

Las VLAN son útiles para la administración de grupos lógicos y permiten mover, cambiar o agregar fácilmente a los miembros de un grupo. Esta actividad se centra en la creación y la denominación de redes VLAN, así como en la asignación de puertos de acceso a VLAN específicas.

# Packet Tracer: configuración de redes VLAN

PRACTICA 1.2

**IZAN NAVARRO LUJAN**

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# Parte 1: Visualizar la configuración de VLAN predeterminada

## 1.1: Mostrar las VLAN actuales

Entramos dentro del Switch1 y una vez lo activamos, ejecutamos el comando “show vlan” y este nos mostrará las características de nuestras VLAN actuales.

```
S1>enable
S1#show vlan

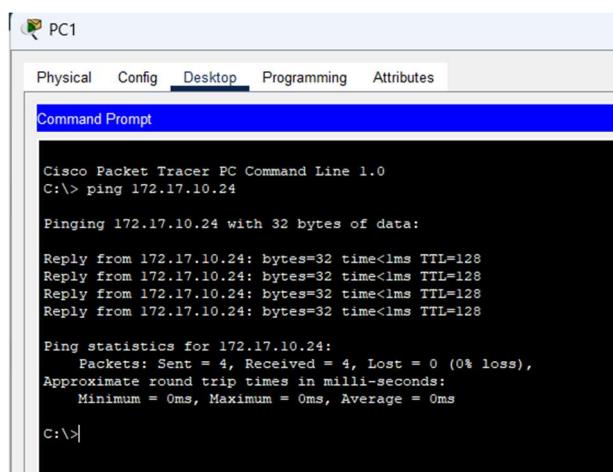
VLAN Name                               Status      Ports
---- --
1   default                             active     Fa0/1, Fa0/2, Fa0/3, Fa0/4
                                         Fa0/5, Fa0/6, Fa0/7, Fa0/8
                                         Fa0/9, Fa0/10, Fa0/11, Fa0/12
                                         Fa0/13, Fa0/14, Fa0/15, Fa0/16
                                         Fa0/17, Fa0/18, Fa0/19, Fa0/20
                                         Fa0/21, Fa0/22, Fa0/23, Fa0/24
                                         Gig0/1, Gig0/2
1002 fddi-default                      active
1003 token-ring-default                active
1004 fddinet-default                  active
1005 trnet-default                    active

VLAN Type    SAID      MTU      Parent RingNo BridgeNo Stp  BrdgMode Trans1 Trans2
---- --
1   enet     100001    1500     -       -       -       -       0       0
1002 fddi    101002    1500     -       -       -       -       0       0
1003 tr     101003    1500     -       -       -       -       0       0
1004 fdnet   101004    1500     -       -       -       ieee   0       0
1005 trnet   101005    1500     -       -       -       ibm   0       0
--More-- |
```

## 1.2: Verificar la conectividad entre dos computadoras en la misma red

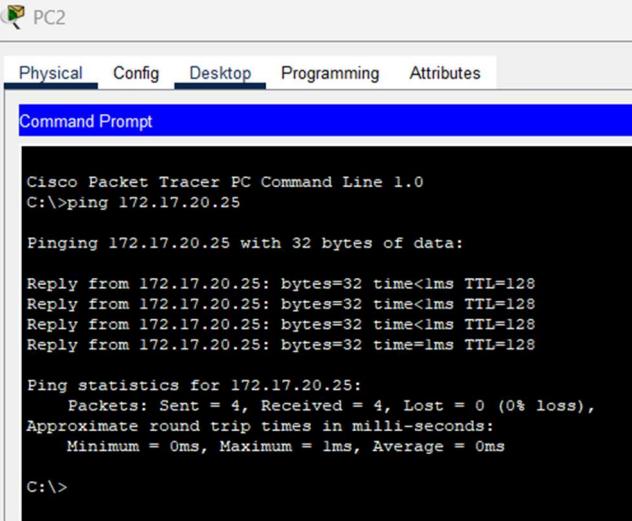
El comando Ping nos permite verificar la conectividad entre equipos, para ver si pueden comunicarse entre ellos.

PC1 a PC4: Conecta



## DISEÑO DE REDES DE COMPUTADORAS SEGURAS

PC2 a PC5: Conecta



The screenshot shows a Cisco Packet Tracer interface titled "PC2". The top menu bar includes "Physical", "Config", "Desktop", "Programming", and "Attributes", with "Physical" being the active tab. Below the menu is a "Command Prompt" window with a blue header. The command entered is "C:\>ping 172.17.20.25". The output shows four successful replies from the target IP address, followed by ping statistics: "Packets: Sent = 4, Received = 4, Lost = 0 (0% loss)", "Approximate round trip times in milli-seconds: Minimum = 0ms, Maximum = 1ms, Average = 0ms". The prompt "C:\>" is visible at the bottom.

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 172.17.20.25

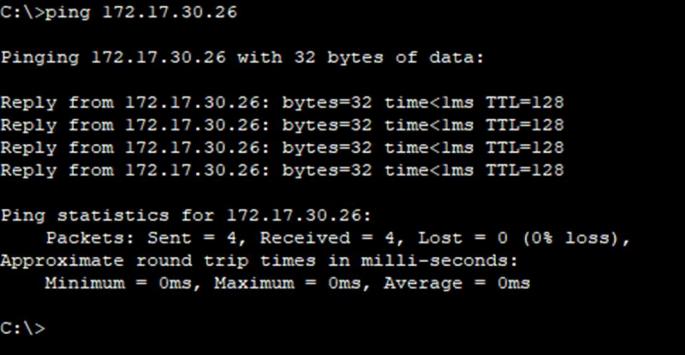
Pinging 172.17.20.25 with 32 bytes of data:

Reply from 172.17.20.25: bytes=32 time<1ms TTL=128
Reply from 172.17.20.25: bytes=32 time<1ms TTL=128
Reply from 172.17.20.25: bytes=32 time<1ms TTL=128
Reply from 172.17.20.25: bytes=32 time=<1ms TTL=128

Ping statistics for 172.17.20.25:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\>
```

PC3 a PC6: Conecta



The screenshot shows a Cisco Packet Tracer interface titled "PC3". The top menu bar includes "Physical", "Config", "Desktop", "Programming", and "Attributes", with "Physical" being the active tab. Below the menu is a "Command Prompt" window with a blue header. The command entered is "C:\>ping 172.17.30.26". The output shows four successful replies from the target IP address, followed by ping statistics: "Packets: Sent = 4, Received = 4, Lost = 0 (0% loss)", "Approximate round trip times in milli-seconds: Minimum = 0ms, Maximum = 0ms, Average = 0ms". The prompt "C:\>" is visible at the bottom.

```
C:\>ping 172.17.30.26

Pinging 172.17.30.26 with 32 bytes of data:

Reply from 172.17.30.26: bytes=32 time<1ms TTL=128

Ping statistics for 172.17.30.26:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>
```

Los beneficios que esta configuración nos proporciona son:

- **Mejor rendimiento:** Menos congestión mejora la eficiencia de la red.
- **Mayor seguridad:** Aísla grupos de dispositivos para mayor protección.
- **Escalabilidad:** Divide redes grandes sin hardware adicional.
- **Segmentación del tráfico:** Cada VLAN crea un dominio de broadcast independiente, reduciendo tráfico innecesario.

## Parte 2: Configurar las VLAN

### 2.1: Crear y nombrar las VLAN en el S1.

Accedemos al S1 y lo activamos y una vez dentro ejecutamos los comandos “vlan X” y “name (nombre)”, después un “exit” y para que se guarden correctamente los cambios, ejecutamos el comando “write memory”.

```

S1
Physical Config CLI Attributes
IOS Command Line Interface

F0/5, 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
Gig0/1, Gig0/2

1002 fddi-default      active
1003 token-ring-default active
1004 fddinet-default   active
1005 trnet-default     active

VLAN Type SAID      MTU Parent RingNo BridgeNo Stp BrdgMode Transl Trans2
----- -----
1  enet 1000001 1500 -  -  -  - 0 0
1002 fddi 101002 1500 -  -  -  - 0 0
1003 tr 101003 1500 -  -  -  - 0 0
1004 fddinet 101004 1500 -  -  - ieee - 0 0
1005 trnet 101005 1500 -  -  - ibm - 0 0

VLAN Type SAID      MTU Parent RingNo BridgeNo Stp BrdgMode Transl Trans2
----- ----

Remote SPAN VLANs

Primary Secondary Type Ports
----- -----
S1#
S1#
S1#
S1#config t
Enter configuration commands, one per line. End with CNTL/Z.
S1(config)#vlan 10
S1(config-vlan)#name Faculty/Staff
S1(config-vlan)#
S1(config-vlan)#vlan 20
S1(config-vlan)#name Students
S1(config-vlan)#vlan 30
S1(config-vlan)#name Guest(Default)
S1(config-vlan)#vlan 99
S1(config-vlan)#name Management&Native
S1(config-vlan)#

```

### 2.2: Verificar la configuración de la VLAN.

Para mostrar el nombre, estado de la VLAN y sus puertos asociados dentro de un switch ejecutamos el comando “show vlan brief”.

```

S1>enable
S1#show vlan brief

VLAN Name          Status    Ports
----- -----
1    default        active    Fa0/1, Fa0/2, Fa0/3, Fa0/4
                           Fa0/5, 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
                           Gig0/1, Gig0/2

10   Faculty/Staff  active
20   Students        active
30   Guest(Default) active
99   Management&Native active
1002 fddi-default   active
1003 token-ring-default active
1004 fddinet-default active
1005 trnet-default   active
S1#

```

## DISEÑO DE REDES DE COMPUTADORAS SEGURAS

### 2.3: Crear las VLAN en el S2 y el S3.

Asignamos las mismas VLAN's a los Switches 2 y 3 como en el 2.1.

**S2:**

```
S2>enable
S2#config t
Enter configuration commands, one per line. End with CNTL/Z.
S2(config)# vlan 10
S2(config-vlan)#name Faculty/Staff
S2(config-vlan)# exit
S2(config)# vlan 20
S2(config-vlan)# name Students
S2(config-vlan)# exit
S2(config)# vlan 30
S2(config-vlan)#name Guest
S2(config-vlan)# exit
S2(config)# vlan 99
S2(config-vlan)# name Management&Native
S2(config-vlan)# exit
S2(config)# end
S2#
%SYS-5-CONFIG_I: Configured from console by console

S2# write memory
Building configuration...
[OK]
S2#
```

**S3:**

```
S3>enable
S3# config t
Enter configuration commands, one per line. End with CNTL/Z.
S3(config)# vlan 10
S3(config-vlan)# name Faculty/Staff
S3(config-vlan)# exit
S3(config)#vlan 20
S3(config-vlan)# name Students
S3(config-vlan)#exit
S3(config)#vlan 30
S3(config-vlan)#name Guest
S3(config-vlan)#exit
S3(config)#vlan 99
S3(config-vlan)#name Management&Native
S3(config-vlan)#exit
S3(config)# end
S3#
%SYS-5-CONFIG_I: Configured from console by console

S3#write memory
Building configuration...
[OK]
S3#
```

## DISEÑO DE REDES DE COMPUTADORAS SEGURAS

### 2.4: Verificar la configuración de la VLAN en el S2 y el S3.

Como en el paso 2.2, verificamos configuración con el comando “show vlan brief”.

**S2:**

```
S2>enable
S2#show vlan brief

VLAN Name          Status    Ports
---- -----
1     default       active    Fa0/1, Fa0/2, Fa0/3, Fa0/4
                           Fa0/5, Fa0/7, Fa0/8, Fa0/9
                           Fa0/10, Fa0/12, Fa0/13, Fa0/14
                           Fa0/15, Fa0/16, Fa0/17, Fa0/19
                           Fa0/20, Fa0/21, Fa0/22, Fa0/23
                           Fa0/24, Gig0/1, Gig0/2
10    Faculty/Staff  active    Fa0/11
20    Students       active    Fa0/18
30    Guest(Default) active    Fa0/6
99    Management&Native active
1002   fddi-default  active
1003   token-ring-default active
1004   fddinet-default active
1005   trnet-default  active
S2#
```

**S3:**

```
S3>enable
S3#show vlan brief

VLAN Name          Status    Ports
---- -----
1     default       active    Fa0/1, Fa0/2, Fa0/3, Fa0/4
                           Fa0/5, Fa0/7, Fa0/8, Fa0/9
                           Fa0/10, Fa0/12, Fa0/13, Fa0/14
                           Fa0/15, Fa0/16, Fa0/17, Fa0/19
                           Fa0/20, Fa0/21, Fa0/22, Fa0/23
                           Fa0/24, Gig0/1, Gig0/2
10    Faculty/Staff  active    Fa0/11
20    Students       active    Fa0/18
30    Guest(Default) active    Fa0/6
99    Management&Native active
1002   fddi-default  active
1003   token-ring-default active
1004   fddinet-default active
1005   trnet-default  active
S3#
```

## Parte 3: Asignar VLAN a los puertos

### 3.1: Asignar las VLAN a los puertos activos en el S2.

Activamos el Switch2 y configuramos los puertos con “switchport” y le indicamos el “access vlan X”.

```
S2(config)#interface fastEthernet 0/11
S2(config-if)#switchport mode access
S2(config-if)#switchport access vlan 10
S2(config-if)# no shutdown
S2(config-if)# exit
S2(config)#interface fastEthernet 0/18
S2(config-if)#
S2#
%SYS-5-CONFIG_I: Configured from console by console

S2#interface fastEthernet 0/18
^
% Invalid input detected at '^' marker.

S2# config t
Enter configuration commands, one per line. End with CNTL/Z.
S2(config)#interface fastEthernet 0/18
S2(config-if)# switchport mode access
S2(config-if)# switchport access vlan 20
S2(config-if)# no shutdown
S2(config-if)# exit
S2(config)# interface fastEthernet 0/6
S2(config-if)# switchport mode access
S2(config-if)# switchport access vlan 30
S2(config-if)# no shutdown
S2(config-if)# exit
S2(config)# end
S2#
%SYS-5-CONFIG_I: Configured from console by console

S2# write memory
Building configuration...
[OK]
S2#
```

### 3.2: Asigne VLAN a los puertos activos en S3.

Asignamos los Puertos al Switch 3 como en el punto anterior.

```
S3>enable
S3#config t
Enter configuration commands, one per line. End with CNTL/Z.
S3(config)# interface fastEthernet 0/11
S3(config-if)#switchport mode access
S3(config-if)#switchport access vlan 10
S3(config-if)# no shutdown
S3(config-if)#exit
S3(config)# interface fastEthernet 0/18
S3(config-if)# switchport mode access
S3(config-if)# switchport access vlan 20
S3(config-if)#no shutdown
S3(config-if)#exit
S3(config)# interface fastEthernet 0/6
S3(config-if)#switchport mode access
S3(config-if)# switchport access vlan 30
S3(config-if)# no shutdown
S3(config-if)# exit
S3(config)#end
S3#
%SYS-5-CONFIG_I: Configured from console by console

S3#write memory
Building configuration...
[OK]
S3#
```

## DISEÑO DE REDES DE COMPUTADORAS SEGURAS

### 3.3: Verificar la pérdida de conectividad

Ahora, después de añadir los puertos y las VLAN's, los pings NO se realizaron correctamente.

Esto se debe a que, aunque los puertos están asignados a las VLAN adecuadas, los switches aún no tienen un **enlace troncal (trunk)** configurado entre ellos para permitir que el tráfico de las distintas VLAN se comunique a través de los switches.

```
C:\>ping 172.17.10.24

Pinging 172.17.10.24 with 32 bytes of data:

Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 172.17.10.24:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
C:\>
```

Hay 2 soluciones válidas:

- Si solo se quiere comunicación entre switches dentro de la misma VLAN:** Configurar los enlaces entre los switches (S1, S2, S3) como **troncales (trunk ports)**.
- Si se necesita comunicación entre VLANs (inter-VLAN routing):** Configurar un **router-on-a-stick** o usar un **switch capa 3** con interfaces virtuales (SVIs) para enrutar entre VLANs.

