Video
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RIPv2

Routing Protocols and Concepts – Chapter 7

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7.0.1 Chapter Introduction

- Encounter and describe RIPv1's limitations.
- Apply the basic Routing Information Protocol Version 2 (RIPv2) configuration commands and evaluate RIPv2 classless routing updates.
- Analyze router output to see RIPv2 support for VLSM and CIDR
- Identify RIPv2 verification commands and common RIPv2 issues.
- Configure, verify, and troubleshoot RIPv2 in "hands-on" labs

7.0.1 Chapter Introduction

- **Chapter focus**
  -Difference between RIPv1 & RIPv2

- RIPv1
  - -A classful distance vector routing protocol
  - -Does not support discontiguous subnets
  - -Does not support VLSM
  - -Does not send subnet mask in routing update
  - -Routing updates are broadcast

- RIPv2
  - -A classless distance vector routing protocol that is an enhancement of RIPv1's features.
  - -Next hop address is included in updates
  - -Routing updates are multicast
  - -The use of authentication is an option

7.0.1 Chapter Introduction

- **Similarities between RIPv1 & RIPv2**

  -Use of timers to prevent routing loops

  -Use of split horizon or split horizon with poison reverse

  -Use of triggered updates

  -Maximum hop count of 15

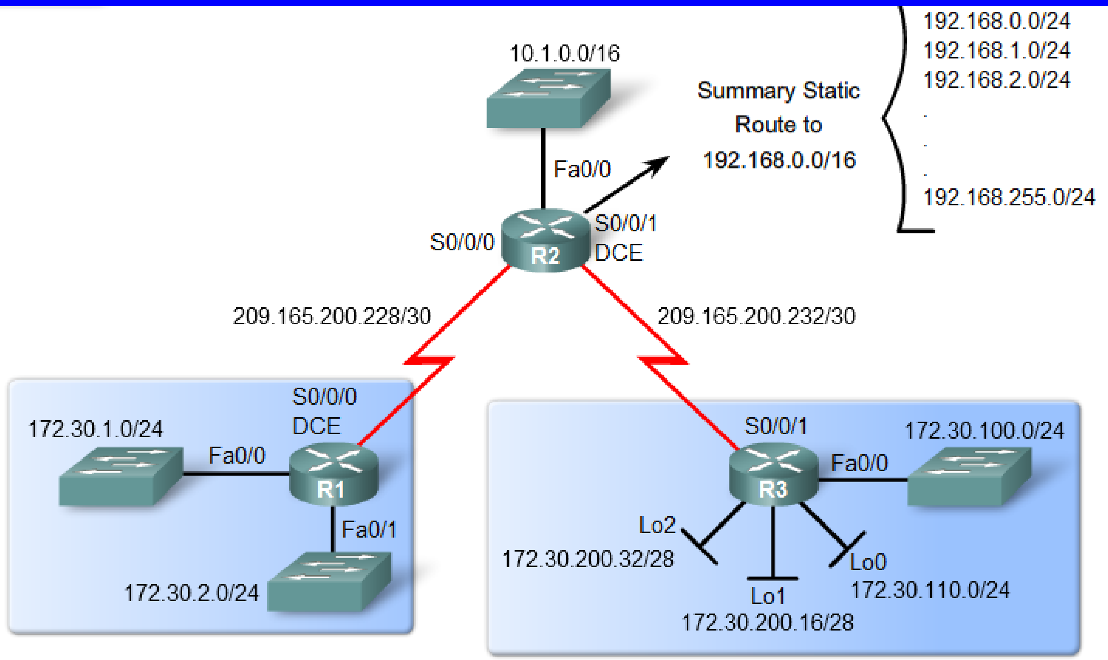
7.0.1 Chapter Introduction

	Interior Gateway Protocols				Exterior Gateway Protocols
	Distance Vector Routing Protocols		Link State Routing Protocols		Path Vector
Classful	RIP	IGRP			EGP
Classless	RIPv2	EIGRP	OSPFv2	IS-IS	BGPv4
IPv6	RIPng	EIGRP for IPv6	OSPFv3	IS-IS for IPv6	BGPv4 for IPv6

In this chapter, you will learn to:

- Encounter and describe the limitations of RIPv1.
- Apply the basic Routing Information Protocol Version 2 (RIPv2) configuration commands and evaluate RIPv2 classless routing updates.
- Analyze router output to see RIPv2 support for VLSM and Classless Inter-Domain Routing (CIDR).
- Identify RIPv2 verification commands and common RIPv2 issues.
- Configure, verify, and troubleshoot RIPv2 in hands-on labs.

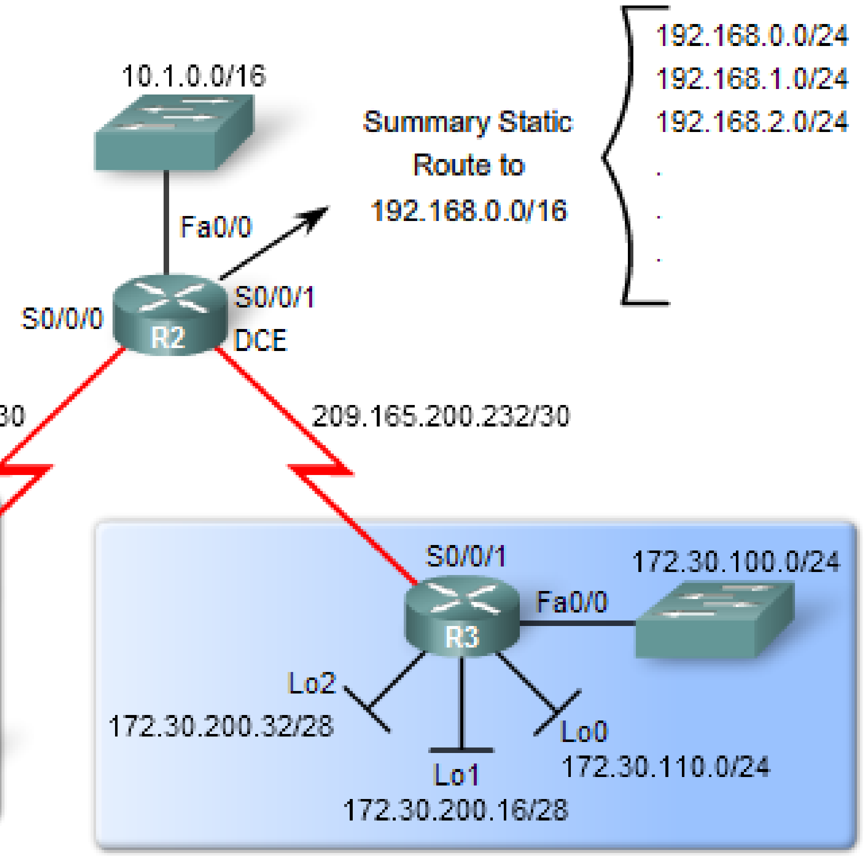
7.1.1 Lab Topology



Device	Interface	IP Address	Subnet Mask
R1	Fa0/0	172.30.1.1	255.255.255.0
	Fa0/1	172.30.2.1	255.255.255.0
	S0/0/0	209.165.200.230	255.255.255.252
R2	Fa0/0	10.1.0.1	255.255.0.0
	S0/0/0	209.165.200.229	255.255.255.252
	S0/0/1	209.165.200.233	255.255.255.252
R3	Fa0/0	172.30.100.1	255.255.255.0
	Lo0	172.30.110.1	255.255.255.0
	Lo1	172.30.200.17	255.255.255.240
	Lo2	172.30.200.33	255.255.255.240
	S0/0/1	209.165.200.234	255.255.255.252

7.1.1 Lab Topology

This topology is discontiguous and will not converge because 172.30.0.0/16 is divided by the 209.165.200.0/24.

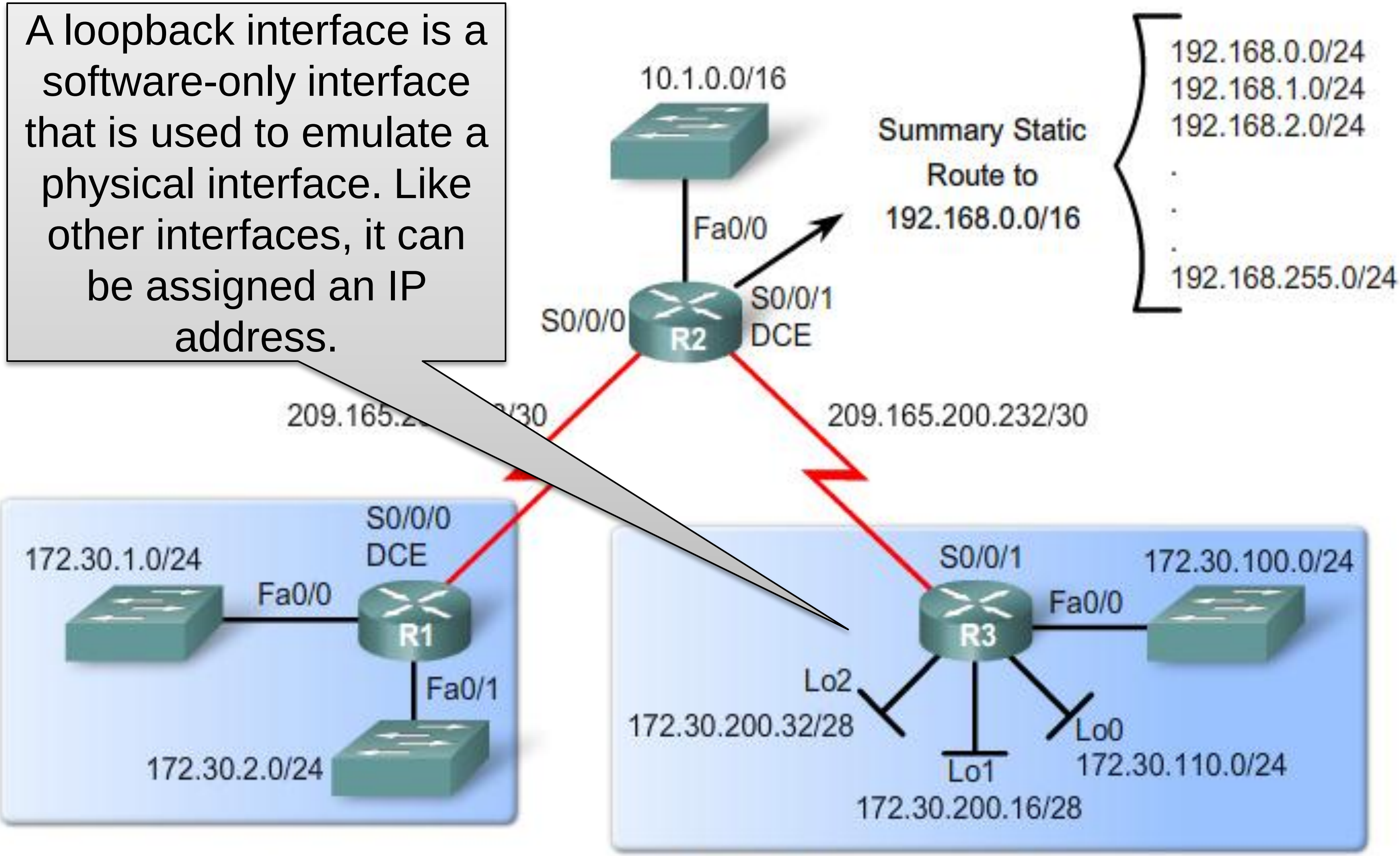


Scenario:

- 3 router set up
- Topology is discontiguous
- There exists a static summary route
- Static route information can be injected into routing table updates using redistribution.
- Routers 1 & 3 contain VLSM networks

7.1.1 Lab Topology

A loopback interface is a software-only interface that is used to emulate a physical interface. Like other interfaces, it can be assigned an IP address.



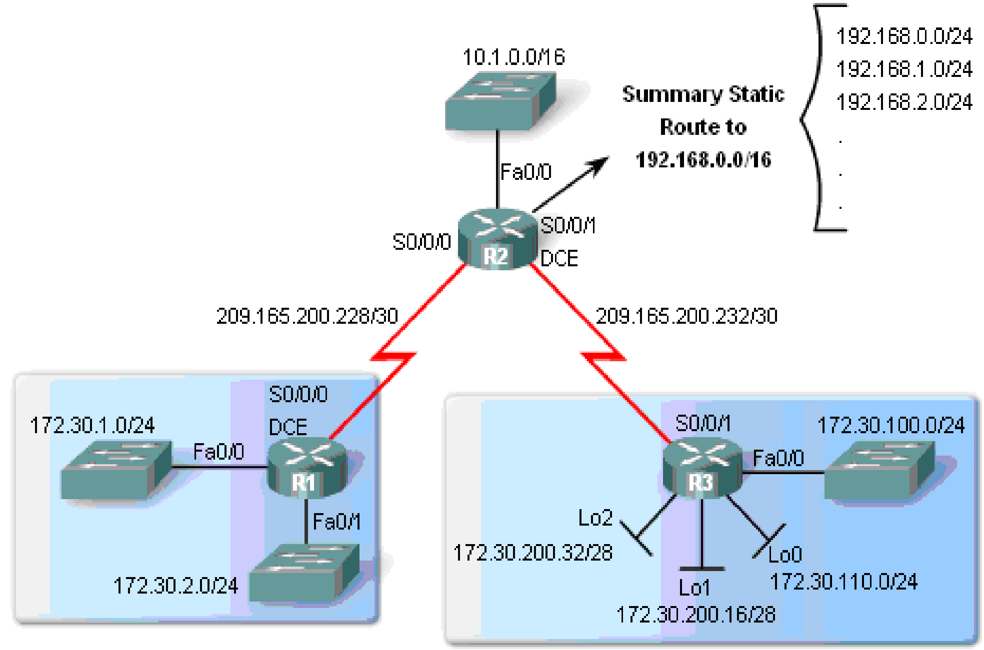
Both groups of subnets are part of the classful major network 172.30.0.0/16

7.1.1 Lab Topology

Scenario Continued

- VLSM sub netting the subnet
- Private IP addresses are on LAN links (10, 172, 192)
- Public IP addresses are used on WAN links 209.165.200.0
- Loopback interfaces

  -These are virtual interfaces that can be pinged and added to routing table



RFC 1918 Private Addresses

Class	Prefix/Mask	Address Range
A	10.0.0.0/8	10.0.0.0 to 10.255.255.255
B	172.16.0.0/12	172.16.0.0 to 172.31.255.255
C	192.168.0.0/16	192.168.0.0 to 192.168.255.255

Used for private IP addressing

Cisco Example IP Addresses

Prefix/Mask	Address Range
209.165.200.224/27	209.165.200.224 to 209.165.200.255
209.165.201.0/27	209.165.201.0 to 209.165.201.31
209.165.202.128/27	209.165.202.128 to 209.165.202.159

Used for public IP addressing when needed for example purposes.

7.1.1 Lab Topology

172.30.0.0/16 subnetted for R1 and R3

Assigned to	Subnet	Network	Host Range	Broadcast
	0	172.30.0.0	172.30.0.1 to 172.30.0.254	172.30.0.255
R1 Fa0/0	1	172.30.1.0	172.30.1.1 to 172.30.1.254	172.30.1.255
R1 Fa0/1	2	172.30.2.0	172.30.2.1 to 172.30.2.254	172.30.2.255
	3	172.30.3.0	172.30.3.1 to 172.30.3.254	172.30.3.255
	4	172.30.4.0	172.30.4.1 to 172.30.4.254	172.30.4.255
	.			
R3 Fa0/0	100	172.30.100.0	172.30.100.1 to 172.30.100.254	172.30.100.255
	.			
R3 Lo0	110	172.30.110.0	172.30.110.1 to 172.30.110.254	172.30.110.255
	.			
Subnetted Again	200	172.30.200.0	172.30.200.1 to 172.30.200.254	172.30.200.255
	.			
	255	172.30.255.0	172.30.255.1 to 172.30.255.254	172.30.255.255

256 /24 subnets

Assigned to	Subnet	Network	Host Range	Broadcast
	0	172.30.200.0	172.30.200.1 to 172.30.200.14	172.30.200.15
R3 Lo1	1	172.30.200.16	172.30.200.17 to 172.30.200.30	172.30.200.31
R3 Lo2	2	172.30.200.32	172.30.200.33 to 172.30.200.46	172.30.200.47
	3	172.30.200.48	172.30.200.49 to 172.30.200.62	172.30.200.63
	.			
	15	172.30.200.240	172.30.200.241 to 172.30.200.254	172.30.200.255

16 /28 subnets

7.1.2 RIPv1 Limitations

Null Interfaces

This is a virtual interface that does not need to be created or configured

- -Traffic sent to a null interface is discarded
- -Null interfaces do not send or receive traffic

Static routes and null interfaces

- null interfaces will serve as the exit interface for static route
- Example of configuring a static supernet route with a null interface
- **R2(config)#ip route 192.168.0.0 255.255.0.0 Null0**

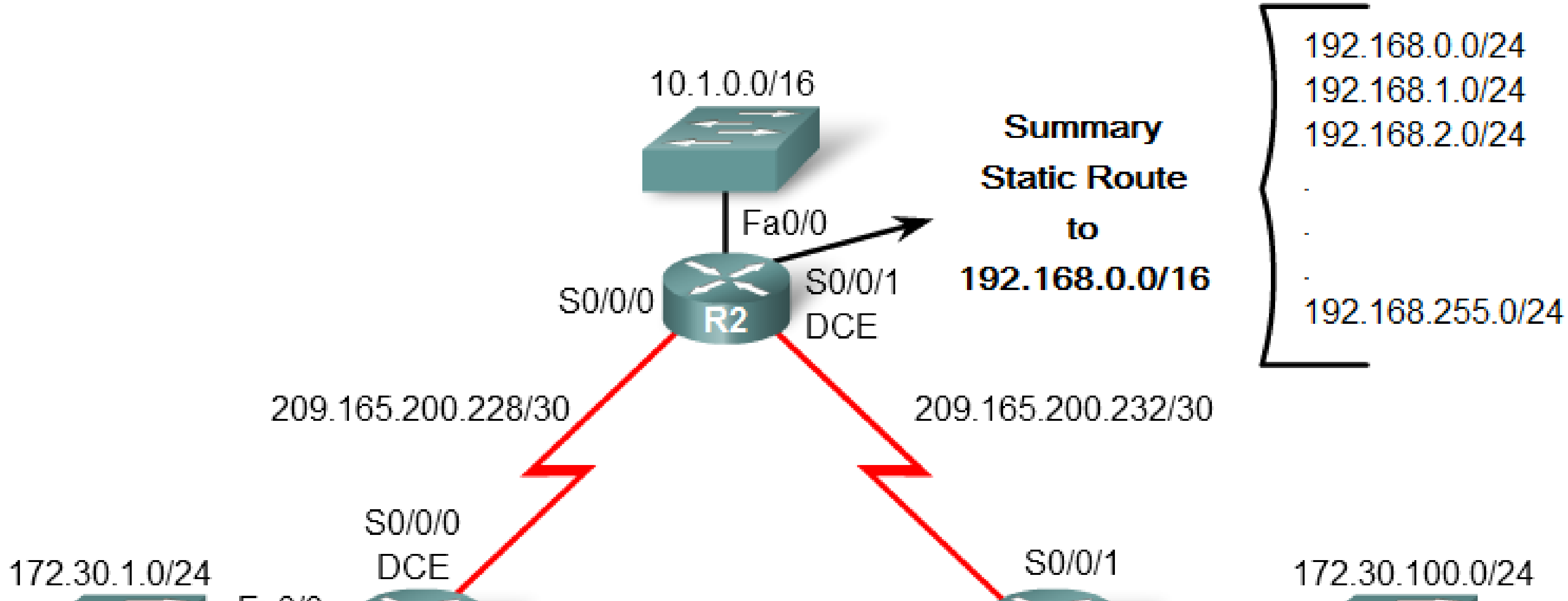
```
R1(config)#router rip
R1(config-router)#network 172.30.0.0
R1(config-router)#network 209.165.200.0
```

```
R2(config)#ip route 192.168.0.0 255.255.0.0 null0
R2(config)#router rip
R2(config-router)#redistribute static
R2(config-router)#network 10.0.0.0
R2(config-router)#network 209.165.200.0
```

Static route configured and redistributed.

```
R3(config)#router rip
R3(config-router)#network 172.30.0.0
R3(config-router)#network 209.165.200.0
```

7.1.2 RIPv1 Limitations




```
R2(config)#ip route 192.168.0.0 255.255.0.0 null0
R2(config)#router rip
R2(config-router)#redistribute static
R2(config-router)#network 10.0.0.0
R2(config-router)#network 209.165.200.0
```

Static route configured and redistributed.

Route redistribution

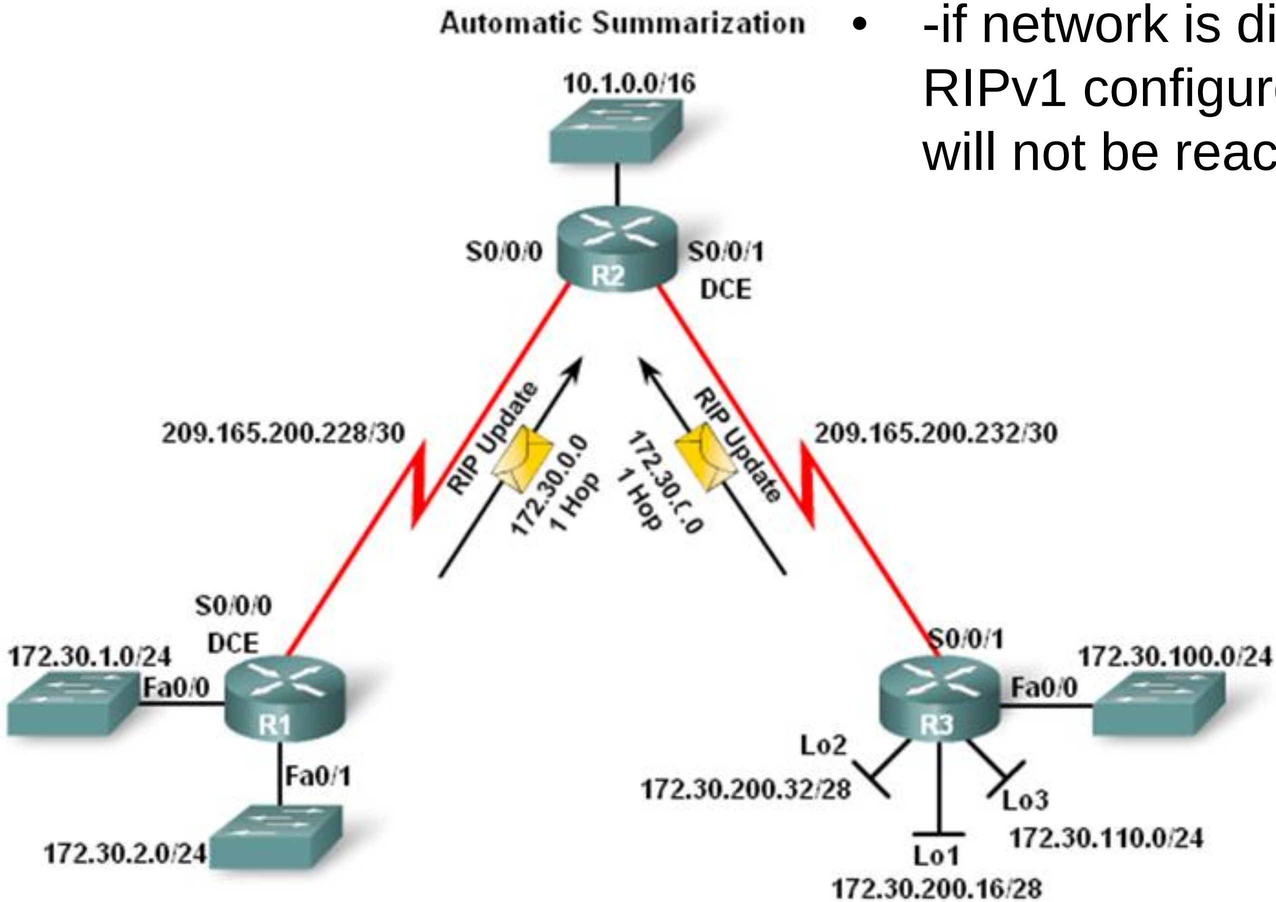
- -Redistribution command is way to disseminate a static route from one router to another via a routing protocol
- -Example

  R2(config-router)#redistribute static

7.1.2 RIPv1 Limitations

Verifying and Testing Connectivity
Use the following commands:

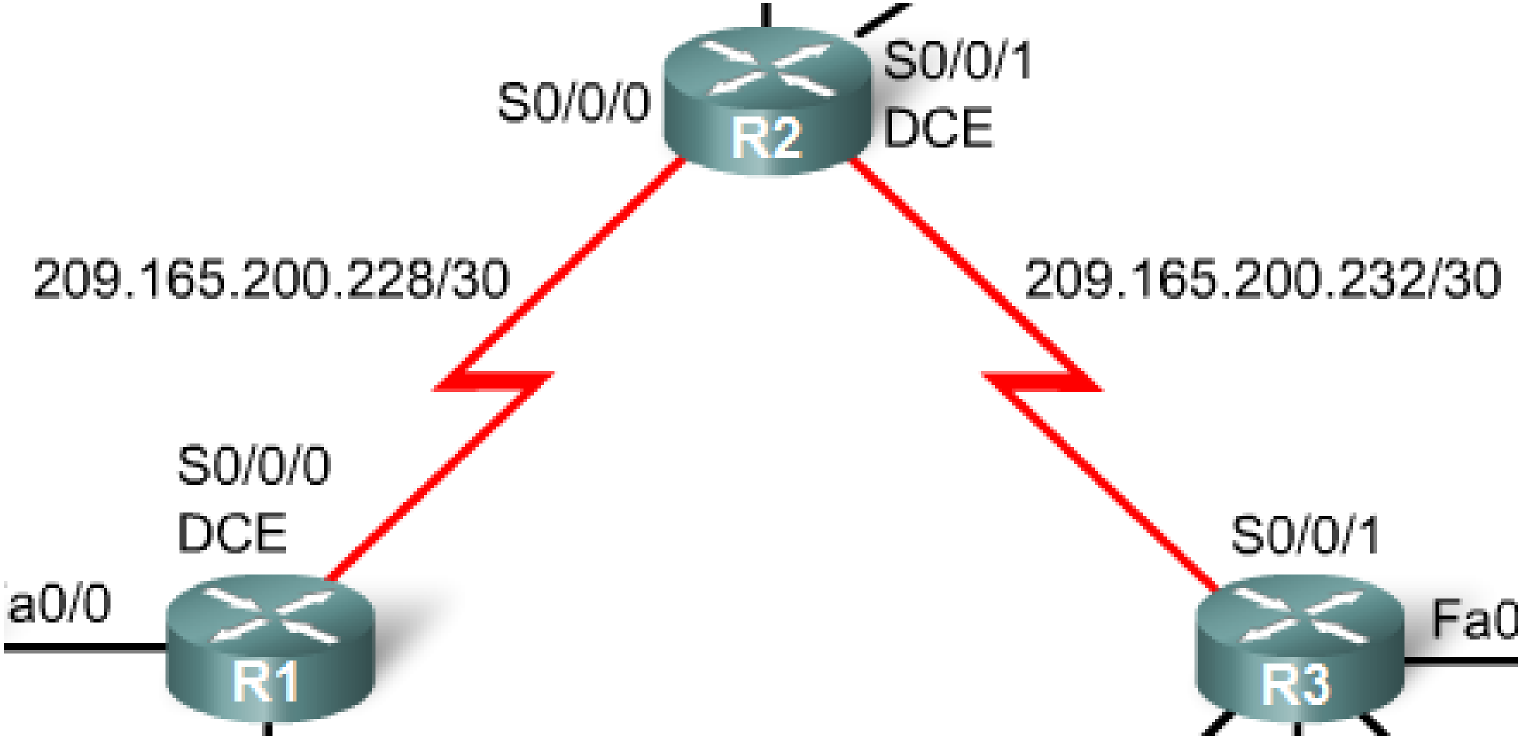
- show ip interfaces brief
- ping
- Traceroute



RIPv1 – a classful routing protocol

- -Subnet mask **are not sent** in updates
- -Summarizes networks at major network boundaries
- -if network is discontiguous and RIPv1 configured convergence will not be reached

7.1.2 RIPv1 Limitations

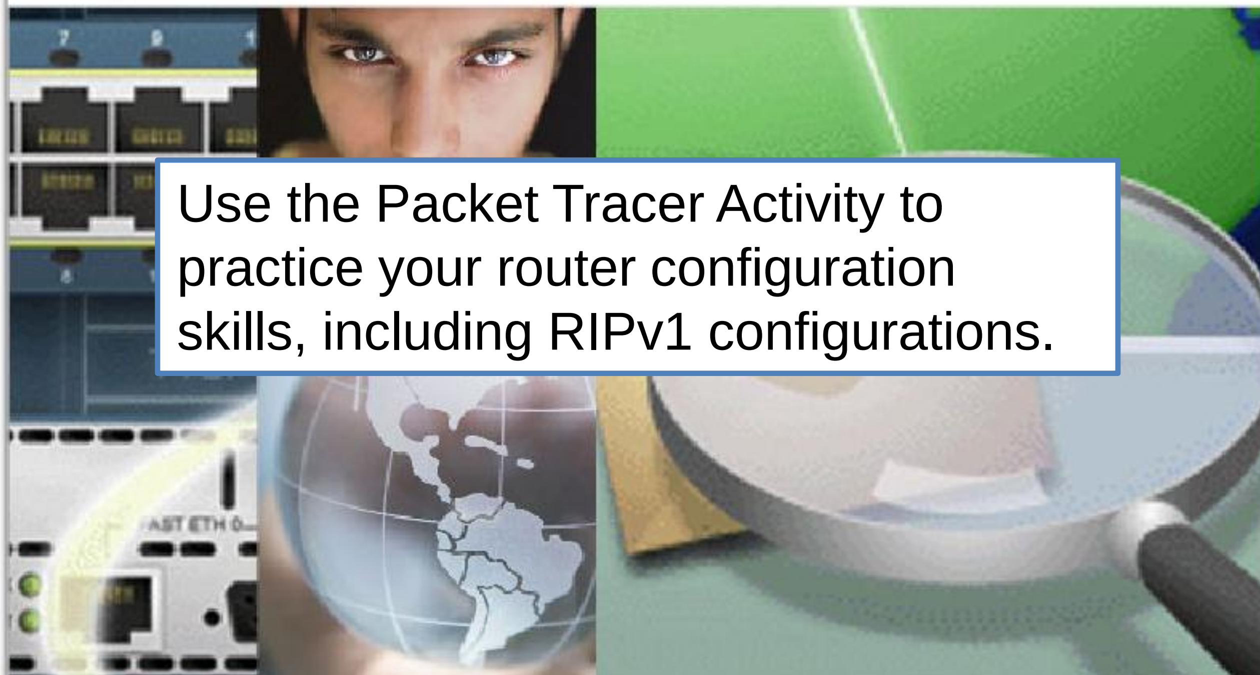



```
R2#show ip interface brief
Interface            IP-Address      OK? Method Status                Protocol
FastEthernet0/0      10.1.0.1        YES manual up                    up
Serial0/0/0          209.165.200.229 YES manual up                    up
FastEthernet0/1      unassigned      YES unset  administratively down down
Serial0/0/1          209.165.200.233 YES manual up                    up
```

R2 has active links to R1 and R3.

7.1.2 RIPv1 Limitations

Packet Tracer Exploration:
Configuring Discontiguous Routes



Use the Packet Tracer Activity to practice your router configuration skills, including RIPv1 configurations.

7.1.2 RIPv1 Limitations

Examining the routing tables

-To examine the contents of routing updates use the **debug ip rip** command

-If RIPv1 is configured then Subnet masks will not be included with the network address

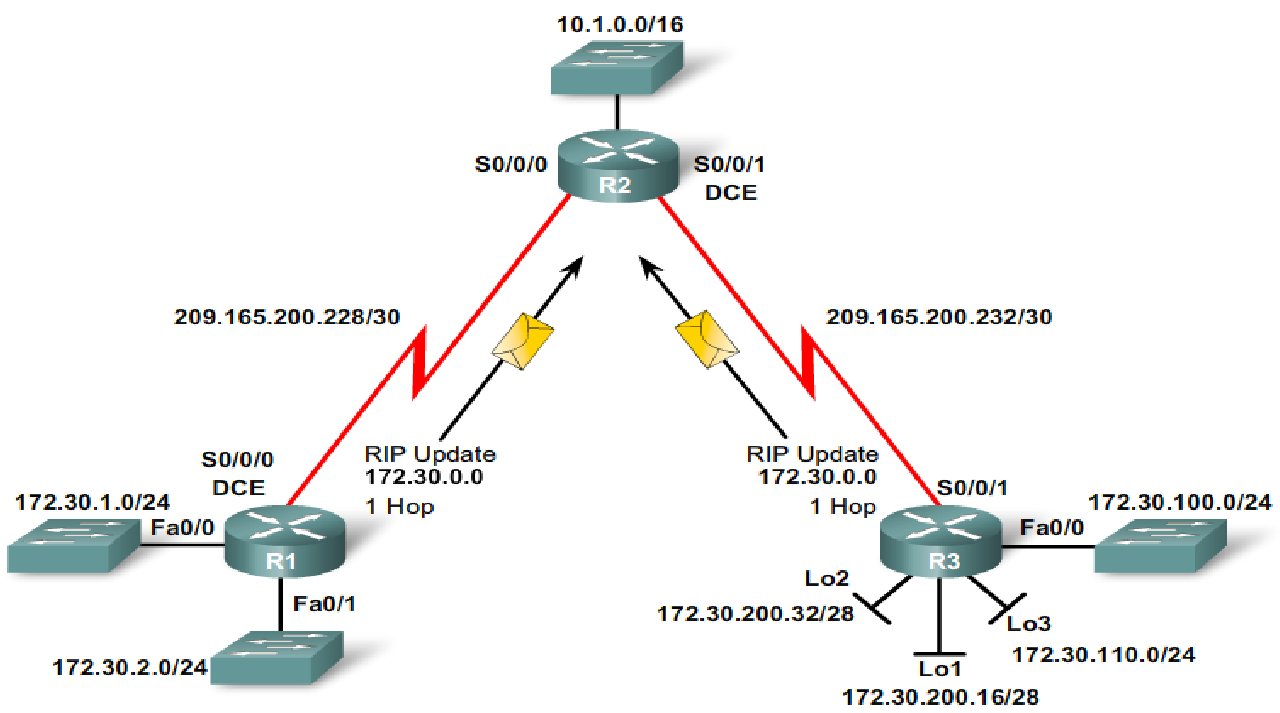
```
R2#debug ip rip
RIP protocol debugging is on
(**output omitted**)
RIP: received v1 update from 209.165.200.230 on Serial0/0/0
     172.30.0.0 in 1 hops
RIP: received v1 update from 209.165.200.234 on Serial0/0/1
     172.30.0.0 in 1 hops
R2#
RIP: sending v1 update to 255.255.255.255 via Serial0/0/0 (209.165.200.229)
RIP: build update entries
        network 10.0.0.0 metric 1
        subnet 209.165.200.232 metric 1
RIP: sending v1 update to 255.255.255.255 via Serial0/0/1 (209.165.200.233)
RIP: build update entries
        network 10.0.0.0 metric 1
        subnet 209.165.200.228 metric 1
R2#
```

R2 is not sending the static route to R1 or R3.

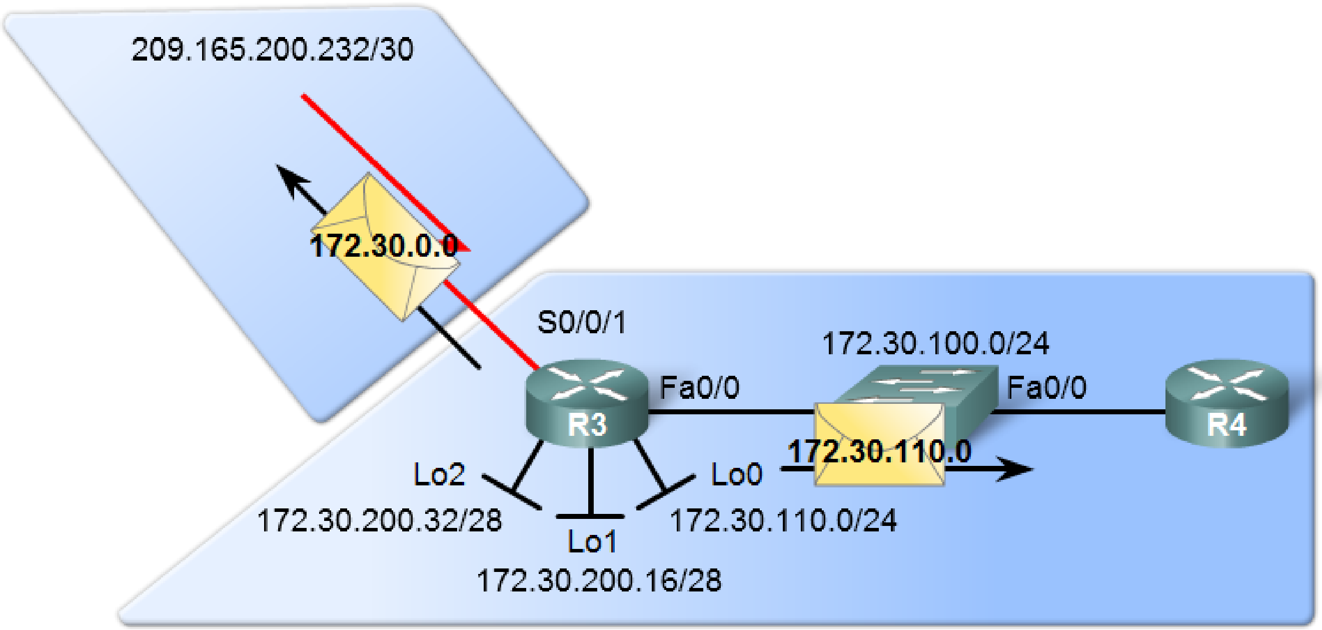
7.1.3 RIPv1 Discontiguious Networks

Because the subnet mask is not included in the update, RIPv1 and other classful routing protocols must summarize networks at major network boundaries. In the figure, RIPv1 on both the R1 and R3 routers will summarize their 172.30.0.0 subnets to the classful major network address of 172.30.0.0 when sending routing updates to R2. From the perspective of R2, both updates have an equal cost of 1 hop to reach network 172.30.0.0/16. R2 installs both paths in the routing table.

Automatic Summarization



7.1.4 RIPv1 No VLSM support




```
R3#debug ip rip
RIP protocol debugging is on
RIP: sending v1 update to 255.255.255.255 via FastEthernet0/0 (172.30.100.1)
RIP: build update entries
        network 10.0.0.0 metric 2
        subnet 172.30.110.0 metric 1
        network 209.165.200.0 metric 1
RIP: sending v1 update to 255.255.255.255 via Serial0/0/1 (209.165.200.234)
RIP: build update entries
        network 172.30.0.0 metric 1
```

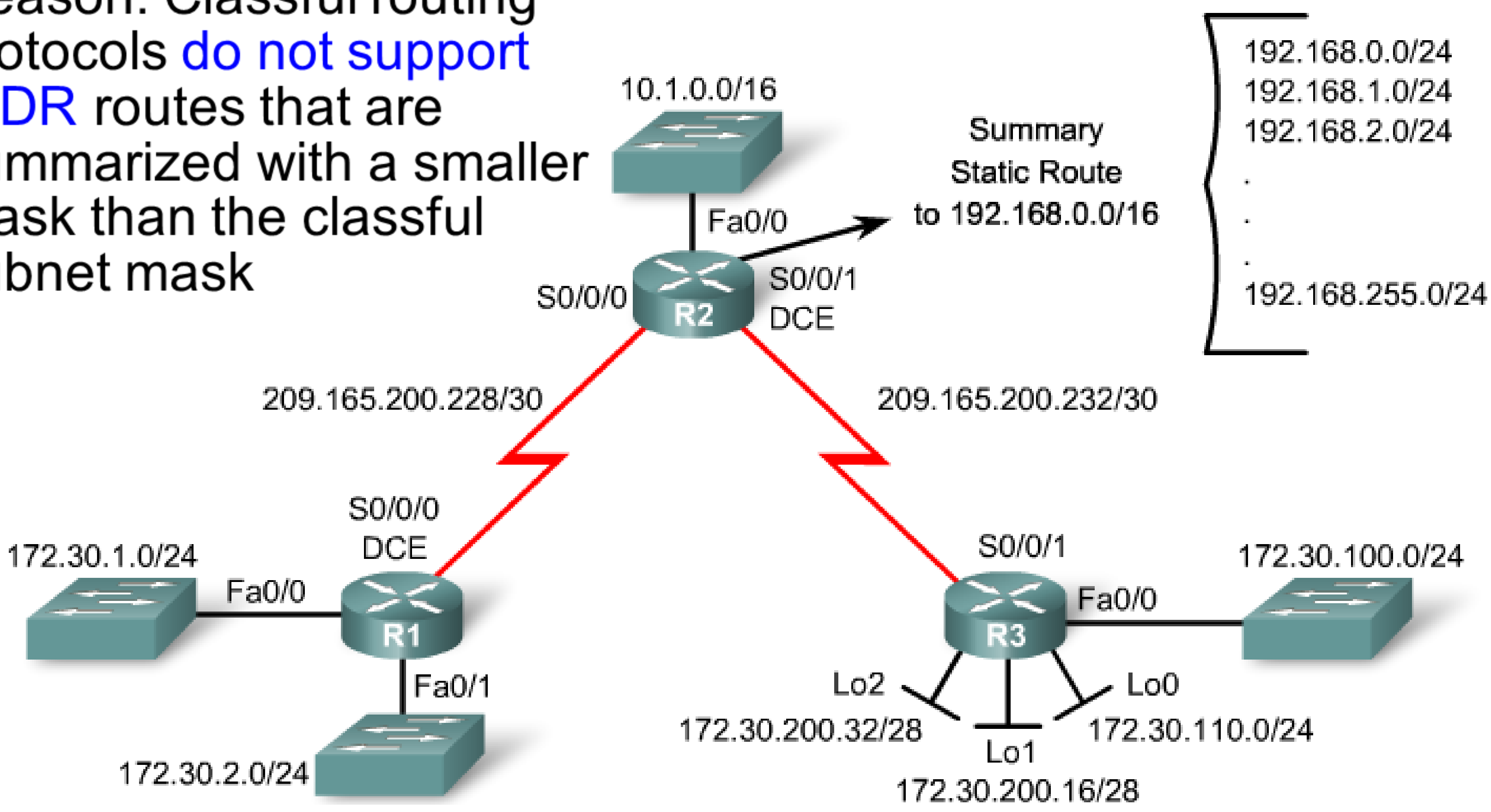
Because 172.30.110.0 has the same subnet mask as the outgoing interface on 172.30.100.0, R3 includes 172.30.110.0 in updates to R4.

- RIPv1 does not support VLSM
  - Reason: RIPv1 does not send subnet mask in routing updates
- RIPv1 does summarize routes to the Classful boundary
  - Or uses the Subnet mask of the outgoing interface to determine which subnets to advertise

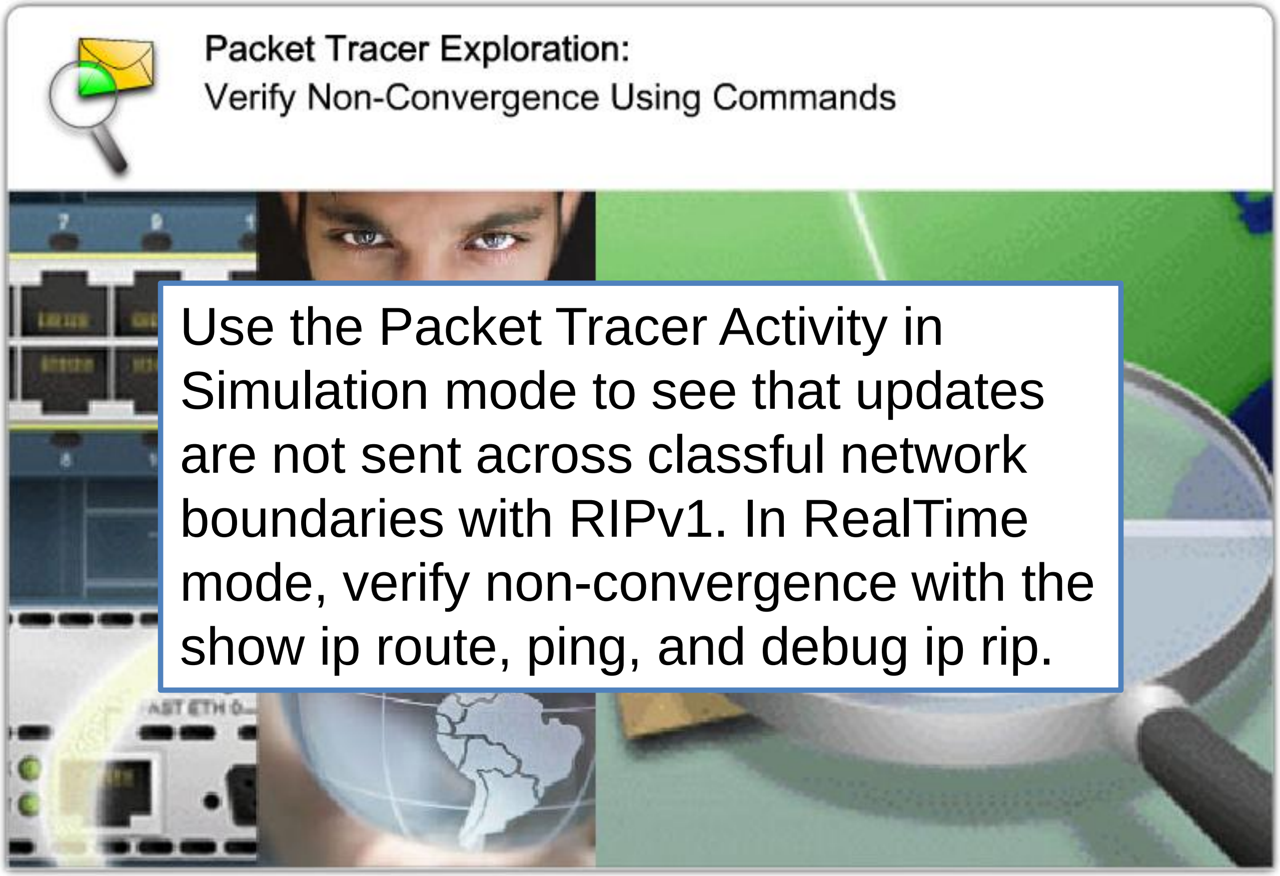
7.1.5 RIPv1 No CIDR Support

- No CIDR Support
- In the diagram R2 will not include the static route in its update

Reason: Classful routing protocols do not support CIDR routes that are summarized with a smaller mask than the classful subnet mask

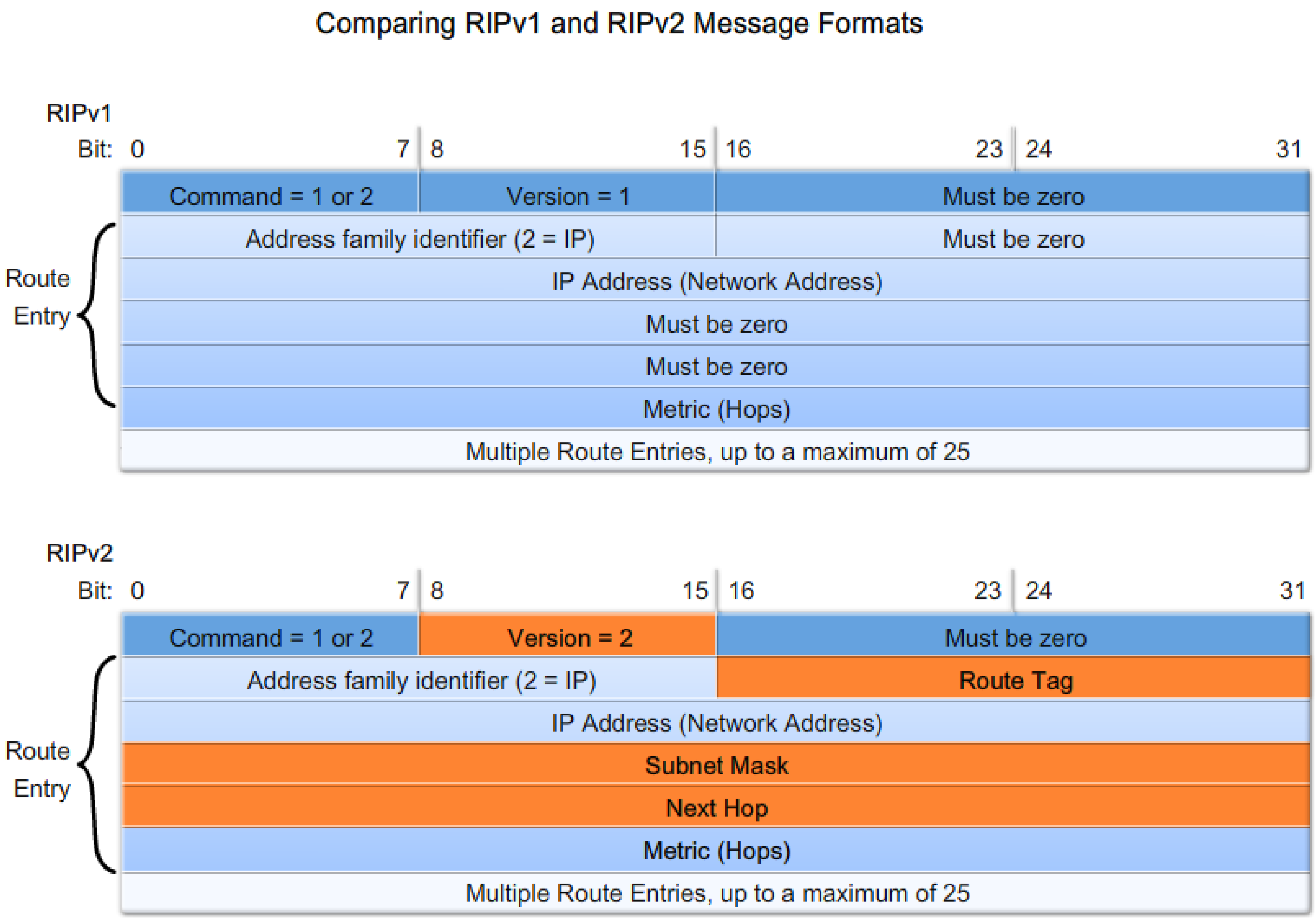


7.1.5 RIPv1 No CIDR Support



Use the Packet Tracer Activity in Simulation mode to see that updates are not sent across classful network boundaries with RIPv1. In RealTime mode, verify non-convergence with the show ip route, ping, and debug ip rip.

7.2.1 Enabling and Verifying RIPv2



Comparing RIPv1 & RIPv2 Message Formats

- -RIPv2 Message format is similar to RIPv1 but has 2 extensions
- 1st extension is the subnet mask field
- 2nd extension is the addition of next hop address

Enabling and Verifying RIPv2

- Configuring RIP on a Cisco router

  By default it is running RIPv1

- Notice that the **version 2** command is used to modify RIP to use version 2.
- This command should be configured on all routers in the routing domain.
- The RIP process will now include the subnet mask in all updates, making RIPv2 a classless routing protocol

7.2.1 Enabling and Verifying RIPv2

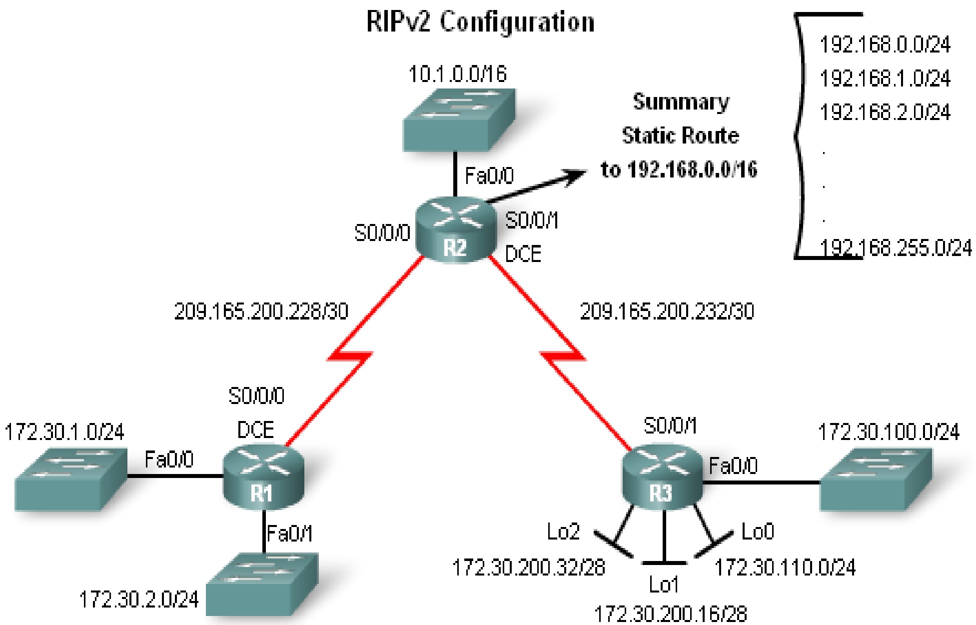
- Configuring **RIPv2** on a Cisco router
- -Requires using the ***version 2*** command
- -RIPv2 ignores RIPv1 updates
- To verify RIPv2 is configured use the

  show ip protocols command

To revert to RIPv1

no version or

version 1




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

```
R2(config)#router rip
R2(config-router)#version 2
```

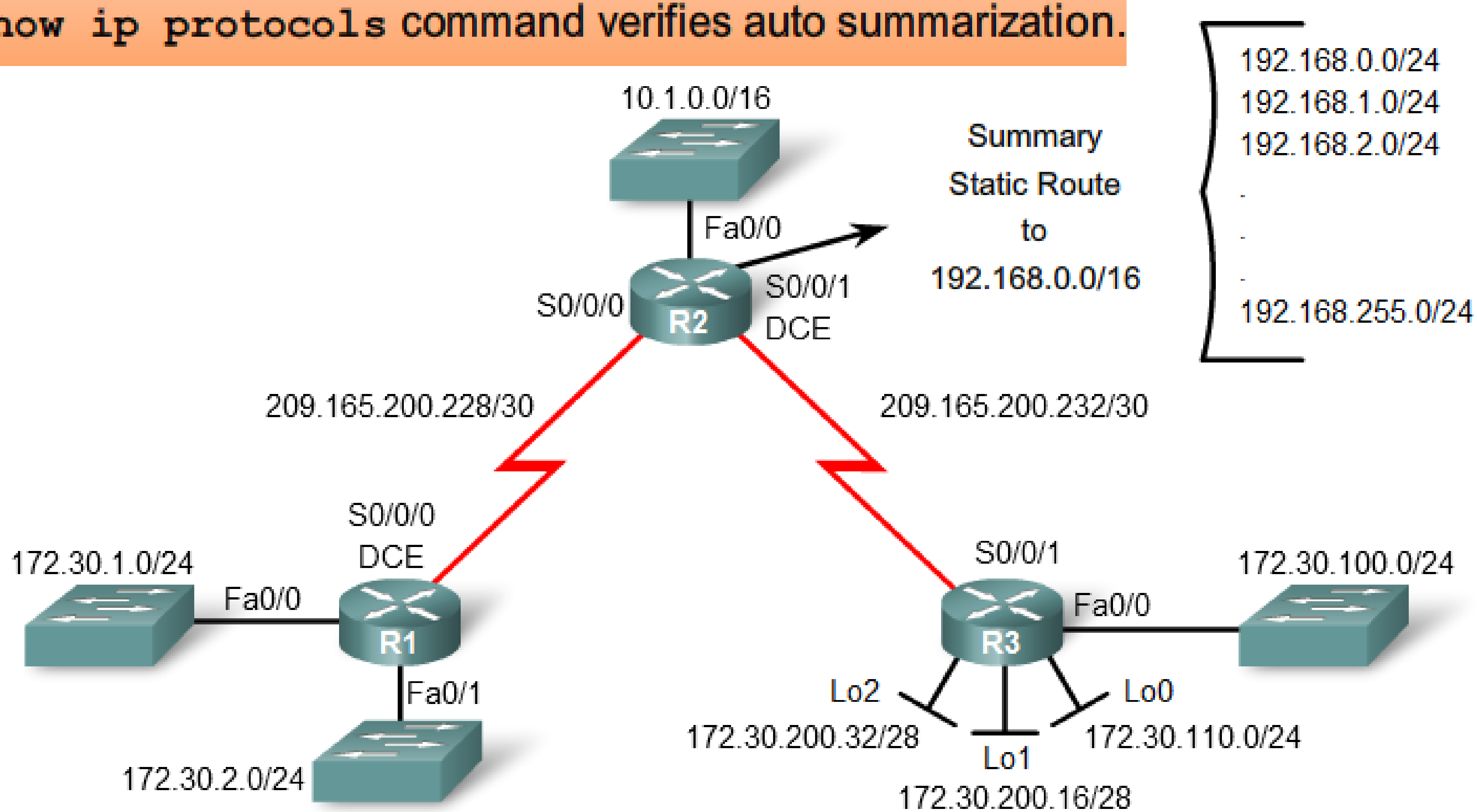
```
R3(config)#router rip
R3(config-router)#version 2
```

R2 After RIPv2 Configuration: RIPv2 ignores RIPv1 updates

```
R2#show ip protocols
Routing Protocol is "rip"
  Sending updates every 30 seconds, next due in 1 seconds
  Invalid after 180 seconds, hold down 180, flushed after 240
  Outgoing update filter list for all interfaces is
  Incoming update filter list for all interfaces is
  Redistributing: static, rip
  Default version control: send version 2, receive version 2
    Interface             Send  Recv  Triggered RIP  Key-chain
    Serial0/0/0           2     2
    Serial0/0/1           2     2
  Automatic network summarization is in effect
  Routing for Networks:
    10.0.0.0
    209.165.200.0
  Passive Interface(s):
    FastEthernet0/0
  Routing Information Sources:
    Gateway         Distance      Last Update
    209.165.200.234      120      00:00:03
    209.165.200.230      120      00:00:17
  Distance: (default is 120)
```

7.2.2 Auto Summary and RIPv2

`show ip protocols` command verifies auto summarization.



- Auto-Summary & RIPv2
- RIPv2 will automatically summarize routes at major network boundaries and can also summarize routes with a subnet mask that is smaller than the classful subnet mask

7.2.2 Auto Summary and RIPv2

```
R2#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

R    172.30.0.0/16 [120/1] via 209.165.200.230, 00:00:28, Serial0/0/0
                   [120/1] via 209.165.200.234, 00:00:18, Serial0/0/1
     209.165.200.0/30 is subnetted, 2 subnets
C       209.165.200.232 is directly connected, Serial0/0/1
C       209.165.200.228 is directly connected, Serial0/0/0
     10.0.0.0/16 is subnetted, 1 subnets
C       10.1.0.0 is directly connected, FastEthernet0/0
S    192.168.0.0/16 is directly connected, Null0
```

R2 still has equal cost routes.

Because RIPv2 is a classless routing protocol, you might expect to see the individual 172.30.0.0 subnets in the routing tables. However, when we examine the routing table for R2 in the figure, we still see the summarized 172.30.0.0/16 route with same two equal cost paths. Routers R1 and R3 still do not include the 172.30.0.0 subnets of the other router.

7.2.2 Auto Summary and RIPv2

```
     172.30.0.0/24 is subnetted, 2 subnets
C       172.30.1.0 is directly connected, FastEthernet0/0
C       172.30.2.0 is directly connected, FastEthernet0/1
     209.165.200.0/30 is subnetted, 2 subnets
R       209.165.200.232 [120/1] via 209.165.200.229, 00:00:04, Serial0/0/0
C       209.165.200.228 is directly connected, Serial0/0/0
R    10.0.0.0/8 [120/1] via 209.165.200.229, 00:00:04, Serial0/0/0
R    192.168.0.0/16 [120/1] via 209.165.200.229, 00:00:04, Serial0/0/0
```

R1 now has supernet.

```
R1#debug ip rip
RIP protocol debugging is on
R1#
RIP: sending v2 update to 224.0.0.9 via Serial0/0/0 (209.165.200.230)
RIP: build update entries
        172.30.0.0/16 via 0.0.0.0, metric 1, tag 0
R1#
 (**output omitted**)
RIP: received v2 update from 209.165.200.229 on Serial0/0/0
     10.0.0.0/8 via 0.0.0.0 in 1 hops
     192.168.0.0/16 via 0.0.0.0 in 1 hops
     209.165.200.232/30 via 0.0.0.0 in 1 hops
 (**output omitted**)
R1#
```

R1 still sending summary route but now with subnet mask /16.

7.2.2 Auto Summary and RIPv2

```
R1#show ip protocols
Routing Protocol is "rip"
  Sending updates every 30 seconds, next due in 20 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 2, receive version 2
    Interface             Send  Recv  Triggered RIP  Key-chain
    FastEthernet0/0       2     2
    FastEthernet0/1       2     2
    Serial0/1/0           2     2
  Automatic network summarization is in effect
  Maximum path: 4
  Routing for Networks:
    172.30.0.0
```

`show ip protocols` command verifies auto summarization.

By default, RIPv2 automatically summarizes networks at major network boundaries, just like RIPv1. Both R1 and R3 routers are still summarizing their 172.30.0.0 subnets to the class B address of 172.30.0.0 when sending updates out their interfaces on the 209.165.200.228 and 209.165.200.232 networks, respectively. The command show ip protocols verifies that "automatic summarization is in effect."

7.2.2 Auto Summary and RIPv2

```
R1#debug ip rip
RIP protocol debugging is on
R1#
RIP: sending v2 update to 224.0.0.9 via Serial0/1/0 (209.165.200.230)
RIP: build update entries
        172.30.0.0/16 via 0.0.0.0, metric 1, tag 0
R1#
<Output omitted for brevity>
RIP: received v2 update from 209.165.200.229 on Serial0/1/0
     10.0.0.0/8 via 0.0.0.0 in 1 hops
     192.168.0.0/16 via 0.0.0.0 in 1 hops
     209.165.200.232/30 via 0.0.0.0 in 1 hops
 (**output omitted**)
R1#
```

Supernets are now included in RIPv2 updates.

The only change resulting from the version 2 command is that R2 is now including the 192.168.0.0/16 network in its updates. This is because RIPv2 includes the 255.255.0.0 mask with the 192.168.0.0 network address in the update. Both R1 and R3 will now receive this redistributed static route via RIPv2 and enter it into their routing tables.

Note: Remember, the 192.168.0.0/16 route could not be distributed with RIPv1 because the subnet mask was less than the classful mask. Because the mask is not included in RIPv1 updates, there was no way for the RIPv1 router to determine what that mask should be. Therefore, the update was never sent.

7.2.3 Disabling Auto Summary in RIPv2

- Disabling Auto-Summary in RIPv2
- To disable automatic summarization issue the *no auto-summary* command

```
R1(config)#router rip
R1(config-router)#no auto-summary
R1(config-router)#end
R1#show ip protocols
Routing Protocol is "rip"

  Default version control: send version 2, receive version 2
    Interface             Send  Recv  Triggered RIP  Key-chain
    FastEthernet0/0       2     2
    FastEthernet0/1       2     2
    Serial0/1/0           2     2
  Automatic network summarization is not in effect
```

```
R2(config)#router rip
R2(config-router)# no auto-summary
```

```
R3(config)#router rip
R3(config-router)#no auto-summary
```

Once automatic summarization has been disabled, RIPv2 will no longer summarize networks to their classful address at boundary routers. RIPv2 will now include all subnets and their appropriate masks in its routing updates.

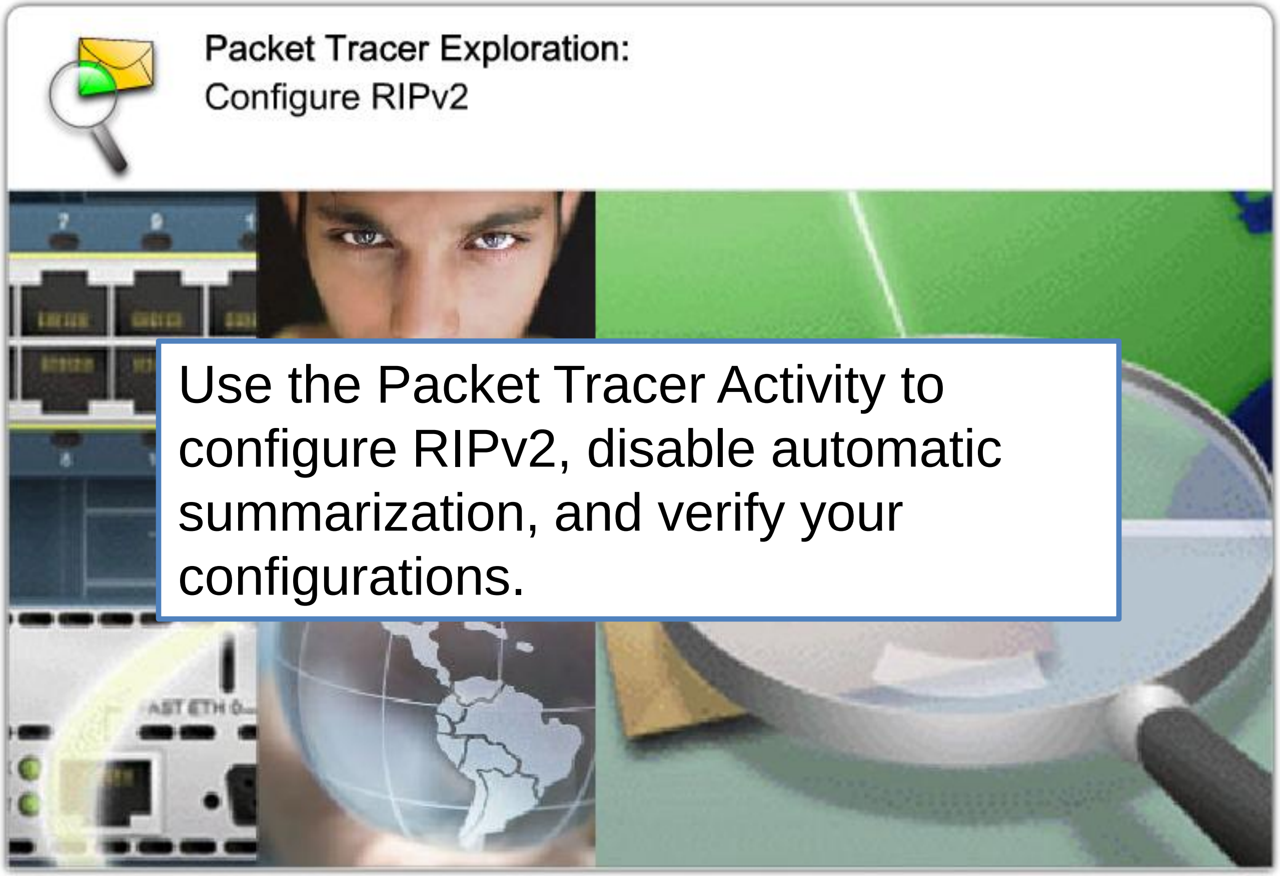
7.2.4 Verifying RIPv2 Updates

- Verifying RIPv2 Updates
  - When using RIPv2 with automatic summarization turned off

    Each subnet and mask has its own specific entry, along with the exit interface and next-hop address to reach that subnet.
  - To verify information being sent by RIPv2 use the

    debug ip rip command

7.2.4 Verifying RIPv2 Updates



Use the Packet Tracer Activity to configure RIPv2, disable automatic summarization, and verify your configurations.

7.3.1 RIPv2 and VLSM

```
R3#debug ip rip
RIP protocol debugging is on
R3#
RIP: received v2 update from 209.165.200.233 on Serial0/
     10.1.0.0/16 via 0.0.0.0 in 1 hops
     172.30.1.0/24 via 0.0.0.0 in 2 hops
     172.30.2.0/24 via 0.0.0.0 in 2 hops
     192.168.0.0/16 via 0.0.0.0 in 1 hops
     209.165.200.228/30 via 0.0.0.0 in 1 hops
R3#
RIP: sending v2 update to 224.0.0.9 via FastEthernet0/0
RIP: build update entries
        10.1.0.0/16 via 0.0.0.0, metric 2, tag 0
        172.30.1.0/24 via 0.0.0.0, metric 3, tag 0
        172.30.2.0/24 via 0.0.0.0, metric 3, tag 0
        172.30.110.0/24 via 0.0.0.0, metric 1, tag 0
        172.30.200.16/28 via 0.0.0.0, metric 1, tag 0
        172.30.200.32/28 via 0.0.0.0, metric 1, tag 0
        192.168.0.0/16 via 0.0.0.0, metric 2, tag 0
        209.165.200.228/30 via 0.0.0.0, metric 2, tag 0
```

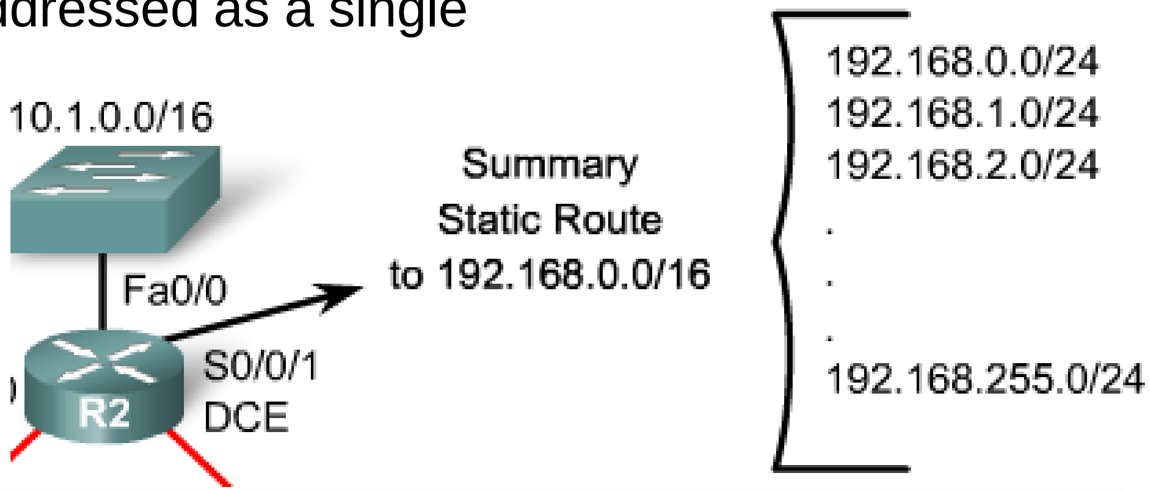
RIPv2 supports VLSM

Because classless routing protocols like RIPv2 can carry both the network address and the subnet mask, they do not need to summarize these networks to their classful addresses at major network boundaries. Therefore, classless routing protocols support **VLSM**.

Routers using RIPv2 no longer need to use the inbound interface's mask to determine the subnet mask in the route advertisement. The network and the mask are explicitly included in each and every routing update.

- **CIDR uses Supernetting**

Supernetting is a bunch of contiguous classful networks that is addressed as a single network.




```
R2(config)#router rip
R2(config-router)#redistribute static
R2(config-router)#network 10.0.0.0
R2(config-router)#network 209.165.200.0
R2(config-router)#exit
R2(config)#ip route 192.168.0.0 255.255.0.0 null0
```

192.168.0.0/16 is a Supernet.

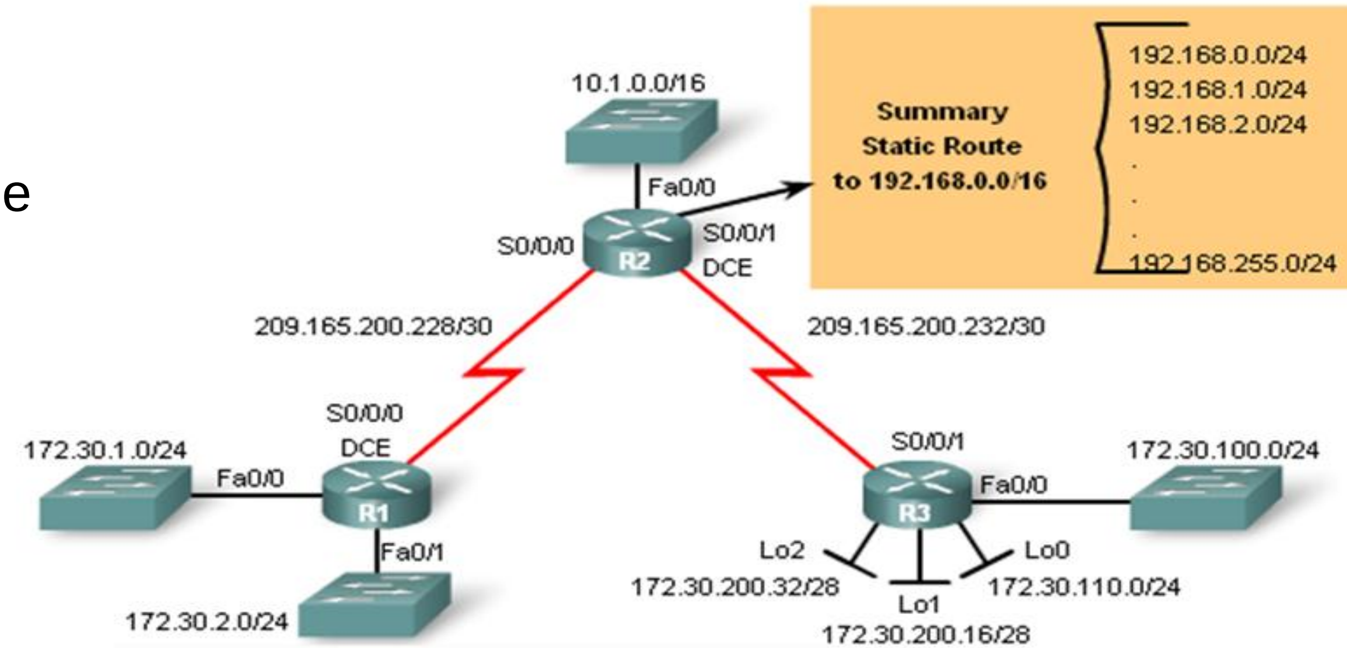
7.3.2 VLSM and CIDR

- To **verify** that **supernets** are being sent and received use the following commands

Show ip route

Debug ip rip

RIPv2 and CIDR



RIPv2 and CIDR

```
R2(config)#router rip
R2(config-router)#redistribute static
R2(config-router)#network 10.0.0.0
R2(config-router)#network 209.165.200.0
R2(config-router)#exit
R2(config)#ip route 192.168.0.0 255.255.0.0 null0
```

192.168.0.0/16 is a Supernet.

```
R2#debug ip rip
RIP protocol debugging is on
R2#
RIP: sending v2 update to 224.0.0.9 via Serial0/0/0 (209.165.200.229)
RIP: build update entries
      10.1.0.0/16 via 0.0.0.0, metric 1, tag 0
      172.30.100.0/24 via 0.0.0.0, metric 2, tag 0
      172.30.110.0/24 via 0.0.0.0, metric 2, tag 0
      172.30.200.16/28 via 0.0.0.0, metric 2, tag 0
      172.30.200.32/28 via 0.0.0.0, metric 2, tag 0
      192.168.0.0/16 via 0.0.0.0, metric 1, tag 0
      209.165.200.232/30 via 0.0.0.0, metric 1, tag 0
```

Supernet is sent by R2.

7.4.1 Verification and Trouble Shooting Commands

- **Basic Troubleshooting** steps

  -Check the status of all links

  -Check cabling

  -Check IP address & subnet mask configuration

  -Remove any unneeded configuration commands

- **Commands used to verify proper operation of RIPv2**
  - Show ip interfaces brief
  - Show ip protocols
  - Debug ip rip
  - Show ip route

7.4.2 Commond RIPv2 Issues

- **Common RIPv2 Issues**
- When trouble shooting RIPv2 examine the following issues:
  - Version

    Check to make sure you are using version 2
  - Network statements

    Network statements may be incorrectly typed or missing
  - Automatic summarization

    If summarized routes are not needed then disable automatic summarization

7.4.2 Commond RIPv2 Issues

- Reasons why it’s good to authenticate routing information

  -Prevent the possibility of accepting invalid routing updates

  -Contents of routing updates are encrypted

- Types of routing protocols that can use authentication

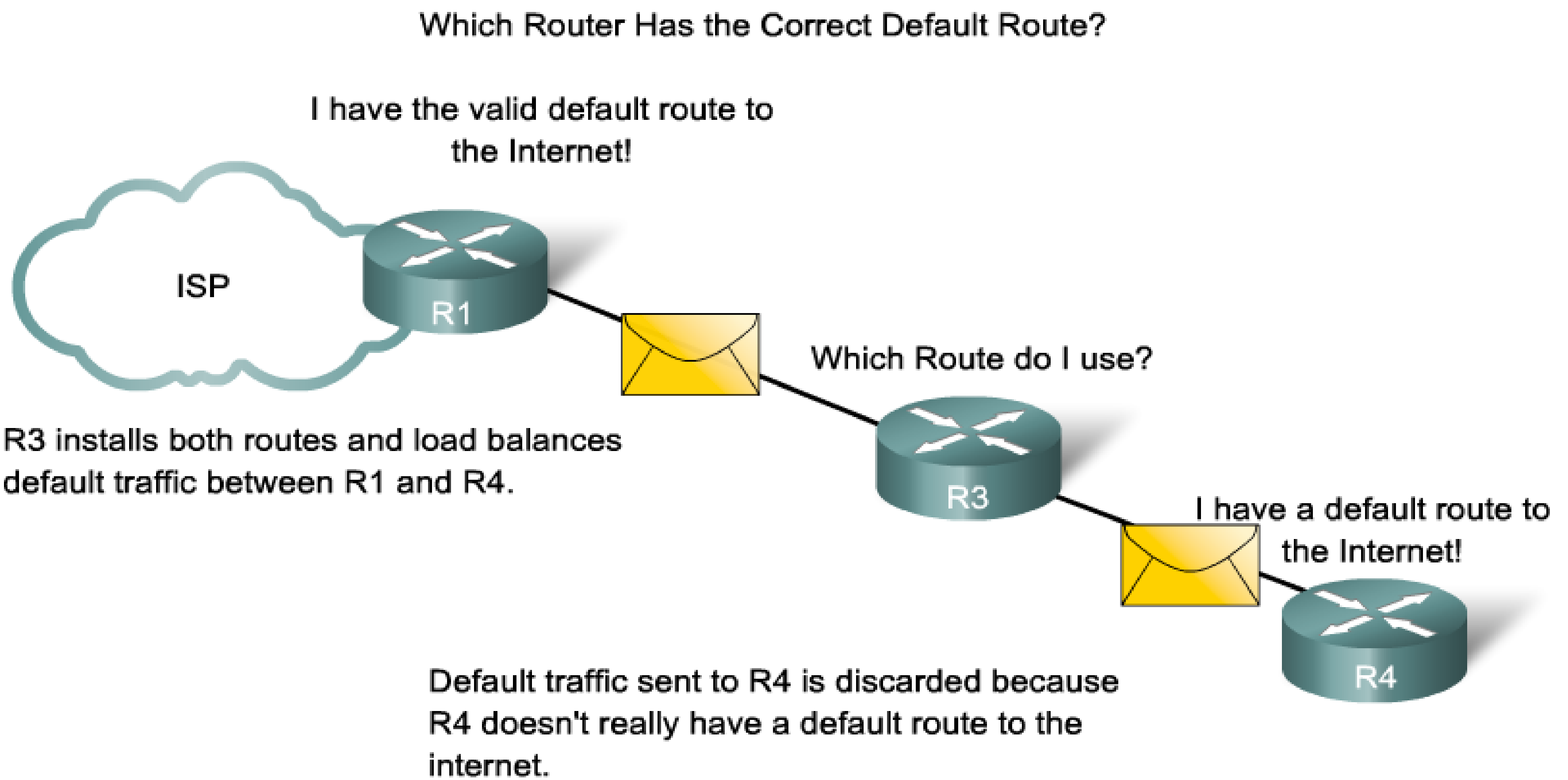
  -RIPv2

  -EIGRP

  -OSPF

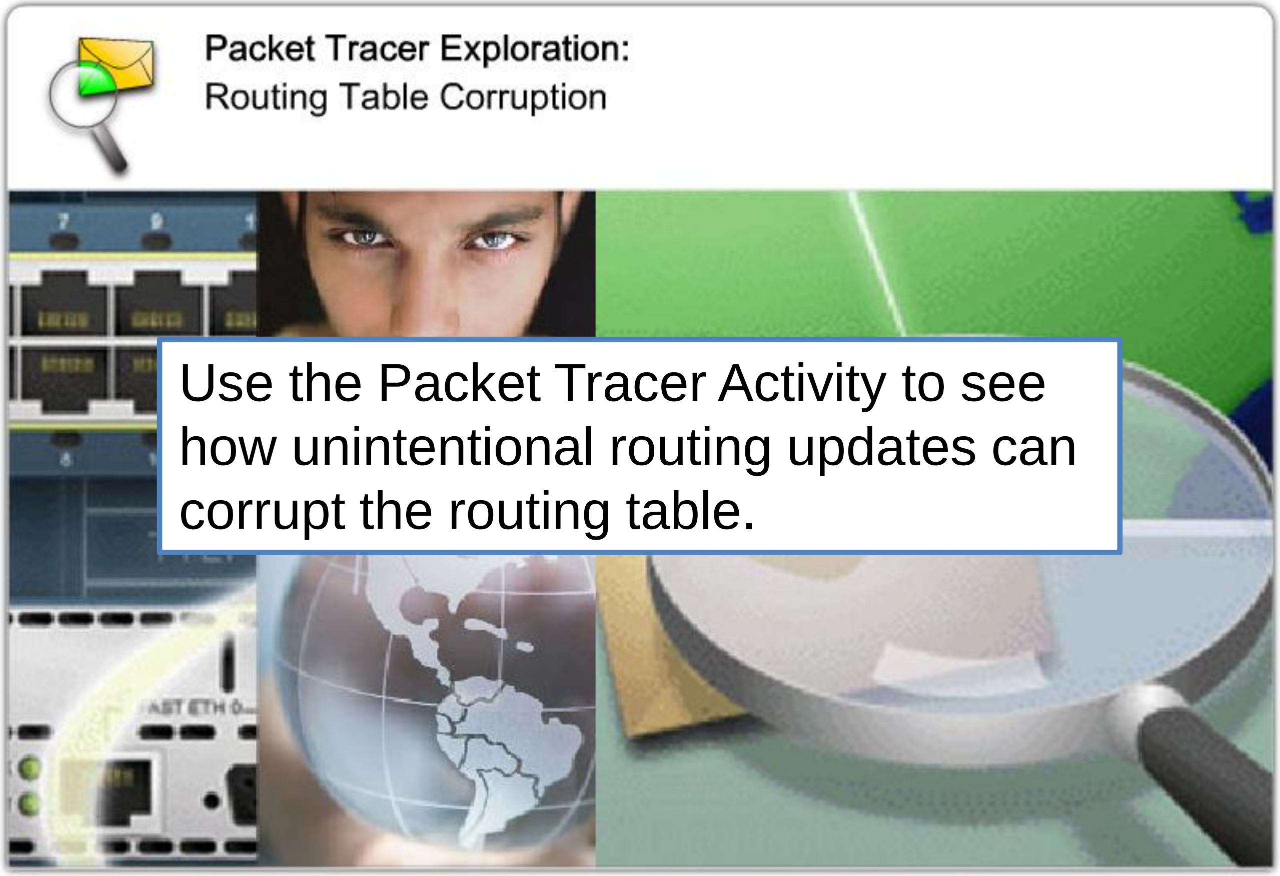
  -IS-IS

  -BGP



R1 is propagating a default route to all other routers in this routing domain. However, someone has mistakenly added router R4 to the network, which is also propagating a default route. Some of the routers may forward default traffic to R4 instead of to the real gateway router, R1. These packets could be "black holed" and never seen again.

7.4.3 Authentication

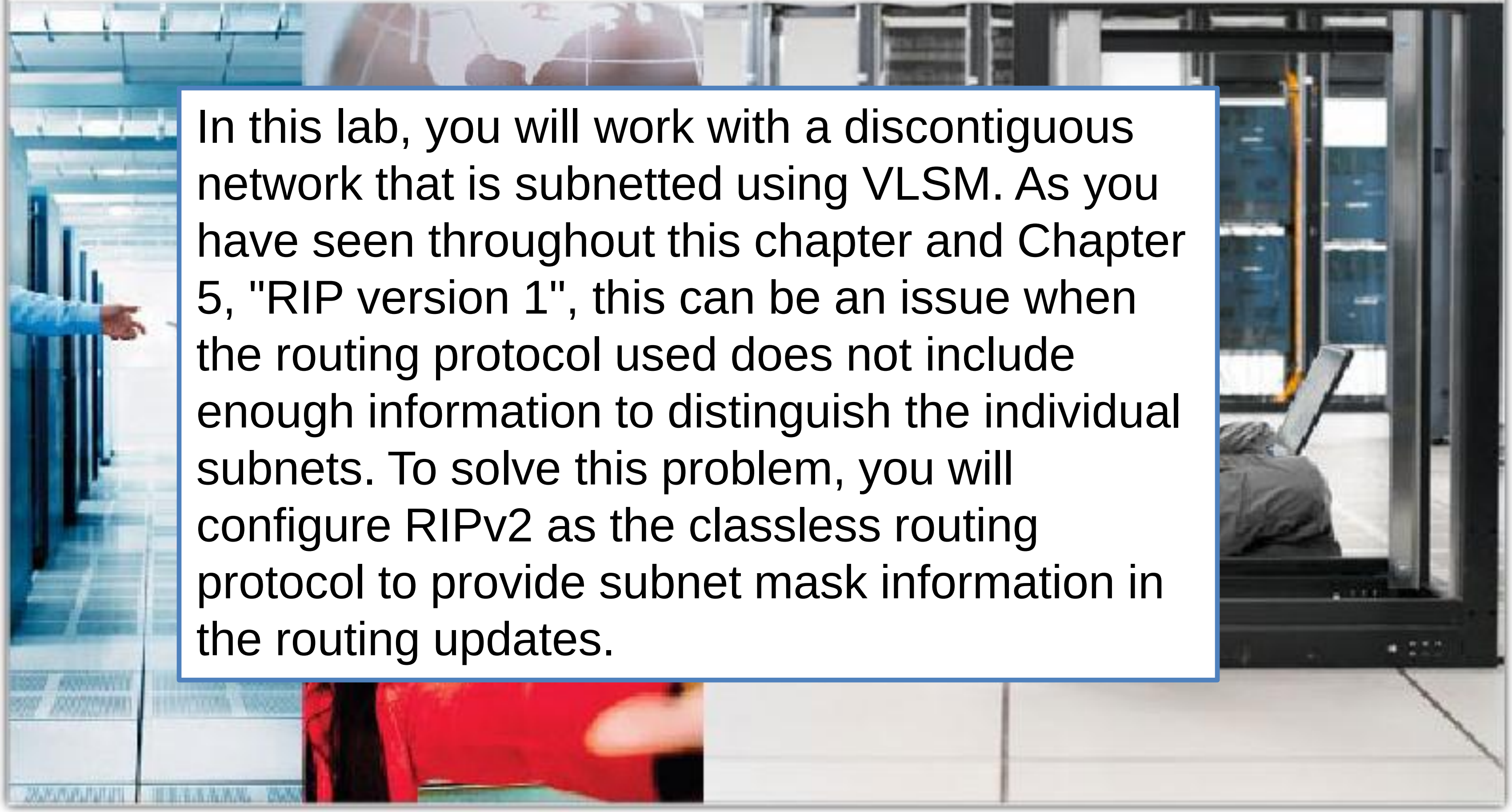


Use the Packet Tracer Activity to see how unintentional routing updates can corrupt the routing table.

7.5.1 Basic RIPv2 Configuration

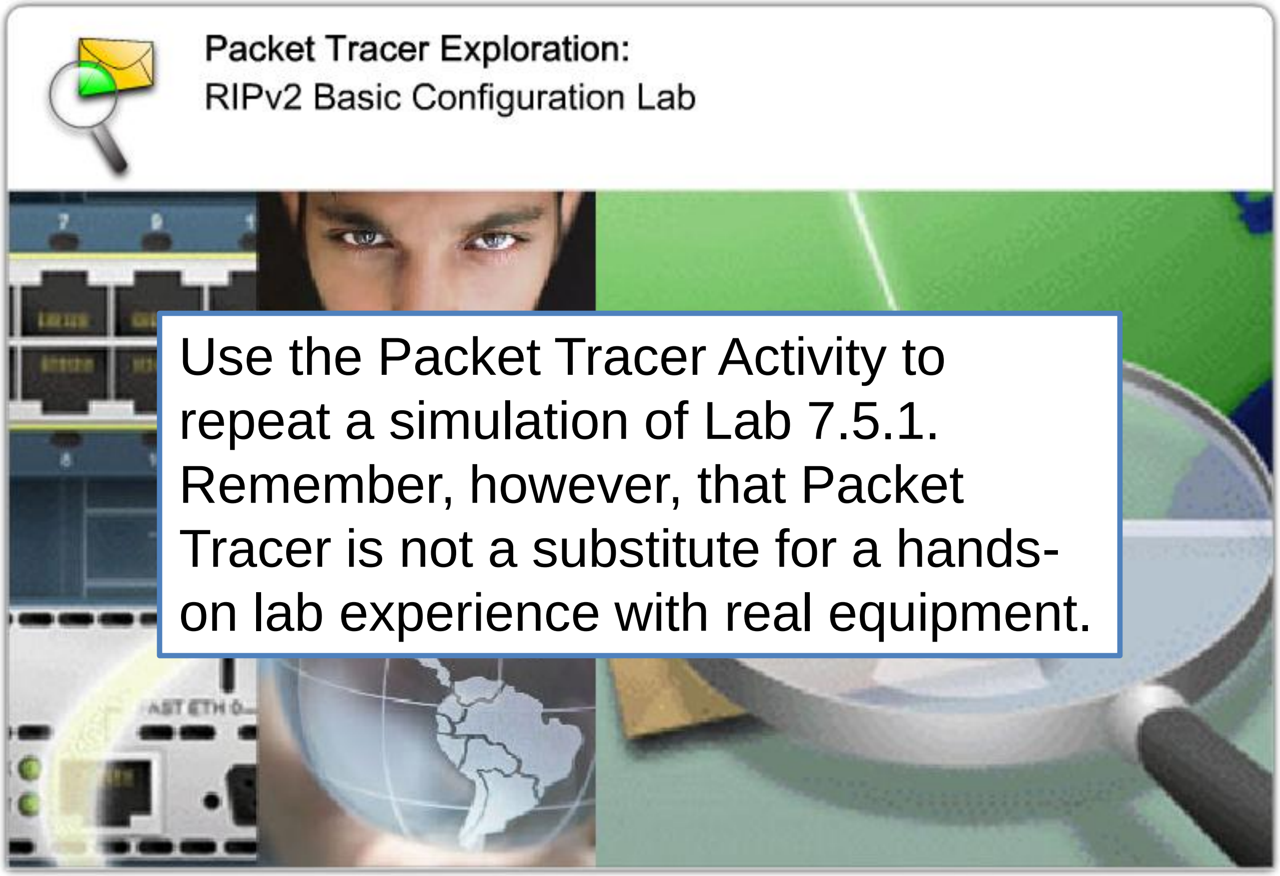
Hands-on Lab:

RIPv2 Basic Configuration Lab



In this lab, you will work with a discontiguous network that is subnetted using VLSM. As you have seen throughout this chapter and Chapter 5, "RIP version 1", this can be an issue when the routing protocol used does not include enough information to distinguish the individual subnets. To solve this problem, you will configure RIPv2 as the classless routing protocol to provide subnet mask information in the routing updates.

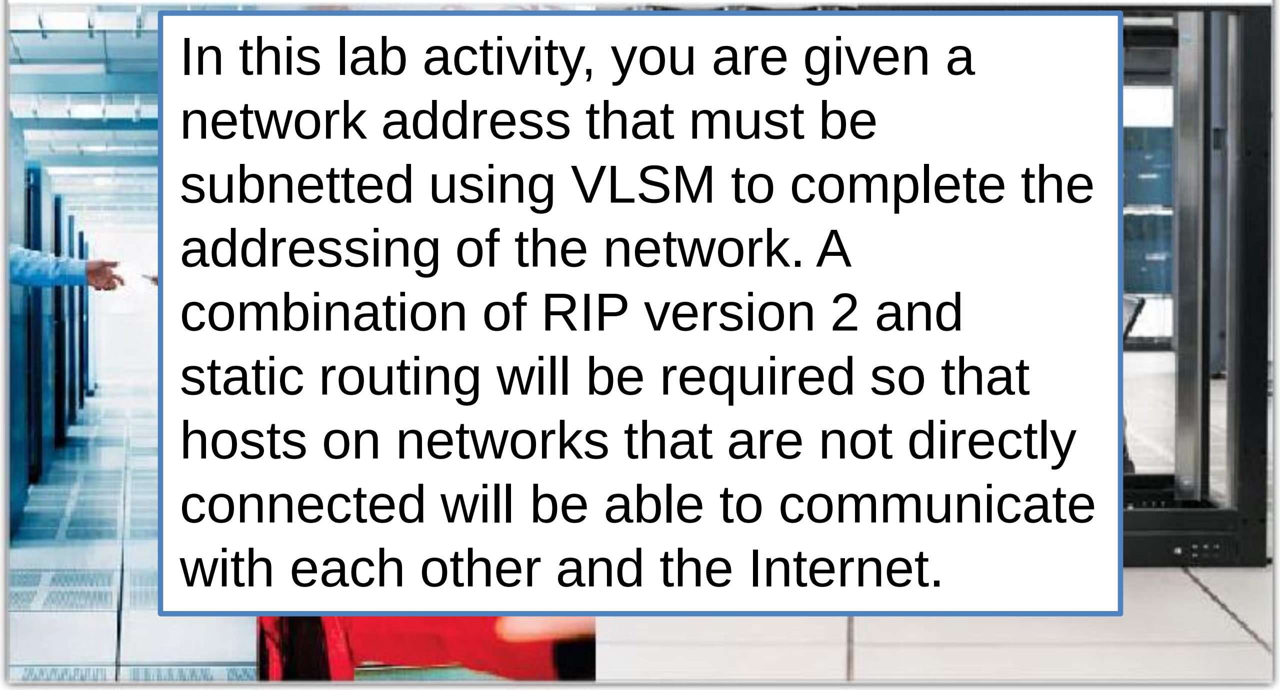
7.5.1 Basic RIPv2 Configuration



Use the Packet Tracer Activity to repeat a simulation of Lab 7.5.1. Remember, however, that Packet Tracer is not a substitute for a hands-on lab experience with real equipment.

7.5.2 Challenge RIPv2 Configuration

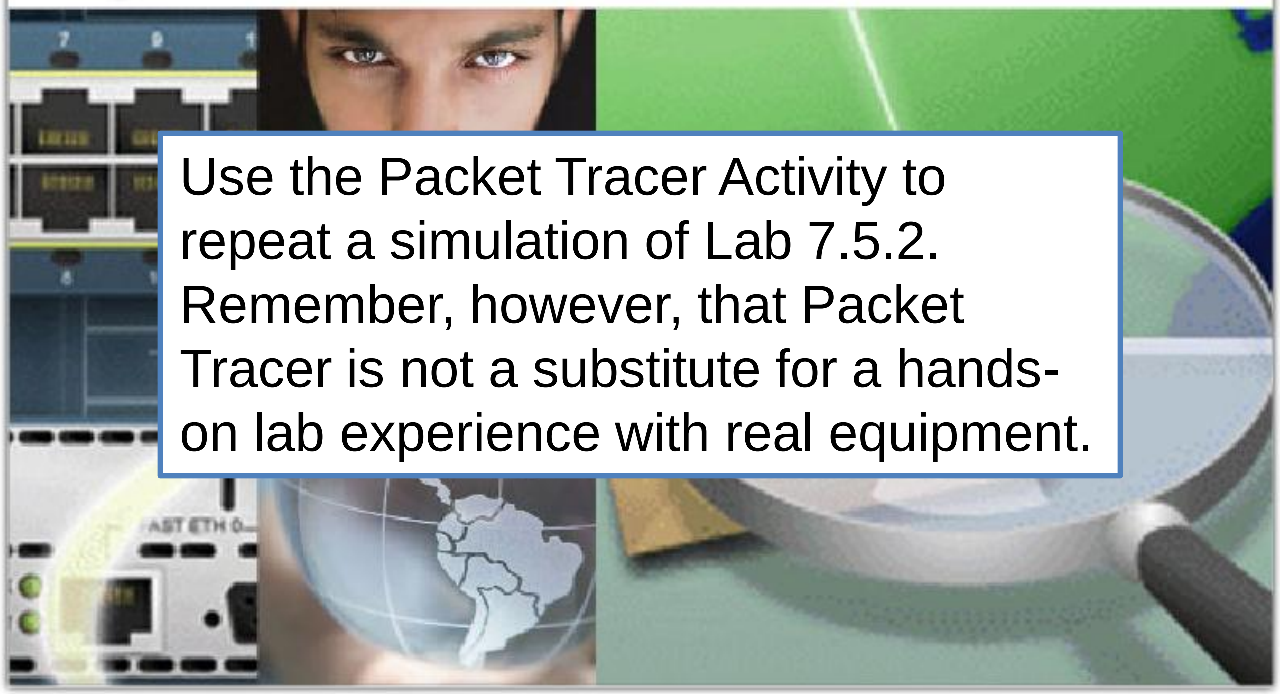
Hands-on Lab:
RIPv2 Challenge Configuration Lab



In this lab activity, you are given a network address that must be subnetted using VLSM to complete the addressing of the network. A combination of RIP version 2 and static routing will be required so that hosts on networks that are not directly connected will be able to communicate with each other and the Internet.

7.5.2 Challenge RIPv2 Configuration

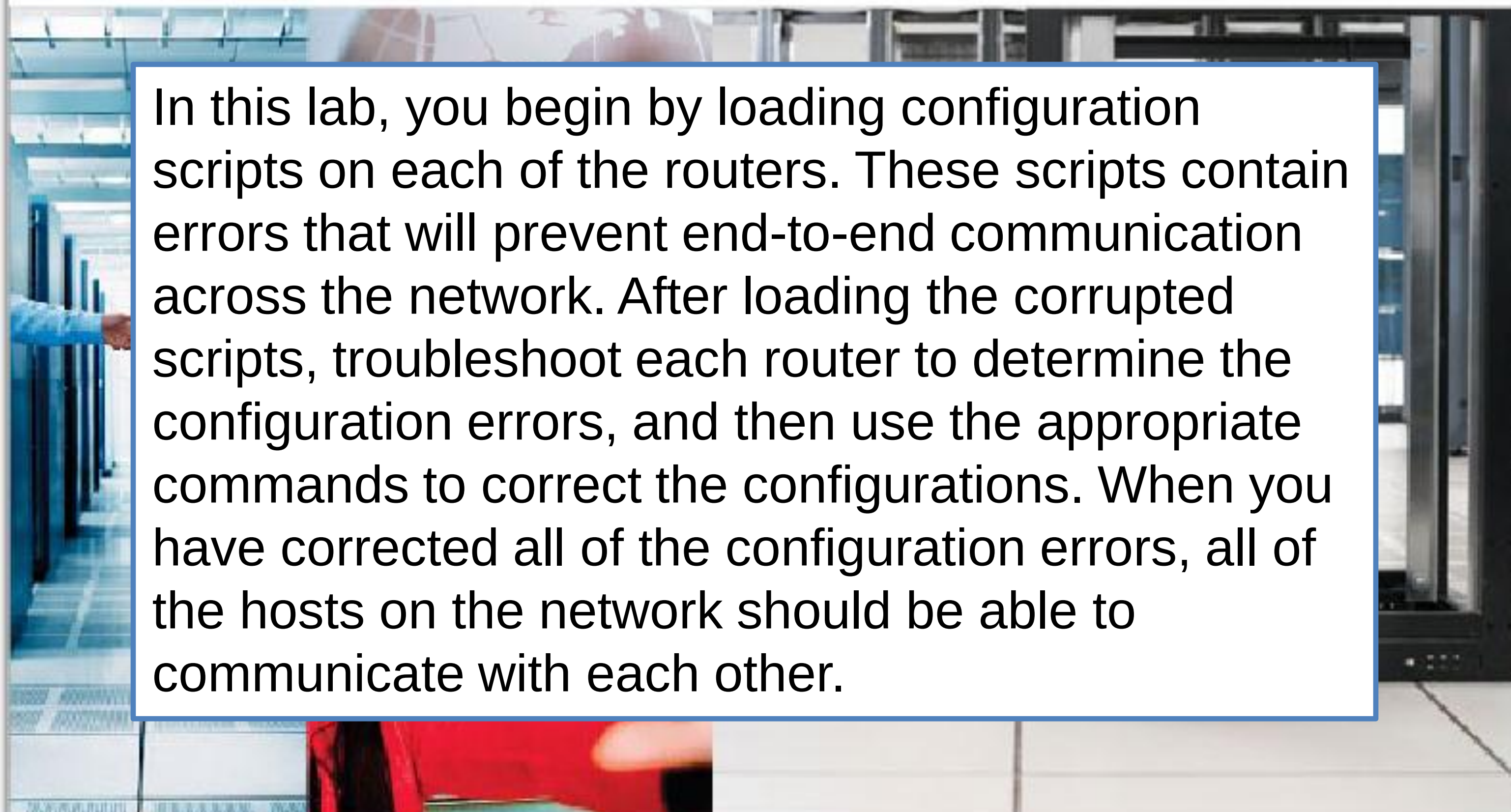
Packet Tracer Exploration:
RIPv2 Challenge Configuration Lab



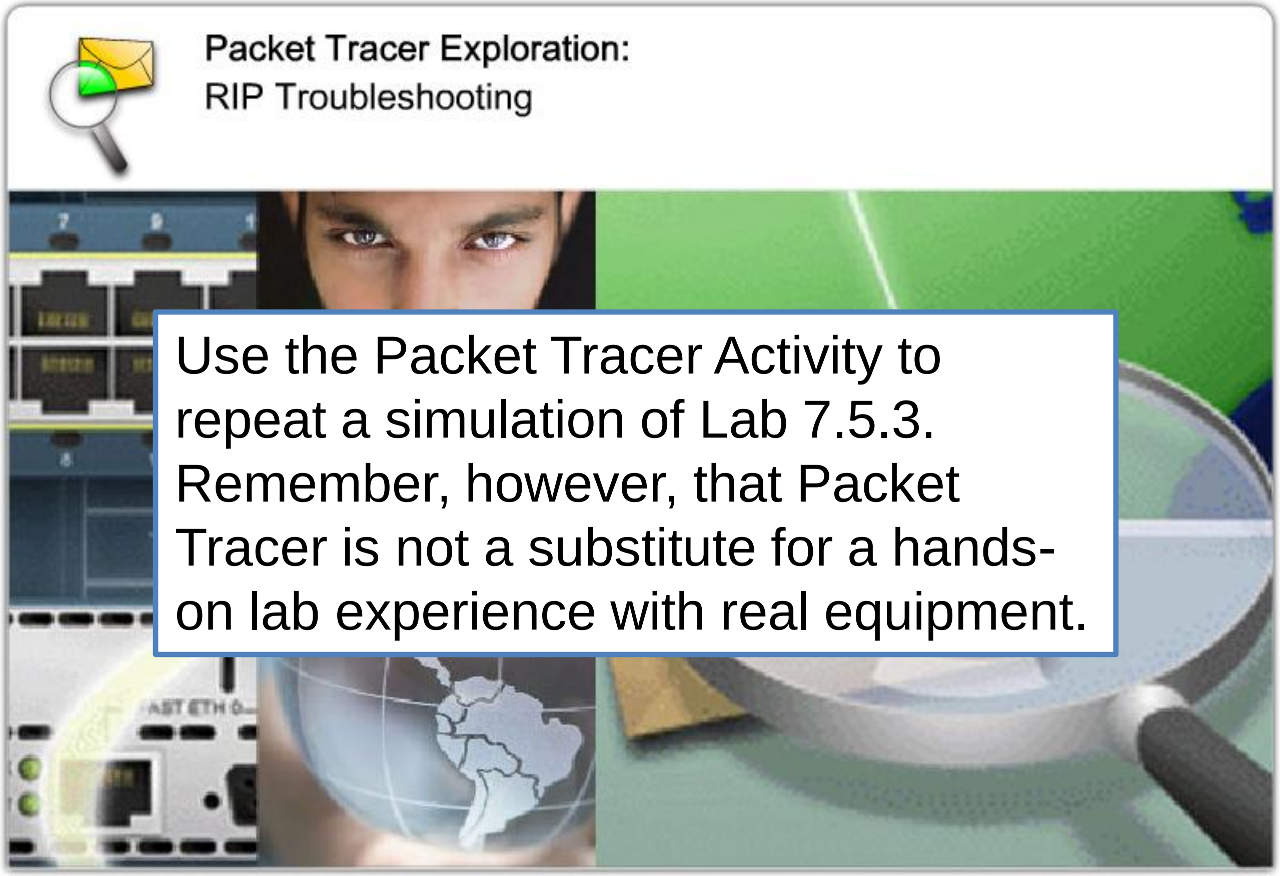
Use the Packet Tracer Activity to repeat a simulation of Lab 7.5.2. Remember, however, that Packet Tracer is not a substitute for a hands-on lab experience with real equipment.

7.5.3 RIPv2 Troubleshooting

Hands-on Lab:
RIPv2 Troubleshooting Lab



In this lab, you begin by loading configuration scripts on each of the routers. These scripts contain errors that will prevent end-to-end communication across the network. After loading the corrupted scripts, troubleshoot each router to determine the configuration errors, and then use the appropriate commands to correct the configurations. When you have corrected all of the configuration errors, all of the hosts on the network should be able to communicate with each other.



Use the Packet Tracer Activity to repeat a simulation of Lab 7.5.3. Remember, however, that Packet Tracer is not a substitute for a hands-on lab experience with real equipment.

7.6.1 Summary and Review

Routing Protocol	Distance Vector	Classless Routing Protocol	Uses Hold-Down Timers	Use of Split Horizon or Split Horizon w/ Poison Reverse	Max Hop count = 15	Auto Summary	Support CIDR	Supports VLSM	Uses Authen-tication
RIPv1	Yes	No	Yes	Yes	Yes	Yes	No	No	No
RIPv2	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

7.6.1 Summary and Review

	Interior Gateway Protocols: Distance Vector Routing Protocols		Interior Gateway Protocols: Link State Routing Protocols		Exterior Gateway Protocols: Path Vector
Classful	RIP	IGRP			EGP
Classless	RIPv2	EIGRP	OSPFv2	IS-IS	BGPv4
IPv6	RIPng	EIGRP for IPv6	OSPFv3	IS-IS for IPv6	BGPv4 for IPv6

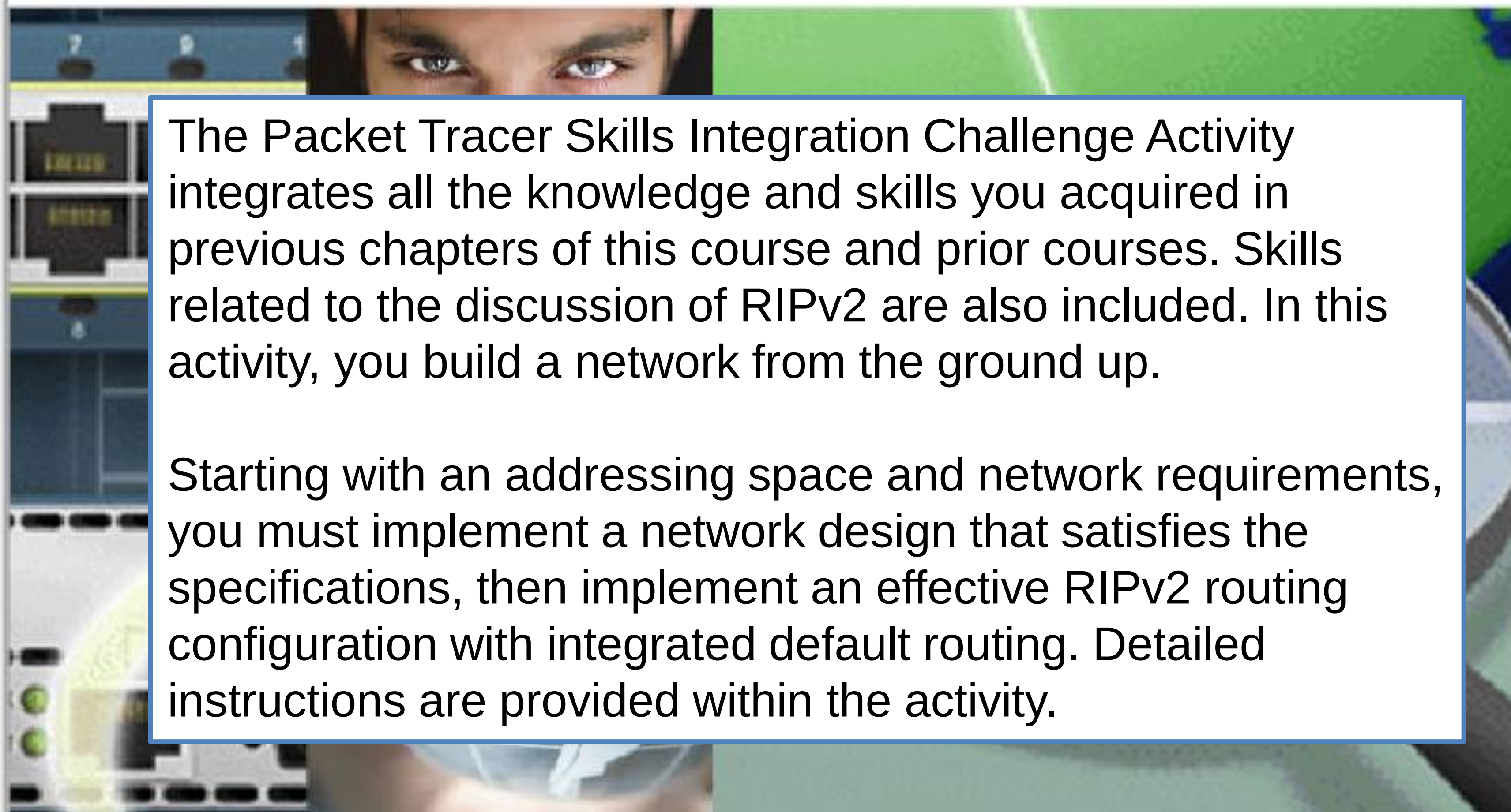
In this chapter, you have learned to:

- Encounter and describe the limitations of RIPv1.
- Apply the basic Routing Information Protocol Version 2 (RIPv2) configuration commands and evaluate RIPv2 classless routing updates.
- Analyze router output to see RIPv2 support for VLSM and Classless Inter-Domain Routing (CIDR).
- Identify RIPv2 verification commands and common RIPv2 issues.
- Configure, verify, and troubleshoot RIPv2 in hands-on labs.

7.6.1 Summary and Review

Packet Tracer Exploration:

Ch7 - Packet Tracer Skills Integration Challenge



The Packet Tracer Skills Integration Challenge Activity integrates all the knowledge and skills you acquired in previous chapters of this course and prior courses. Skills related to the discussion of RIPv2 are also included. In this activity, you build a network from the ground up.

Starting with an addressing space and network requirements, you must implement a network design that satisfies the specifications, then implement an effective RIPv2 routing configuration with integrated default routing. Detailed instructions are provided within the activity.