Lecture (02)
Determining IP Routes (2)

By:

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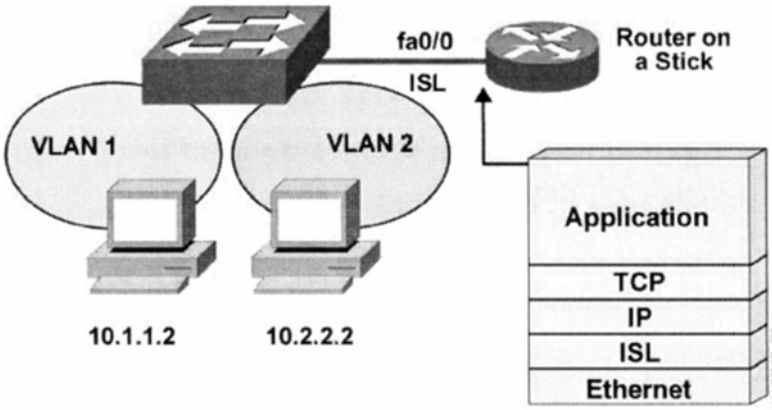
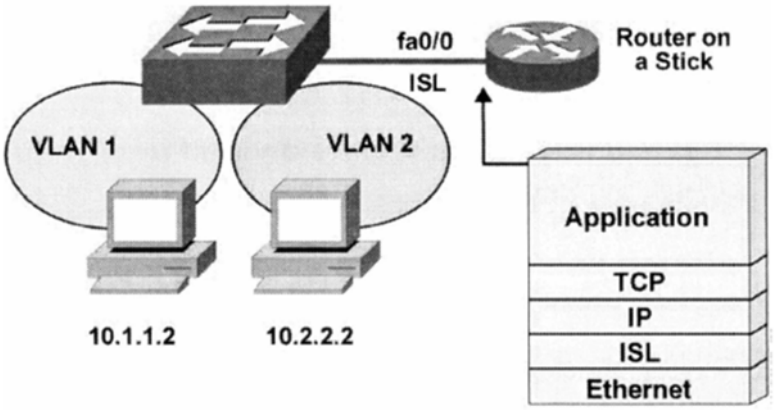
InterVLAN Routing



- Inter-VLAN communication occurs between broadcast domains via a Layer 3 device.
- In a VLAN environment, frames are switched only between ports within the same broadcast domain.

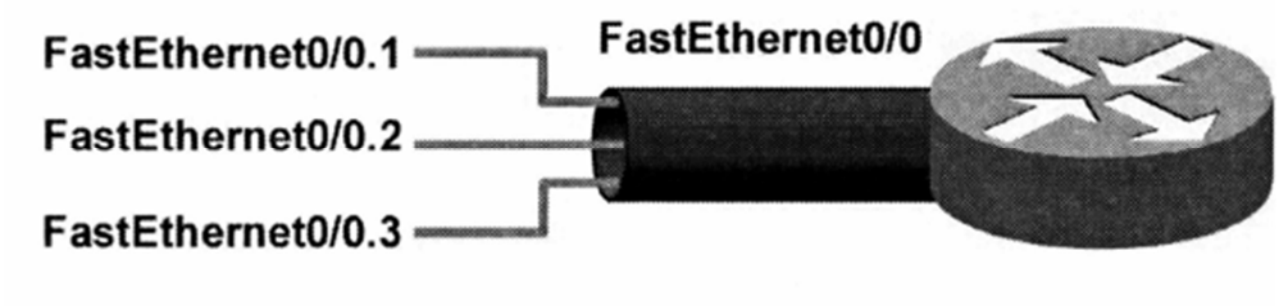


- VLANs perform network partitioning and traffic separation at Layer 2.
- InterVLAN communication cannot occur without a Layer 3 device, such as a router.
- Use Inter-Switch Link (ISL) or 802.1 Q to enable trunking on a router subinterface.

Router on a Stick

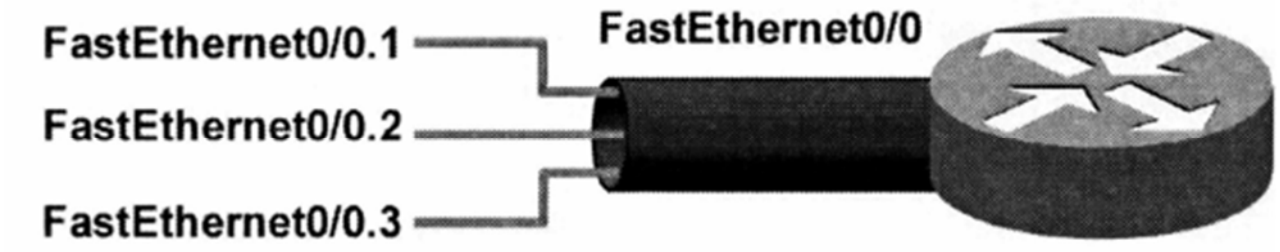
- The figure illustrates a router attached to a core switch. The configuration between a router and a core switch is sometimes referred to as a "router on a stick."
- The router can receive packets on one VLAN and forward them to another VLAN.
- To perform interVLAN routing functions, the router must know how to reach all VLANs being interconnected.
- There must be a separate physical connection on the router for each VLAN, and you must enable ISL or 802.1Q trunking on a single physical connection.
- The router already knows about directly connected networks.
- The router must learn routes to networks not connected directly to it.

Dividing a Physical Interface into Subinterfaces



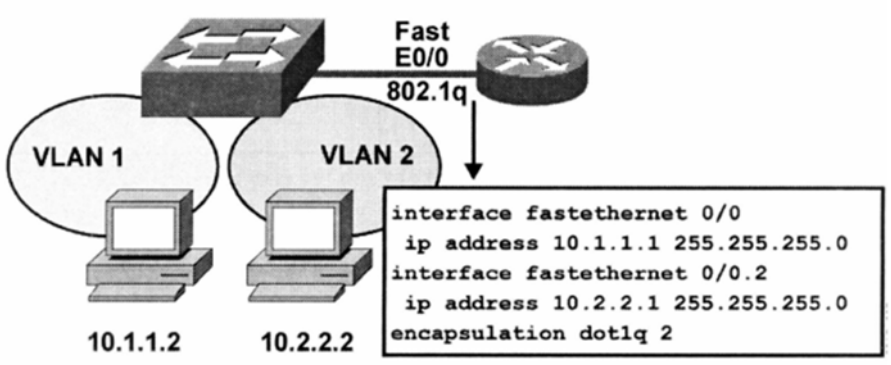
- To support ISL or 802.1 Q trunking, you must subdivide the physical Fast Ethernet interface of the router into multiple, logical, addressable interfaces, one per VLAN.
- The resulting logical interfaces are called subinterfaces.
- Without this subdivision, a separate physical interface would have to be dedicated to each VLAN.

Subinterfaces



- In the figure, the FastEthernet0/0 interface is divided into multiple subinterfaces: FastEthernet0/0.1,
- FastEthernet0/0.2, and FastEthernet0/0.3.

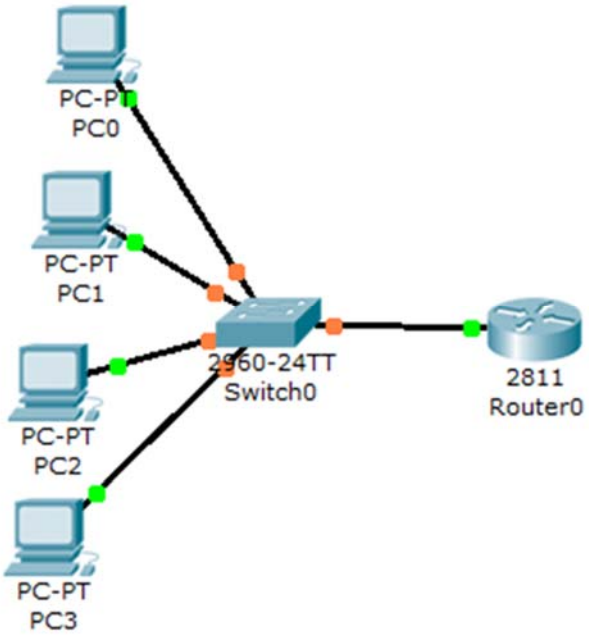
Routing Between VLANs with 802.1Q Trunks



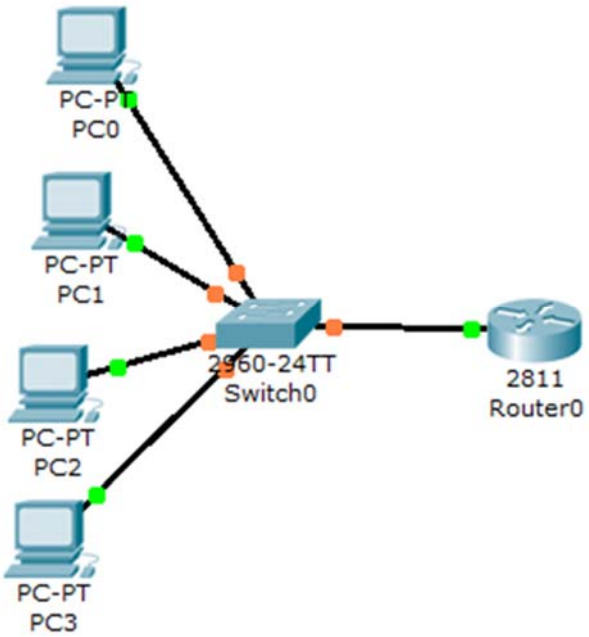
- Use the encapsulation dotlq *vlan identifier* sub interface configuration command to enable 802.1 Q encapsulation trunking on a router subinterface (where *vlan identifier* is the VLAN number).

- 802 .1 Q is slightly different from ISL.
- The native VLAN frames in 802.1 Q do not carry a tag.
- Therefore, the major interface of a trunk has an address. Any other configuration information for the native VLAN subinterfaces is configured with the dot 1Q encapsulation and the IP address.
- The subinterface number need not equal the dot1Q VLAN number.
- However, management is easier when the two numbers are the same.

Practice



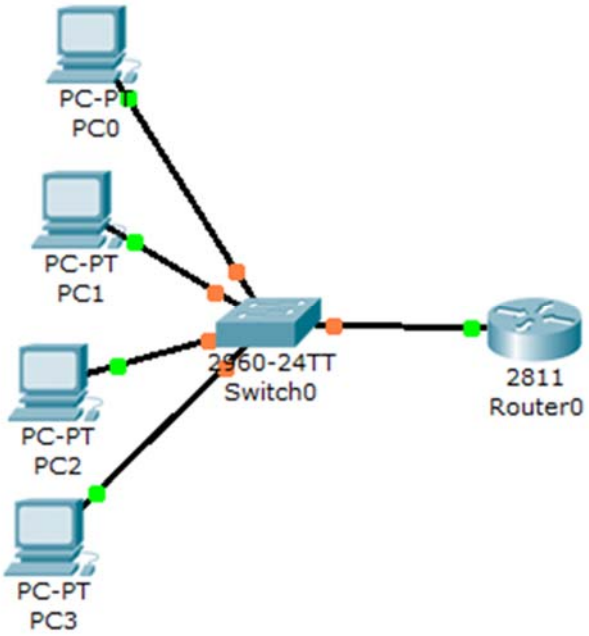
step 1



********** switch
****
enabl
config t
interface vlan 1
ip address 1.1.1.1 255.255.255.0
no shutdown
vlan 2
name dept1

vlan 3
name dept2
interface fa0/1
switchport mode access
switchport access vlan 2

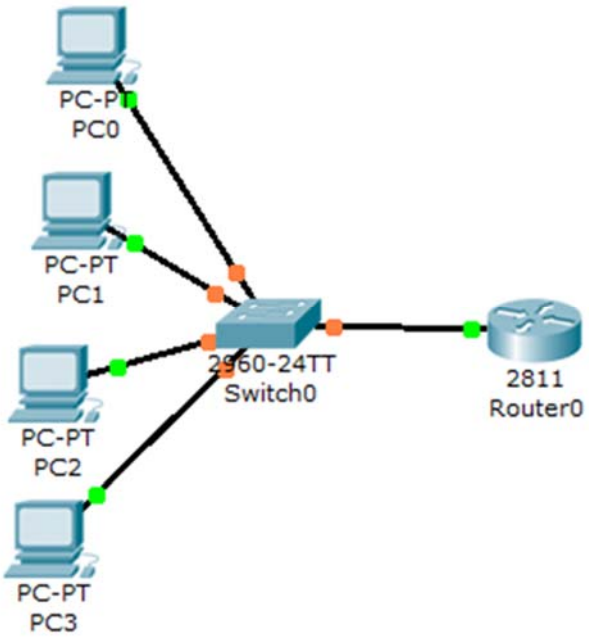
interface fa0/2
switchport mode access
switchport access vlan 2



interface fa0/3
switchport mode access
switchport access vlan 3

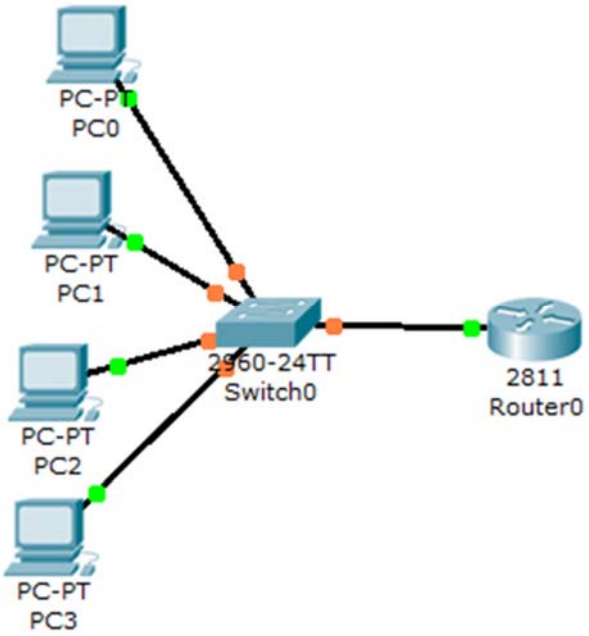
interface fa0/4
switchport mode access
switchport access vlan 3
end

copy running-config startup-config

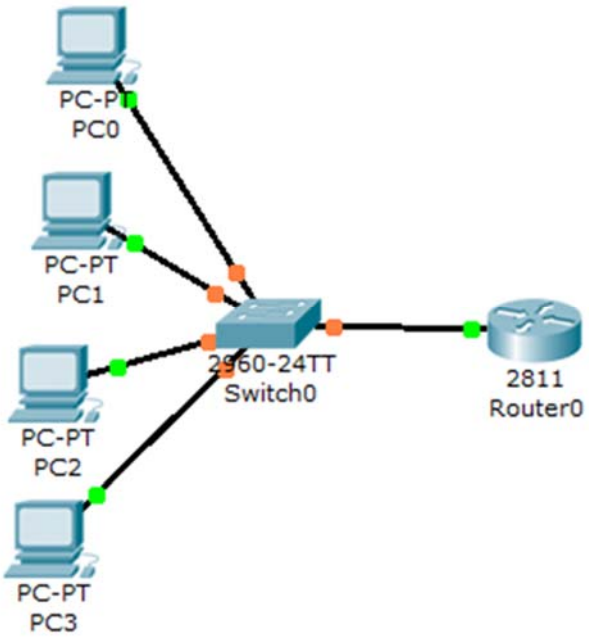


PCS configuration

PC1	10.1.1.2	255.255.255.0
	10.1.1.1	fa0/1
PC2	10.1.1.3	255.255.255.0
	10.1.1.1	fa0/2
PC3	10.2.2.2	255.255.255.0
	10.2.2.1	fa0/3
PC4	10.2.2.3	255.255.255.0
	10.2.2.1	

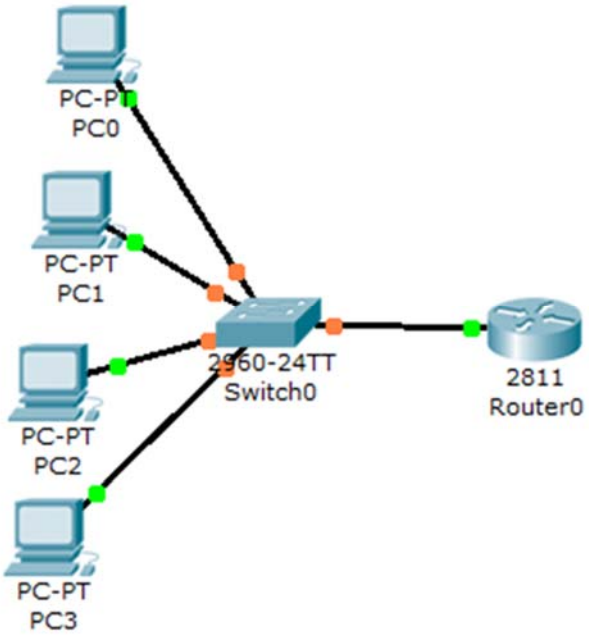



```
router

en
config t
interface fa0/0
no ip address
no sh
interface loopback 0
ip address 1.1.1.2 255.255.255.255
no sh
end

copy running-config startup-config
exit
```

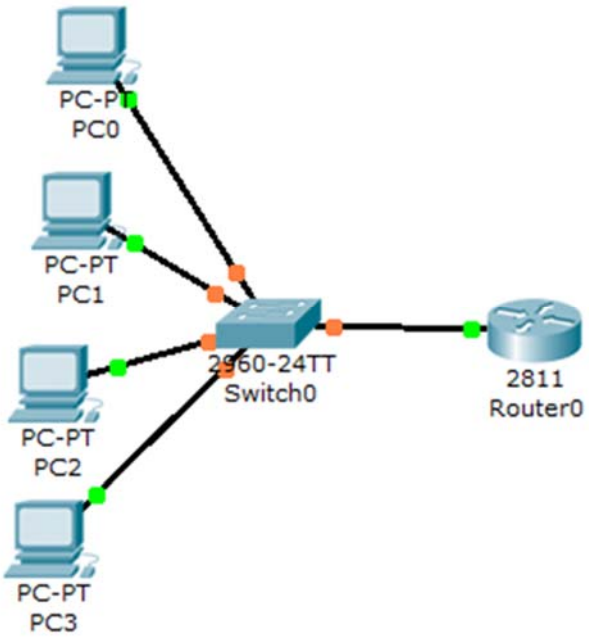




```
PC0 >>
        ping 10.1.1.3
    ping 10.2.2.3
        ping 1.1.1.2

PC2>>
        ping 10.1.1.3
        ping 10.2.2.3
        ping 1.1.1.2

switch>>
        ping 1.1.1.2
        ping 10.1.1.3
        ping 10.2.2.3
```

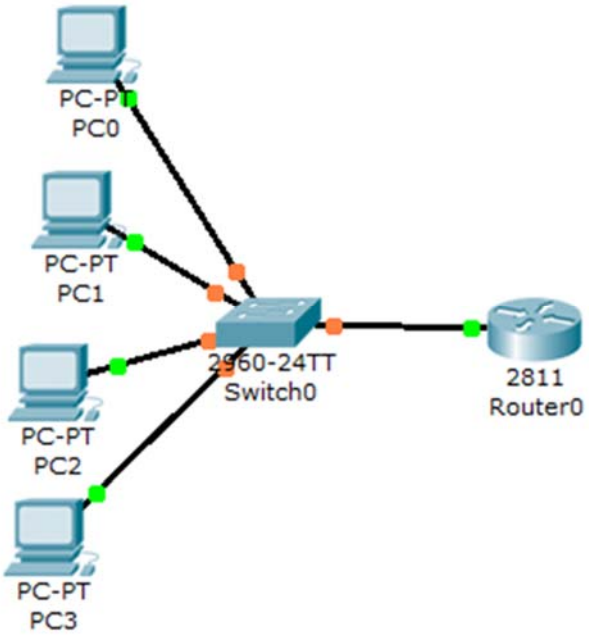
step 02




```
switch

en
config t
interface fa0/24
switchport mode trunk
end
copy running-config startup-config
exit
```


```
en
config t
interface fa0/0.1
encapsulation dot1Q 2
ip address 10.1.1.1 255.255.255.0
no sh
interface fa0/0.2
encapsulation dot1Q 3
ip address 10.2.2.1 255.255.255.0
no sh

copy running-config startup-config
exit
```



PC0 >> ping 10.1.1.3
ping 10.2.2.3
ping 1.1.1.2
PC2>> ping 10.1.1.3
ping 10.2.2.3
ping 1.1.1.2
switch>>
ping 1.1.1.2
ping 10.1.1.3
ping 10.2.2.3

Thanks,..

See you next week (ISA),…