Computer Networks-Lab

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CL30001 – Computer Networks-Lab

SEMESTER Fall 2021

Computer Networks - Lab 10

OBJECTIVES

After these Lab students shall be able to perform

- **Configuration of static routing**
- **Configure static routing in two routers.**
- **Configure static routing in Multi Routers.**
- **Ip route command**

PRE-LAB READING ASSIGNMENT

Remember the delivered lecture carefully.

Table of Contents

IP route command

IP route command is used to configure the static route. Static routes are the most secure way of routing. They will also increase overall network performance. These features are extremely helpful in small network.

```
Router(config)# ip route destination_network_# [subnet_mask]
IP_address_of_next_hop_neighbor


And


Router(config)# ip route destination_network_# [subnet_mask]
interface_to_exit
```

Let's explore above commands in detail

ip route

This is the base command which adds new route in routing table.

destination_network_#[subnet_mask]

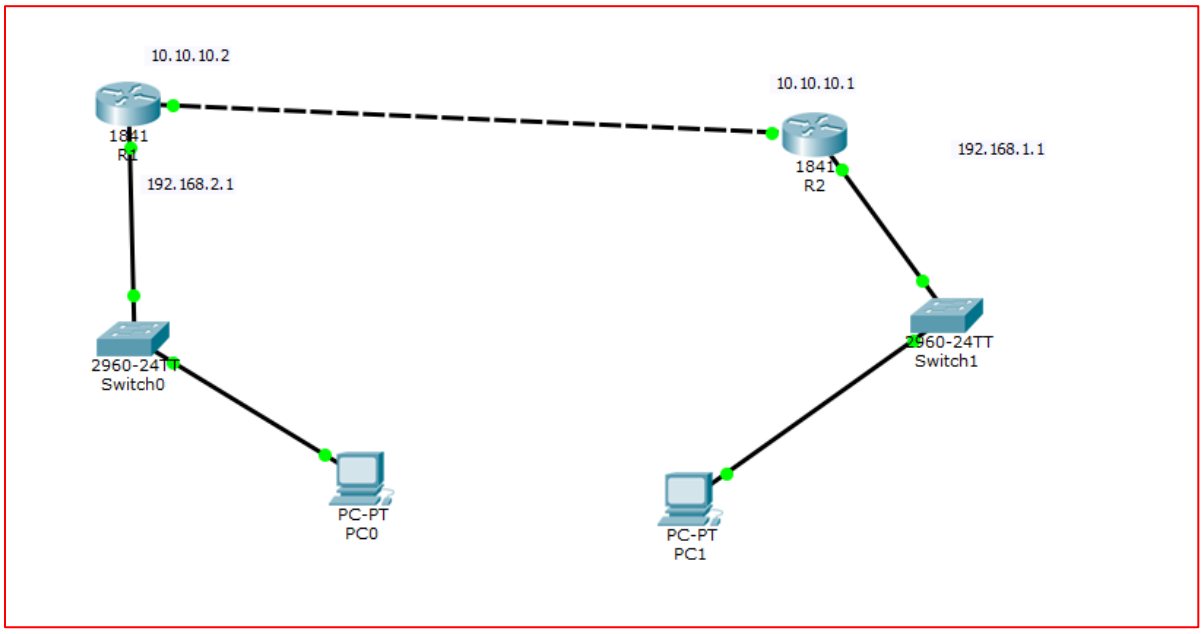
This is the first parameter. It specifies the destination network address. We need to provide subnet mask if we are using sub-network. Sub-networks are the smaller networks created from one large network in subnetting. If we are not using sub-network then we can omit the subnet mask value. It will parse automatically.

IP_address_of_next_hop_neighbor / interface_to_exit

This parameter provides a way to reach the destination network. Both commands use separate way to assign this value. First command provides the IP address of next hop neighbor. It tells router that if it receives a packet for destination [that we set in previous parameter], forward that packet to this next hop neighbor IP address.

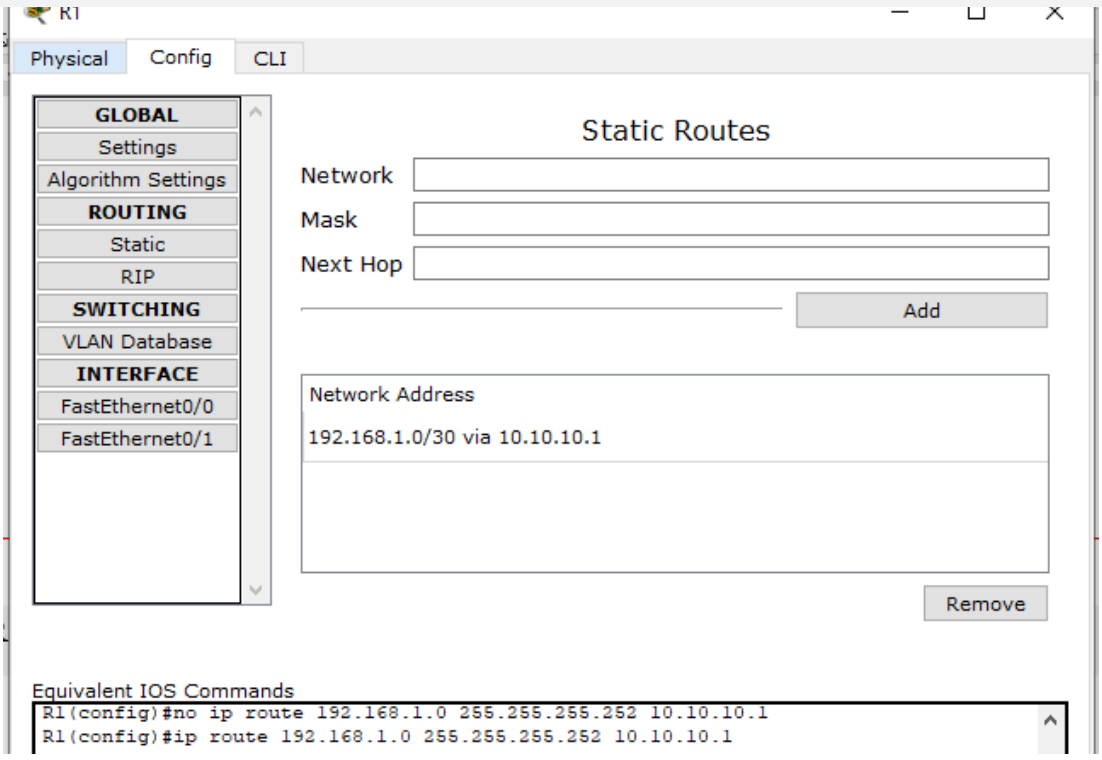
Second command also do the same job but in different way. It specifies exit interface instead of next hop IP address. It tells router that if it receives a packet for the destination specified by previous parameter then exits that packet from this interface. Device attached on other end of this interface will take care of the packet.

Connect 2 Routers:

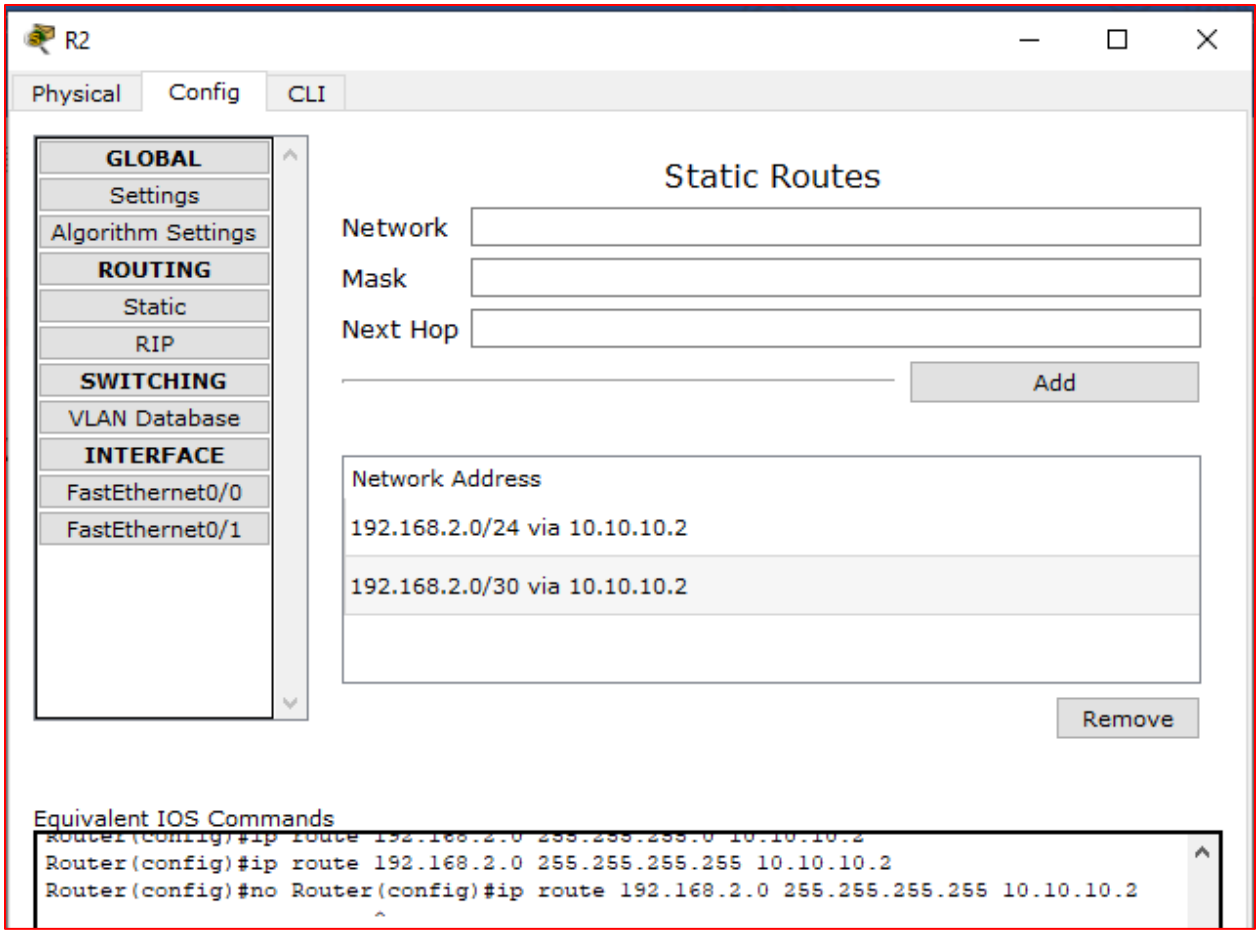


Assigned Ip address to router interfaces. After it Just write this command in router 1.

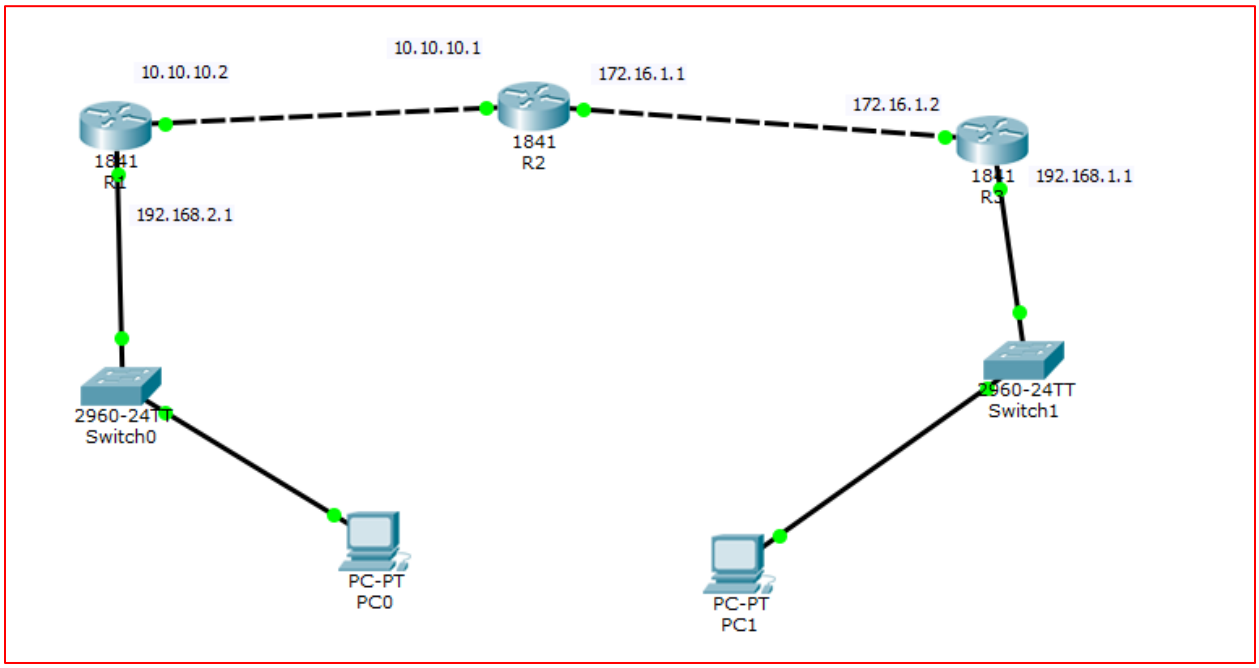
```
R1(config)#ip route 192.168.1.0 255.255.255.252 10.10.10.1
```




```
R2(config)#ip route 192.168.2.0 255.255.255.255 10.10.10.2
```

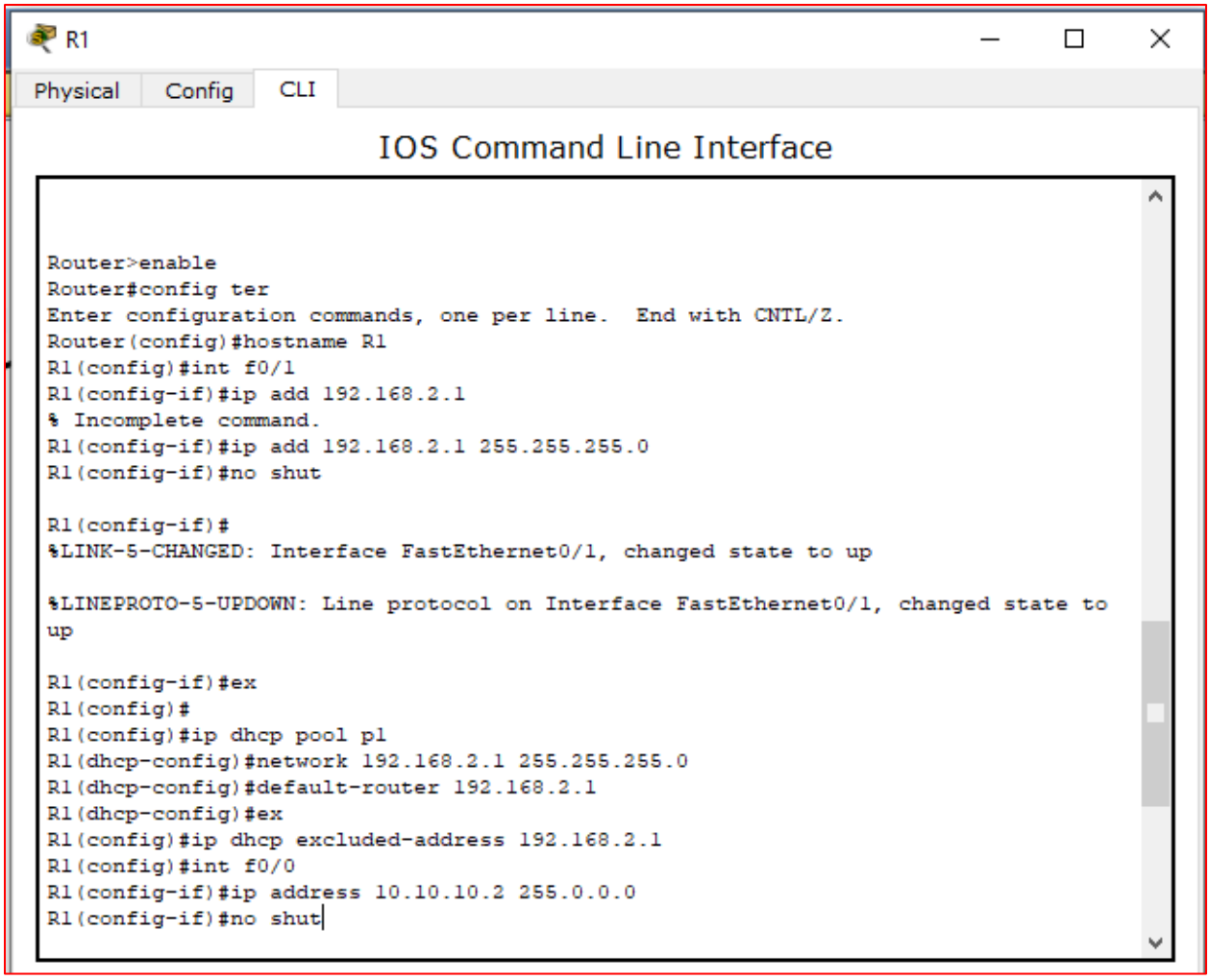

R2
Physical
Config
CLI
GLOBAL
Settings
Algorithm Settings
ROUTING
Static
RIP
SWITCHING
VLAN Database
INTERFACE
FastEthernet0/0
FastEthernet0/1
Static Routes
Network
Mask
Next Hop
Add
Network Address
192.168.2.0/24 via 10.10.10.2
192.168.2.0/30 via 10.10.10.2
Remove
Equivalent IOS Commands
Router(config)#ip route 192.168.2.0 255.255.255.255 10.10.10.2
Router(config)#no Router(config)#ip route 192.168.2.0 255.255.255.255 10.10.10.2

Static Routing (connect 3 Routers):



Router 1 Configuration

```
Router>enable
Router#config ter
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname R1
R1(config)#int f0/1
R1(config-if)#ip add 192.168.2.1 255.255.255.0
R1(config-if)#no shut
R1(config-if)#ex
R1(config)#ip dhcp pool p1
R1(dhcp-config)#network 192.168.2.1 255.255.255.0
R1(dhcp-config)#default-router 192.168.2.1
R1(dhcp-config)#ex
R1(config)#ip dhcp excluded-address 192.168.2.1
R1(config)#int f0/0
R1(config-if)#ip address 10.10.10.2  255.0.0.0
R1(config-if)#no shut
```



Router 3 Configuration

Router>enable

Router#config ter

Enter configuration commands, one per line. End with CNTL/Z.

Router(config)#hostname R3

R3(config)#int f0/1

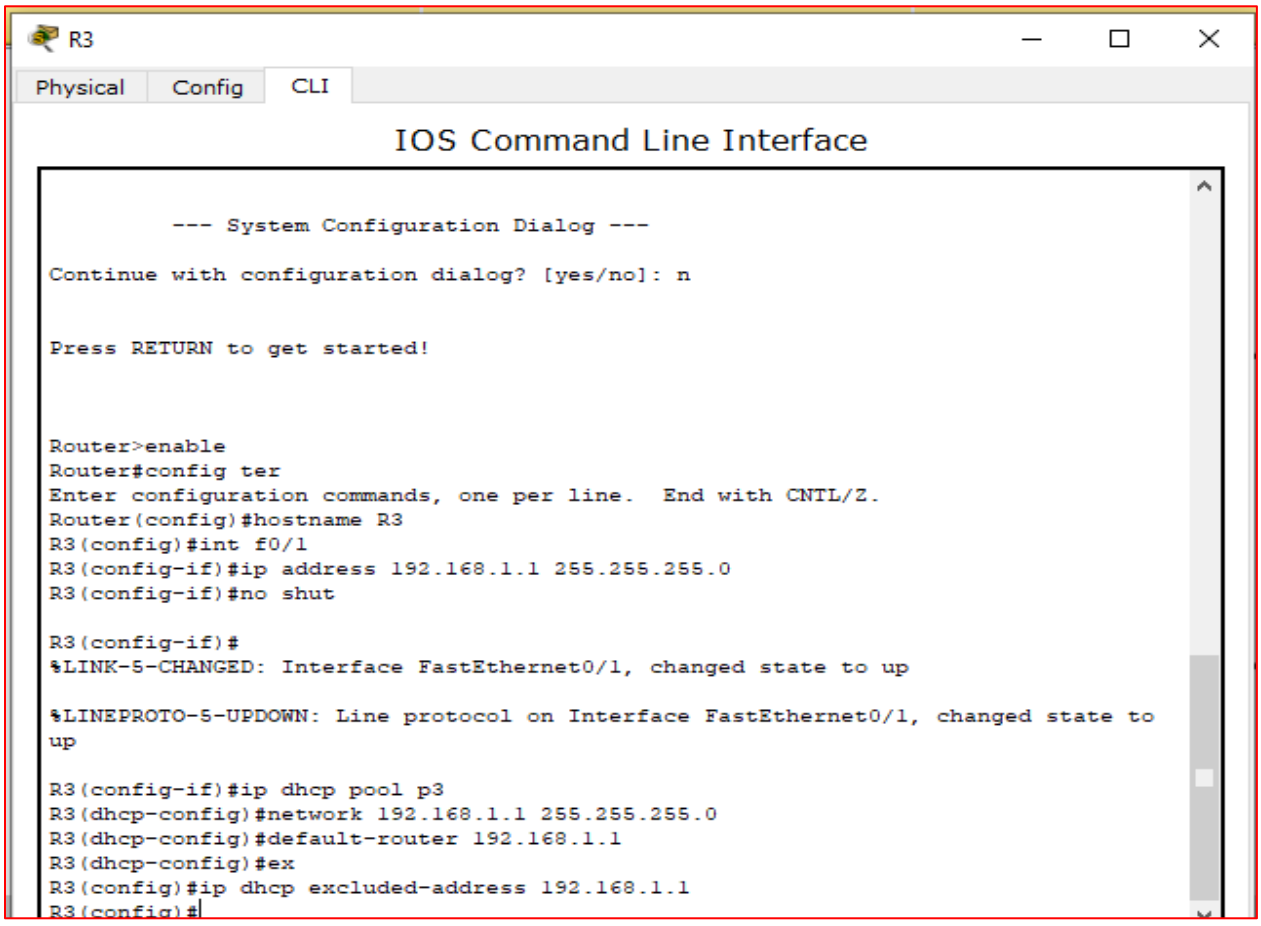
R3(config-if)#ip address 192.168.1.1 255.255.255.0

R3(config-if)#no shut

R3(config-if)#ip dhcp pool p3

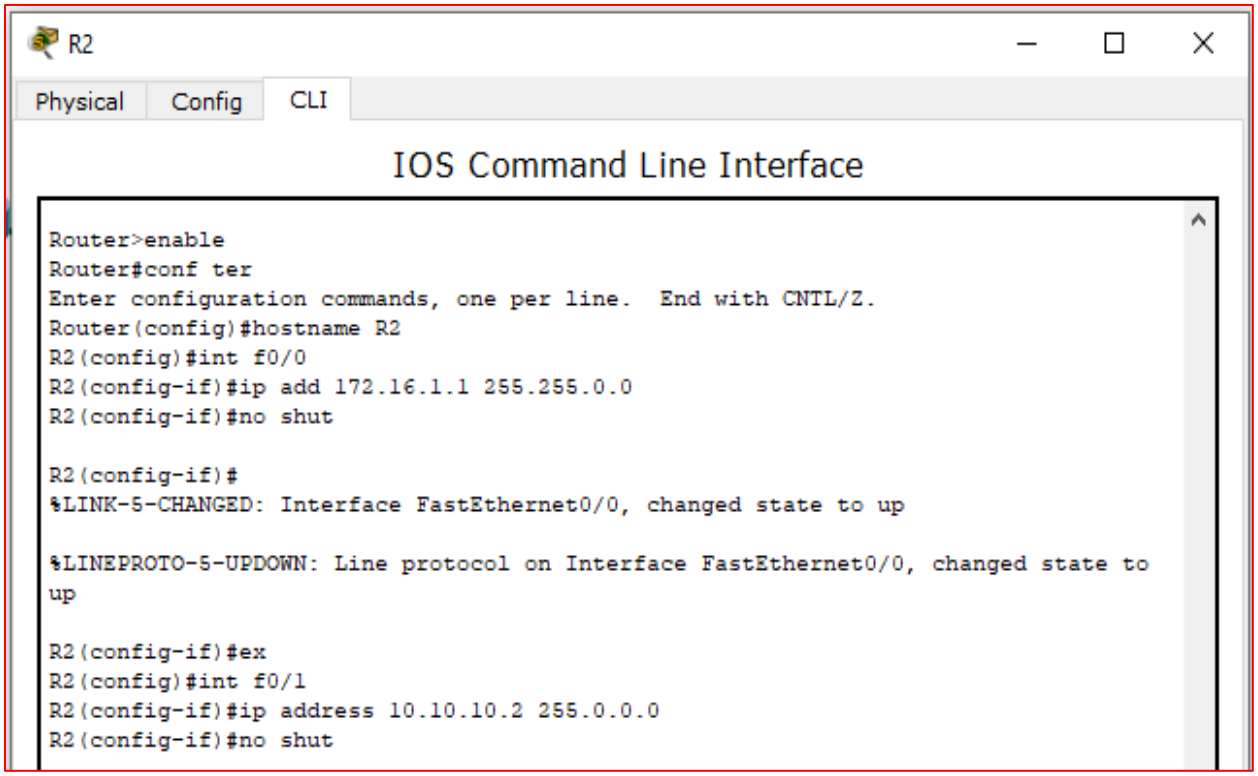
R3(dhcp-config)#network 192.168.1.1 255.255.255.0

R3(dhcp-config)#default-router 192.168.1.1


R3
Physical
Config
CLI
IOS Command Line Interface
--- System Configuration Dialog ---
Continue with configuration dialog? [yes/no]: n
Press RETURN to get started!
Router>enable
Router#config ter
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname R3
R3(config)#int f0/1
R3(config-if)#ip address 192.168.1.1 255.255.255.0
R3(config-if)#no shut
R3(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
R3(config-if)#ip dhcp pool p3
R3(dhcp-config)#network 192.168.1.1 255.255.255.0
R3(dhcp-config)#default-router 192.168.1.1
R3(dhcp-config)#ex
R3(config)#ip dhcp excluded-address 192.168.1.1
R3(config)#

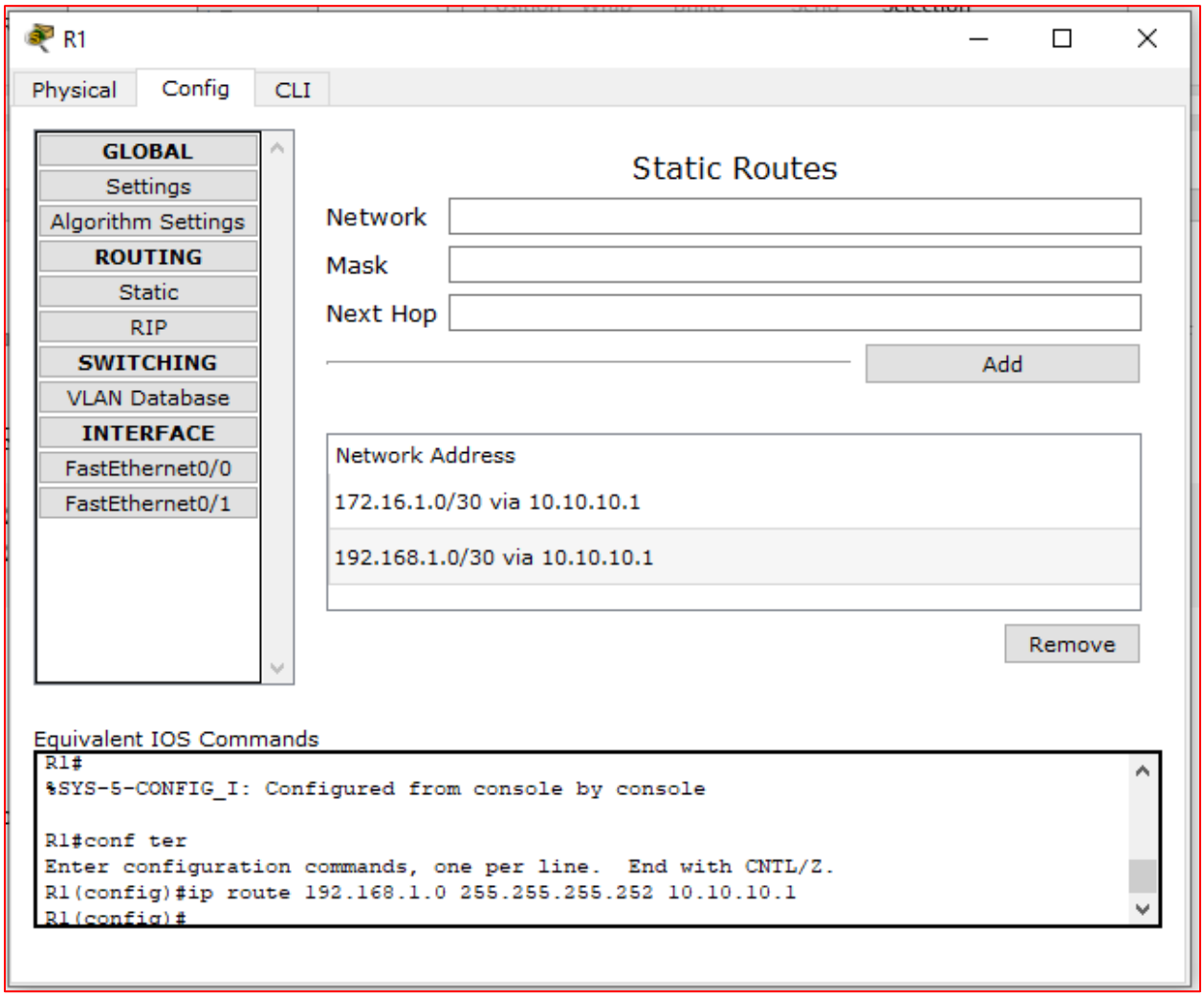
Router 2 Configuration

```
Router>enable
Router#conf ter
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname R2
R2(config)#int f0/0
R2(config-if)#ip add 172.16.1.1 255.255.0.0
R2(config-if)#no shut
R2(config-if)#ex
```



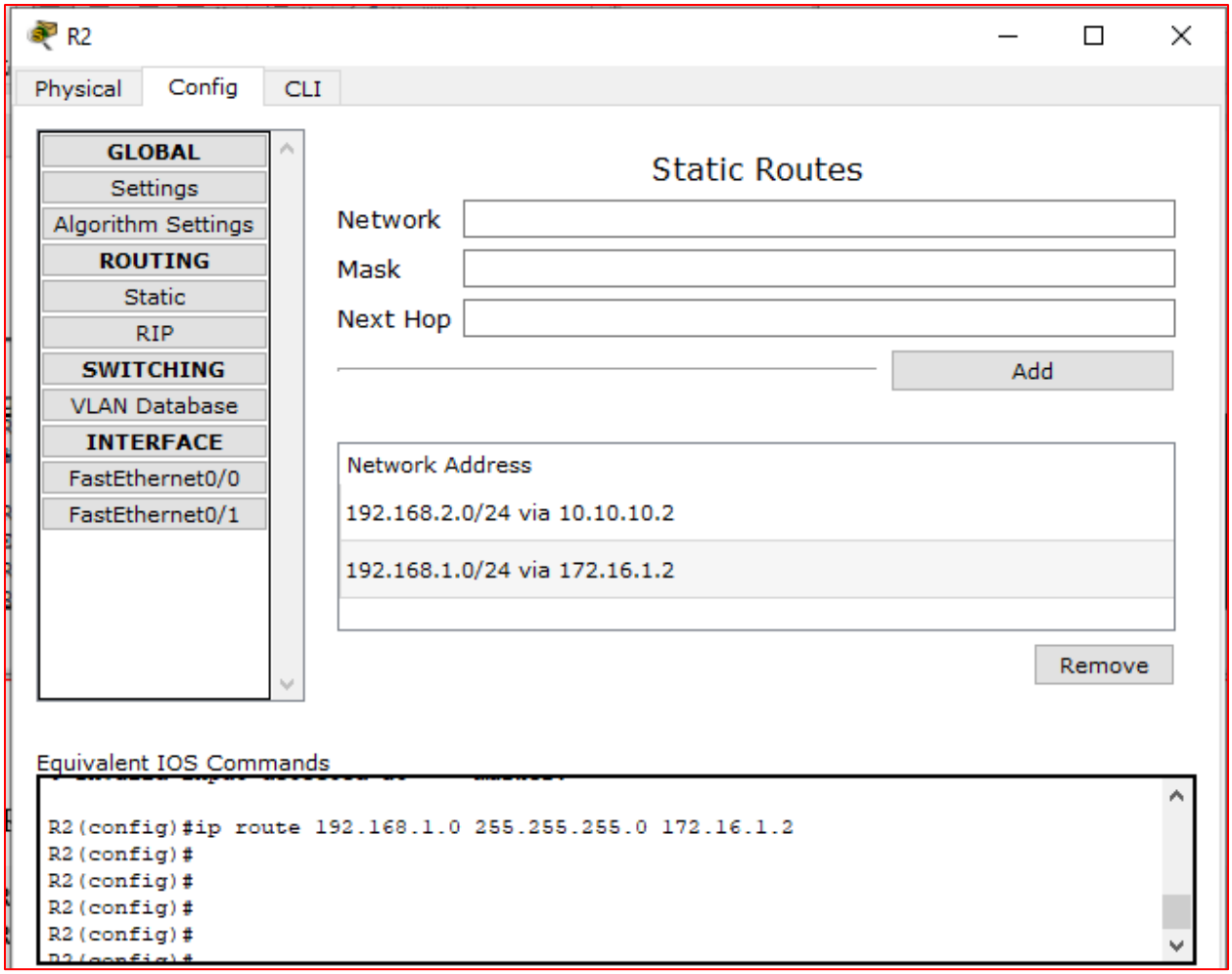
IP Route in R1:

```
R1(config)#ip route 172.16.1.0 255.255.255.252 10.10.10.1

R1(config)#ip route 192.168.1.0 255.255.255.252 10.10.10.1
```



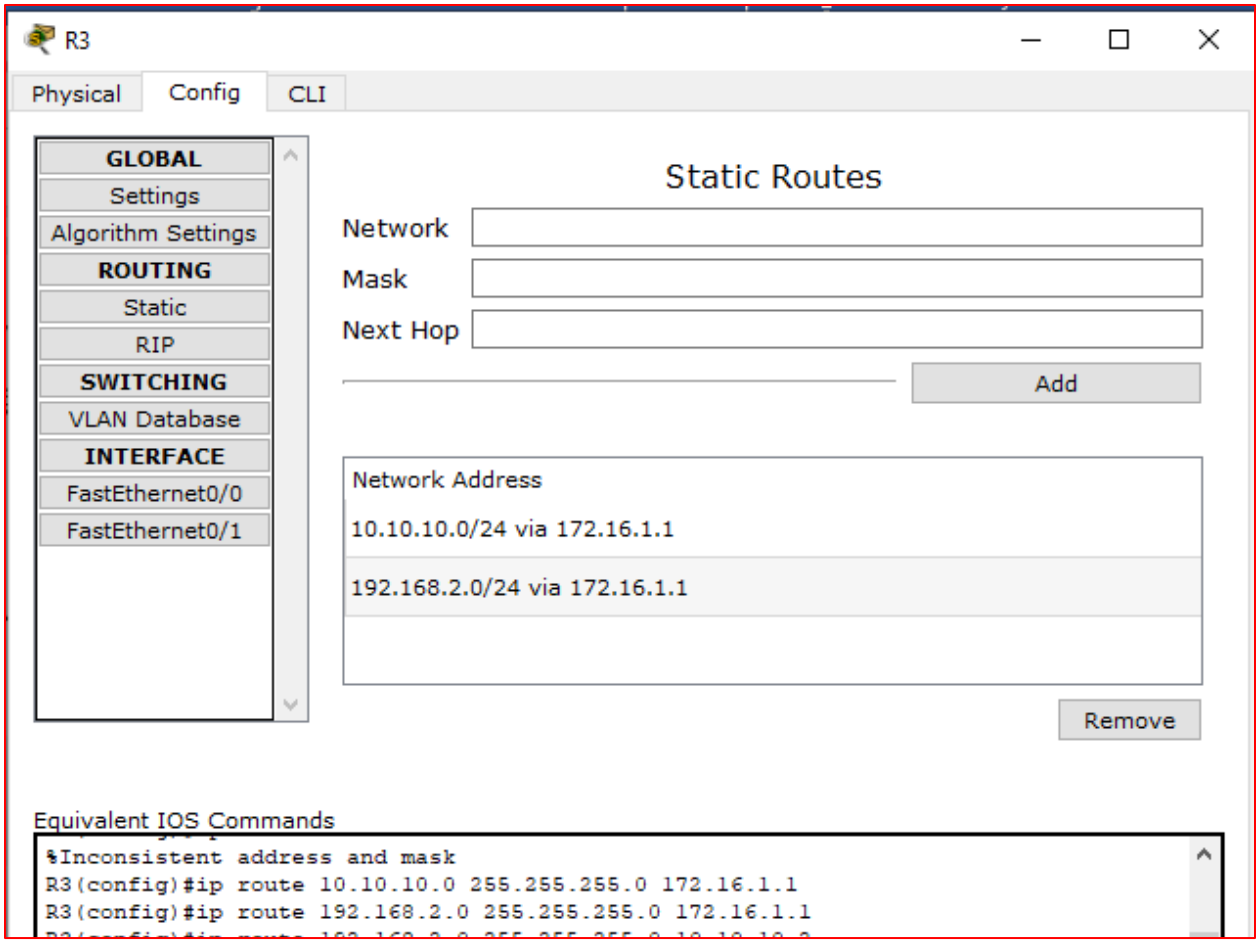
IP Route in R2:

```
R2(config)#ip route 192.168.2.0 255.255.255.0 10.10.10.2

R2(config)#ip route 192.168.1.0 255.255.255.0 172.16.1.2
```



IP Route in R3:

```
R3(config)#ip route 10.10.10.0 255.255.255.0 172.16.1.1
R3(config)#ip route 192.168.2.0 255.255.255.0 172.16.1.1
```


R3
Physical
Config
CLI
GLOBAL
Settings
Algorithm Settings
ROUTING
Static
RIP
SWITCHING
VLAN Database
INTERFACE
FastEthernet0/0
FastEthernet0/1
Static Routes
Network
Mask
Next Hop
Add
Network Address
10.10.10.0/24 via 172.16.1.1
192.168.2.0/24 via 172.16.1.1
Remove
Equivalent IOS Commands
%Inconsistent address and mask
R3(config)#ip route 10.10.10.0 255.255.255.0 172.16.1.1
R3(config)#ip route 192.168.2.0 255.255.255.0 172.16.1.1