

Packet Tracer – Static Routing Protocol.

Practical

We are going to develop the Static Routing method in CISCO Packet Tracer.

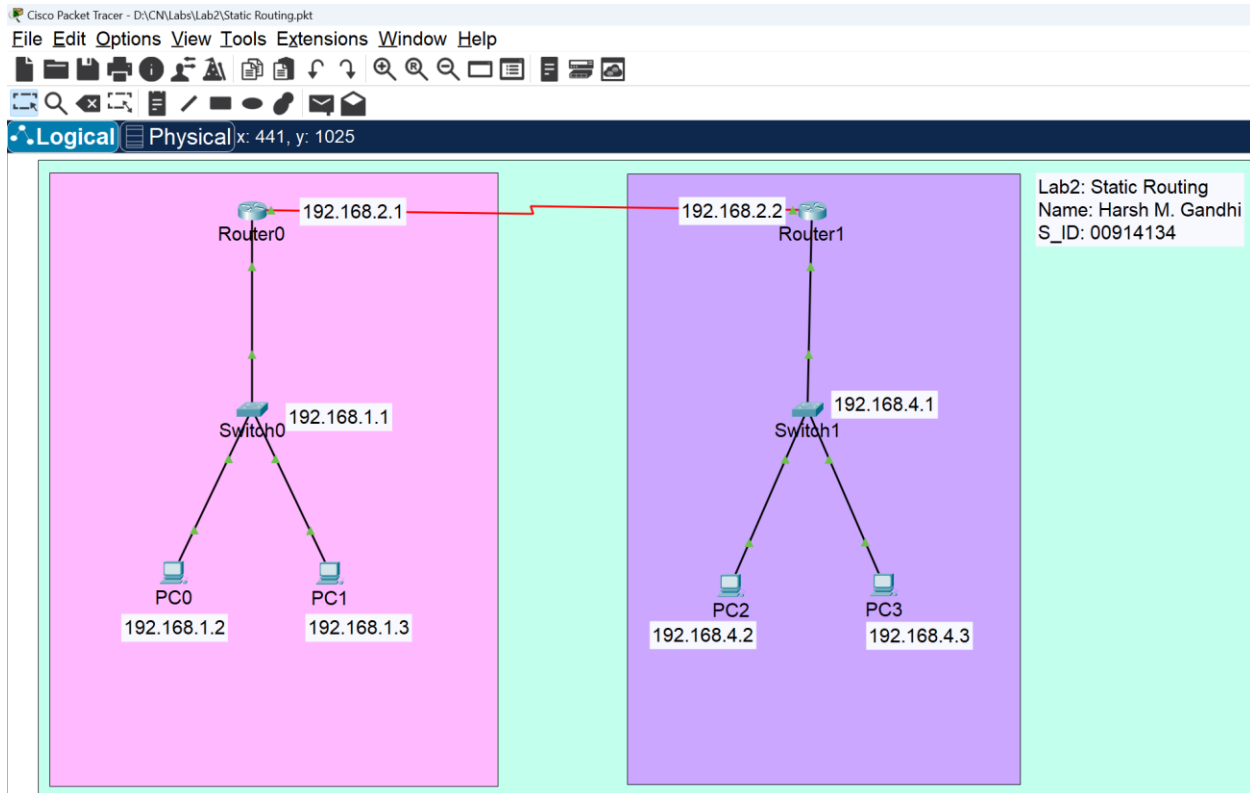


fig 1.1 of Prototype.

Outcome:

- 1) Paste the CLI of both the router.
- 2) Show that the message transmission was successful.

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Routing

What is Routing?

The process of choosing a path for traffic inside, between, or across several networks is known as routing. In general, routing is carried out in a variety of networks, including computer networks like the Internet and circuit-switched networks like the public switched telephone network.

Routing schemes differ in how they deliver messages.

- Unicast
 - In computer networking, unicast routing is a communication technique that sends data over a dedicated, direct channel from one sender to a specified destination. It is not the same as multicast or broadcast, which transfer data to several receivers. Similar to IP, unicast routing technologies choose the most effective and dependable path for data to take in order to reach its intended single destination.
- Broadcast
 - A networking communication technique called broadcast routing sends data to every device in a network from a single sender. It is employed when the sender want to simultaneously reach every device without designating a specific recipient.
- Multicast
 - A networking communication technique called multicast routing allows data to be transferred from a single sender to a predetermined set of receivers. Instead of providing data to every device in the network, it distributes it selectively to those that have indicated an interest in receiving it, allowing for effective one-to-many or many-to-many communication.
- Anycast
 - Anycast routing is a networking strategy in which several servers or network devices are allocated the same IP address. When a client submits a request to an anycast IP address, the network forwards it to the server that is closest to the client or responds the fastest among the devices that are using the same IP address. Anycast is frequently used to balance load and enhance the responsiveness and dependability of services.
- Geocast
 - Geocast routing is a networking technique that targets all devices within a given geographic region by sending data from a single sender to that area. With this technique, information may be delivered to devices within a certain geographic range, enabling location-based communication. Applications like location-based services or information distribution to a particular local region might benefit from geocast routing.

Topology distribution:

There are two types of routing mechanisms. They are static routing and dynamic routing.

- **Static Routing:** Manually input data is stored in a static routing table. Every destination's route is entered by the administrator into the table. The table cannot be set up to update automatically whenever something changes on the internet. The routing table has to be changed by the administrator.
- **Dynamic Routing:** Using one of the dynamic routing protocols, such as RIP, OSPF, or BGP, a dynamic routing table is updated on a regular basis. The dynamic routing protocols instantly update all of the routers' tables whenever there is a change in the internet, such a router shutting down or a link breaking. (It will be for later practical).

Static Routing has several primary uses, including:

- Facilitating simple routing table maintenance for tiny networks with little growth prospects. Routing to and from a stub network, which is a network with only one default route out and no knowledge of any remote networks.
- Accessing a single default route (which is used to represent a path to any network that does not have a more specific match with another route in the routing table).

Advantage and Disadvantage of Static Routing.

Advantages	Disadvantages
Easy to Implement in small network	Suitable for simple topologies for special purposes such as a default static route.
Very Secure, No advertisement are sent, unlike with dynamic routing protocols.	Configuration complexity increases dramatically as the network grows. Managing the static configurations in large networks can become time consuming.
It is very predictable, as the route to the destination is always the same.	If a link fails, a static route cannot reroute traffic. Therefore, manual intervention is required to re-route traffic.
No routing algorithm or update mechanisms are required. Therefore, extra resources (CPU and memory) are not required.	

Solution.

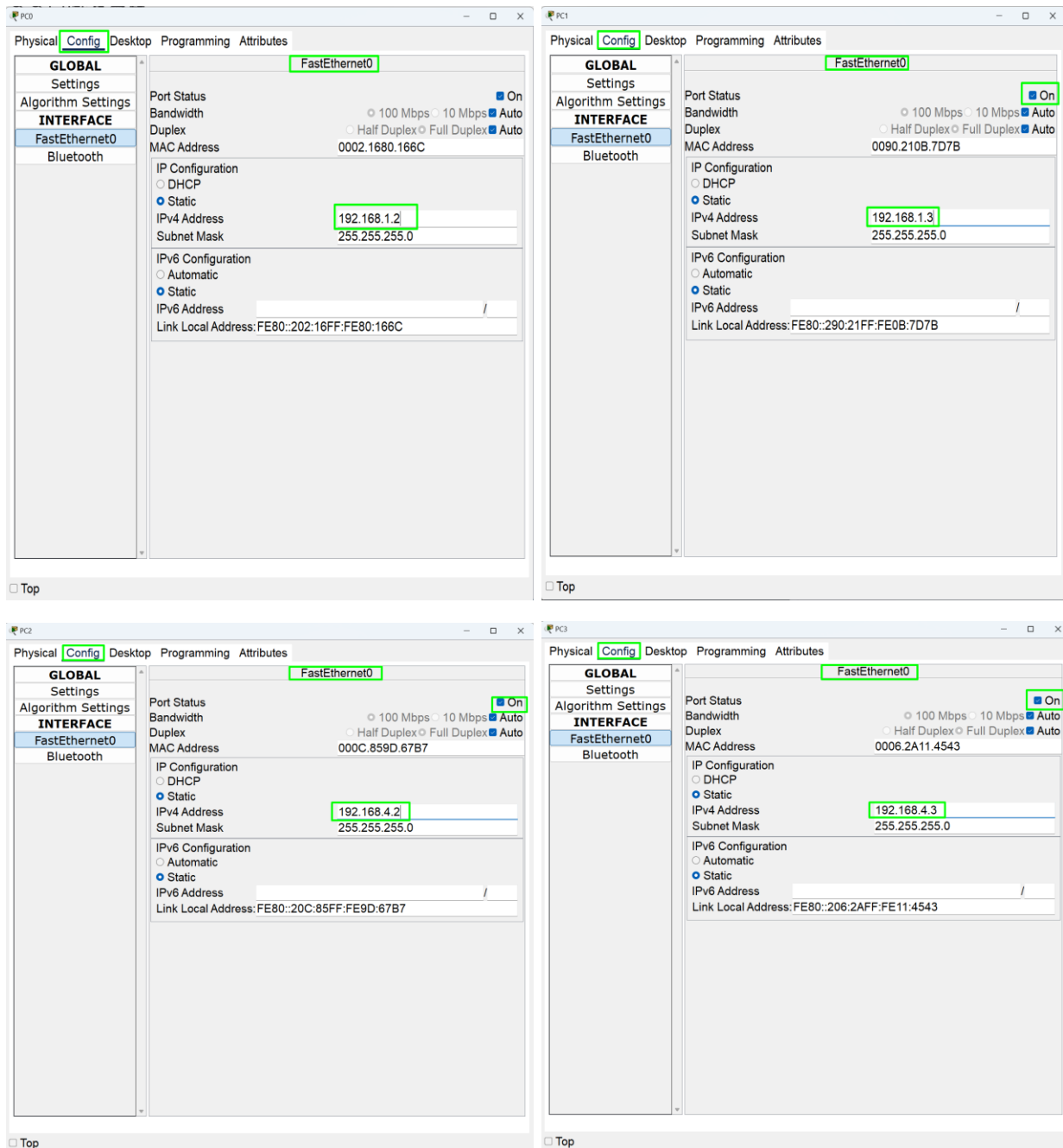
Step to build the Network.

- 1) First of all, Open the CISCO packet tracer with new file(Blank File).
- 2) Take 2 PT-Router, 2 PT-Switch, and 4 PC.
- 3) Now we will create a 2 separate environment network which contain 1 router, 1 switch and 2 pc.
- 4) Connect the PC with Switch through Copper Straight-Through in both the environment, then connect the Switch to Router with same cable in both the environment, in last connect both the Router with each other so they can communicate.
- 5) It is shown if the device has established a Fa0/0 or Fa0/1 connection when you hover over the green or red dot in the network. In your network, take notice of these connections.

Configure All the End-Points.

- 1) Double Click on the PC0 and Move to Config tab and click on the FastEthernet0
- 2) Check the Port Status is On or not if not Just click on the check box.
- 3) Now Give the Static IP address as shown in the figure(Provide the same IP as in figuer).
- 4) Repeat the Same Step in PC 1, PC 2 and PC 3.

Image with Ip Configuration in all the PC.

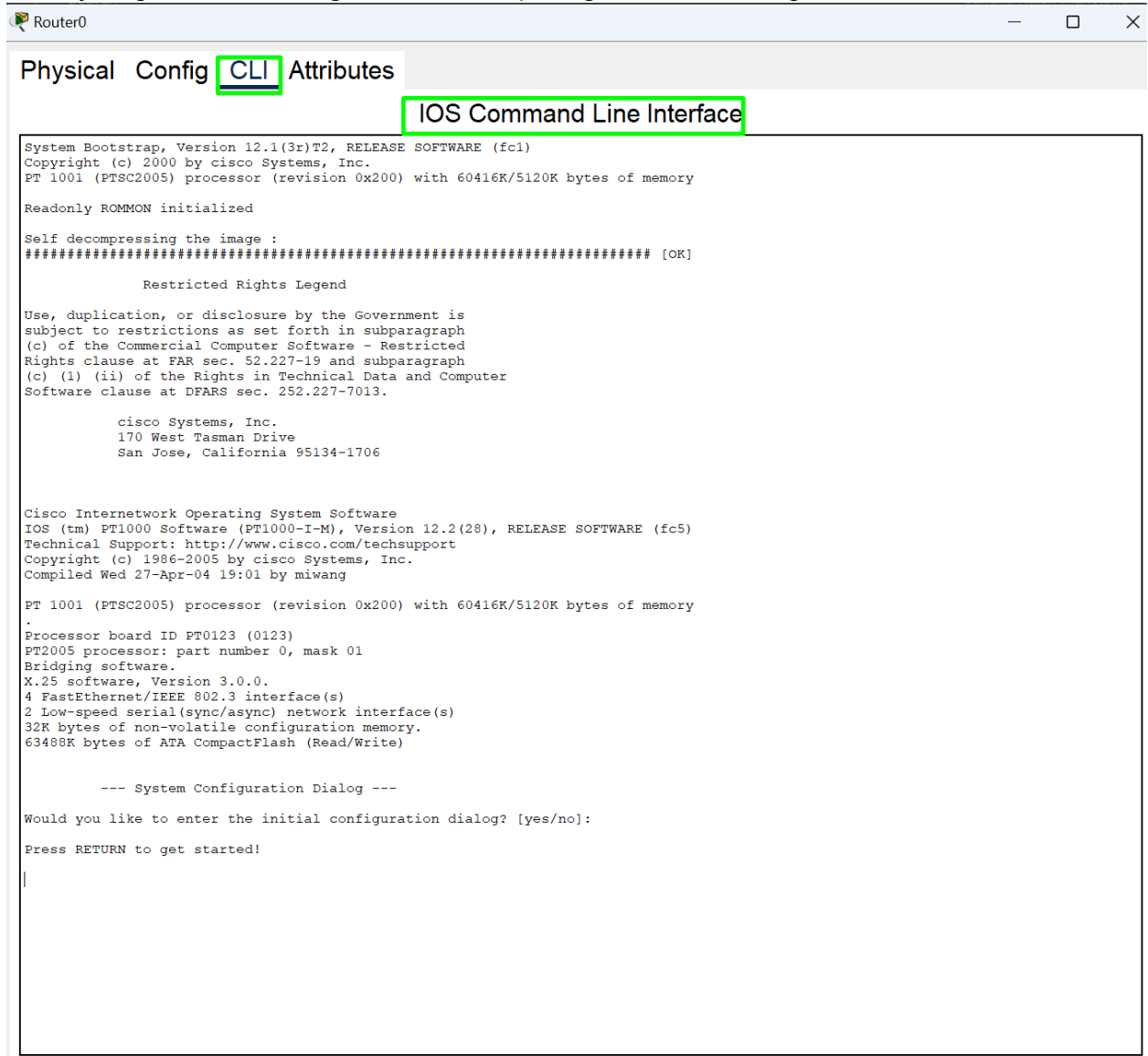


Configuring the Router.

There are 2 method to configuring the router 1) through CLI and 2) By UI interface of the Router and add Static IP.

Through CLI Interface.

- Double Click on the Router, and move to CLI windows.
- Here you get the following same desktop as given in the image.



CLI Command

Now write all the Following command in the CLI window.

```
Router>
Router>en
Router#
Router#config t
Router(config)# int fa0/0
Router(config-if)#ip add 192.168.1.1 255.255.255.0
Router(config-if)#no shutdown
Router(config-if)#int se2/0
Router(config-if)#ip add 192.168.2.1 255.255.255.0
Router(config-if)#no shutdown
Router(config-if)#clock rate 64000
Router(config-if)#exit
```

- Now click on router 1 and open the CLI. Enter the following commands.

```
Router>
Router>en
Router#
Router#config t
Router(config)# int fa0/0
Router(config-if)#ip add 192.168.4.1 255.255.255.0
Router(config-if)#no shutdown
Router(config-if)#int se2/0
Router(config-if)#ip add 192.168.2.2 255.255.255.0
Router(config-if)#no shutdown
Router(config-if)#exit
```

- Now go back to the CLI of router 0 and type the following commands.

```
Router(config)# ip route 192.168.4.0 255.255.255.0 192.168.2.2
Router(config)#exit
```

- Now go back to the CLI of router 1 and type the following commands.

```
Router(config)# ip route 192.168.1.0 255.255.255.0 192.168.2.1
Router(config)#exit
```


By UI interface

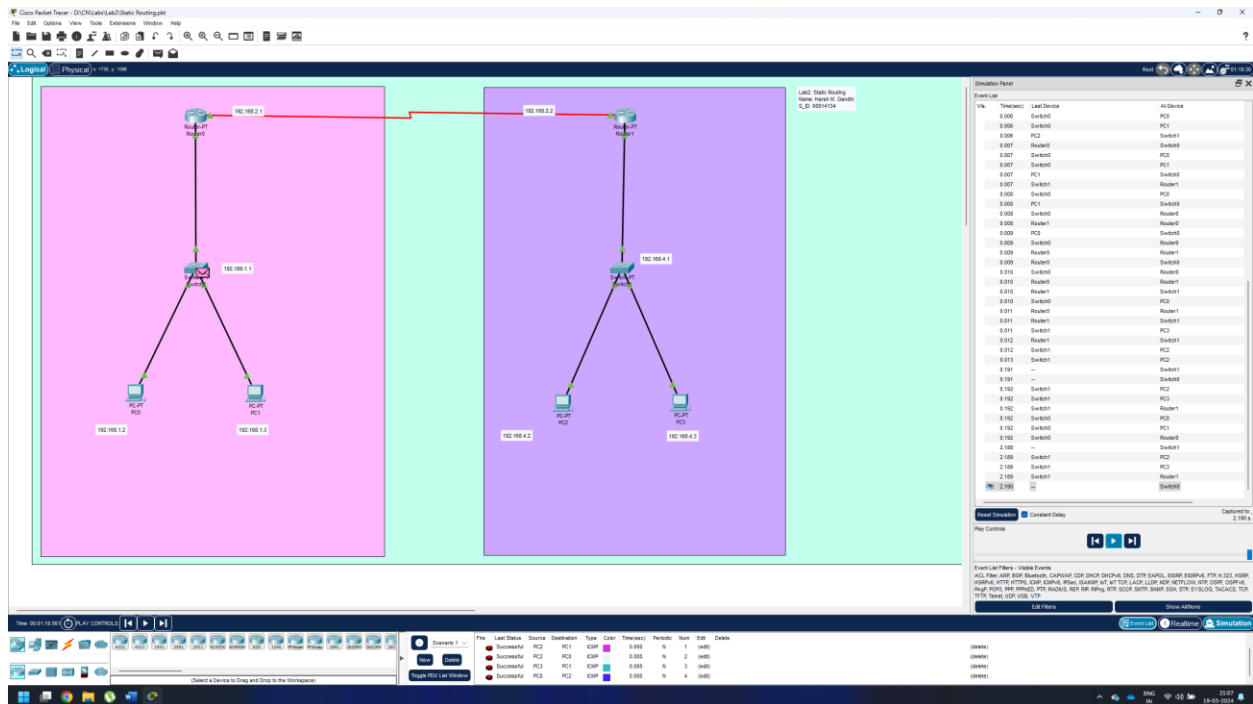
- Instead of typing this command `ip route 192.168.1.0 255.255.255.0 192.168.2.1`, it can also be done as follows:
- Double Click on the Router0 and open the Config tab and open the Static Window under the Routing tab.
- Now manually enter the value of Network, Subnet Mask and Next Hop
- Network IP: 192.168.1.0
- Subnet Mask: 255.255.255.0
- Next Hop: 192.168.2.1
- It means you are defining (specifying source and destination) a route for the traffic to flow through the router.
- Do the same for Router1.

The screenshot shows the configuration window for Router0. The 'Config' tab is selected, and the 'Static' option under the 'ROUTING' section is highlighted. In the 'Static Routes' section, the following values are entered:

Field	Value
Network	192.168.4.0
Mask	255.255.255.0
Next Hop	192.168.2.2

An 'Add' button is visible next to the input fields. Below the input fields, the 'Network Address' is displayed as '192.168.4.0/24 via 192.168.2.2'. A 'Remove' button is located at the bottom right of the network address display area. The 'Equivalent IOS Commands' section at the bottom is currently empty.

Result of all packages



- Here you can see that all packages are making the proper communication with each other as the routing protocol has been designed.