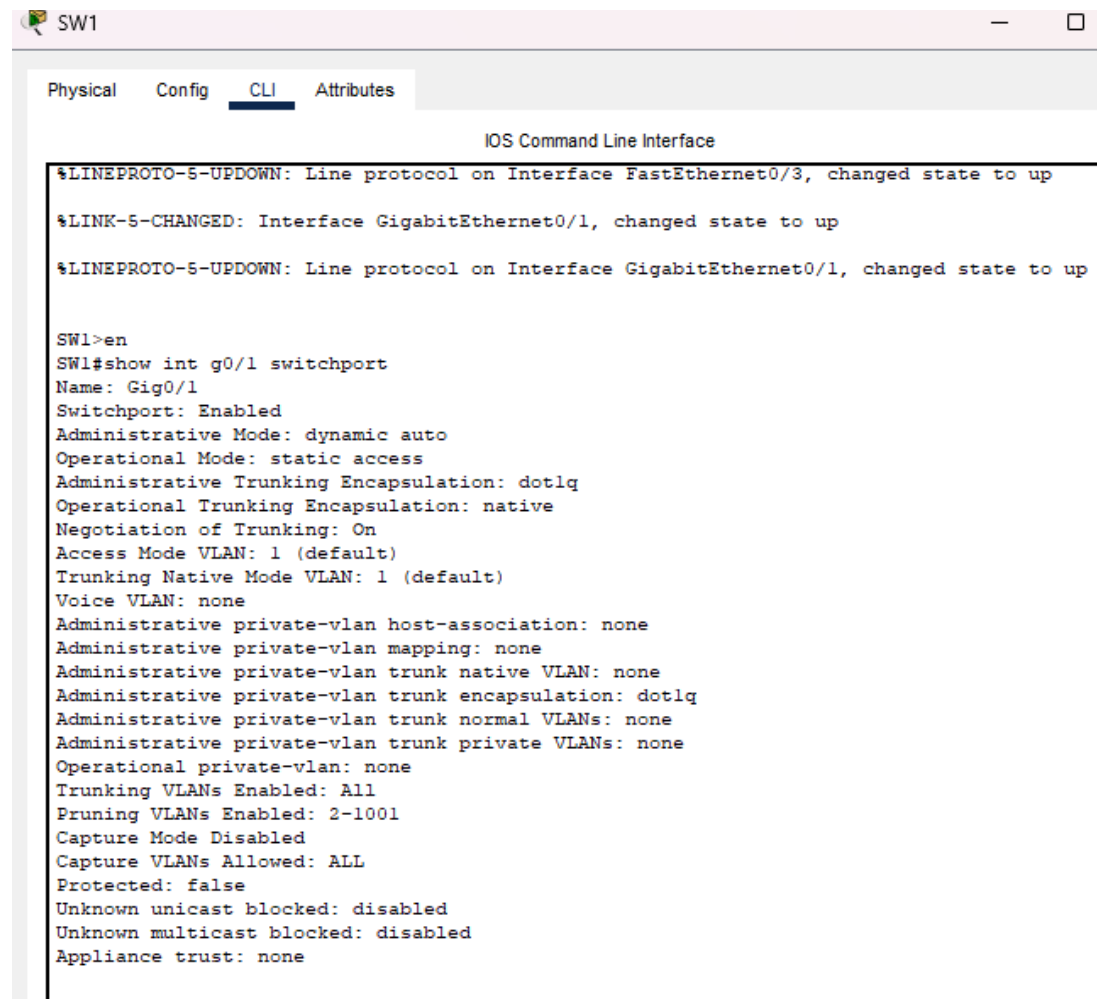# VTP, Access and Trunk Ports

- View the default switchport status between SW1 and SW2

```
enable
show int g0/1 switchport
```


- Configure the links between the switches as trunk

SW1

```
conf t
int g0/1
switchport mode trunk
```

SW2

```
enable
conf t
int g0/1
switchport trunk encap dot1q
switchport mode trunk

int g0/2
switchport trunk encap dot1q
switchport mode trunk
```

SW3

```
enable
conf t
```

```
int g0/2
switchport mode trunk
```

- Configure VTP. SW1 as VTP server. SW2 as transparent so as not to synchronize with SW1 VLAN database. SW3 must learn VLAN information from SW1 VLAN database.

SW1

```
conf t
vtp domain Practice
vtp mode server
```

```
SW1#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
SW1(config)#vtp domain Practice
Changing VTP domain name from NULL to Practice
SW1(config)#vtp mode server
Device mode already VTP SERVER.
SW1(config)#exit
SW1#
%SYS-5-CONFIG_I: Configured from console by console

SW1#
```

SW2

```
conf t
vtp domain Practice
vtp mode transparent
```

```
SW2#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
SW2(config)#vtp domain Practice
Domain name already set to Practice.
SW2(config)#vtp mode transparent
Setting device to VTP TRANSPARENT mode.
SW2(config)#exit
SW2#
%SYS-5-CONFIG_I: Configured from console by console

SW2#
```

SW3

```
conf t
vtp domain Practice
vtp mode client
```

```
SW3#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
SW3(config)#vtp domain Practice
Changing VTP domain name from NULL to Practice
SW3(config)#vtp mode client
Setting device to VTP CLIENT mode.
SW3(config)#exit
SW3#
%SYS-5-CONFIG_I: Configured from console by console

SW3#
```

You can use "show vtp status" to verify each of the switch vtp status

- Configure VLAN on the switches

VLAN 10 - Tech

VLAN 20 - Sales

VLAN 199 – Native

SW1 & SW2

```
conf t
vlan 10
name Tech
vlan 20
name Sales
vlan 199
name Native
end
```

- Configure the ports connected

SW1

```
int range f0/1-2
switchport mode access
switchport access vlan 10
int f0/3
switchport mode access
switchport access vlan 20
end
```

SW3

```
int f0/3
switchport mode access
switchport access vlan 10
int range f0/1-2
switchport mode access
switchport access vlan 20
```

- SW3 will automatically learn the VLAN information from SW1 because of the vtp configuration. So we don't have to configure VLAN on SW3.

Use "show vlan brief" to verify

```
SW1#sh vlan brief

VLAN Name                             Status    Ports
---- -------------------------------- --------- -------------------------------
1    default                          active    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, Gig0/2
10   Tech                             active    Fa0/1, Fa0/2
20   Sales                            active    Fa0/3
199  Native                           active
1002 fddi-default                     active
1003 token-ring-default               active
1004 fddinet-default                  active
1005 trnet-default                    active
SW1#
```

```
SW2#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
SW2(config)#vlan 10
SW2(config-vlan)#name Tech
SW2(config-vlan)#vlan 20
SW2(config-vlan)#name Sales
SW2(config-vlan)#vlan 199
SW2(config-vlan)#name Native
SW2(config-vlan)#exit
SW2(config)#exit
SW2#
%SYS-5-CONFIG_I: Configured from console by console

SW2#sh 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
10   Tech                             active
20   Sales                            active
199  Native                           active
1002 fddi-default                     active
1003 token-ring-default               active
1004 fddinet-default                  active
1005 trnet-default                    active
SW2#
```

```
Enter configuration commands, one per line.  End with CNTL/Z.
SW3(config)#
SW3(config)#int f0/3
SW3(config-if)#switch mode access
SW3(config-if)#switch access vlan 10
SW3(config-if)#int range f0/1-2
SW3(config-if-range)#switch mode access
SW3(config-if-range)#switch access vlan 20
SW3(config-if-range)#end
SW3#
%SYS-5-CONFIG_I: Configured from console by console

SW3#sh vlan brief

VLAN Name                             Status    Ports
---- -------------------------------- --------- -------------------------------
1    default                          active    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
10   Tech                             active    Fa0/3
20   Sales                            active    Fa0/1, Fa0/2
199  Native                           active
1002 fddi-default                     active
1003 token-ring-default               active
1004 fddinet-default                  active
1005 trnet-default                    active
SW3#
```

- Configure the trunk links to use VLAN 199 as the native VLAN for better security

SW1

```
int g0/1
switchport trunk native vlan 199
```

```
SW1>en
SW1#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
SW1(config)#int g0/1
SW1(config-if)#switchport trunk native vlan 199
SW1(config-if)#end
SW1#
%SYS-5-CONFIG_I: Configured from console by console

SW1#
```

SW2

```
int g0/1
switchport trunk native vlan 199
int g0/2
switchport trunk native vlan 199
```

```
SW2>en
SW2#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
SW2(config)#int g0/1
SW2(config-if)#switch trunk native vlan 199
SW2(config-if)#%SPANTREE-2-UNBLOCK_CONSIST_PORT: Unblocking GigabitEthernet0/1 on
VLAN0199. Port consistency restored.

%SPANTREE-2-UNBLOCK_CONSIST_PORT: Unblocking GigabitEthernet0/1 on VLAN0001. Port
consistency restored.


SW2(config-if)#int g0/2
SW2(config-if)#switch trunk native vlan 199
SW2(config-if)#end
SW2#
%SYS-5-CONFIG_I: Configured from console by console

SW2#
```

SW3

```
int g0/2
switchport trunk native vlan 199
```

```
SW3>en
SW3#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
SW3(config)#int g0/2
SW3(config-if)#switch trunk native vlan 199
SW3(config-if)#%SPANTREE-2-UNBLOCK_CONSIST_PORT: Unblocking GigabitEthernet0/2 on
VLAN0199. Port consistency restored.

%SPANTREE-2-UNBLOCK_CONSIST_PORT: Unblocking GigabitEthernet0/2 on VLAN0001. Port
consistency restored.


SW3(config-if)#exit
```

- Verify connectivity between PCs in the same VLAN. You can ping Tech2 and Tech3 from Tech1. Do the same for Sales VLAN PCs.

NB: Tech VLAN PCs will not have connection with Sales VLAN PCs because we are yet to configure inter-VLAN routing which would enable layer 3 communications.

Physical   Config   Desktop   Programming   Attributes

Command Prompt   X

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 10.10.10.12

Pinging 10.10.10.12 with 32 bytes of data:

Reply from 10.10.10.12: bytes=32 time=112ms TTL=128
Reply from 10.10.10.12: bytes=32 time=10ms TTL=128
Reply from 10.10.10.12: bytes=32 time<1ms TTL=128
Reply from 10.10.10.12: bytes=32 time<1ms TTL=128

Ping statistics for 10.10.10.12:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 112ms, Average = 30ms

C:\>ping 10.10.10.11

Pinging 10.10.10.11 with 32 bytes of data:

Reply from 10.10.10.11: bytes=32 time<1ms TTL=128
Reply from 10.10.10.11: bytes=32 time<1ms TTL=128
Reply from 10.10.10.11: bytes=32 time<1ms TTL=128
Reply from 10.10.10.11: bytes=32 time<1ms TTL=128

Ping statistics for 10.10.10.11:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping 10.10.20.11

Pinging 10.10.20.11 with 32 bytes of data:

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

Physical   Config   Desktop   Programming   Attributes

Command Prompt   X

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 10.10.20.10

Pinging 10.10.20.10 with 32 bytes of data:

Reply from 10.10.20.10: bytes=32 time<1ms TTL=128
Reply from 10.10.20.10: bytes=32 time<1ms TTL=128
Reply from 10.10.20.10: bytes=32 time=10ms TTL=128
Reply from 10.10.20.10: bytes=32 time<1ms TTL=128

Ping statistics for 10.10.20.10:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 10ms, Average = 2ms

C:\>ping 10.10.20.11

Pinging 10.10.20.11 with 32 bytes of data:

Reply from 10.10.20.11: bytes=32 time<1ms TTL=128
Reply from 10.10.20.11: bytes=32 time<1ms TTL=128
Reply from 10.10.20.11: bytes=32 time<1ms TTL=128
Reply from 10.10.20.11: bytes=32 time<1ms TTL=128

Ping statistics for 10.10.20.11:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping 10.10.10.11

Pinging 10.10.10.11 with 32 bytes of data:

Request timed out.
Request timed out.
Request timed out.
Request timed out.
```
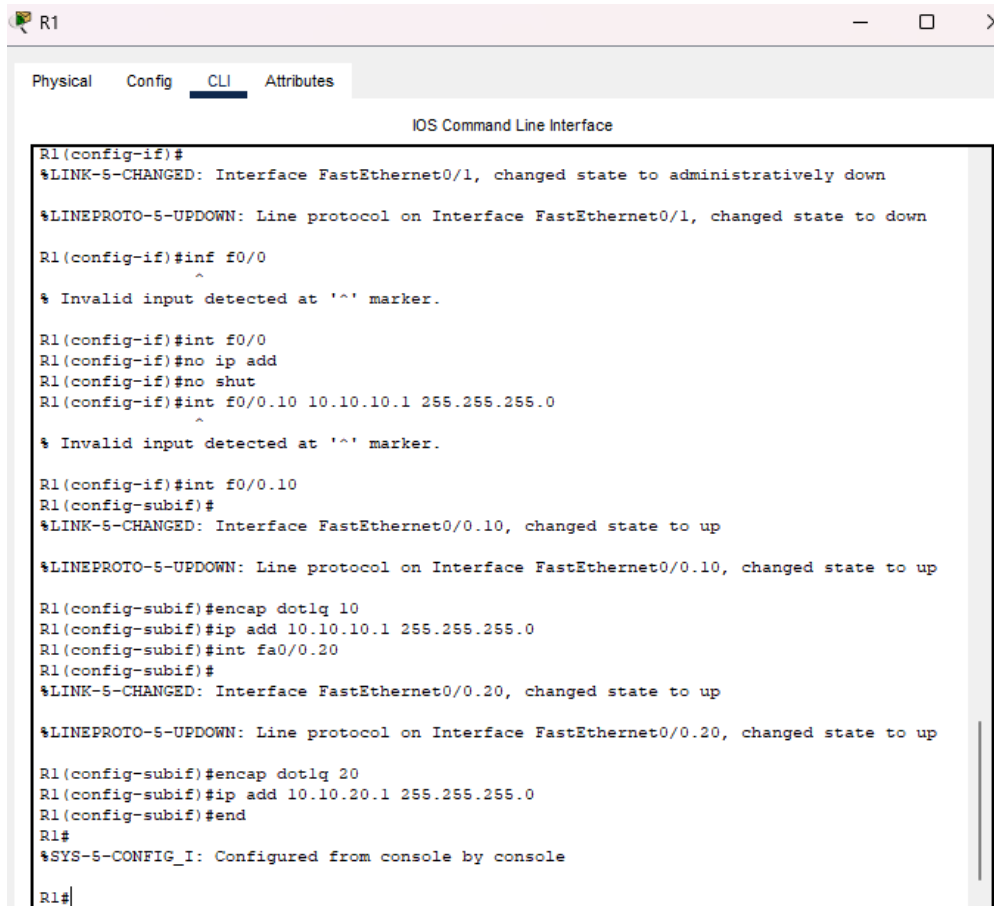
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Inter-VLAN Routing

We are going examine the three options in this lab.

Option 1 - Separate Interfaces on Router

- On R1, configure interfaces fa0/0 and fa0/1 as default gateways for the Tech and Sale PCs respectively

```
int f0/0
ip address 10.10.10.1 255.255.255.0
no shut
int f0/1
ip address 10.10.20.1 255.255.255.0
no shut
```

```
R1>en
R1#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R1(config)#int f0/0
R1(config-if)#ip add 10.10.10.1 255.255.255.0
R1(config-if)#no shut

R1(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up

R1(config-if)#int f0/1
R1(config-if)#ip add 10.10.20.1 255.255.255.0
R1(config-if)#no shut

R1(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/1, changed state to up

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

R1(config-if)#end
R1#
%SYS-5-CONFIG_I: Configured from console by console

R1#
```
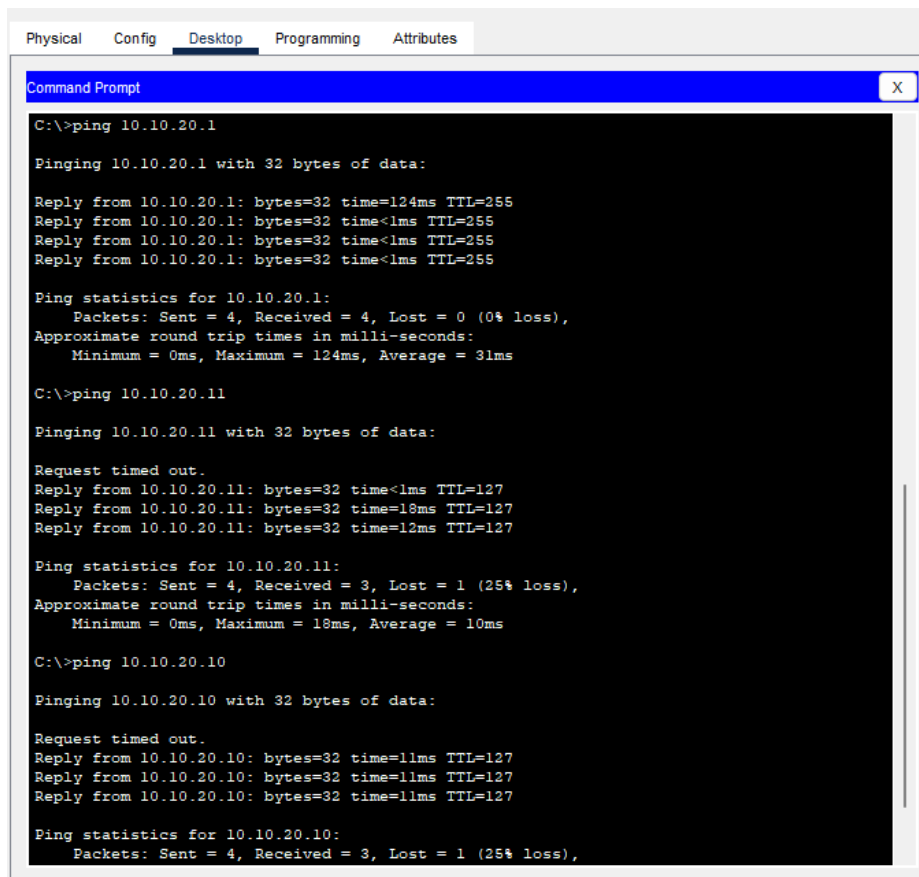
- On SW2, configure the interfaces to support inter-VLAN routing

```
int f0/1
switchport mode access
switchport access vlan 10
int f0/2
switchport mode access
switchport access vlan 20
```

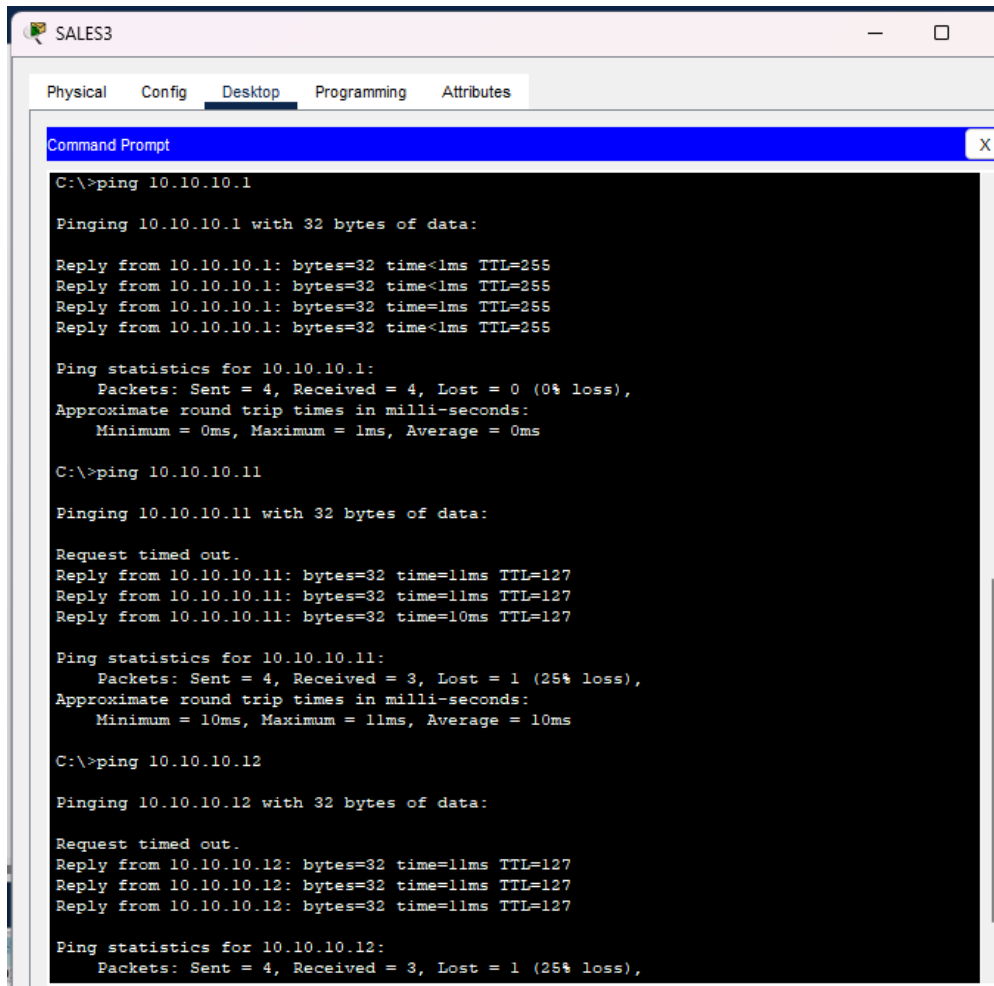```
SW2>en
SW2#conf t
Enter configuration commands, one per line. End with CNTL/Z.
SW2(config)#int f0/1
SW2(config-if)#switch mode access
SW2(config-if)#switch access vlan 10
SW2(config-if)#int f0/2
SW2(config-if)#switch mode access
SW2(config-if)#switch access vlan 20
SW2(config-if)#end
SW2#
%SYS-5-CONFIG_I: Configured from console by console

SW2#
```

**- Verify there is connectivity between the two VLANs**



*Option 2 - Router on a stick*

**- Before starting option 2, shut down any of the two router ports we configured earlier. Interface fa0/1 preferably**

```
int fa0/1
shutdown
```

- Go ahead to create virtual interfaces on the remaining one physical interface.

```
int fa0/0
no ip address
no shutdown
int fa0/0.10
encapsulation dot1q 10
ip address 10.10.10.1 255.255.255.0
int fa0/0.20
encapsulation dot1q 20
ip address 10.10.20.1 255.255.255.0
```

- Configure SW2 to support inter-VLAN routing

```
int fa0/1
switchport trunk encapsulation dot1q
switchport mode trunk
```


- Verify the connectivity between the two VLANs

Option 3 - Layers 3 Switch

- We don't need a router for this option. Shutdown the second interface of the router to disconnect.

```
int f0/0
shutdown
```

- Configure SVI (Switch Virtual Interface) on SW2 to support inter-VLAN routing between the two VLANs

```
ip routing
int vlan 10
ip address 10.10.10.1 255.255.255.0
int vlan 20
ip address 10.10.20.1 255.255.255.0
```

```
SW2>en
SW2#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
SW2(config)#ip routing
SW2(config)#int vlan 10
SW2(config-if)#
%LINK-5-CHANGED: Interface Vlan10, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan10, changed state to up

SW2(config-if)#ip add 10.10.10.1 255.255.255.0
SW2(config-if)#int vlan 20
SW2(config-if)#
%LINK-5-CHANGED: Interface Vlan20, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan20, changed state to up

SW2(config-if)#ip add 10.10.20.1 255.255.255.0
SW2(config-if)#end
SW2#
%SYS-5-CONFIG_I: Configured from console by console

SW2#
```

- Verify the connectivity between the two VLANs