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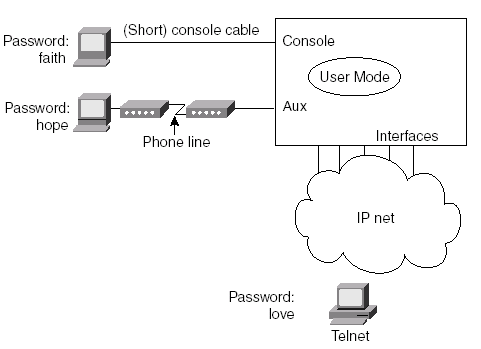
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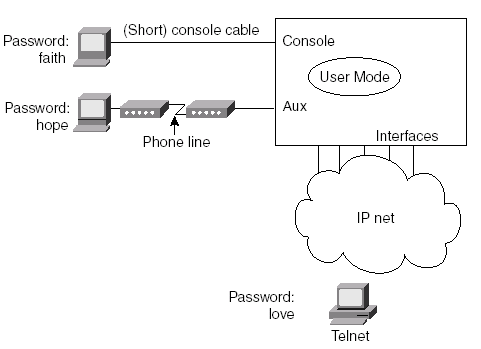
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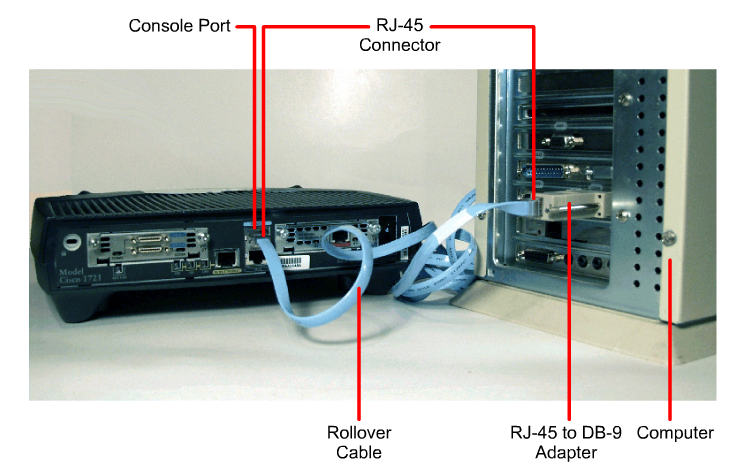
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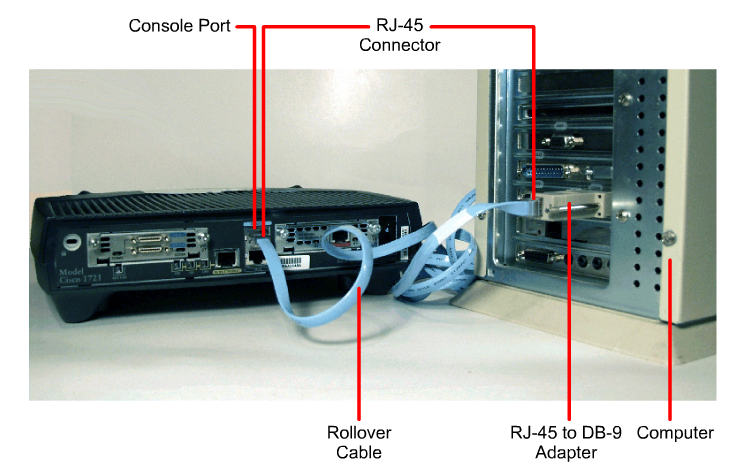
# Router Configuration in Packet Tracer



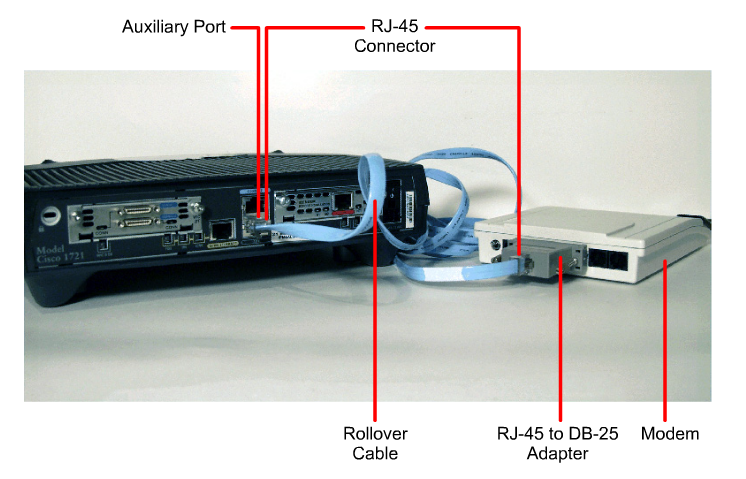
****

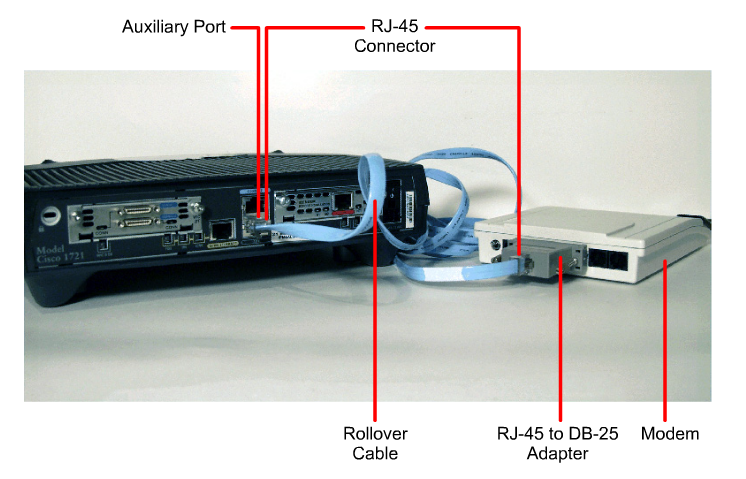
**Console port connection**



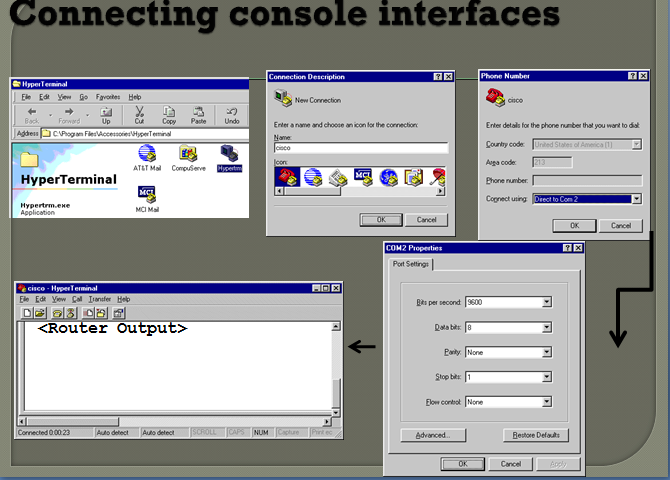
****

**Auxiliary port connection**



****

**Connecting console interfaces**



## Basic Lab Overview

This lab will introduce the Cisco Internetwork Operating System (IOS) command line interface (CLI). You will need to logon to a router and become familiar with the different levels of access on the router. You will also become familiar with the commands available to you in each mode (user or privileged) and the router help facility, history, and editing features.

**User vs. Privileged Mode**

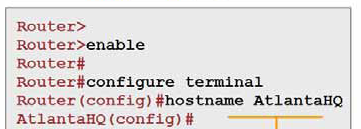
User mode is indicated with the ‘>’ next to the router name. You can look at settings but can not make changes from user mode. In Privilege mode (indicated by the '#') you can do additional tasks than user mode. To get into privilege mode the keyword is ‘*enable’*.

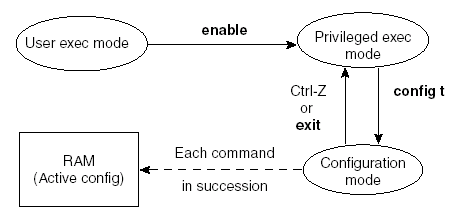
**Router >**

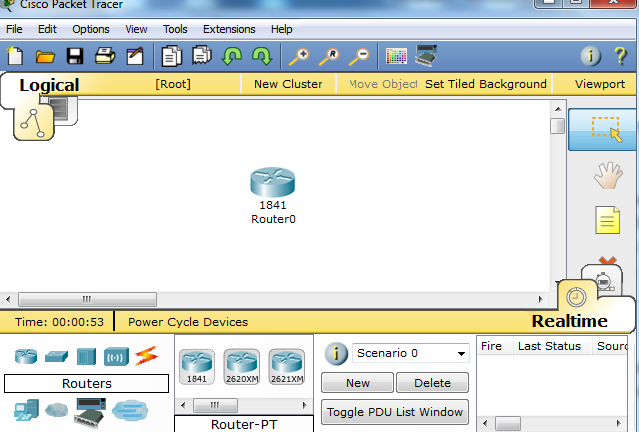
**Router > enable**

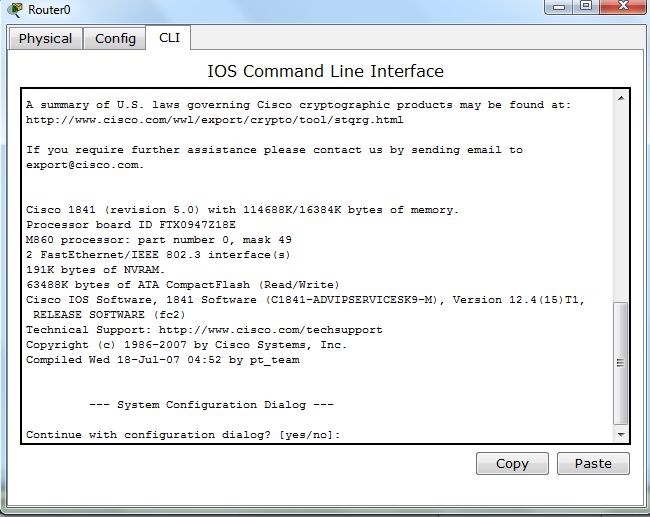
**Password:**

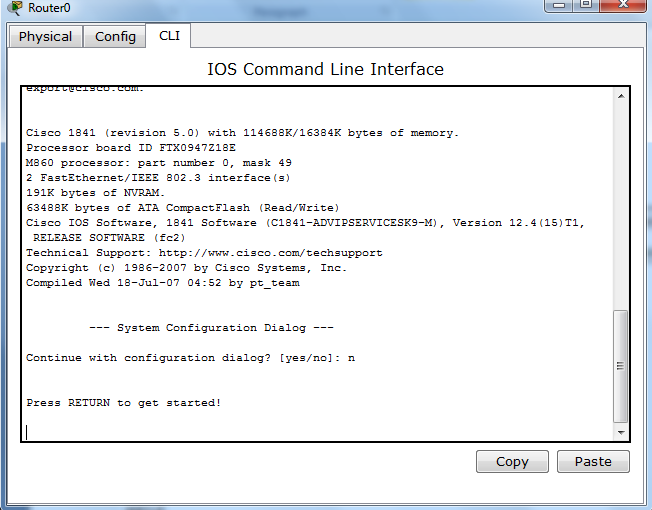
**Router #**

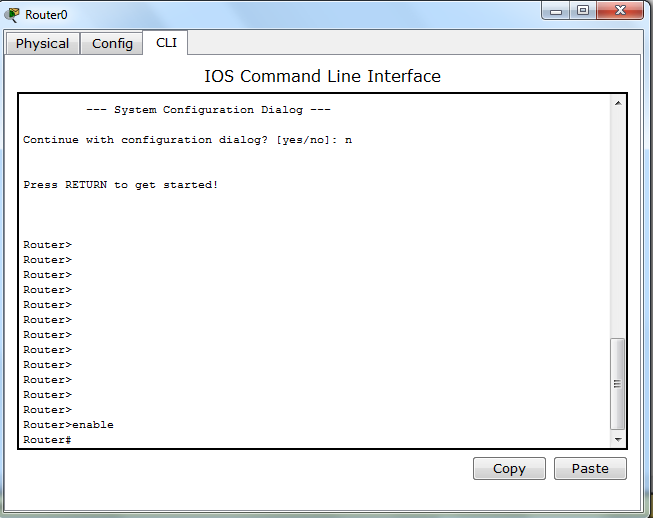












**HELP**

To view all commands available from this mode, type ‘?’ and press Enter Key. This will give you the list of all available commands for the router in your current mode. You can also use the question mark after you have started typing a command. For example if you want to use a show command but you do not remember which one it is, type ‘*show ?*’. This will output all commands that you can use with the show command.

**Router#show ?**

**access-lists List access lists**

**arp Arp table**

**cdp CDP information**

**clock Display the system clock**

**controllers Interface controllers status**

**crypto Encryption module**

**debugging State of each debugging option**

**dhcp Dynamic Host Configuration Protocol status**

**flash: display information about flash: file system**

**frame-relay Frame-Relay information**

**history Display the session command history**

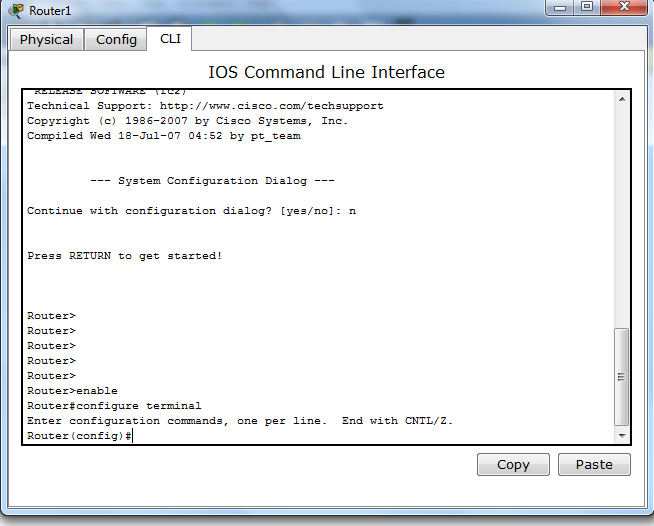
**--More—**

**Configuration Mode**

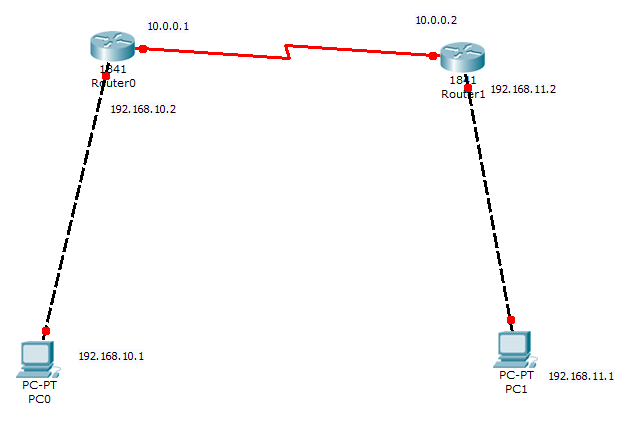
From privilege mode, you can enter to the configuration mode by typing *‘configure terminal’.* To exit configuration mode, type ‘***exit’*** or <**CTL>+z**

**Router#configure terminal**

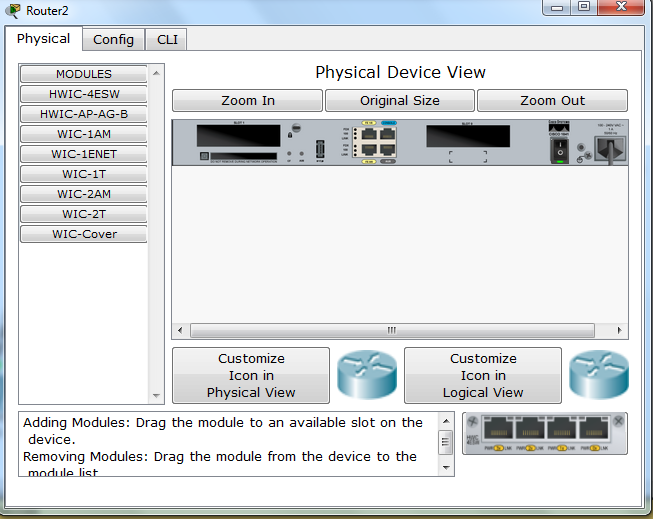
**Router( config)#exit**



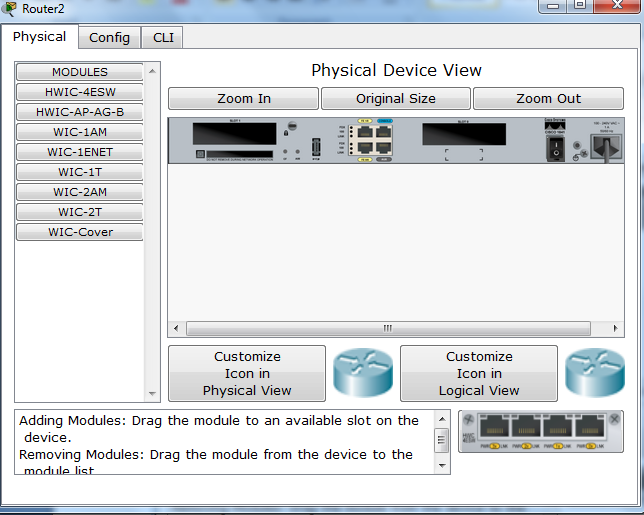
## IP configuration



**Add serial port to router**

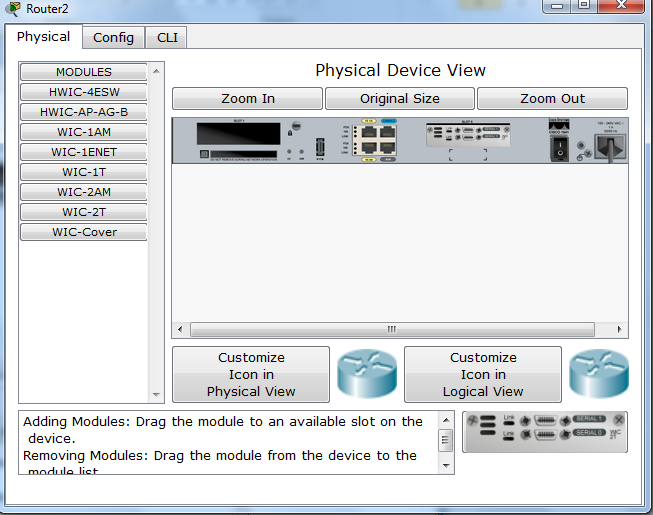


**switch off the power supply**



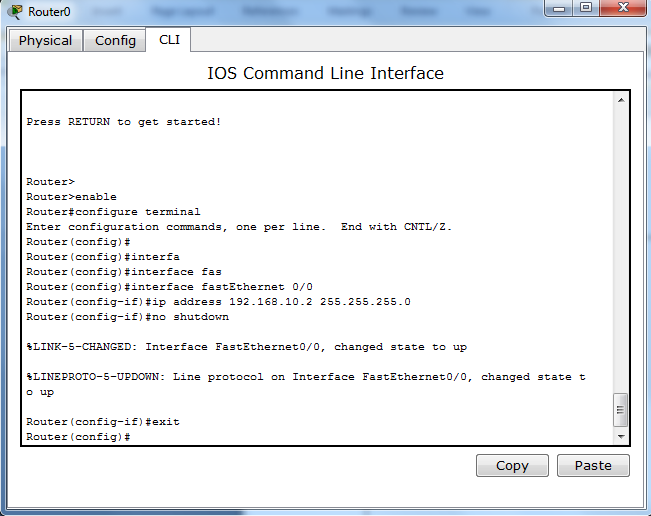
Click this button

Drag and drop this module to this space



Switch on the button

Router0 Fast Ethernet port configuration



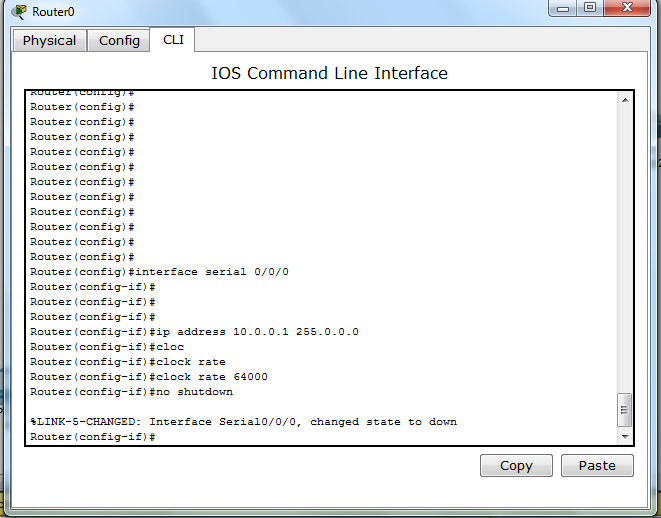
Router(config)#interface fastEthernet 0/0

Router(config-if)#ip address 192.168.10.2 255.255.255.0

Router(config-if)#no shutdown

Router(config-if)#exit

Router Serial Port Configuration



Router(config)#interface serial 0/0/0

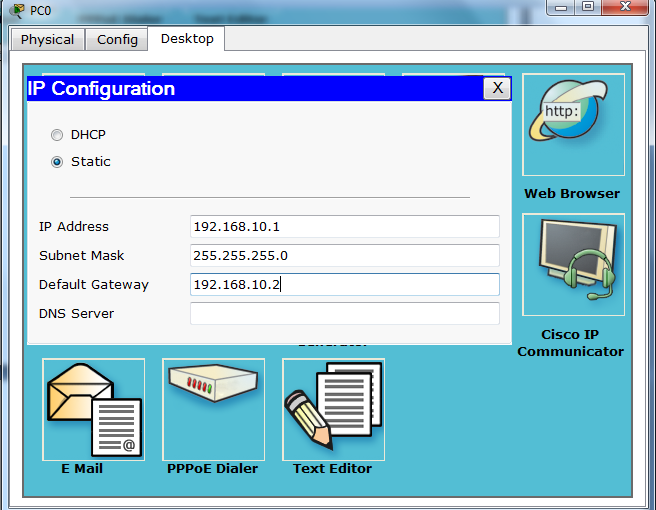
Router(config-if)#ip address 10.0.0.1 255.0.0.0

Router(config-if)#clock rate 64000

Router(config-if)#no shutdown

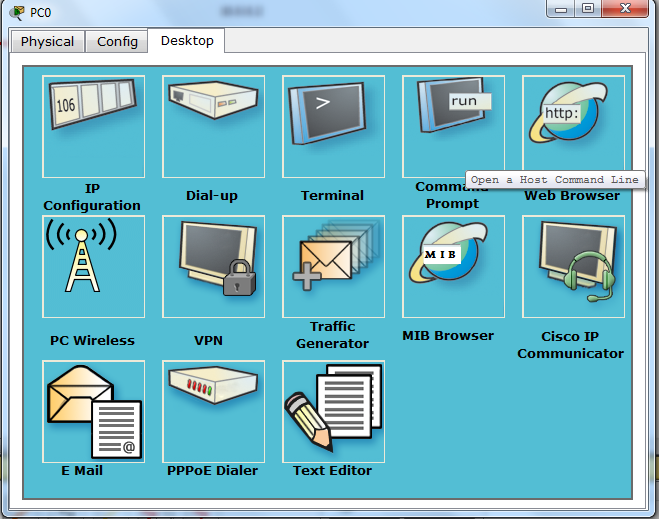
PC configuration





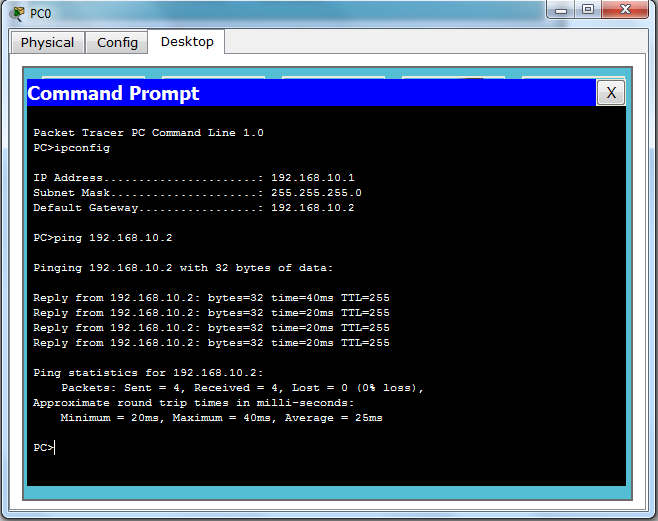
Check the connectivity in 192.168.10.0 network

Open command promt



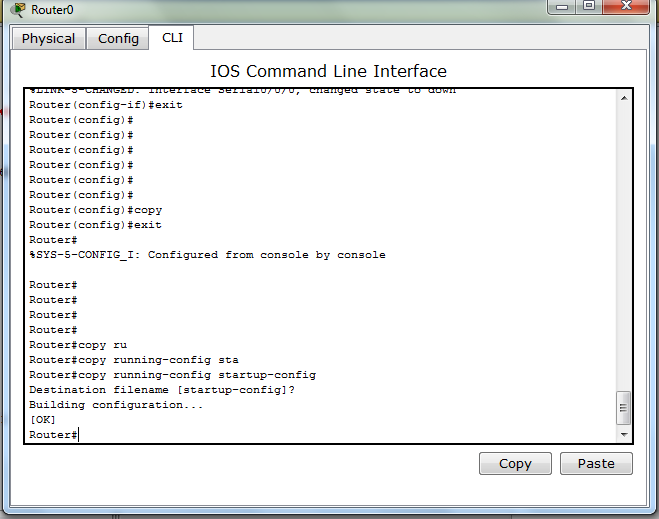
Type Ipconfig to check the host IP address

Type Ping command to check the connectivity



## Save your file

First save your current router configuration



Router#copy running-config sta

Router#copy running-config startup-config

Destination filename [startup-config]?

Building configuration...

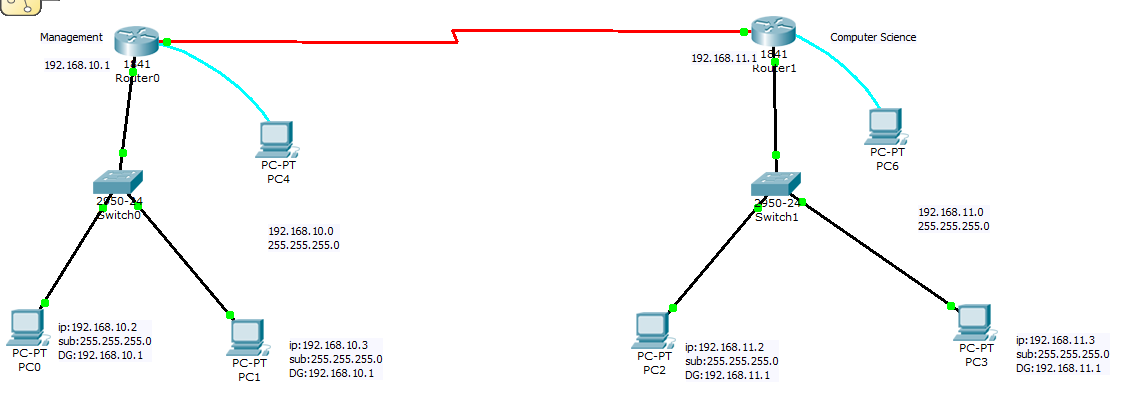
[OK]

Router#

# Lab1-Exercise Basic Static Route configuration

**Static Routing**

A router with manually configured routing tables is known as a static router. A network administrator, with knowledge of the internetwork topology, manually builds and updates the routing table, programming all routes in the routing table. Static routers can work well for small internetworks but do not scale well to large or dynamically changing internetworks due to their manual administration.



|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Device | Interface | IP address | Subnet mask | Default Gateway |
| Router 0(Management) | Fa 0/0 | 192.168.10.1 | 255.255.255.0 | N/A |
| Se 0/0/0 | 10.0.0.1 | 10.0.0.0 | N/A |
| Router 1(Computer science) | Fa 0/0 | 192.168.11.1 | 255.255.255.0 | N/A |
| Se 0/0/0 | 10.0.0.2 | 10.0.0.0 | N/A |
| PC0 | N/C | 192.168.10.2 | 255.255.255.0 | 192.168.11.1 |
| PC1 | N/C | 192.168.10.3 | 255.255.255.0 | 192.168.11.1 |
| PC2 | N/C | 192.168.11.2 | 255.255.255.0 | 192.168.11.1 |
| PC3 | N/C | 192.168.11.3 | 255.255.255.0 | 192.168.11.1 |

## Objective of this Lab

1. Perform Basic configuration task on a router.
2. Configure and activate serial and Ethernet addresses.
3. Configure static route using intermediate addresses.
4. Configure static route using exit interface.
5. Configure a summary static route.

### Perform Basic configuration task on a router.

1. Naming the router.

**Router 0**

Router(config)#hostname Management

**Router 1**

Router(config)#hostname computerscience

1. Setting password

*Configure password that is to be used to enter privileged EXEC mode.*

**Router 0**

Management(config)#enable secret abc

Enter the configuration password

Management>enable

Password:

Management#

**Router 1**

computerscience(config)#enable secret class

1. Configure console and telnet password

*The command login enables password checking in the line. If you do not enter the command login on the console line, the user will be granted access to the line without entering a password.*

**Router 0**

Management(config)#line console 0

Management(config-line)#password cisco

Management(config-line)#login

Here enter the console password

User Access Verification

Password:

Management>

Management(config)#line vty 0 4

Management(config-line)#password cisco

Management(config-line)#login

1. Configure a Banner

Management(config)#banner motd #

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

WARNING !! UNAUTHORIZED ACCESS PROHIBITED!!

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

WARNING !! UNAUTHORIZED ACCESS PROHIBITED!!

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

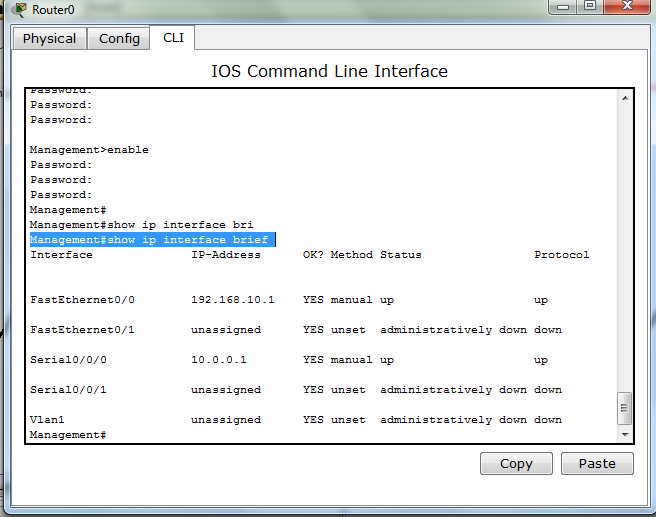
User Access Verification

Password:

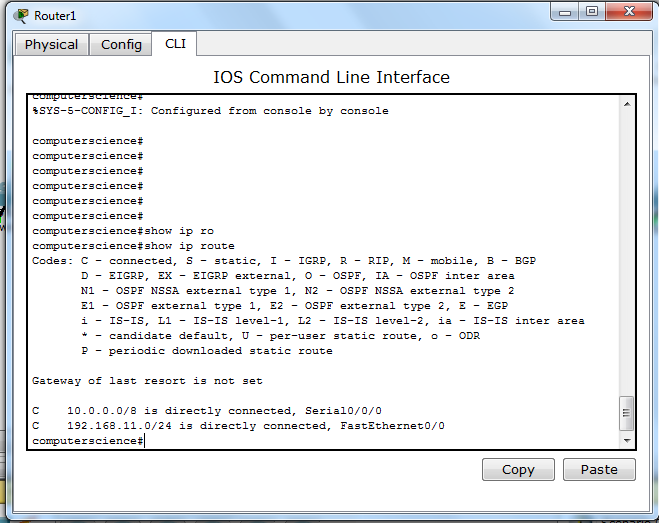
**Gather information**

Check the status of the interface on each router

***Management# show ip interface brief***

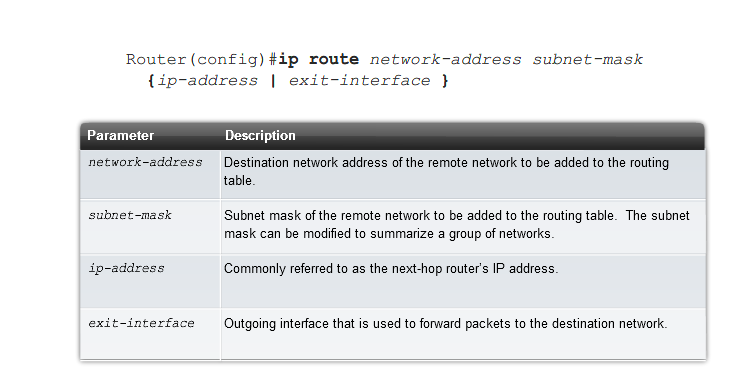


View the routing table information



Directly Connected Networks

## Configure a Static Route



**Router 0**

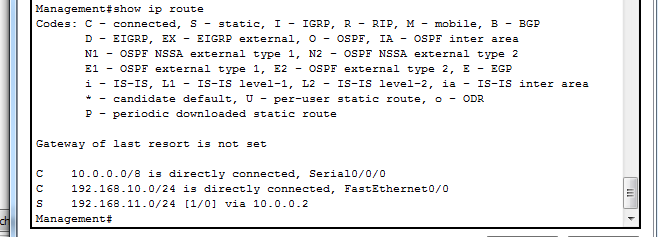
Management(config)#ip route 192.168.11.0 255.255.255.0 10.0.0.2

**Router 1**

computerscience(config)#ip route 192.168.10.0 255.255.255.0 10.0.0.1

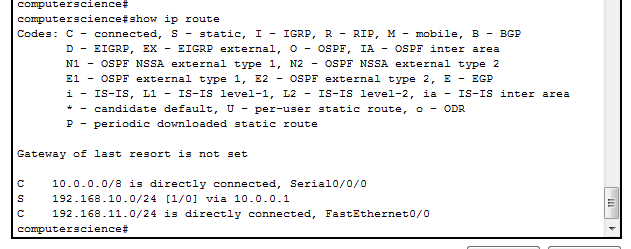
### View the routing table to verify the new static entry

**Router 0**

****

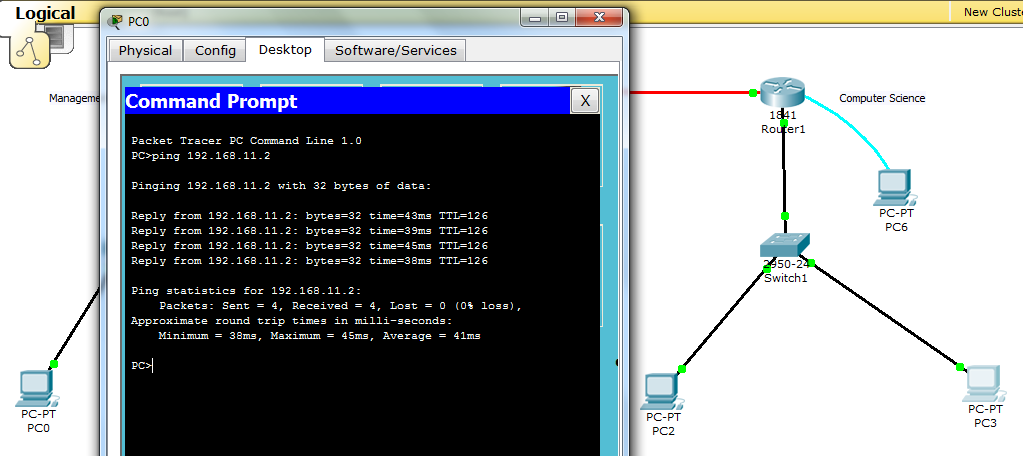
Static route information

**Router 1**

****

Static Route Information

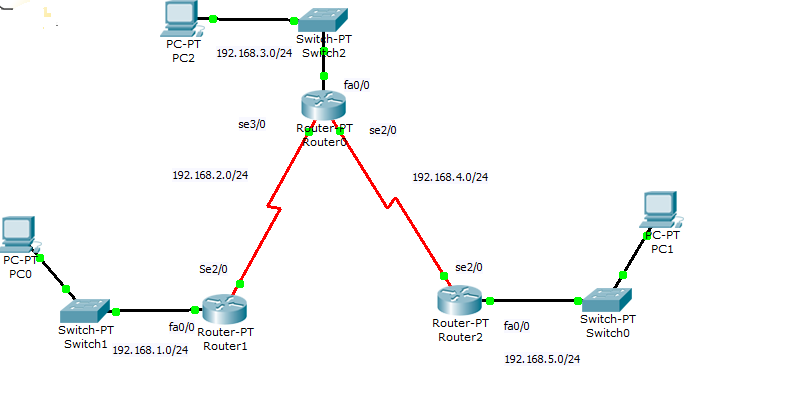
**Check the connectivity**

****

PC0(192.168.10.2) connected to PC2(192.168.11.2)

# Lab 2-Exercise Dynamic Route configuration(RIPv1)

**Basic RIP Configuration-Running RIPv1 on classful networks**



## Learning Objectives

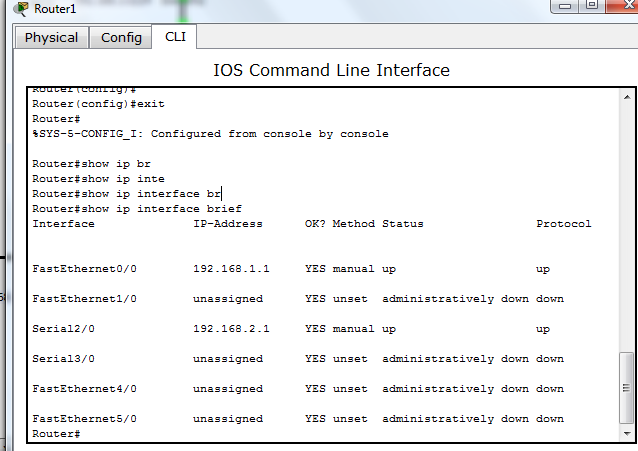
* Perform basic configuration tasks on a router.
* Configure and active interfaces.
* Configure RIP routing on all routers.
* Verify RIP routing using show and debug commands.
* Document the RIP configuration.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Device | Interface | IP Address | Subnet Mask | Default Gateway |
| Router 1 | Fa0/0 | 192.168.1.1 | 255.255.255.0 | N/A |
| Se2/0 | 192.168.2.1 | 255.255.255.0 | N/A |
| Router 0 | Fa0/0 | 192.168.3.1 | 255.255.255.0 | N/A |
| Se2/0 | 192.168.4.2 | 255.255.255.0 | N/A |
| Se3/0 | 192.168.2.2 | 255.255.255.0 | N/A |
| Router 2 | Se2/0 | 192.168.4.1 | 255.255.255.0 | N/A |
| Fa0/0 | 192.168.5.1 | 255.255.255.0 | N/A |
| PC0 | NIC | 192.168.1.2 | 255.255.255.0 | 192.168.2.1 |
| PC2 | NIC | 192.168.3.2 | 255.255.255.0 | 192.168.3.1 |
| PC1 | NIC | 192.168.5.2 | 255.255.255.0 | 192.168.5.1 |

### Task1- Configure and Activate Serial and Ethernet Addresses.

### Task2- Verify IP addressing and interfaces.

*Router#show ip interface brief*



### Task 3- Configure RIP.

***Step 1: Enable dynamic routing.***

To enable RIP, enter the command in global configuration mode.

**Router1**

R1(config)#router rip

R1(config-router)#

*Same as for Roter 0 and Router 2*

***Step 2: Enter classful network addresses***.

Once you are in routing configuration mode, enter the classful network address for each directly

connected network, using the network command.

**Router 1**

R1(config-router)#network 192.168.1.0

R1(config-router)#network 192.168.2.0

**Router 2**

R2(config)#router rip

R2(config-router)#network 192.168.5.0

R2(config-router)#network 192.168.4.0

**Router 0**

R0(config)#router rip

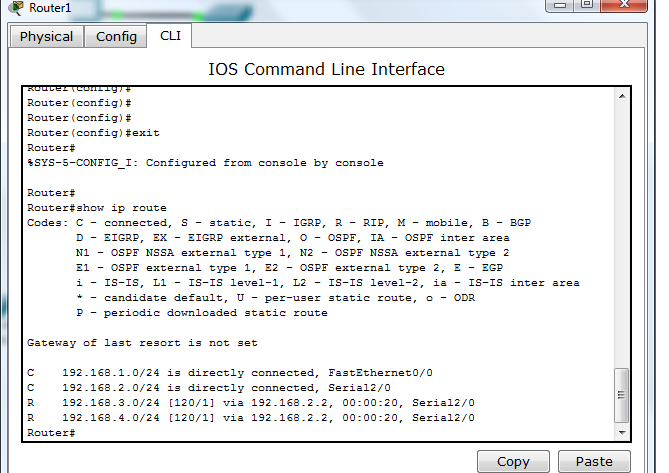
R0(config-router)#network 192.168.2.0

R0(config-router)#network 192.168.4.0

R0(config-router)#network 192.168.3.0

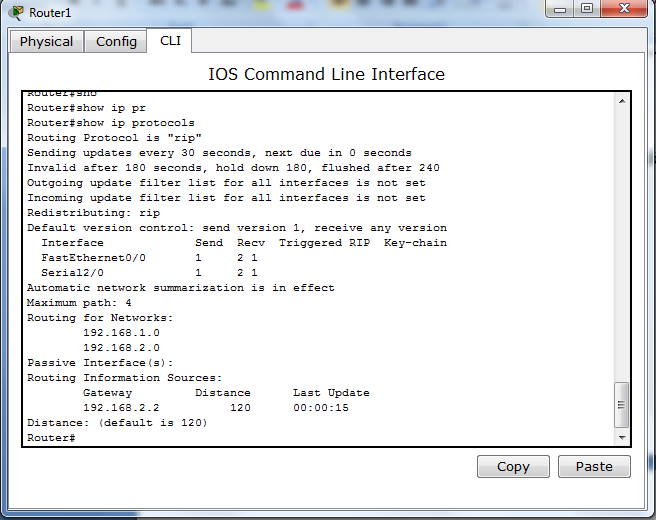
### Task 4- Verify RIP Routing

*Router# show ip route*



### Task 5- Use the show ip protocols command to view information about the routing processes.

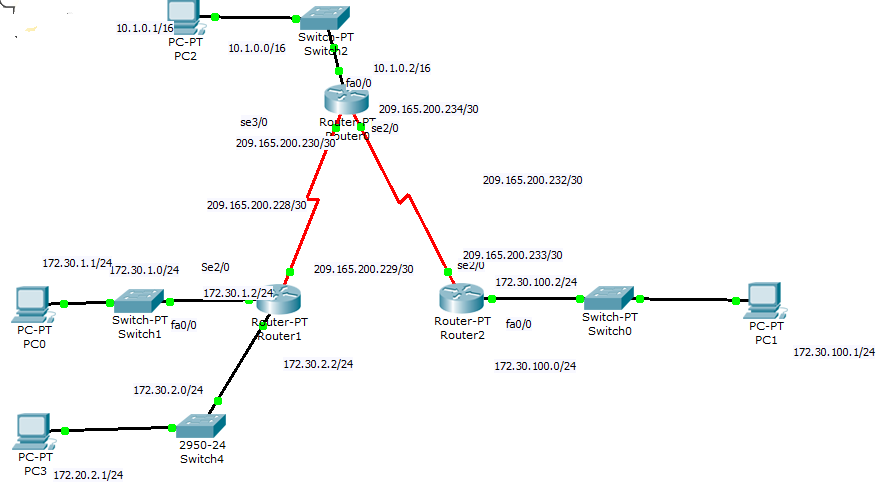
Router#show ip protocols



### Task 6- Use the debug ip rip command to view the RIP messages being sent and received.

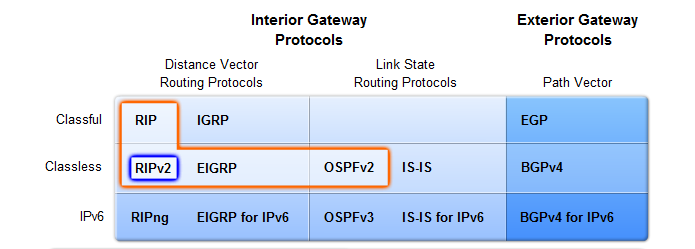
Router#debug ip rip

# Lab 3: RIPv2 Basic Configuration Lab



## Learning Objectives

* Cable a network according to the Topology Diagram.
* Examine the current status of the network.
* Configure RIPv2 on all routers.
* Examine the automatic summarization of routes.
* Examine the routing tables.
* Verify network connectivity.
* Document the RIPv2 configuration



RIPv2 support Classless routing

The main limitation of RIPv1 is that it is a classful routing protocol. As you know, classful routing protocols do not include the subnet mask with the network address in routing updates, which can cause problems with discontiguous subnets or networks that use Variable-Length Subnet Masking (VLSM). Because RIPv2 is a classless routing protocol, subnet masks are included in the routing updates, making RIPv2 more compatible with modern routing environments.

## RIPv2 Configuration

Router 1

Router(config)#Router rip

Router(config-router)#version 2

Router(config-router)#network 172.30.0.0

Router(config-router)#network 200.165.200.0

Router 0

Router(config)#Router rip

Router(config-router)#version 2

Router(config-router)#network 10.0.0.0

Router(config-router)#network 200.165.200.0

Router 2

Router(config)#Router rip

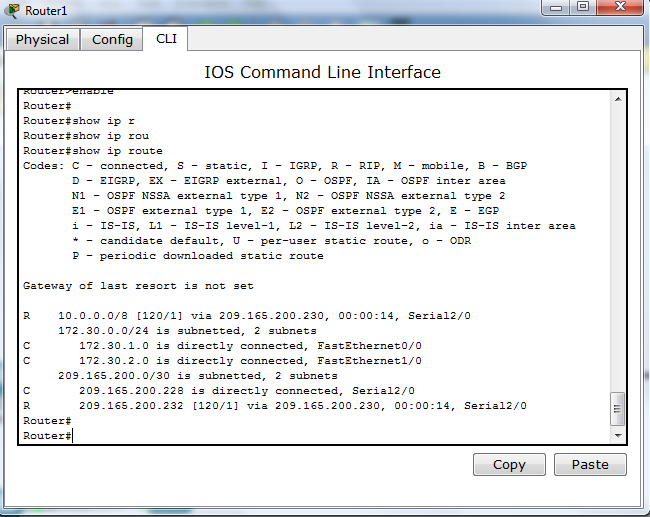
Router(config-router)#version 2

Router(config-router)#network 172.30.0.0

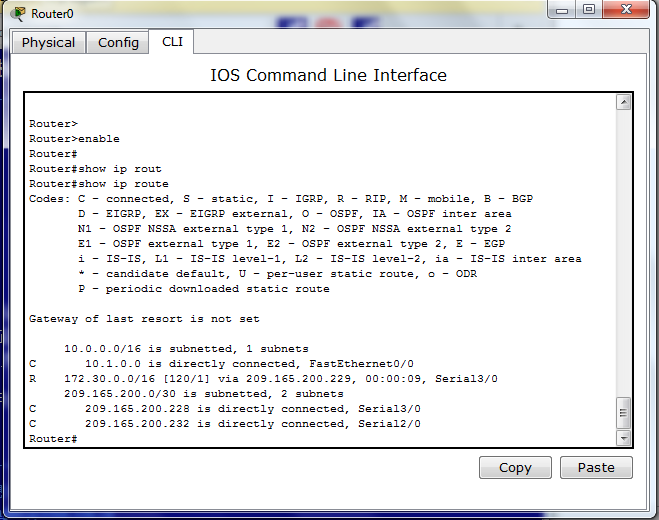
Router(config-router)#network 200.165.200.0

## Examine the routing tables.

Router 1



Router 0

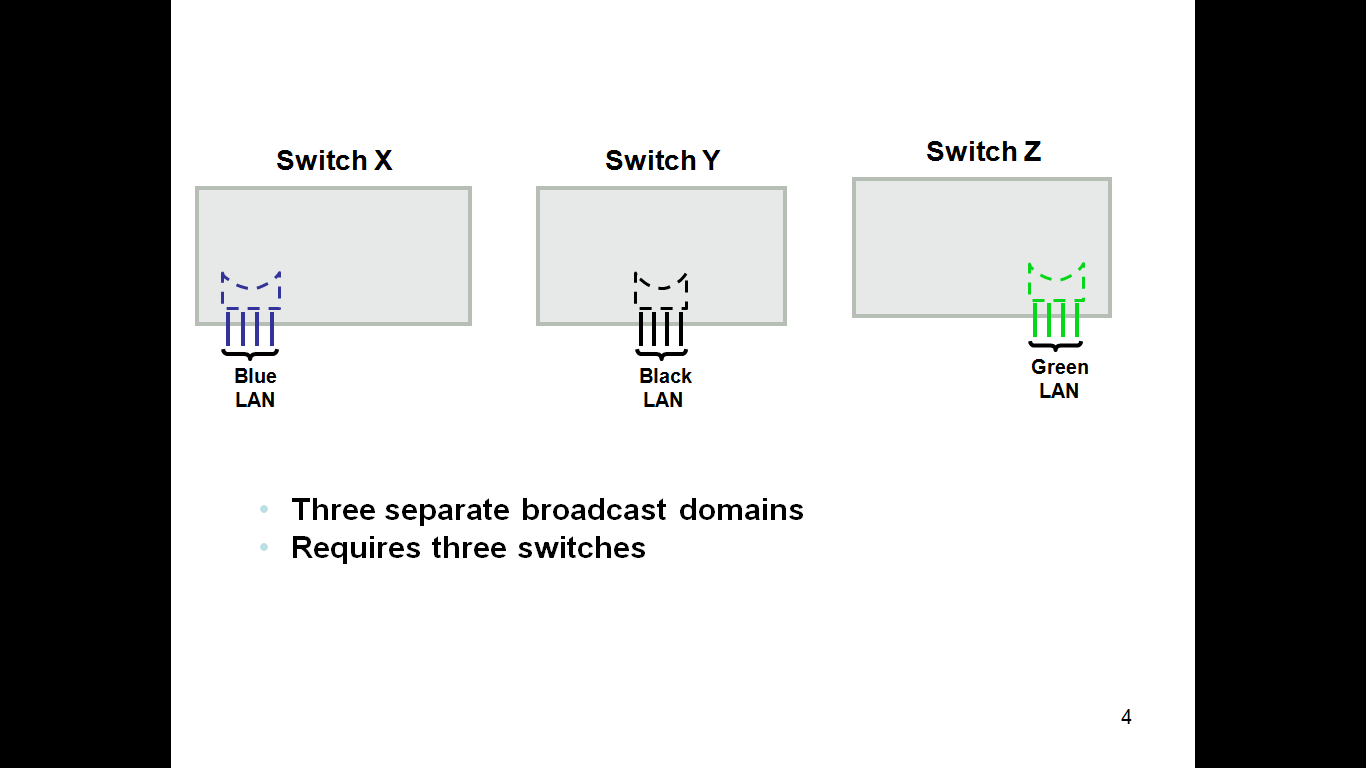


Router 2

# Lab 4-Basic VLAN Configuration

## VLAN Configurations

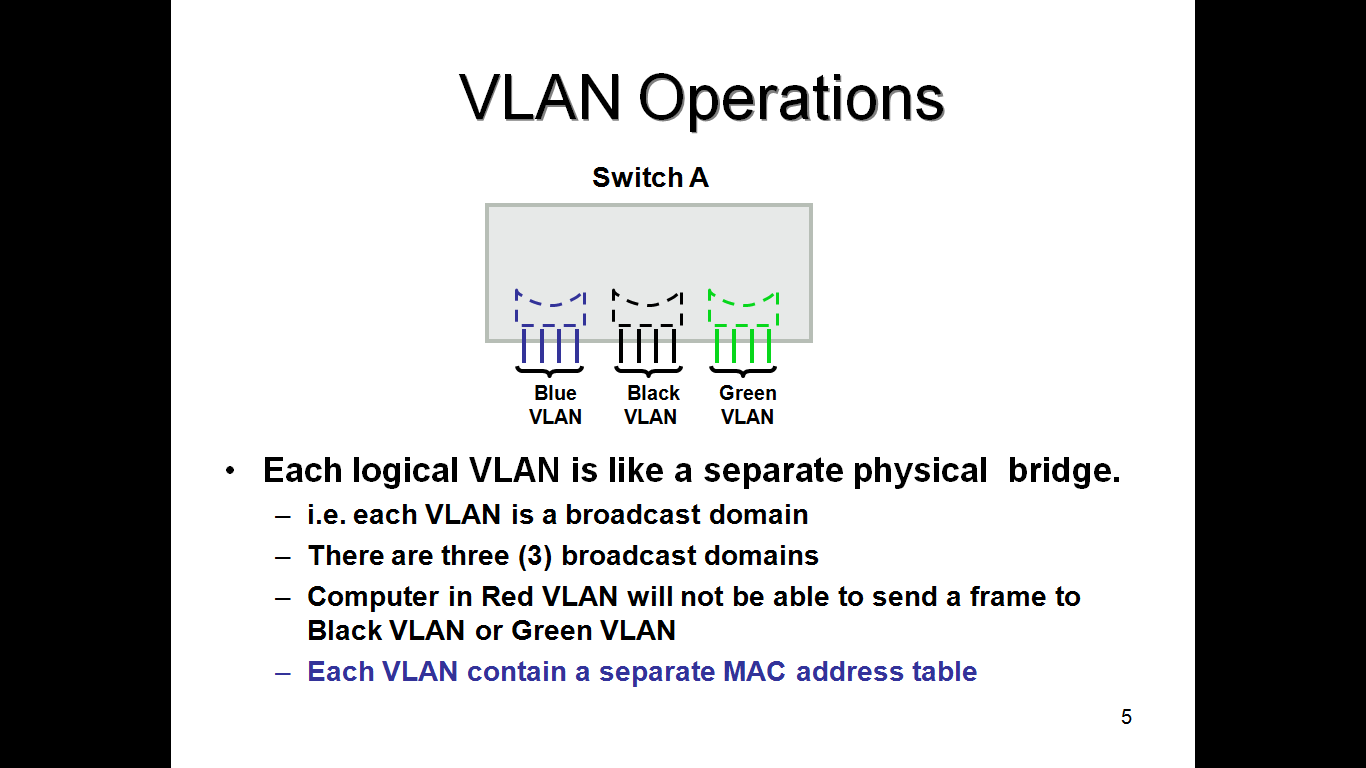
**Broadcast Domain**



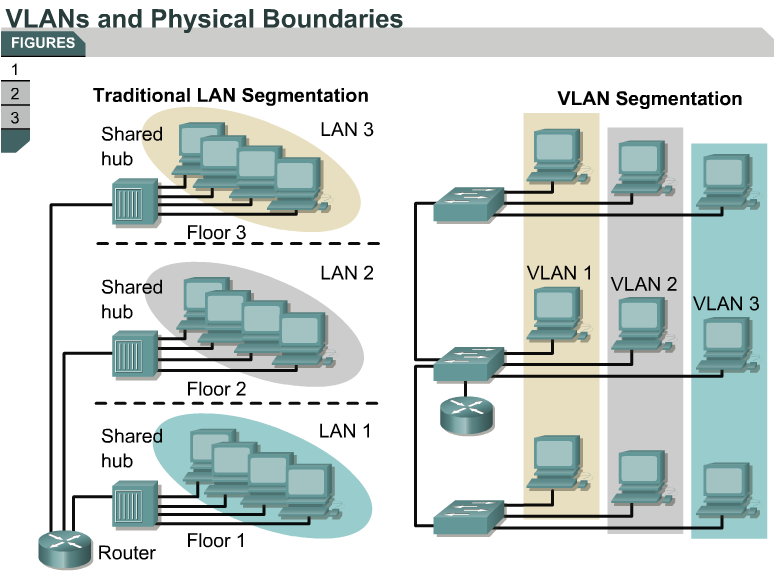
* Three separate broadcast domains
* Requires three switches

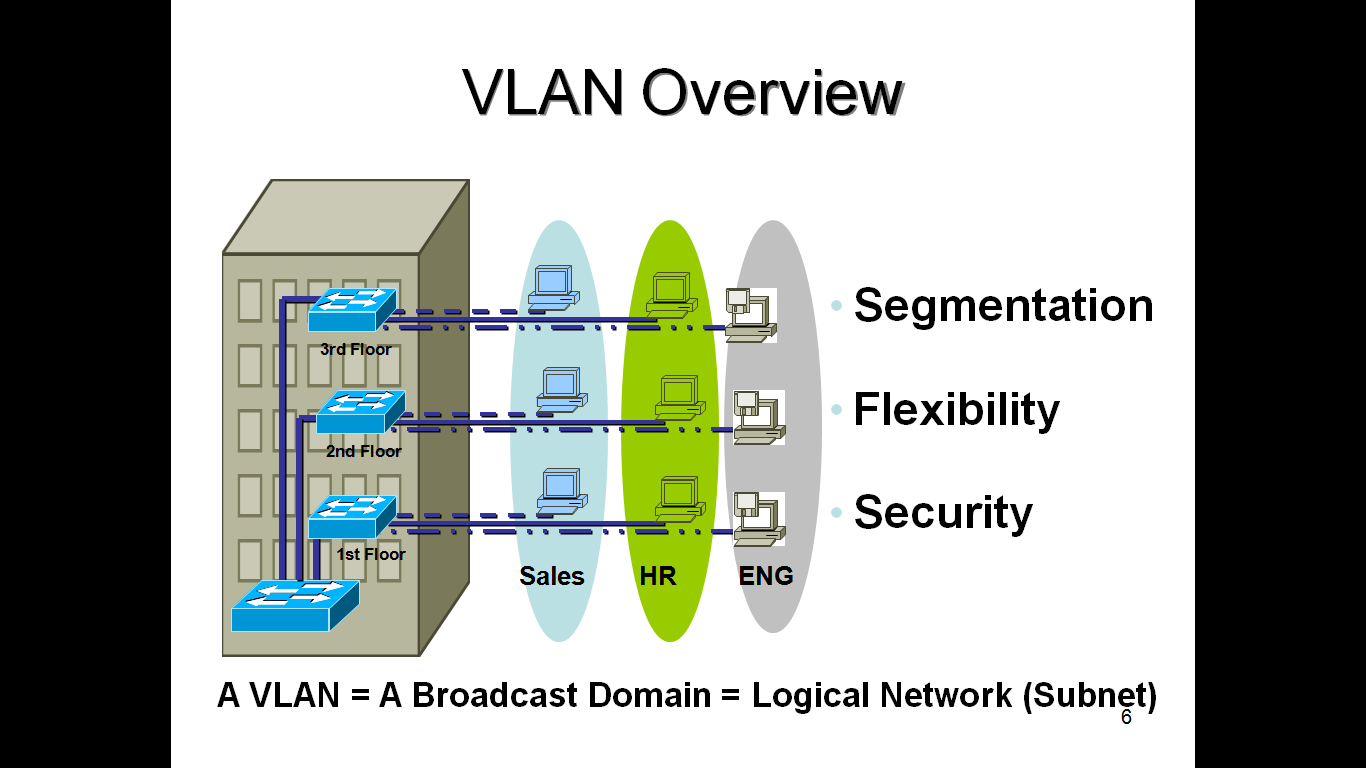
**Virtual Local Area Network (VLAN)**

* VLANS Creates broadcast domains by one or more switches
* Hosts(ports) on the switch with a common set of requirements can be grouped
* VLAN has a switched network that is logically segmented
* Each switch port can be assigned to a VLAN
* Ports assigned to the same VLAN share broadcasts.
* Ports that do not belong to that VLAN do not share these broadcasts

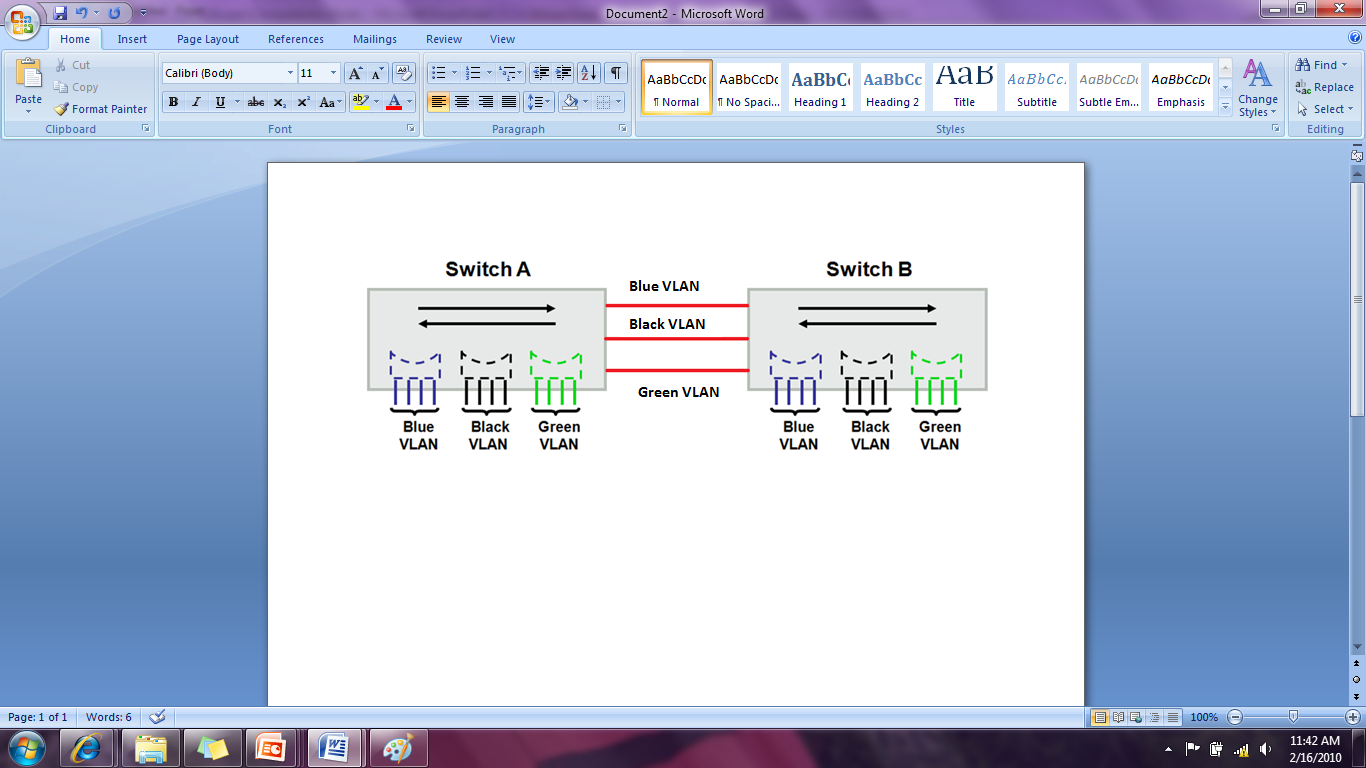


* Each logical VLAN is like a separate physical switch
* Each VLAN is a separate broadcast domain (3 broadcast domains)
* Each VLAN contains a separate MAC address table
* Computer in Blue VLAN will not be able to send a frame to Black VLAN or Green VLAN

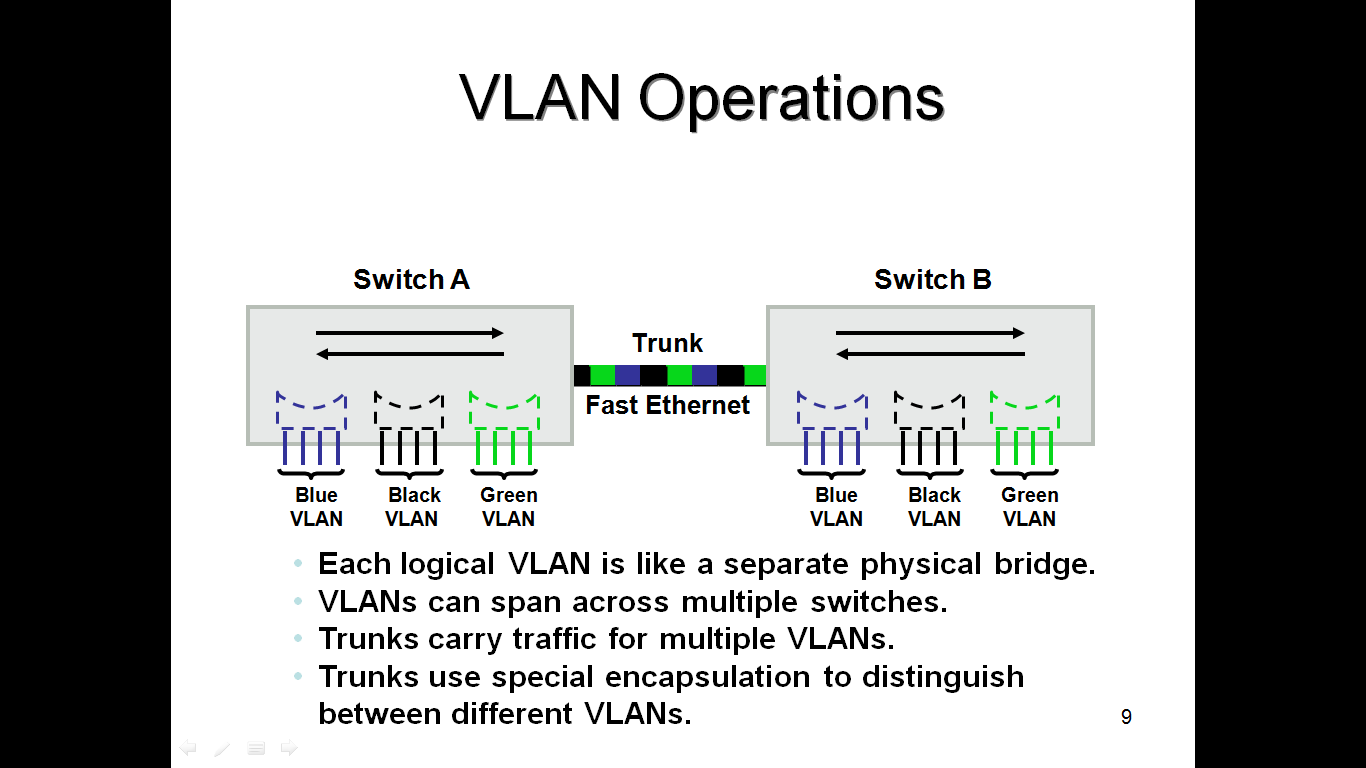




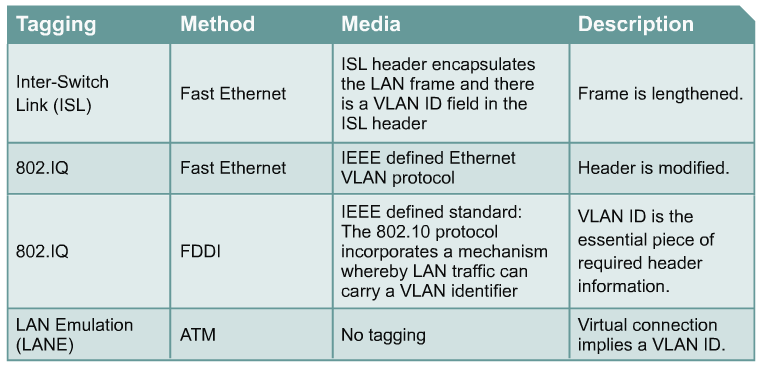
**VLANs can span across multiple switches**



VLAN TRUNKING



* The process of adding an additional header to a LAN frame
* Used to identify the VLAN to which the frame belongs
* Cisco refers to this as trunking
* Trunks carry traffic for multiple VLANs



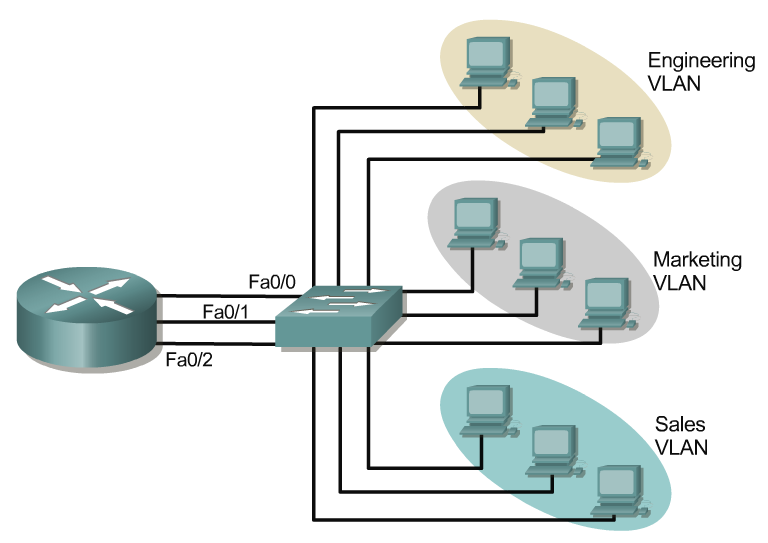
There are two types of VLAN Trunking:

- ISL (Inter-Switch Link) – Cisco Proprietary

- IEEE 802.1Q

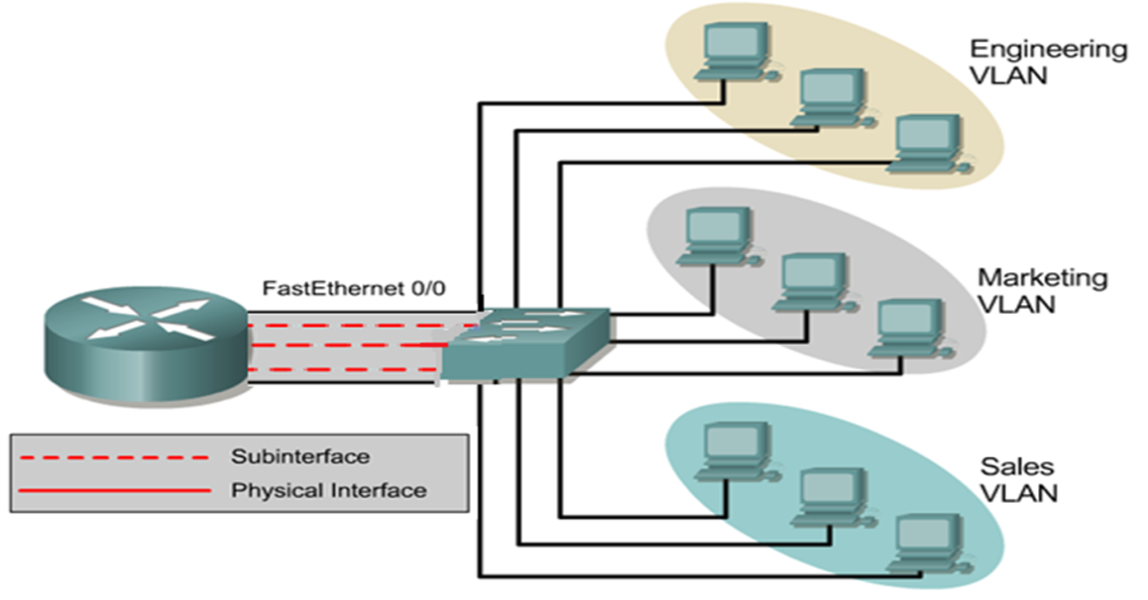
* Each VLAN will have different IP subnets
* VLANs don’t send data frames to other VLAN

(Separate MAC address table for each VLAN)



* + Three IP subnets
  + Router with 3 LAN ports
  + Waste of resources

**Passing traffic between VLANs cont**



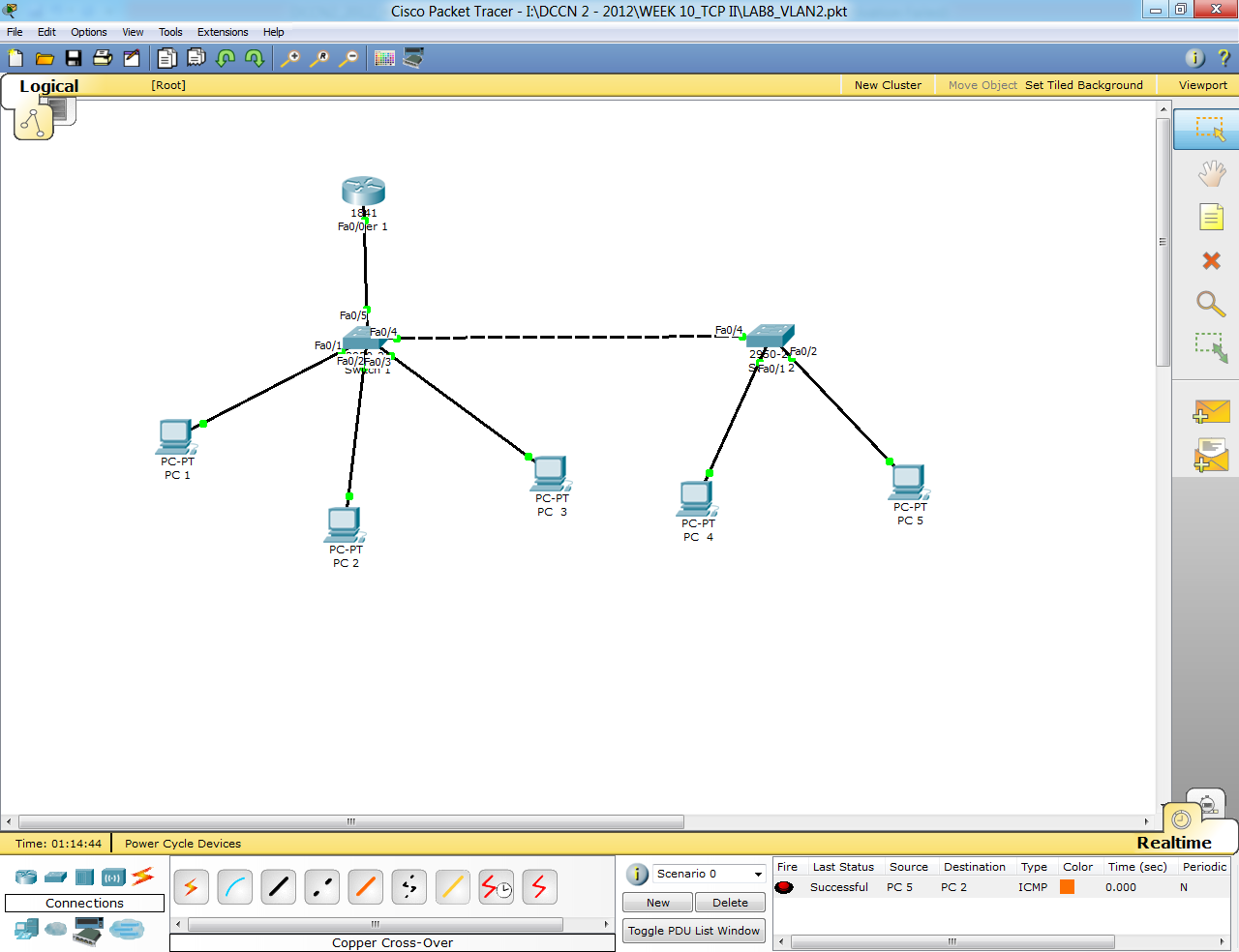
Router supports trunking (Inter VLAN routing)

- Single physical connection

- Single Fast Ethernet port

**Inter VLAN routing**

* Sub interfaces on a router can be used to divide a single physical interface into multiple logical interfaces
* Each physical interface can have up to 65,535 logical interfaces



## Creating VLAN

Create 3 VLANS – VLAN2, VLAN3, and VLAN4.

Assign ports to VLANs.

Switch1 E0/1 – VLAN2

Switch1 E0/2 – VLAN3

Switch1 E0/3 – VLAN4

Switch2 E0/2 – VLAN2

Switch2 E0/3 – VLAN3

**Creating VLAN**

**SWITCH 1**

Switch(config)#hostname SWITCH1

SWITCH1(config)#vlan 2

SWITCH1(config-vlan)#name vlan2

SWITCH1(config-vlan)#exit

SWITCH1(config)#vlan 3

SWITCH1(config-vlan)#name vlan3

SWITCH1(config-vlan)#exit

SWITCH1(config)#vlan 4

SWITCH1(config-vlan)#name vlan4

SWITCH1(config-vlan)#exit

SWITCH1(config)#

**SWITCH 2**

Switch(config)#hostname SWITCH2

SWITCH2(config)#vlan 2

SWITCH2(config-vlan)#name vlan2

SWITCH2(config-vlan)#exit

SWITCH2(config)#

SWITCH2(config)#vlan 3

SWITCH2(config-vlan)#name vlan3

SWITCH2(config-vlan)#exit

SWITCH2(config)

## Assign PC s to specific vlans

SWITCH1(config)#interface fastEthernet 0/1

SWITCH1(config-if)#switchport mode access

SWITCH1(config-if)#switchport access vlan 2

SWITCH1(config)#interface fastEthernet 0/2

SWITCH1(config-if)#switchport mode access

SWITCH1(config-if)#switchport access vlan 3

SWITCH1(config)#interface fastEthernet 0/3

SWITCH1(config-if)#switchport mode access

SWITCH1(config-if)#switchport access vlan 4

Same as for other interfaces that assign for vlan in Switch 1 and switch 2

## Configure TRUNK MODE

SWITCH1(config)#interface fastEthernet 0/5

SWITCH1(config-if)#switchport mode trunk

SWITCH1(config-if)#switchport trunk allowed vlan 2,3,4

Assign same as for Switch 2 also

SWITCH2(config)#interface fastEthernet 0/1

SWITCH2(config-if)#switchport mode trunk

SWITCH2(config-if)#switchport trunk allowed vlan 2,3

## Configure INTER VLAN ROUTING

**SWITCH CONFIGURATION**

SWITCH1(config)#interface FastEthernet0/4

SWITCH1(config-if)#switchport mode trunk

**When we move to Router configuration we must assign sub network for 3 vlans**

Router(config)#interface fastEthernet 0/0

Router(config)#no shutdown

Router(config-if)#interface fastEthernet 0/0.1

Router(config-subif)#encapsulation dot1Q 2

Router(config-subif)#ip address 192.168.10.1 255.255.255.0

Router(config-if)#interface fastEthernet 0/0.2

Router(config-subif)#encapsulation dot1Q 3

Router(config-subif)#ip address 192.168.11.1 255.255.255.0

Router(config-if)#interface fastEthernet 0/0.3

Router(config-subif)#encapsulation dot1Q 4

Router(config-subif)#ip address 192.168.12.1 255.255.255.0