

# Data Communication and Computer Network

## Lab8: Distance Vector Routing Protocol

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**Aim:** Configure a Network using Distance Vector Routing protocol.

**Apparatus (Software):** packet tracer software

### **Theory:**

In computer communication theory relating to packet-switched networks, a distance-vector routing protocol is one of the two major classes of routing protocols, the other major class being the link-state protocol. Distance-vector routing protocols use the Bellman-Ford algorithm, Ford-Fulkerson algorithm, or DUAL FSM (in the case of Cisco Systems' protocols) to calculate paths. A distance-vector routing protocol requires that a router informs its neighbors of topology changes periodically. Compared to link-state protocols, which require a router to inform all the nodes in a network of topology changes, distance-vector routing protocols have less computational complexity and message overhead.

The Routing Information Protocol (RIP) is one of the oldest distance-vector routing protocols, which employs the hop count as a routing metric. RIP prevents routing loops by implementing a limit on the number of hops allowed in a path from the source to a destination. The maximum number of hops allowed for RIP is 15. This hop limit, however, also limits the size of networks that RIP can support. A hop count of 16 is considered an infinite distance, in other words the route is considered unreachable.

### **Procedure:**

Step 1: First we will set up three routers.

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Step 2: Now we will take three switches, one for each router.



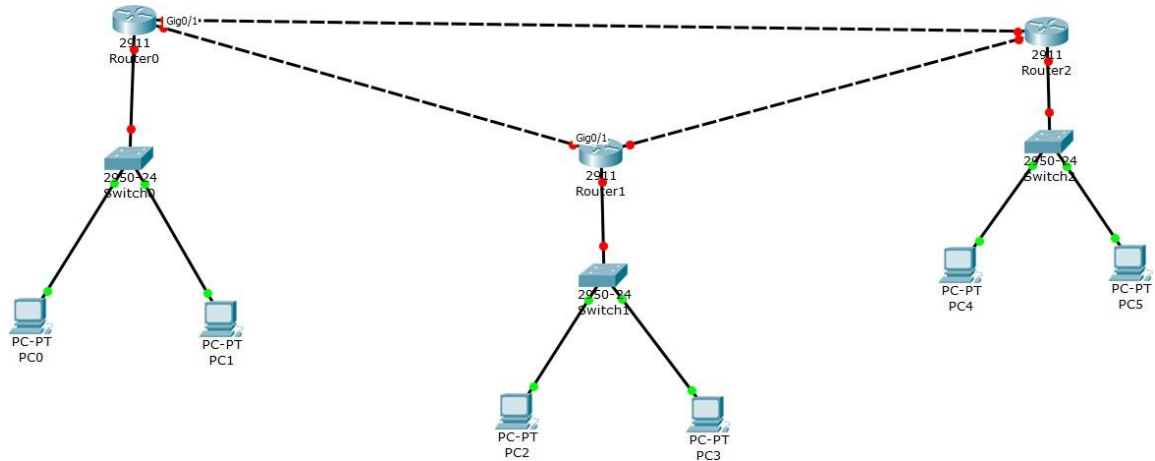
Step 3: Now we will take two end devices for each router.



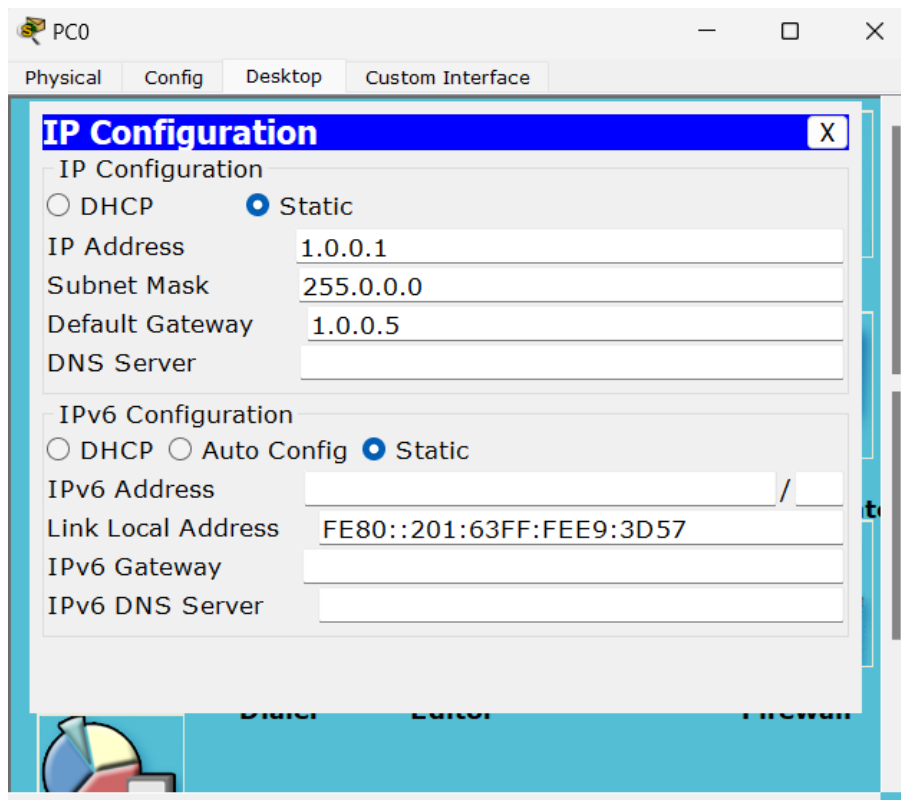
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Step 4: The final topology should look like this:



Step 5: Now we will give IP address to each end device. Changing the config for PC0.



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Step 6: Similarly, we'll change the config of other

devices. Now, setting IP address for router0:

The screenshot shows the configuration window for Router0, specifically for the GigabitEthernet0/0 interface. The left sidebar has tabs for GLOBAL, ROUTING, SWITCHING, and INTERFACE. The INTERFACE tab is selected, and GigabitEthernet0/0 is chosen. The main area shows the configuration for this interface: Port Status is checked, Bandwidth is set to 100 Mbps, Duplex is set to Full Duplex, MAC Address is 0001.C767.2301, IP Address is 1.0.0.5, Subnet Mask is 255.0.0.0, and Tx Ring Limit is 10. Below the configuration, the 'Equivalent IOS Commands' section shows the following commands:

```
%LINK-5-CHANGED: Interface GigabitEthernet0/2, changed state to up  
Router(config-if)#exit  
Router(config)#interface GigabitEthernet0/0  
Router(config-if)#
```

The screenshot shows the configuration window for Router0, specifically for the GigabitEthernet0/1 interface. The left sidebar has tabs for GLOBAL, ROUTING, SWITCHING, and INTERFACE. The INTERFACE tab is selected, and GigabitEthernet0/1 is chosen. The main area shows the configuration for this interface: Port Status is checked, Bandwidth is set to 1000 Mbps, Duplex is set to Full Duplex, MAC Address is 0001.C767.2302, IP Address is 5.0.0.1, Subnet Mask is 255.0.0.0, and Tx Ring Limit is 10. Below the configuration, the 'Equivalent IOS Commands' section shows the following commands:

```
Router(config)#interface GigabitEthernet0/1  
Router(config-if)#  
Router(config-if)#exit  
Router(config)#interface GigabitEthernet0/1  
Router(config-if)#
```

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The screenshot shows the configuration window for Router0, specifically the GigabitEthernet0/2 interface. The left sidebar has tabs for GLOBAL, ROUTING, SWITCHING, and INTERFACE. The main area displays the following settings:

- Port Status: ☒
- Bandwidth: 1000 Mbps (selected), 100 Mbps, 10 Mbps
- Duplex: Half Duplex, Full Duplex (selected)
- MAC Address: 0001.C767.2303
- IP Configuration:
  - IP Address: 4.0.0.1
  - Subnet Mask: 255.0.0.0
- Tx Ring Limit: 10

Below the interface settings, the 'Equivalent IOS Commands' section shows the following commands:

```
Router(config)#interface GigabitEthernet0/2
Router(config-if)#
Router(config-if)#exit
Router(config)#interface GigabitEthernet0/2
Router(config-if)#
```

Step 7: Similarly, we'll set up IP address for other routers.

Now we will add RIP (Network IP Address for each network connected to router).For Router0:

The screenshot shows the configuration window for Router0, specifically the RIP Routing section. The left sidebar has tabs for GLOBAL, ROUTING, SWITCHING, and INTERFACE. The main area displays the following settings:

- Network: 1.0.0.0, 4.0.0.0, 5.0.0.0
- Remove button

Below the RIP Routing settings, the 'Equivalent IOS Commands' section shows the following commands:



```
changed state to up
Router(config-if)#exit
Router(config)#router rip
Router(config-router)#network 1.0.0.0
Router(config-router)#network 5.0.0.0
Router(config-router)#network 4.0.0.0
Router(config-router)#
```

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Step 8: We'll follow the same process for the other

routers as well. Sending packet from PC0 to PC

Fire	Last Status	Source	Destination	Type	Color	Time(se	Periodic	Num	Edit	Delete
	Successful	PC0	PC5	ICMP		0.000	N	0	(edit)	(delete)

Step 9: Sending packet from PC1 to PC4:

**Conclusion:** Successfully the Distance vector routing protoc

Fire	Last Status	Source	Destination	Type	Color	Time(se	Periodic	Num	Edit	Delete
	Successful	PC1	PC4	ICMP		0.000	N	0	(edit)	(delete)