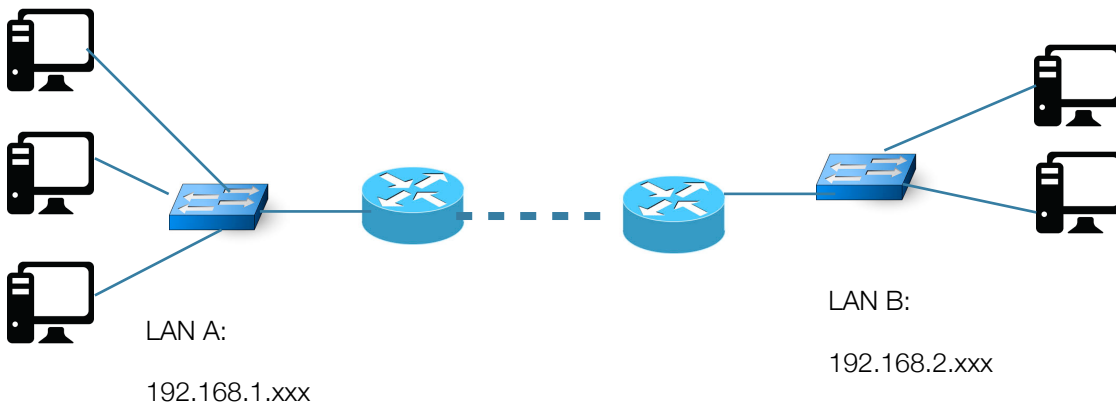
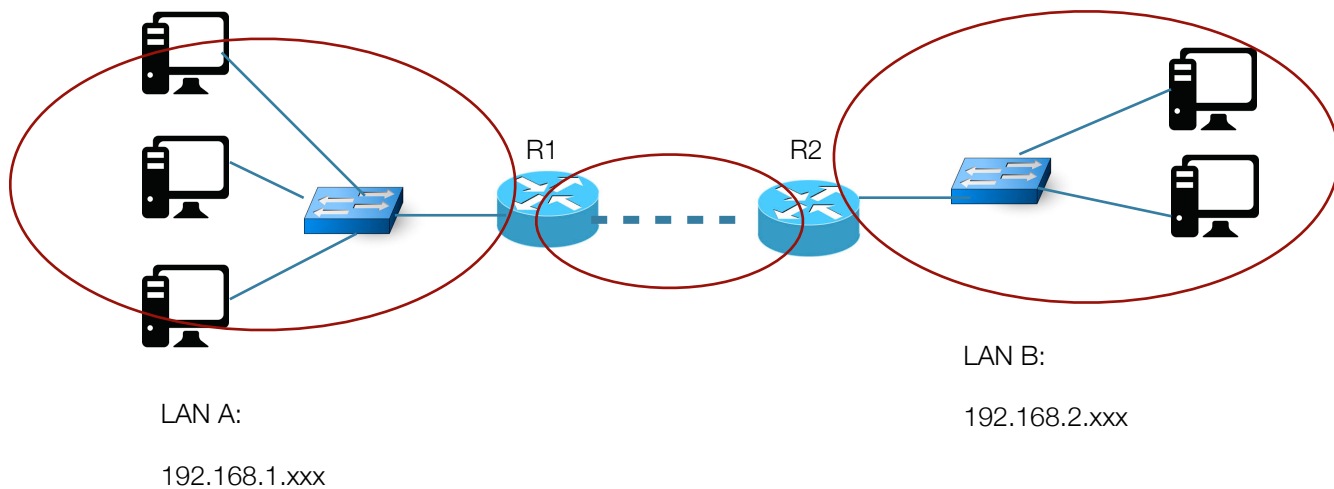


### LAB BRIEF

Last week we connected two networks together using a single router. In this scenario the router **knows** about both networks because they are directly connected to it. This week we will see a network where we connect two LANs together using two routers like this:



This Actually creates **three** separate networks.



The middle network between the two routers also needs its **own address range** (street address). We will give it the address range: 192.168.3.xxx.

This situation is more difficult to organise because:

R1 knows - 192.168.1.xxx and 192.168.3.xxx networks, but **not** 192.168.2.xxx.

R2 knows - 192.168.2.xxx and 192.168.3.xxx networks, but **not** 192.168.1.xxx.

If R1 gets a message for 192.168.2.xxx, where should it send that message?

We will tell the router what to do with messages where the destination is **unknown** to the router.

---

## COMPUTER NETWORKS

We will add **static routes**. - See “**Adding static routes**” below for further information.

The object of the lab is to design a network so that all clients on the network can send messages to each other. The network will be designed in Cisco Packet Tracer.

- Router configuration will be performed using the command line interface (CLI).

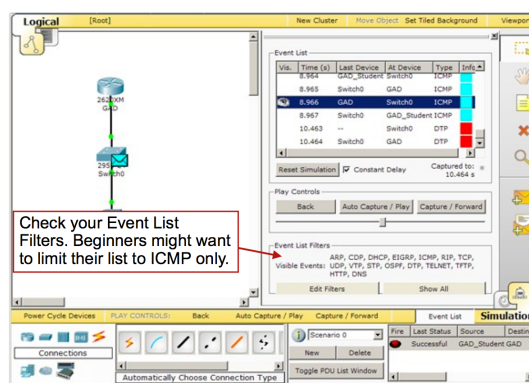
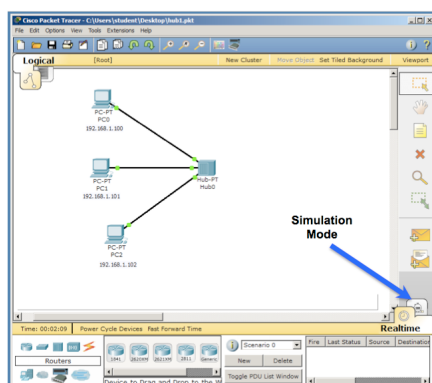
## PACKET TRACER SETUP

**PACKET TRACER SETUP**

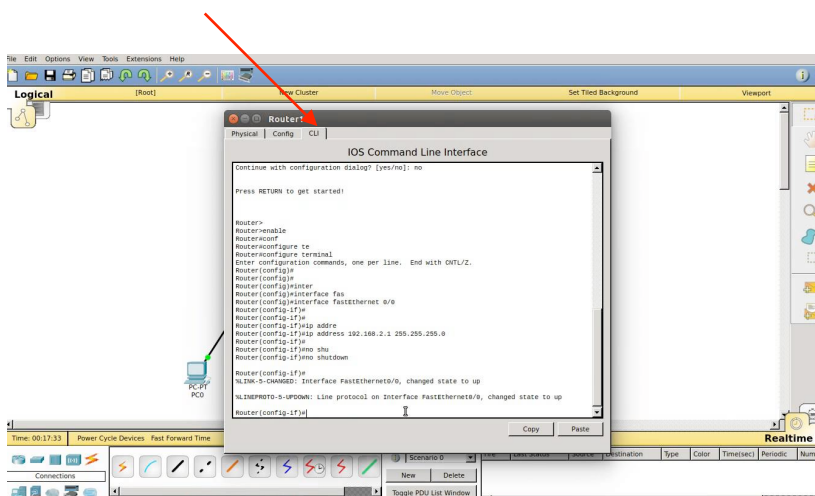
To help with debugging and progressive designing of the network I suggest you set your packet tracer to run in:

Simulation:-

Filters set to ICMP only!



Configure using the CLI terminal:



---

## THE CLI INTERFACE

The Router CLI has a number of privilege levels:

<b>User EXEC</b>	- Can only see some aspects of router
<b>Privilege EXEC</b>	- Can see all configuration of router
<b>Configure Mode</b>	- Can make changes to the configuration

The user enters the router in “User EXEC” mode.

```
Router> enable
```

```
Router# configure terminal
```

```
Router (config)# exit
```

Using the command “enable” brings the user to Privilege EXEC.

Using “configure terminal” will bring the user to configuration mode.

Type “exit” to exit - EXEC modes, Interfaces.

### The Show command

The “Show” command is extremely useful. It can show you configuration information on the router but can also show you a list of commands that you can use.

try:

```
Router# show ?
```

```
Router# show interfaces
```

```
Router# show ip interface brief
```

```
Router# show ip interface FastEthernet 0/1
```

Tip: Use the show command to look at all the interfaces on the router..... is there an interface called “FastEthernet 0/1” on your router?

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---

## Interfaces:

The intent of router interface configuration is to configure each of the interfaces correctly.

To enter the interface and configure use "interface interface-name interface-number(slot/port)":

```
Router (config)# interface FastEthernet 0/1
```

We can use this command to give the interface an IP address :- this is all we want to do for today on interface.

```
Router (config-if)# ip address 192.168.1.5 255.255.255.0
```

Now we turn the interface on!

```
Router (config-if)# no shutdown
```

and exit the interface:

```
Router (config-if)# exit
```

Now try the show interfaces and show ip interface command for that interface.

## Adding static routes

Static routes tell a router where to send messages for a network the router does not know.

With a static route we let the router know about the unknown network. Example:

We tell R1 that if it wants to send a message to Network 192.168.2.xxx, it should send the message to R2.  
(Actually we tell it to send it to R2's interface).

The router holds a list of all the networks it knows:

Attached to - Knows directly,

Learns about - either through static routes or - dynamic routing which we will learn about later.

First look at the routers routing table (To see what networks the router currently knows):

```
Router#show ip route
```

Adding a static route is a simple command:

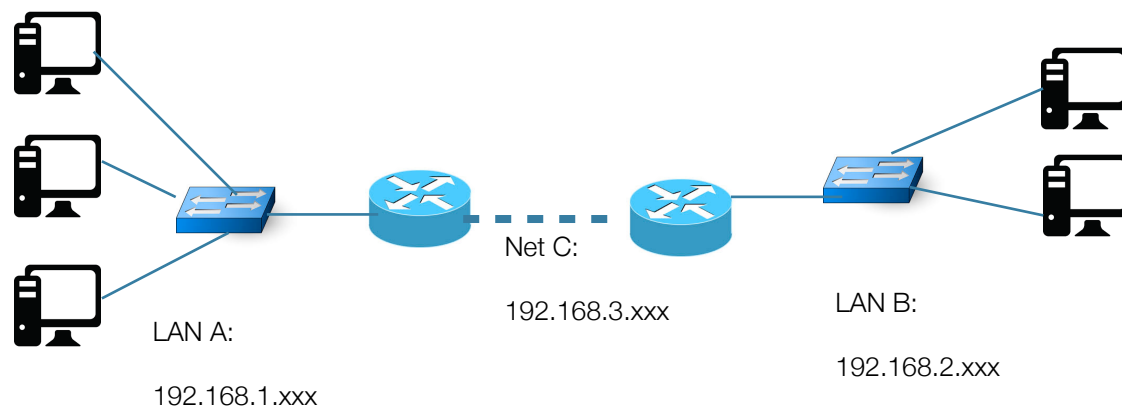
```
Router (config)# ip route 192.168.2.0 255.255.255.0 192.168.3.1
```

This tells the router to send any packets with IP address 192.168.2.xxx to the ip address 192.168.3.1.

---

---

## NETWORK DESIGN



The proposed Network design contains:

2 routers

2 switches

Lan A - 3 clients - IP address 192.168.1.xxx, IP MASK 255.255.255.0

Lab B - 2 clients - IP address 192.168.2.xxx, IP Mask 255.255.255.0

Net C - 0 clients..... But 2 interfaces - IP address 192.168.3.xxx, IP Mask 255.255.255.0

Each client in the network should be able to send a PING message to every other client in the network.

## STEPS

- Set up the Network with 2 switches 2 routers and 5 computers on your workspace.
  - Give each of the Computers a correct IP address.
  - Try sending messages to/from all of the Computers/Interfaces on the network - What happens?
  - Give each of the Router Interfaces an IP address - see **"Interfaces"** above.
  - Give each of the Computers a default Gateway.
  - Try sending messages to/from all of the Computers/Interfaces on the network - What happens?
  -
-

- 
- Add the **static routes**: - use “**Adding Static routes**” for help.
    - Look at R1's routing table.
    - Add a route, sending packets for LAN B to R2's interface that is connected to R1.
    - Recheck the routing table
    - Look at R2's routing table.
    - Add a route, sending packets for LAN A to R1's interface that is connected to R2.
    - Recheck the routing table.
  - Try sending messages to/from all of the Computers/Interfaces on the network - What happens?
-