

WELCOME NETWORKING

Cisco Certified Networking Associate(CCNA)

200-301

(7th Class)



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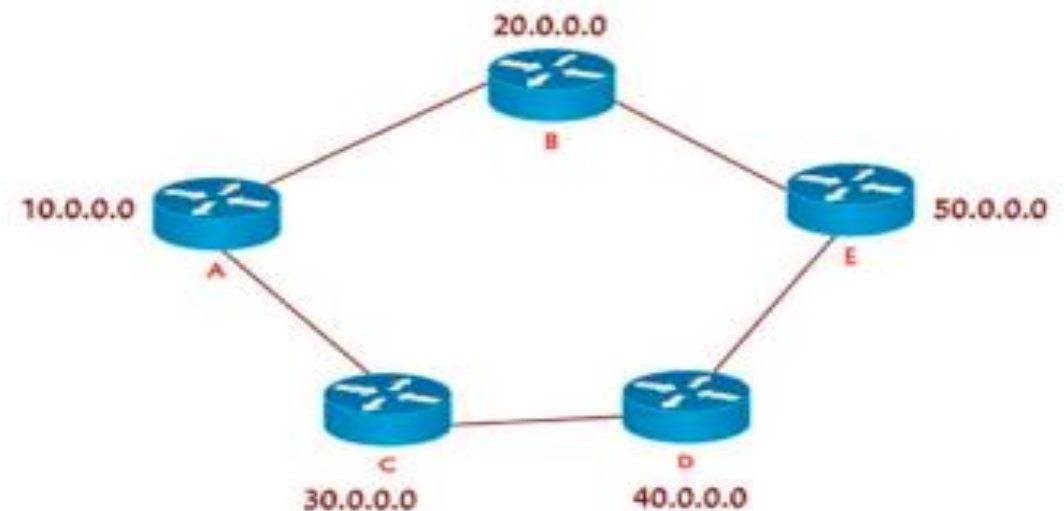
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Dynamic Routing

RIP, EIGRP, OSPF

Dynamic Routing



Advantages of Dynamic over static :

- No need of manual configuration (unlike static routing)
- Learns about other networks via advertisements (of directly connected networks)
- Automatically select the best route. (builds routing table)
- Updates the topology changes dynamically.
- No need to know the destination networks. (others network)
- Administrative work is reduced
- Applicable for large organizations.

Types of Dynamic Routing Protocols

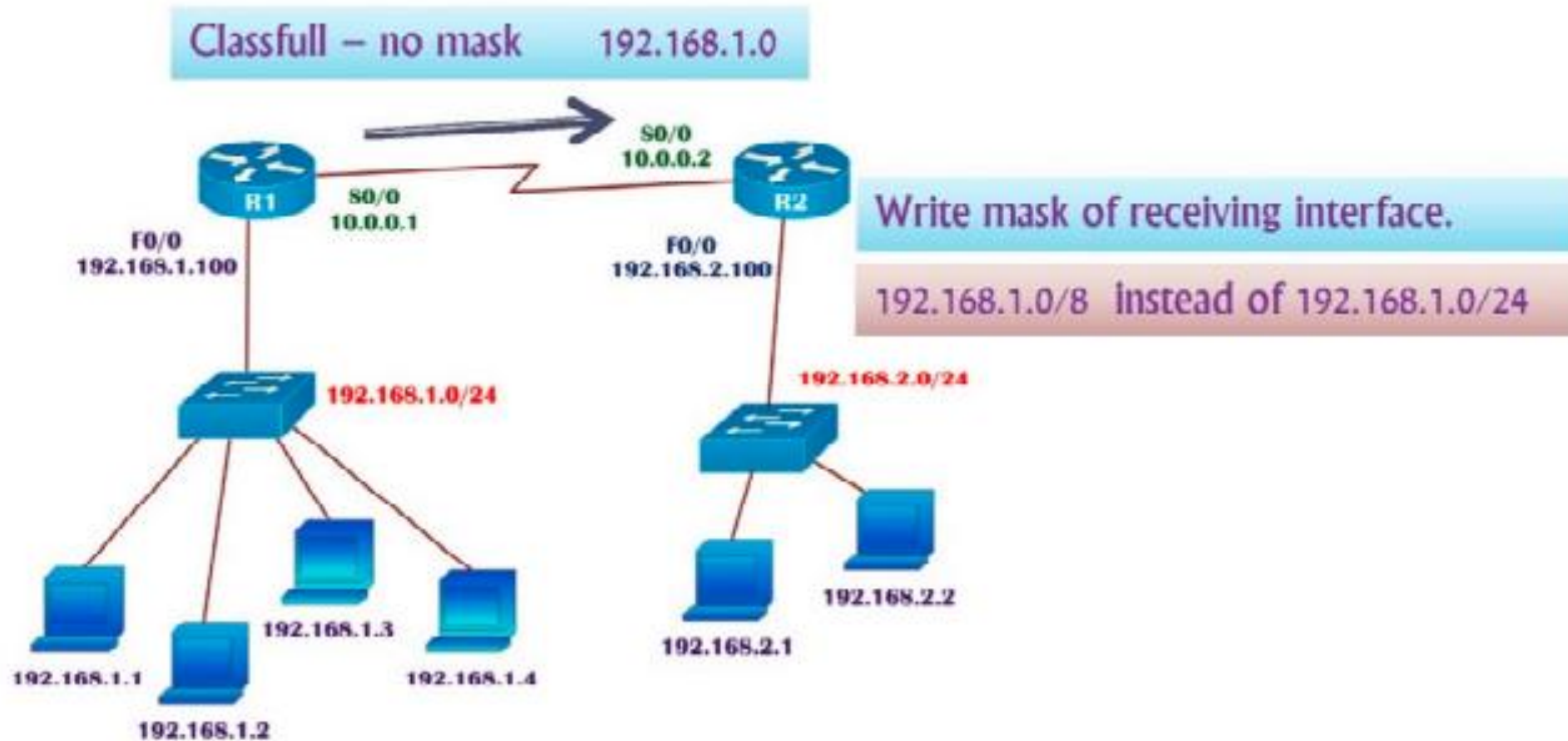
- **Distance Vector Protocol**
- **Link State Protocol**
- **Hybrid Protocol**

Types of Protocols:

- 1. Classfull Protocol**
- 2. Classless Protocol**

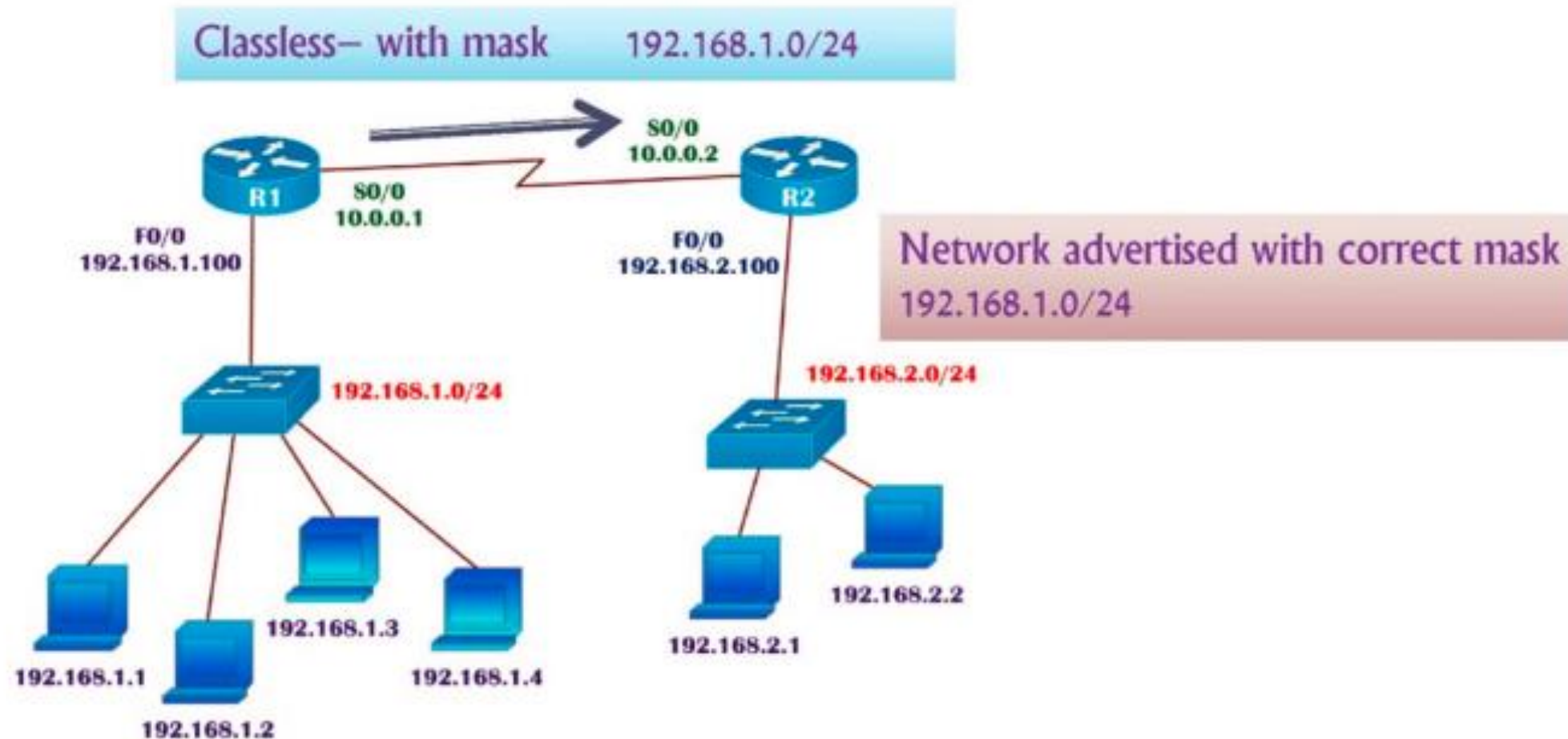
Classfull protocols

- Classful routing protocols do not carry the subnet mask information along with updates
- which means that all devices in the network must use the same subnet mask (FLSM or default same class)
 - Ex : RIPv1 , IGRP



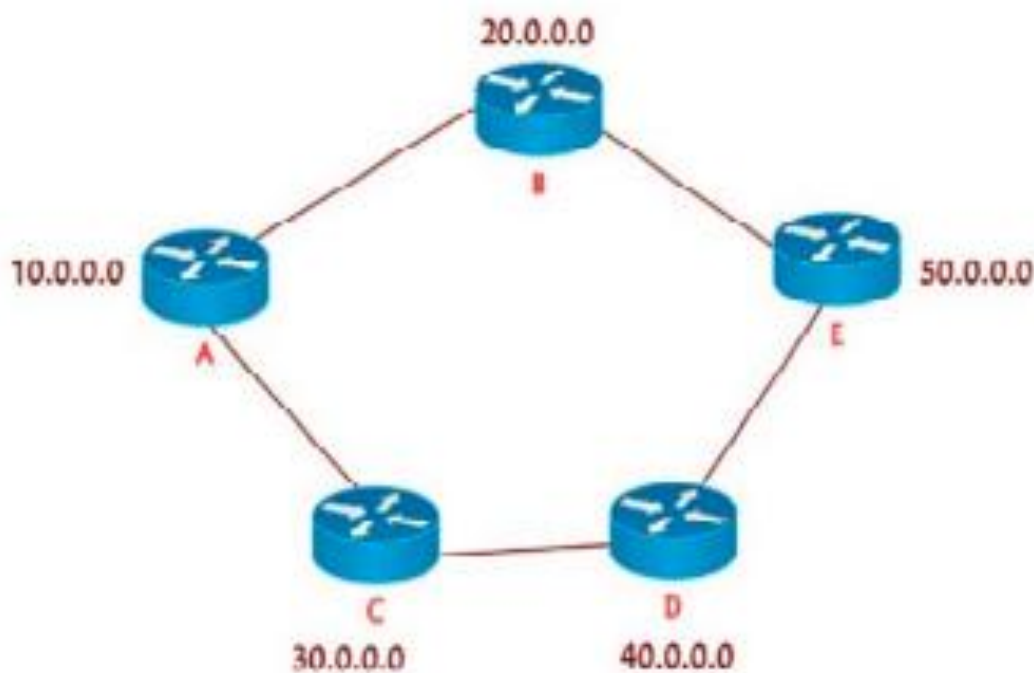
Classless protocols

- ▶ Classless routing protocol carry the subnet mask information along with updates
- ▶ That's why they support sub networks(VLSM and FLISM) and default networks also
 - Ex : RIPv2 , EIGRP , OSPF , IS-IS



Routing Information Protocol (RIP)

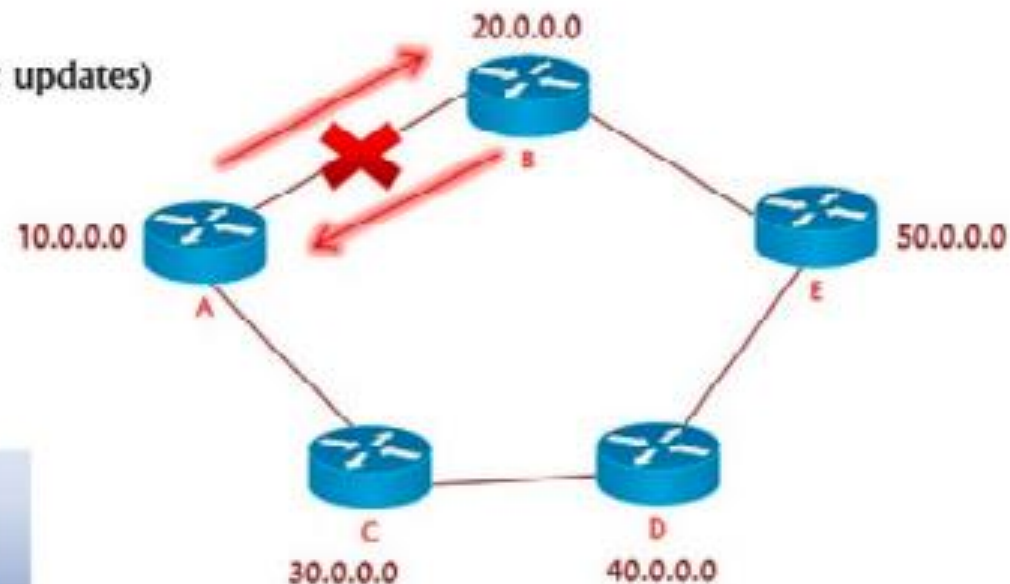
- Open Standard Protocol (Cisco/ non-cisco)
- Classfull routing protocol (not carry subnetmask)
- Updates are broadcasted via 255.255.255.255
- Metric : Hop count
- Load Balancing up to 4 equal paths
- Max Hop counts = 15 / Max routers = 16
- Applicable for small organizations
- Administrative distance is 120
- Exchange entire routing table for every 30 seconds. (periodic updates)



Rip Timers

Update Timer :

- Exchange entire routing table for every 30 seconds. (periodic updates)



Update timer
30 sec

Hold down timer
180 sec

Invalid timer
180 sec (30+150)

Flush timer
240 sec (180+ 60)

RIPv1

- ▶ Classful routing protocol (not carry mask)
- ▶ Updates via broadcasts (255.255.255.255)
- ▶ No support for authentication.

RIPv2

- ▶ Classless routing protocol (carry mask)
- ▶ Updates via multicast address 224.0.0.9
- ▶ Supports authentication

Configuring RIP v1

```
Router(config)# router rip
```

```
Router(config-router)# network <Network ID>
```

Configuring RIP v2

```
Router(config)# router rip
```

```
Router(config-router)# network <Network ID>
```

```
Router(config-router)# version 2
```

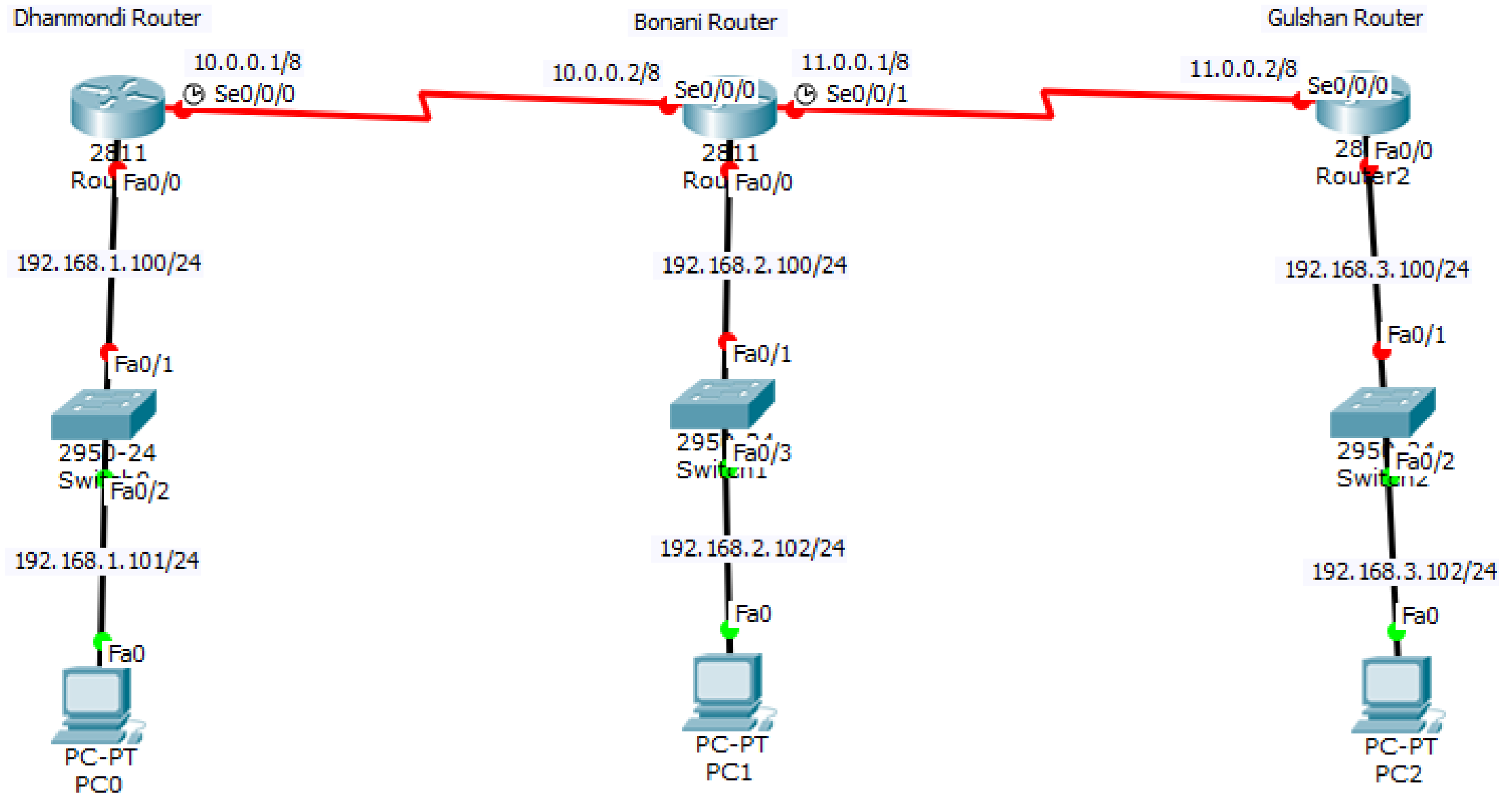
Advantages of RIP

- Easy to configure
- No design constraints (unlike OSPF)
- Less overhead

Disadvantage of RIP

- Bandwidth utilization is very high as broadcast for every 30 seconds (periodic updates)
- Works only on hop count (not consider BW)
- Applicable for small organizations (maximum hop counts = 15)
- Slow convergence (240 sec)

LAB : Routing using RIPv2



Step-1: সবার প্রথমে সকল রাউটারের Interface UP করে নিতে হবে।

1. Dhanmondi router

Continue with configuration dialog? [yes/no]: no

Router>enable

Router#configure terminal

Router(config)#interface serial 0/0/0

Router(config-if)#ip address 10.0.0.1 255.0.0.0

Router(config-if)#no shutdown

Router(config-if)#exit

Router(config)#interface fastEthernet 0/0

Router(config-if)#ip address 192.168.1.100 255.255.255.0

Router(config-if)#no shutdown

Router(config-if)#exit

2.Bonani Router

Continue with configuration dialog? [yes/no]: no

Router>enable

Router#configure terminal

Router(config)#interface serial 0/0/0

Router(config-if)#ip address 10.0.0.2 255.0.0.0

Router(config-if)#no shutdown

Router(config-if)#exit

Router(config)#interface fastEthernet 0/0

Router(config-if)#ip address 192.168.2.100 255.255.255.0

Router(config-if)#no shutdown

Router(config-if)#exit

Router(config)#interface serial 0/0/1

Router(config-if)#ip address 11.0.0.1 255.0.0.0

Router(config-if)#no shutdown

3.Gulshan Router

Continue with configuration dialog? [yes/no]: no

```
Router>enable
```

```
Router#configure terminal
```

```
Router(config)#interface serial 0/0/0
```

```
Router(config-if)#ip address 11.0.0.2 255.0.0.0
```

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

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

```
Router(config-if)#interface fastEthernet 0/0
```

```
Router(config-if)#ip address 192.168.3.100 255.255.255.0
```

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

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


Step-2: পরবর্তীতে প্রতিটি রাউটারে প্রবেশ করে Routing Lookup or RIPv2 Routing করতে হবে।

1. Dhanmondi router:

```
Router (config)#router rip
```

```
Router (config-router)#network 192.168.1.0
```

```
Router (config-router)#network 10.0.0.0
```

```
Router (config-router)#version 2
```

2. Bonani router:

```
Router (config)#router rip
```

```
Router (config-router)#network 192.168.2.0
```

```
Router (config-router)#network 10.0.0.0
```

```
Router (config-router)#network 11.0.0.0
```

```
Router (config-router)#version 2
```

3. Gulshan router:

```
Router (config)#router rip
```

```
Router (config-router)#network 192.168.3.0
```

```
Router (config-router)#network 11.0.0.0
```

```
Router (config-router)#version 2
```

Step-3: পরবর্তীতে প্রতিটি রাউটারে প্রবেশ করে ip route করে দেখতে হবে যে, প্রতিটি রাউটারে Routing হয়েছে কিনা।

1. Dhanmondi router:

```
Router#show ip route
```

Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP

C 10.0.0.0/8 is directly connected, Serial0/0/0

R 11.0.0.0/8 [120/1] via 10.0.0.2, 00:00:05, Serial0/0/0

C 192.168.1.0/24 is directly connected, FastEthernet0/0

R 192.168.2.0/24 [120/1] via 10.0.0.2, 00:00:05, Serial0/0/0

R 192.168.3.0/24 [120/2] via 10.0.0.2, 00:00:05, Serial0/0/0

এখানে দেখা যাচ্ছে যে, **R** দিয়ে যা দেখা যাচ্ছে তা হলো **Rip Routing**. আর **C** দিয়ে **Interface ip** গুলো দেখানো হয়েছে।

2. Bonani router:

Router#show ip route

C 10.0.0.0/8 is directly connected, Serial0/0/0

C 11.0.0.0/8 is directly connected, Serial0/0/1

R 192.168.1.0/24 [120/1] via 10.0.0.1, 00:00:25, Serial0/0/0

C 192.168.2.0/24 is directly connected, FastEthernet0/0

R 192.168.3.0/24 [120/1] via 11.0.0.2, 00:00:05, Serial0/0/1

3. Gulshan router:

Router#show ip route

R 10.0.0.0/8 [120/1] via 11.0.0.1, 00:00:22, Serial0/0/0

C 11.0.0.0/8 is directly connected, Serial0/0/0

R 192.168.1.0/24 [120/2] via 11.0.0.1, 00:00:22, Serial0/0/0

R 192.168.2.0/24 [120/1] via 11.0.0.1, 00:00:22, Serial0/0/0

C 192.168.3.0/24 is directly connected, FastEthernet0/0

Step-4: পরবর্তীতে প্রতিটি কম্পিউটারে প্রবেশ করে IP দিতে হবে।

1. Go to PCO => Click Desktop => Click IP Configuration

| | |
|-----------------|---------------|
| IP Address | 192.168.1.101 |
| Subnet Mask | 255.255.255.0 |
| Default Gateway | 192.168.1.100 |
| DNS Servers | |

পরবর্তীতে IP Address, Subnet Mask, Default Gateway (এটি হলো মূলত কম্পিউটার যে পোর্টের মাধ্যমে রাউটারের সাথে সংযুক্ত তার IP) দিয়ে উপরে Cross এ Click দিতে হবে।

2. Go to PC1 => Click Desktop => Click IP Configuration

| | |
|-----------------|---------------|
| IP Address | 192.168.2.101 |
| Subnet Mask | 255.255.255.0 |
| Default Gateway | 192.168.2.100 |
| DNS Server | |

3. Go to PC2 => Click Desktop => Click IP Configuration

| | |
|-----------------|---------------|
| IP Address | 192.168.3.101 |
| Subnet Mask | 255.255.255.0 |
| Default Gateway | 192.168.3.100 |
| | |

Step-5: পরবর্তীতে প্রতিটি কম্পিউটারে প্রবেশ করে ping দিয়ে Connectivity Check করতে হবে।

1. Go to PCO => Click Desktop => Click Command Prompt

```
PC>ping 192.168.2.101
```

Pinging 192.168.2.101 with 32 bytes of data:

Reply from 192.168.2.101: bytes=32 time=11ms TTL=128

Reply from 192.168.2.101 : bytes=32 time=0ms TTL=128

Reply from 192.168.2.101 : bytes=32 time=8ms TTL=128

Reply from 192.168.2.101 : bytes=32 time=8ms TTL=128

Ping statistics for 192.168.2.101 :

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 0ms, Maximum = 11ms, Average = 6ms.

যদি এইরকম আসে তাহলে আমি অন্য কম্পিউটারের সাথে সংযুক্ত আছি। আর সংযুক্ত না থাকলে Request Time Out আসবে।

1. Go to PCO => Click Desktop => Click Command Prompt

PC>ping 192.168.3.101

Pinging 192.168.3.101 with 32 bytes of data:

Reply from 192.168.3.101: bytes=32 time=11ms TTL=128

Reply from 192.168.3.101 : bytes=32 time=0ms TTL=128

Reply from 192.168.3.101 : bytes=32 time=8ms TTL=128

Reply from 192.168.3.101 : bytes=32 time=8ms TTL=128

Ping statistics for 192.168.3.101 :

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 0ms, Maximum = 11ms, Average = 6ms.

2. Go to PC1 => Click Desktop => Click Command Prompt

PC>ping 192.168.1.101

Pinging 192.168.1.101 with 32 bytes of data:

Reply from 192.168.1.101: bytes=32 time=11ms TTL=128

Reply from 192.168.1.101 : bytes=32 time=0ms TTL=128

Reply from 192.168.1.101 : bytes=32 time=8ms TTL=128

Reply from 192.168.1.101 : bytes=32 time=8ms TTL=128

Ping statistics for 192.168.1.101 :

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 0ms, Maximum = 11ms, Average = 6ms.

PC>ping 192.168.3.101

Pinging 192.168.3.101 with 32 bytes of data:

Reply from 192.168.3.101: bytes=32 time=11ms TTL=128

Reply from 192.168.3.101 : bytes=32 time=0ms TTL=128

Reply from 192.168.3.101 : bytes=32 time=8ms TTL=128

Reply from 192.168.3.101 : bytes=32 time=8ms TTL=128

Ping statistics for 192.168.3.101 :

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 0ms, Maximum = 11ms, Average = 6ms.

2. Go to PC2 => Click Desktop => Click Command Prompt

PC>ping 192.168.1.101

Pinging 192.168.1.101 with 32 bytes of data:

Reply from 192.168.1.101: bytes=32 time=11ms TTL=128

Reply from 192.168.1.101 : bytes=32 time=0ms TTL=128

Reply from 192.168.1.101 : bytes=32 time=8ms TTL=128

Reply from 192.168.1.101 : bytes=32 time=8ms TTL=128

Ping statistics for 192.168.1.101 :

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 0ms, Maximum = 11ms, Average = 6ms.

PC>ping 192.168.2.101

Pinging 192.168.2.101 with 32 bytes of data:

Reply from 192.168.2.101: bytes=32 time=11ms TTL=128

Reply from 192.168.2.101 : bytes=32 time=0ms TTL=128

Reply from 192.168.2.101 : bytes=32 time=8ms TTL=128

Reply from 192.168.2.101 : bytes=32 time=8ms TTL=128

Ping statistics for 192.168.2.101 :

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 0ms, Maximum = 11ms, Average = 6ms.

Thank
you

