

Universidad Nacional Autónoma de México
Facultad de Ciencias

Redes de computadoras 2025-1

Profesor: Luis Enrique Serrano Gutiérrez

Ayudantes:

Luis Angel Leyva Castillo

Erick Bernal Márquez

Diego Alberto Magallanes Ramírez

Jorge Erick Rivera López

Práctica 8

Integrantes:

Marco Silva Huerta 316205326

Carlos Daniel Cortés Jiménez 420004846

Jonathan Martínez Camarillo 318042989

Edgar Montiel Ledesma 317317794

Giovanny Cruz Martínez 312001690

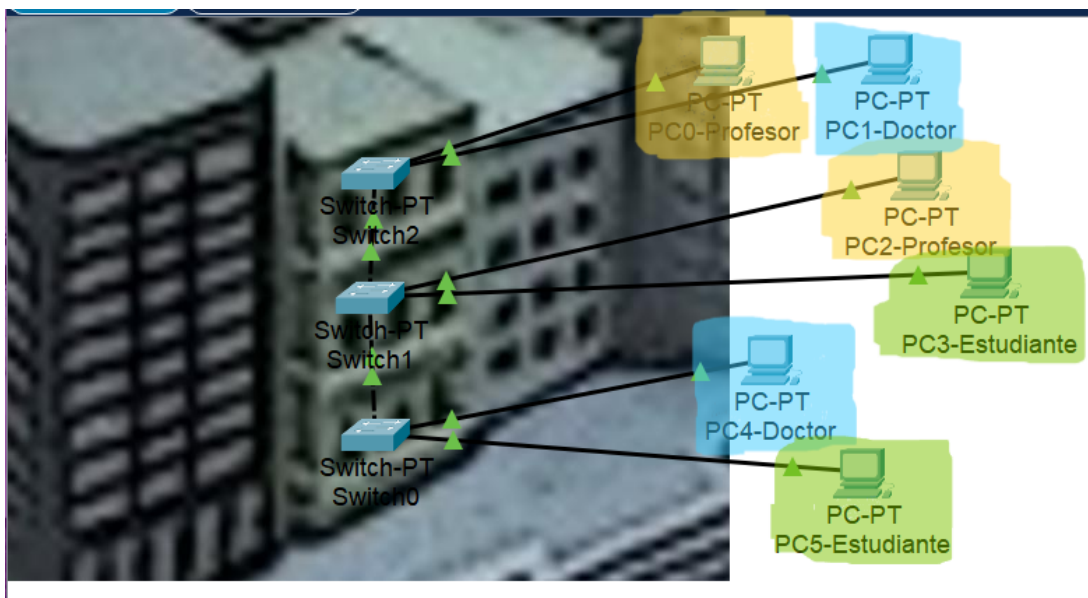
20 de Noviembre 2024

Actividad

Seleccionamos un edificio de la ciudad principal.



Tenemos la siguiente topología en un edificio:



Aquí tendremos 3 VLAN, una de Profesores(VLAN4), una de Doctores(VLAN2) y una de Estudiantes(VLAN3), siendo un edificio perteneciente a una escuela donde los 3 grupos de personas pueden realizar sus actividades académicas como de investigación.

Tenemos las siguientes IP:

- PC0: 192.168.1.1
- PC1: 192.168.1.2
- PC2: 192.168.1.3
- PC3: 192.168.1.4
- PC4: 192.168.1.5
- PC5: 192.168.1.6

Procedemos a configurar los switches de la siguiente manera:

Para el Switch0 con las PC4 y PC5, lo configuramos como:

```
Switch(config)#interface fastEthernet 1/1
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 2
% Access VLAN does not exist. Creating vlan 2

Switch(config)#interface fastEthernet 2/1
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 3
% Access VLAN does not exist. Creating vlan 3
```

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

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

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

Switch(config-if)#switchport mode trunk
Switch(config-if)#switchport nonegotiate
Switch(config-if)#switchport trunk allowed vlan 2-4
```

Para el Switch1 con las PC2 y PC3, lo configuramos como:

```
Switch(config)#interface fastethernet 2/1
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 4
% Access VLAN does not exist. Creating vlan 4

Switch(config)#interface fastethernet 3/1
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 3
% Access VLAN does not exist. Creating vlan 3

Switch(config)#interface fastethernet 0/1
Switch(config-if)#switchport mode trunk
Switch(config-if)#switchport nonegotiate
Switch(config-if)#switchport trunk allowed vlan 2-4
Switch(config-if)#interface fastethernet 1/1
Switch(config-if)#switchport mode trunk

Switch(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet1/1, changed state to down

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet1/1, changed state to up

Switch(config-if)#switchport nonegotiate
Switch(config-if)#switchport trunk allowed vlan 2-4
```

Finalmente para el Switch2 con las PC0 y PC1, lo configuramos como:

```
Switch(config)#interface fasteth 1/1
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 4
% Access VLAN does not exist. Creating vlan 4

Switch(config)#interface fasteth 2/1
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 2
% Access VLAN does not exist. Creating vlan 2
```


Verificamos las conexiones de las VLAN con los comandos `show vlan brief`, `show interfaces fastethernet 0/1 switchport(0/1 y 1/1 para el Switch1)`, y `show interfaces trunk`.

Para el Switch0 tenemos lo siguiente:

```
Switch#show vlan brief
```

VLAN	Name	Status	Ports
1	default	active	Fa3/1, Fa4/1, Fa5/1
2	VLAN0002	active	Fa1/1
3	VLAN0003	active	Fa2/1
1002	fddi-default	active	
1003	token-ring-default	active	
1004	fddinet-default	active	
1005	trnet-default	active	

```
Switch#show interfaces fastethernet 0/1 switchport
```

```
Name: Fa0/1
```

```
Switchport: Enabled
```

```
Administrative Mode: trunk
```

```
Operational Mode: trunk
```

```
Administrative Trunking Encapsulation: dot1q
```

```
Operational Trunking Encapsulation: dot1q
```

```
Negotiation of Trunking: Off
```

```
Access Mode VLAN: 1 (default)
```

```
Trunking Native Mode VLAN: 1 (default)
```

```
Voice VLAN: none
```

```
Administrative private-vlan host-association: none
```

```
Administrative private-vlan mapping: none
```

```
Administrative private-vlan trunk native VLAN: none
```

```
Administrative private-vlan trunk encapsulation: dot1q
```

```
Administrative private-vlan trunk normal VLANs: none
```

```
Administrative private-vlan trunk private VLANs: none
```

```
Operational private-vlan: none
```

```
Trunking VLANs Enabled: 2-4
```

```
Pruning VLANs Enabled: 2-1001
```

```
Capture Mode Disabled
```

```
Capture VLANs Allowed: ALL
```

```
Protected: false
```

```
Appliance trust: none
```

```

Switch#show interfaces trunk
Port      Mode      Encapsulation  Status      Native vlan
Fa0/1     on        802.1q         trunking    1

Port      Vlans allowed on trunk
Fa0/1     2-4

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

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

```

Para el Switch1 tenemos lo siguiente:

```
Switch#show vlan brief
```

VLAN	Name	Status	Ports
1	default	active	Fa4/1, Fa5/1
3	VLAN0003	active	Fa3/1
4	VLAN0004	active	Fa2/1
1002	fddi-default	active	
1003	token-ring-default	active	
1004	fddinet-default	active	
1005	trnet-default	active	

```

Switch#show interfaces fastethernet 0/1 switchport
Name: Fa0/1
Switchport: Enabled
Administrative Mode: trunk
Operational Mode: trunk
Administrative Trunking Encapsulation: dot1q
Operational Trunking Encapsulation: dot1q
Negotiation of Trunking: Off
Access Mode VLAN: 1 (default)
Trunking Native Mode VLAN: 1 (default)
Voice VLAN: none
Administrative private-vlan host-association: none
Administrative private-vlan mapping: none
Administrative private-vlan trunk native VLAN: none
Administrative private-vlan trunk encapsulation: dot1q
Administrative private-vlan trunk normal VLANs: none
Administrative private-vlan trunk private VLANs: none
Operational private-vlan: none
Trunking VLANs Enabled: 2-4
Pruning VLANs Enabled: 2-1001
Capture Mode Disabled
Capture VLANs Allowed: ALL
Protected: false
Appliance trust: none

Switch#show interfaces trunk

```

Port	Mode	Encapsulation	Status	Native vlan
Fa0/1	on	802.1q	trunking	1
Fal/1	on	802.1q	trunking	1

Port	Vlans allowed on trunk
Fa0/1	2-4
Fal/1	2-4

Port	Vlans allowed and active in management domain
Fa0/1	3,4
Fal/1	3,4

Port	Vlans in spanning tree forwarding state and not pruned
Fa0/1	3,4
Fal/1	3,4

Y por último, para el Switch2 tenemos lo siguiente:

Switch#show vlan brief

VLAN	Name	Status	Ports
1	default	active	Fa3/1, Fa4/1, Fa5/1
2	VLAN0002	active	Fa2/1
4	VLAN0004	active	Fa1/1
1002	fddi-default	active	
1003	token-ring-default	active	
1004	fddinet-default	active	
1005	trnet-default	active	

Switch#show interfaces fastethernet 0/1 switchport

Name: Fa0/1

Switchport: Enabled

Administrative Mode: trunk

Operational Mode: trunk

Administrative Trunking Encapsulation: dot1q

Operational Trunking Encapsulation: dot1q

Negotiation of Trunking: Off

Access Mode VLAN: 1 (default)

Trunking Native Mode VLAN: 1 (default)

Voice VLAN: none

Administrative private-vlan host-association: none

Administrative private-vlan mapping: none

Administrative private-vlan trunk native VLAN: none

Administrative private-vlan trunk encapsulation: dot1q

Administrative private-vlan trunk normal VLANs: none

Administrative private-vlan trunk private VLANs: none

Operational private-vlan: none

Trunking VLANs Enabled: 2-4

Pruning VLANs Enabled: 2-1001

Capture Mode Disabled

Capture VLANs Allowed: ALL

Protected: false

Appliance trust: none

Switch#show interfaces trunk

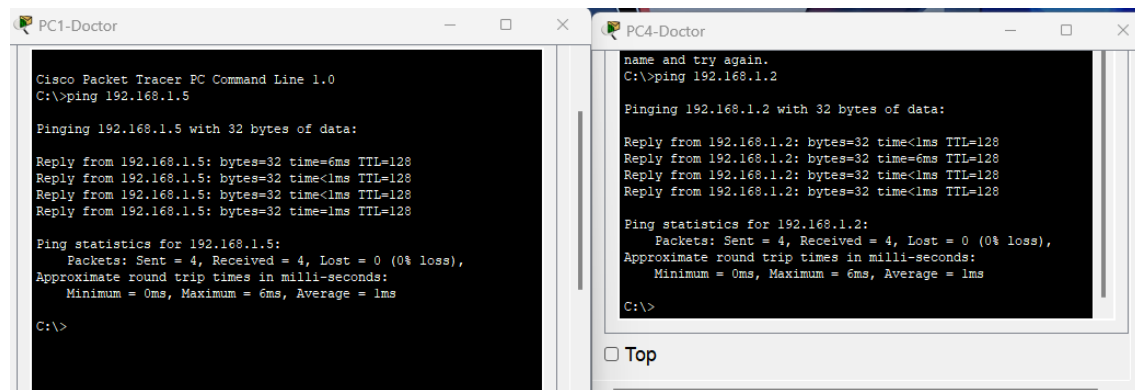
Port	Mode	Encapsulation	Status	Native vlan
Fa0/1	on	802.1q	trunking	1

Port	Vlans allowed on trunk
Fa0/1	2-4

Port	Vlans allowed and active in management domain
Fa0/1	2,4

Port	Vlans in spanning tree forwarding state and not pruned
Fa0/1	2,4

Ahora comprobamos la comunicación entre las diferentes VLAN:
Para la VLAN 2 tenemos:



```
PC1-Doctor
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.168.1.5

Pinging 192.168.1.5 with 32 bytes of data:

Reply from 192.168.1.5: bytes=32 time=6ms TTL=128
Reply from 192.168.1.5: bytes=32 time<1ms TTL=128
Reply from 192.168.1.5: bytes=32 time<1ms TTL=128
Reply from 192.168.1.5: bytes=32 time=1ms TTL=128

Ping statistics for 192.168.1.5:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 6ms, Average = 1ms

C:\>

PC4-Doctor
name and try again.
C:\>ping 192.168.1.2

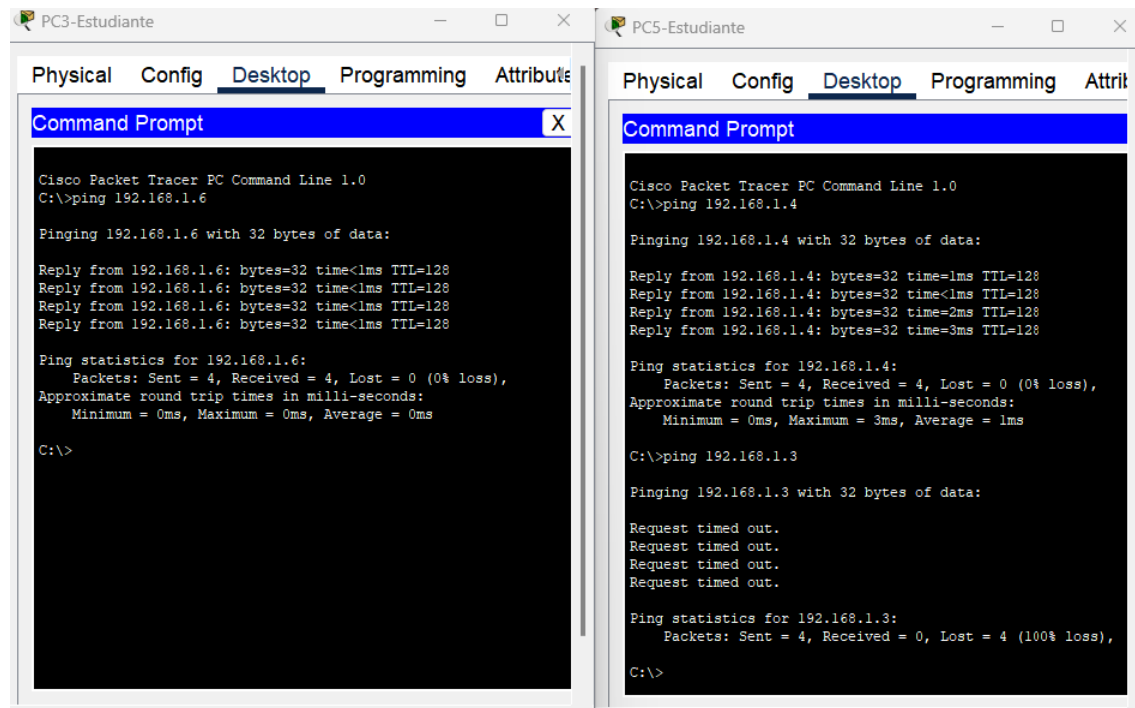
Pinging 192.168.1.2 with 32 bytes of data:

Reply from 192.168.1.2: bytes=32 time<1ms TTL=128
Reply from 192.168.1.2: bytes=32 time=6ms TTL=128
Reply from 192.168.1.2: bytes=32 time<1ms TTL=128
Reply from 192.168.1.2: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.1.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 6ms, Average = 1ms

C:\>
```

Para la VLAN 3 tenemos lo siguiente, junto la comprobación de que no pueden comunicarse entre diferente VLAN:



```
PC3-Estudiante
Physical Config Desktop Programming Attributes
Command Prompt
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.168.1.6

Pinging 192.168.1.6 with 32 bytes of data:

Reply from 192.168.1.6: bytes=32 time<1ms TTL=128
Reply from 192.168.1.6: bytes=32 time<1ms TTL=128
Reply from 192.168.1.6: bytes=32 time<1ms TTL=128
Reply from 192.168.1.6: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.1.6:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>

PC5-Estudiante
Physical Config Desktop Programming Attributes
Command Prompt
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.168.1.4

Pinging 192.168.1.4 with 32 bytes of data:

Reply from 192.168.1.4: bytes=32 time=1ms TTL=128
Reply from 192.168.1.4: bytes=32 time<1ms TTL=128
Reply from 192.168.1.4: bytes=32 time=2ms TTL=128
Reply from 192.168.1.4: bytes=32 time=3ms TTL=128

Ping statistics for 192.168.1.4:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 3ms, Average = 1ms

C:\>ping 192.168.1.3

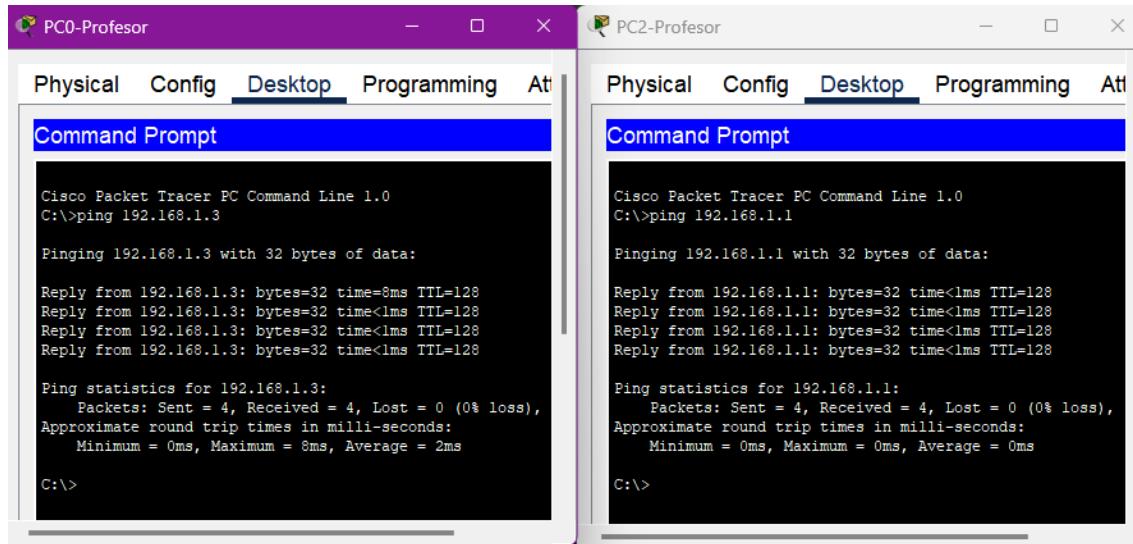
Pinging 192.168.1.3 with 32 bytes of data:

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

Ping statistics for 192.168.1.3:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\>
```

Finalmente para la VLAN 4 tenemos:



Teoría

1. ¿Cuál es el beneficio de usar redes VLAN?.

Las redes VLAN permiten segmentar una red física en redes lógicas independientes, lo que aporta beneficios clave en términos de seguridad, eficiencia y administración de la red. Un beneficio destacado es la reducción del dominio de broadcast, lo que mejora el rendimiento al limitar la cantidad de tráfico innecesario en la red. Además, las VLAN mejoran la seguridad al aislar diferentes grupos de usuarios, lo que evita que dispositivos de una VLAN accedan directamente a otra sin configuración explícita.

2. Menciona algunos uso que consideres se les pueden dar. (Justifica por lo menos 1).

Algunos usos de las redes VLAN incluyen:

- Segmentación por departamentos: Separar lógicamente las redes de diferentes áreas como Finanzas, Recursos Humanos y TI.
- Implementación de redes de invitados: Crear una VLAN específica para visitantes que permita acceso limitado a Internet pero no a recursos internos.
- Aislamiento de servidores sensibles: Garantizar que los servidores críticos estén en una VLAN separada para protegerlos de accesos no autorizados.
- Optimización en entornos educativos: Permitir que cada facultad o laboratorio tenga su propia VLAN, simplificando la administración y mejorando el control.

Un ejemplo es la implementación de redes de invitados. Este uso es fundamental para proteger los recursos internos de una organización, ya que evita que dispositivos desconocidos tengan acceso directo a la red principal, minimizando riesgos de intrusión o malware. Esta implementación es común en oficinas corporativas y espacios coworking, donde los visitantes requieren conectividad sin comprometer la infraestructura interna.

3. Escribe lo aprendido sobre esta practica asi como dificultades.

En esta práctica aprendimos a configurar redes VLAN, poder observar cómo funcionan y sus usos.

Referencias:

- Stallings, W. (2014). Data and Computer Communications (10th ed.). Pearson.
- Tanenbaum, A. S., & Wetherall, D. J. (2011). Computer Networks (5th ed.). Pearson.