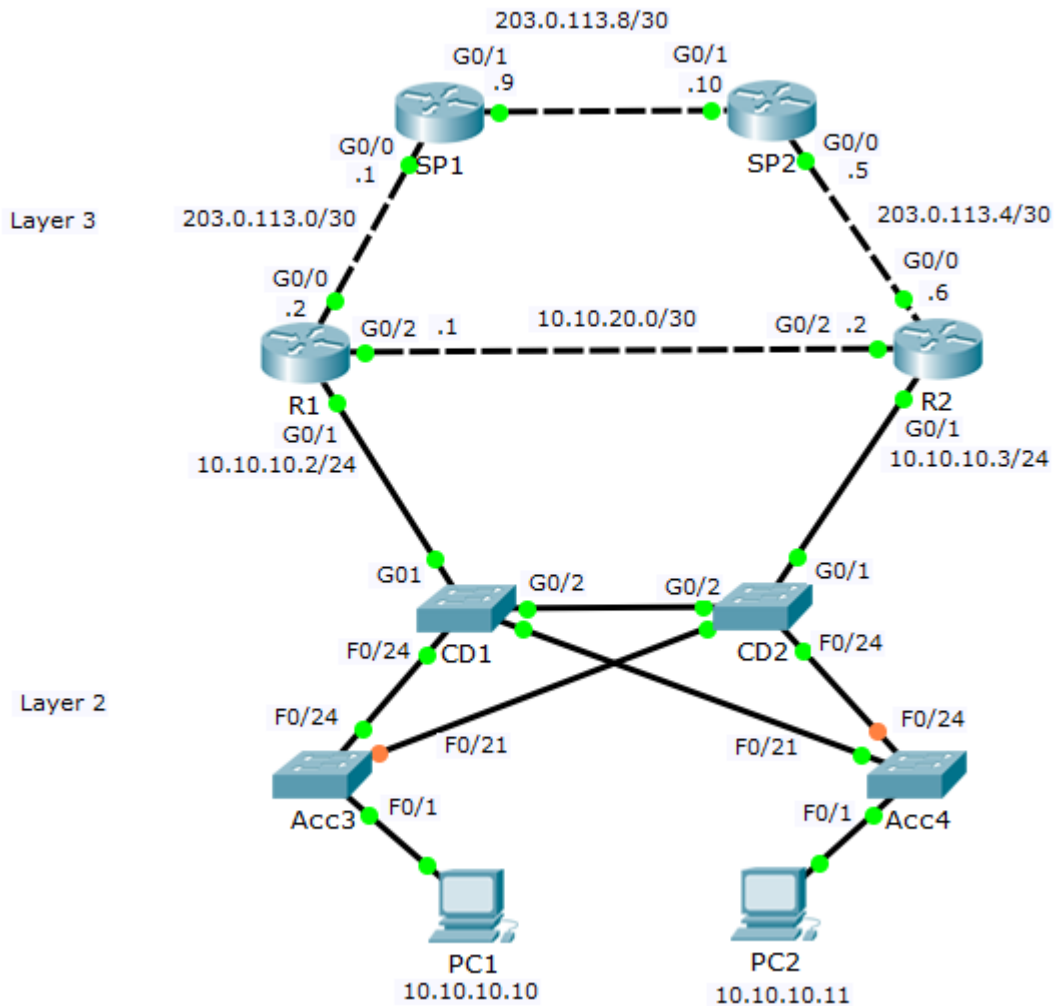


Network Redundancy – Layer 3 Configuration



- Redundancy and failover are relatively easy to implement for Layer 3 routing
- Routes on R1:

Static route to SP1:

```
ip route 0.0.0.0 0.0.0.0 203.0.113.1
```

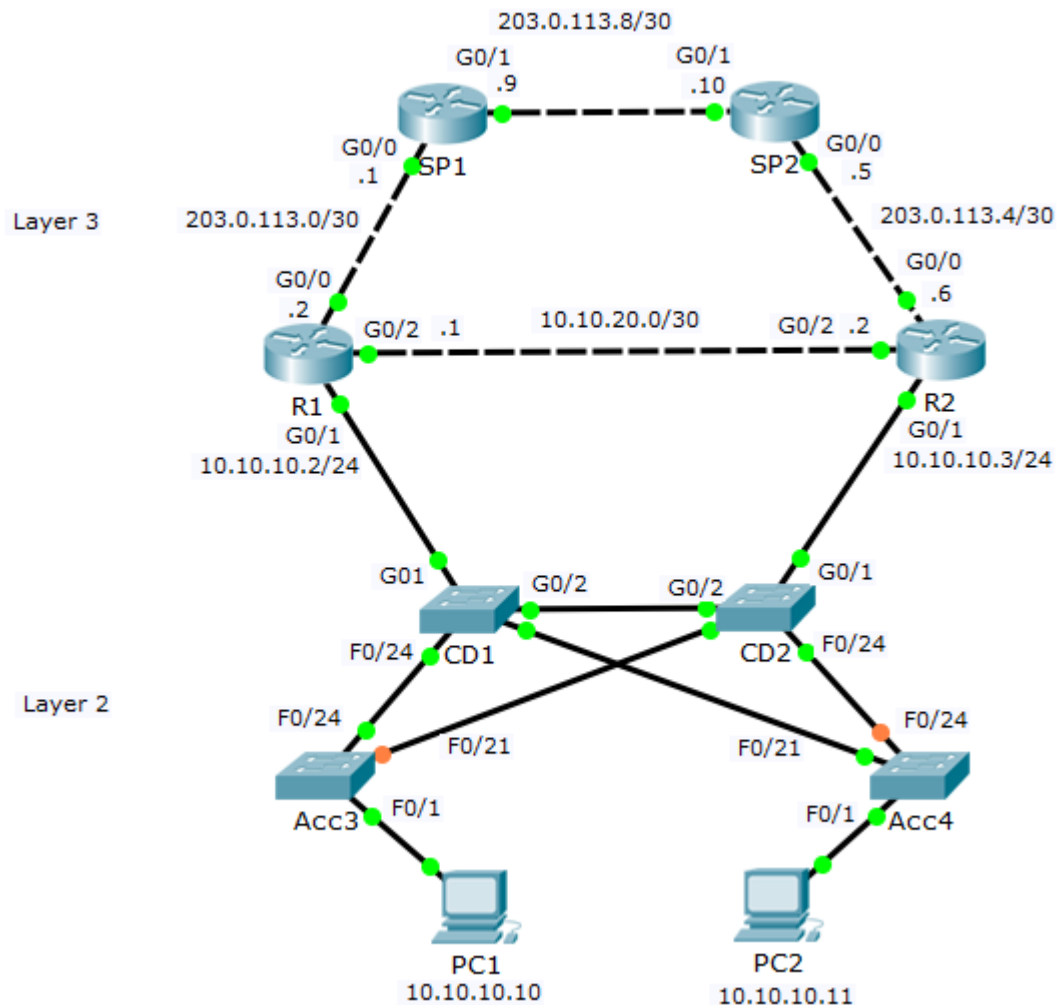
Backup default static route via R2 if link to SP1 goes down:

```
ip route 0.0.0.0 0.0.0.0 10.10.20.2 5
```

Backup route to inside via R2 if link to CD1 goes down:

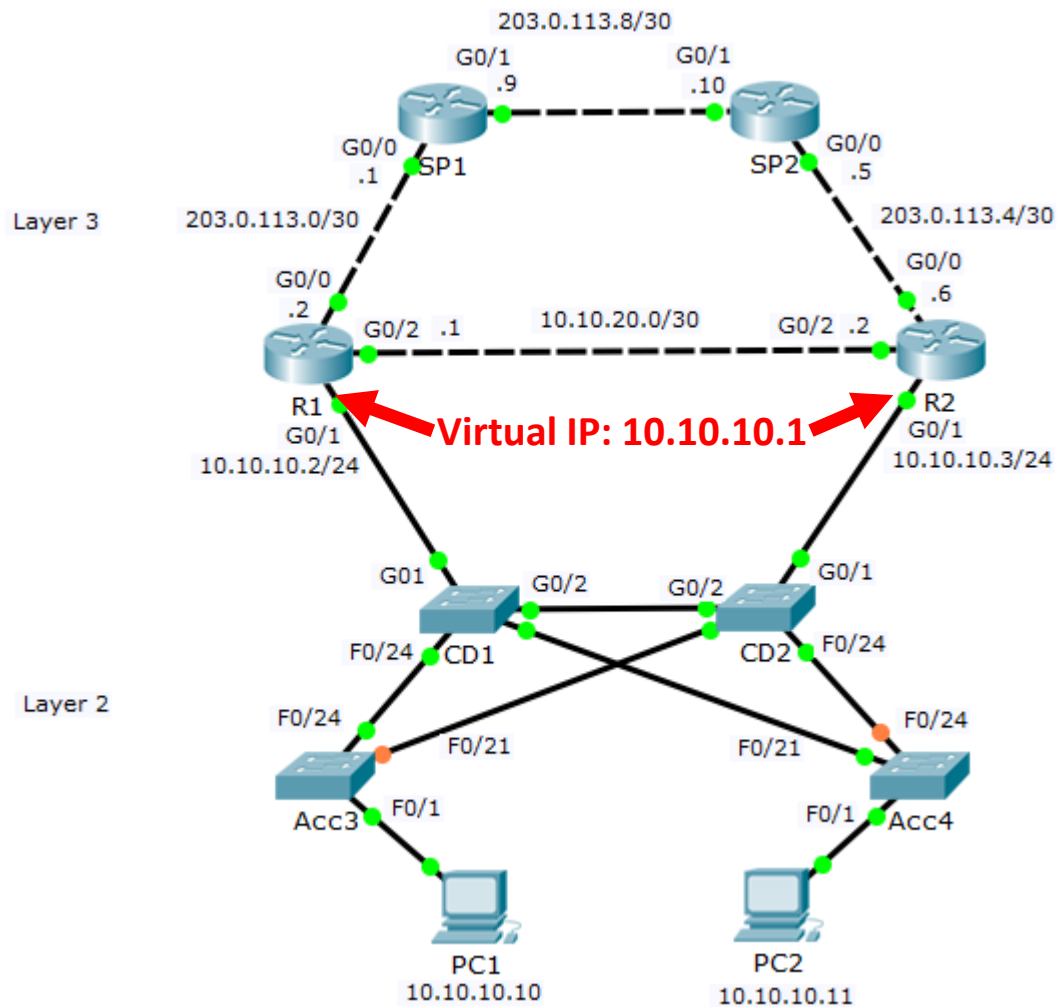
```
ip route 10.10.10.0 255.255.255.0 10.10.20.2
```

Network Redundancy – Host Gateways



- We have redundant gateways for the PCs in the 10.10.10.0/24 network:
- R1 with IP address 10.10.10.2
- R2 with IP address 10.10.10.3
- We could configure half our PCs to use 10.10.10.2 as their default gateway, and half to use 10.10.10.3
- That would be inconvenient and would require manual reconfiguration on the PCs to failover if one of the routers failed

First Hop Redundancy Protocols (FHRP)



- First Hop Redundancy Protocols (HSRP) use a Virtual IP (VIP) and MAC address to allow for automated gateway failover
- The hosts use the VIP as their default gateway address
- If a physical gateway fails, another gateway will take over

First Hop Redundancy Protocols (FHRP)

- Hot Standby Router Protocol (HSRP): Cisco proprietary. Deployed in active/standby pair.
- Virtual Router Redundancy Protocol (VRRP): Open standard. Deployed in active/standby pair. Very similar to HSRP.
- Gateway Load Balancing Protocol (GLBP): Cisco proprietary. Supports active/active load balancing across multiple routers.