Instituto Politécnico Nacional

Escuela Superior de Cómputo

PRACTICE_ROUTING_MULTILAYER_SWITCHING

Materia:

Administración de servicios en red

Grupo:

4CV13

Profesor:

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Fecha:

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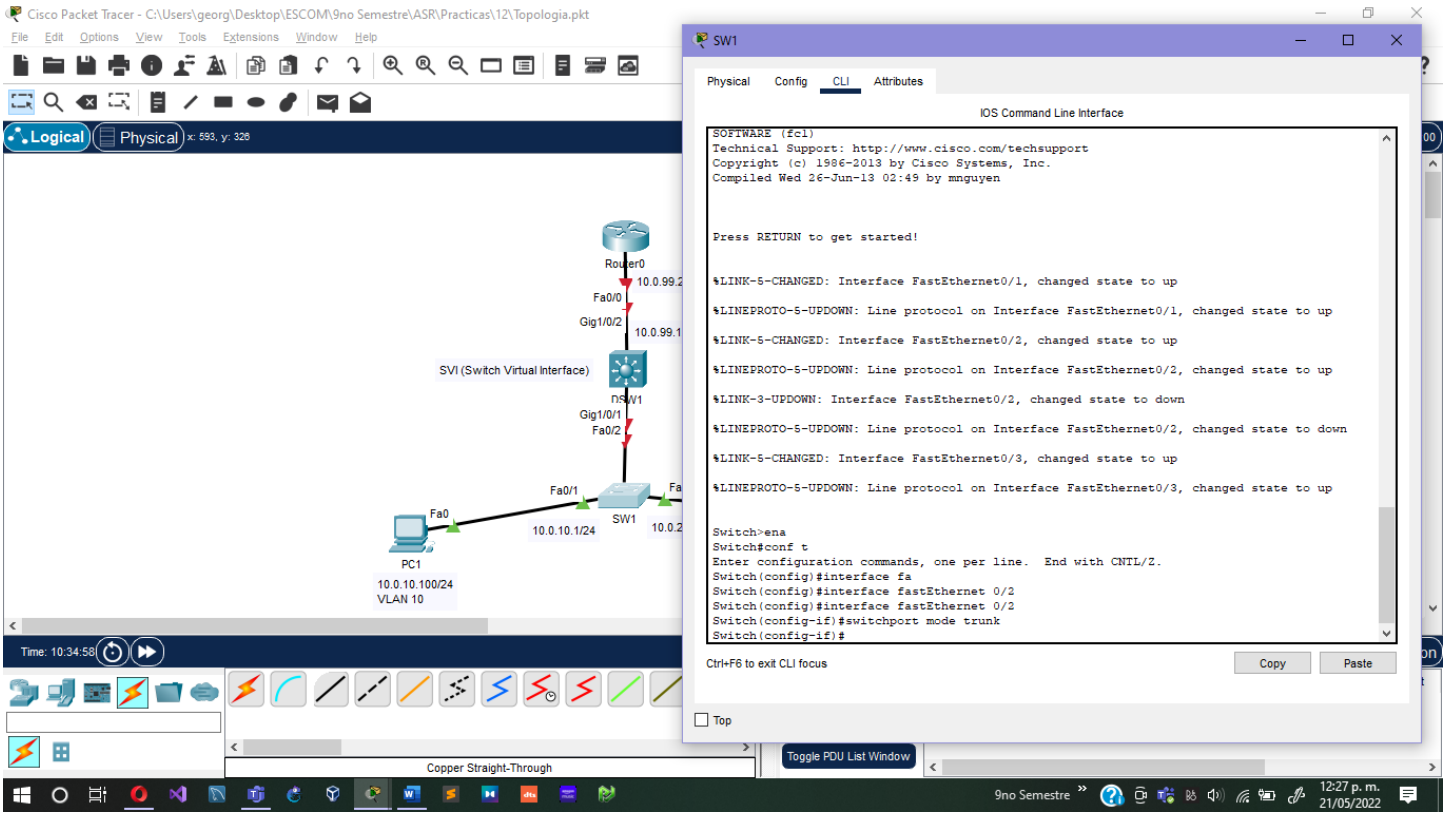
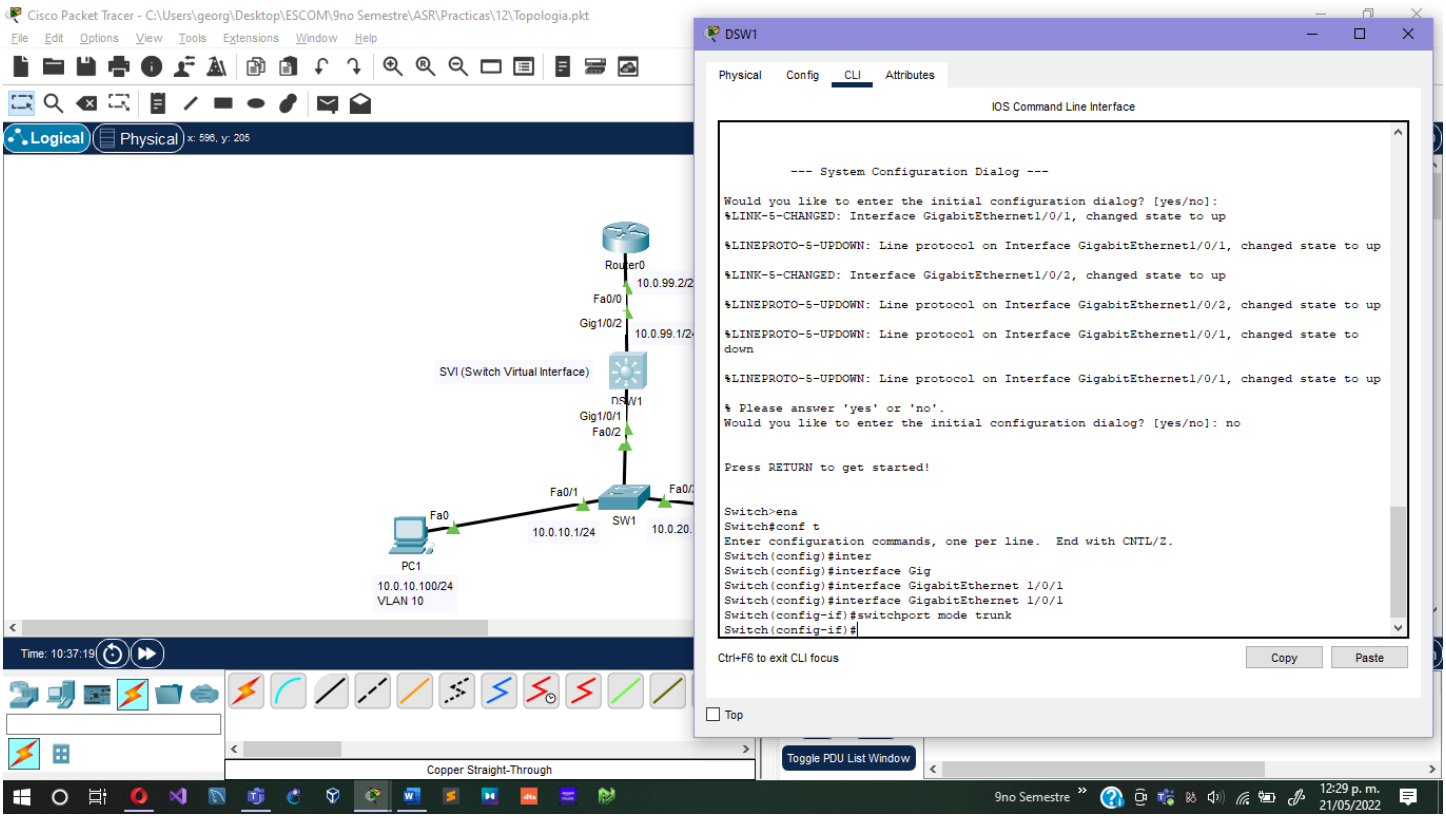
PRÁCTICA: ENRUTAMIENTO EN UN INTERRUPTOR MULTICAPA

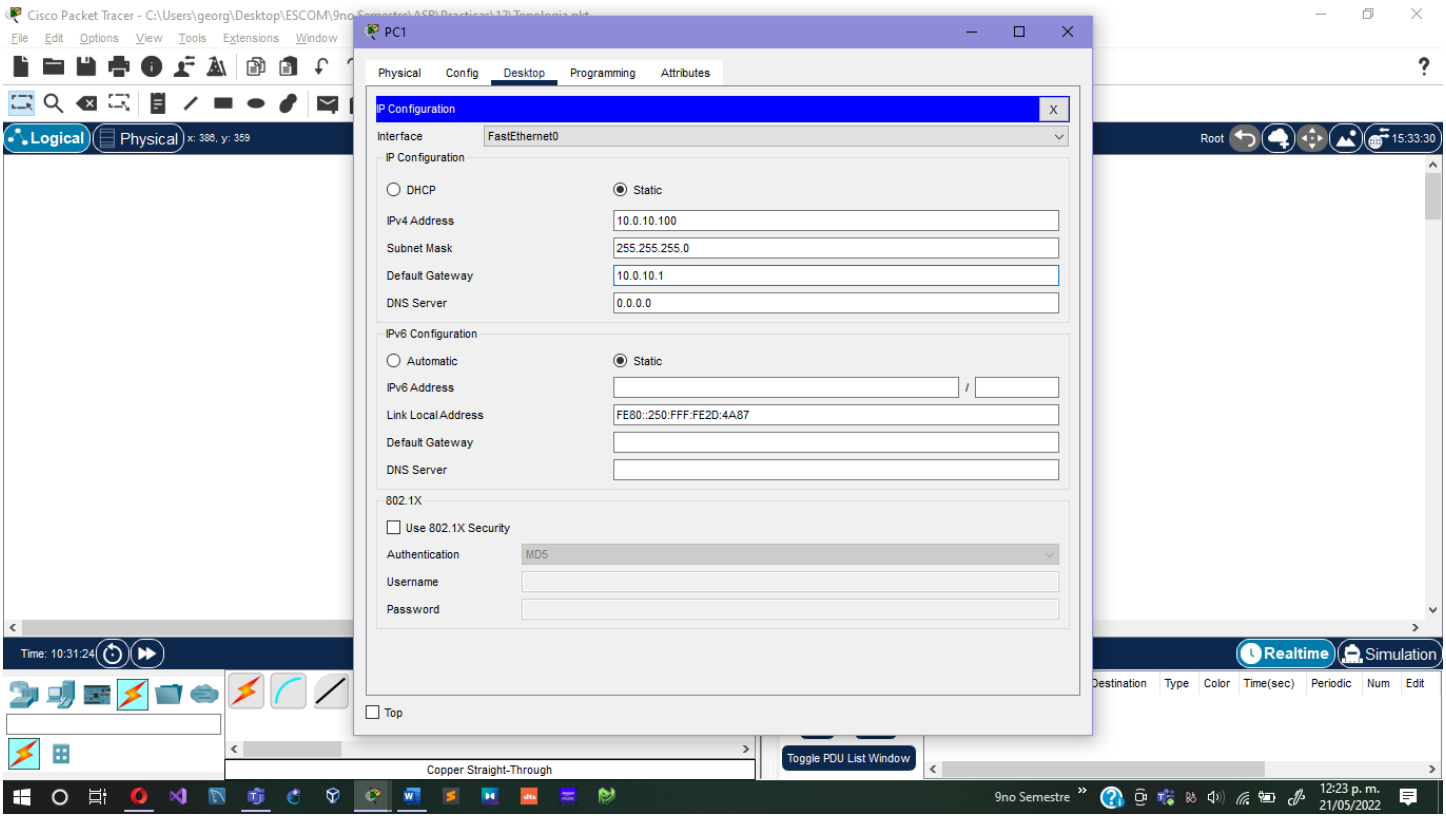
En esta práctica, aprenderá a configurar una SVI (interfaz virtual de conmutador), puertos enrutados y enrutamiento en un conmutador multicapa.

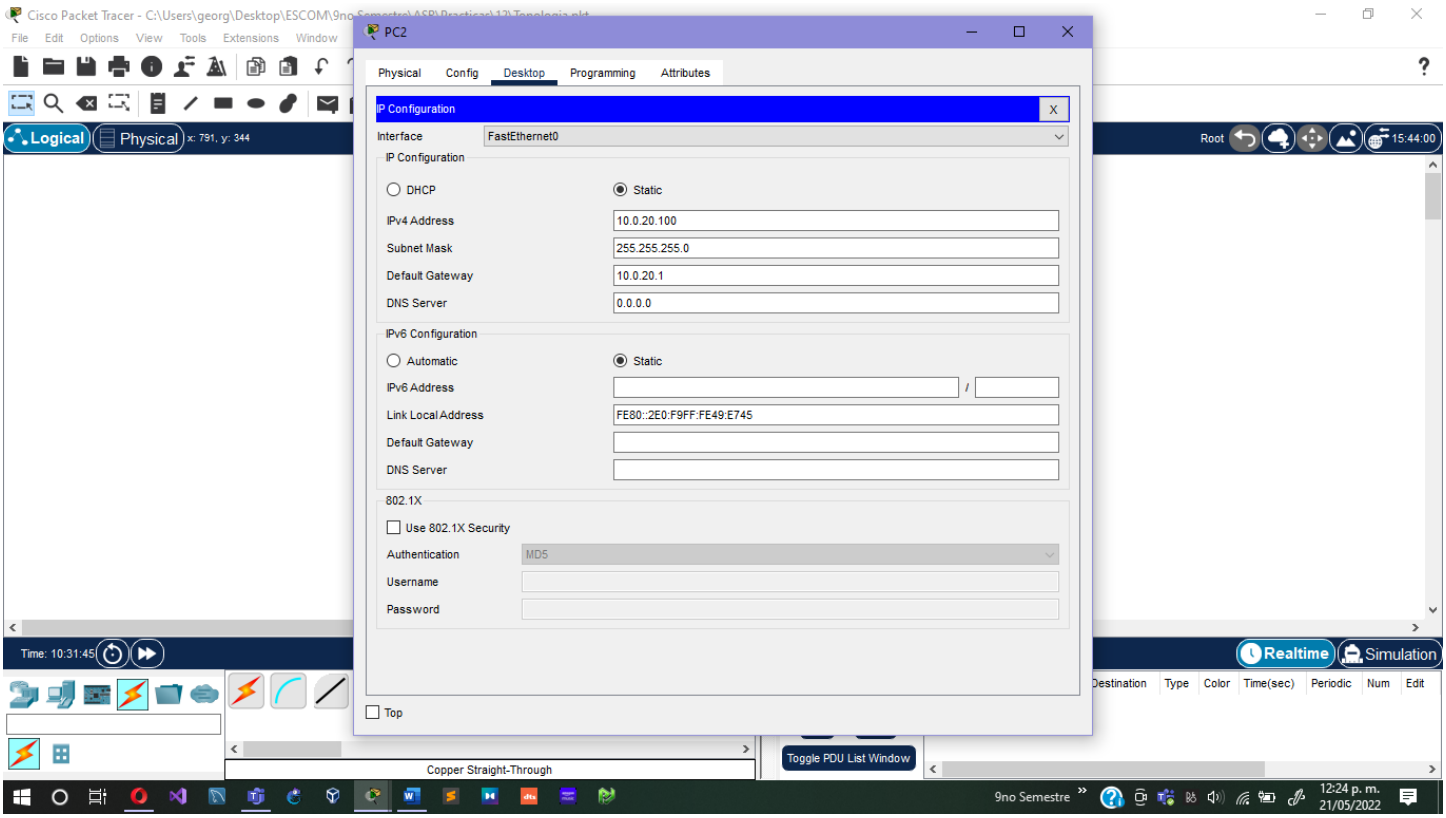
- Los puertos en SW1 deben configurarse para tener PC1 en VLAN 10 y PC2 en VLAN 20.
- El enlace entre SW1 y DSW1 está configurado como enlace troncal.



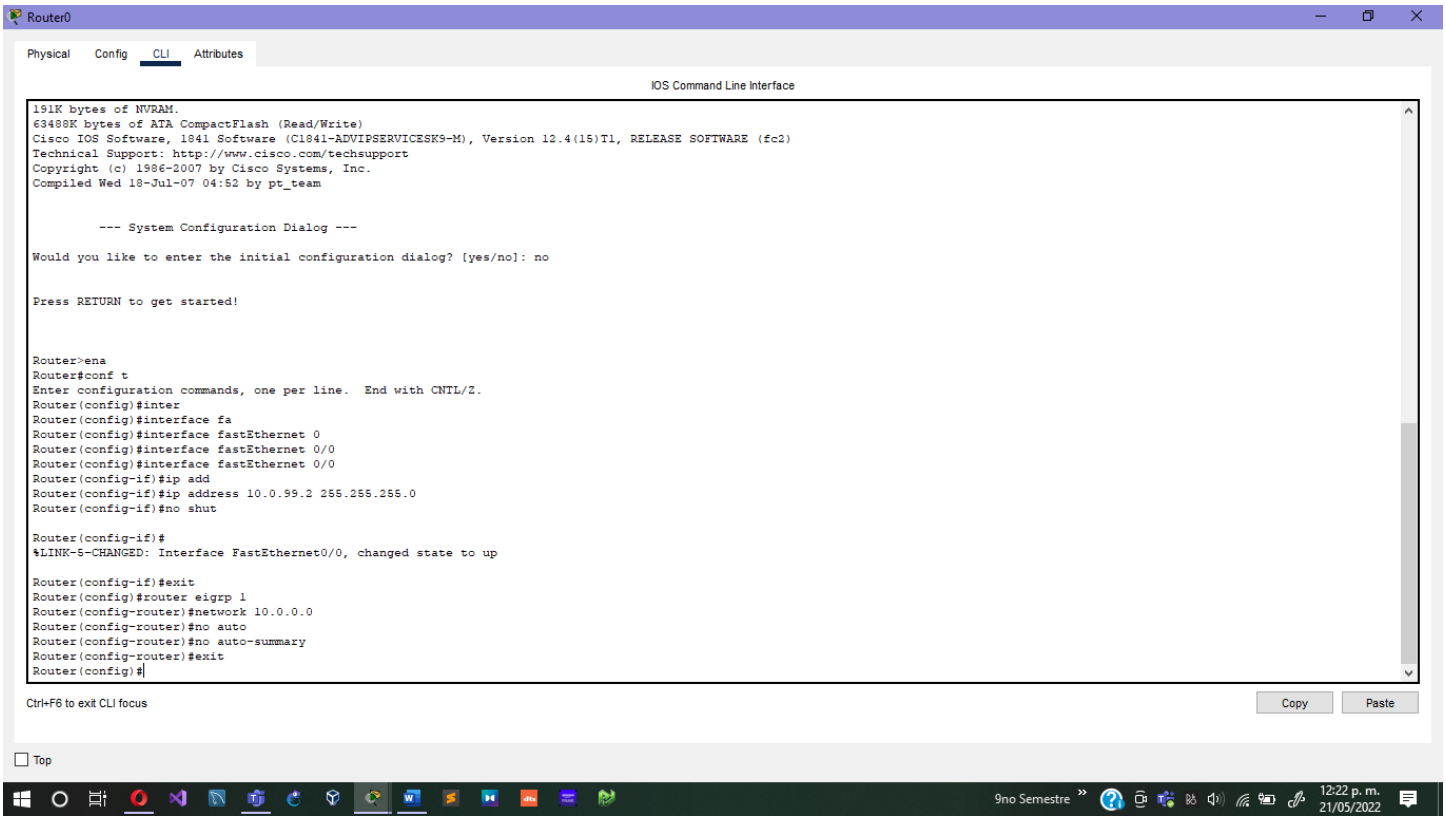


- PC1 y PC2 están configurados con direcciones.



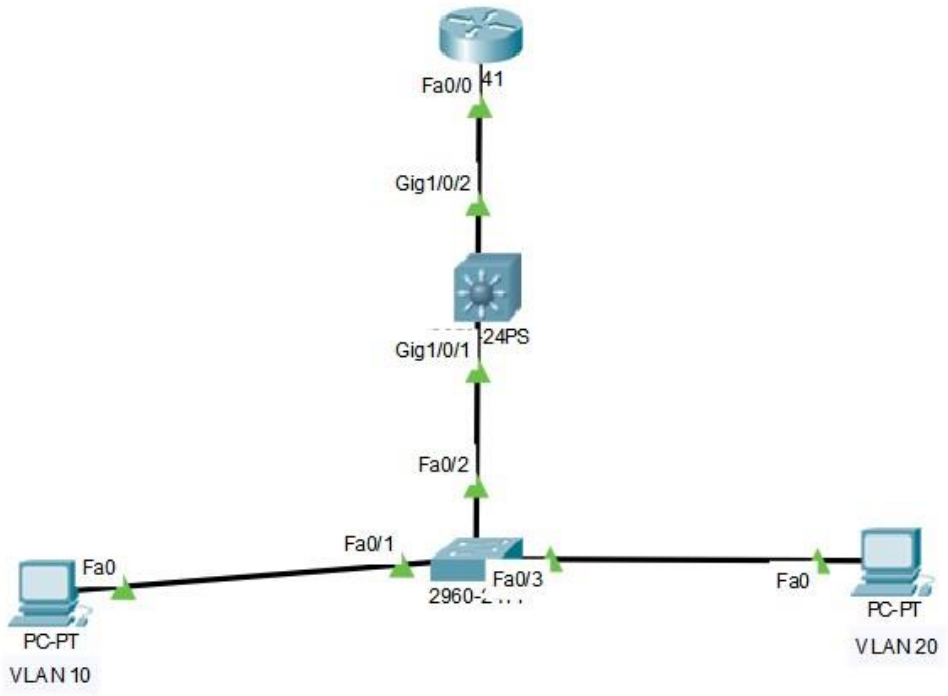


- R1 está configurado con direcciones IP y EIGRP.



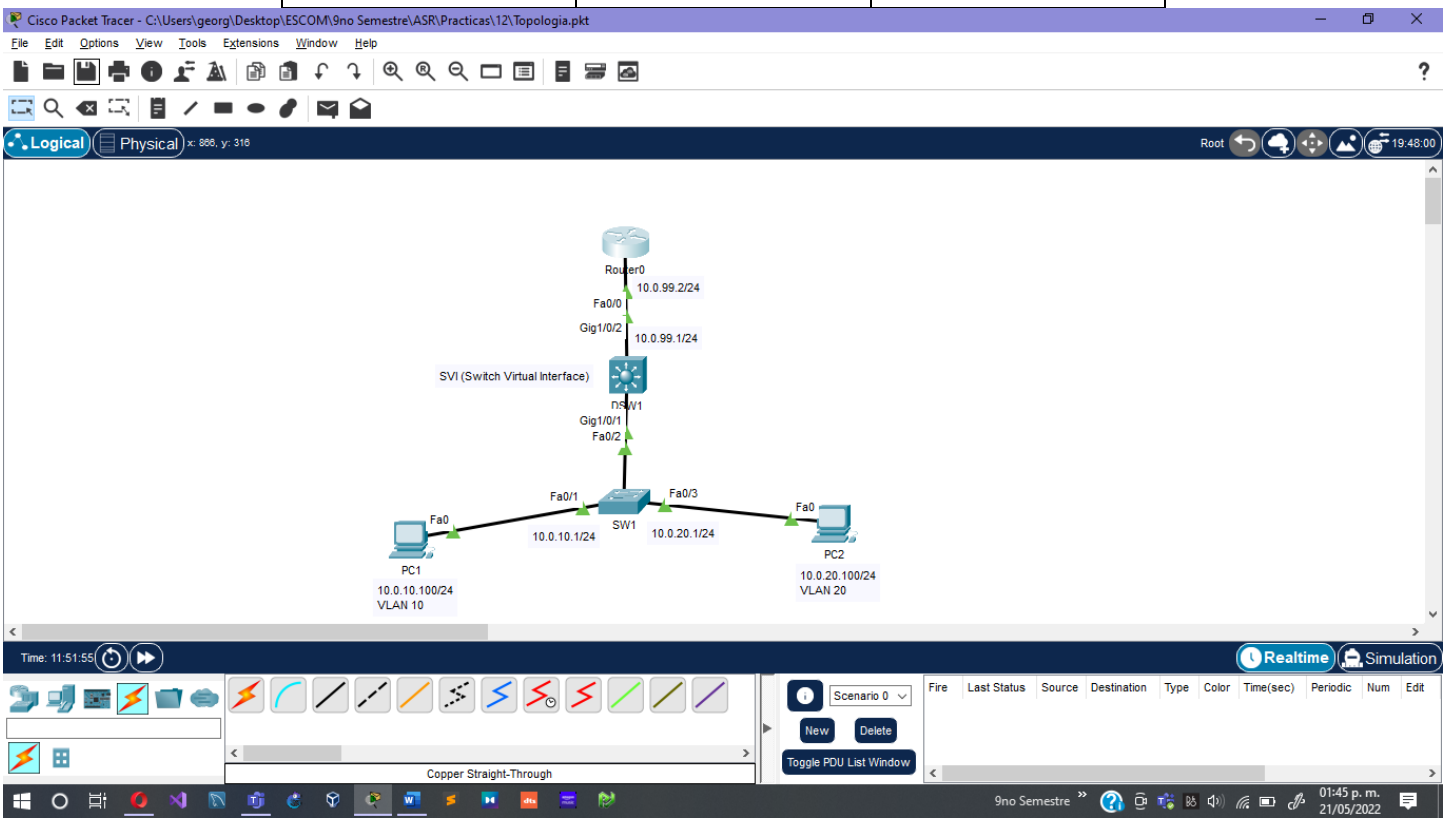
- Configure DSW1 para enrutar entre PC1 y PC2.

TOPOLOGY



DEVICE	INTERFACE	IP ADDRESS
PC1	FA0/0	10.0.10.100/24
PC2	FA0/0	10.0.20.100/24

SW1	VLAN 10	10.0.10.1/24
SW1	VLAN 20	10.0.20.1/24
DSW1	G1/0/2	10.0.99.1/24
R1	FA0/0	10.0.99.2/24



Task 1: Routing on a Multilayer Switch

Activity

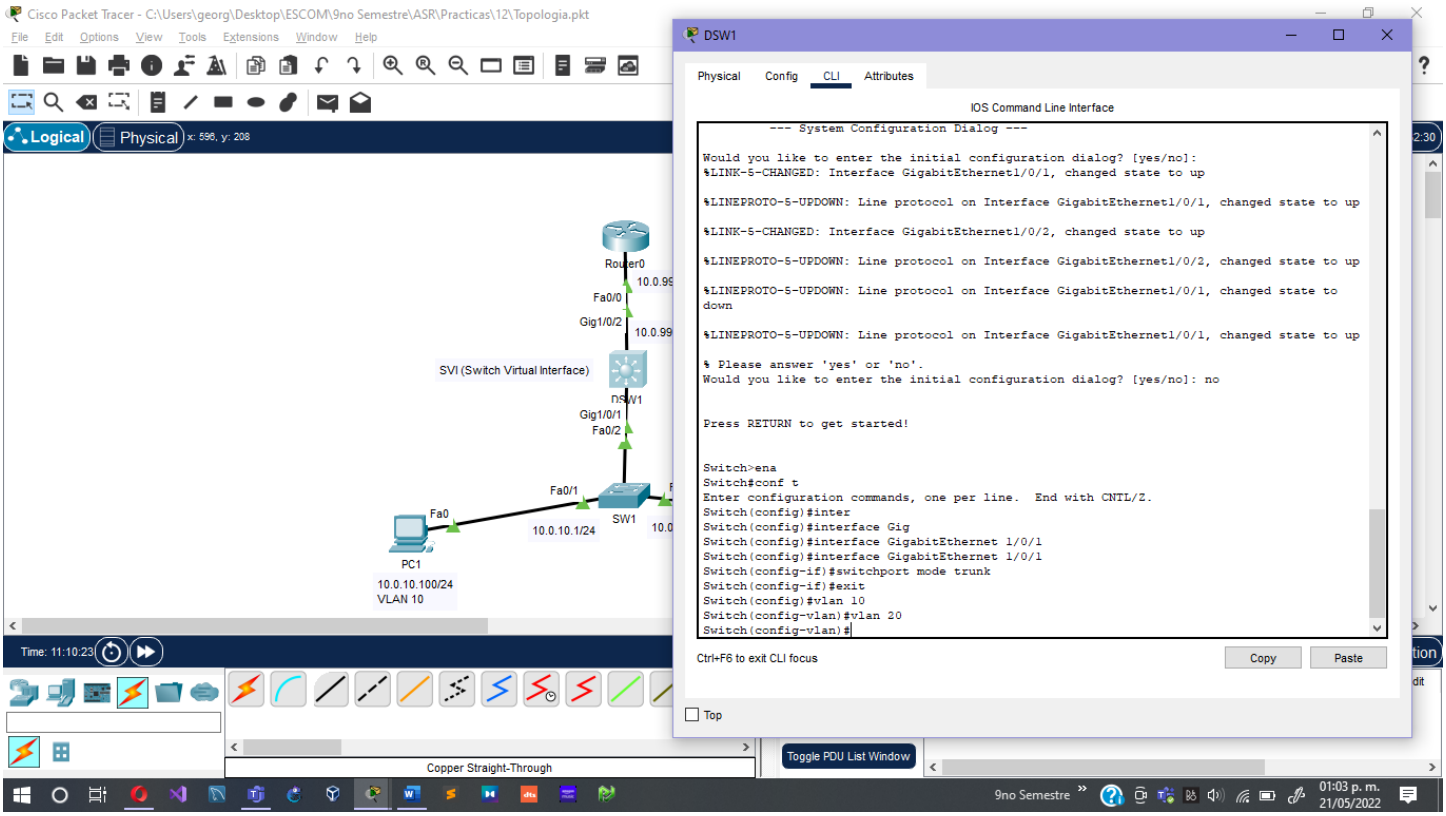
Step 1

On DSW1, create VLANs 10 and 20.

```
DSW1(config)# vlan 10
DSW1(config-vlan)# vlan 20
```

If a VLAN that is to be routed by an SVI does not exist on the multilayer switch, you must create it.

In this example, VLANs 10 and 20 were already preconfigured on DSW1 and you could have verified that with the **show vlan** command. However, these VLANs will not be present on a new device and if you forget to configure them, the switch will not be able to perform inter-VLAN routing.

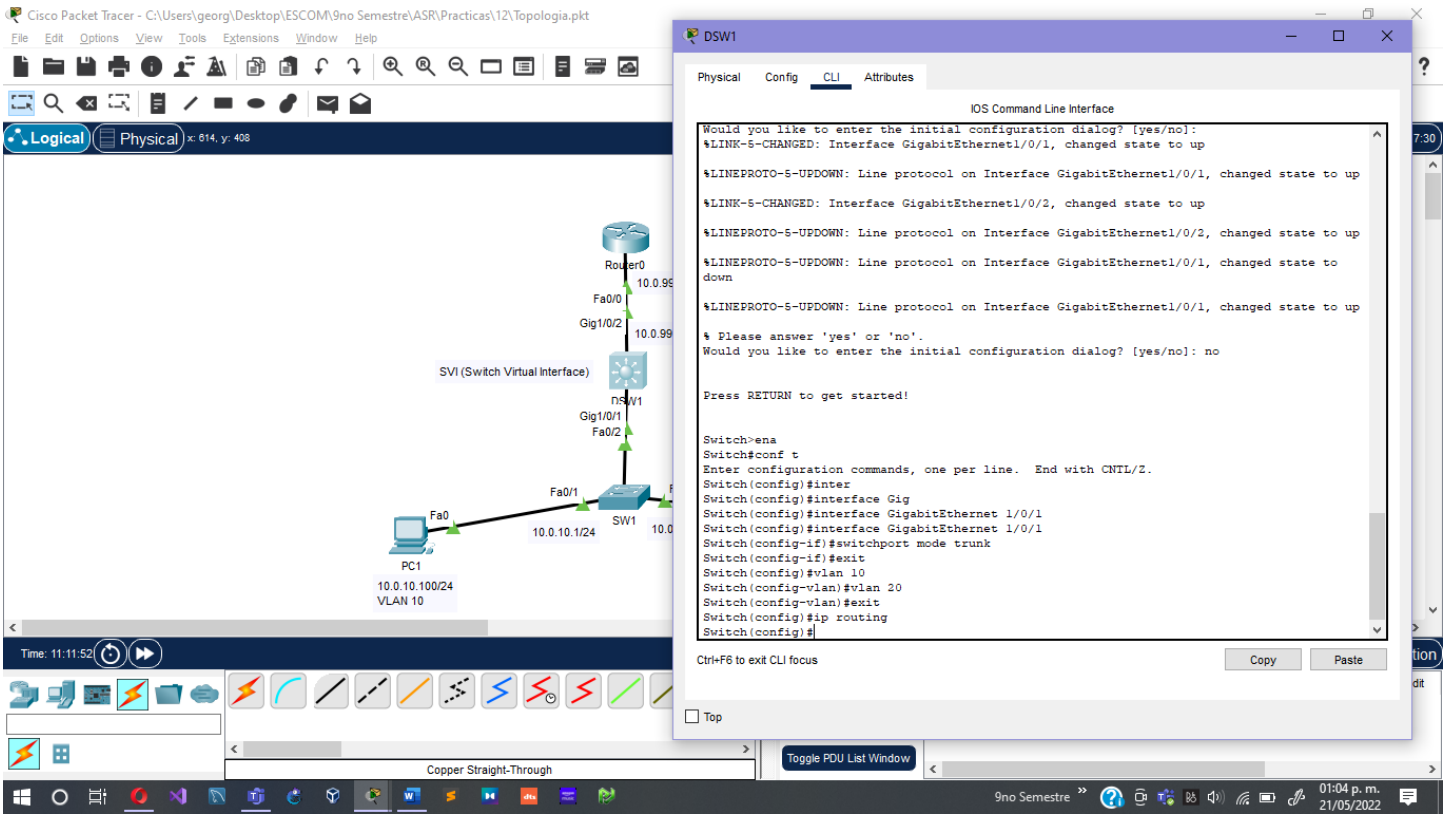


Step 2

On DSW1, enable IPv4 routing.

```
DSW1(config)# ip routing
```

Multilayer switches might or might not have IP routing that is enabled by default. In order for the switch to route between SVIs, you will need to enable IPv4 routing.



Step 3

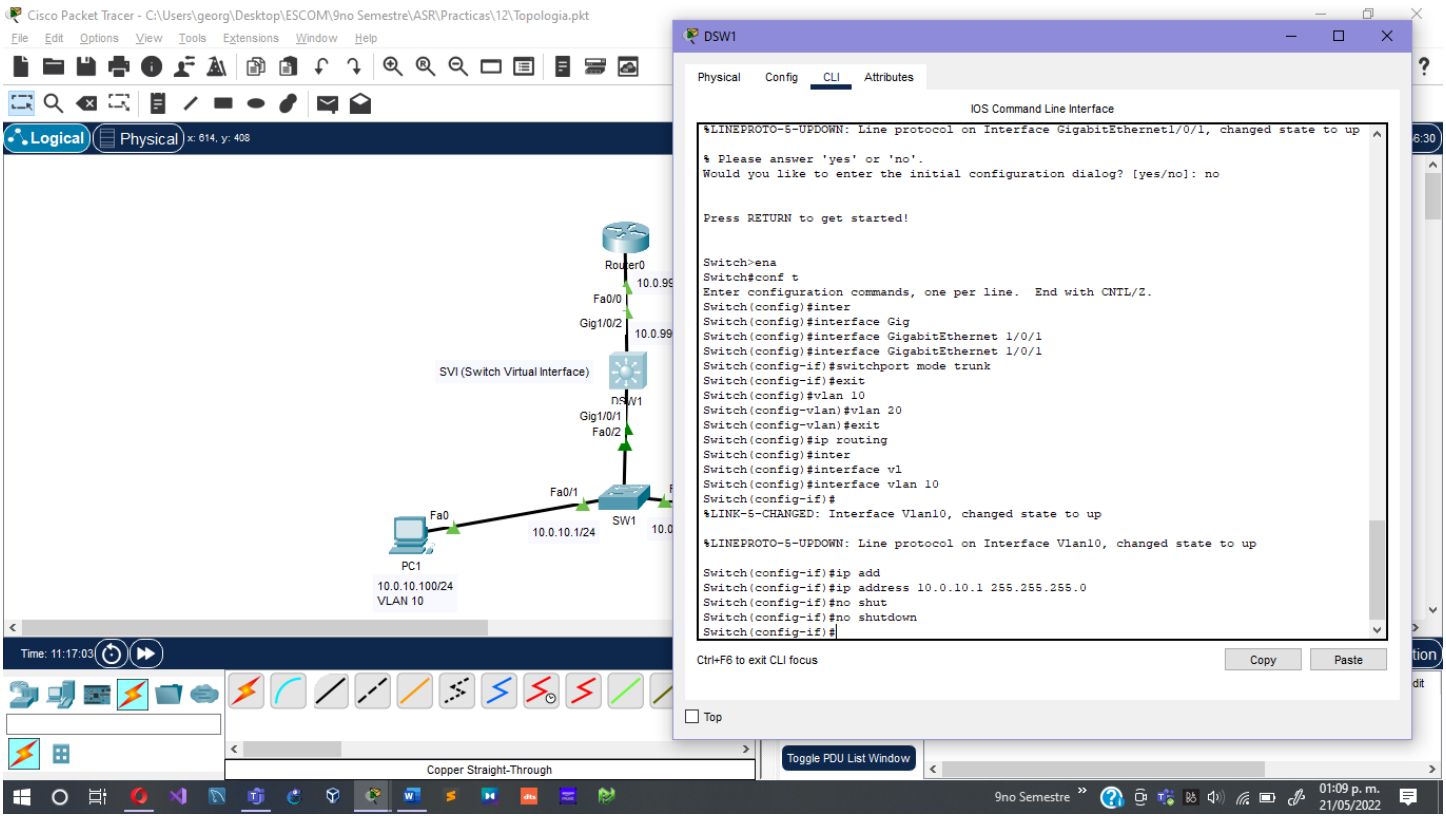
On DSW1, configure an SVI for VLAN 10 with the IP address 10.0.10.1/24.

PC1 is in VLAN 10 and is already configured with a default gateway of 10.0.10.1. You can now configure this IP address on DSW1.

```
DSW1(config)# interface vlan 10
DSW1(config-if)# ip address 10.0.10.1 255.255.255.0
DSW1(config-if)# no shutdown
```

You need to create an SVI for each VLAN that is to be routed within the multilayer switch.

SVI needs to be enabled with the **no shutdown** command. Otherwise it will stay in the "administratively shutdown" state.

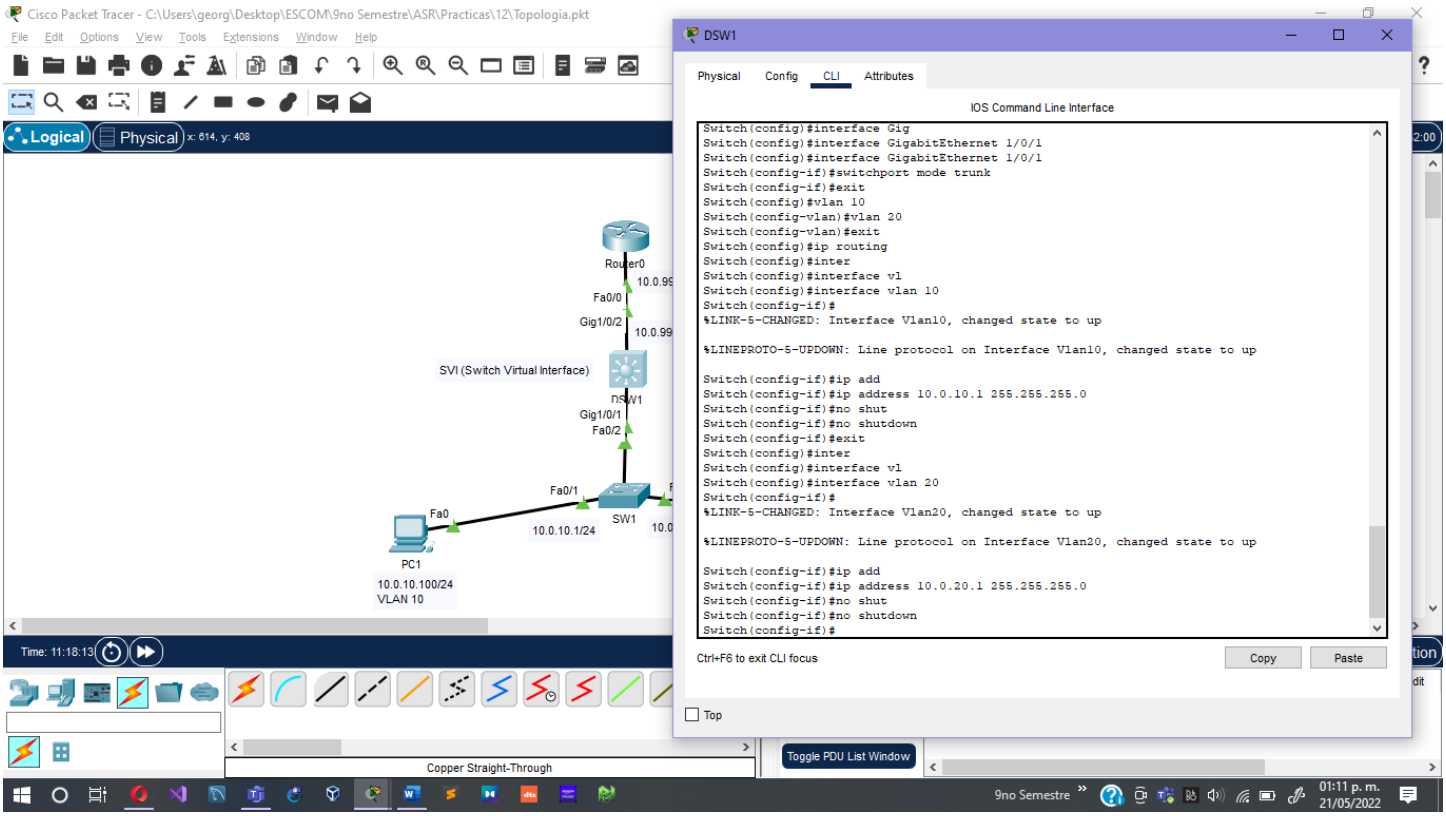


Step 4

On DSW1, configure an SVI for VLAN 20 with the IP address 10.0.20.1/24.

PC2 is in VLAN 20 and is already configured with the default gateway of 10.0.20.1. You can now configure this IP address on DSW1.

```
DSW1(config)# interface vlan 20
DSW1(config-if)# ip address 10.0.20.1 255.255.255.0
DSW1(config-if)# no shutdown
```

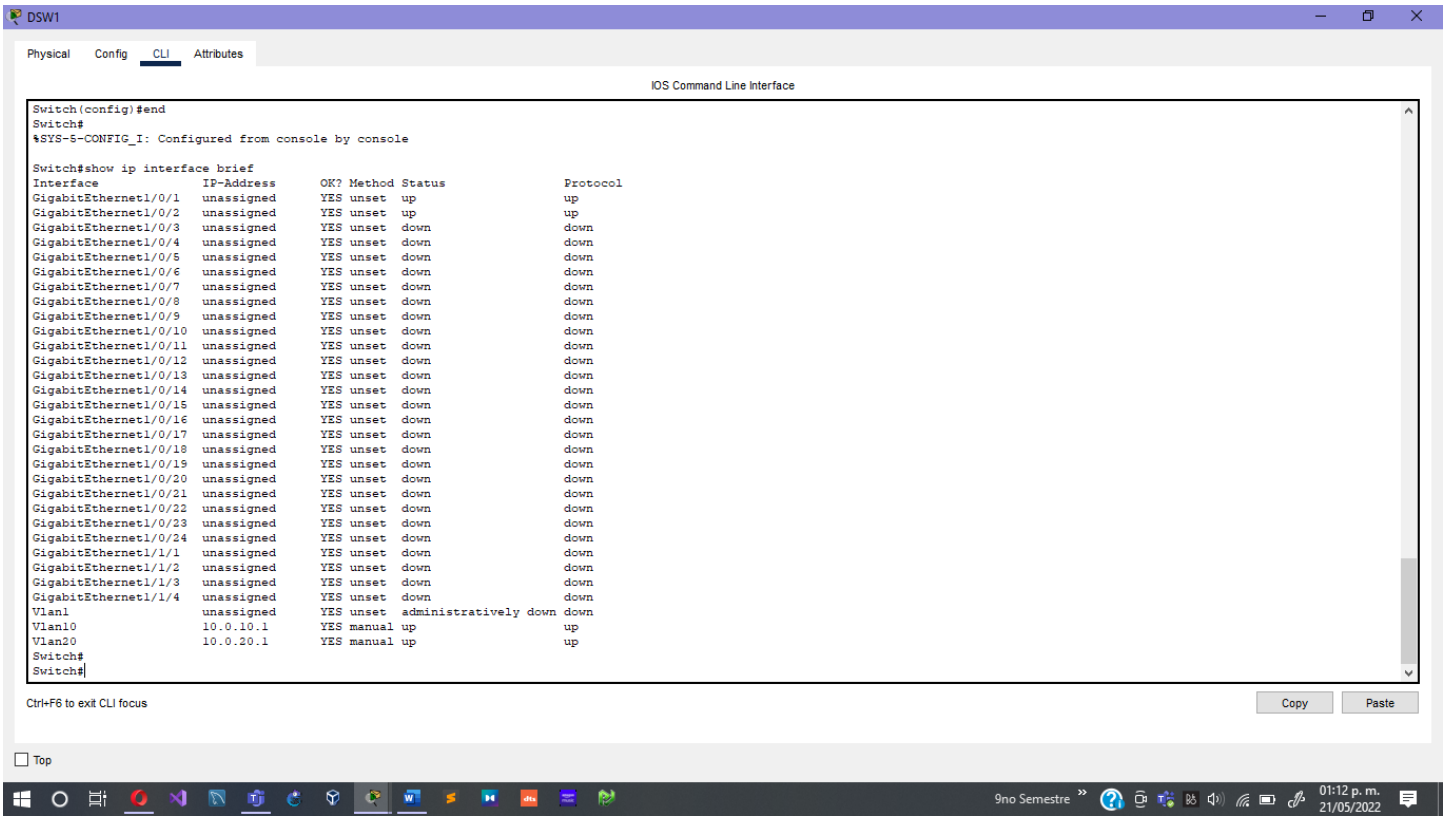


Step 5

On DSW1, verify the IP interface configuration for VLANs 10 and 20.

```
DSW1# show ip interface brief
<... output omitted ...>
Vlan10                 10.0.10.1       YES manual up                    up
Vlan20                 10.0.20.1       YES manual up                    up
```

In order for the SVIs to be fully operational, they need to have the correct IP address configured and in the "up/up" state.



Step 6

Use the **traceroute** command to test connectivity between PC1 and PC2.

```
PC1# traceroute 10.0.20.100
Type escape sequence to abort.
Tracing the route to 10.0.20.100
VRF info: (vrf in name/id, vrf out name/id)
  1 10.0.10.1 1001 msec 1 msec 0 msec
  2  *  *
    10.0.20.100 1 msec
```

You should be able to ping from PC1 to PC2. The traffic from PC1 goes through SW1 to the SVI for VLAN 10 on DSW1, gets routed to the SVI for VLAN 20 on DSW1, and then goes through SW1 to PC2. The reverse path is the same.

Step 7

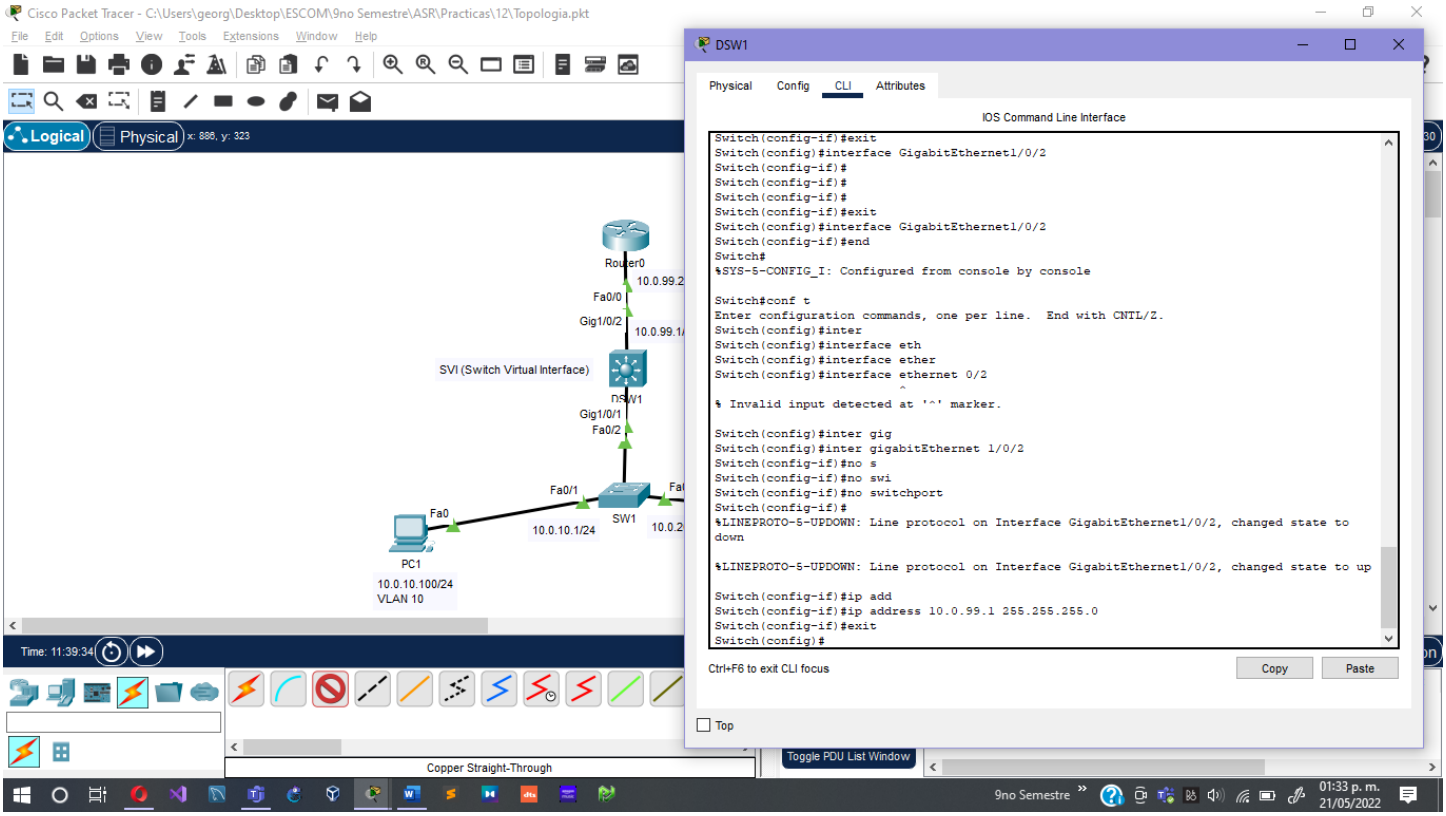
On DSW1, change the interface that connects to R1 (Ethernet 0/2) into a routed interface. Configure it with the IP address 10.0.99.1/24.

The link between DSW1 and R1 should be a Layer 3 link. The R1 interface is already configured with an IP address.

```
DSW1(config)# interface ethernet 0/2
DSW1(config-if)# no switchport
*Nov 28 15:03:55.138: %LINK-3-UPDOWN: Interface Ethernet0/2, changed state to up
*Nov 28 15:03:56.142: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet0/2, changed state to up
DSW1(config-if)# ip address 10.0.99.1 255.255.255.0
```

When you enter the **no switchport** command for an interface, it changes it from a Layer 2 interface to a Layer 3 interface.

When you issue the **no switchport** command, the interface will be shut down and then brought back up. When you put the interface into Layer 3 mode, you delete all Layer 2 configuration on the interface.

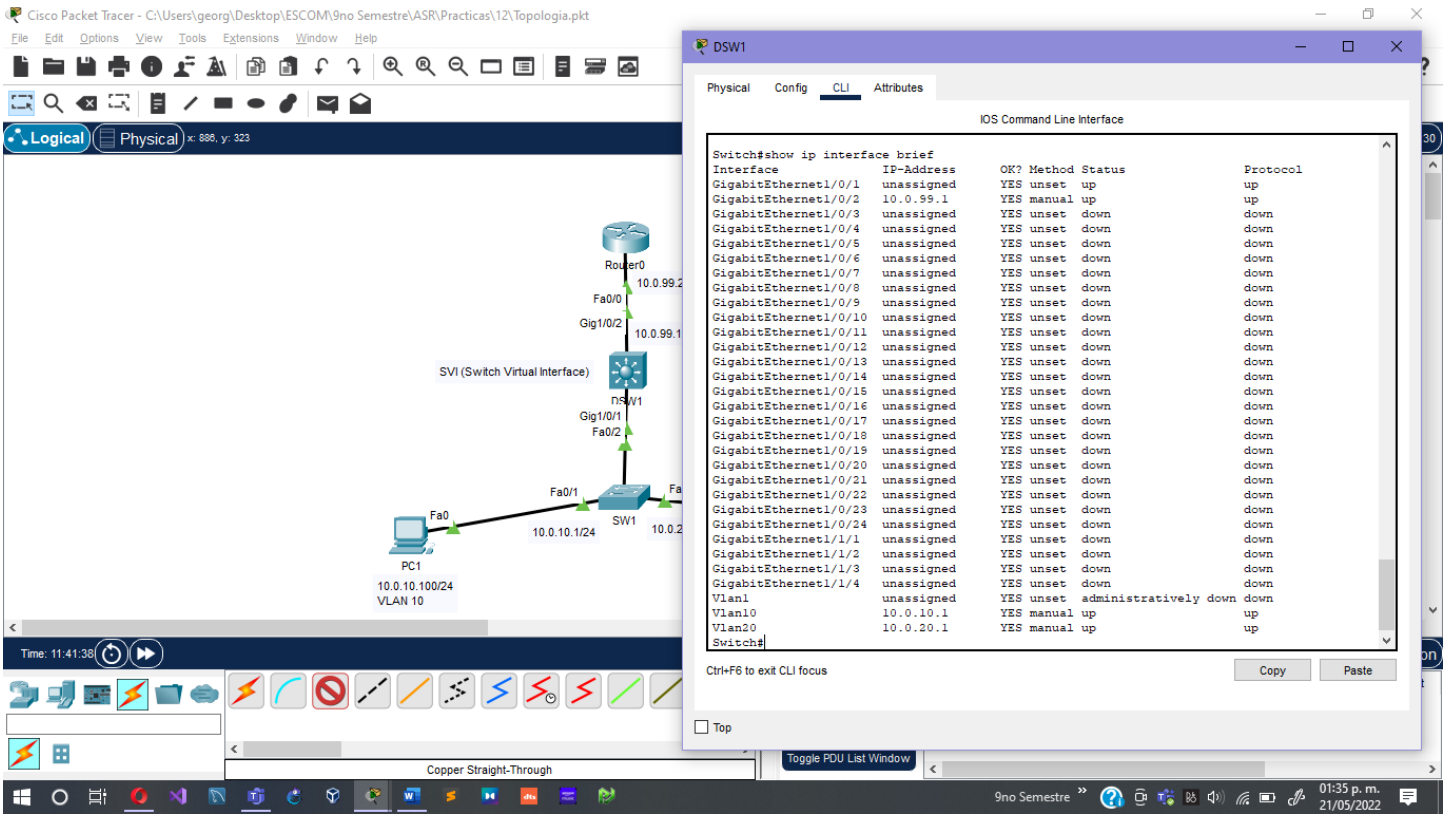


Step 8

On DSW1, verify the configuration for the routed port IP interface.

```
DSW1# show ip interface brief
Interface              IP-Address      OK? Method Status                Protocol
Ethernet0/0            unassigned      YES unset  up                    up
Ethernet0/1            unassigned      YES unset  up                    up
Ethernet0/2            10.0.99.1       YES manual up                    up
<... output omitted ...>
```

The routed interface on DSW1 has an IP address that is configured and is in the "up/up" state. The interface functions like a port on a router.



Step 9

On DSW1, configure EIGRP with AS 1. Enable the VLAN 10, VLAN 20, and Ethernet 0/2 interfaces for EIGRP.

When a multilayer switch is configured with Layer 3 IP addresses, it starts behaving like a router because it has connections to different subnets. Communication between these subnets is no longer possible by using Layer 2 protocols. A major difference between a multilayer switch and a router is that the multilayer switch does not route by default. To allow routing behavior, you first need to enable routing with the **ip routing** command. Once routing is enabled, you can configure static routes or dynamic routing, or both, just like on a router.

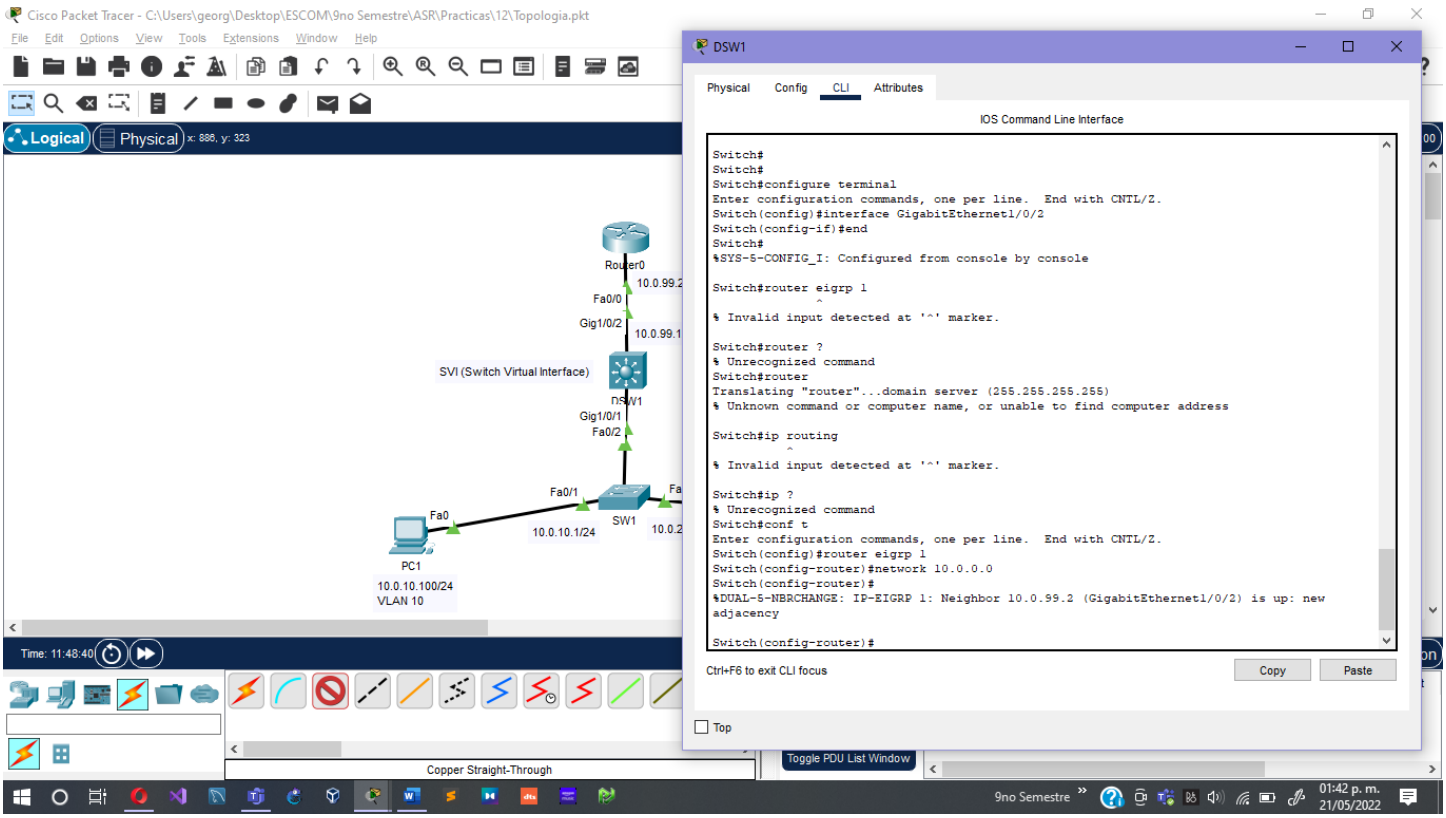
R1 is already configured to exchange routes through EIGRP.

```
DSW1(config)# router eigrp 1
DSW1(config-router)# network 10.0.0.0
*Nov 28 15:12:22.448: %DUAL-5-NBRCHANGE: EIGRP-IPv4 1: Neighbor 10.0.99.2 (Ethernet0/2) is up: new adjacency
```


```
DSW1(config)# router eigrp 1
DSW1(config-router)# network 10.0.0.0
*Nov 28 15:12:22.448: %DUAL-5-NBRCHANGE: EIGRP-IPv4 1: Neighbor 10.0.99.2 (Ethernet0/2) is up: new adjacency
```


Issuing the **network 10.0.0.0** command will enable all interfaces that are configured with an IP address within the 10.0.0.0/8 subnet. The Ethernet 0/2, VLAN 10, and VLAN 20 interfaces on DSW1 will be enabled for EIGRP.

DSW1 established an EIGRP adjacency with R1.



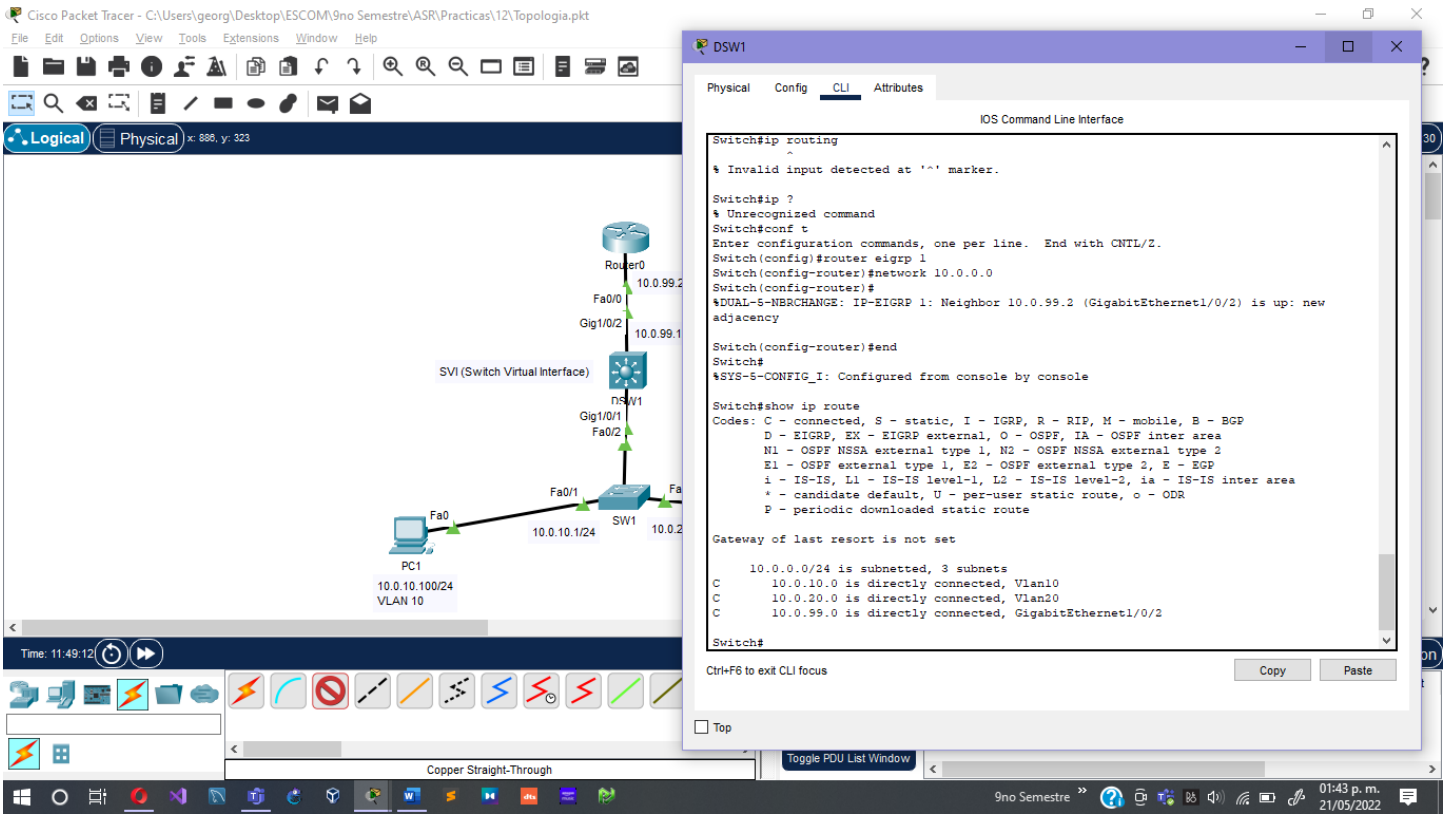
Step 10

Verify the routing table on DSW1.

```
DSW1# show ip route
<... output omitted ...>
D*EX  0.0.0.0/0 [170/307200] via 10.0.99.2, 00:07:13, Ethernet0/2
      10.0.0.0/8 is variably subnetted, 6 subnets, 2 masks
<... output omitted ...>
```

DSW1 acquired a default route from R1 via EIGRP.

If you ping from PC1 to the Internet address of 209.165.201.1, your ping should be successful. PC1 has its default gateway set to the IP of the SVI for VLAN 10 on DSW1. DSW1 has a default route that it acquired through EIGRP from R1.


Cisco Packet Tracer - C:\Users\georg\Desktop\ESCOM\9no Semestre\ASR\Practicas\12\Topologia.pkt
File Edit Options View Tools Extensions Window Help
Logical
Physical
Router0
Fa0/0
Gig1/0/2
SVI (Switch Virtual Interface)
DSW1
Gig1/0/1
Fa0/2
Fa0/1
SW1
Fa0
PC1
10.0.10.100/24
VLAN 10
10.0.10.1/24
Time: 11:49:12
Copper Straight-Through
Toggle PDU List Window
DSW1
Physical
Config
CLI
Attributes
IOS Command Line Interface
Switch#ip routing
% Invalid input detected at '^' marker.
Switch#ip ?
% Unrecognized command
Switch#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#router eigrp 1
Switch(config-router)#network 10.0.0.0
Switch(config-router)#
%DUAL-5-NBRCHANGE: IP-EIGRP 1: Neighbor 10.0.99.2 (GigabitEthernet1/0/2) is up: new adjacency
Switch(config-router)#end
Switch#
%SYS-5-CONFIG_I: Configured from console by console
Switch#show ip route
Codes: C - connected, S - static, I - IGRP, 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, E - EGP
i - IS-IS, 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
Gateway of last resort is not set
10.0.0.0/24 is subnetted, 3 subnets
C 10.0.10.0 is directly connected, Vlan10
C 10.0.20.0 is directly connected, Vlan20
C 10.0.99.0 is directly connected, GigabitEthernet1/0/2
Switch#
Ctrl+F6 to exit CLI focus
Copy
Paste
Top
9no Semestre
01:43 p. m.
21/05/2022

Conclusiones:

Arévalo Andrade Miguel Ángel:

Se logró configurar una SVI (interfaz virtual de conmutador), puertos enrutados y enrutamiento en un conmutador multicapa.

- Los puertos en SW1 se configuraron para tener PC1 en VLAN 10 y PC2 en VLAN 20.
- El enlace entre SW1 y DSW1 se configuró como enlace troncal.

Castro Cruces Jorge Eduardo:

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López Mares Irene Elizabeth:

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Pedroza García Rodolfo:

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