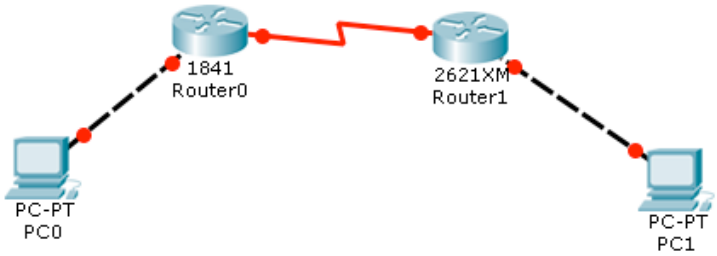
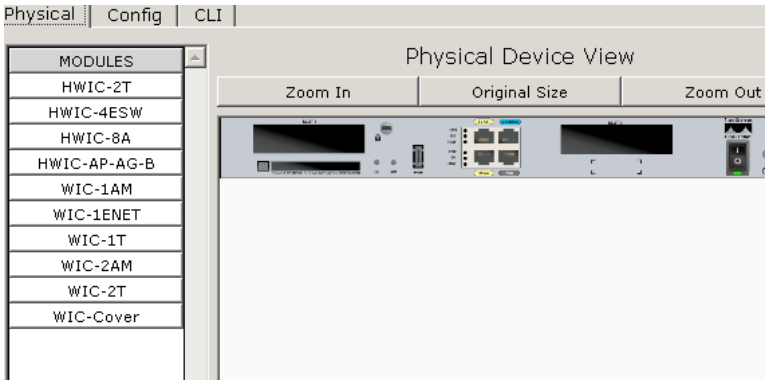
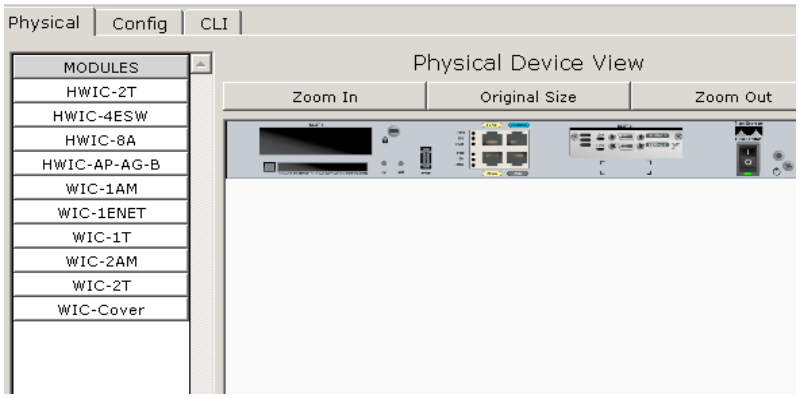
Design1. Static Route configuration on Router

Create the following topology with 2 pcs and 2 routers (1841 and 2621XM).
Use copper cross over cable for pc and router connectivity and Serial DCE cable for router-to-router connectivity.



To enable router-to-router serial connectivity, click on the routers and add the WIC 2T to the slot as shown. (Switch of the router before adding, and turn on after adding)





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WIC 2T (The dual-serial port WAN interface cards (WICs) feature Cisco`s new, compact, high-density Smart Serial connector to support a wide variety of electrical interfaces when used with the appropriate transition cable. Two cables are required to support the two ports on the WIC. Each port on a WIC is a different physical interface and can support different protocols such as Point-to-Point protocol (PPP) or Frame Relay and Data Terminal Equipment/Data Communications Equipment (DTE/DCE)).

Static routing occurs when you manually add routes in each router's routing table. There are advantages and disadvantages to static routing, but that's true for all routing processes.

Static routing has the following advantages:

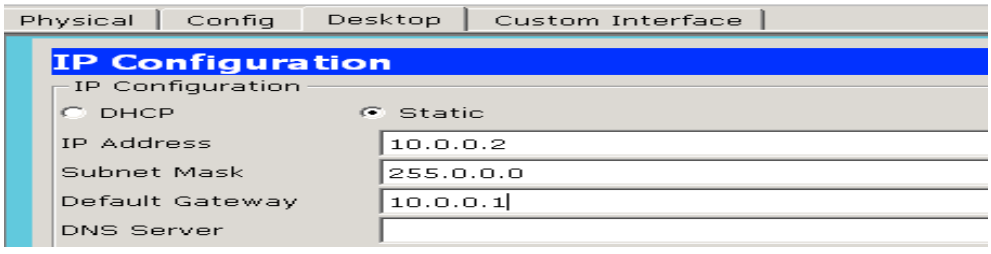
There is no overhead on the router CPU.
There is no bandwidth usage between routers.
It adds security because the administrator can choose to allow routing access to certain networks only.

Static routing has the following disadvantages:

The administrator must really understand the internetwork and how each router is connected in order to configure routes correctly.
If a network is added to the internetwork, the administrator has to add a route to it on all routers—manually.
It's not possible in large networks because maintaining it would be a full-time job in itself.

Configure PC0 (select IP configuration)

Set the IP address



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sanoopmallissery

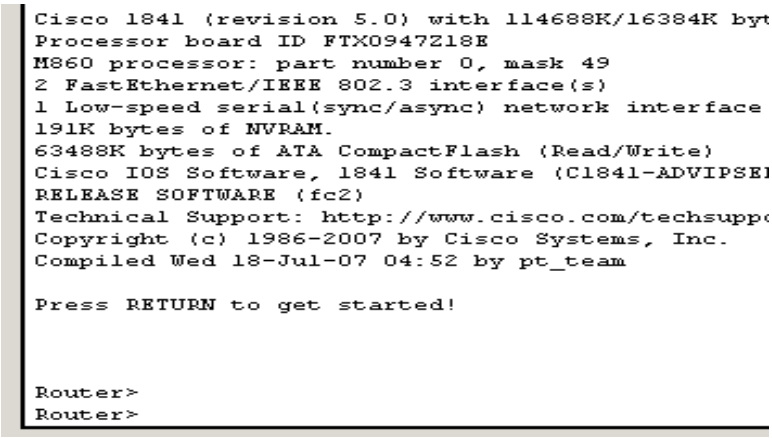
IP address 10.0.0.2 Subnet mask 255.0.0.0 Default Gateway 10.0.0.1

Follow the same process in PC-1 and set the ip address to

IP address 30.0.0.2 Subnet mask 255.0.0.0 Default Gateway 30.0.0.1

Two interfaces ***FastEthernet0/0*** and ***Serial0/0/0*** of ***Router0*** are used in this topology. By default interfaces on router are remain administratively down during the start up. We need to configure IP address and other parameters on interfaces before we could actually use them for routing. Interface mode is used to assign IP address and other parameters. Interface mode can be accessed from global configuration mode. Following commands are used to access global configuration mode.

Click on router 1841 and select CLI



Set Hostname to R1 and assign 10.0.0.1 255.0.0.0 ip address to fast Ethernet 0/0.

```
Router>enable
Router#configure terminal
Enter configuration commands, one per line.
End with CNTL/Z.
Router(config)#hostname R1
R1(config)#interface fastethernet 0/0
R1(config-if)#ip address 10.0.0.1 255.0.0.0
```

```
R1(config-if)#no shutdown
%LINK-5-CHANGED: Interface FastEthernet0/0,
changed state to up
R1(config-if)#exit
R1(config)#
```

interface fastEthernet 0/0 command is used to enter in interface mode.
ip address 10.0.0.2 255.0.0.0 command will assign IP address to interface.
no shutdown command will bring the interface up.
exit command is used to return in global configuration mode.

Configure Router-2 in same way with hostname R2 and 30.0.0.1 255.0.0.0 ip address on fast Ethernet 0/0.

```
Router>enable
Router#configure terminal
Enter configuration commands, one per line.
End with CNTL/Z.
Router(config)#hostname R2
R2(config)#interface fastEthernet 0/0
R2(config-if)#ip address 30.0.0.1 255.0.0.0
R2(config-if)#no shutdown
%LINK-5-CHANGED: Interface FastEthernet0/0,
changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface
FastEthernet0/0, changed state to up
R2(config-if)#exit
R2(config)#
```

Now we have connectivity between local segment and router's Ethernet port.
configure serial port

Again select router R1 and go to CLI

```
R1(config)#interface serial 0/0/0
R1(config-if)#ip address 20.0.0.1 255.0.0.0
R1(config-if)#clock rate 64000
R1(config-if)#bandwidth 64
R1(config-if)#no shutdown
%LINK-5-CHANGED: Interface Serial0/0/0, changed
state to up
```

```
%LINEPROTO-5-UPDOWN: Line protocol on Interface
Serial0/0/0, changed state to up
R1(config-if)#exit
R1(config)#
```

Serial interface needs two additional parameters clock rate and bandwidth. Every serial cable has two ends DTE and DCE. These parameters are always configured at DCE end. We can use ***show controllers interface*** command from privilege mode to check the cable's end.

Router#configure terminal Command is used to enter in global configuration mode.
Router(config)#interface serial 0/0/0 Command is used to enter in interface mode.
Router(config-if)#ip address 192.168.0.253 255.255.255.252 Command assigns IP address to interface. For serial link we usually use IP address from /30 subnet.
Router(config-if)#clock rate 64000 And ***Router(config-if)#bandwidth 64*** In real life environment these parameters control the data flow between serial links and need to be set at service providers end. In lab environment we need not to worry about these values. We can use these values.
Router(config-if)#no shutdown Command brings interface up.
Router(config-if)#exit Command is used to return in global configuration mode.

Select router R2 and go to CLI

```
R2(config)#interface serial 0/0
R2(config-if)#ip address 20.0.0.2 255.0.0.0
R2(config-if)#no shutdown
R2(config-if)#exit
```

At this point you have configured ip address on interfaces.
But still pc0 will not ping to pc1 as R1 have no information the network of 30.0.0.0
There are two way to configure route in router. **Static or Dynamic.** You will learn more about static and dynamic in our next article. In this example we will use simple static route.
First tell R1 about to network of 30.0.0.0

```
R1(config)#ip route 30.0.0.0 255.0.0.0 20.0.0.2
R1(config)#
```

In this command 30.0.0.0 is the destination network and 255.0.0.0 is the subnetmask on destination network and 20.0.0.2 is the ip address of next hope. That is "To get to the destination network of 30.0.0.0, with a subnet mask of 255.0.0.0,

send all packets to 20.0.0.2"

IP route command is used to configure the static route. In this section we will explain static route command in detail. We have two commands to configure the static route.

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

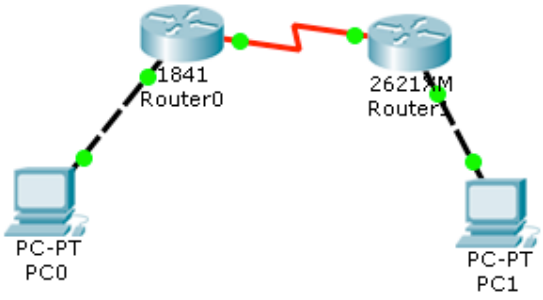
Or

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

destination_network The network you're placing in the routing table.
mask The subnet mask being used on the network.
next-hop_address The address of the next-hop router that will receive the packet and forward it to the remote network.
exit_interface Used in place of the next-hop address if you want, and shows up as a directly connected route.
administrative_distance By default, static routes have an administrative distance of 1 (or even 0 if you use an exit interface instead of a next-hop address).
permanent Keyword (Optional) Without the permanent keyword in a static route statement, a static route will be removed if an interface goes down. Adding the permanent keyword to a static route statement will keep the static routes in the routing table even if the interface goes down and the directly connected networks are removed.

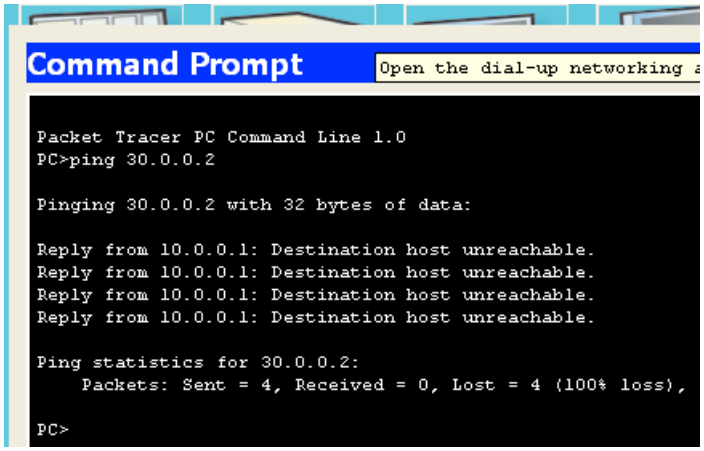
Now tell R2 about to network of 10.0.0.0

```
R2(config)#ip route 10.0.0.0 255.0.0.0 20.0.0.1
R2(config)#
```



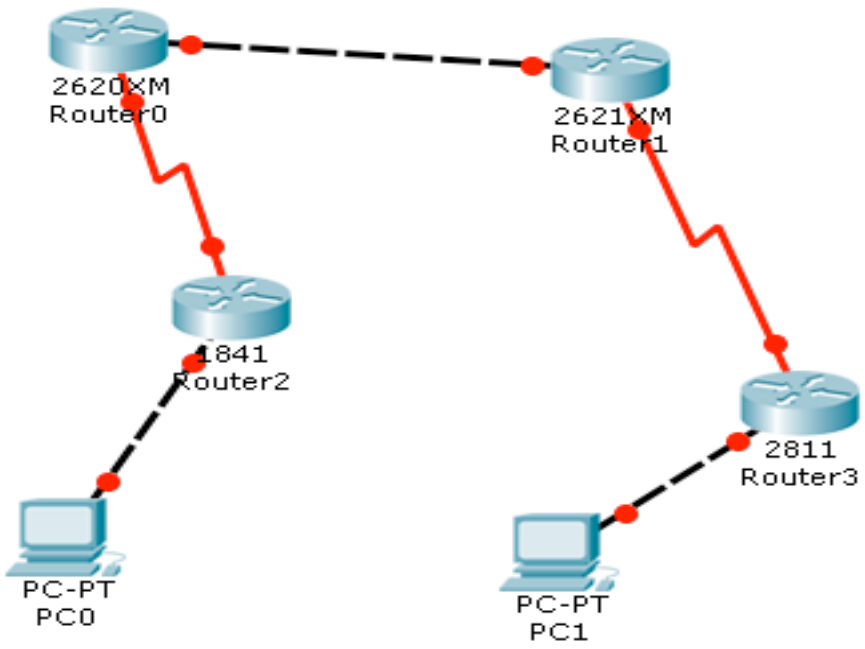
Now test the connectivity. Go on pc1 and

```
PC:\> ping 30.0.0.2
```



Design 2. Configure Static Route on router

Cerate the following topology with different routers



1841 Series Router0 (R1)		
	FastEthernet0/0	Serial0/0/0
IP address	10.0.0.1	20.0.0.1
Connected With	Pc0	R2 on Serial 0/0

2811 Series Router0 (R4)		
	FastEthernet0/0	Serial0/0/0
IP address	50.0.0.1	40.0.0.2
Connected With	Pc1	R3 on Serial 0/0

2621XM Series Router0 (R3)		
	FastEthernet0/0	Serial0/0/0
IP address	30.0.0.2	40.0.0.1
Connected With	FastEthernet0/0	R4 on Serial 0/0/0

2620XM Series Router1 (R2)		
	FastEthernet0/0	Serial0/0
IP address	30.0.0.1	20.0.0.2
Connected With	R3 on FastEthernet0/0	R1 on Serial 0/0/0

PC-PT PC0		
	FastEthernet0	Default Gateway
IP address	10.0.0.2	10.0.0.1
Connected With	R1 on FastEthernet0/0	

PC-PT PC1		
	FastEthernet0	Default Gateway
IP address	50.0.0.2	50.0.0.1
Connected With	R4 on FastEthernet0/0	

(1841Router0) Hostname R1

```
Router>enable
Router#configure terminal
Enter configuration commands, one per line.
End with CNTL/Z.
Router(config)#hostname R1
R1(config)#interface fastethernet 0/0
R1(config-if)#ip address 10.0.0.1 255.0.0.0
R1(config-if)#no shutdown
%LINK-5-CHANGED: Interface FastEthernet0/0,
changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface
FastEthernet0/0, changed state to up
R1(config-if)#exit
R1(config)#interface serial 0/0/0
R1(config-if)#ip address 20.0.0.1 255.0.0.0
R1(config-if)#clock rate 64000
R1(config-if)#bandwidth 64
R1(config-if)#no shutdown
%LINK-5-CHANGED: Interface Serial0/0/0, changed
state to down
R1(config-if)#exit
%LINK-5-CHANGED: Interface Serial0/0/0, changed
state to up
```

```
R1(config)#ip route 30.0.0.0 255.0.0.0 20.0.0.2
R1(config)#ip route 40.0.0.0 255.0.0.0 20.0.0.2
R1(config)#ip route 50.0.0.0 255.0.0.0 20.0.0.2
```

(2620XM-Router1) Hostname R2

```
Router>enable
Router#configure terminal
Enter configuration commands, one per line.
End with CNTL/Z.
Router(config)#hostname R2
R2(config)#interface serial 0/0
R2(config-if)#ip address 20.0.0.2 255.0.0.0
R2(config-if)#no shutdown
%LINK-5-CHANGED: Interface Serial0/0, changed
state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface
Serial0/0, changed state to up
R2(config-if)#exit
R2(config)#interface fastethernet 0/0
R2(config-if)#ip address 30.0.0.1 255.0.0.0
R2(config-if)#no shutdown
%LINK-5-CHANGED: Interface FastEthernet0/0,
changed state to up
R2(config-if)#exit
%LINEPROTO-5-UPDOWN: Line protocol on Interface
FastEthernet0/0, changed state to up
R2(config)#ip route 10.0.0.0 255.0.0.0 20.0.0.1
R2(config)#ip route 40.0.0.0 255.0.0.0 30.0.0.2
R2(config)#ip route 50.0.0.0 255.0.0.0 30.0.0.2
```

(2621XM-Router2)Hostname R3

```
Router>enable
Router#configure terminal
Enter configuration commands, one per line.
End with CNTL/Z.
Router(config)#hostname R3
R3(config)#interface fastethernet 0/0
```

```
R3(config-if)#ip address 30.0.0.2 255.0.0.0
R3(config-if)#no shutdown
%LINK-5-CHANGED: Interface FastEthernet0/0,
changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface
FastEthernet0/0, changed state to up
R3(config-if)#interface serial 0/0
R3(config-if)#ip address 40.0.0.1 255.0.0.0
R3(config-if)#clock rate 64000
R3(config-if)#bandwidth 64
R3(config-if)#no shutdown
%LINK-5-CHANGED: Interface Serial0/0, changed
state to down
R3(config-if)#exit
%LINK-5-CHANGED: Interface Serial0/0, changed
state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface
Serial0/0, changed state to up
R3(config)#ip route 10.0.0.0 255.0.0.0 30.0.0.1
R3(config)#ip route 20.0.0.0 255.0.0.0 30.0.0.1
R3(config)#ip route 50.0.0.0 255.0.0.0 40.0.0.2
```

(2811Router3) Hostname R4

```
Router>enable
Router#configure terminal
Enter configuration commands, one per line.
End with CNTL/Z.
Router(config)#interface serial 0/0/0
Router(config-if)#ip address 40.0.0.2 255.0.0.0
Router(config-if)#no shutdown
%LINK-5-CHANGED: Interface Serial0/0/0, changed
state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface
Serial0/0/0, changed state to up
Router(config-if)#exit
Router(config)#interface fastethernet 0/0
Router(config-if)#ip address 50.0.0.1 255.0.0.0
Router(config-if)#no shutdown
```

```
%LINK-5-CHANGED: Interface FastEthernet0/0,
changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface
FastEthernet0/0, changed state to up
Router(config-if)#exit
Router(config)#ip route 10.0.0.0 255.0.0.0
40.0.0.1
Router(config)#ip route 20.0.0.0 255.0.0.0
40.0.0.1
Router(config)#ip   route   30.0.0.0   255.0.0.0
40.0.0.1
```

PC-1

```
PC>ipconfig

IP Address.....................: 10.0.0.2
Subnet Mask....................: 255.0.0.0
Default Gateway................: 10.0.0.1

PC>ping 50.0.0.2

Pinging 50.0.0.2 with 32 bytes of data:

Reply from 50.0.0.2: bytes=32 time=156ms
TTL=124
Reply from 50.0.0.2: bytes=32 time=127ms
TTL=124
Reply from 50.0.0.2: bytes=32 time=156ms
TTL=124
Reply from 50.0.0.2: bytes=32 time=140ms
TTL=124

Ping statistics for 50.0.0.2:
    Packets: Sent = 4, Received = 4, Lost = 0
(0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 127ms, Maximum = 156ms, Average =
144ms
```

```
PC>
```

PC-2

```
PC>ipconfig

IP Address......................: 50.0.0.2
Subnet Mask.....................: 255.0.0.0
Default Gateway.................: 50.0.0.1

PC>ping 10.0.0.2

Pinging 10.0.0.2 with 32 bytes of data:

Reply from 10.0.0.2: bytes=32 time=140ms
TTL=124
Reply from 10.0.0.2: bytes=32 time=141ms
TTL=124
Reply from 10.0.0.2: bytes=32 time=157ms
TTL=124
Reply from 10.0.0.2: bytes=32 time=156ms
TTL=124

Ping statistics for 10.0.0.2:
    Packets: Sent = 4, Received = 4, Lost = 0
(0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 140ms, Maximum = 157ms, Average =
148ms
```

RIP Routing information protocol

Routing Information Protocol (RIP) is a standards-based, distance-vector, interior gateway protocol (IGP) used by routers to exchange routing information. RIP uses hop count to determine the best path between two locations. Hop count is the number of routers the packet must go through till it reaches the destination network. The maximum allowable number of hops a packet can traverse in an IP network implementing RIP is 15 hops.
it has a maximum allowable hop count of 15 by default, meaning that 16 is deemed

unreachable. RIP works well in small networks, but it's inefficient on large networks with slow WAN links or on networks with a large number of routers installed.
In a **RIP** network, each router broadcasts its entire RIP table to its neighboring routers every 30 seconds. When a router receives a neighbor's RIP table, it uses the information provided to update its own routing table and then sends the updated table to its neighbors.

Differences between RIPv1 or RIPv2

RIPv1

A classful protocol, broadcasts updates every 30 seconds, hold-down period 180 seconds. Hop count is metric (Maximum 15).

RIP supports up to six equal-cost paths to a single destination, where all six paths can be placed in the routing table and the router can load-balance across them. The default is actually four paths, but this can be increased up to a maximum of six. Remember that an equal-cost path is where the hop count value is the same. RIP will not load-balance across unequal-cost paths

RIPv2

RIPv2 uses multicasts, version 1 use broadcasts,

RIPv2 supports triggered updates—when a change occurs, a RIPv2 router will immediately propagate its routing information to its connected neighbors.

RIPv2 is a classless protocol. RIPv2 supports variable-length subnet masking (VLSM)

RIPv2 supports authentication. You can restrict what routers you want to participate in RIPv2. This is accomplished using a hashed password value.

RIP Timers

RIP uses four different kinds of timers to regulate its performance:

Route update timer

Sets the interval (typically 30 seconds) between periodic routing updates in which the router sends a complete copy of its routing table out to all neighbors.

Route invalid timer

Determines the length of time that must elapse (180 seconds) before a router determines that a route has become invalid. It will come to this conclusion if it hasn't heard any updates about a particular route for that period. When that happens, the router will send out updates to all its neighbors letting them know that the route is invalid.

Holddown timer

This sets the amount of time during which routing information is suppressed. Routes will enter into the holddown state when an update packet is received that indicated the route is unreachable. This continues either until an update packet is received with a better metric or until the holddown timer expires. The default is 180 seconds.

Route flush timer

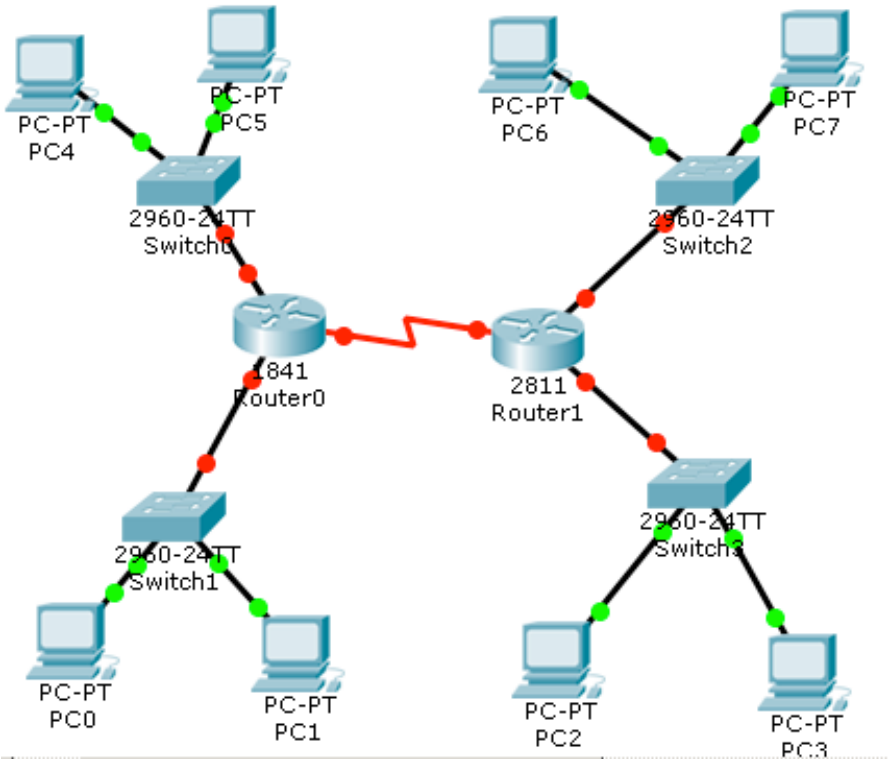
Sets the time between a route becoming invalid and its removal from the routing table (240 seconds). Before it's removed from the table, the router notifies its

neighbors of that route's impending failure. The value of the route invalid timer must be less than that of the route flush timer. This gives the router enough time to tell its neighbors about the invalid route before the local routing table is updated.

Rip Routing configurations

Design 3. Configure the following network

We will use two router and four subnet.



Router	FastEthernet 0/0	FastEthernet 0/1	Serial 0/0/0
R1	10.0.0.1	20.0.0.1	50.0.0.1
R2	30.0.0.1	40.0.0.1	50.0.0.2
PC	**IP Address**	**PC**	**IP Address**
PC0	20.0.0.2	PC1	20.0.0.3
PC2	40.0.0.2	PC3	40.0.0.3
PC4	10.0.0.2	PC5	10.0.0.3
PC6	30.0.0.2	PC7	30.0.0.3

Prepared by Sanoop Mallissery

Assign ip address to PC. Select pc and double click on it. select ip configurations from desktop tab and set ip address given as in table.
To configure router double click on it and select CLI.To configure this topology use this step by step guide.

(1841Router0) Hostname R1

To configure and enable rip routing on R1 follow these commands exactly.

```
Router>enable
Router#configure terminal
Enter configuration commands, one per line.
End with CNTL/Z.
Router(config)#hostname R1
R1(config)#interface fastethernet 0/0
R1(config-if)#ip address 10.0.0.1 255.0.0.0
R1(config-if)#no shutdown
%LINK-5-CHANGED: Interface FastEthernet0/0,
changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface
FastEthernet0/0, changed state to up
R1(config-if)#exit
R1(config)#interface fastethernet 0/1
R1(config-if)#ip address 20.0.0.1 255.0.0.0
R1(config-if)#no shutdown
%LINK-5-CHANGED: Interface FastEthernet0/1,
changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface
FastEthernet0/1, changed state to up
R1(config-if)#exit
R1(config)#interface serial 0/0/0
R1(config-if)#ip address 50.0.0.1 255.0.0.0
R1(config-if)#clock rate 64000
R1(config-if)#bandwidth 64
R1(config-if)#no shutdown
%LINK-5-CHANGED: Interface Serial0/0/0, changed
state to down
R1(config-if)#exit
R1(config)#router rip
R1(config-router)#network 10.0.0.0
```

```
R1(config-router)#network 20.0.0.0
R1(config-router)#network 50.0.0.0
R1(config-router)#exit
```

(2811Router1) Hostname R2

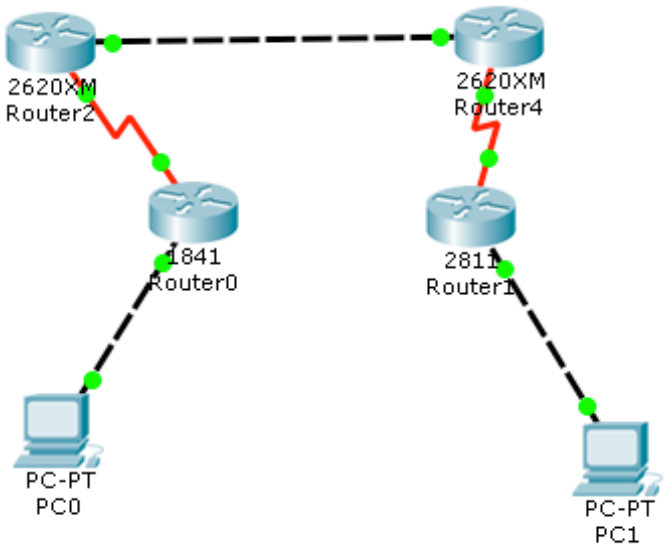
To configure and enable rip routing on R2 follow these commands exactly.

```
Router>enable
Router#configure terminal
Enter configuration commands, one per line.
End with CNTL/Z.
Router(config)#hostname R2
R2(config)#interface fastethernet 0/0
R2(config-if)#ip address 30.0.0.1 255.0.0.0
R2(config-if)#no shutdown
%LINK-5-CHANGED: Interface FastEthernet0/0,
changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface
FastEthernet0/0,
 changed state to up
R2(config-if)#exit
R2(config)#interface fastethernet 0/1
R2(config-if)#ip address 40.0.0.1 255.0.0.0
R2(config-if)#no shutdown
%LINK-5-CHANGED: Interface FastEthernet0/1,
changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface
FastEthernet0/1,
 changed state to up
R2(config-if)#exit
R2(config)#interface serial 0/0/0
R2(config-if)#ip address 50.0.0.2 255.0.0.0
R2(config-if)#no shutdown
%LINK-5-CHANGED: Interface Serial0/0/0, changed
state to up
R2(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface
Serial0/0/0,
 changed state to up
R2(config-if)#exit
```

```
R2(config)#router rip
R2(config-router)#network 30.0.0.0
R2(config-router)#network 40.0.0.0
R2(config-router)#network 50.0.0.0
R2(config-router)#exit
```

To test rip routing do ping from pc0 to all pc and vice versa. If you get replay then you have successfully configured rip routing.

Design 4. How to configure RIP Routing information protocol



1841 Series Router0 (R1)		
	FastEthernet0/0	Serial0/0/0
IP address	10.0.0.1	20.0.0.1
Connected With	Pc0	R2 on Serial 0/0

2811 Series Router0 (R4)		
	FastEthernet0/0	Serial0/0/0
IP address	50.0.0.1	40.0.0.2
Connected With	Pc1	R3 on Serial 0/0

2621XM Series Router0 (R3)		
	FastEthernet0/0	Serial0/0/0
IP address	30.0.0.2	40.0.0.1
Connected With	FastEthernet0/0	R4 on Serial 0/0/0

2620XM Series Router1 (R2)		
	FastEthernet0/0	Serial0/0
IP address	30.0.0.1	20.0.0.2
Connected With	R3 on FastEthernet0/0	R1 on Serial 0/0/0

PC-PT PC0		
	FastEthernet0	Default Gateway
IP address	10.0.0.2	10.0.0.1
Connected With	R1 on FastEthernet0/0	

PC-PT PC1		
	FastEthernet0	Default Gateway
IP address	50.0.0.2	50.0.0.1
Connected With	R4 on FastEthernet0/0	

(1841Router0) Hostname R1

To configure and enable rip routing on R1 follow these commands exactly.

```
Router>enable
Router#configure terminal
Enter configuration commands, one per line.
End with CNTL/Z.
Router(config)#hostname R1
R1(config)#interface fastethernet 0/0
R1(config-if)#ip address 10.0.0.1 255.0.0.0
R1(config-if)#no shutdown
%LINK-5-CHANGED: Interface FastEthernet0/0,
changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface
FastEthernet0/0, changed state to up
R1(config-if)#exit
R1(config)#interface serial 0/0/0
R1(config-if)#ip address 20.0.0.1 255.0.0.0
R1(config-if)#clock rate 64000
R1(config-if)#bandwidth 64
R1(config-if)#no shutdown
%LINK-5-CHANGED: Interface Serial0/0/0, changed
state to down
R1(config-if)#exit
%LINK-5-CHANGED: Interface Serial0/0/0, changed
state to up
R1(config)#router rip
R1(config-router)#network 10.0.0.0
R1(config-router)#network 20.0.0.0
R1(config-router)#exit
R1(config)#
```

(2620XM-Router1) Hostname R2

To configure and enable rip routing on R2 follow these commands exactly.

```
Router>enable
Router#configure terminal
Enter configuration commands, one per line.
```

```
End with CNTL/Z.
Router(config)#hostname R2
R2(config)#interface serial 0/0
R2(config-if)#ip address 20.0.0.2 255.0.0.0
R2(config-if)#no shutdown
%LINK-5-CHANGED: Interface Serial0/0, changed
state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface
Serial0/0, changed state to up
R2(config-if)#exit
R2(config)#interface fastethernet 0/0
R2(config-if)#ip address 30.0.0.1 255.0.0.0
R2(config-if)#no shutdown
%LINK-5-CHANGED: Interface FastEthernet0/0,
changed state to up
R2(config-if)#exit
%LINEPROTO-5-UPDOWN: Line protocol on Interface
FastEthernet0/0, changed state to up
R2(config)#router rip
R2(config-router)#network 20.0.0.0
R2(config-router)#network 30.0.0.0
R2(config-router)#exit
R2(config)#
```

(2620XM-Router2)Hostname R3

To configure and enable rip routing on R3 follow these commands exactly.

```
Router>enable
Router#configure terminal
Enter configuration commands, one per line.
End with CNTL/Z.
Router(config)#hostname R3
R3(config)#interface fastethernet 0/0
R3(config-if)#ip address 30.0.0.2 255.0.0.0
R3(config-if)#no shutdown
%LINK-5-CHANGED: Interface FastEthernet0/0,
changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface
FastEthernet0/0, changed state to up
```

```
R3(config-if)#interface serial 0/0
R3(config-if)#ip address 40.0.0.1 255.0.0.0
R3(config-if)#clock rate 64000
R3(config-if)#bandwidth 64
R3(config-if)#no shutdown
%LINK-5-CHANGED: Interface Serial0/0, changed
state to down
R3(config-if)#exit
%LINK-5-CHANGED: Interface Serial0/0, changed
state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface
Serial0/0, changed state to up
R3(config)#router rip
R3(config-router)#network 30.0.0.0
R3(config-router)#network 40.0.0.0
R3(config-router)#exit
R3(config)#
```

(2811Router3) Hostname R4

To configure and enable rip routing on R4 follow these commands exactly.

```
Router>enable
Router#configure terminal
Enter configuration commands, one per line.
End with CNTL/Z.
Router(config)#interface serial 0/0/0
Router(config-if)#ip address 40.0.0.2 255.0.0.0
Router(config-if)#no shutdown
%LINK-5-CHANGED: Interface Serial0/0/0, changed
state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface
Serial0/0/0, changed state to up
Router(config-if)#exit
Router(config)#interface fastethernet 0/0
Router(config-if)#ip address 50.0.0.1 255.0.0.0
Router(config-if)#no shutdown
%LINK-5-CHANGED: Interface FastEthernet0/0,
changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface
```

```
FastEthernet0/0, changed state to up
Router(config-if)#exit
R4(config)#router rip
R4(config-router)#network 40.0.0.0
R4(config-router)#network 50.0.0.0
R4(config-router)#exit
R4(config)#
```

PC-1

```
PC>ipconfig

IP Address.....................: 10.0.0.2
Subnet Mask....................: 255.0.0.0
Default Gateway................: 10.0.0.1

PC>ping 50.0.0.2

Pinging 50.0.0.2 with 32 bytes of data:

Reply from 50.0.0.2: bytes=32 time=156ms
TTL=124
Reply from 50.0.0.2: bytes=32 time=127ms
TTL=124
Reply from 50.0.0.2: bytes=32 time=156ms
TTL=124
Reply from 50.0.0.2: bytes=32 time=140ms
TTL=124

Ping statistics for 50.0.0.2:
    Packets: Sent = 4, Received = 4, Lost = 0
(0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 127ms, Maximum = 156ms, Average =
```

```
144ms
PC>
```

PC-2

```
PC>ipconfig

IP Address......................: 50.0.0.2
Subnet Mask.....................: 255.0.0.0
Default Gateway.................: 50.0.0.1

PC>ping 10.0.0.2

Pinging 10.0.0.2 with 32 bytes of data:

Reply from 10.0.0.2: bytes=32 time=140ms
TTL=124
Reply from 10.0.0.2: bytes=32 time=141ms
TTL=124
Reply from 10.0.0.2: bytes=32 time=157ms
TTL=124
Reply from 10.0.0.2: bytes=32 time=156ms
TTL=124

Ping statistics for 10.0.0.2:
    Packets: Sent = 4, Received = 4, Lost = 0
(0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 140ms, Maximum = 157ms, Average =
148ms
```

You can verify that RIP is running successfully via **show ip protocols** command in privilege mode.

```
R1#show ip protocols
Routing Protocol is "rip"
Sending updates every 30 seconds, next due in 2
seconds
Invalid after 180 seconds, hold down 180,
flushed after 240
```

```
Outgoing update filter list for all interfaces
is not set
Incoming update filter list for all interfaces
is not set
Redistributing: rip
Default version control: send version 1,
receive any version
  Interface              Send  Recv  Triggered
RIP  Key-chain
  FastEthernet0/0        1     2 1
  Serial0/0/0            1     2 1
Automatic network summarization is in effect
Maximum path: 4
Routing for Networks:
    10.0.0.0
    20.0.0.0
Passive Interface(s):
Routing Information Sources:
    Gateway         Distance      Last Update
    20.0.0.2              120      00:00:20
Distance: (default is 120)
R1#
```

You can use **show ip route** command to troubleshoot rip network. If you did not see information about any route checks the router attached with that network.

```
R1#show ip route
Codes: C - connected, S - static, I - IGRP, R -
RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O -
OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 -
OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF
external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-
IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user
static route, o - ODR
       P - periodic downloaded static route
```

```
Gateway of last resort is not set

C    10.0.0.0/8 is directly connected,
FastEthernet0/0
C    20.0.0.0/8 is directly connected,
Serial0/0/0
R    30.0.0.0/8 [120/1] via 20.0.0.2, 00:00:01,
Serial0/0/0
R    40.0.0.0/8 [120/2] via 20.0.0.2, 00:00:01,
Serial0/0/0
R    50.0.0.0/8 [120/3] via 20.0.0.2, 00:00:01,
Serial0/0/0
R1#
```

Configure RIP Routing command cheat sheet

Commands	Descriptions
Router(config)#router rip	Enables RIP as a routing protocol
Router(config-router)#network w.x.y.z	w.x.y.z is the network number of the directly connected network you want to advertise.
Router(config)#no router rip	Turns off the RIP routing process
Router(config-router)#no network w.x.y.z	Removes network w.x.y.z from the RIP routing process.
Router(config-router)#version 2	RIP will now send and receive RIPv2 packets globally.
Router(config-router)#version 1	RIP will now send and receive RIPv1 packets only
Router(config-router)#no auto-summary	RIPv2 summarizes networks at the classful boundary. This command turns auto summarization off.
Router(config-router)#passive-interface s0/0/0	RIP updates will not be sent out this interface.
Router(config-router)#no ip split-horizon	Turns off split horizon (on by default).
Router(config-router)#ip split-horizon	Re-enables split horizon
Router(config-router)#timers basic 30 90 180 270 360	Changes timers in RIP: 30 = Update timer (in seconds) 90 = Invalid timer (in seconds) 180 = Hold-down timer (in seconds) 270 = Flush timer (in seconds) 360 = Sleep time (in milliseconds)
Router#debug ip rip	Displays all RIP activity in real time
Router#show ip rip database	Displays contents of the RIP database

References

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