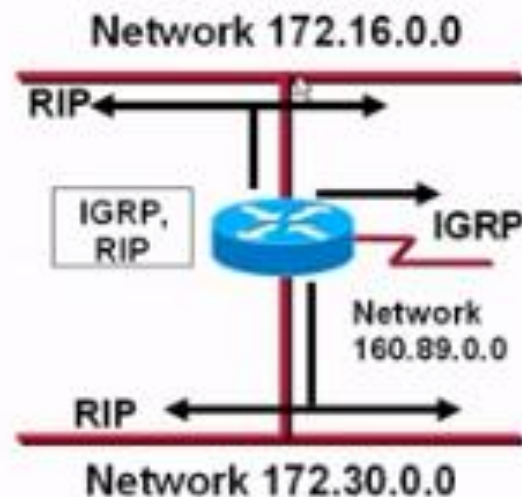


Introduction to Routing Information Protocol (RIP)

IP Routing Configuration Tasks

Router configuration

- Select routing protocols
- Specify networks or interfaces



Dynamic Routing Configuration

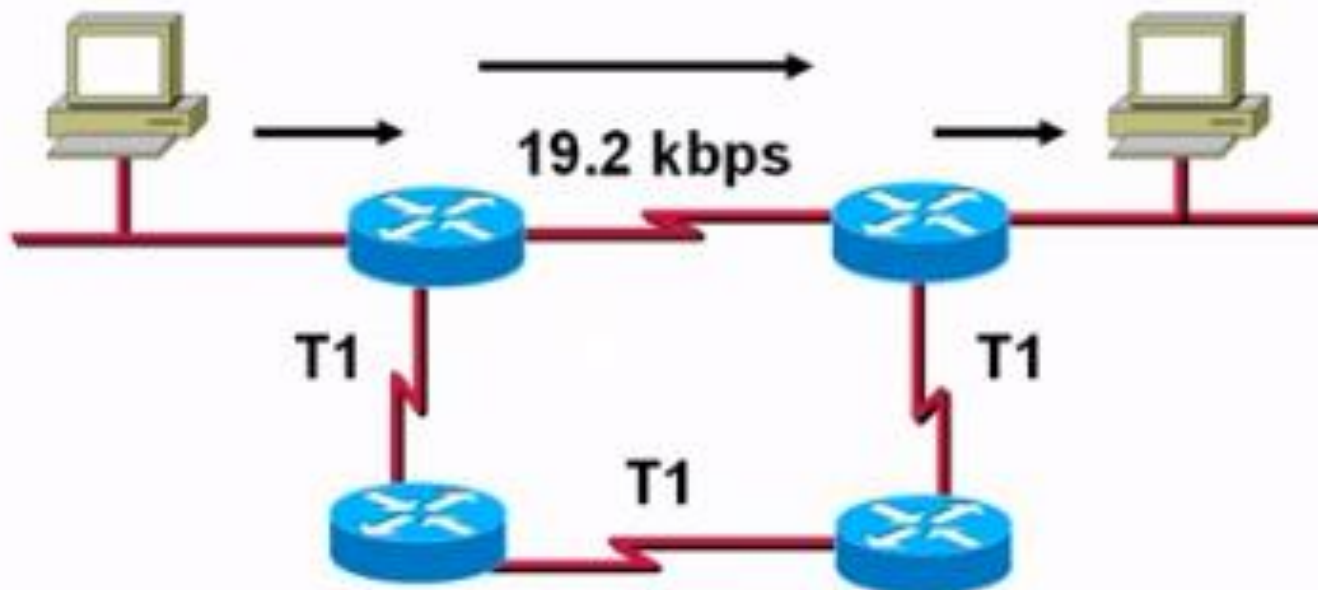
```
Router(config)#router protocol [keyword]
```

- Defines an IP routing protocol

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

- Mandatory configuration command for each IP routing process
- Identifies the physically connected network that routing updates are forwarded to

RIP Overview



- Hop count metric selects the path
- Routes update every 30 seconds

RIP Configuration

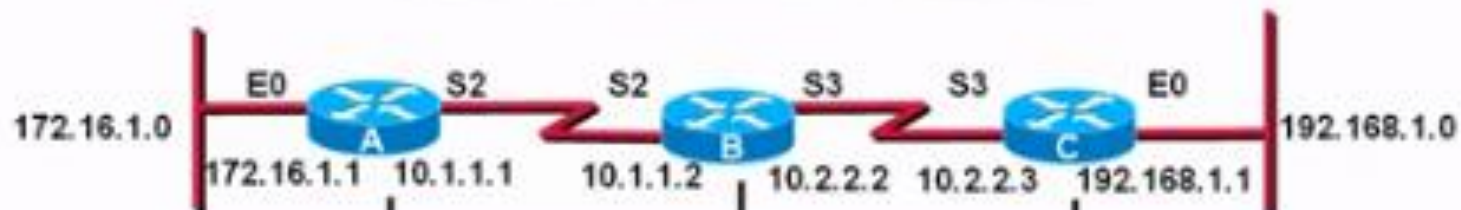
```
Router(config)#router rip
```

- Starts the RIP routing process

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

- Selects participating attached networks
- The network number must be a major classful network number

RIP Configuration Example

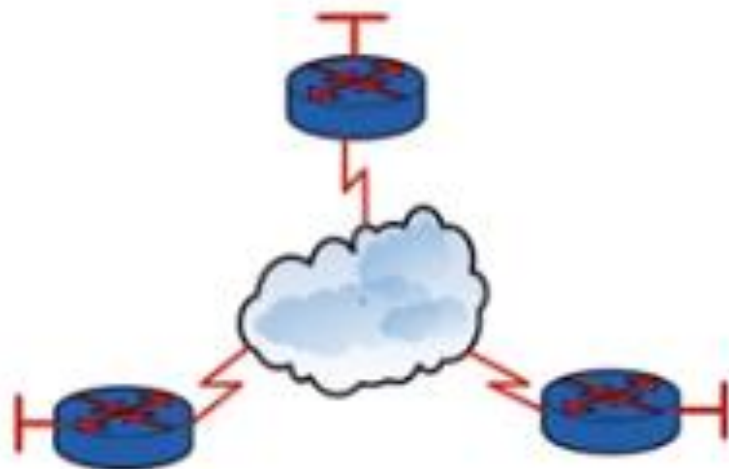


```
router rip
network 172.16.0.0
network 10.0.0.0
```

```
router rip
network 192.168.1.0
network 10.0.0.0
```

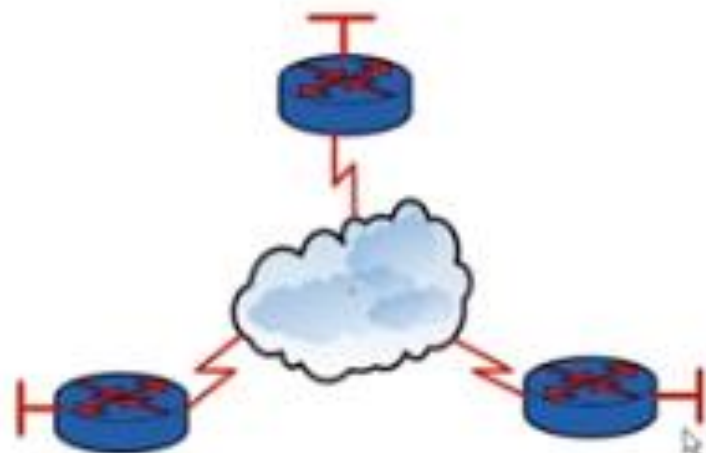
```
router rip
network 10.0.0.0
```

Overview



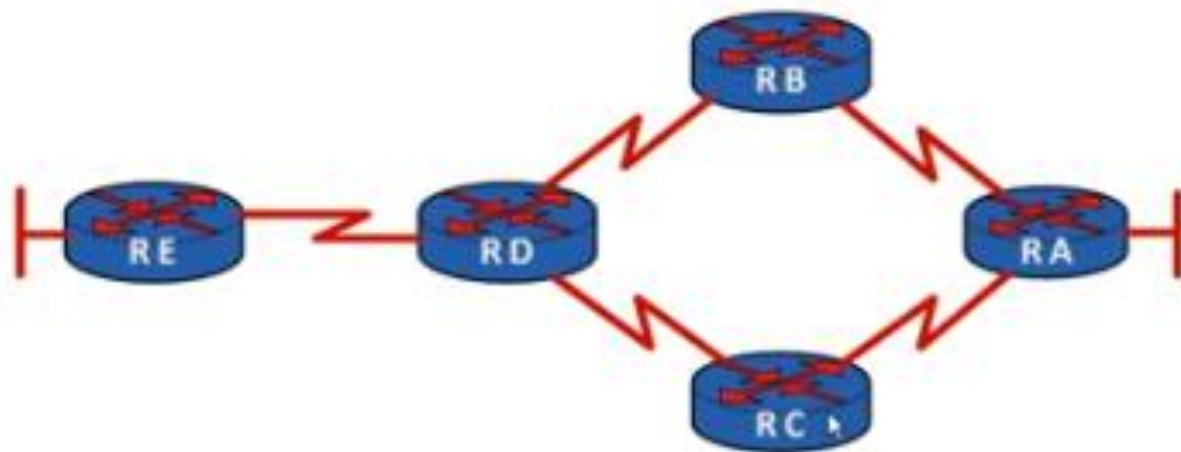
- RIP Features
- RIPv1 vs. RIPv2
- Configuring and Verifying RIP

RIP Details

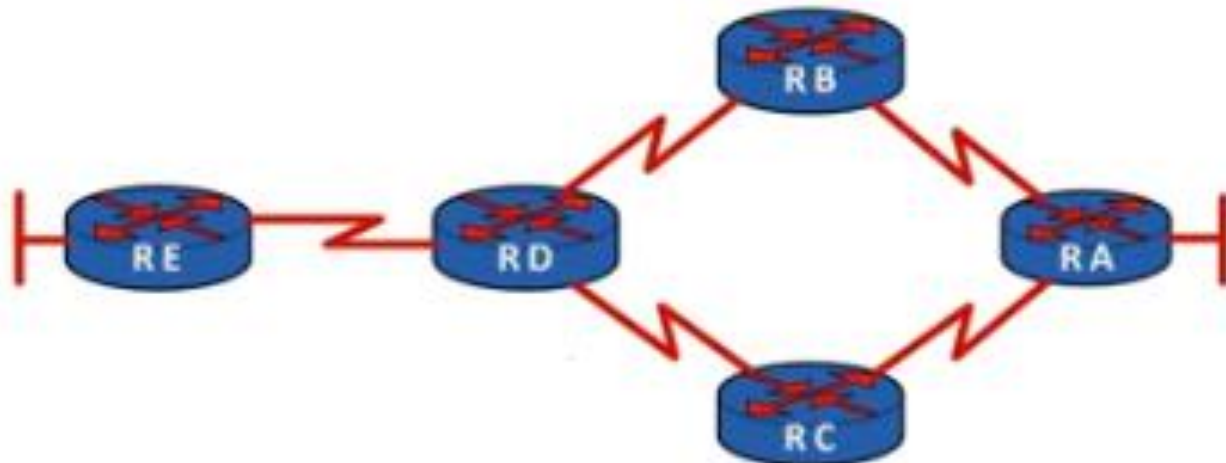


- Distance Vector Protocol
- Periodic Updates – 30 Seconds
- Possible loops in a complex topology
- Uses Hop Count as metric
- Maximum Hop Count is 15
- Administrative Distance is 120

Distance Vector Protocols



Distance Vector Protocols



Features of Distance-Vector Protocols

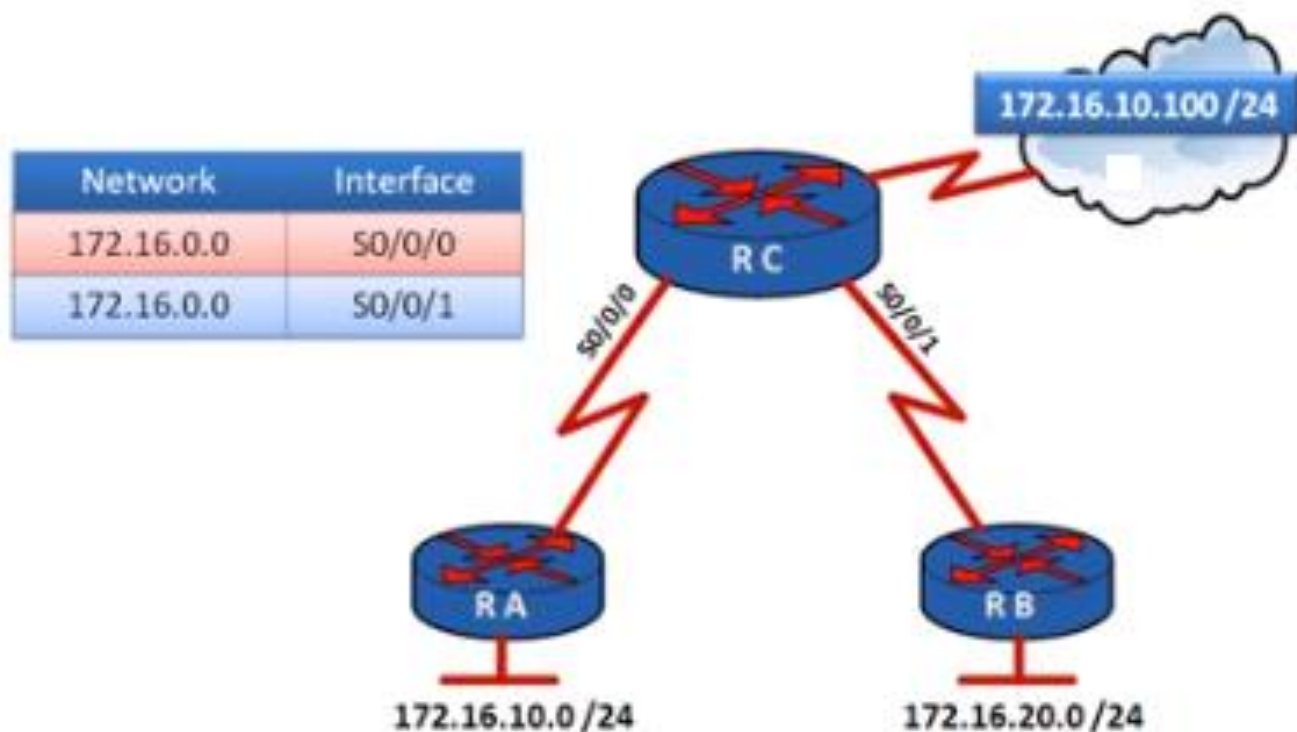
Have limited scope of the topology

Send Periodic Updates

Includes the Entire Routing Table in the routing updates

By default are Classful Routing Protocols

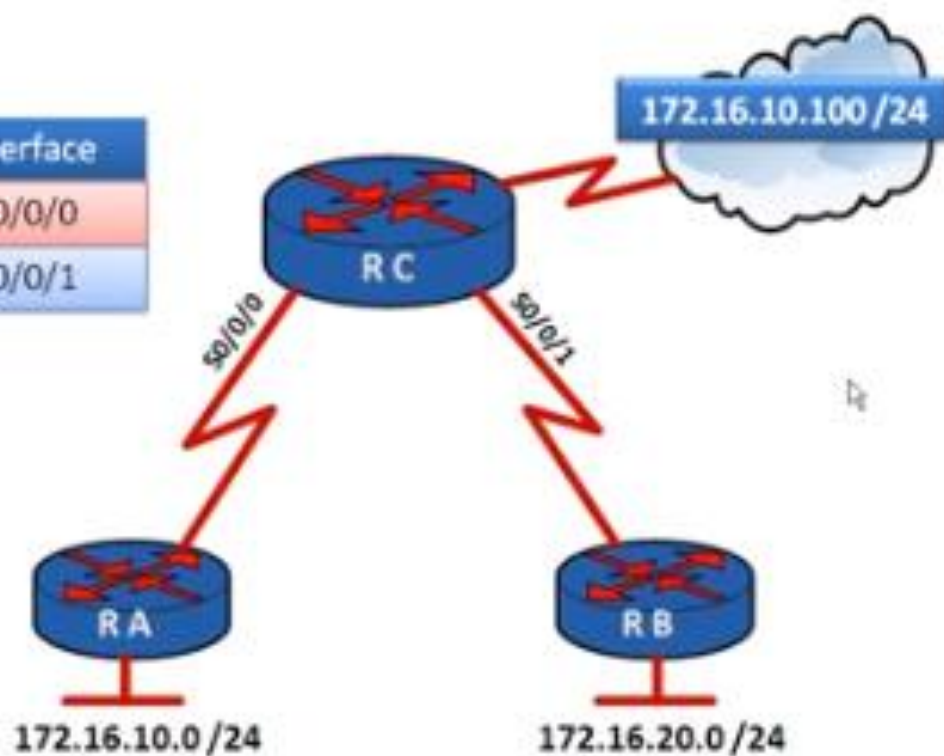
Classful vs. Classless Routing Protocols



- Classful Routing Protocols do NOT understand VLSM and do NOT perform CIDR

Classful vs. Classless Routing Protocols

Network	Interface
172.16.10.0 /24	50/0/0
172.16.20.0 /24	50/0/1



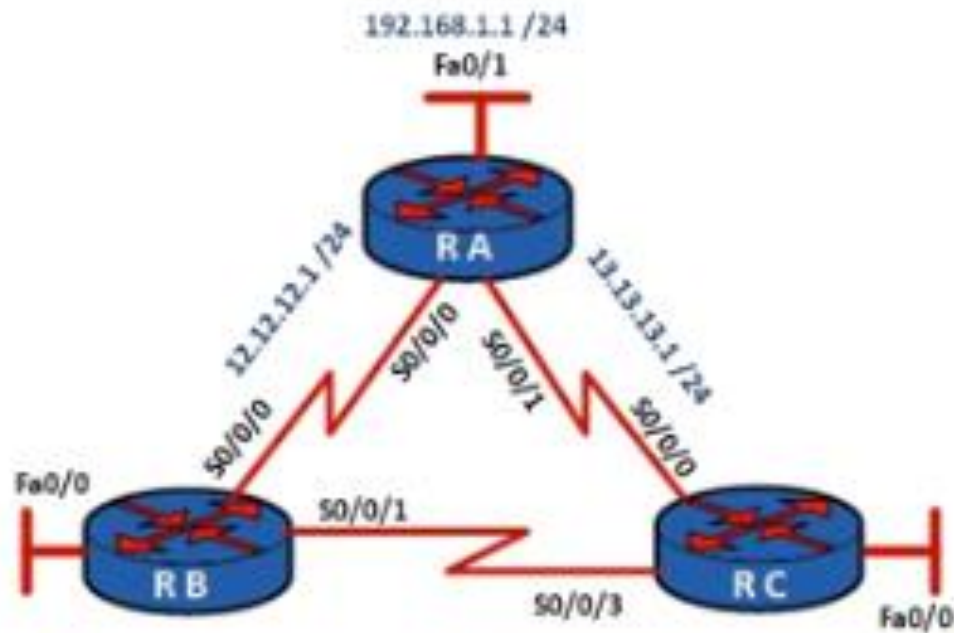
- Classless Routing Protocols understand VLSM and Perform CIDR

RIPv2 Configuration

Basic RIPv2 Configuration Commands	
Router(config)#	router rip
Enables RIP process on the router	
Router(config-router)#	version 2
Enables RIP version 2	
Router(config-router)#	no auto-summary
Makes RIP a classless routing protocol	
Router(config-router)#	network <network>
<ul style="list-style-type: none">•<network> MUST be a directly connected network•Enables RIP on all the interfaces whose IP Address belong to the network <network>•Starts Sending periodic updates through those interfaces•Updates include all the networks listed with network <network> command plus all other networks learned from neighbor routers.	

- Basic RIP version 2 configuration commands

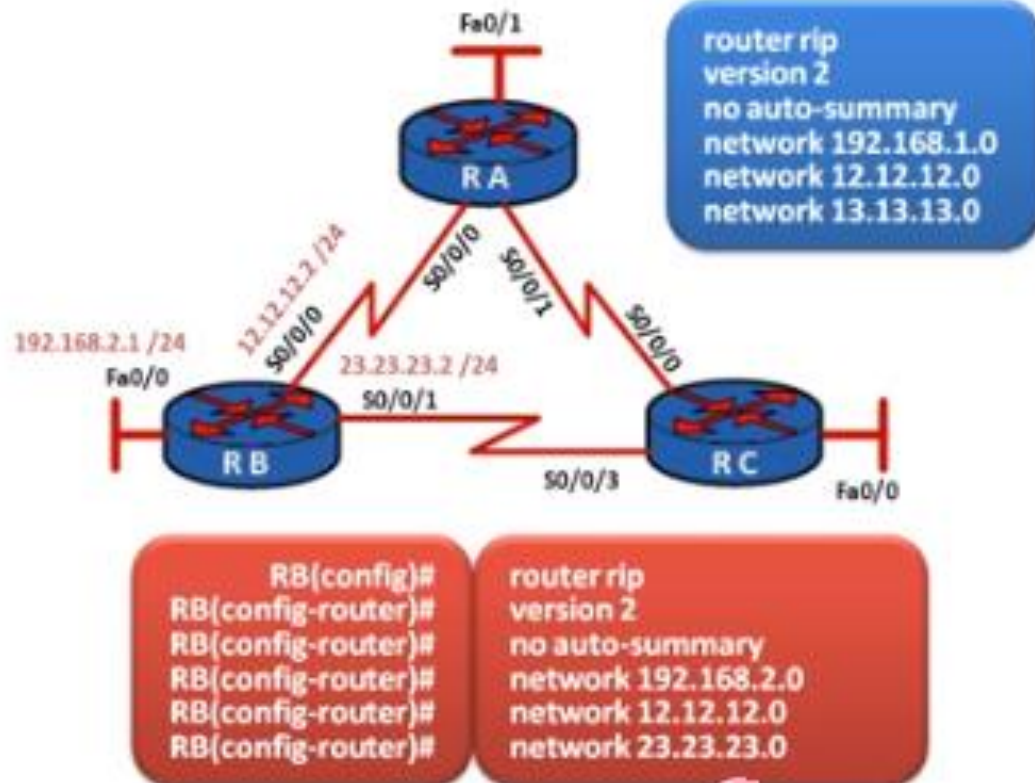
RIPv2 Configuration



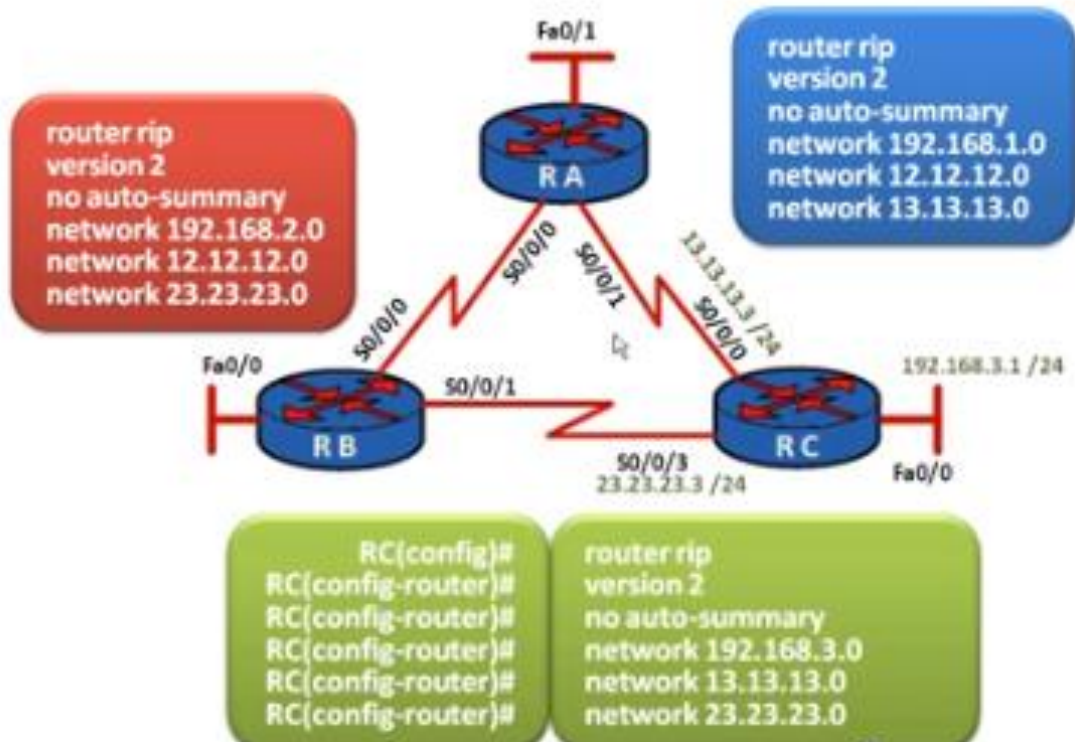
```
RA(config)#  
RA(config-router)#  
RA(config-router)#  
RA(config-router)#  
RA(config-router)#  
RA(config-router)#
```

```
router rip  
version 2  
no auto-summary  
network 192.168.1.0  
network 12.12.12.0  
network 13.13.13.0
```


RIPv2 Configuration



RIPv2 Configuration



RIP Configuration Verification

Verifying RIP Configuration

Router#	show ip protocols
---------	-------------------

Displays information about all routing protocols running on the Router

Router#	show ip route
---------	---------------

Displays the routing table of the Router

Router#	show running-config
---------	---------------------

Displays the Routers running configuration

- Basic router configuration verification commands.

RA#show ip protocols

Routing Protocol is "rip"

Outgoing update filter list for all interfaces is not set

Incoming update filter list for all interfaces is not set

Sending updates every 30 seconds, next due in 11 seconds

Invalid after 180 seconds, hold down 180, flushed after 240

Redistributing: rip

Default version control: send version 2, receive version 2

Interface	Send	Recv	Triggered	RIP	Key-chain
FastEthernet0/0	2	2			
Serial0/0/0	2	2			
Serial0/0/1	2	2			

Automatic network summarization is not in effect

Maximum path: 4

Routing for Networks:

12.0.0.0

13.0.0.0

192.168.1.0

Routing Information Sources:

Gateway	Distance	Last Update
13.13.13.3	120	00:00:09
12.12.12.2	120	00:00:01

Distance: (default is 120)

RB#show ip protocols

Routing Protocol is "rip"

Outgoing update filter list for all interfaces is not set

Incoming update filter list for all interfaces is not set

Sending updates every 30 seconds, next due in 20 seconds

Invalid after 180 seconds, hold down 180, flushed after 240

Redistributing: rip

Default version control: send version 2, receive version 2

Interface	Send	Recv	Triggered	RIP	Key-chain
FastEthernet0/0	2	2			
Serial0/0/0	2	2			
Serial0/0/1	2	2			

Automatic network summarization is not in effect

Maximum path: 4

Routing for Networks:

12.0.0.0

23.0.0.0

192.168.2.0

Routing Information Sources:

Gateway	Distance	Last Update
12.12.12.1	120	00:00:15
23.23.23.3	120	00:00:21

Distance: (default is 120)

RA#show ip route

Codes: C - connected, S - static, 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

i - IS-IS, su - IS-IS summary, 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

23.0.0.0/24 is subnetted, 1 subnets

R 23.23.23.0 [120/1] via 13.13.13.3, 00:00:03, Serial0/0/1
[120/1] via 12.12.12.2, 00:00:05, Serial0/0/0

12.0.0.0/24 is subnetted, 1 subnets

C 12.12.12.0 is directly connected, Serial0/0/0

C 192.168.1.0/24 is directly connected, FastEthernet0/0

13.0.0.0/24 is subnetted, 1 subnets

C 13.13.13.0 is directly connected, Serial0/0/1

R 192.168.2.0/24 [120/1] via 12.12.12.2, 00:00:05, Serial0/0/0

R 192.168.3.0/24 [120/1] via 13.13.13.3, 00:00:04, Serial0/0/1

RA#show ip route

Codes: C - connected, S - static, 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

i - IS-IS, su - IS-IS summary, 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

23.0.0.0/24 is subnetted, 1 subnets

R 23.23.23.0 [120/1] via 13.13.13.3, 00:00:03, Serial0/0/1
[120/1] via 12.12.12.2, 00:00:05, Serial0/0/0

12.0.0.0/24 is subnetted, 1 subnets

C 12.12.12.0 is directly connected, Serial0/0/0

C 192.168.1.0/24 is directly connected, FastEthernet0/0

13.0.0.0/24 is subnetted, 1 subnets

C 13.13.13.0 is directly connected, Serial0/0/1

R 192.168.2.0/24 [120/1] via 12.12.12.2, 00:00:05, Serial0/0/0

R 192.168.3.0/24 [120/1] via 13.13.13.3, 00:00:04, Serial0/0/1

RA#show ip route

Codes: C - connected, S - static, 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

i - IS-IS, su - IS-IS summary, 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

23.0.0.0/24 is subnetted, 1 subnets

R 23.23.23.0 [120/1] via 13.13.13.3, 00:00:03, Serial0/0/1
[120/1] via 12.12.12.2, 00:00:05, Serial0/0/0

12.0.0.0/24 is subnetted, 1 subnets

C 12.12.12.0 is directly connected, Serial0/0/0

C 192.168.1.0/24 is directly connected, FastEthernet0/0

13.0.0.0/24 is subnetted, 1 subnets

C 13.13.13.0 is directly connected, Serial0/0/1

R 192.168.2.0/24 [120/1] via 12.12.12.2, 00:00:05, Serial0/0/0

R 192.168.3.0/24 [120/1] via 13.13.13.3, 00:00:04, Serial0/0/1

RIP Configuration Verification

Router#	show running-config
Displays the Routers running configuration	

```
RA#show running-config
```

```
<output omitted>
```

```
!
```

```
router rip
```

```
version 2
```

```
network 12.0.0.0
```

```
network 13.0.0.0
```

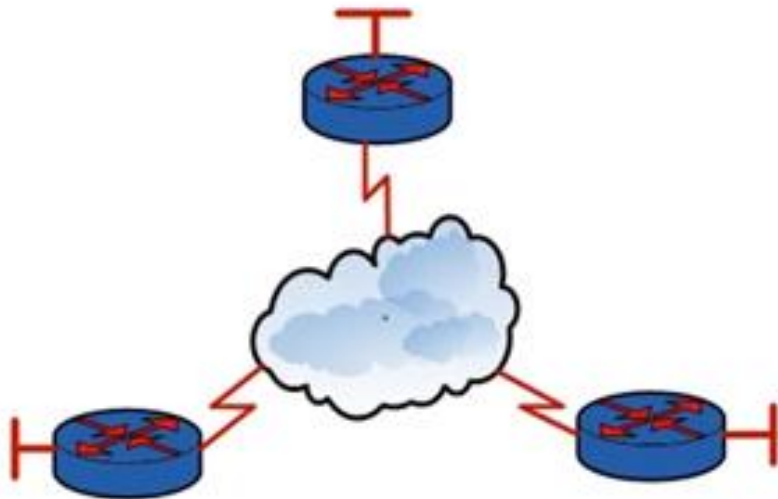
```
network 192.168.1.0
```

```
no auto-summary
```

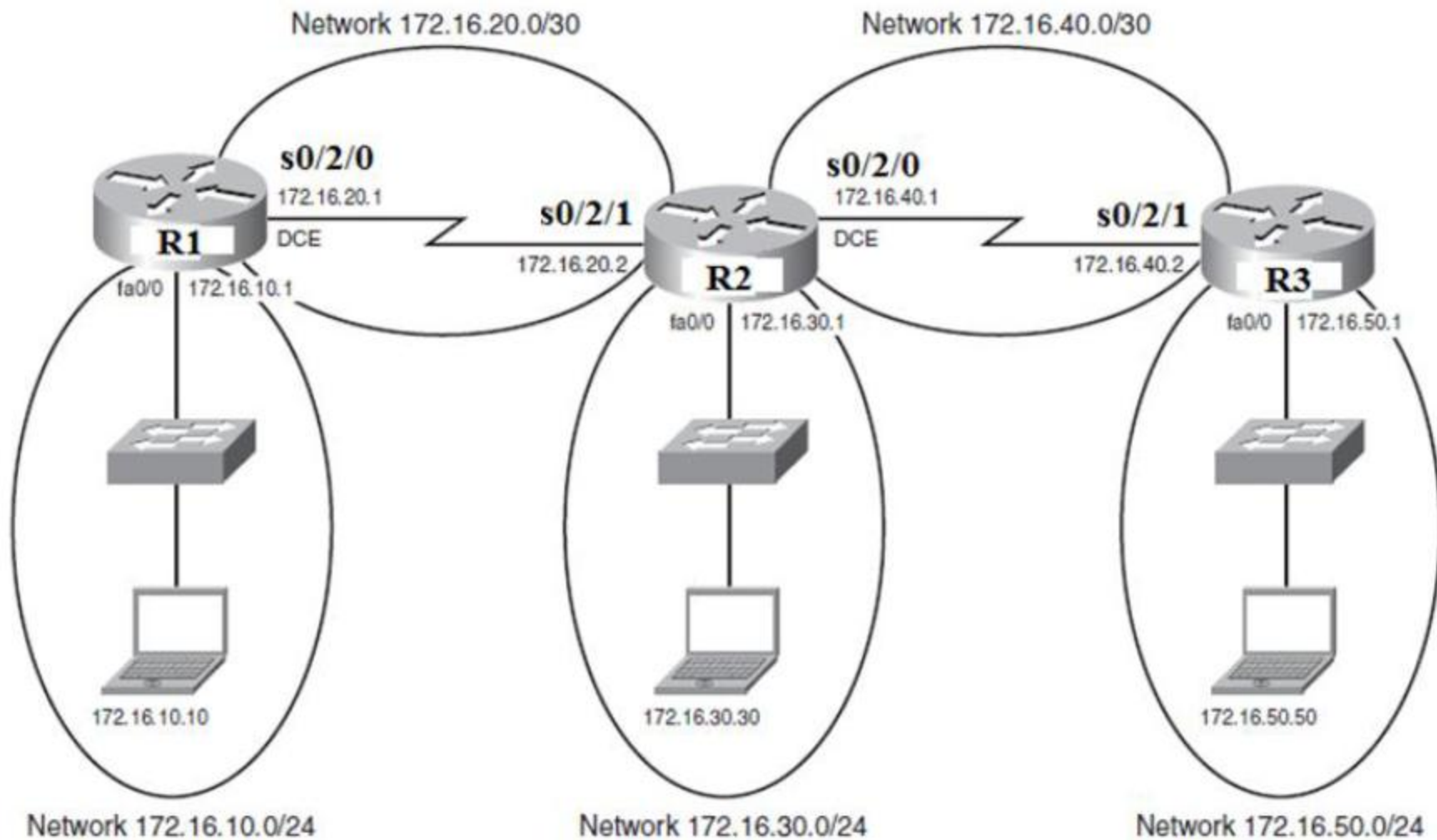
```
!
```

```
<output omitted>
```

Summary



- Distance Vector Protocol
- Periodic Updates – 30 Seconds
- Configuration commands:
router rip
version 2
network <network>



R1 Router

R1 >enable	Moves to privileged mode
R1 #configure terminal	Moves to global configuration mode
R1 (config)#router rip	Enables RIP routing
R1 (config-router)#version 2	Enables RIPv2
R1 (config-router)#network 172.16.0.0	Advertises directly connected networks (classful address only)
R1 (config-router)#no auto-summary	Turns off auto-summarization
R1 (config-router)#exit	Returns to global configuration mode
R1 (config)#exit	Returns to privileged mode
R1 #copy run start	Saves the configuration to NVRAM

R2 Router

R2	>enable	Moves to privileged mode
R2	#configure terminal	Moves to global configuration mode
R2	(config)#router rip	Enables RIP routing
R2	(config-router)#version 2	Enables RIPv2
R2	(config-router)#network 172.16.0.0	Advertises directly connected networks (classful address only)
R2	(config-router)#no auto-summary	Turns off auto-summarization
R2	(config-router)#exit	Moves to global configuration mode
R2	(config)#exit	Returns to privileged mode
R2	#copy running-config startup-config	Saves the configuration to NVRAM

R3 Router

R3 > enable	Moves to privileged mode
R3 # configure terminal	Moves to global configuration mode
R3 (config)# router rip	Enables RIP routing
R3 (config-router)# version 2	Enables RIPv2
R3 (config-router)# network 172.16.0.0	Advertises directly connected networks (classful address only)
R3 (config-router)# no auto-summary	Turns off auto-summarization
R3 (config-router)# exit	Moves to global configuration mode
R3 (config)# exit	Returns to privileged mode
R3 # copy running-config startup-config	Saves the configuration to NVRAM