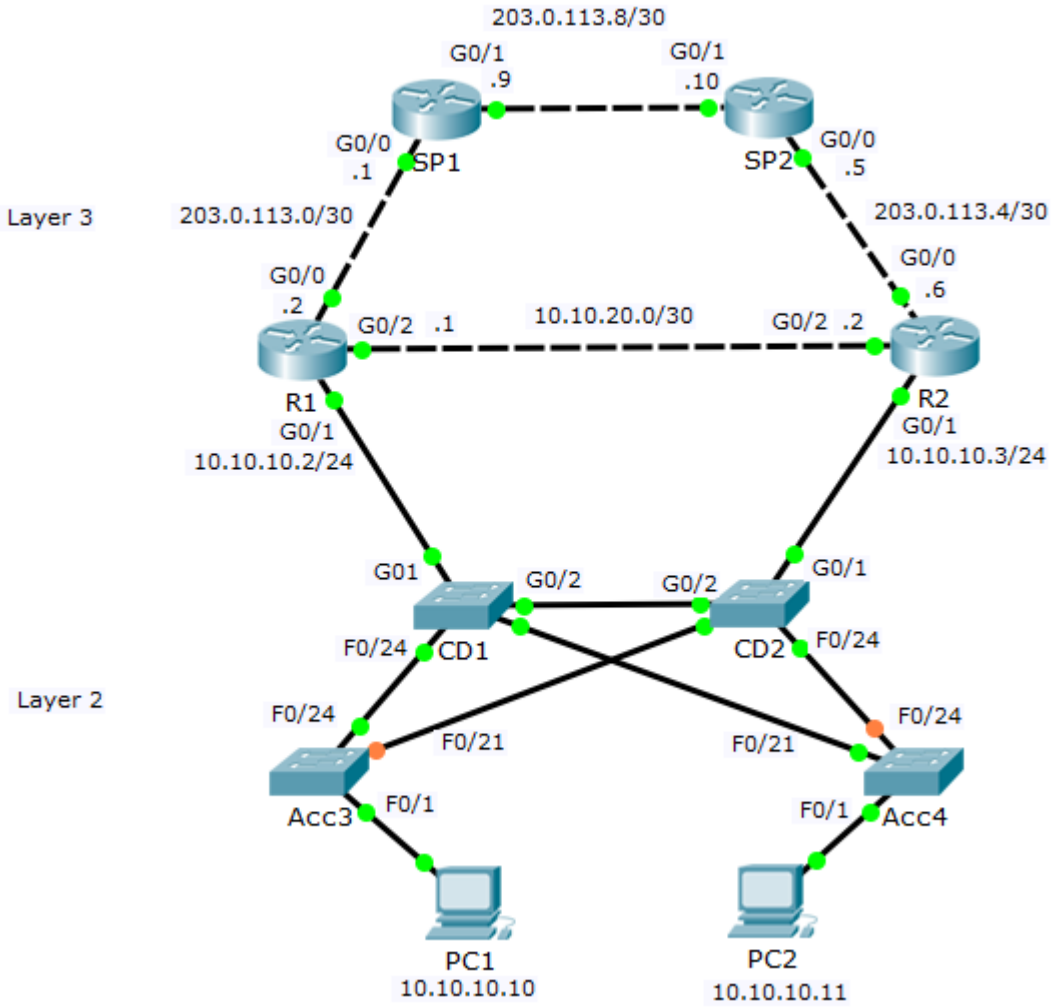
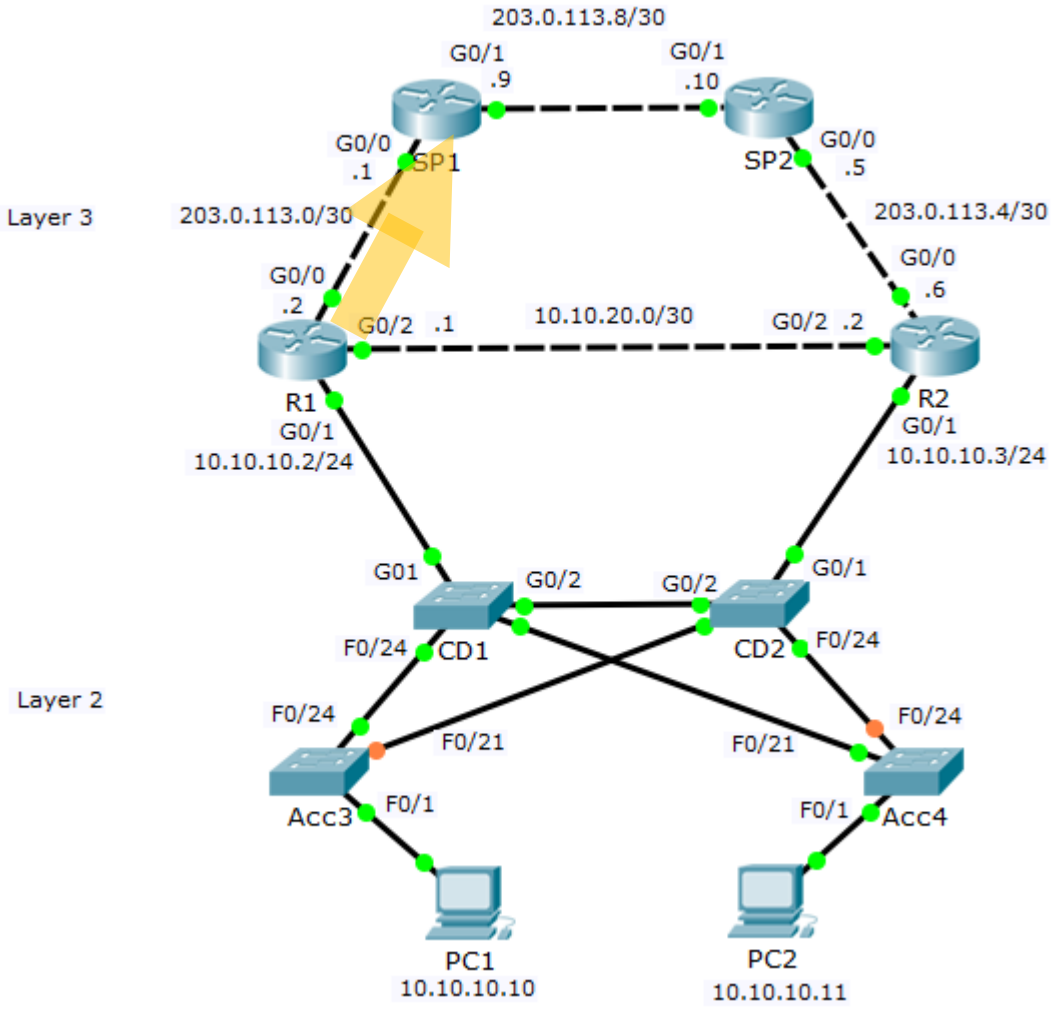
Layer 3 Network Redundancy Review



- Layer 3 routing and HSRP control the path selection and provide automatic failover for Layer 3 connections

Network Redundancy – Layer 3 Configuration

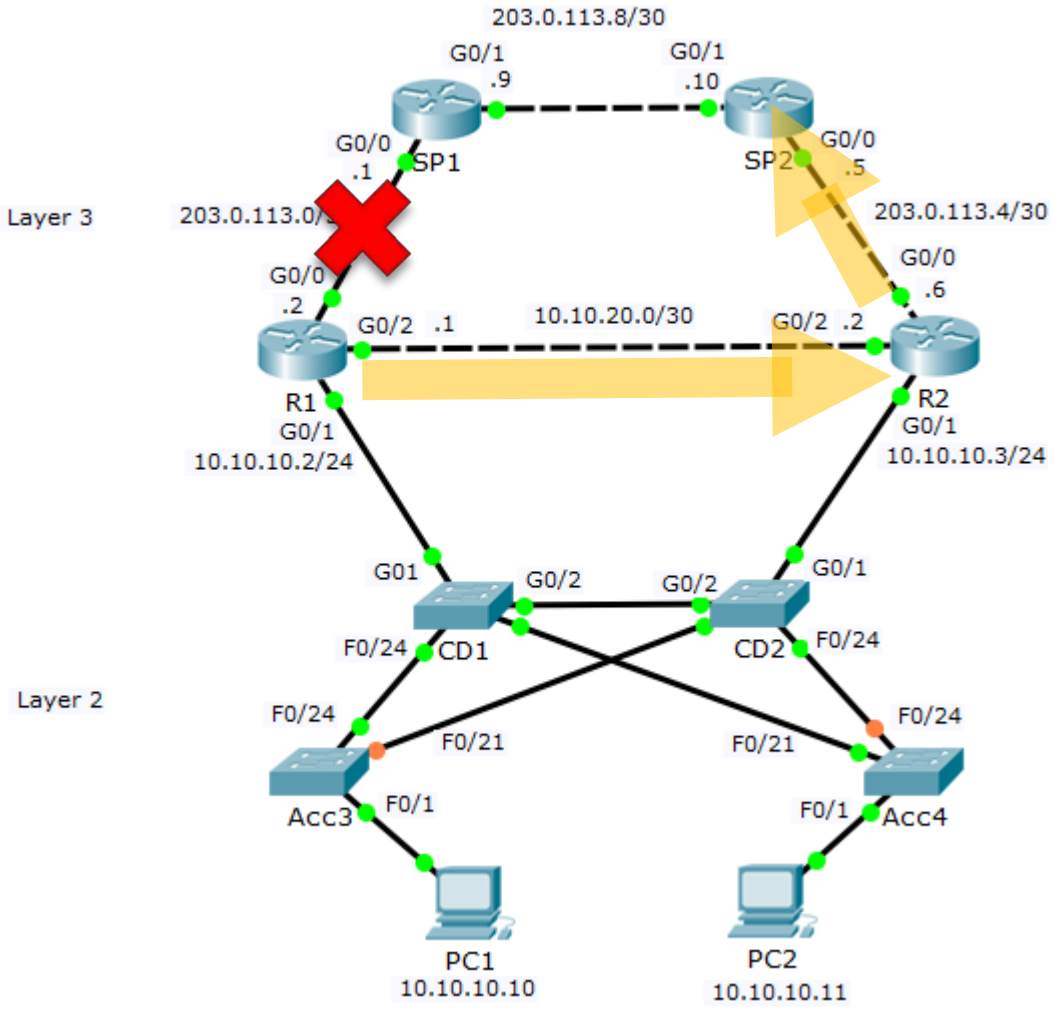


- Routes on R1:

Default static route to SP1 (Administrative Distance 1):

```
ip route 0.0.0.0 0.0.0.0 203.0.113.1
```

Network Redundancy – Layer 3 Configuration

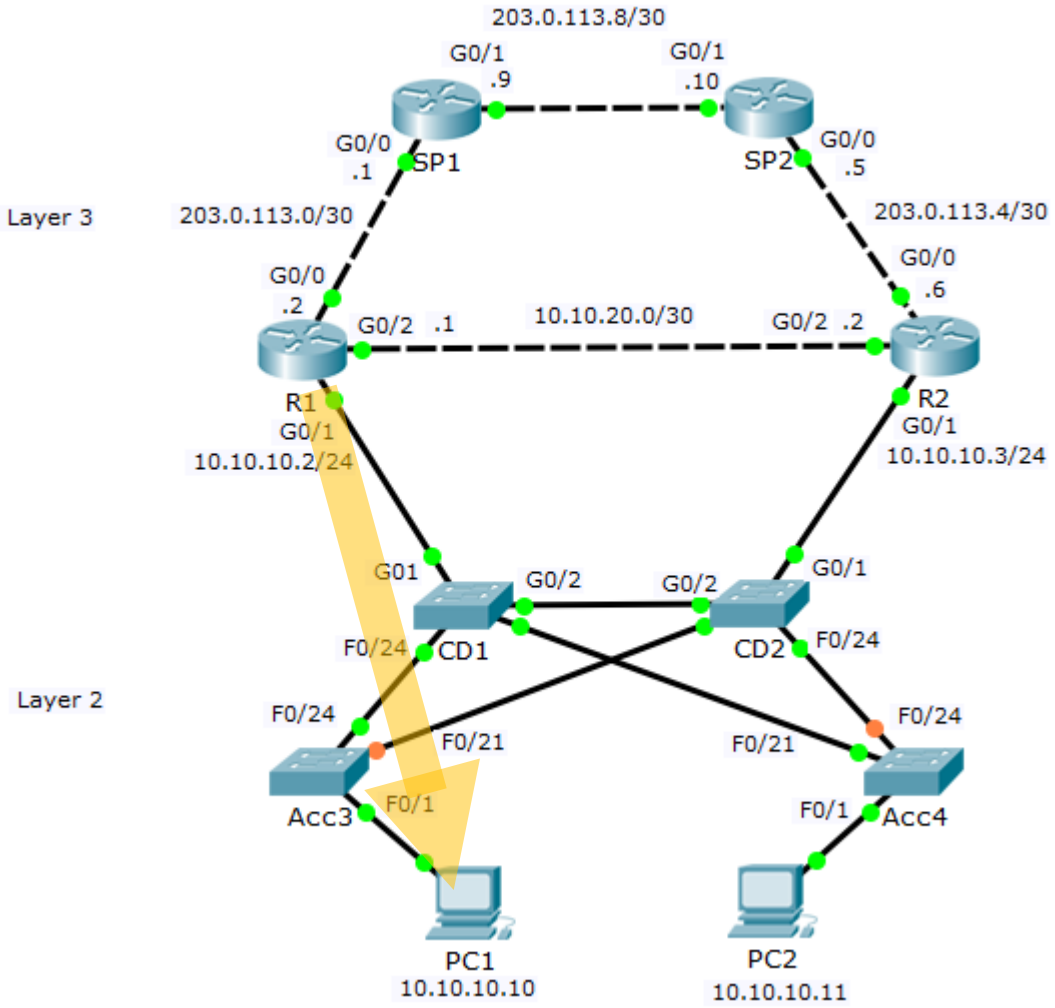


- Routes on R1:

Backup default static route via R2 (AD 5):

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

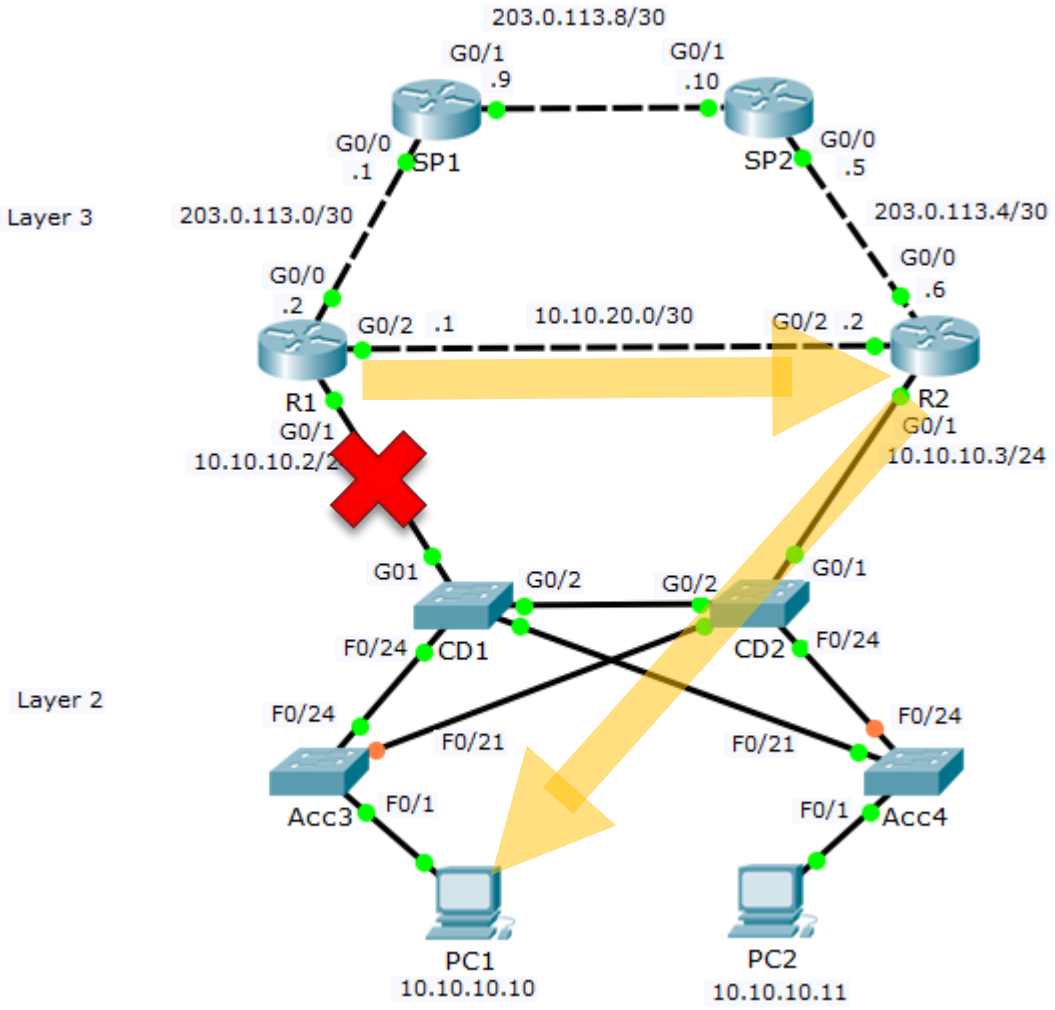
Network Redundancy – Layer 3 Configuration



- Routes on R1:

Interface G0/1 is directly connected to 10.10.10.0/24 (Administrative Distance 0)

Network Redundancy – Layer 3 Configuration

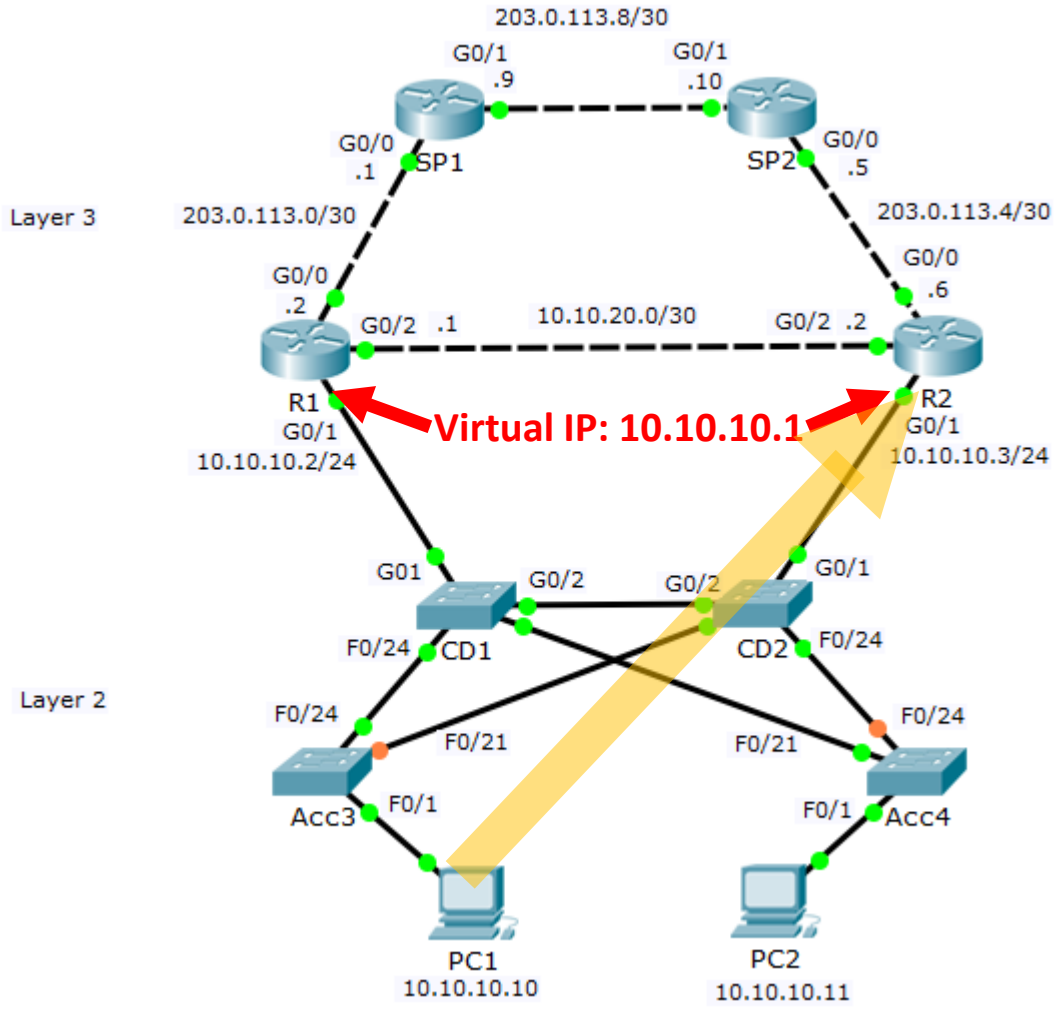


- Routes on R1:

Backup route to 10.10.10.0/24 via R2 if link to CD1 goes down (AD 1):

```
ip route 10.10.10.0 255.255.255.0
10.10.20.2
```

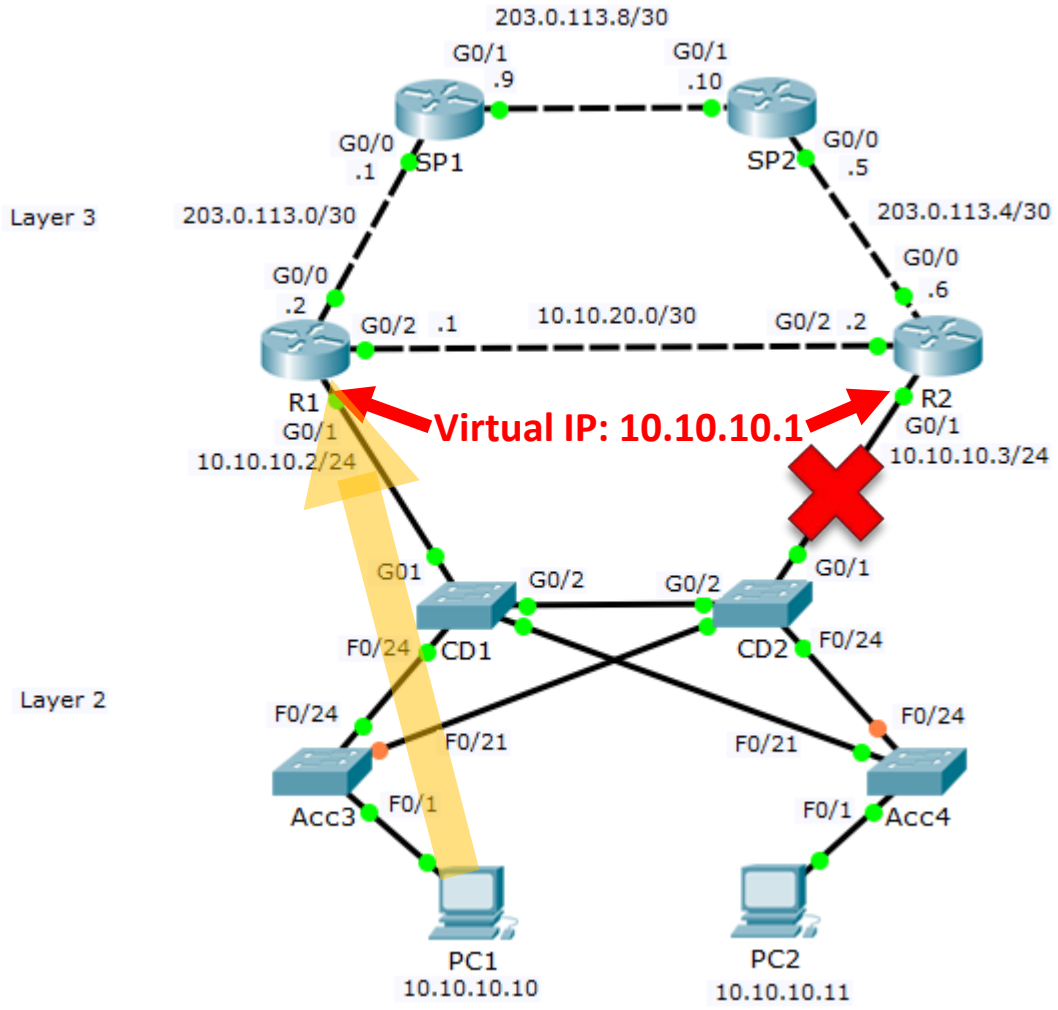
HSRP Hot Standby Router Protocol




```
R1(config)#interface g0/1
R1(config-if)#ip address 10.10.10.2 255.255.255.0
R1(config-if)#no shutdown
R1(config-if)#standby 1 ip 10.10.10.1
```

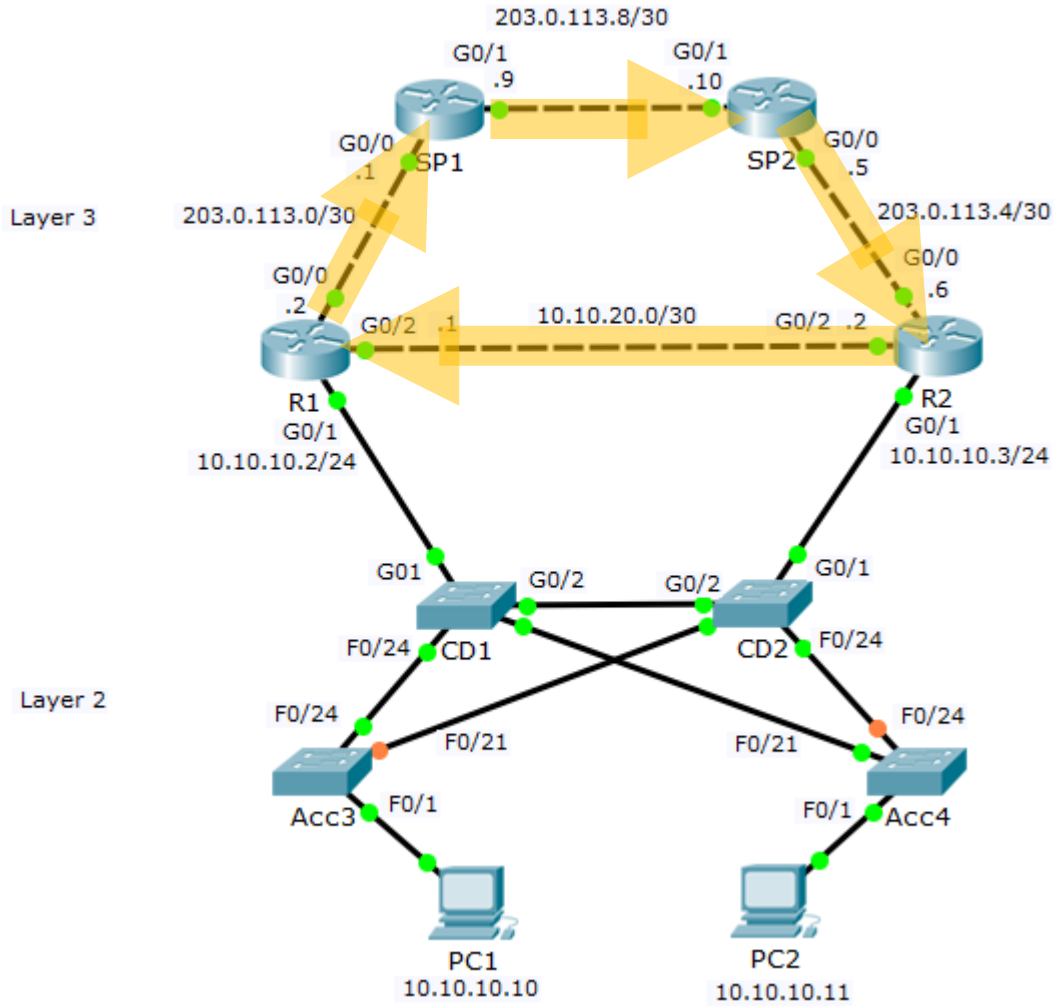
```
R2(config)#interface g0/1
R2(config-if)#ip address 10.10.10.3 255.255.255.0
R2(config-if)#no shutdown
R2(config-if)#standby 1 ip 10.10.10.1
```

HSRP Hot Standby Router Protocol



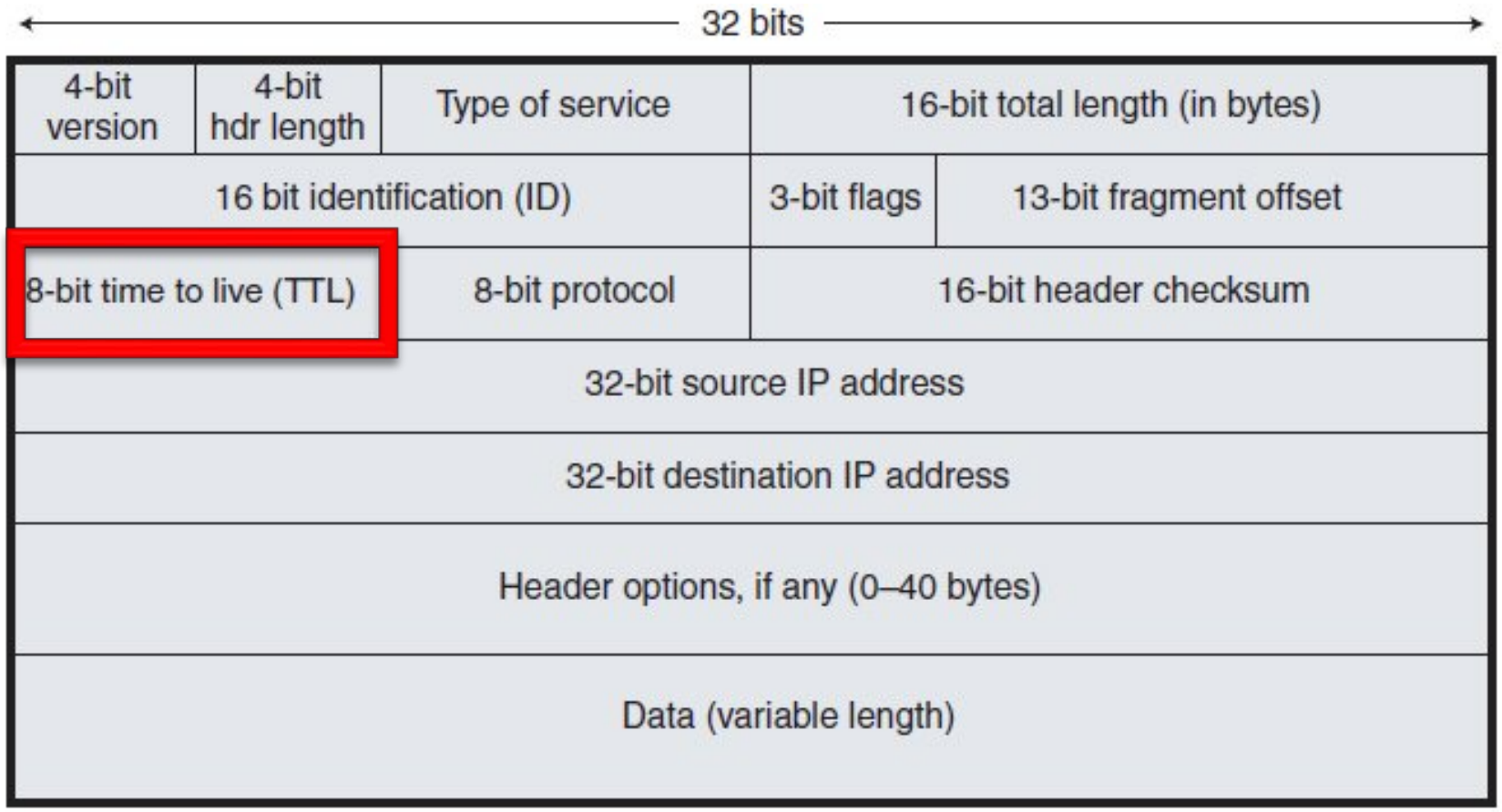

```
R1(config)#interface g0/1
R1(config-if)#ip address 10.10.10.2 255.255.255.0
R1(config-if)#no shutdown
R1(config-if)#standby 1 ip 10.10.10.1

R2(config)#interface g0/1
R2(config-if)#ip address 10.10.10.3 255.255.255.0
R2(config-if)#no shutdown
R2(config-if)#standby 1 ip 10.10.10.1
```

Routing Loop

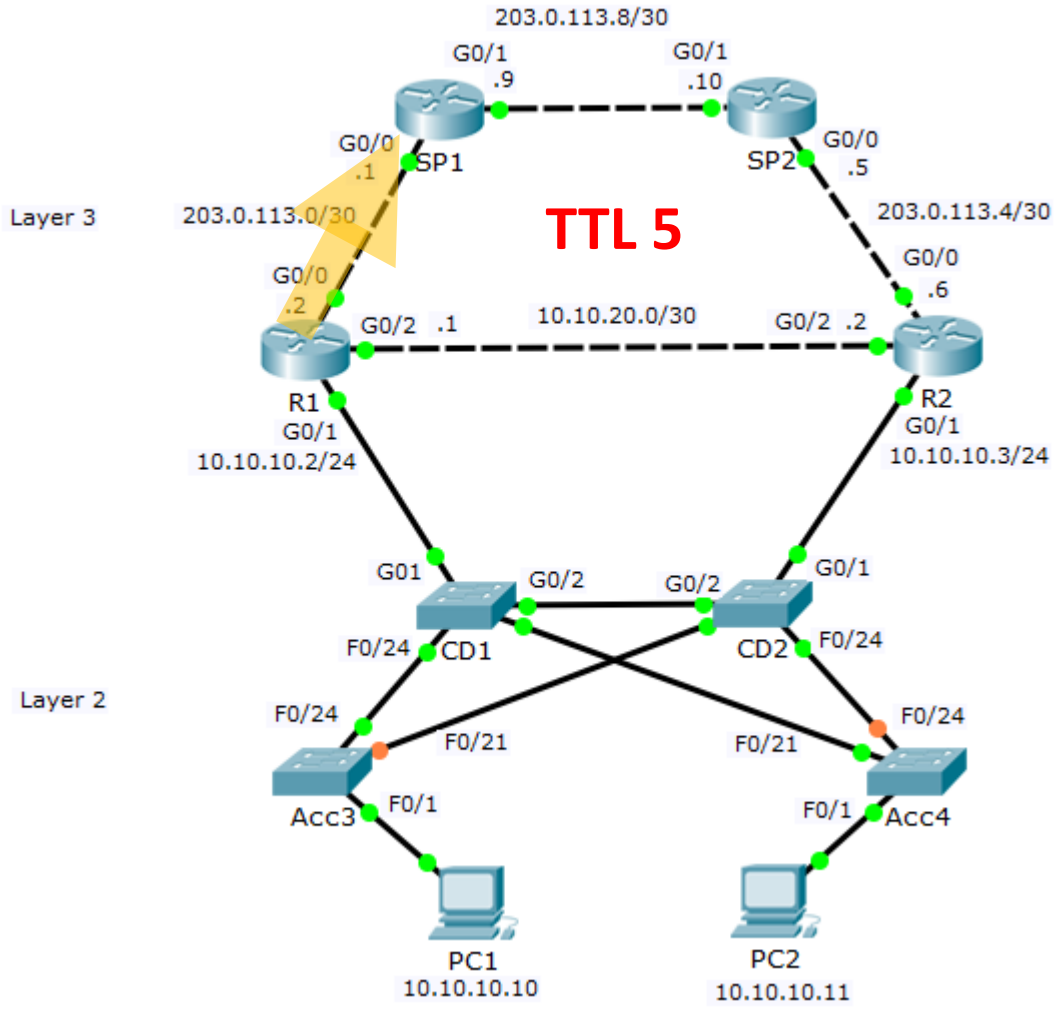



```
R1(config)#ip route 10.10.50.0
255.255.255.0 203.0.113.1
SP1(config)#ip route 10.10.50.0
255.255.255.0 203.0.113.10
SP2(config)#ip route 10.10.50.0
255.255.255.0 203.0.113.6
R2(config)#ip route 10.10.50.0
255.255.255.0 10.10.20.1
```

The IP Header Time to Live Field

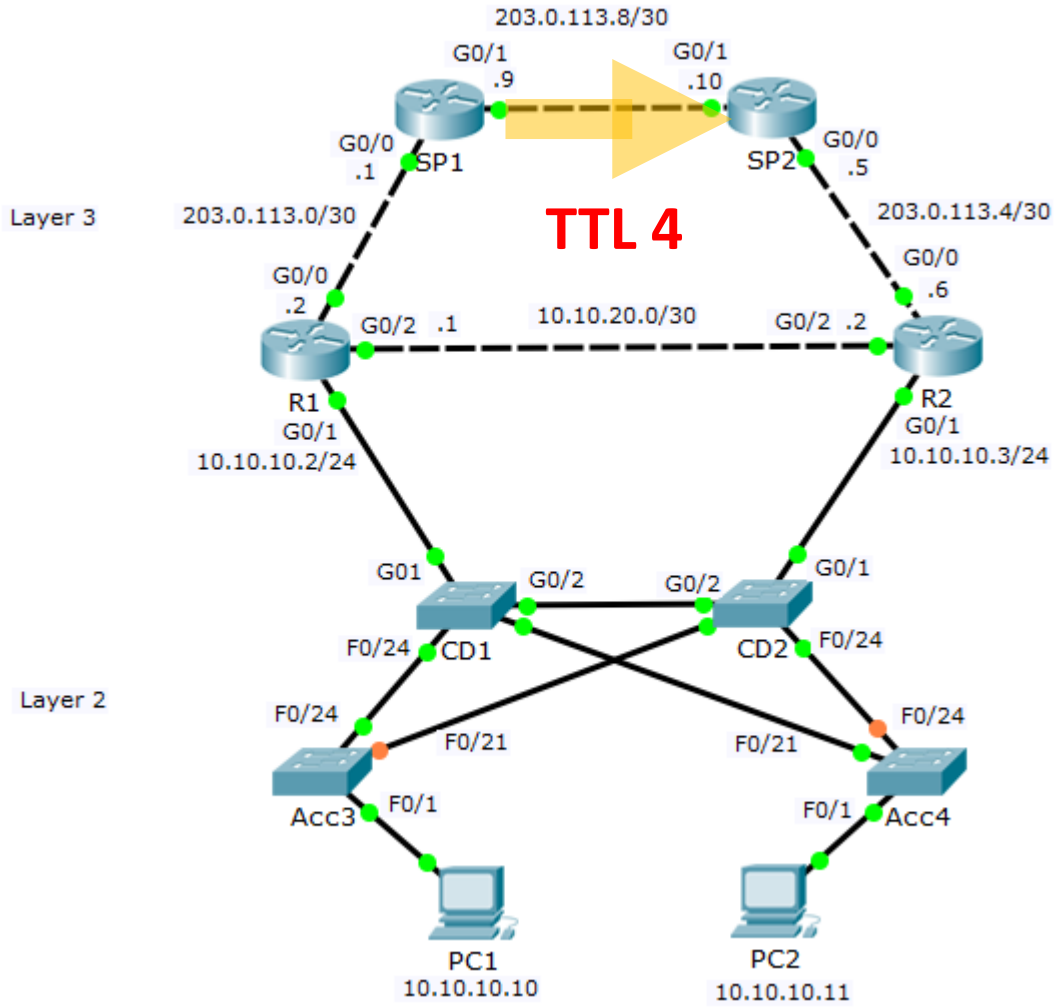


Routing Loop



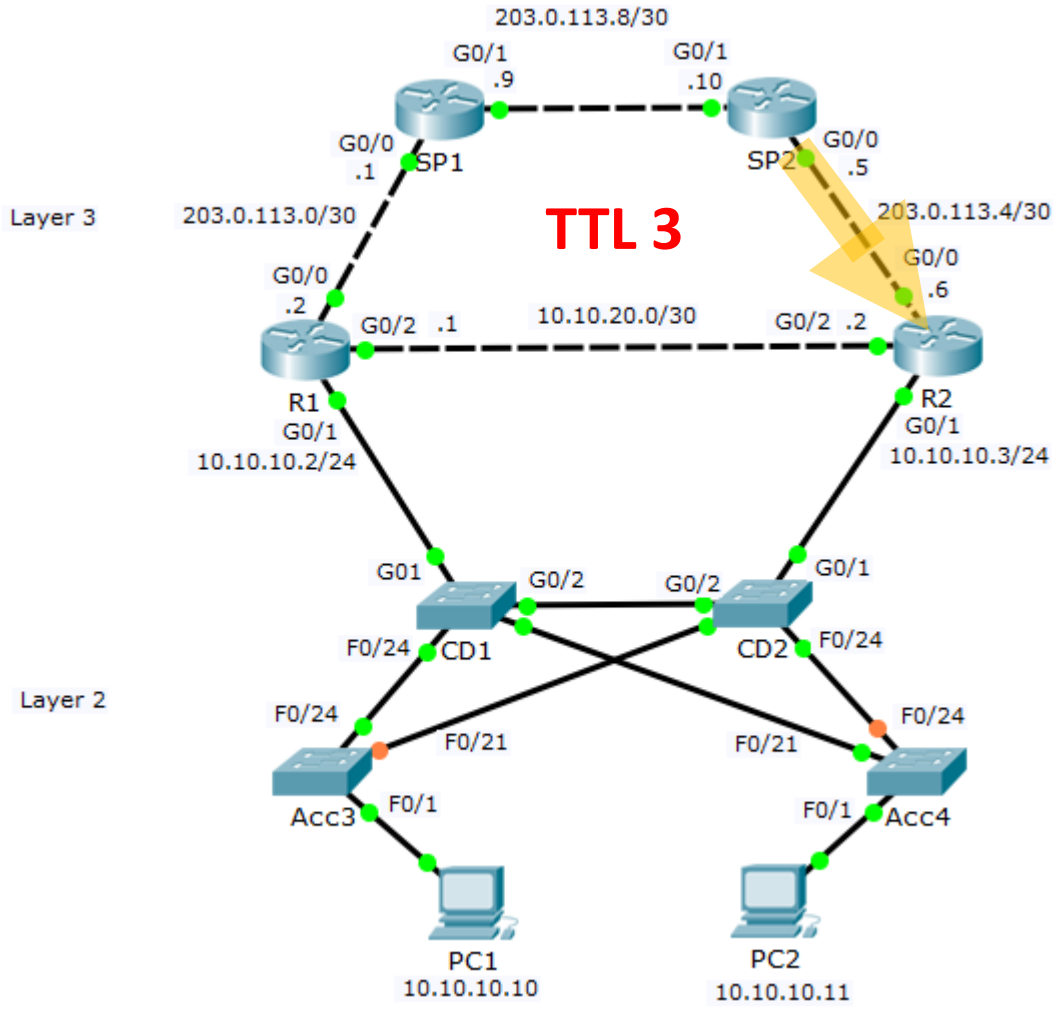

```
R1(config)#ip route 10.10.50.0
255.255.255.0 203.0.113.1
SP1(config)#ip route 10.10.50.0
255.255.255.0 203.0.113.10
SP2(config)#ip route 10.10.50.0
255.255.255.0 203.0.113.6
R1(config)#ip route 10.10.50.0
255.255.255.0 10.10.20.1
```

Routing Loop



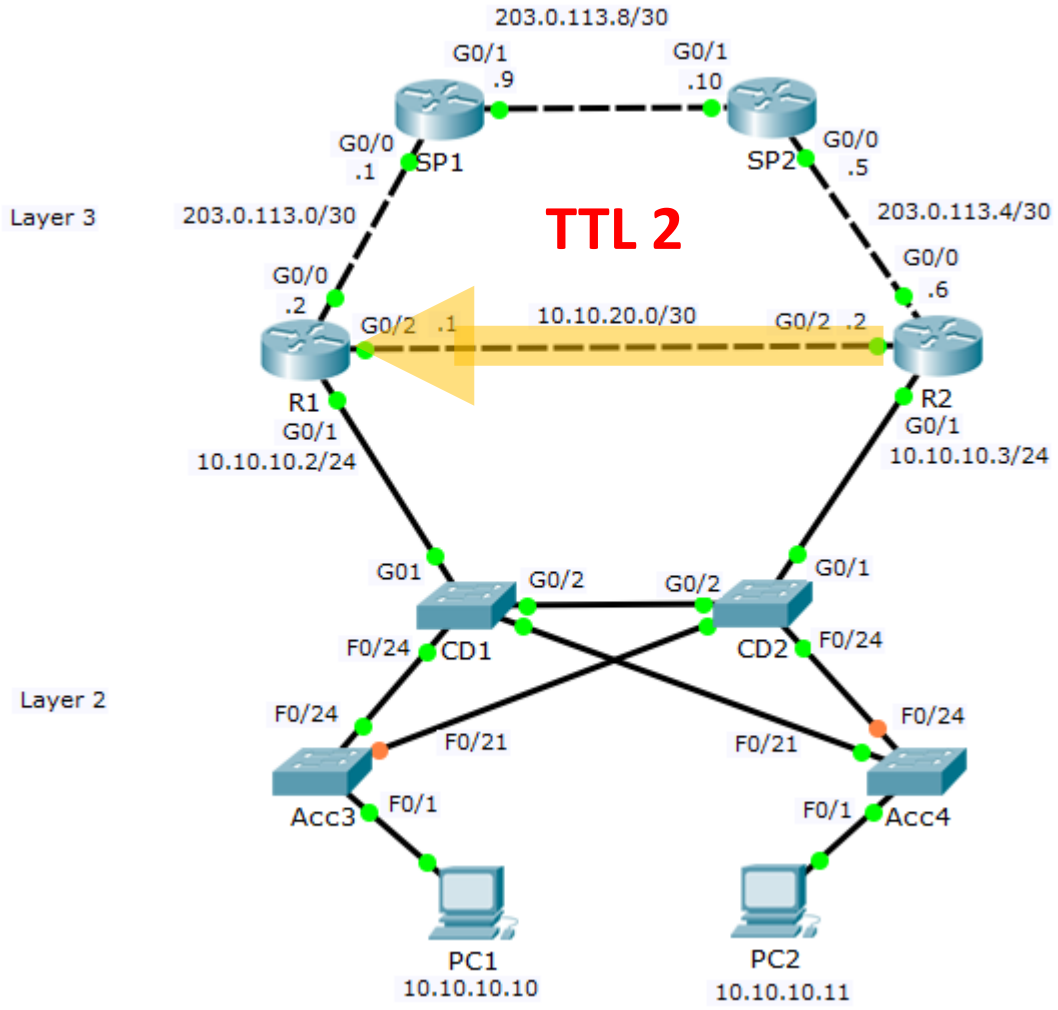

```
R1(config)#ip route 10.10.50.0
255.255.255.0 203.0.113.1
SP1(config)#ip route 10.10.50.0
255.255.255.0 203.0.113.10
SP2(config)#ip route 10.10.50.0
255.255.255.0 203.0.113.6
R1(config)#ip route 10.10.50.0
255.255.255.0 10.10.20.1
```

Routing Loop



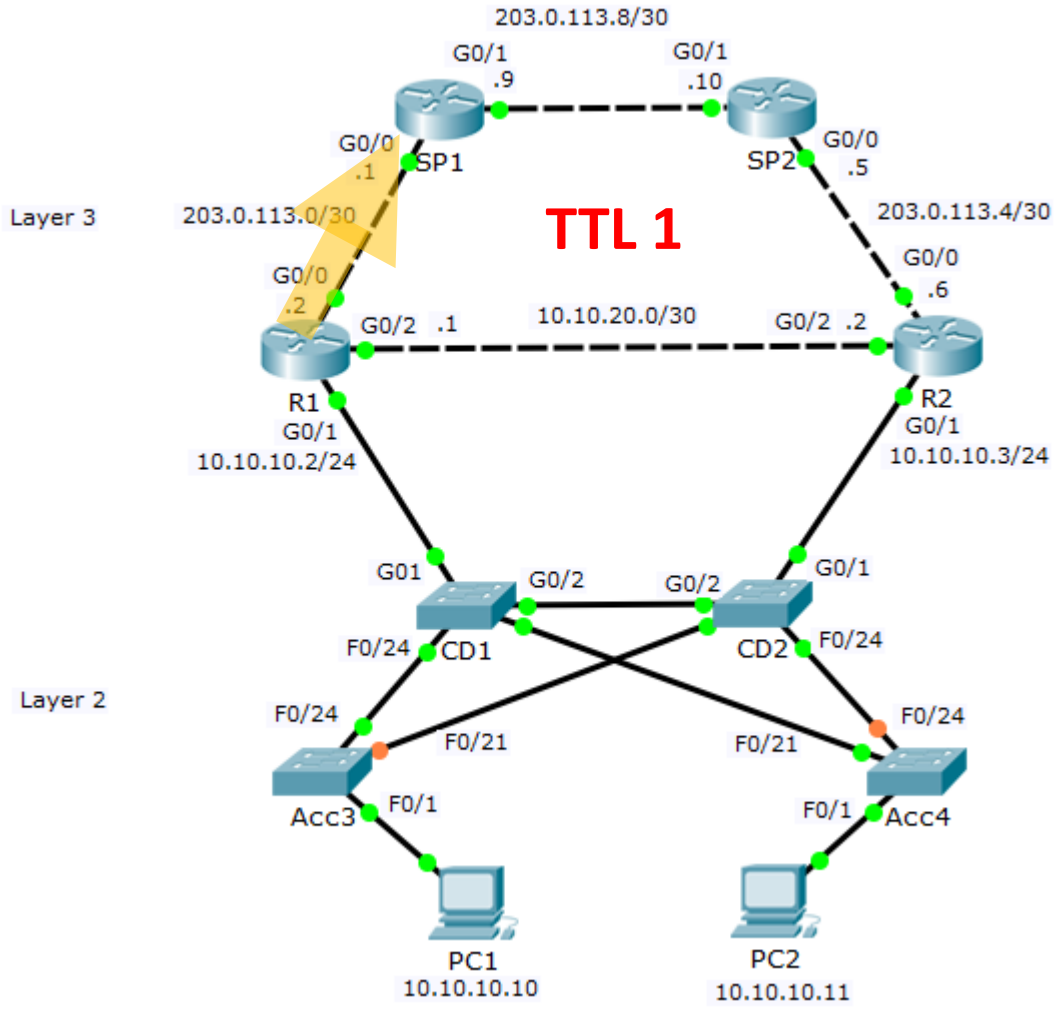

```
R1(config)#ip route 10.10.50.0
255.255.255.0 203.0.113.1
SP1(config)#ip route 10.10.50.0
255.255.255.0 203.0.113.10
SP2(config)#ip route 10.10.50.0
255.255.255.0 203.0.113.6
R1(config)#ip route 10.10.50.0
255.255.255.0 10.10.20.1
```

Routing Loop



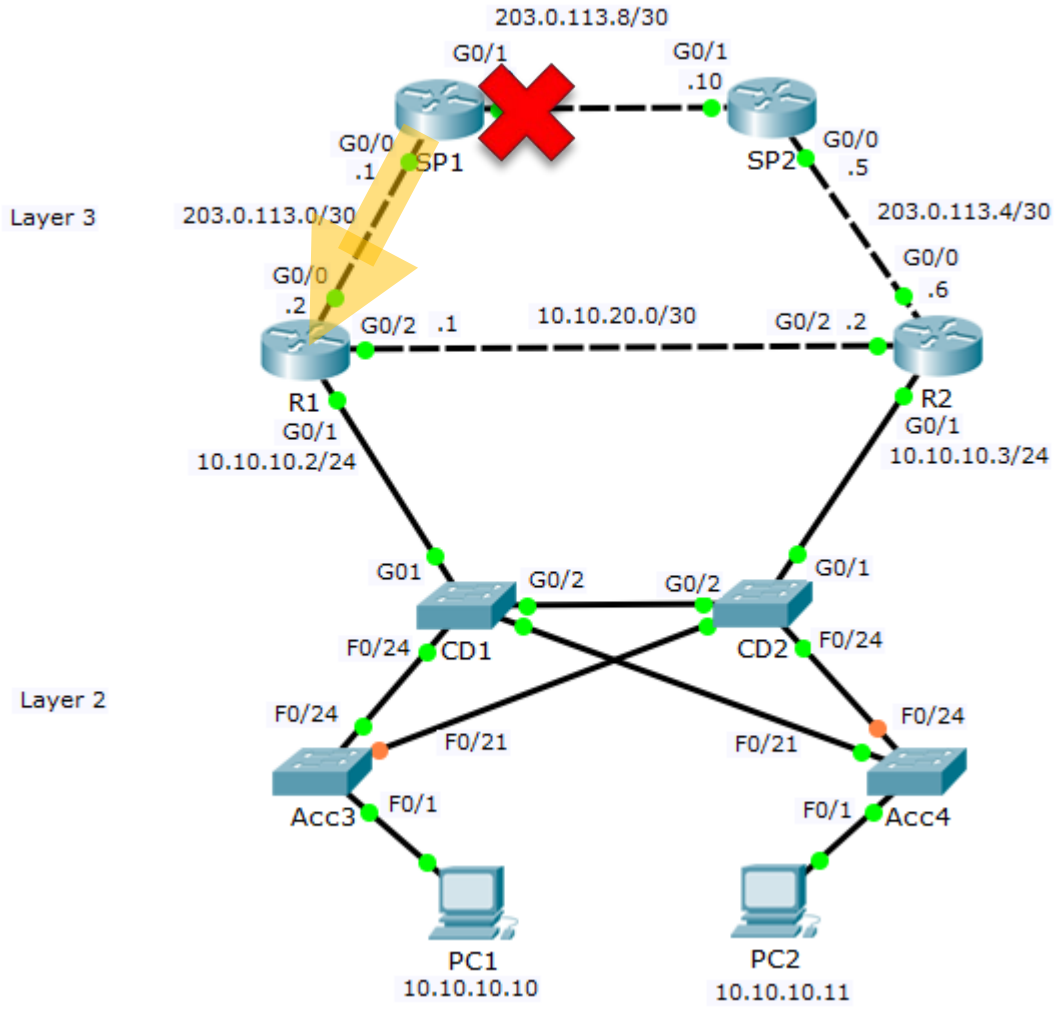

```
R1(config)#ip route 10.10.50.0
255.255.255.0 203.0.113.1
SP1(config)#ip route 10.10.50.0
255.255.255.0 203.0.113.10
SP2(config)#ip route 10.10.50.0
255.255.255.0 203.0.113.6
R1(config)#ip route 10.10.50.0
255.255.255.0 10.10.20.1
```

Routing Loop



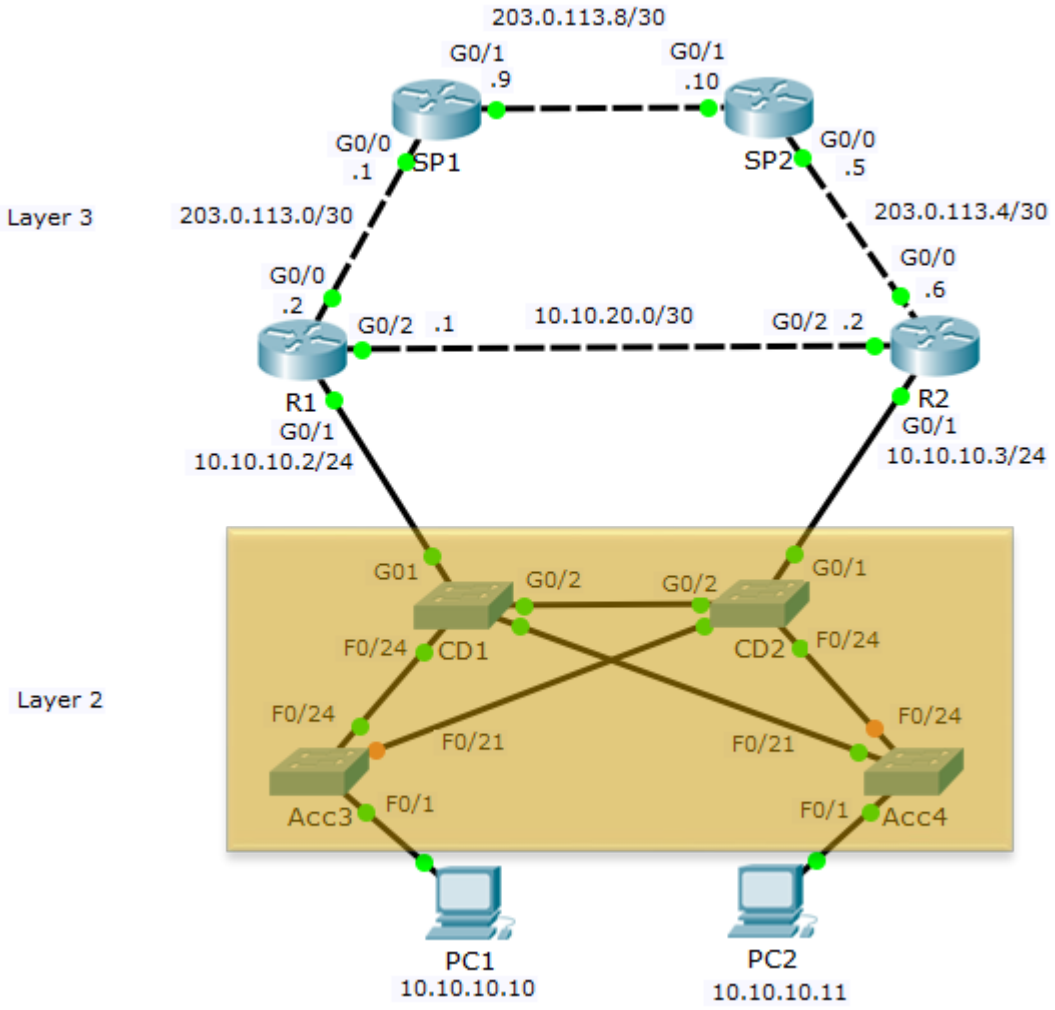

```
R1(config)#ip route 10.10.50.0
255.255.255.0 203.0.113.1
SP1(config)#ip route 10.10.50.0
255.255.255.0 203.0.113.10
SP2(config)#ip route 10.10.50.0
255.255.255.0 203.0.113.6
R1(config)#ip route 10.10.50.0
255.255.255.0 10.10.20.1
```

ICMP Time Exceeded




```
R1(config)#ip route 10.10.50.0
255.255.255.0 203.0.113.1
SP1(config)#ip route 10.10.50.0
255.255.255.0 203.0.113.10
SP2(config)#ip route 10.10.50.0
255.255.255.0 203.0.113.6
R1(config)#ip route 10.10.50.0
255.255.255.0 10.10.20.1
```

Network Redundancy – Layer 3 Configuration



- Layer 3 routing and HSRP will control the path selection and provide automatic failover for our Layer 3 connections
- Dynamic routing protocols have built-in loop prevention mechanisms and TTL acts as a final failsafe
- How will path selection, failover and loop prevention work for the Layer 2 only switches?