



**REPÚBLICA DE GUATEMALA**

**UNIVERSIDAD DE SAN CARLOS DE GUATEMALA**

**FACULTAD DE INGENIERÍA**

**INGENIERÍA EN CIENCIAS Y SISTEMAS**

**REDES DE COMPUTADORAS 2**

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## **PRÁCTICA 2**

**REALIZADO POR:**

**Grupo 18**

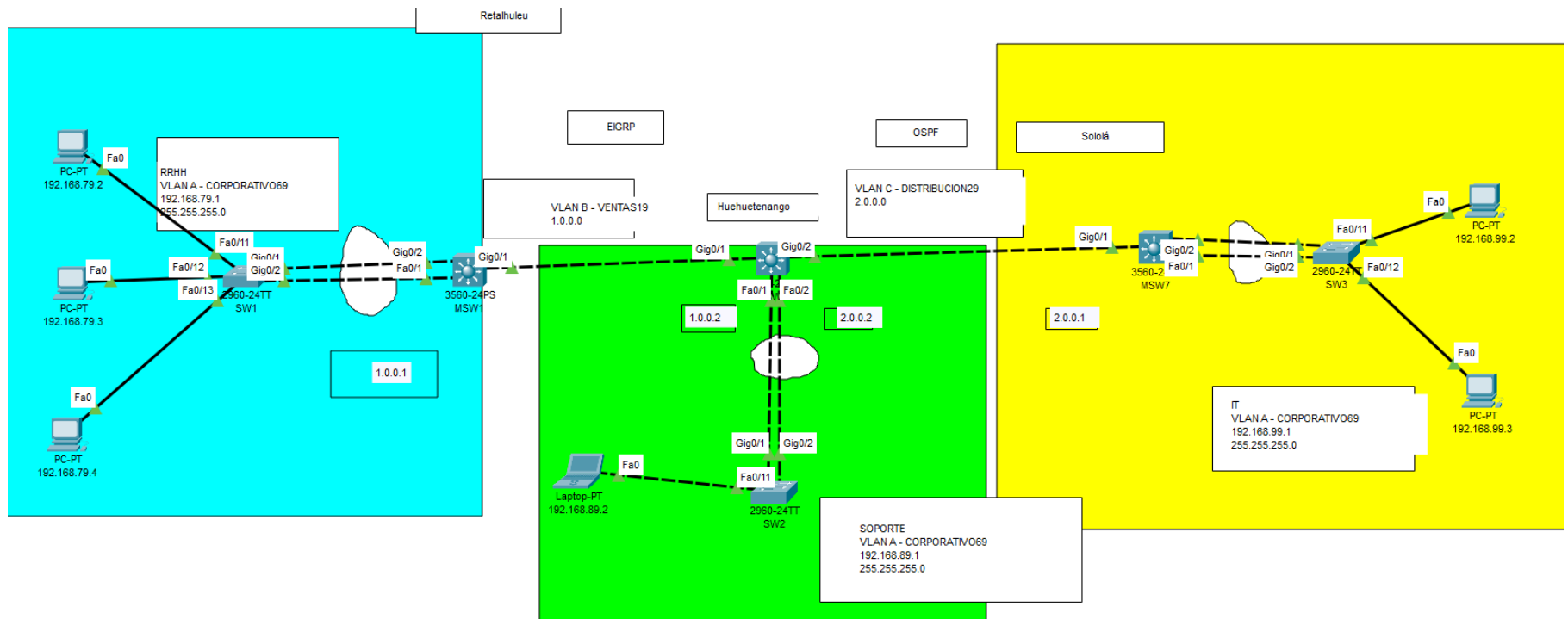
**GUATEMALA, SEGUNDO SEMESTRE 15 SEPTIEMBRE 2023**

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## Práctica 2

### Topología



## VLAN

❖ Sucursal Retalhuleu:  $X, Y, Z = 1 + 8 = 9$

➤ Sector: RRHH

➤ VLAN A - CORPORATIVO69:

■ 192.168.79.1/255.255.255.0

➤ Switch de Capa 2 (SW1: MODELO 2960-24TT) con 3 usuarios

■ (PC1, PC2, PC3): Gateway 192.168.79.1

● 192.168.79.2/255.255.255.0

● 192.168.79.3/255.255.255.0

● 192.168.79.4/255.255.255.0

➤ Switch Multicapa (MSW1: MODELO 3560-24PS) que se conecta a VLAN B -

VENTAS

■ (1.0.0.0)

❖ Sucursal Huehuetenango:

➤ Sector: SOPORTE

➤ VLAN A - CORPORATIVO69:

■ 192.168.89.1/255.255.255.0

➤ VLAN B - VENTAS19:

■ 1.0.0.0/255.0.0.0

➤ Switch Multicapa (MSW4: MODELO 3560-24PS) conectado a

■ VLAN B - VENTAS19

➤ Switch de Capa 2 (SW2: MODELO 2960-24TT) con

■ PC4: Gateway 192.168.89.1

- 192.168.89.2/255.255.255.0

❖ Sucursal Sololá:

- Sector: IT
- VLAN A - CORPORATIVO69:
  - 192.168.99.1/255.255.255.0
- VLAN C - DISTRIBUCIÓN29:
  - 2.0.0.0/255.0.0.0
- Switch Multicapa (MSW7: MODELO 3560-24PS) conectado a
  - VLAN C - DISTRIBUCIÓN29
- Switch de Capa 2 (SW3: MODELO 2960-24TT) con usuarios
  - PC5 y PC6: Gateway es 192.168.99.1
    - 192.168.99.2/255.255.255.0
    - 192.168.99.3/255.255.255.0

❖ Respecto a las configuraciones de protocolos:

- Entre Retalhuleu y Huehuetenango, se usa el protocolo EIGRP.
- Entre Huehuetenango y Sololá, se usa el protocolo OSPF.

Además, se debe configurar LACP (Link Aggregation Control Protocol)

## Comandos Packet Tracer:

Configuramos las redes LAN CORPORATIVO69 en los SW1, SW2 y SW3 y las Interfaces

### SW1:

```
SW1(config)# vlan 69
SW1(config-vlan)# name CORPORATIVO69
SW1(config)# interface range f0/11-13, g0/1
SW1(config-if-range)# switchport mode access
SW1(config-if-range)# switchport access vlan 69
SW1(config-if-range)# no shutdown
SW1(config-if-range)# exit
SW1(config)# exit
SW1# write memory
```

### SW2:

```
SW2(config)# vlan 69
SW2(config-vlan)# name CORPORATIVO69
SW2(config)# interface range f0/11, g0/1
SW2(config-if-range)# switchport mode access
SW2(config-if-range)# switchport access vlan 69
SW2(config-if-range)# no shutdown
SW2(config-if-range)# exit
SW2(config)# exit
SW2# write memory
```

### SW3:

```
SW3(config)# vlan 69
SW3(config-vlan)# name CORPORATIVO69
```

```
SW3(config)# interface range f0/11-12, g0/1
SW3(config-if-range)# switchport mode access
SW3(config-if-range)# switchport access vlan 69
SW3(config-if-range)# no shutdown
SW3(config-if-range)# exit
SW3(config)# exit
SW3# write memory
```

## Configuramos las VLAN e Interfaces en los MSW

### MSW1:

```
MSW1(config)# vlan 69
MSW1(config-vlan)# name CORPORATIVO69
MSW1(config)# vlan 19
MSW1(config-vlan)# name VENTAS19
MSW1(config)# interface vlan 69
MSW1(config-if)# ip address 192.168.79.1 255.255.255.0
MSW1(config-if)# no shutdown
MSW1(config-if)# exit
MSW1(config)# interface vlan 19
MSW1(config-if)# ip address 1.0.0.1 255.0.0.0
MSW1(config-if)# no shutdown
MSW1(config-if)# exit
//Conexion de MSW1 hacia MSW4
MSW1(config)# interface g0/1 // Puerto de MSW1 conectado a MSW4
MSW1(config-if)# switchport trunk encapsulation dot1q
MSW1(config-if)# switchport mode trunk
MSW1(config-if)# switchport trunk native vlan 19 // VLAN nativa 19
MSW1(config-if)# switchport trunk allowed vlan 19 // Permitir el
tráfico de la VLAN 19
MSW1(config-if)# no shutdown
MSW1(config-if)# exit
//Conexion de MSW1 hacia SW1
MSW1(config)# interface g0/2
MSW1(config-if)# switchport trunk encapsulation dot1q
MSW1(config-if)# switchport mode trunk
```

```
MSW1(config-if)# switchport trunk allowed vlan 69
MSW1(config-if)# no shutdown
MSW1(config-if)# exit
MSW1(config)# exit
MSW1# write memory
```

#### **MSW4:**

```
MSW4(config)# vlan 19
MSW4(config-vlan)# name VENTAS19
MSW4(config)# vlan 29
MSW4(config-vlan)# name DISTRIBUCION29
MSW4(config)# vlan 69
MSW4(config-vlan)# name CORPORATIVO69
MSW4(config)# interface vlan 19
MSW4(config-if)# ip address 1.0.0.2 255.0.0.0
MSW4(config-if)# no shutdown
MSW4(config-if)# exit
MSW4(config)# interface vlan 29
MSW4(config-if)# ip address 2.0.0.2 255.0.0.0
MSW4(config-if)# no shutdown
MSW4(config-if)# exit
MSW4(config)# interface vlan 69
MSW4(config-if)# ip address 192.168.89.1 255.255.255.0
MSW4(config-if)# no shutdown
MSW4(config-if)# exit
    //Conexion de MSW4 hacia MSW1
MSW4(config)# interface g0/1 //puerto hacia MSW1
MSW4(config-if)# switchport trunk encapsulation dot1q
MSW4(config-if)# switchport mode trunk // Configura puerto como trunk
MSW4(config-if)# switchport trunk native vlan 19 // Establece la VLAN
nativa en 19
MSW4(config-if)# switchport trunk allowed vlan 19 // Permite el
tráfico de la VLAN 19
MSW4(config-if)# no shutdown
MSW4(config-if)# exit
    //Conexion de MSW4 hacia MSW7
```



```

MSW4(config)# interface g0/2 // o el num de puerto correspondiente
MSW4(config-if)# switchport trunk encapsulation dot1q
MSW4(config-if)# switchport mode trunk // Configura puerto como trunk
MSW4(config-if)# switchport trunk native vlan 29 // Establece la
VLAN nativa en 29
MSW4(config-if)# switchport trunk allowed vlan 29 // Permite el
tráfico de la VLAN 29
MSW4(config-if)# no shutdown
MSW4(config-if)# exit
//conexion a SW2
MSW4(config)# interface f0/1
MSW4(config-if)# switchport trunk encapsulation dot1q
MSW4(config-if)# switchport mode trunk
MSW4(config-if)# switchport trunk allowed vlan 69
MSW4(config-if)# no shutdown
MSW4(config-if)# exit
MSW4(config)# exit
MSW4# write memory

```

### **MSW7:**

```

MSW7(config)# vlan 69
MSW7(config-vlan)# name CORPORATIVO69
MSW7(config)# vlan 29
MSW7(config-vlan)# name DISTRIBUCION29
MSW7(config)# interface vlan 69
MSW7(config-if)# ip address 192.168.99.1 255.255.255.0
MSW7(config-if)# no shutdown
MSW7(config-if)# exit
MSW7(config)# interface vlan 29
MSW7(config-if)# ip address 2.0.0.1 255.0.0.0
MSW7(config-if)# no shutdown
MSW7(config-if)# exit
//Conexion de MSW7 hacia MSW4
MSW7(config)# interface g0/1 // Puerto de MSW7 conectado a MSW4
MSW7(config-if)# switchport trunk encapsulation dot1q
MSW7(config-if)# switchport mode trunk // Configurar el puerto como
trunk

```

```

MSW7(config-if)# switchport trunk native vlan 29 // Establecer la
VLAN nativa en 29
MSW7(config-if)# switchport trunk allowed vlan 29 // Permitir el
tráfico de la VLAN 29
MSW7(config-if)# no shutdown
MSW7(config-if)# exit
//Conexion de MSW7 hacia SW3
MSW7(config)# interface g0/2
MSW7(config-if)# switchport trunk encapsulation dot1q
MSW7(config-if)# switchport mode trunk
MSW7(config-if)# switchport trunk allowed vlan 69
MSW7(config-if)# no shutdown
MSW7(config-if)# exit
MSW7(config)# exit
MSW7# write memory

```

## Configuración EIGRP

### ***Configuración de EIGRP en MSW1 (Retalhuleu - Huehuetenango):***

```

SW1(config)# ip routing
MSW1(config)# router eigrp 100 // Número de proceso EIGRP
MSW1(config-router)# network 192.168.79.0 0.0.0.255 // Red de
Retalhuleu
MSW1(config-router)# network 1.0.0.0 0.255.255.255 // Red de
Huehuetenango
MSW1(config-router)# no shutdown
MSW1(config-router)# exit
MSW1(config)# exit
MSW1# write memory

```

### ***Configuración de EIGRP en MSW4 (Huehuetenango - Sololá):***

```

MSW4(config)# ip routing // Número de proceso EIGRP
MSW1(config)# router eigrp 100 // Número de proceso EIGRP

```

```
MSW1(config-router)# network 192.168.89.0 0.0.0.255 // Red de Huehuetenango
MSW1(config-router)# network 1.0.0.0 0.255.255.255 // Red de Retalhuleu
MSW1(config-router)# no shutdown
MSW1(config-router)# exit
MSW1(config)# exit
MSW1# write memory
```

## Configuración OSPF

### Configuración de OSPF en MSW4 (Huehuetenango - Sololá):

```
MSW4(config)# ip routing // Número de proceso OSPF
MSW4(config)# router ospf 1 // Número de proceso OSPF
MSW4(config-router)# network 192.168.89.0 0.0.0.255 area 0 // Red de Huehuetenango
MSW4(config-router)# network 2.0.0.0 0.255.255.255 area 1 // Red de Sololá
MSW4(config-router)# exit
MSW4(config)# exit
MSW4# write memory
```

### Configuración de OSPF en MSW7 (Sololá - Huehuetenango):

```
MSW4(config)# ip routing // Número de proceso OSPF
MSW4(config)# router ospf 1 // Número de proceso OSPF
MSW4(config-router)# network 192.168.99.0 0.0.0.255 area 0 // Red de Sololá
MSW4(config-router)# network 2.0.0.0 0.255.255.255 area 1 // Red de Huehuetenango
MSW4(config-router)# exit
MSW4(config)# exit
MSW4# write memory
```

## Configuración LACP

### *Configuración LACP en los Switches de Capa 2 (SW1, SW2 y SW3):*

```
SW1(config)# interface range g0/1-2 // Rango de puertos para LACP
SW1(config-if-range)# channel-group 1 mode active // Crear grupo
LACP activo
SW1(config-if-range)# no shutdown
SW1(config-if-range)# exit

SW2(config)# interface range g0/1-2 // Rango de puertos para LACP
SW2(config-if-range)# channel-group 1 mode active // Crear grupo
LACP activo
SW2(config-if-range)# no shutdown
SW2(config-if-range)# exit

SW3(config)# interface range g0/1-2 // Rango de puertos para LACP
SW3(config-if-range)# channel-group 1 mode active // Crear grupo
LACP activo
SW3(config-if-range)# no shutdown
SW3(config-if-range)# exit
```

### *Configuración LACP en los Switches de Capa 3 (MSW1, MSW4 y MSW7):*

```
MSW1(config)# interface range g0/2, f0/1 // Rango de puertos para
LACP
MSW1(config-if-range)# channel-group 1 mode active // Crear grupo
LACP activo
MSW1(config-if-range)# exit

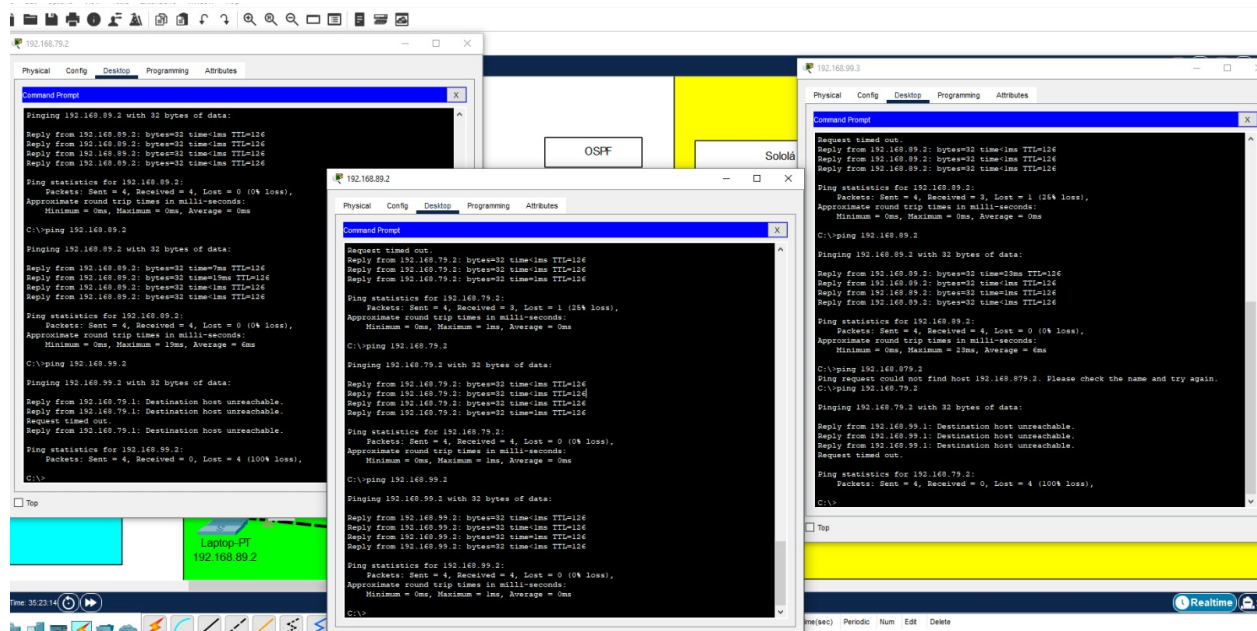
MSW4(config)# interface range f0/1-2
MSW4(config-if-range)# channel-group 1 mode active
MSW4(config-if-range)# exit

MSW7(config)# interface range gigabitEthernet g0/2, f0/1
MSW7(config-if-range)# channel-group 1 mode active
MSW7(config-if-range)# exit
```

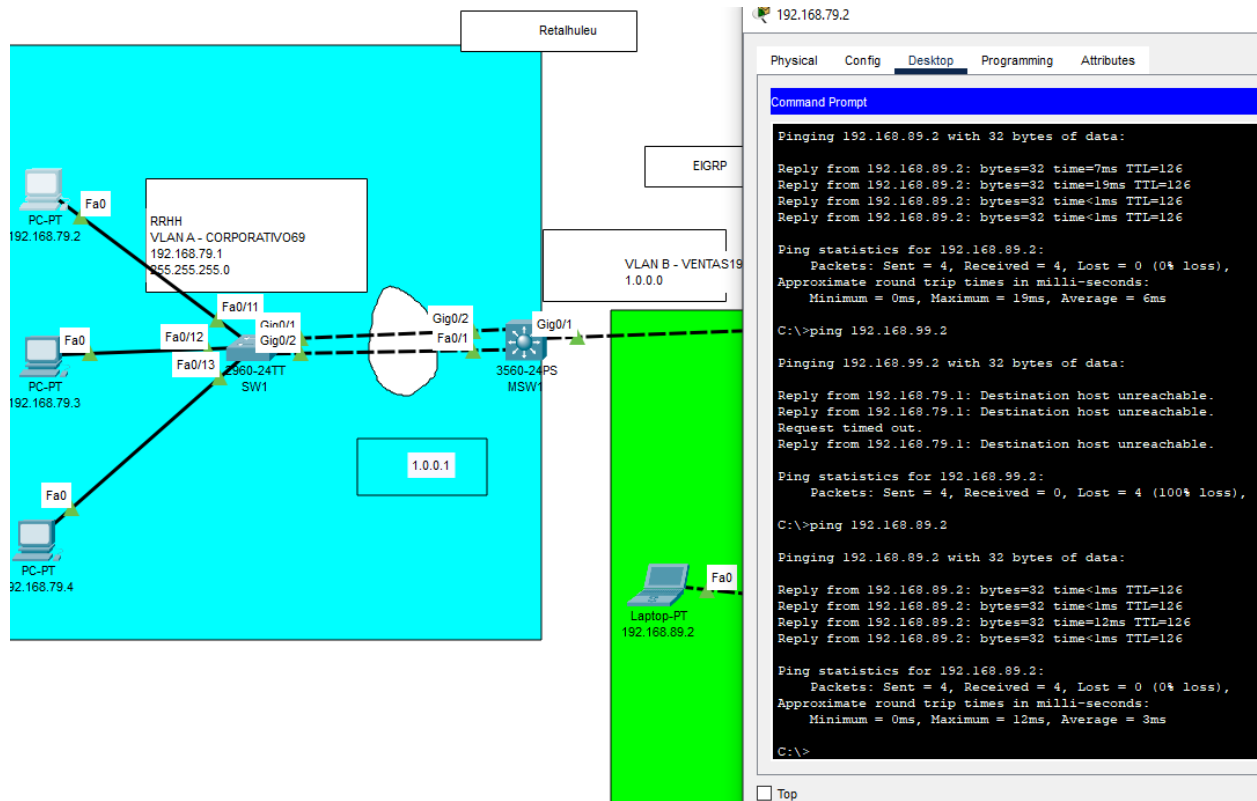
***Configuración opcional:***

```
MSW(config)# interface Port-channel1 // Puede ser cualquier número  
de grupo deseado  
MSW(config-if)# switchport trunk encapsulation dot1q  
MSW(config-if)# switchport mode trunk  
MSW(config-if)# switchport trunk allowed vlan all  
MSW(config-if)# no shutdown  
MSW(config-if)# exit
```

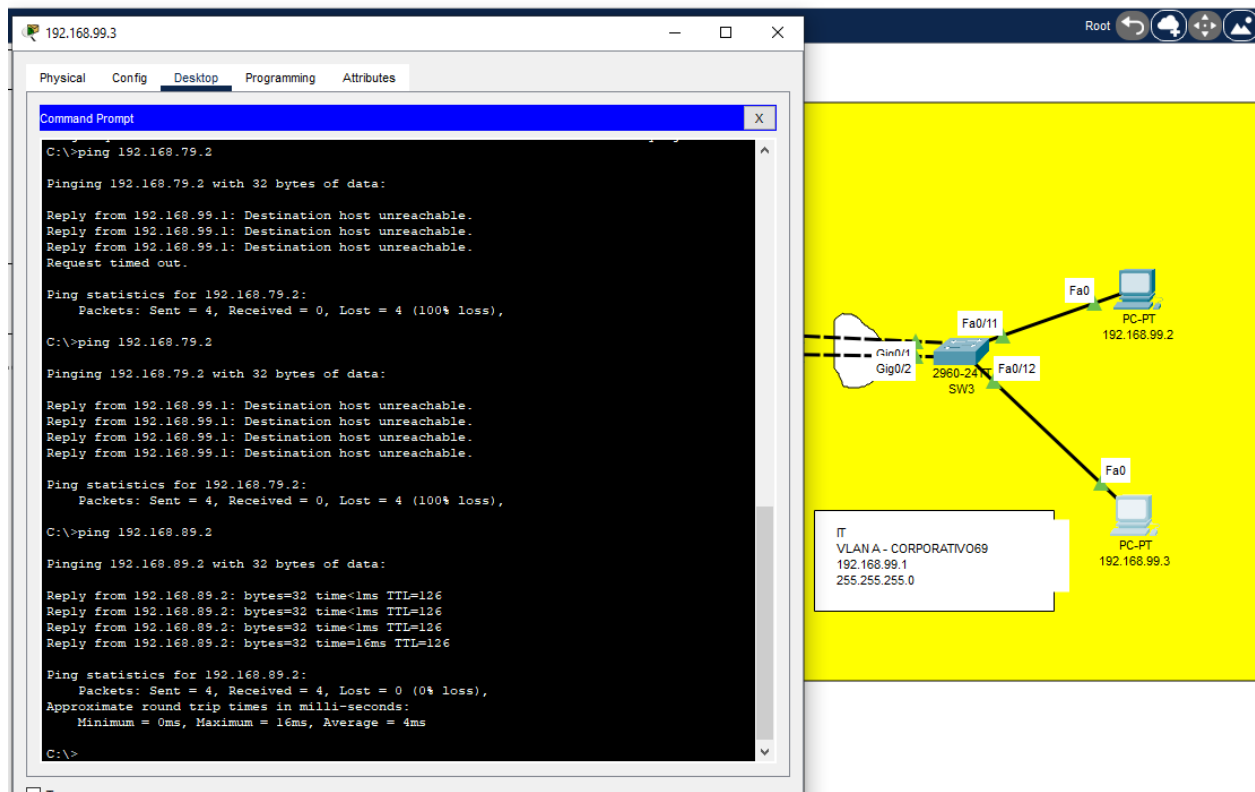
# ANEXOS



## RRHH Ping a Soporte



## IT a Soporte



## *RRHH a IT e IT a RRHH*

The image displays two side-by-side screenshots of Windows Command Prompts, each titled with its respective IP address: 192.168.99.2 on the left and 192.168.99.3 on the right. Both windows have tabs for Physical, Config, Desktop, Programming, and Attributes, with 'Desktop' selected. The Command Prompt windows show the results of a series of ping commands.

**Left Window (192.168.99.2):**

```
C:\>ping 192.168.99.2

Pinging 192.168.99.2 with 32 bytes of data:

Reply from 192.168.79.1: Destination host unreachable.
Reply from 192.168.79.1: Destination host unreachable.
Request timed out.
Reply from 192.168.79.1: Destination host unreachable.

Ping statistics for 192.168.99.2:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\>ping 192.168.89.2

Pinging 192.168.89.2 with 32 bytes of data:

Reply from 192.168.89.2: bytes=32 time<1ms TTL=126
Reply from 192.168.89.2: bytes=32 time<1ms TTL=126
Reply from 192.168.89.2: bytes=32 time<1ms TTL=126
Reply from 192.168.89.2: bytes=32 time<1ms TTL=126

Ping statistics for 192.168.89.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 12ms, Average = 3ms

C:\>ping 192.168.99.2

Pinging 192.168.99.2 with 32 bytes of data:

Reply from 192.168.79.1: Destination host unreachable.
Reply from 192.168.79.1: Destination host unreachable.
Reply from 192.168.79.1: Destination host unreachable.
Reply from 192.168.79.1: Destination host unreachable.

Ping statistics for 192.168.99.2:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\>
```

**Right Window (192.168.99.3):**

```
Request timed out.

Ping statistics for 192.168.79.2:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\>ping 192.168.79.2

Pinging 192.168.79.2 with 32 bytes of data:

Reply from 192.168.99.1: Destination host unreachable.
Reply from 192.168.99.1: Destination host unreachable.
Reply from 192.168.99.1: Destination host unreachable.
Reply from 192.168.99.1: Destination host unreachable.

Ping statistics for 192.168.79.2:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\>ping 192.168.89.2

Pinging 192.168.89.2 with 32 bytes of data:

Reply from 192.168.89.2: bytes=32 time<1ms TTL=126
Reply from 192.168.89.2: bytes=32 time<1ms TTL=126
Reply from 192.168.89.2: bytes=32 time<1ms TTL=126
Reply from 192.168.89.2: bytes=32 time<1ms TTL=126

Ping statistics for 192.168.89.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 16ms, Average = 4ms

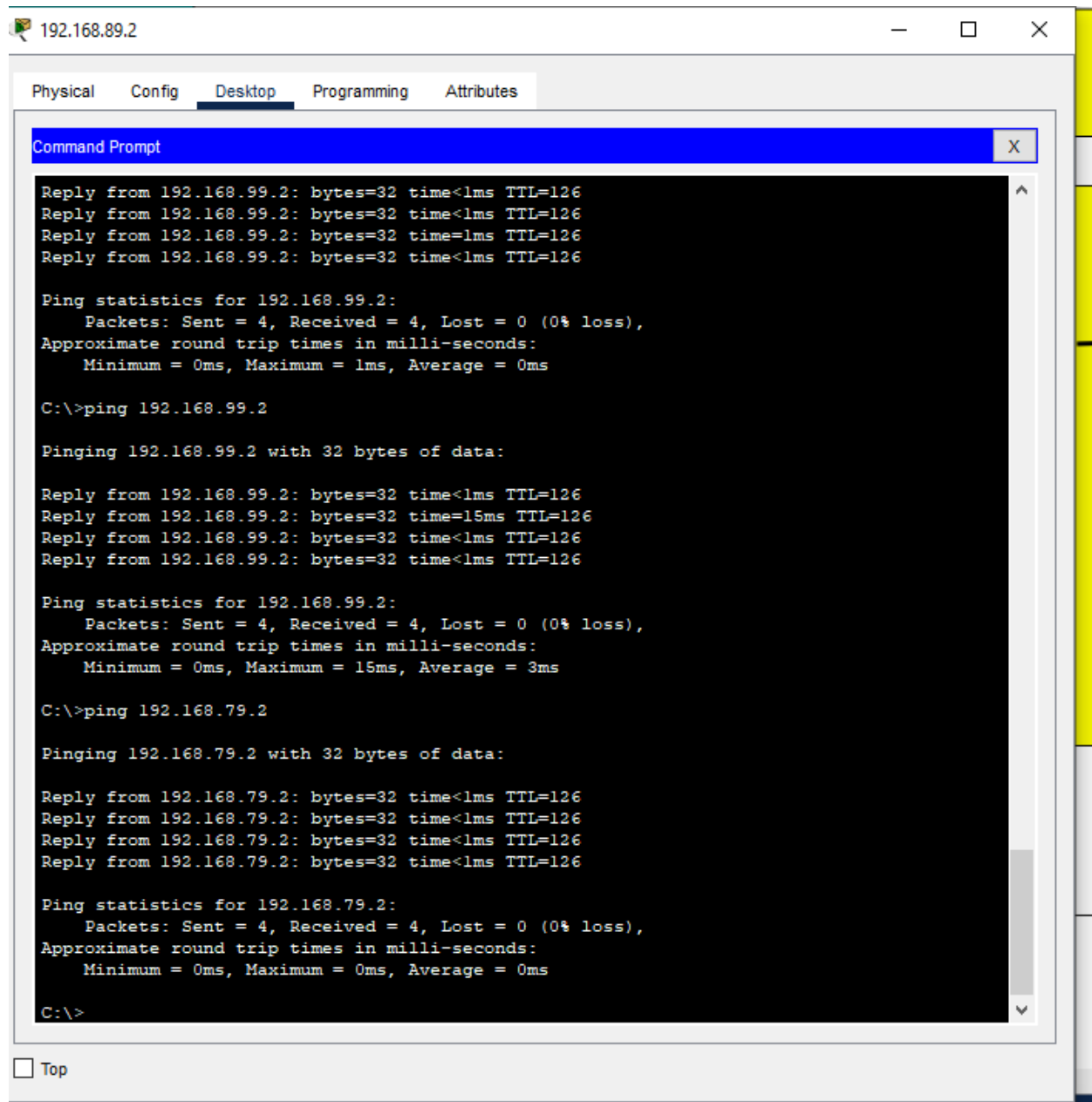
C:\>ping 192.168.79.2

Pinging 192.168.79.2 with 32 bytes of data:

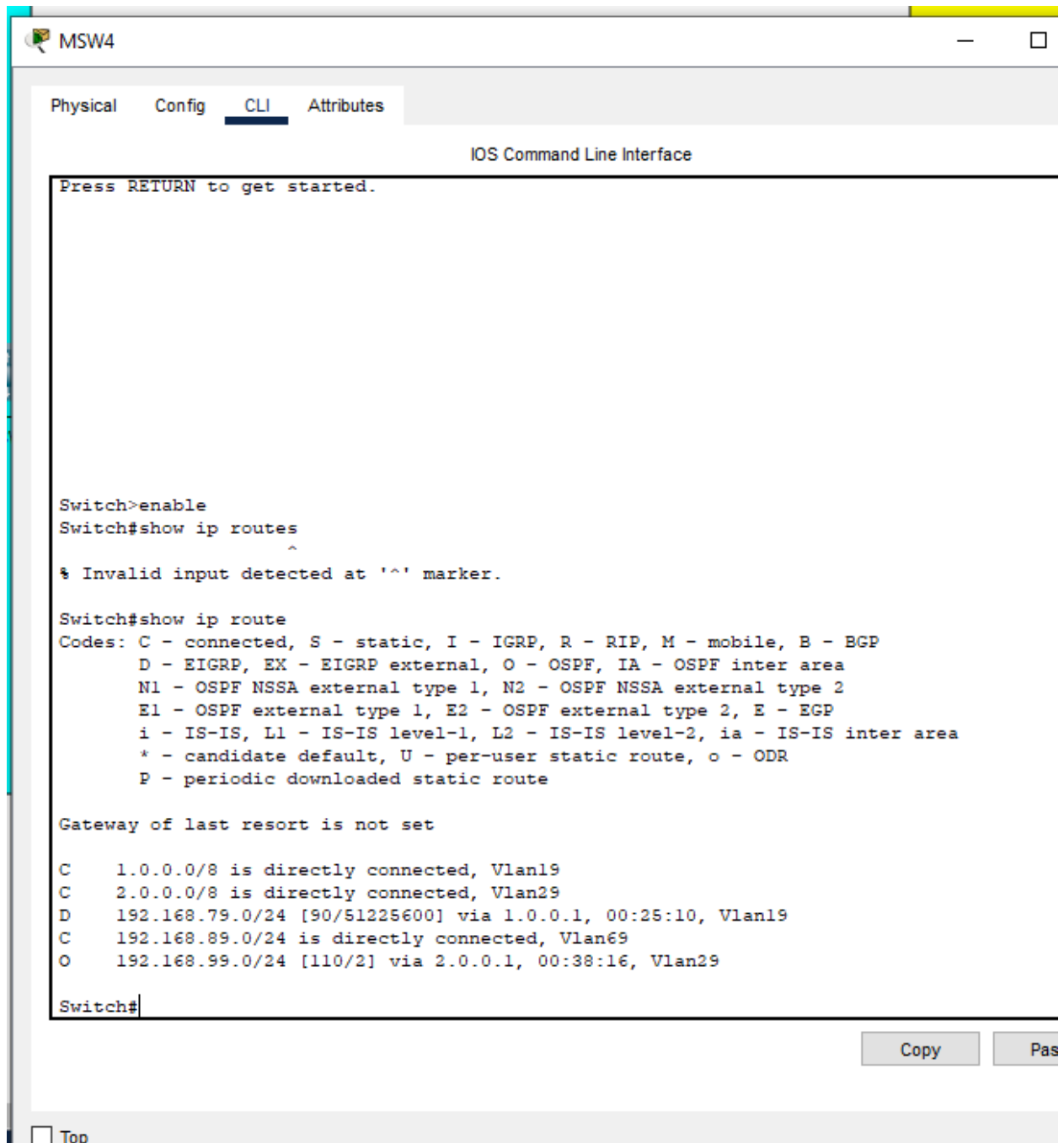
Reply from 192.168.99.1: Destination host unreachable.
Reply from 192.168.99.1: Destination host unreachable.
Reply from 192.168.99.1: Destination host unreachable.
Reply from 192.168.99.1: Destination host unreachable.
```



## *Soporte a RRHH e IT*



## *EIGRP (D), OSPF (O) - show ip route*



The screenshot shows a network switch interface with tabs for Physical, Config, CLI, and Attributes. The CLI tab is active, displaying the IOS Command Line Interface. The prompt is 'Switch>'. The user enters 'enable' to enter privileged mode, then 'show ip routes'. An error message appears: '% Invalid input detected at '^' marker.' The user then enters 'show ip route'. The output displays the routing table with codes for various protocols and their parameters. The routing table shows five entries: two connected routes (C) for 1.0.0.0/8 and 2.0.0.0/8, and three other routes (D, C, O) for 192.168.79.0/24, 192.168.89.0/24, and 192.168.99.0/24. The prompt is 'Switch#'. There are 'Copy' and 'Pas' buttons at the bottom right of the CLI window.

```
MSW4
Physical Config CLI Attributes
IOS Command Line Interface
Press RETURN to get started.

Switch>enable
Switch#show ip routes
^
% Invalid input detected at '^' marker.


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

C    1.0.0.0/8 is directly connected, Vlan19
C    2.0.0.0/8 is directly connected, Vlan29
D    192.168.79.0/24 [90/51225600] via 1.0.0.1, 00:25:10, Vlan19
C    192.168.89.0/24 is directly connected, Vlan69
O    192.168.99.0/24 [110/2] via 2.0.0.1, 00:38:16, Vlan29

Switch#
```

## LACP - show etherchannel summary

 MSW4

Physical Config CLI Attributes

IOS Command Line Interface

```
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

C    1.0.0.0/8 is directly connected, Vlan19
C    2.0.0.0/8 is directly connected, Vlan29
D    192.168.79.0/24 [90/51225600] via 1.0.0.1, 00:25:10, Vlan19
C    192.168.89.0/24 is directly connected, Vlan69
O    192.168.99.0/24 [110/2] via 2.0.0.1, 00:38:16, Vlan29

Switch#
Switch#show etherchannel summary
Flags: D - down          P - in port-channel
       I - stand-alone s - suspended
       H - Hot-standby (LACP only)
       R - Layer3        S - Layer2
       U - in use        f - failed to allocate aggregator
       u - unsuitable for bundling
       w - waiting to be aggregated
       d - default port

Number of channel-groups in use: 1
Number of aggregators:          1

Group  Port-channel  Protocol    Ports
-----+-----+-----+-----
1      Po1(SU)          LACP       Fa0/1(P) Fa0/2(P)
Switch#
```

Copy

☐ Top

