# RIP Characteristics

- The Routing Information Protocol (RIP) is a Distance Vector routing protocol
- It uses hop count as its metric
- The maximum hop count is 15
- It will perform Equal Cost Multi Path, for up to 4 paths by default

# RIPv2 vs RIPv1

- RIPv1 is a legacy protocol which is not typically used anymore (although it is still supported on Cisco routers)
- RIPv1 does not send subnet mask information with routing updates so Variable Length Subnet Masking (VLSM) is not supported. RIPv2 does support VLSM.
- RIPv1 updates are sent every 30 seconds as broadcast traffic. RIPv2 uses multicast address 224.0.0.9
- RIPv2 supports authentication, RIPv1 does not.

# RIPng

- RIPng (RIP next generation) supports IPv6 networks
- It is not covered on the CCNA exam

# RIPv2 Configuration

```
R1(config)#router rip
R1(config-router)#version 2
R1(config-router)#network 10.0.0.0
```

- The ‘network’ command should reference a classful network. No subnet mask is specified.

# Auto-Summary

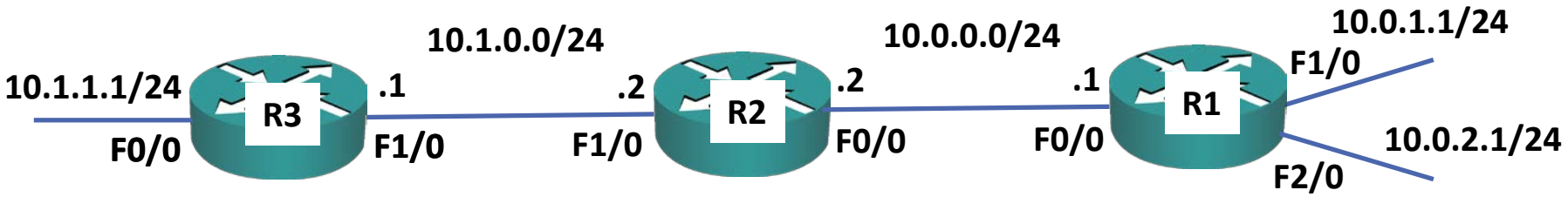
- RIP will automatically summarise routes to the classful boundary by default
- For example, 192.168.10.1/30 will be advertised as 192.168.10.0/24
- 172.16.10.1/30 will be advertised as 172.16.0.0/16
- This is almost never desirable

```
R1(config)#router rip
R1(config-router)#no auto-summary
```

# Manual Summarization

- Manual summarisation gives you control of exactly how you summarise
- The individual summarised routes are not advertised - only their summary route

```
R2(config-router)#interface f1/0
R2(config-if)#ip summary-address rip 10.0.0.0 255.255.0.0
```



# RIPv2 Verification – show ip protocols

```
R1#show ip protocols
*** IP Routing is NSF aware ***

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 27 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
    FastEthernet1/0       2     2
    FastEthernet2/0       2     2
    FastEthernet3/0       2     2
  Automatic network summarization is not in effect
  Maximum path: 4
  Routing for Networks:
    10.0.0.0
  Routing Information Sources:
    Gateway         Distance      Last Update
    10.0.0.2              120      00:00:12
    10.0.3.2              120      00:00:01
  Distance: (default is 120)
```

# RIPv2 Verification – show run | section rip

```
R1#sh run | section rip
router rip
 version 2
 network 10.0.0.0
 no auto-summary
```

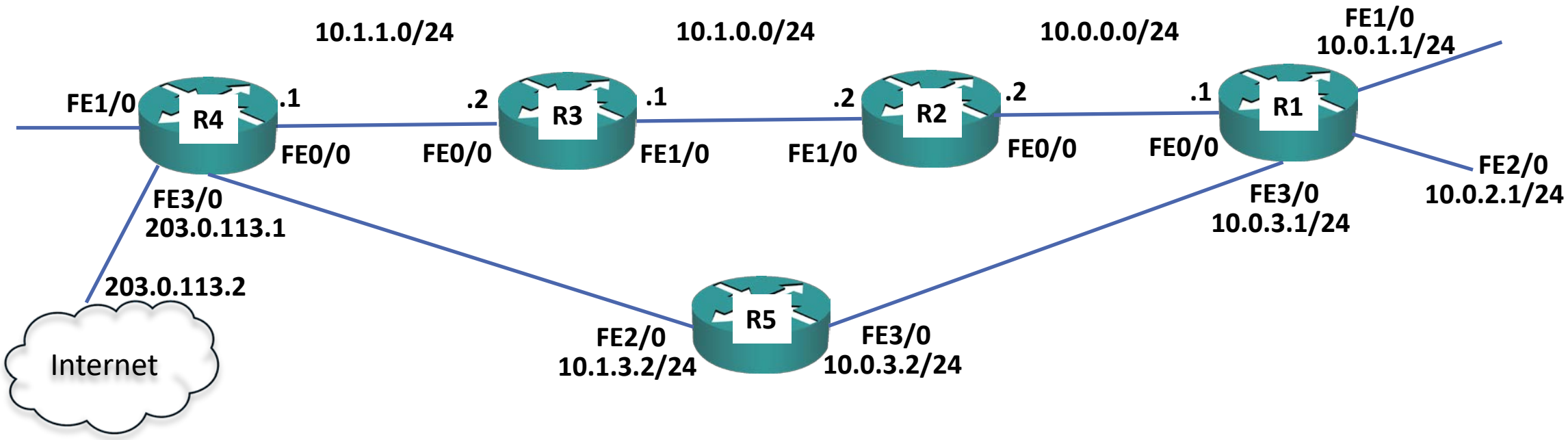
# RIPv2 Verification – show ip route

```
R1#show ip route
Codes: L - local, 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, H - NHRP, l - LISP
       + - replicated route, % - next hop override

Gateway of last resort is not set

      10.0.0.0/8 is variably subnetted, 12 subnets, 2 masks
C        10.0.0.0/24 is directly connected, FastEthernet0/0
L        10.0.0.1/32 is directly connected, FastEthernet0/0
C        10.0.1.0/24 is directly connected, FastEthernet1/0
L        10.0.1.1/32 is directly connected, FastEthernet1/0
C        10.0.2.0/24 is directly connected, FastEthernet2/0
L        10.0.2.1/32 is directly connected, FastEthernet2/0
C        10.0.3.0/24 is directly connected, FastEthernet3/0
L        10.0.3.1/32 is directly connected, FastEthernet3/0
R        10.1.0.0/24 [120/1] via 10.0.0.2, 00:00:15, FastEthernet0/0
R        10.1.1.0/24 [120/2] via 10.0.3.2, 00:00:03, FastEthernet3/0
                     [120/2] via 10.0.0.2, 00:00:15, FastEthernet0/0
R        10.1.2.0/24 [120/2] via 10.0.3.2, 00:00:03, FastEthernet3/0
R        10.1.3.0/24 [120/1] via 10.0.3.2, 00:00:03, FastEthernet3/0
```

# RIPv2 Verification – show ip rip database

```
R1#show ip rip database
10.0.0.0/8    auto-summary
10.0.0.0/24    directly connected, FastEthernet0/0
10.0.1.0/24    directly connected, FastEthernet1/0
10.0.2.0/24    directly connected, FastEthernet2/0
10.0.3.0/24    directly connected, FastEthernet3/0
10.1.0.0/24
    [1] via 10.0.0.2, 00:00:12, FastEthernet0/0
10.1.1.0/24
    [2] via 10.0.3.2, 00:00:00, FastEthernet3/0
    [2] via 10.0.0.2, 00:00:12, FastEthernet0/0
10.1.2.0/24
    [2] via 10.0.3.2, 00:00:00, FastEthernet3/0
10.1.3.0/24
    [1] via 10.0.3.2, 00:00:00, FastEthernet3/0
```

# Default Route Injection




```
R4(config)#ip route 0.0.0.0 0.0.0.0 203.0.113.2
R4(config)#router rip
R4(config-router)#default-information originate
```

# Default Route Injection Verification


```
R1#sh ip route
Codes: L - local, 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, H - NHRP, l - LISP
       + - replicated route, % - next hop override

Gateway of last resort is 10.0.3.2 to network 0.0.0.0

R*    0.0.0.0/0 [120/2] via 10.0.3.2, 00:00:25, FastEthernet3/0
      10.0.0.0/8 is variably subnetted, 12 subnets, 2 masks
C        10.0.0.0/24 is directly connected, FastEthernet0/0
L        10.0.0.1/32 is directly connected, FastEthernet0/0
C        10.0.1.0/24 is directly connected, FastEthernet1/0
L        10.0.1.1/32 is directly connected, FastEthernet1/0
C        10.0.2.0/24 is directly connected, FastEthernet2/0
L        10.0.2.1/32 is directly connected, FastEthernet2/0
C        10.0.3.0/24 is directly connected, FastEthernet3/0
L        10.0.3.1/32 is directly connected, FastEthernet3/0
R        10.1.0.0/24 [120/1] via 10.0.0.2, 00:00:00, FastEthernet0/0
R        10.1.1.0/24 [120/2] via 10.0.3.2, 00:00:25, FastEthernet3/0
                     [120/2] via 10.0.0.2, 00:00:00, FastEthernet0/0
R        10.1.2.0/24 [120/2] via 10.0.3.2, 00:00:25, FastEthernet3/0
R        10.1.3.0/24 [120/1] via 10.0.3.2, 00:00:25, FastEthernet3/0
      192.168.1.0/32 is subnetted, 1 subnets
C        192.168.1.1 is directly connected, Loopback0
```