

INFORME – PRUEBA DE HABILIDADES PRACTICA

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NOTA DE ACEPTACIÓN

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Firma del Jurado

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## GLOSARIO

**DIRECCIONAMIENTO:** en la actualidad la mayoría de redes de conexión de datos utilizan el protocolo TCP/IP, en el cual se basa el direccionamiento IP. Cada equipo que este conectado a una red necesita dos identificadores básicos, la dirección IP y la mascara de subred.

**DISPOSITIVO:** es un aparato o mecanismo que desarrolla determinadas acciones. Su nombre esta vinculado a que dicho arteificio esta dispuesto para cumplir con su objetivo.

**ENRUTADORES:** es un termino que se utiliza para dar a entender la transmisión de señal de video y/o audio.

**INTERFAZ:** en informática, esta nocion sirve para señalar a la conexión que se da de manera física y a nivel de utilidad entre dispositivos o sistemas.

**TRUNK:** Es un enlace que se configura en uno o mas puertos de un switch para permitir el paso del trafico de las distintas VLANs que hemos configurado.

## RESUMEN

Las redes de enrutamiento son la herramienta mas usada en los diferentes protocolos de comunicación permitiendo que se realice la conmutación entre equipos y servidores entre redes LAN y WAN

Por lo tanto, en el presente trabajo de enrutamiento Cisco CCNP como opcion de grado para el programa de Ingenieria Electronica se reportan los resultados de la configuración de la red de trabajo, pudiendo enviar y recibir información completa de extremo a extremo y que los hosts tengan soporte de puerta de enlace predeterminada confiable para que los protocolos de administración esten operativos dentro de la topología de la red de la empresa.

Los recursos utilizados fueron 2 imágenes, 1 de Cisco 7200, 1 de Cisco IOU L2 y 4 PC que se encontraban en el software de simulación GNS3, posteriormente se cableo la red según lo topología de conexión para poder comenzar con la configuración de los ajustes básicos de cada dispositivo direccionando su interfaz de ruteo permitiendo realizar la configuración en la red de capa 2 y compatibilidad con el host, por utlimo se realizo la configuración de los protocolos de enrutamiento y la configuración de redundancia del primer salto.

Finalmente la configuración de los hosts permite que se puedan realizar pruebas de comunicación enviando y recibiendo información entre los 4 PC de la topología de CCNP

Palabras Clave: CISCO, CCNP, CONMUTACIÓN, ENRUTAMIENTO, REDES, ELECTRÓNICA.



## ABSTRACT

Routing networks are the most used tool in the different communication protocols, allowing switching between computers and servers between LAN and WAN networks.

Therefore, in this Cisco CCNP routing work as a degree option for the Electronic Engineering program, the results of the network configuration are reported, being able to send and receive complete information from end to end and that the hosts have Trusted default gateway support for management protocols to be operational within the enterprise network topology.

The resources used were 2 images, 1 Cisco 7200, 1 Cisco IOU L2 and 4 PCs that were in the GNS3 simulation software, later the network was wired according to the connection topology to be able to start with the configuration of the basic settings. of each device addressing its routing interface allowing the configuration in the layer 2 network and compatibility with the host, finally the configuration of the routing protocols and the redundancy configuration of the first hop were carried out.

Finally, the configuration of the hosts allows communication tests to be carried out by sending and receiving information between the 4 PCs of the CCNP topology.

Keywords: CISCO, CCNP, SWITCHING, ROUTING, NETWORKS, ELECTRONICS.

## INTRODUCCION

Dentro del contenido del desarrollo del siguiente trabajo de diplomado CCNP podemos encontrar la prueba de habilidades practica en 2 partes según la configuración que se le dio a los 3 router, los 2 switchs propuestos en la topología.

Para el primer escenario se encuentra la estructura de redes conmutadas mediante el uso del protocolo STP y la configuración de VLANs, para comprender las características de una infraestructura de red jerarquica convergente, adicional se diseñan las soluciones de red escalables mediante la configuración básica y avanzada de protocolos de enrutamiento para la implementación de servicios IP con calidad de servicio en ambientes de red empresarial LAN y WAN, dando a conocer los resultados obtenidos po medio de pantallazos con los comandos de configurados en el simulador GNS3.

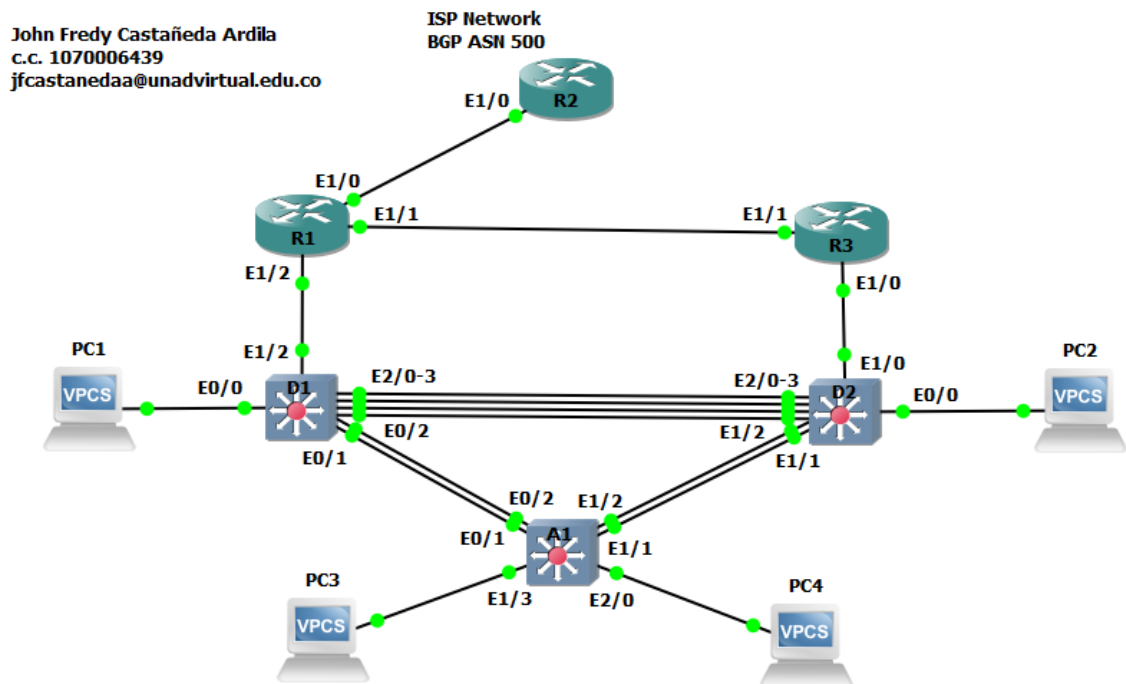
En el desarrollo del segundo escenario se planifican las redes inalámbricas, de acceso remoto y sitio a sitio seguras mediante el análisis de escenarios simulados de infraestructuras de red empresariales para la aplicación de servicios de autenticación, roaming y localización. Adicional se implementa redes empresariales con acceso seguro a través de la automatización y virtualización de la red para aplicar metodologias de solución de problemas en ambientes de re corporativos LAN y WAN.

## DESARROLLO ACTIVIDAD

Parte 1: Construir la red y configurar los ajustes básicos del dispositivo y el direccionamiento de la interfaz.

### 1. ESCENARIO 1

Figura 1. Escenario 1



Configuración de la topología de la red y configuración ajustes básicos del direccionamiento en las interfaz.

Figura 2. Configuración en Router 1

```
R1#
R1#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#in e1/0
R1(config-if)#ip add 209.165.200.225 255.255.255.224
R1(config-if)#ipv6 add fe80::1:1 link-local
R1(config-if)#ipv6 add 2001:db8:200::1/64
R1(config-if)#no shutdown
R1(config-if)#exit
R1(config)#
*Oct 12 10:53:58.667: %LINK-3-UPDOWN: Interface Ethernet1/0, changed state to up
R1(config)#
*Oct 12 10:53:59.667: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet1/0, changed state to up
R1(config)#in e1/2
R1(config-if)#ip add 10.39.10.1 255.255.255.0
R1(config-if)#ipv6 add fe80::1:2 link-local
R1(config-if)#ipv6 add 2001:db8:100:1010::1/64
R1(config-if)#no shutdown
R1(config-if)#exit
R1(config)#
*Oct 12 10:56:19.583: %LINK-3-UPDOWN: Interface Ethernet1/2, changed state to up
*Oct 12 10:56:20.583: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet1/2, changed state to up
R1(config)#in e1/1
R1(config-if)#ip add 10.39.13.1 255.255.255.0
R1(config-if)#ipv6 add fe80::1:3 link-local
R1(config-if)#ipv6 add 2001:db8:100:1013::1/64
R1(config-if)#no shutdown
R1(config-if)#exit
R1(config)#
*Oct 12 10:58:24.647: %LINK-3-UPDOWN: Interface Ethernet1/1, changed state to up
*Oct 12 10:58:25.647: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet1/1, changed state to up
R1(config)#
```

### 1.1. Configuración de interfaz en Router 1

Se adjunta código y pantallazos con veracidad del código.

#### Router R1

```
in e1/0
ip add 209.165.200.225 255.255.255.224
ipv6 add fe80::1:1 link-local
ipv6 add 2001:db8:200::1/64
no shutdown
exit
in e1/2
ip add 10.39.10.1 255.255.255.0
ipv6 add fe80::1:2 link-local
ipv6 add 2001:db8:100:1010::1/64
no shutdown
exit
in e1/1
ip add 10.39.13.1 255.255.255.0
ipv6 add fe80::1:3 link-local
ipv6 add 2001:db8:100:1013::1/64
no shutdown
exit
```

Figura 3. Configuración en Router 2

```
R2#
R2#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#int e1/0
R2(config-if)#ip add 209.165.200.226 255.255.255.224
R2(config-if)#ipv6 add fe80::2:1 link-local
R2(config-if)#ipv6 add 2001:db8:200::2/64
R2(config-if)#no shutdown
R2(config-if)#exit
R2(config)#
*Oct 12 11:07:47.295: %LINK-3-UPDOWN: Interface Ethernet1/0, changed state to up
*Oct 12 11:07:48.295: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet1/0, changed state to up
R2(config)#int Loopback 0
R2(config-if)#ip
*Oct 12 11:08:23.515: %LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback0, changed state to up
R2(config-if)#ip add 2.2.2.2 255.255.255.225
Bad mask 0xFFFFFEE1 for address 2.2.2.2
R2(config-if)#ip add 2.2.2.2 255.255.255.225
Bad mask 0xFFFFFEE1 for address 2.2.2.2
R2(config-if)#ip add 2.2.2.2 255.255.255.255
R2(config-if)#ipv6 add fe80::2:3 link-local
R2(config-if)#ipv6 add 2001:db8:2222::1/128
R2(config-if)#no shutdown
R2(config-if)#exit
R2(config)#
```

## 1.2. Configuración de interfaz en Router 2

Se adjunta código y pantallazos con veracidad del código.

### Router R2

```
int e1/0
ip add 209.165.200.226 255.255.255.224
ipv6 add fe80::2:1 link-local
ipv6 add 2001:db8:200::2/64
no shutdown
exit
int Loopback 0
ip add 2.2.2.2 255.255.255.255
ipv6 add fe80::2:3 link-local
ipv6 add 2001:db8:2222::1/128
no shutdown
exit
```

Figura 4. Configuración en Router 3

```
R3#
R3#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
R3(config)#int e1/0
R3(config-if)#ip add 10.39.11.1 255.255.255.0
R3(config-if)#ipv6 add fe80::3:2 link-local
R3(config-if)#ipv6 add 2001:db8:1011::1/64
R3(config-if)#no shutdown
R3(config-if)#exit
R3(config)#
*Oct 12 11:17:37.239: %LINK-3-UPDOWN: Interface Ethernet1/0, changed state to up
*Oct 12 11:17:38.239: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet1/0, changed state to up
R3(config)#int e1/1
R3(config-if)#ip add 10.39.13.3 255.255.255.0
R3(config-if)#ipv6 add fe80::3:3 link-local
R3(config-if)#ipv6 add 2001:db8:100:1010::2/64
R3(config-if)#no shutdown
R3(config-if)#exit
R3(config)#
*Oct 12 11:19:34.423: %LINK-3-UPDOWN: Interface Ethernet1/1, changed state to up
*Oct 12 11:19:35.423: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet1/1, changed state to up
R3(config)#
```

### 1.3. Configuración de interfaz en Router 3

Se adjunta código y pantallazos con veracidad del código.

#### **Router R3**

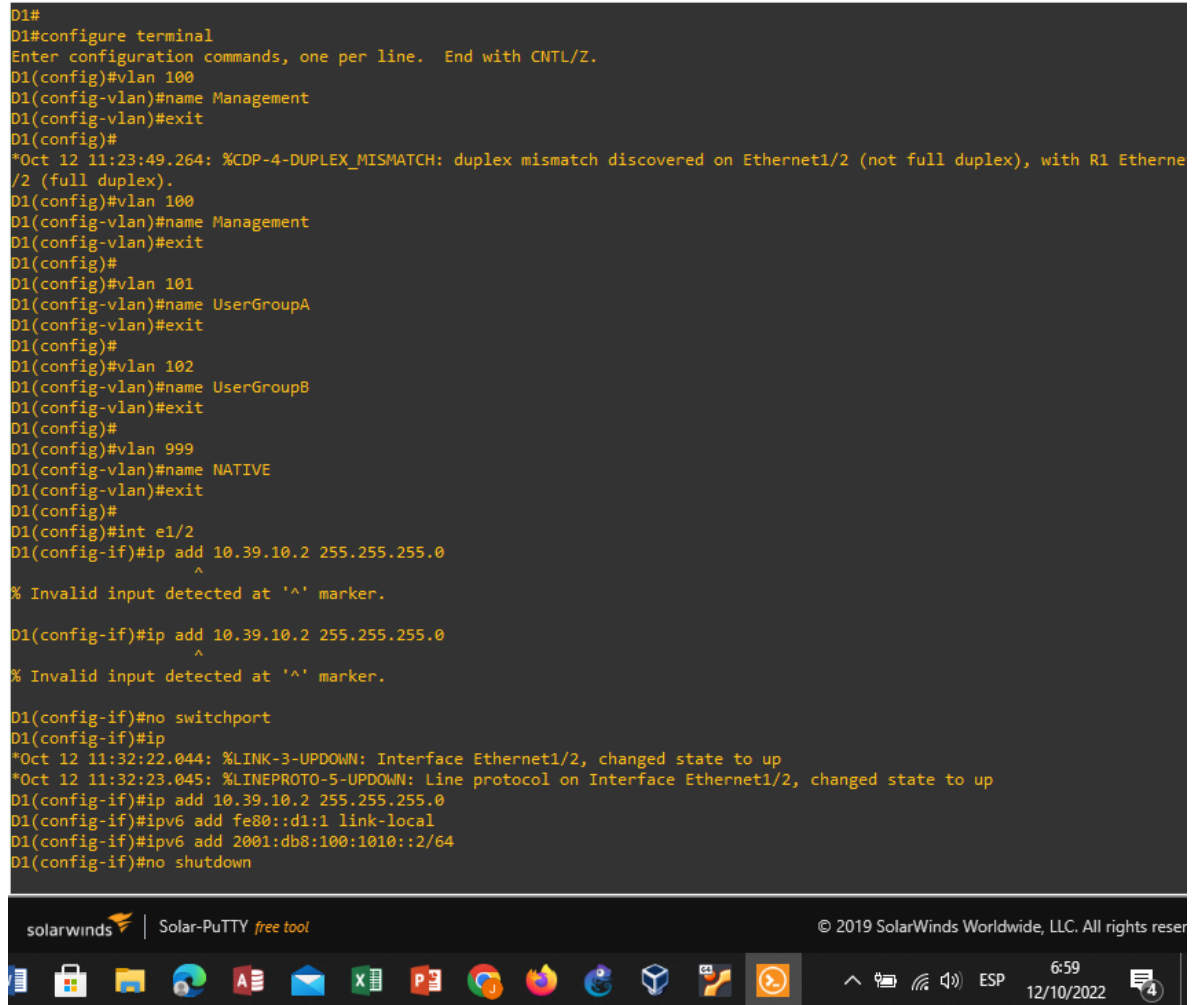
```
int e1/0
ip add 10.39.11.1 255.255.255.0
ipv6 add fe80::3:2 link-local
ipv6 add 2001:db8:1011::1/64
no shutdown
exit
int e1/1
ip add 10.39.13.3 255.255.255.0
ipv6 add fe80::3:3 link-local
ipv6 add 2001:db8:100:1010::2/64
no shutdown
exit
```

Figura 5. Configuración en Switch D1

```
D1#
D1#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
D1(config)#vlan 100
D1(config-vlan)#name Management
D1(config-vlan)#exit
D1(config)#
*Oct 12 11:23:49.264: %CDP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethernet1/2 (not full duplex), with R1 Ethernet
/2 (full duplex).
D1(config)#vlan 100
D1(config-vlan)#name Management
D1(config-vlan)#exit
D1(config)#
D1(config)#vlan 101
D1(config-vlan)#name UserGroupA
D1(config-vlan)#exit
D1(config)#
D1(config)#vlan 102
D1(config-vlan)#name UserGroupB
D1(config-vlan)#exit
D1(config)#
D1(config)#vlan 999
D1(config-vlan)#name NATIVE
D1(config-vlan)#exit
D1(config)#
D1(config)#int e1/2
D1(config-if)#ip add 10.39.10.2 255.255.255.0
^
% Invalid input detected at '^' marker.

D1(config-if)#ip add 10.39.10.2 255.255.255.0
^
% Invalid input detected at '^' marker.

D1(config-if)#no switchport
D1(config-if)#ip
*Oct 12 11:32:22.044: %LINK-3-UPDOWN: Interface Ethernet1/2, changed state to up
*Oct 12 11:32:23.045: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet1/2, changed state to up
D1(config-if)#ip add 10.39.10.2 255.255.255.0
D1(config-if)#ipv6 add fe80::d1:1 link-local
D1(config-if)#ipv6 add 2001:db8:100:1010::2/64
D1(config-if)#no shutdown
```



#### 1.4. Configuración de interfaz en Switch D1

Se adjunta código y pantallazos con veracidad del código.

##### Switch D1

```
vlan 100
name Management
exit
vlan 101
name UserGroupA
exit
vlan 102
name UserGroupB
exit
```

```

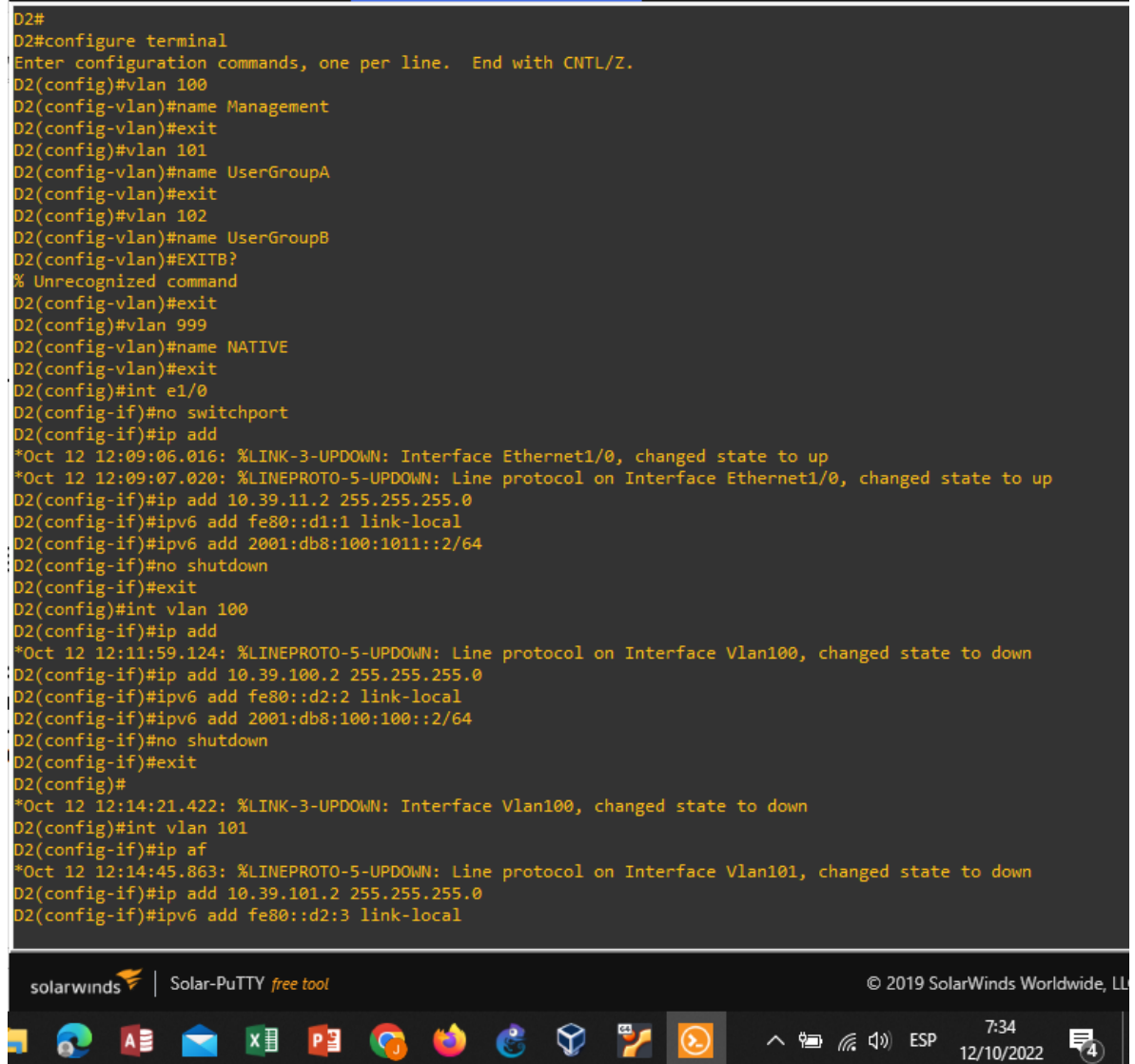
vlan 999
name NATIVE
exit
int e1/2
no switchport
ip add 10.39.10.2 255.255.255.0
ipv6 add fe80::d1:1 link-local
ipv6 add 2001:db8:100:1010::2/64
no shutdown
exit
int vlan 100
ip add 10.39.100.1 255.255.255.0
ipv6 add fe80::d1:2 link-local
ipv6 add 2001:db8:100:100::1/64
no shutdown
exit
int vlan 101
ip add 10.39.101.1 255.255.255.0
ipv6 add fe80::d1:3 link-local
ipv6 add 2001:db8:100:101::1/64
no shutdown
exit
int vlan 102
ip add 10.39.102.1 255.255.255.0
ipv6 add fe80::d1:4 link-local
ipv6 add 2001:db8:100:102::1/64
no shutdown
exit
ip dhcp excluded-address 10.39.101.1 10.39.101.109
ip dhcp excluded-address 10.39.101.141 10.39.101.254
ip dhcp excluded-address 10.39.102.1 10.39.102.109
ip dhcp excluded-address 10.39.102.141 10.39.102.254
ip dhcp pool VLAN-101
network 10.39.101.0 255.255.255.0
default-router 10.39.102.254
exit
ip dhcp pool VLAN-101
network 10.39.101.0 255.255.255.0
default-router 10.39.101.254
exit
ip dhcp pool VLAN-102
network 10.39.102.0 255.255.255.0
default-router 10.39.102.254
exit
int range e0/0-3,e1/0-1,e1/3,e2/0-3,e3/0-3
shutdown
exit

```



Figura 6. Configuración en Switch D2

```
D2#
D2#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
D2(config)#vlan 100
D2(config-vlan)#name Management
D2(config-vlan)#exit
D2(config)#vlan 101
D2(config-vlan)#name UserGroupA
D2(config-vlan)#exit
D2(config)#vlan 102
D2(config-vlan)#name UserGroupB
D2(config-vlan)#EXITB?
% Unrecognized command
D2(config-vlan)#exit
D2(config)#vlan 999
D2(config-vlan)#name NATIVE
D2(config-vlan)#exit
D2(config)#int e1/0
D2(config-if)#no switchport
D2(config-if)#ip add
*Oct 12 12:09:06.016: %LINK-3-UPDOWN: Interface Ethernet1/0, changed state to up
*Oct 12 12:09:07.020: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet1/0, changed state to up
D2(config-if)#ip add 10.39.11.2 255.255.255.0
D2(config-if)#ipv6 add fe80::d1:1 link-local
D2(config-if)#ipv6 add 2001:db8:100:1011::2/64
D2(config-if)#no shutdown
D2(config-if)#exit
D2(config)#int vlan 100
D2(config-if)#ip add
*Oct 12 12:11:59.124: %LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan100, changed state to down
D2(config-if)#ip add 10.39.100.2 255.255.255.0
D2(config-if)#ipv6 add fe80::d2:2 link-local
D2(config-if)#ipv6 add 2001:db8:100:100::2/64
D2(config-if)#no shutdown
D2(config-if)#exit
D2(config)#
*Oct 12 12:14:21.422: %LINK-3-UPDOWN: Interface Vlan100, changed state to down
D2(config)#int vlan 101
D2(config-if)#ip af
*Oct 12 12:14:45.863: %LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan101, changed state to down
D2(config-if)#ip add 10.39.101.2 255.255.255.0
D2(config-if)#ipv6 add fe80::d2:3 link-local
```



### 1.5. Configuración de interfaz en Switch D2

Se adjunta código y pantallazos con veracidad del código.

#### Switch D2

```
vlan 100
name Management
exit
vlan 101
name UserGroupA
exit
vlan 102
```

```

name UserGroupB
exit
vlan 999
name NATIVE
exit
int e1/0
no switchport
ip add 10.39.11.2 255.255.255.0
ipv6 add fe80::d1:1 link-local
ipv6 add 2001:db8:100:1011::2/64
no shutdown
exit
int vlan 100
ip add 10.39.100.2 255.255.255.0
ipv6 add fe80::d2:2 link-local
ipv6 add 2001:db8:100:100::2/64
no shutdown
exit
int vlan 101
ip add 10.39.101.2 255.255.255.0
ipv6 add fe80::d2:3 link-local
ipv6 add 2001:db8:100:101::2/64
no shutdown
exit
int vlan 102
ip add 10.39.102.2 255.255.255.0
ipv6 add fe80::d2:4 link-local
ipv6 add 2001:db8:100:102::2/64
no shutdown
exit
ip dhcp excluded-address 10.39.101.1 10.39.101.209
ip dhcp excluded-address 10.39.101.241 10.39.101.254
ip dhcp excluded-address 10.39.102.1 10.39.102.209
ip dhcp excluded-address 10.39.102.241 10.39.102.254
ip dhcp pool VLAN-101
network 10.39.101.0 255.255.255.0
default-router 39.0.101.254
exit
ip dhcp pool VLAN-102
network 10.39.102.0 255.255.255.0
default-router 10.39.102.254
exit
int range e0/0-3,e1/1-3,e2/0-3,e3/0-3
shutdown
exit

```

Figura 7. Configuración en Switch A1

```
A1#
A1#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
A1(config)#vlan 100
A1(config-vlan)#name Managemente
A1(config-vlan)#exit
A1(config)#vlan101
^
% Invalid input detected at '^' marker.

A1(config)#vlan 101
A1(config-vlan)#name UserGroupA
A1(config-vlan)#exit
A1(config)#vlan 102
A1(config-vlan)#name UserGroupB
A1(config-vlan)#exit
A1(config)#vlan 999
A1(config-vlan)#name NATIVE
A1(config-vlan)#exit
A1(config)#interface vlan 100
A1(config-if)#ip add
*Oct 12 13:18:42.227: %LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan100, changed state to down
A1(config-if)#ip add 10.39.100.3 255.255.255.0
A1(config-if)#ipv6 add fe80::a1:1 link-local
A1(config-if)#ipv6 add 2001:db8:100:100::3/64
A1(config-if)#no shutdown
A1(config-if)#
*Oct 12 13:20:44.769: %LINK-3-UPDOWN: Interface Vlan100, changed state to down
A1(config-if)#int range e0/0,e0/3,e1/0,e2/1-3,e3/0-3
A1(config-if-range)#shutdown
A1(config-if-range)#exit
A1(config)#
*Oct 12 13:22:22.241: %LINK-5-CHANGED: Interface Ethernet0/0, changed state to administratively down
*Oct 12 13:22:22.241: %LINK-5-CHANGED: Interface Ethernet0/3, changed state to administratively down
*Oct 12 13:22:22.241: %LINK-5-CHANGED: Interface Ethernet1/0, changed state to administratively down
*Oct 12 13:22:22.251: %LINK-5-CHANGED: Interface Ethernet2/1, changed state to administratively down
```

## 1.6. Configuración de interfaz en Switch A1

Se adjunta código y pantallazos con veracidad del código.

### Switch A1

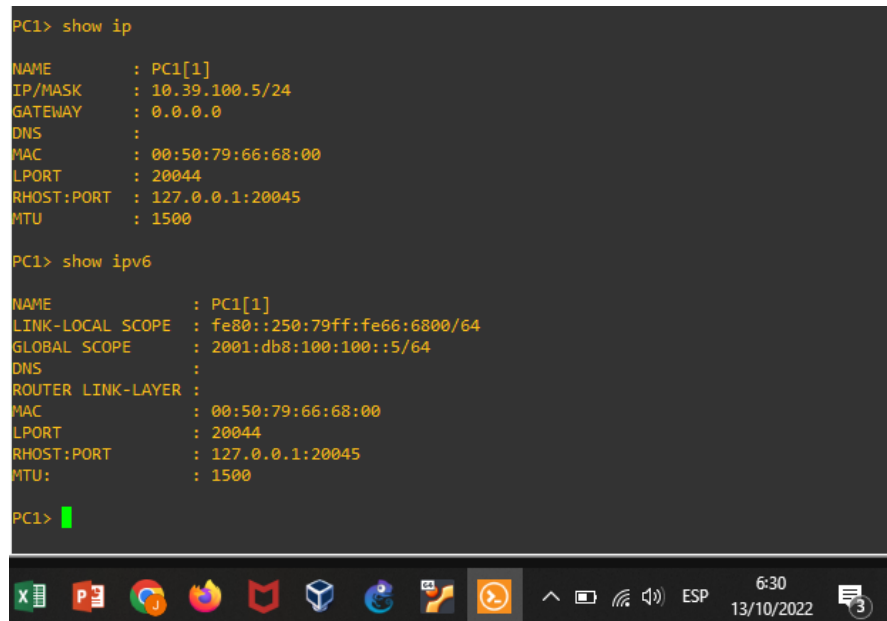
```
vlan 100
name Managemente
exit
vlan 101
name UserGroupA
exit
vlan 102
name UserGroupB
exit
vlan 999
name NATIVE
exit
interface vlan 100
ip add 10.39.100.3 255.255.255.0
ipv6 add fe80::a1:1 link-local
ipv6 add 2001:db8:100:100::3/64
no shutdown
int range e0/0,e0/3,e1/0,e2/1-3,e3/0-3
shutdown
exit
```

Figura 8. Direcccionamiento de host en PC1

```
PC1> show ip
NAME       : PC1[1]
IP/MASK    : 10.39.100.5/24
GATEWAY    : 0.0.0.0
DNS        :
MAC        : 00:50:79:66:68:00
LPORT      : 20044
RHOST:PORT : 127.0.0.1:20045
MTU        : 1500

PC1> show ipv6
NAME       : PC1[1]
LINK-LOCAL SCOPE : fe80::250:79ff:fe66:6800/64
GLOBAL SCOPE   : 2001:db8:100:100::5/64
DNS           :
ROUTER LINK-LAYER :
MAC          : 00:50:79:66:68:00
LPORT        : 20044
RHOST:PORT   : 127.0.0.1:20045
MTU          : 1500

PC1>
```



1.7. Configuracion de host en PC1

Figura 9. Direcccionamiento de host en PC4

```
PC4> show ip
NAME       : PC4[1]
IP/MASK    : 10.39.100.6/24
GATEWAY    : 0.0.0.0
DNS        :
MAC        : 00:50:79:66:68:03
LPORT      : 20046
RHOST:PORT : 127.0.0.1:20047
MTU        : 1500

PC4> show ipv6
NAME       : PC4[1]
LINK-LOCAL SCOPE : fe80::250:79ff:fe66:6803/64
GLOBAL SCOPE   : 2001:db8:100:100::6/64
DNS           :
ROUTER LINK-LAYER :
MAC          : 00:50:79:66:68:03
LPORT        : 20046
RHOST:PORT   : 127.0.0.1:20047
MTU          : 1500

PC4>
```



1.8. Configuracion de host en PC4

## 2. Configuración de la red en capa 2 y compatibilidad con el host

Figura 10. Configuración parte 2 en switch D1

```
D1#
D1#show interface trunk

Port      Mode          Encapsulation  Status      Native vlan
Po1       on            802.1q         trunking    999
Po12      on            802.1q         trunking    999

Port      Vlans allowed on trunk
Po1       1-4094
Po12      1-4094

Port      Vlans allowed and active in management domain
Po1       1,100-102,999
Po12      1,100-102,999

Port      Vlans in spanning tree forwarding state and not pruned
Po1       1,100-102,999
Po12      1,100-102,999
D1#
*Oct 14 12:49:21.129: %CDP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethernet1/2 (not full duplex),
/2 (full duplex).
D1#
*Oct 14 12:50:17.426: %CDP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethernet1/2 (not full duplex),
/2 (full duplex).
D1#
```

### 2.1. Configuración en Switch D1 para puntos 2.1, 2.2, 2.3, 2.4, 2.5 y 2.6 de la guía

Se adjunta código y pantallazos con veracidad del código.

#### Switch D1

```
int range e2/0-3
switchport trunk encapsulation dot1q
switchport mode trunk
switchport trunk native vlan 999
channel-group 12 mode active
no shutdown
exit
int range e0/1-2
switchport trunk encapsulation dot1q
switchport mode trunk
switchport trunk native vlan 999
channel-group 1 mode active
no shutdown
exit
spanning-tree mode rapid-pvst
spanning-tree vlan 100,102 root primary
spanning-tree vlan 101 root secondary
int e0/0
switchport mode access
switchport access vlan 100
spanning-tree portfast
no shutdown
exit
```

Figura 11. Configuración parte 2 en switch D2

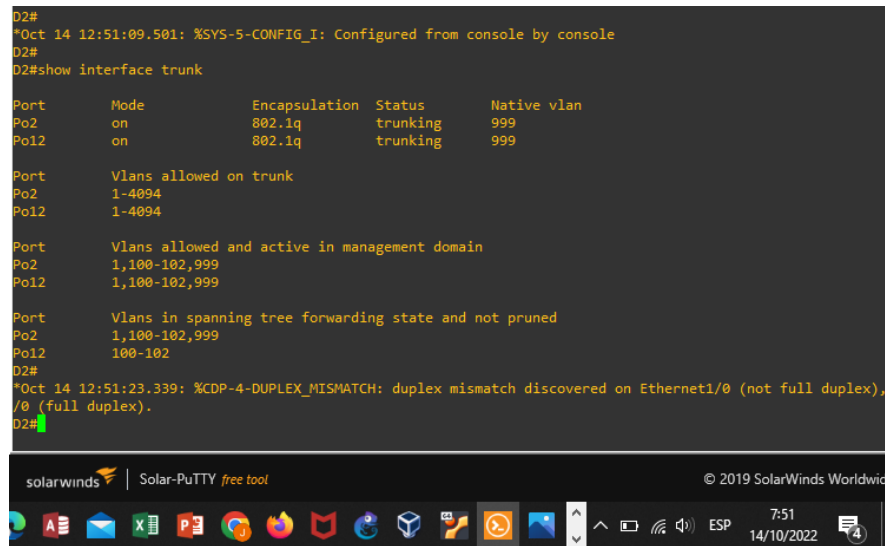
```
D2#
*Oct 14 12:51:09.501: %SYS-5-CONFIG_I: Configured from console by console
D2#
D2#show interface trunk

Port      Mode      Encapsulation  Status      Native vlan
Po2       on        802.1q         trunking    999
Po12      on        802.1q         trunking    999

Port      Vlans allowed on trunk
Po2       1-4094
Po12      1-4094

Port      Vlans allowed and active in management domain
Po2       1,100-102,999
Po12      1,100-102,999

Port      Vlans in spanning tree forwarding state and not pruned
Po2       1,100-102,999
Po12      100-102
D2#
*Oct 14 12:51:23.339: %CDP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Ethernet1/0 (not full duplex),
/0 (full duplex).
D2#
```



## 2.2. Configuración en Switch D2 para puntos 2.1, 2.2, 2.3, 2.4, 2.5 y 2.6 de la guía

Se adjunta código y pantallazos con veracidad del código.

### Switch D2

```
int range e2/0-3
switchport trunk encapsulation dot1q
switchport mode trunk
switchport trunk native vlan 999
channel-group 12 mode active
no shutdown
exit
int range e1/1-2
switchport trunk encapsulation dot1q
switchport mode trunk
switchport trunk native vlan 999
channel-group 2 mode active
no shutdown
exit
spanning-tree mode rapid-pvst
spanning-tree vlan 101 root primary
spanning-tree vlan 100,102 root secondary
int e0/0
switchport mode access
switchport access vlan 102
spanning-tree portfast
no shutdown
exit
end
```

Figura 12. Configuración parte 2 en switch A1

```
A1#
A1#show interfaces trunk

Port      Mode          Encapsulation  Status        Native vlan
-----
Po1       on            802.1q         trunking     999
Po2       on            802.1q         trunking     999

Port      Vlans allowed on trunk
-----
Po1       1-4094
Po2       1-4094

Port      Vlans allowed and active in management domain
-----
Po1       1,100-102,999
Po2       1,100-102,999

Port      Vlans in spanning tree forwarding state and not pruned
-----
Po1       1,100,102,999
Po2       1,101,999
A1#
A1#
```

2.3. Configuración en Switch A1 para puntos 2.1, 2.2, 2.3, 2.4, 2.5 y 2.6 de la guía  
Se adjunta código y pantallazos con veracidad del código.

### Switch A1

```
spanning-tree mode rapid-pvst
int range e0/1-2
switchport trunk encapsulation dot1q
switchport mode trunk
switchport trunk native vlan 999
channel-group 1 mode active
no shutdown
exit
int range e1/1-2
switchport trunk encapsulation dot1q
switchport mode trunk
switchport trunk native vlan 999
channel-group 2 mode active
no shutdown
no shutdown
exit
int e1/3
switchport mode access
switchport access vlan 101
spanning-tree portfast
no shutdown
exit
int e2/0
switchport mode access
switchport access vlan 100
spanning-tree portfast
no shutdown
exit
end
```

Figura 13. Comprobacion de ping desde PC1

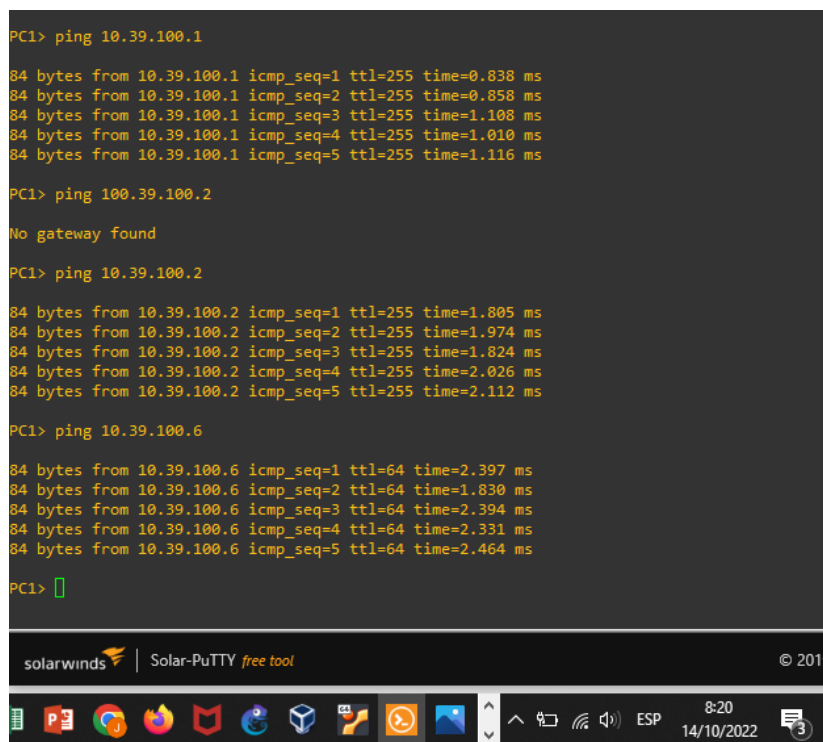
```
PC1> ping 10.39.100.1
84 bytes from 10.39.100.1 icmp_seq=1 ttl=255 time=0.838 ms
84 bytes from 10.39.100.1 icmp_seq=2 ttl=255 time=0.858 ms
84 bytes from 10.39.100.1 icmp_seq=3 ttl=255 time=1.108 ms
84 bytes from 10.39.100.1 icmp_seq=4 ttl=255 time=1.010 ms
84 bytes from 10.39.100.1 icmp_seq=5 ttl=255 time=1.116 ms

PC1> ping 100.39.100.2
No gateway found

PC1> ping 10.39.100.2
84 bytes from 10.39.100.2 icmp_seq=1 ttl=255 time=1.805 ms
84 bytes from 10.39.100.2 icmp_seq=2 ttl=255 time=1.974 ms
84 bytes from 10.39.100.2 icmp_seq=3 ttl=255 time=1.824 ms
84 bytes from 10.39.100.2 icmp_seq=4 ttl=255 time=2.026 ms
84 bytes from 10.39.100.2 icmp_seq=5 ttl=255 time=2.112 ms

PC1> ping 10.39.100.6
84 bytes from 10.39.100.6 icmp_seq=1 ttl=64 time=2.397 ms
84 bytes from 10.39.100.6 icmp_seq=2 ttl=64 time=1.830 ms
84 bytes from 10.39.100.6 icmp_seq=3 ttl=64 time=2.394 ms
84 bytes from 10.39.100.6 icmp_seq=4 ttl=64 time=2.331 ms
84 bytes from 10.39.100.6 icmp_seq=5 ttl=64 time=2.464 ms

PC1> █
```



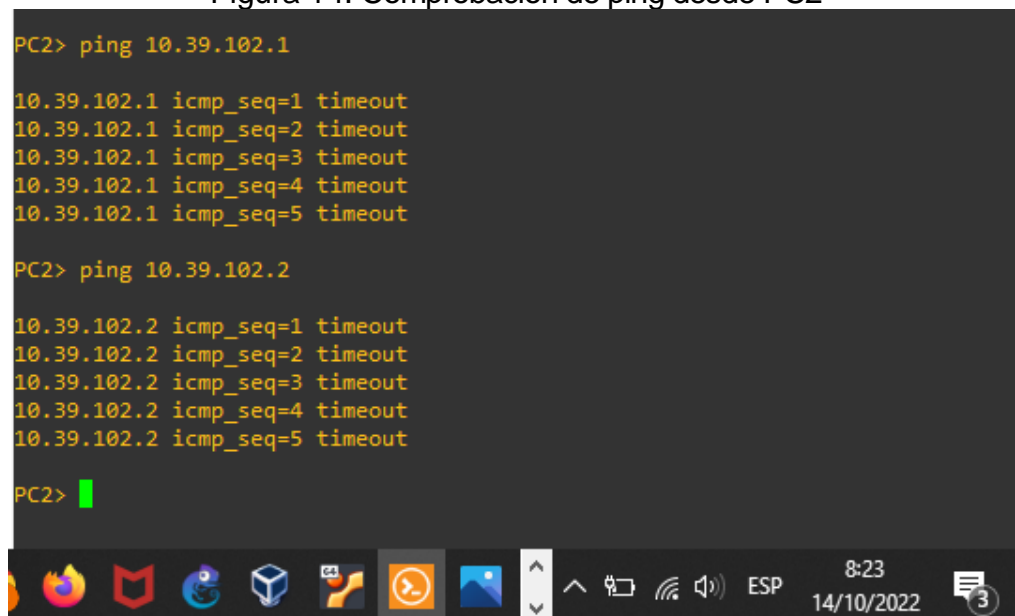
#### 2.4. Comprobacion de ping desde PC1 con D1, D2 y PC4

Figura 14. Comprobacion de ping desde PC2

```
PC2> ping 10.39.102.1
10.39.102.1 icmp_seq=1 timeout
10.39.102.1 icmp_seq=2 timeout
10.39.102.1 icmp_seq=3 timeout
10.39.102.1 icmp_seq=4 timeout
10.39.102.1 icmp_seq=5 timeout

PC2> ping 10.39.102.2
10.39.102.2 icmp_seq=1 timeout
10.39.102.2 icmp_seq=2 timeout
10.39.102.2 icmp_seq=3 timeout
10.39.102.2 icmp_seq=4 timeout
10.39.102.2 icmp_seq=5 timeout

PC2> █
```



#### 2.5. Comprobacion de ping desde PC2 con D1 y D2



Figura 15. Comprobacion de ping desde PC3

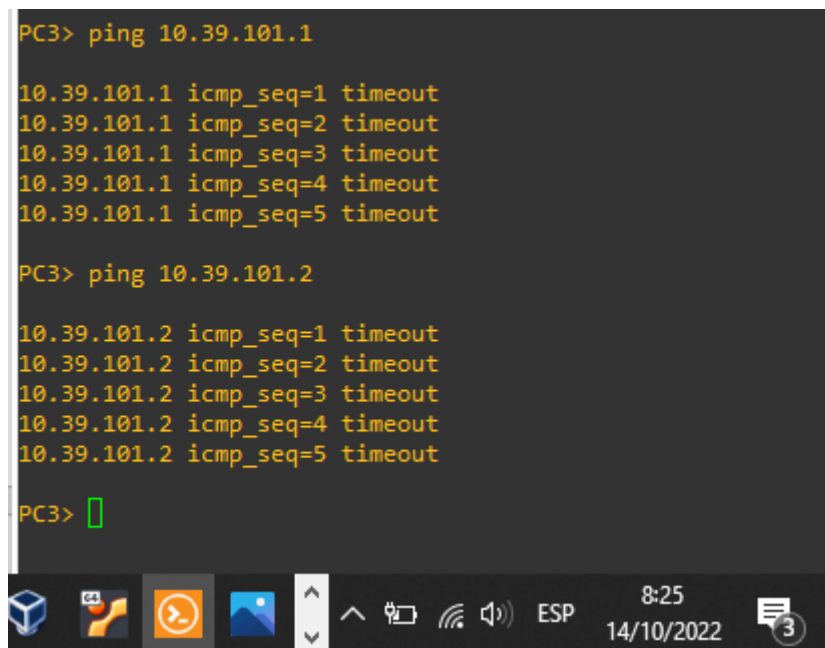
```
PC3> ping 10.39.101.1

10.39.101.1 icmp_seq=1 timeout
10.39.101.1 icmp_seq=2 timeout
10.39.101.1 icmp_seq=3 timeout
10.39.101.1 icmp_seq=4 timeout
10.39.101.1 icmp_seq=5 timeout

PC3> ping 10.39.101.2

10.39.101.2 icmp_seq=1 timeout
10.39.101.2 icmp_seq=2 timeout
10.39.101.2 icmp_seq=3 timeout
10.39.101.2 icmp_seq=4 timeout
10.39.101.2 icmp_seq=5 timeout

PC3> █
```



2.6. Comprobacion de ping desde PC3 con D1 y D2

Figura 16. Comprobacion de ping desde PC4

```
PC4> ping 10.39.100.1

84 bytes from 10.39.100.1 icmp_seq=1 ttl=255 time=0.438 ms
84 bytes from 10.39.100.1 icmp_seq=2 ttl=255 time=0.653 ms
84 bytes from 10.39.100.1 icmp_seq=3 ttl=255 time=0.679 ms
84 bytes from 10.39.100.1 icmp_seq=4 ttl=255 time=0.547 ms
84 bytes from 10.39.100.1 icmp_seq=5 ttl=255 time=0.494 ms

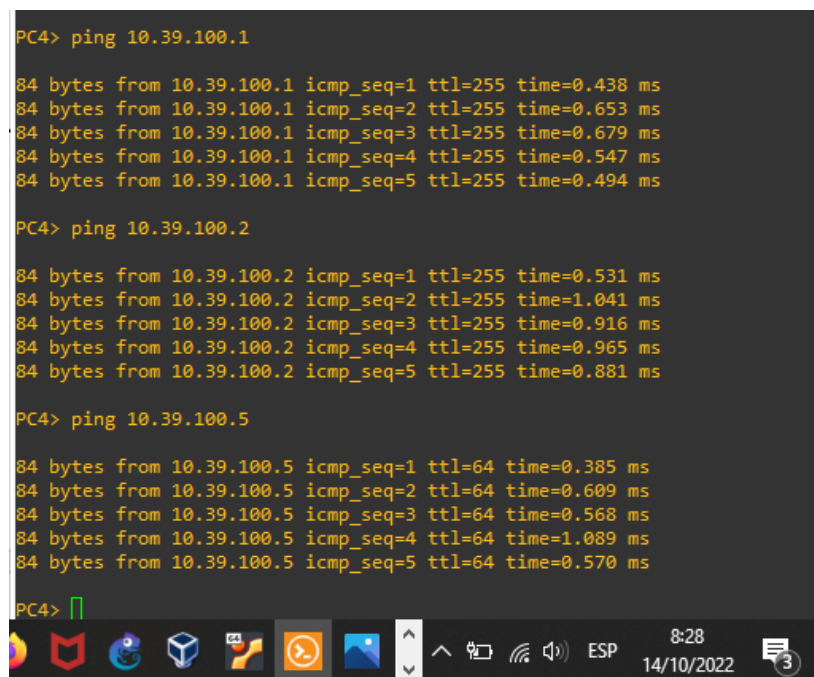
PC4> ping 10.39.100.2

84 bytes from 10.39.100.2 icmp_seq=1 ttl=255 time=0.531 ms
84 bytes from 10.39.100.2 icmp_seq=2 ttl=255 time=1.041 ms
84 bytes from 10.39.100.2 icmp_seq=3 ttl=255 time=0.916 ms
84 bytes from 10.39.100.2 icmp_seq=4 ttl=255 time=0.965 ms
84 bytes from 10.39.100.2 icmp_seq=5 ttl=255 time=0.881 ms

PC4> ping 10.39.100.5

84 bytes from 10.39.100.5 icmp_seq=1 ttl=64 time=0.385 ms
84 bytes from 10.39.100.5 icmp_seq=2 ttl=64 time=0.609 ms
84 bytes from 10.39.100.5 icmp_seq=3 ttl=64 time=0.568 ms
84 bytes from 10.39.100.5 icmp_seq=4 ttl=64 time=1.089 ms
84 bytes from 10.39.100.5 icmp_seq=5 ttl=64 time=0.570 ms

PC4> █
```



2.7. Comprobacion de ping desde PC4 con D1, D2 y PC1

### 3. Configuración de protocolos de enrutamiento

Figura 17. Configuración OSPFv2 en router R1

```
R1#
R1#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#
R1(config)#Router R1
      ^
% Invalid input detected at '^' marker.

R1(config)#
R1(config)#router ospf 4
R1(config-router)#router-id 0.0.4.1
R1(config-router)#network 10.39.10.0 0.0.0.255 area 0
R1(config-router)#network 10.39.13.0 0.0.0.255 area 0
R1(config-router)#default-information originate
R1(config-router)#exit
R1(config)#
*Nov 17 01:42:41.143: %CDP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Et
/2 (half duplex).
R1(config)#
```

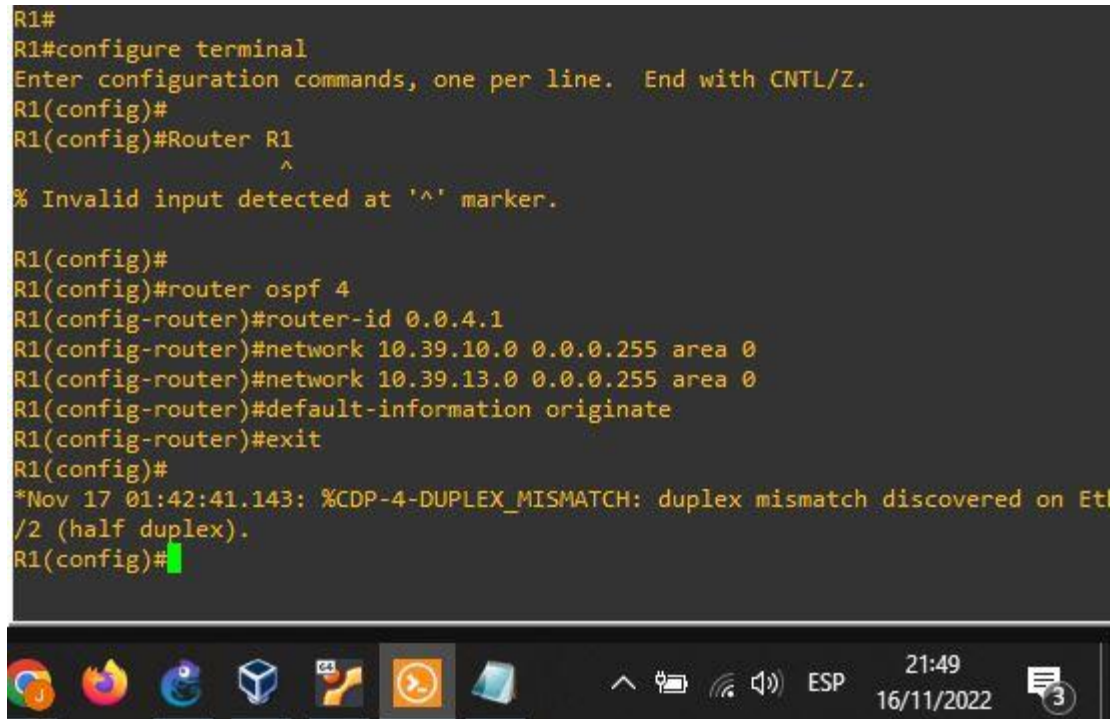


Figura 18. Configuración OSPFv2 en router R3

```
R3#
R3#configure terminal
*Nov 17 01:44:20.867: %CDP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Et
/0 (half duplex).
R3#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
R3(config)#
R3(config)#router ospf 4
R3(config-router)#router-id 0.0.4.3
R3(config-router)#network 10.39.11.0 0.0.0.255 area 0
R3(config-router)#network 10.39.13.0 0.0.0.255 area 0
R3(config-router)#exit
R3(config)#
R3(config)#
*Nov 17 01:44:28.787: %OSPF-5-ADJCHG: Process 4, Nbr 0.0.4.1 on Ethernet1/1 fr
R3(config)#
```

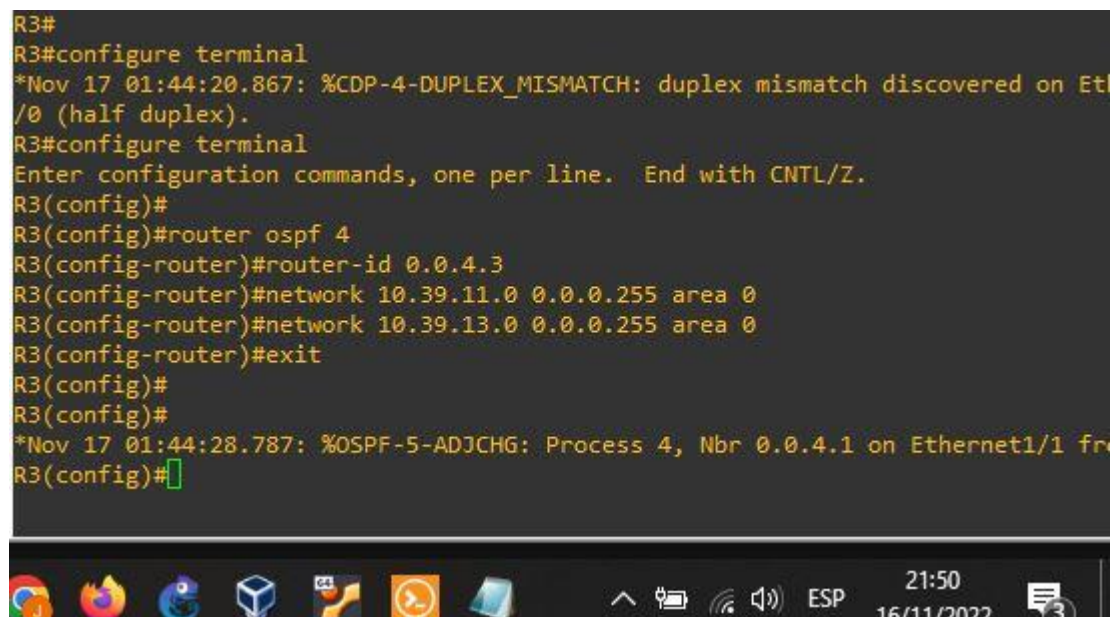


Figura 19. Configuración OSPFv2 en switch D1

```
D1#
D1#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
D1(config)#
D1(config)#router ospf 4
D1(config-router)#router-id 0.0.4.131
D1(config-router)#network 10.39.100.0 0.0.0.255 area 0
D1(config-router)#network 10.39.101.0 0.0.0.255 area 0
D1(config-router)#network 10.39.102.0 0.0.0.255 area 0
D1(config-router)#network 10.39.10.0 0.0.0.255 area 0
D1(config-router)#passive-interface default
D1(config-router)#no passive-interface e1/2
D1(config-router)#
D1(config-router)#
*Nov 17 01:45:47.531: %OSPF-5-ADJCHG: Process 4, Nbr 0.0.4.1 on Ethernet1/2 fr
D1(config-router)#exit
D1(config)#
```

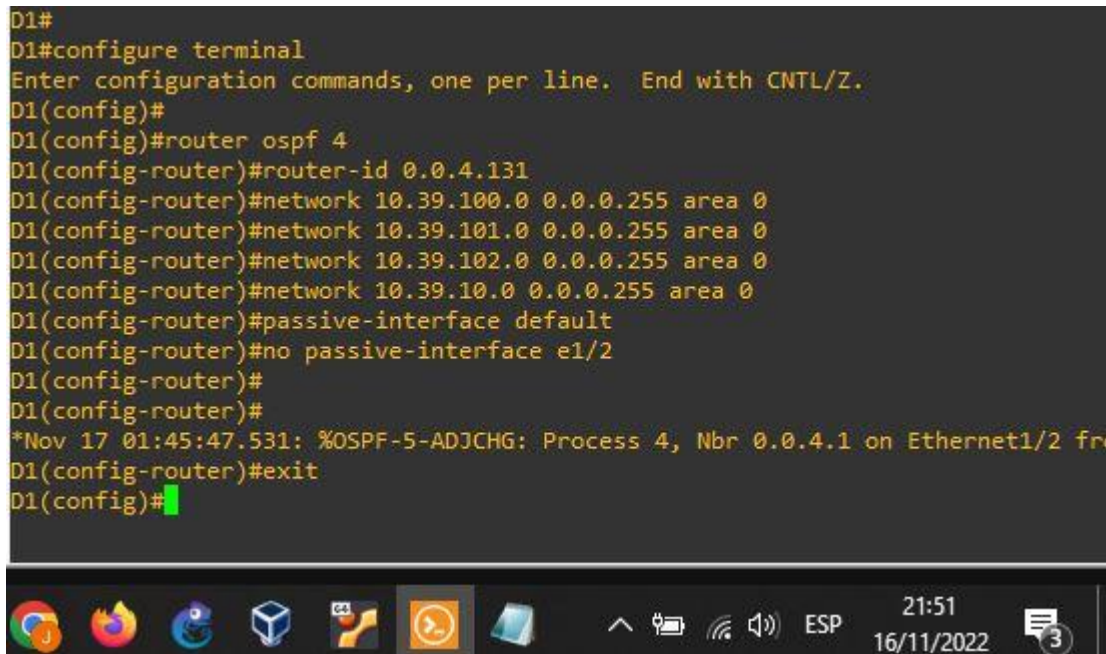
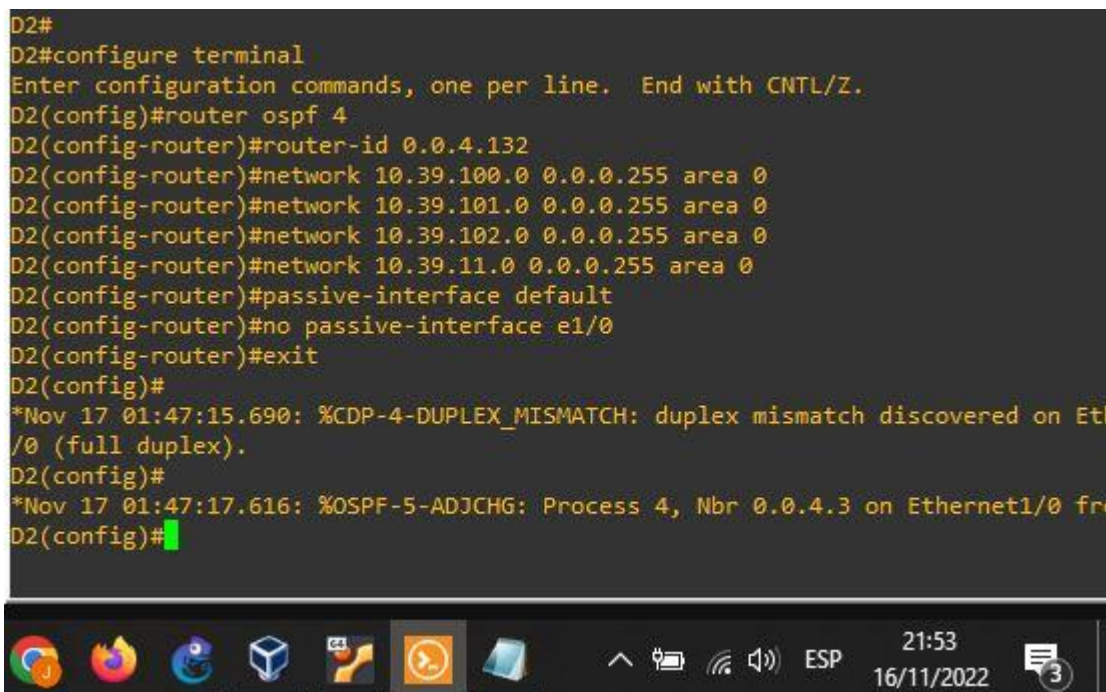


Figura 20. Configuración OSPFv2 en switch D2

```
D2#
D2#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
D2(config)#router ospf 4
D2(config-router)#router-id 0.0.4.132
D2(config-router)#network 10.39.100.0 0.0.0.255 area 0
D2(config-router)#network 10.39.101.0 0.0.0.255 area 0
D2(config-router)#network 10.39.102.0 0.0.0.255 area 0
D2(config-router)#network 10.39.11.0 0.0.0.255 area 0
D2(config-router)#passive-interface default
D2(config-router)#no passive-interface e1/0
D2(config-router)#exit
D2(config)#
*Nov 17 01:47:15.690: %CDP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Et
/0 (full duplex).
D2(config)#
*Nov 17 01:47:17.616: %OSPF-5-ADJCHG: Process 4, Nbr 0.0.4.3 on Ethernet1/0 fr
D2(config)#
```



- 3.1. En la red de la empresa es decir R1,R2,R3, D1 y D2, configurar OSPFv2 de área única en el área 0.

Se adjunta código y pantallazos con veracidad del código.

Usar OSPF Process ID 4  
Router R1

```
router ospf 4
router-id 0.0.4.1
network 10.39.10.0 0.0.0.255 area 0
network 10.39.13.0 0.0.0.255 area 0
default-information originate
exit
```

Router R3

```
router ospf 4
router-id 0.0.4.3
network 10.39.11.0 0.0.0.255 area 0
network 10.39.13.0 0.0.0.255 area 0
exit
```

Switch D1

```
router ospf 4
router-id 0.0.4.131
network 10.39.100.0 0.0.0.255 area 0
network 10.39.101.0 0.0.0.255 area 0
network 10.39.102.0 0.0.0.255 area 0
network 10.39.10.0 0.0.0.255 area 0
passive-interface default
no passive-interface e1/2
```

Switch D2

```
router ospf 4
router-id 0.0.4.132
network 10.39.100.0 0.0.0.255 area 0
network 10.39.101.0 0.0.0.255 area 0
network 10.39.102.0 0.0.0.255 area 0
network 10.39.11.0 0.0.0.255 area 0
passive-interface default
no passive-interface e1/0
exit
```



Figura 21. Configuración OSPFv3 en router R1

```
R1(config)#
*Nov 17 01:48:07.771: %CDP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Et
/2 (half duplex).
R1(config)#ipv6 router ospf 6
R1(config-rtr)#router-id 0.0.6.1
R1(config-rtr)#default-information originate
R1(config-rtr)#exit
R1(config)#interface e1/2
R1(config-if)#ipv6 ospf 6 area 0
R1(config-if)#exit
R1(config)#interface e1/1
R1(config-if)#ipv6 ospf 6 area 0
R1(config-if)#exit
R1(config)#
```

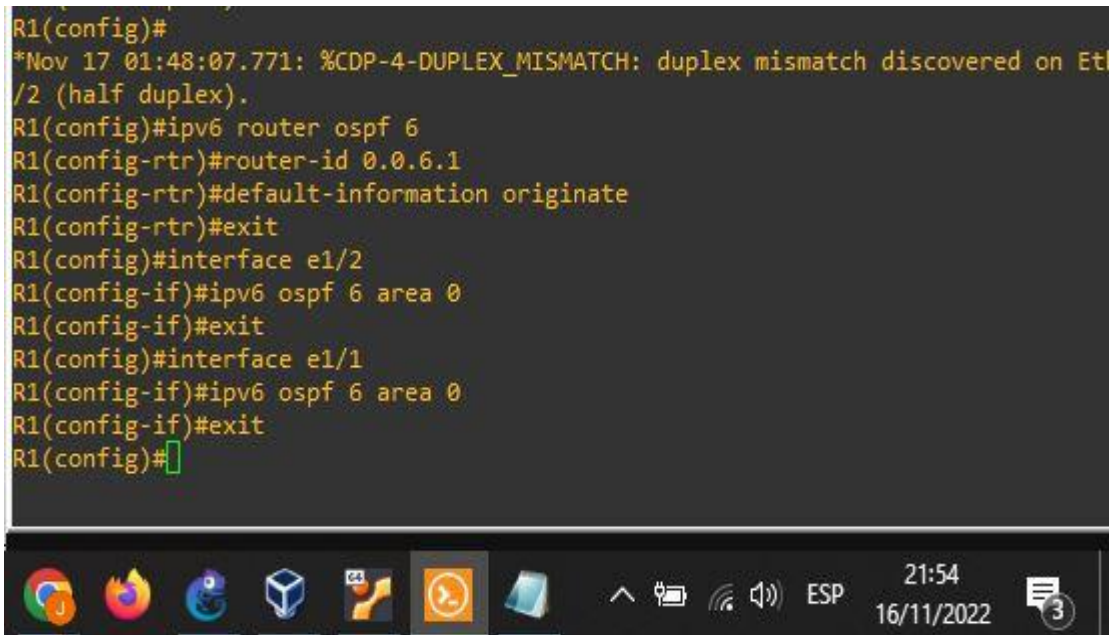


Figura 22. Configuración OSPFv3 en router R3

```
R3(config)#
*Nov 17 01:49:46.583: %CDP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Et
/0 (half duplex).
R3(config)#
R3(config)#ipv6 router ospf 6
R3(config-rtr)#router-id 0.0.6.3
R3(config-rtr)#exit
R3(config)#interface e1/0
R3(config-if)#ipv6 ospf 6 area 0
R3(config-if)#exit
R3(config)#interface e1/1
R3(config-if)#ipv6 ospf 6 area 0
R3(config-if)#exit
R3(config)#
R3(config)#
*Nov 17 01:50:03.151: %OSPFv3-5-ADJCHG: Process 6, Nbr 0.0.6.1 on Ethernet1/1
R3(config)#
```

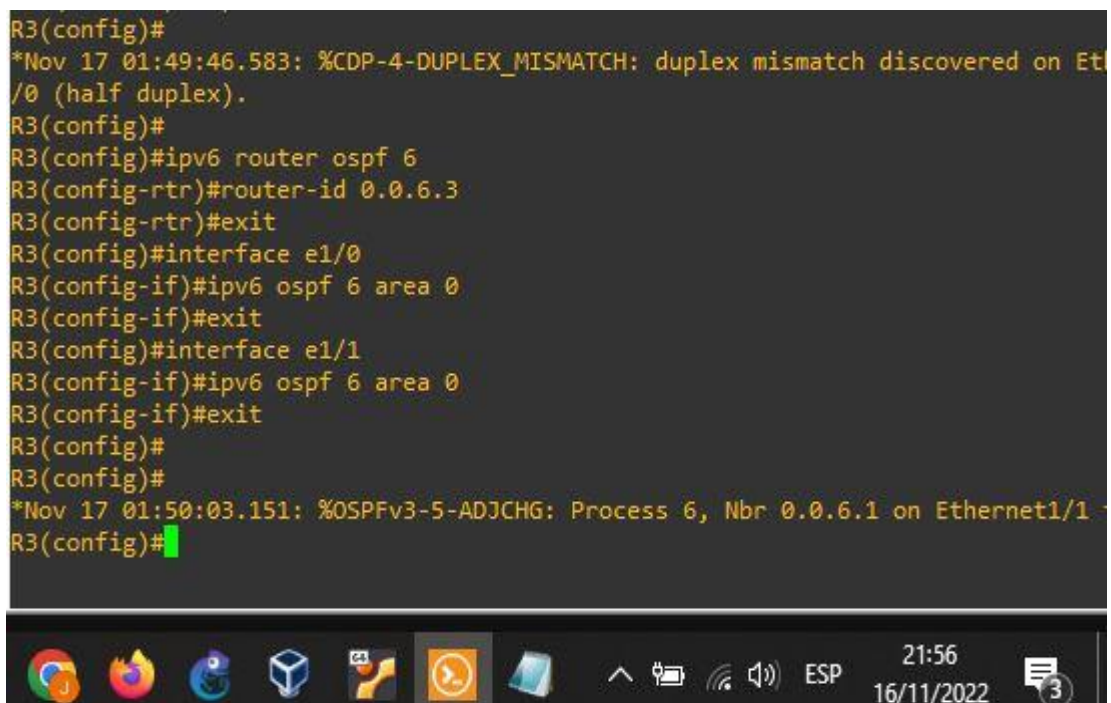


Figura 23. Configuración OSPFv3 en switch D1

```
D1(config)#
*Nov 17 01:51:13.592: %CDP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Et
/2 (full duplex).
D1(config)#
D1(config)#ipv6 router ospf 6
D1(config-rtr)#router-id 0.0.6.131
D1(config-rtr)#passive-interface default
D1(config-rtr)#no passive-interface e1/2
D1(config-rtr)#exit
D1(config)#passive-interface default
^
% Invalid input detected at '^' marker.

D1(config)#no passive-interface e1/2
^
% Invalid input detected at '^' marker.

D1(config)#exit
D1#interface e1/2
```

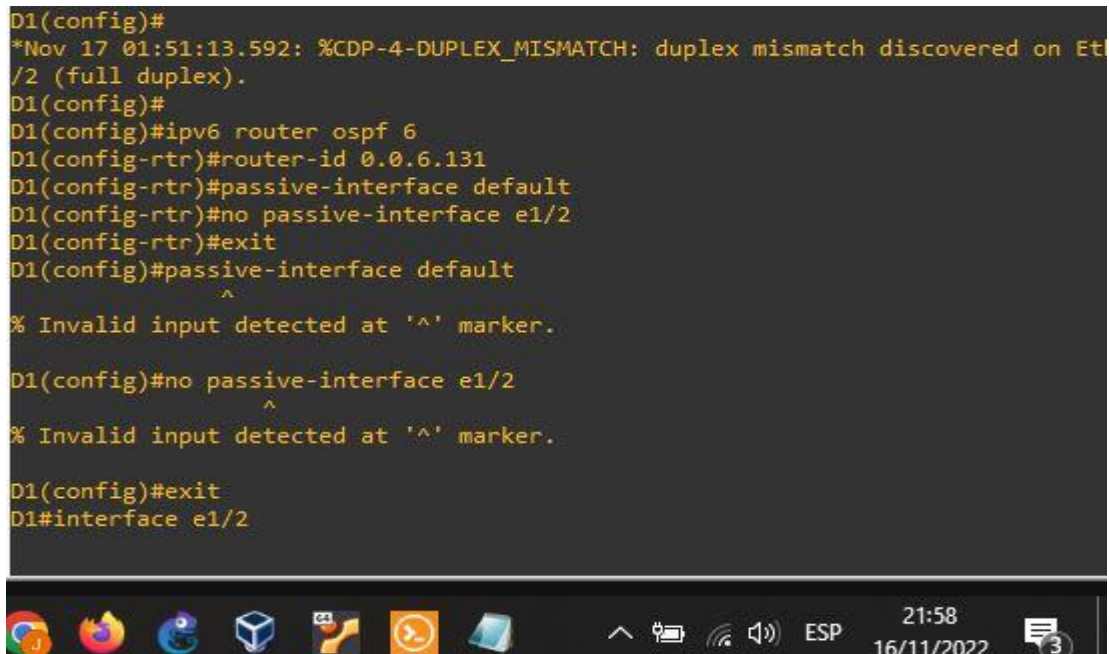
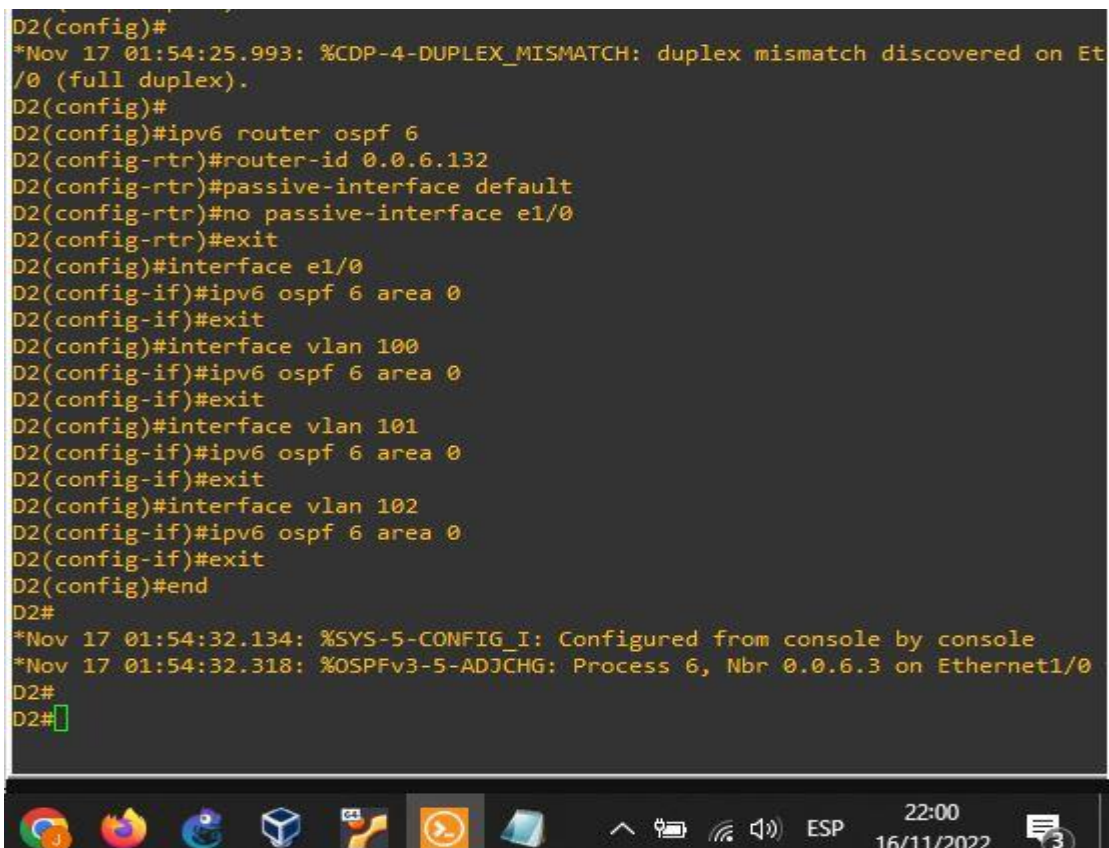


Figura 24. Configuración OSPFv3 en switch D2

```
D2(config)#
*Nov 17 01:54:25.993: %CDP-4-DUPLEX_MISMATCH: duplex mismatch discovered on Et
/0 (full duplex).
D2(config)#
D2(config)#ipv6 router ospf 6
D2(config-rtr)#router-id 0.0.6.132
D2(config-rtr)#passive-interface default
D2(config-rtr)#no passive-interface e1/0
D2(config-rtr)#exit
D2(config)#interface e1/0
D2(config-if)#ipv6 ospf 6 area 0
D2(config-if)#exit
D2(config)#interface vlan 100
D2(config-if)#ipv6 ospf 6 area 0
D2(config-if)#exit
D2(config)#interface vlan 101
D2(config-if)#ipv6 ospf 6 area 0
D2(config-if)#exit
D2(config)#interface vlan 102
D2(config-if)#ipv6 ospf 6 area 0
D2(config-if)#exit
D2(config)#end
D2#
*Nov 17 01:54:32.134: %SYS-5-CONFIG_I: Configured from console by console
*Nov 17 01:54:32.318: %OSPFv3-5-ADJCHG: Process 6, Nbr 0.0.6.3 on Ethernet1/0
D2#
D2#
```



- 3.2. En la red de la empresa es decir R1,R2,R3, D1 y D2, configurar OSPFv3 de área única en el área 0.

Se adjunta código y pantallazos con veracidad del código.

Usar OSPF Process ID 6  
Router R1

```
ipv6 router ospf 6
router-id 0.0.6.1
default-information originate
exit
interface e1/2
ipv6 ospf 6 area 0
exit
interface e1/1
ipv6 ospf 6 area 0
exit
```

Router R3

```
ipv6 router ospf 6
router-id 0.0.6.3
exit
interface e1/0
ipv6 ospf 6 area 0
exit
interface e1/1
ipv6 ospf 6 area 0
exit
```

Switch D1

```
ipv6 router ospf 6
router-id 0.0.6.131
passive-interface default
no passive-interface e1/2
exit
passive-interface default
no passive-interface e1/2
exit
interface e1/2
ipv6 ospf 6 area 0
exit
interface vlan 100
ipv6 ospf 6 area 0
exit
```

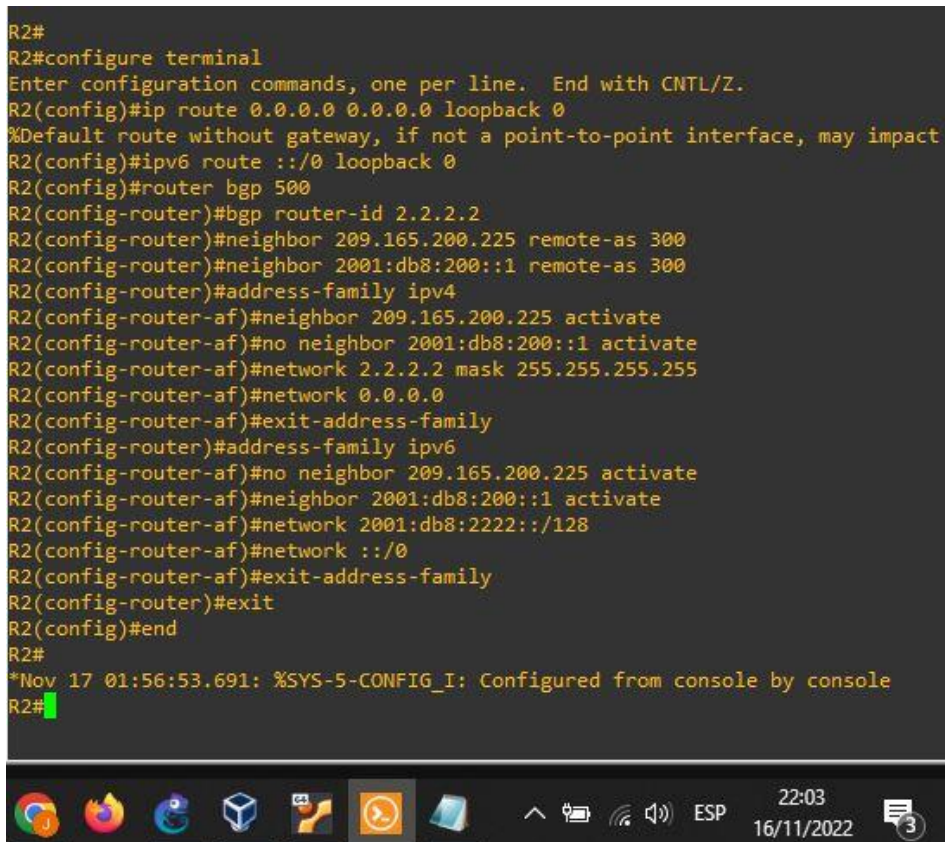
```
interface vlan 101
ipv6 ospf 6 area 0
exit
interface vlan 102
ipv6 ospf 6 area 0
exit
end
```

```
Switch D2
ipv6 router ospf 6
router-id 0.0.6.132
passive-interface default
no passive-interface e1/0
exit
interface e1/0
ipv6 ospf 6 area 0
exit
interface vlan 100
ipv6 ospf 6 area 0
exit
interface vlan 101
ipv6 ospf 6 area 0
exit
interface vlan 102
ipv6 ospf 6 area 0
exit
end
```



Figura 25. Configuración “Red ISP” en router R2

```
R2#
R2#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#ip route 0.0.0.0 0.0.0.0 loopback 0
%Default route without gateway, if not a point-to-point interface, may impact
R2(config)#ipv6 route ::/0 loopback 0
R2(config)#router bgp 500
R2(config-router)#bgp router-id 2.2.2.2
R2(config-router)#neighbor 209.165.200.225 remote-as 300
R2(config-router)#neighbor 2001:db8:200::1 remote-as 300
R2(config-router)#address-family ipv4
R2(config-router-af)#neighbor 209.165.200.225 activate
R2(config-router-af)#no neighbor 2001:db8:200::1 activate
R2(config-router-af)#network 2.2.2.2 mask 255.255.255.255
R2(config-router-af)#network 0.0.0.0
R2(config-router-af)#exit-address-family
R2(config-router)#address-family ipv6
R2(config-router-af)#no neighbor 209.165.200.225 activate
R2(config-router-af)#neighbor 2001:db8:200::1 activate
R2(config-router-af)#network 2001:db8:2222::/128
R2(config-router-af)#network ::/0
R2(config-router-af)#exit-address-family
R2(config-router)#exit
R2(config)#end
R2#
*Nov 17 01:56:53.691: %SYS-5-CONFIG_I: Configured from console by console
R2#
```



### 3.3. En R2 en la “Red ISP”, configure MP-BGP.

Se adjunto código y pantallazo con veracidad del código.

#### **Router R2**

```
ip route 0.0.0.0 0.0.0.0 loopback 0
ipv6 route ::/0 loopback 0
router bgp 500
bgp router-id 2.2.2.2
neighbor 209.165.200.225 remote-as 300
neighbor 2001:db8:200::1 remote-as 300
address-family ipv4
neighbor 209.165.200.225 activate
no neighbor 2001:db8:200::1 activate
network 2.2.2.2 mask 255.255.255.255
network 0.0.0.0
exit-address-family
address-family ipv6
no neighbor 209.165.200.225 activate
```

```
neighbor 2001:db8:200::1 activate
network 2001:db8:2222::/128
network ::/0
exit-address-family
```

Figura 26. Configuración “Red ISP” en router R1

```
R1#
R1#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#
R1(config)#ip route 10.39.0.0 255.0.0.0 null0
%Inconsistent address and mask
R1(config)#ipv6 route 2001:db8:100::/48 null0
R1(config)#
R1(config)#router bgp 300
R1(config-router)#bgp router-id 1.1.1.1
R1(config-router)#neighbor 209.165.200.226 remote-as 500
R1(config-router)#neighbor 2001:db8:200::2 remote-as 500
R1(config-router)#address-family ipv4 unicast
R1(config-router-af)#neighbor 209.165.200.226 activate
R1(config-router-af)#no neighbor 2001:db8:200::2 activate
R1(config-router-af)#network 10.39.0.0 mask 255.0.0.0
% BGP: Incorrect network or mask/prefix-length configured
R1(config-router-af)#exit-address-family
R1(config-router)#address-family ipv6 unicast
R1(config-router-af)#no neighbor 209.165.200.226 activate
R1(config-router-af)#neighbor 2001:db8:200::2 activate
R1(config-router-af)#network 2001:db8:100::/48
R1(config-router-af)#exit-address-family
R1(config-router)#
*Nov 17 01:59:14.143: %BGP-5-ADJCHANGE: neighbor 209.165.200.226 Up
R1(config-router)#exit
R1(config)#
*Nov 17 01:59:22.263: %BGP-5-ADJCHANGE: neighbor 2001:DB8:200::2 Up
R1(config)#
```

3.4. En R1 en la “Red ISP”, configure MP-BGP.

Se adjunta código y pantallazos con veracidad del código.

### Router R1

Configurar MP-BGP  
Router R1

```
ip route 10.39.0.0 255.0.0.0 null0
ipv6 route 2001:db8:100::/48 null0
```

```

router bgp 300
bgp router-id 1.1.1.1
neighbor 209.165.200.226 remote-as 500
neighbor 2001:db8:200::2 remote-as 500
address-family ipv4 unicast
neighbor 209.165.200.226 activate
no neighbor 2001:db8:200::2 activate
network 10.39.0.0 mask 255.0.0.0
exit-address-family
address-family ipv6 unicast
no neighbor 209.165.200.226 activate
neighbor 2001:db8:200::2 activate
network 2001:db8:100::/48
exit-address-family

```

#### 4. Configuración de protocolos de enrutamiento

Figura 27. Configuración IP SLA y HSRPv2 en switch D1

```

D1#
D1#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
D1(config)#
D1(config)#ip sla 4
D1(config-ip-sla)#icmp-echo 10.0.10.1
D1(config-ip-sla-echo)#frequency 5
D1(config-ip-sla-echo)#exit
D1(config)#ip sla 6
D1(config-ip-sla)#icmp-echo 2001:db8:100:1010::1
D1(config-ip-sla-echo)#frequency 5
D1(config-ip-sla-echo)#exit
D1(config)#ip sla schedule 4 life forever start-time now
D1(config)#ip sla schedule 6 life forever start-time now
D1(config)#track 4 ip sla 4
D1(config-track)#delay down 10 up 15
D1(config-track)#exit
D1(config)#track 6 ip sla 6
D1(config-track)#delay down 10 up 15
D1(config-track)#exit
D1(config)#interface vlan 100
D1(config-if)#standby version 2
D1(config-if)#standby 104 ip 10.39.100.254
D1(config-if)#standby 104 priority 150
D1(config-if)#standby 104 preempt
D1(config-if)#standby 104 track 4 decrement 60
D1(config-if)#standby 106 ipv6 autoconfig
D1(config-if)#standby 106 priority 150
D1(config-if)#standby 106 preempt
D1(config-if)#standby 106 track 6 decrement 60
D1(config-if)#exit
D1(config)#interface vlan 101
D1(config-if)#standby version 2
D1(config-if)#standby 114 ip 10.39.101.254
D1(config-if)#standby 114 preempt
D1(config-if)#standby 114 track 4 decrement 60
D1(config-if)#standby 116 ipv6 autoconfig
D1(config-if)#standby 116 preempt
D1(config-if)#standby 116 track 6 decrement 60
D1(config-if)#exit
D1(config)#interface vlan 102
D1(config-if)#standby version 2
D1(config-if)#standby 124 ip 10.39.102.254
D1(config-if)#standby 124 priority 150
D1(config-if)#standby 124 preempt
D1(config-if)#standby 124 track 4 decrement 60
D1(config-if)#standby 126 ipv6 autoconfig
D1(config-if)#standby 126 priority 150
D1(config-if)#standby 126 preempt
D1(config-if)#standby 126 track 6 decrement 60
D1(config-if)#exit
D1(config)#end
D1#
*Nov 14 23:23:58.599: %SYS-5-CONFIG_I: Configured from console by console
D1#

```

Figura 28. Configuración IP SLA y HSRPv2 en switch D2

```
D2#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
D2(config)#
D2(config)#ip sla 4
D2(config-ip-sla)#icmp-echo 10.0.11.1
D2(config-ip-sla-echo)#frequency 5
D2(config-ip-sla-echo)#exit
D2(config)#ip sla 6
D2(config-ip-sla)#icmp-echo 2001:db8:100:1011::1
D2(config-ip-sla-echo)#frequency 5
D2(config-ip-sla-echo)#exit
D2(config)#ip sla schedule 4 life forever start-time now
D2(config)#ip sla schedule 6 life forever start-time now
D2(config)#track 4 ip sla 4
D2(config-track)#delay down 10 up 15
D2(config-track)#exit
D2(config)#track 6 ip sla 6
D2(config-track)#delay down 10 up 15
D2(config-track)#exit
D2(config)#interface vlan 100
D2(config-if)#standby version 2
D2(config-if)#standby 104 ip 10.39.100.254
D2(config-if)#standby 104 preempt
D2(config-if)#standby 104 track 4 decrement 60
D2(config-if)#standby 106 ipv6 autoconfig
D2(config-if)#standby 106 preempt
D2(config-if)#standby 106 track 6 decrement 60
D2(config-if)#exit
D2(config)#interface vlan 101
D2(config-if)#standby version 2
D2(config-if)#standby 114 ip 10.39.101.254
D2(config-if)#standby 114 priority 150
D2(config-if)#standby 114 preempt
D2(config-if)#standby 114 track 4 decrement 60
D2(config-if)#standby 116 ipv6 autoconfig
D2(config-if)#standby 116 priority 150
D2(config-if)#standby 116 preempt
D2(config-if)#standby 116 track 6 decrement 60
D2(config-if)#exit
D2(config)#interface vlan 102
D2(config-if)#standby version 2
D2(config-if)#standby 124 ip 10.39.102.254
D2(config-if)#standby 124 preempt
D2(config-if)#standby 124 track 4 decrement 60
D2(config-if)#standby 126 ipv6 autoconfig
D2(config-if)#standby 126 preempt
D2(config-if)#standby 126 track 6 decrement 60
D2(config-if)#
D2(config-if)#
*Nov 14 23:28:09.030: %HSRP-5-STATECHANGE: Vlan101 Grp 114 state Listen -> Active
D2(config-if)#exit
D2(config)#
D2(config)#end
D2#
D2#
```

- 4.1. En D1, cree IP SLA que prueben la accesibilidad de la interfaz E1/2 de R1.
- 4.2. En D2, cree IP SLA que prueben la accesibilidad de la interfaz E1/0 de R3.
- 4.3. En D1, configure HSRPv2.
- 4.4. En D2, configure HSRPv2.

### Switch D1

```
ip sla 4
icmp-echo 10.39.10.1
frequency 5
exit
```

```
ip sla 6
icmp-echo 2001:db8:100:1010::1
frequency 5
exit
ip sla schedule 4 life forever start-time now
ip sla schedule 6 life forever start-time now
track 4 ip sla 4
delay down 10 up 15
exit
track 6 ip sla 6
delay down 10 up 15
exit
interface vlan 100
standby version 2
standby 104 ip 10.39.100.254
standby 104 priority 150
standby 104 preempt
standby 104 track 4 decrement 60
standby 106 ipv6 autoconfig
standby 106 priority 150
standby 106 preempt
standby 106 track 6 decrement 60
exit
interface vlan 101
standby version 2
standby 114 ip 10.39.101.254
standby 114 preempt
standby 114 track 4 decrement 60
standby 116 ipv6 autoconfig
standby 116 preempt
standby 116 track 6 decrement 60
exit
interface vlan 102
standby version 2
standby 124 ip 10.39.102.254
standby 124 priority 150
standby 124 preempt
standby 124 track 4 decrement 60
standby 126 ipv6 autoconfig
standby 126 priority 150
standby 126 preempt
standby 126 track 6 decrement 60
exit
end
```

## Switch D2

```
ip sla 4
icmp-echo 10.39.11.1
frequency 5
exit
ip sla 6
icmp-echo 2001:db8:100:1011::1
frequency 5
exit
ip sla schedule 4 life forever start-time now
ip sla schedule 6 life forever start-time now
track 4 ip sla 4
delay down 10 up 15
exit
track 6 ip sla 6
delay down 10 up 15
exit
interface vlan 100
standby version 2
standby 104 ip 10.39.100.254
standby 104 preempt
standby 104 track 4 decrement 60
standby 106 ipv6 autoconfig
standby 106 preempt
standby 106 track 6 decrement 60
exit
interface vlan 101
standby version 2
standby 114 ip 10.39.101.254
standby 114 priority 150
standby 114 preempt
standby 114 track 4 decrement 60
standby 116 ipv6 autoconfig
standby 116 priority 150
standby 116 preempt
standby 116 track 6 decrement 60
exit
interface vlan 102
standby version 2
standby 124 ip 10.39.102.254
standby 124 preempt
standby 124 track 4 decrement 60
standby 126 ipv6 autoconfig
standby 126 preempt
standby 126 track 6 decrement 60
```



## CONCLUSIONES

Con el desarrollo del anterior trabajo lo cual comprende las partes 1 y parte 2, del escenario 1 se puede concluir que gracias al modo trunk es posible comunicar los host de los switch D1, D2 y A1 para poder hacer ping desde PC1 hasta el PC4, gracias a la puerta de enlace del grupo 1.

En las partes 3 y 4 del escenario 2 se puede concluir que la configuración de la red de la compañía la cual está compuesta por R1, R3, D1 y D2 a través de las interfaces de conexión de IPv4 e IPv6 permite el envío de información y recepción dentro y fuera de la red de la compañía.

El desarrollo de la temática planteada en el software de simulación GNS3 permitió realizar de forma precisa la posible configuración en tiempo real con routers o switches físicos los cuales vamos a encontrar en la ejecución de nuestras tareas profesionales como futuro ingeniero electrónico.

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