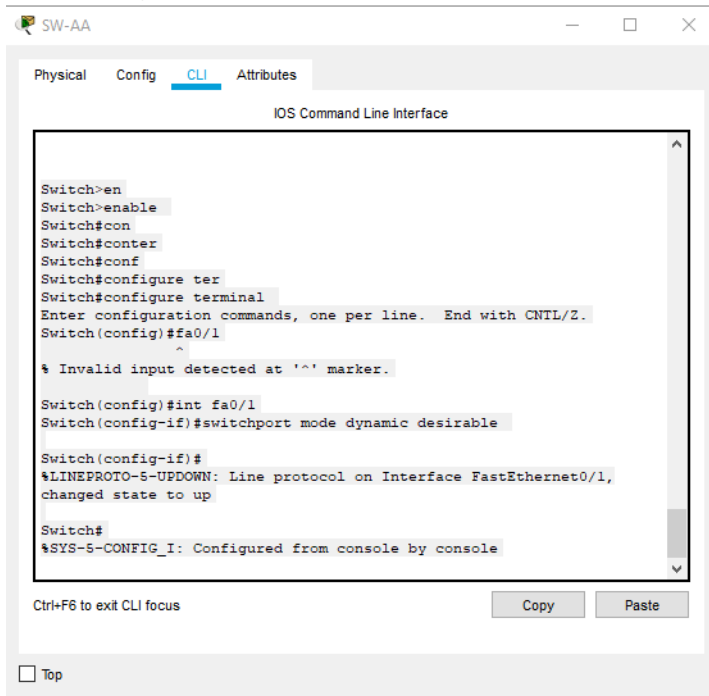
```
Switch>
Switch>show vtp status
VTP Version : 2
Configuration Revision : 4
Maximum VLANs supported locally : 255
Number of existing VLANs : 7
VTP Operating Mode : Client
VTP Domain Name : CCNP
VTP Pruning Mode : Disabled
VTP V2 Mode : Disabled
VTP Traps Generation : Disabled
MD5 digest : 0xEB 0xD8 0x9A 0xAC 0xB1 0x6A 0x46 0xD4
Configuration last modified by 0.0.0.0 at 3-1-93 00:36:51
Switch>
```

Configurar DTP (Dynamic Trunking Protocol)

2.4 Configure un enlace troncal ("trunk") dinámico entre SW-AA y SW-BB. Debido a que el modo por defecto es dynamic auto, solo un lado del enlace debe configurarse como

dynamic desirable.

Figura 23. Configuración de DTP SW-AA



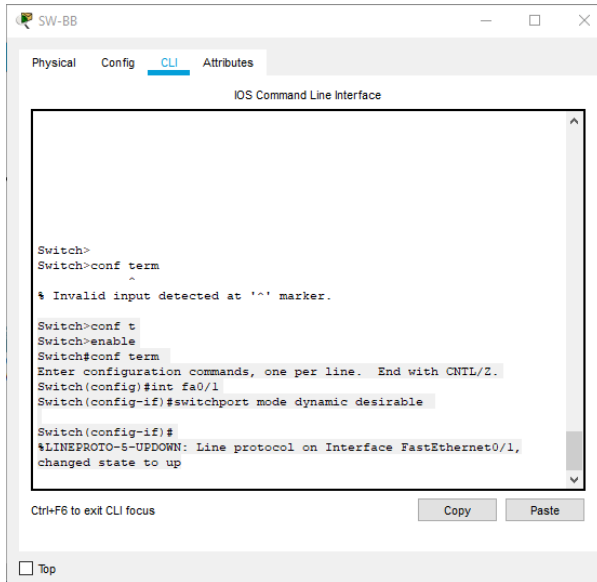
Con el comando `show int fa0/3 switchport` podemos ver que el enlace se encuentra en trunk y si no lo podemos cambiar con el comando `switchport mode dynamic desirable`.

```
Switch>en
Switch>enable
Switch#con
Switch#conter
Switch#conf
Switch#configure ter
Switch#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#fa0/1
^
% Invalid input detected at '^' marker.
Switch(config)#int fa0/1
Switch(config-if)#switchport mode dynamic desirable

Switch(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1,
changed state to up
```

```
Switch#
%SYS-5-CONFIG_I: Configured from console by console
```

Figura 24. Configuración de DTP SW-BB



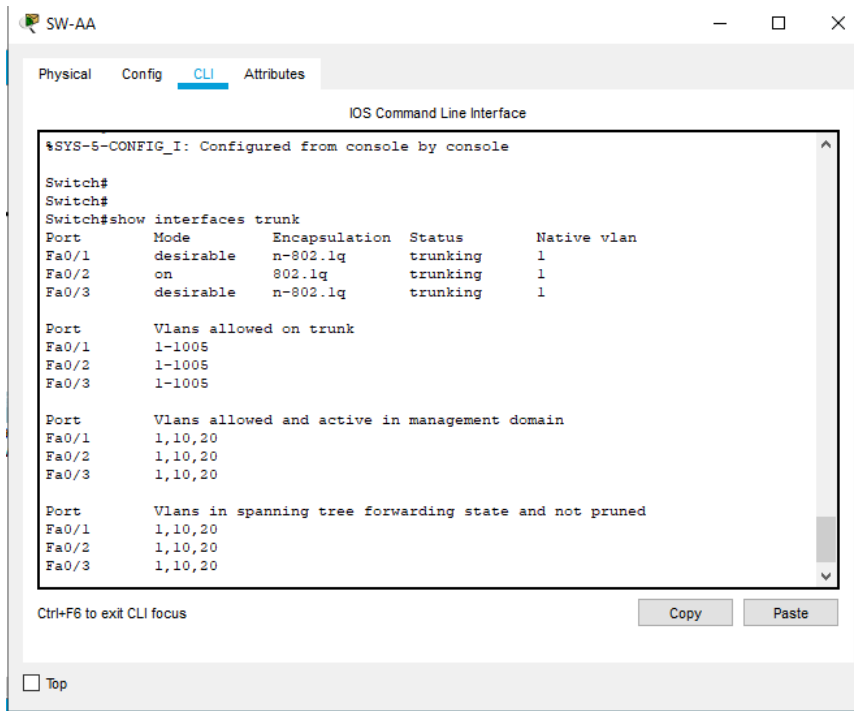
Con el comando `show int fa0/1 switchport` podemos ver que el enlace se encuentra en trunk y si no lo podemos cambiar con el comando `switchport mode dynamic desirable`

```
Switch>conf t
Switch>enable
Switch#conf term
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#int fa0/1
Switch(config-if)#switchport mode dynamic desirable

Switch(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1,
changed state to up
```

2.4 Verifique el enlace "trunk" entre SW-AA y SW-BB usando el comando `show interfaces trunk`.

Figura 25. Verificación de trunk SW-AA



```
Switch#show interfaces trunk  
Port Mode Encapsulation Status Native vlan  
Fa0/1 desirable n-802.1q trunking 1  
Fa0/2 on 802.1q trunking 1  
Fa0/3 desirable n-802.1q trunking 1
```

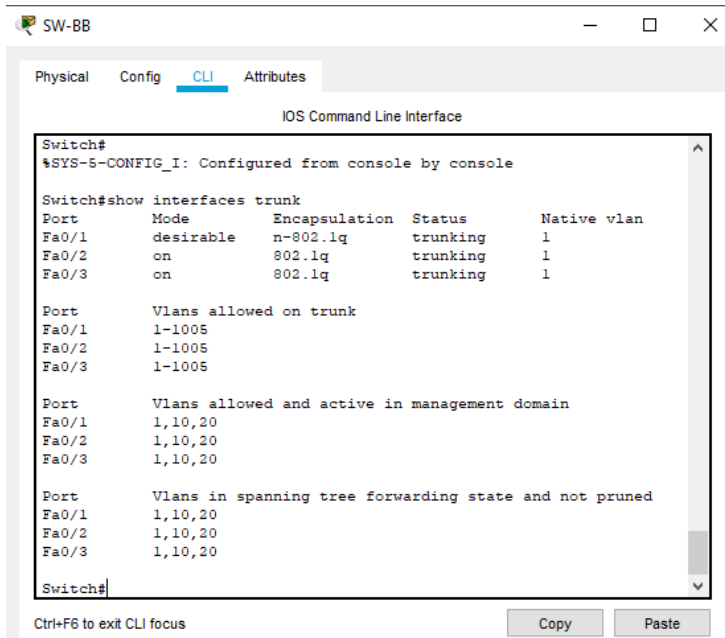
```
Port Vlans allowed on trunk  
Fa0/1 1-1005  
Fa0/2 1-1005  
Fa0/3 1-1005
```

```
Port Vlans allowed and active in management domain  
Fa0/1 1,10,20  
Fa0/2 1,10,20  
Fa0/3 1,10,20
```

```
Port Vlans in spanning tree forwarding state and not pruned  
Fa0/1 1,10,20  
Fa0/2 1,10,20  
Fa0/3 1,10,20
```

```
Switch#
```

Figura 26. Verificación de trunk SW-BB



```
Switch#  
%SYS-5-CONFIG_I: Configured from console by console
```

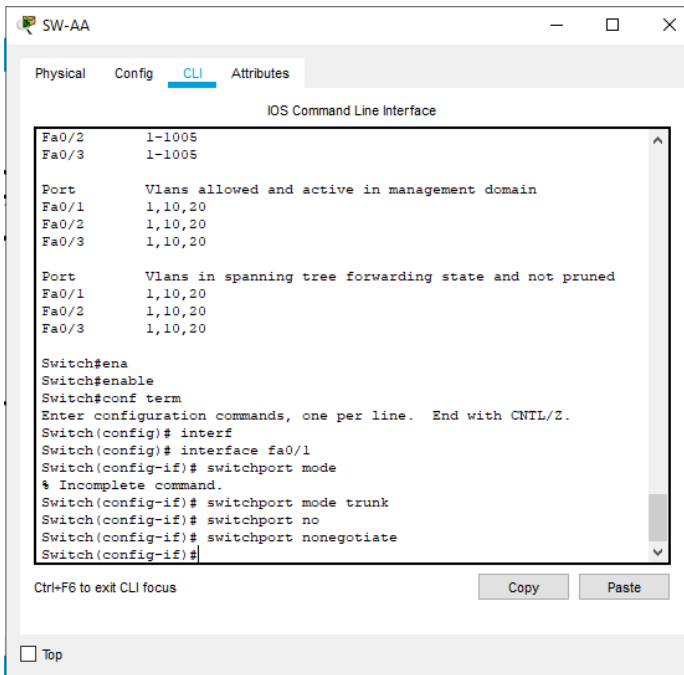
```
Switch#show interfaces trunk  
Port Mode Encapsulation Status Native vlan  
Fa0/1 desirable n-802.1q trunking 1  
Fa0/2 on 802.1q trunking 1  
Fa0/3 on 802.1q trunking 1
```

```
Port Vlans allowed on trunk  
Fa0/1 1-1005  
Fa0/2 1-1005  
Fa0/3 1-1005
```

```
Port Vlans allowed and active in management domain  
Fa0/1 1,10,20  
Fa0/2 1,10,20  
Fa0/3 1,10,20
```

```
Port Vlans in spanning tree forwarding state and not pruned  
Fa0/1 1,10,20  
Fa0/2 1,10,20  
Fa0/3 1,10,20  
Switch#
```

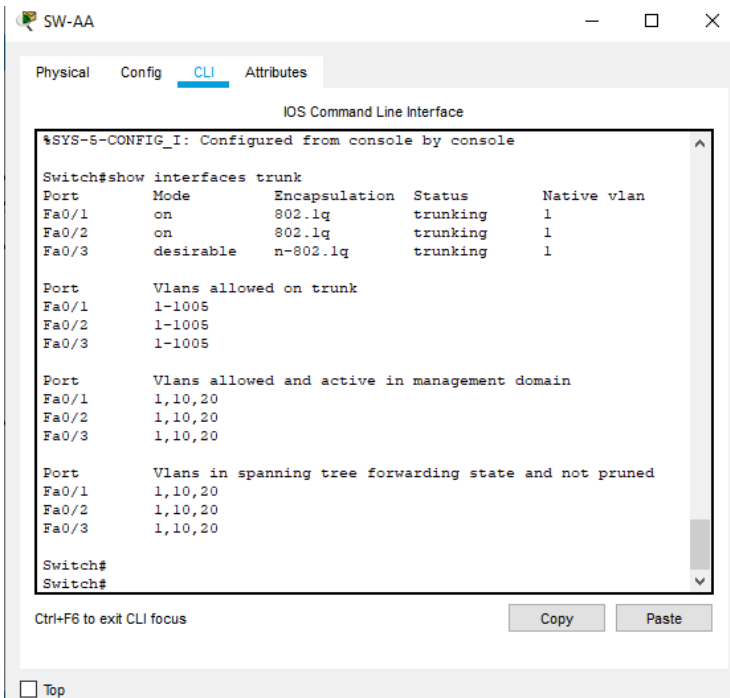
Figura 27. Configuración de trunk SW-AA y SW-BB



```
Switch#ena
Switch#enable
Switch#conf term
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)# interf
Switch(config)# interface fa0/1
Switch(config-if)# switchport mode
% Incomplete command.
Switch(config-if)# switchport mode trunk
Switch(config-if)# switchport no
Switch(config-if)# switchport nonegotiate
Switch(config-if)#
```

2.5 Verifique el enlace "trunk" el comando show interfaces trunk en SW-AA

Figura 28. Verifique el enlace trunk en SW-AA



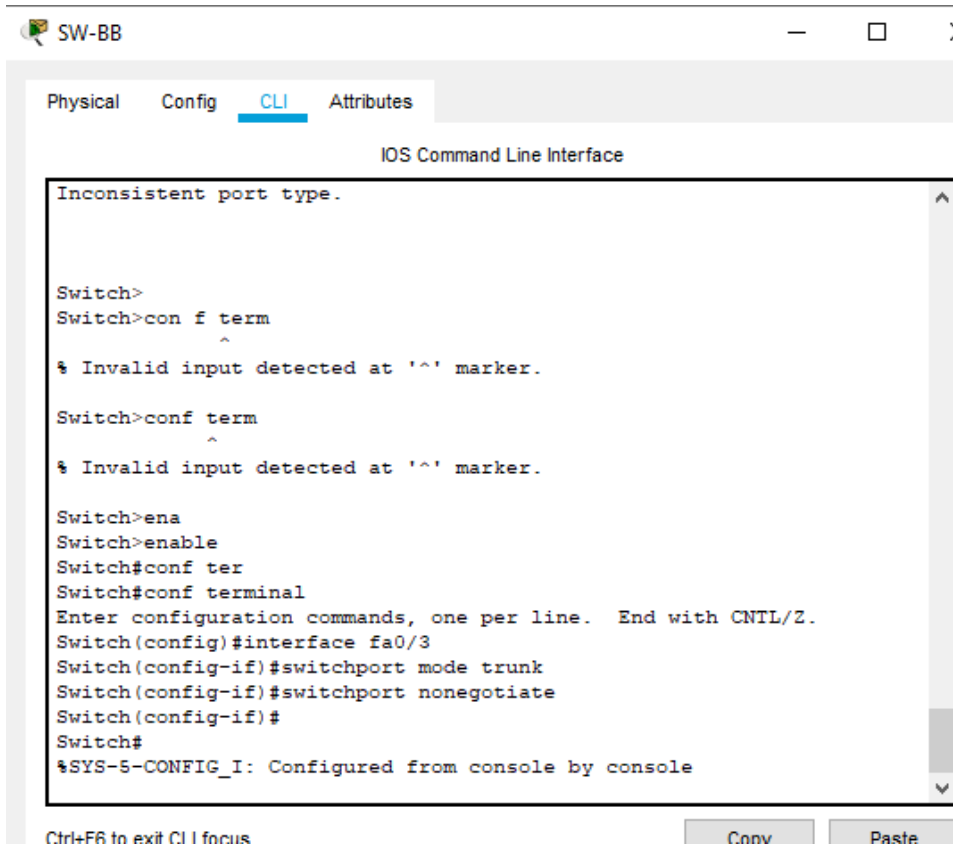
```
Switch#show interfaces trunk
Port Mode Encapsulation Status Native vlan
Fa0/1 on 802.1q trunking 1
Fa0/2 on 802.1q trunking 1
Fa0/3 desirable n-802.1q trunking 1
```

```
Port Vlans allowed on trunk
Fa0/1 1-1005
Fa0/2 1-1005
Fa0/3 1-1005
```

```
Port Vlans allowed and active in management domain
Fa0/1 1,10,20
Fa0/2 1,10,20
Fa0/3 1,10,20
```

```
Port Vlans in spanning tree forwarding state and not pruned
Fa0/1 1,10,20
Fa0/2 1,10,20
Fa0/3 1,10,20
Switch#
```

Figura 29. Configuración de enlace trunk SW-BB y SW-CC

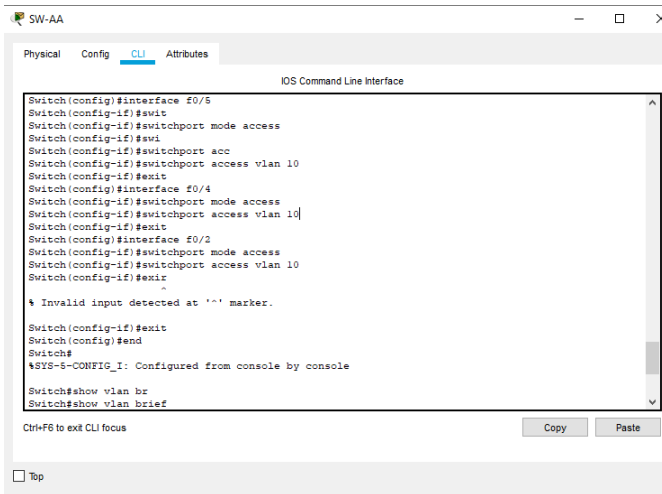


```
Switch>ena  
Switch>enable  
Switch#conf ter  
Switch#conf terminal  
Enter configuration commands, one per line. End with CNTL/Z.  
Switch(config)#interface fa0/3  
Switch(config-if)#switchport mode trunk  
Switch(config-if)#switchport nonegotiate  
Switch(config-if)#  
Switch#  
%SYS-5-CONFIG_I: Configured from console by console
```

Agregar VLANs y asignar puertos.

- a. En SW-AA agregue la VLAN 10. En SW-BB agregue las VLANs Compras (10), Personal (25), Planta (30) y Admon (99)

Figura 30. Configuración VLAN SW-AA Y SW-BB



SW-AA

Se asignara a cada puerto las VLAN correspondientes y se verificara han sido agregadas correctamente

```
Switch#ena
Switch#enable
Switch#conf term
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#inte
Switch(config)#interface f0/5
Switch(config-if)#swit
Switch(config-if)#switchport mode access
Switch(config-if)#swi
Switch(config-if)#switchport acc
Switch(config-if)#switchport access vlan 10
Switch(config-if)#exit
Switch(config)#interface f0/4
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 10
Switch(config-if)#exit
Switch(config)#interface f0/2
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 10
Switch(config-if)#exir
^
% Invalid input detected at '^' marker.
Switch(config-if)#exit
Switch(config)#end
Switch#
```

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

```
Switch#show vlan br  
Switch#show vlan brief
```

```
VLAN Name Status Ports
```

```
-----  
-----  
1 default active Fa0/6, Fa0/7, Fa0/8, Fa0/9  
Fa0/10, Fa0/11, Fa0/12, Fa0/13  
Fa0/14, Fa0/15, Fa0/16, Fa0/17  
Fa0/18, Fa0/19, Fa0/20, Fa0/21  
Fa0/22, Fa0/23, Fa0/24  
10 AAA active Fa0/2, Fa0/4, Fa0/5  
20 BBB active  
1002 fddi-default active  
1003 token-ring-default active  
1004 fddinet-default active  
1005 trnet-default active  
Switch#
```

SW-BB

```
Switch>ena  
Switch>enable  
Switch#conf term  
Enter configuration commands, one per line. End with CNTL/Z.  
Switch(config)#interface f0/2  
Switch(config-if)#switchport mode access  
Switch(config-if)#switchport access vlan 10  
Switch(config-if)#exit  
Switch(config)#interface f0/4  
Switch(config-if)#switchport mode access  
Switch(config-if)#switchport access vlan 25  
Switch(config-if)#switchport access vlan 25  
Switch(config-if)#exit  
Switch(config)#interface f0/5  
Switch(config-if)#switchport mode access  
Switch(config-if)#switchport access vlan 30  
Switch(config-if)#  
Switch#  
%SYS-5-CONFIG_I: Configured from console by console
```

2.7 Asocie los puertos a las VLAN y configure las direcciones IP de acuerdo con la

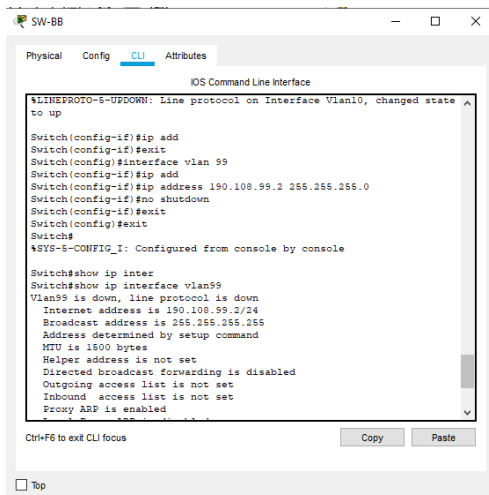
siguiente tabla.

Interfaz	VLAN	Direcciones IP de los PCs
F0/10	VLAN 10	190.108.10.X / 24
F0/15	VLAN 25	190.108.20.X /24
F0/20	VLAN 30	190.108.30.X /24

Configurar las direcciones IP en los Switches

Equipo	Interfaz	Dirección IP	Máscara
SW-AA	VLAN 99	190.108.99.1	255.255.255.0
SW-BB	VLAN 99	190.108.99.2	255.255.255.0
SW-CC	VLAN 99	190.108.99.3	255.255.255.0

Figura 30. Configuración direcciones IP en los Switches.



Reconfiguro cada una de los Switch SW-AA, SW-BB y SW-CC en la VLAN 99 con su dirección IP y su máscara.

Switch SW-AA

```
Switch#ena
```

```
Switch#enable
```

```
Switch#conf term
```

Enter configuration commands, one per line. End with CNTL/Z.

```
Switch(config)#inter
Switch(config)#interface vlan99
Switch(config-if)#ip add
Switch(config-if)#ip address 190.108.99.1 255.255.255.0
Switch(config-if)#no sh
Switch(config-if)#no shutdown
Switch(config-if)#
Switch#
Switch>show ip interface vlan99
Vlan99 is down, line protocol is down
Internet address is 190.108.99.1/24
Broadcast address is 255.255.255.255
Address determined by setup command
MTU is 1500 bytes
Helper address is not set
Directed broadcast forwarding is disabled
Outgoing access list is not set
Inbound access list is not set
Proxy ARP is enabled
Local Proxy ARP is disabled
Security level is default
Split horizon is enabled
ICMP redirects are always sent
ICMP unreachable are always sent
ICMP mask replies are never sent
IP fast switching is disabled
IP fast switching on the same interface is disabled
IP Null turbo vector
IP multicast fast switching is disabled
IP multicast distributed fast switching is disabled
IP route-cache flags are None
--More--
```

Switch SW-BB

```
witch(config-if)#exit
Switch(config)#interface vlan 99
Switch(config-if)#ip add
Switch(config-if)#ip address 190.108.99.2 255.255.255.0
Switch(config-if)#no shutdown
Switch(config-if)#exit
Switch(config)#exit
Switch#
%SYS-5-CONFIG_I: Configured from console by console

Switch#show ip inter
```

```
Switch#show ip interface vlan99
Vlan99 is down, line protocol is down
Internet address is 190.108.99.2/24
Broadcast address is 255.255.255.255
Address determined by setup command
MTU is 1500 bytes
Helper address is not set
Directed broadcast forwarding is disabled
Outgoing access list is not set
Inbound access list is not set
Proxy ARP is enabled
Local Proxy ARP is disabled
Security level is default
Split horizon is enabled
ICMP redirects are always sent
ICMP unreachable are always sent
ICMP mask replies are never sent
IP fast switching is disabled
IP fast switching on the same interface is disabled
IP Null turbo vector
IP multicast fast switching is disabled
IP multicast distributed fast switching is disabled
IP route-cache flags are None
--More--
```

Switch SW-BB


```
Switch>ena
Switch>enable
Switch#conf term
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#interface vlan 99
Switch(config-if)#190.108.99.3
^
% Invalid input detected at '^' marker.
Switch(config-if)#ip add
Switch(config-if)#ip address 190.108.99.3 255.255.255.0
Switch(config-if)#no shutdown
Switch(config-if)#exit
Switch(config)#exi
Switch#
%SYS-5-CONFIG_I: Configured from console by console

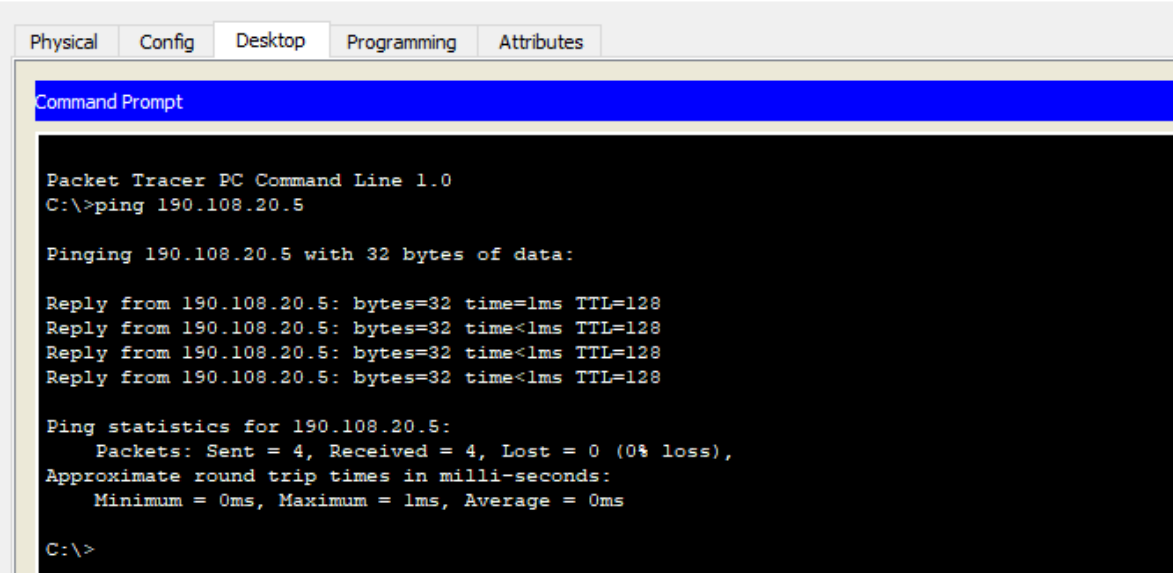
Switch#show ip interface vlan99
Vlan99 is down, line protocol is down
Internet address is 190.108.99.3/24
```

Broadcast address is 255.255.255.255
Address determined by setup command
MTU is 1500 bytes
Helper address is not set
Directed broadcast forwarding is disabled
Outgoing access list is not set
Inbound access list is not set
Proxy ARP is enabled
Local Proxy ARP is disabled
Security level is default
Split horizon is enabled
ICMP redirects are always sent
ICMP unreachable are always sent
ICMP mask replies are never sent
IP fast switching is disabled
IP fast switching on the same interface is disabled
IP Null turbo vector
IP multicast fast switching is disabled
IP multicast distributed fast switching is disabled
IP route-cache flags are None

2.8 Verificar la conectividad Extremo a Extremo

Ping al pc 190.108.20.5

 Planta pc1



```
Physical  Config  Desktop  Programming  Attributes
Command Prompt
Packet Tracer PC Command Line 1.0
C:\>ping 190.108.20.5

Pinging 190.108.20.5 with 32 bytes of data:

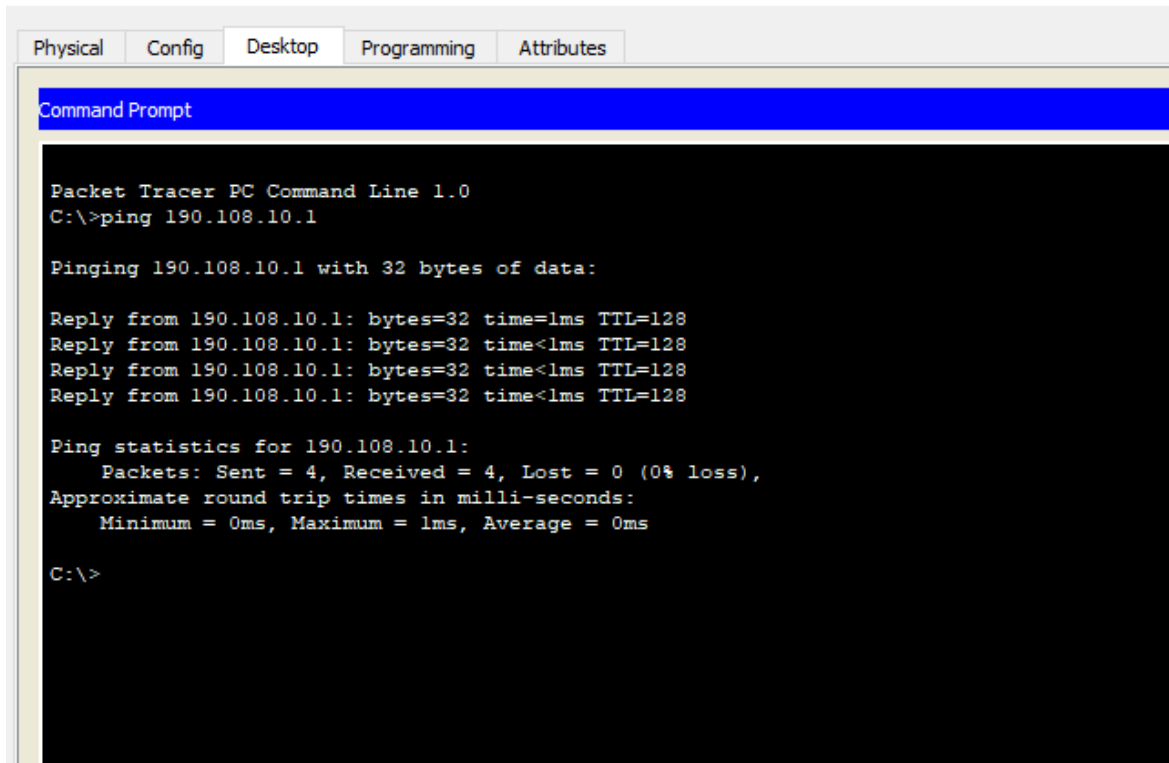
Reply from 190.108.20.5: bytes=32 time=1ms TTL=128
Reply from 190.108.20.5: bytes=32 time<1ms TTL=128
Reply from 190.108.20.5: bytes=32 time<1ms TTL=128
Reply from 190.108.20.5: bytes=32 time<1ms TTL=128

Ping statistics for 190.108.20.5:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\>
```

Ping al pc 190.108.10.1

Compras



```
Physical Config Desktop Programming Attributes
Command Prompt

Packet Tracer PC Command Line 1.0
C:\>ping 190.108.10.1

Pinging 190.108.10.1 with 32 bytes of data:

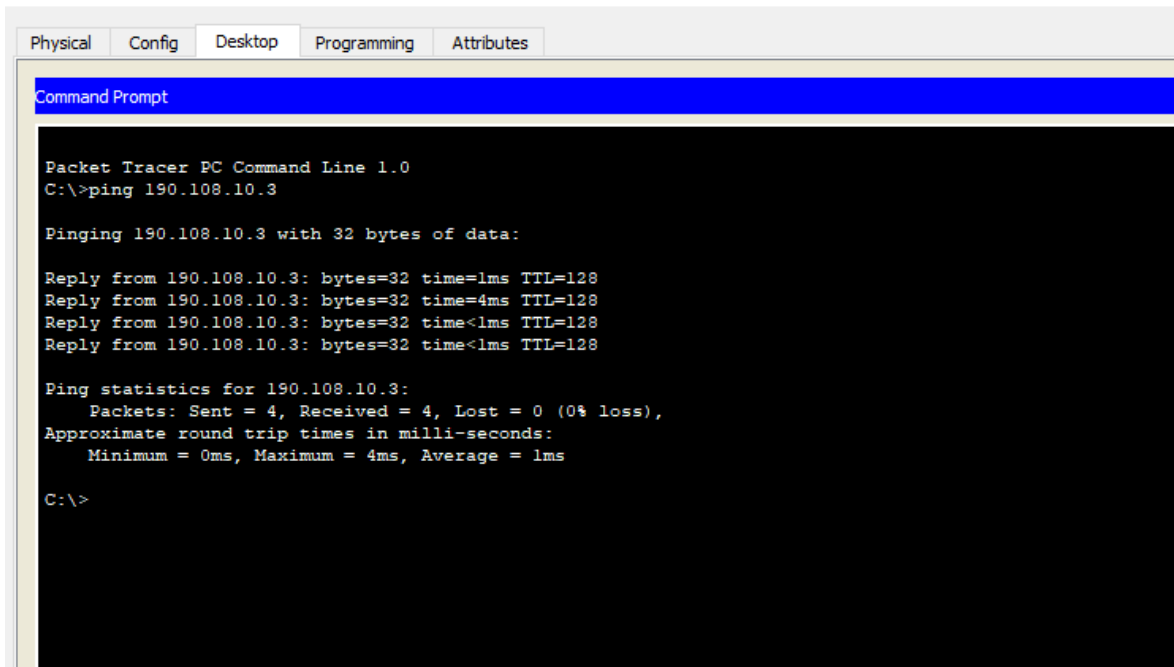
Reply from 190.108.10.1: bytes=32 time=1ms TTL=128
Reply from 190.108.10.1: bytes=32 time<1ms TTL=128
Reply from 190.108.10.1: bytes=32 time<1ms TTL=128
Reply from 190.108.10.1: bytes=32 time<1ms TTL=128

Ping statistics for 190.108.10.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\>
```

Ping al pc 190.108.10.3

PC4



```
Physical Config Desktop Programming Attributes
Command Prompt

Packet Tracer PC Command Line 1.0
C:\>ping 190.108.10.3

Pinging 190.108.10.3 with 32 bytes of data:

Reply from 190.108.10.3: bytes=32 time=1ms TTL=128
Reply from 190.108.10.3: bytes=32 time=4ms TTL=128
Reply from 190.108.10.3: bytes=32 time<1ms TTL=128
Reply from 190.108.10.3: bytes=32 time<1ms TTL=128

Ping statistics for 190.108.10.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 4ms, Average = 1ms

C:\>
```

CONCLUSIONES

Con el desarrollo del trabajo de habilidades prácticas se pudo poner a prueba la capacidad de diseñar y configurar una red en los escenarios propuestos, en tal sentido se establecieron los direccionamientos IP, protocolos de enrutamiento y seguridad.

Los escenarios propuestos afianzaron las capacidades en configuración de dispositivos como router y switches, configuración de Vlan, puertos troncales, configuración de redes primarias y secundarias.

Con el desarrollo del ejercicio de habilidades prácticas permitió evidenciar los diferentes problemas que pueden llegarse a presentar y como solucionarlos, también permitió el uso de diferentes herramientas de simulación que afianzaron las habilidades y competencias adquiridas durante el desarrollo del diplomado de profundización de CCNP.

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