Network Topology Exercise A V1.2

From

Routing Tables

to

Network Topology

Network Topology Exercise A

- You need to understand the contents of the routing table to determine:
  - the Topology of the network
  - Troubleshoot a Problem with the operation of the routing protocol

Routing Table Entries – show ip route

The contents of the routing table:

- **Link local route interfaces -** Added to the routing table when an interface is configured. Shows IP address of the Interface.

- **Connected interfaces – directly connected networks** Added to the routing table when an interface is configured and active.

- **Static routes -** Added when a route is manually configured and the exit interface is active.

- **Dynamic routing protocol – remote networks** Added when RIP, EIGRP or OSPF are implemented and networks are identified.

Tasks

Given Routing Tables for R1, R2 and R3

1. Draw a Network Topology Diagram
   - Show all interfaces with their ip addresses
   - Show all LAN subnets with their subnet addresses
   - Show all Serial subnets with their subnet addresses

2. Answer Questions on the information contained in the routing tables

R1 Router - Routing Table

R1# **show ip route**

10.0.0.0/8 is variably subnetted, 3 subnets, 2 masks
C 10.1.1.0/30 is directly connected, Serial0/0/0
L 10.1.1.1/32 is directly connected, Serial0/0/0
R 10.2.2.0/30 [120/1] via 10.1.1.2, 00:00:21, Serial0/0/0

172.30.0.0/16 is variably subnetted, 2 subnets, 2 masks
C 172.30.10.0/24 is directly connected, FastEthernet0/1
L 172.30.10.1/32 is directly connected, FastEthernet0/1

R2 Router - Routing Table

R2# **show ip route**

10.0.0.0/8 is variably subnetted, 4 subnets, 2 masks
C 10.1.1.0/30 is directly connected, Serial0/0/0
L 10.1.1.2/32 is directly connected, Serial0/0/0
C 10.2.2.0/30 is directly connected, Serial0/0/1
L 10.2.2.2/32 is directly connected, Serial0/0/1

R 172.30.0.0/16 [120/1] via 10.2.2.1, 00:00:23, Serial0/0/1
[120/1] via 10.1.1.1, 00:00:09, Serial0/0/0

209.165.201.0/24 is variably subnetted, 2 subnets, 2 masks
C 209.165.201.0/24 is directly connected, FastEthernet0/0
L 209.165.201.1/32 is directly connected, FastEthernet0/0

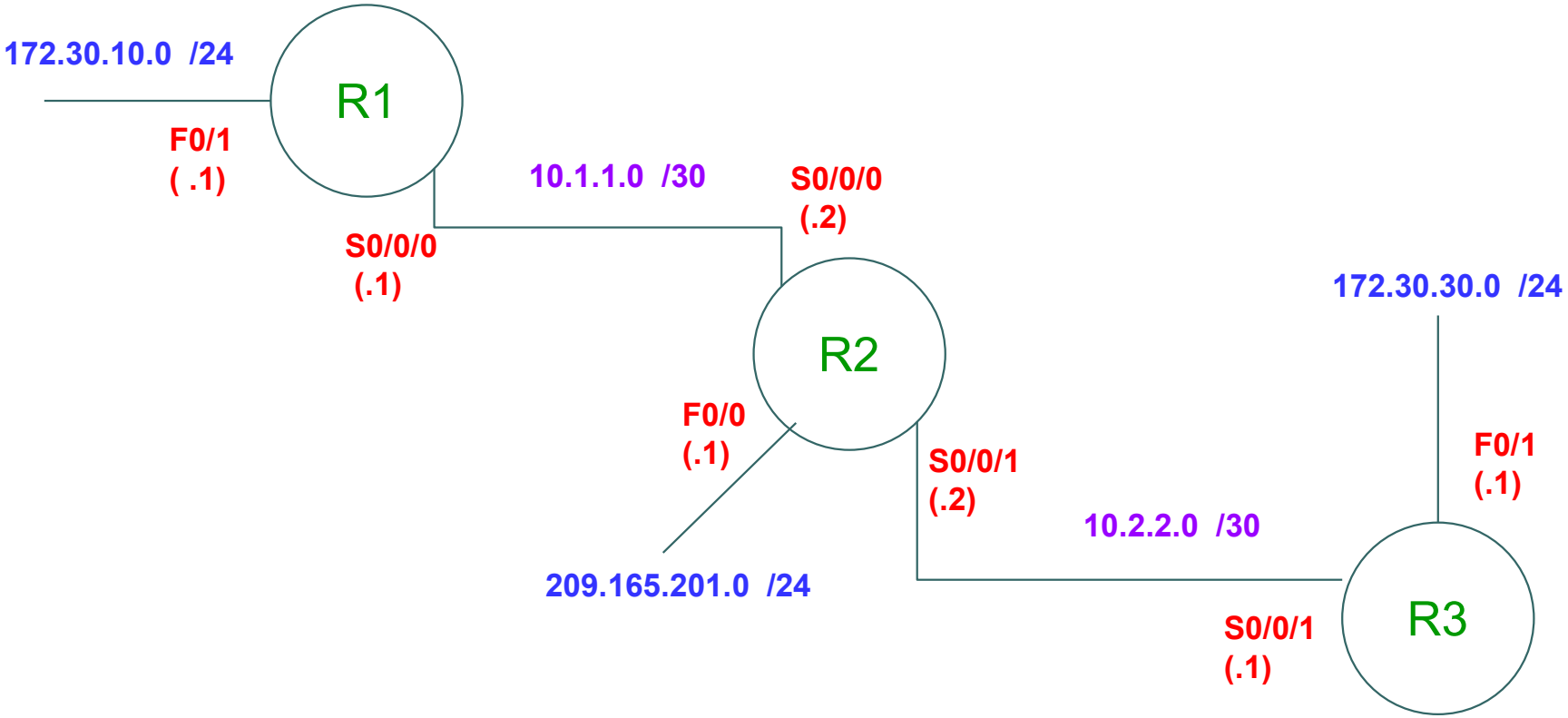
R3 Router - Routing Table

R3# **show ip route**

```
     10.0.0.0/8 is variably subnetted, 3 subnets, 2 masks
C       10.2.2.0/30 is directly connected, Serial0/0/1
L       10.2.2.1/32 is directly connected, Serial0/0/1
R       10.1.1.0/30 [120/1] via 10.2.2.2, 00:00:23, Serial0/0/1

     172.30.0.0/16 is variably subnetted, 2 subnets, 2 masks
C       172.30.30.0/24 is directly connected, FastEthernet0/1
L       172.30.30.1/32 is directly connected, FastEthernet0/1
```

Network Topology



Questions - R2 Routing Table

- What does variably subnetted mean ?
  - Using VLSM “variable length subnet masks” to identify subnets

Given Route entry on R2 routing table

R 172.30.0.0/16 [120/1] via 10.2.2.1, 00:00:23, Serial0/0/1
[120/1] via 10.1.1.1, 00:00:09, Serial0/0/0

  - What does ‘ R ’ tell Us ?
    - Routing protocol is RIP
  - What does [120/1] tell Us ?
    - 120 Administrative Distance
    - Hop Count
  - What does 00:00:23 tell Us ?
    - 7 secs until next update
  - Why are RIP updates from 172.30.0.0/16 coming from two different interfaces ?
    - R1 and R2 have subnets from Class B Network 172.30.0.0 /16

- R1 cannot see the 172.30.30.0 /24 subnet, Why ?
  - By default, routing protocols summarize to Class B level eg 172.30.0.0/16, hence no subnet information is passed, when an update is sent to another network

Questions – R1 and R3 Routing Table

- R1 and R3 cannot see the 209.165.201.0/24 subnet on R2, Why ?

- Router 2 RIP configuration does not include a network statement
- Network 209.165.201.0 /24
- hence no subnet information is passed, when an update is sent to another network
- & RIP version 2 should be used. .