

Consider only routes with no AS loops and a valid (reachable) next hop.
Use Longest Prefix Match.

Where multiple routes are available to identical network and prefix:

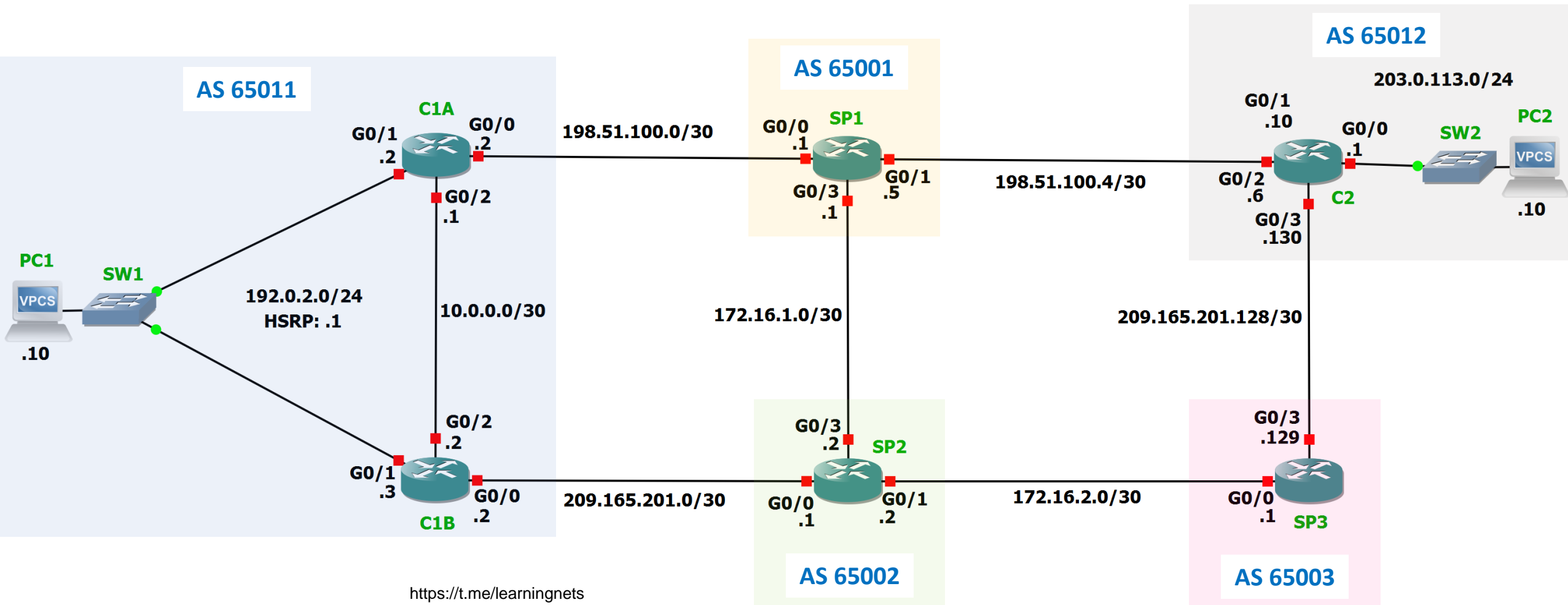
- Prefer highest weight (local to router).
- Prefer highest local preference (global within AS).
- Prefer route originated by the local router ('network' command or redistribution).
- Prefer shortest AS path.
- Prefer lowest origin code: IGP ('network') < EGP (legacy) < incomplete (redistributed).
- Prefer lowest MED (exchanged between autonomous systems).
- Prefer EBGP path over IBGP path.
- Prefer the path through the closest IGP neighbor.
- Prefer oldest route for EBGP paths.
- Prefer the path with the lowest neighbor BGP router ID.
- Prefer the path with the lowest neighbor IP address.

AS Path



- BGP is an AS-by-AS routing protocol, not a router-by-router routing protocol.
- When a route is originated in BGP, the destination AS is added to the 'AS Path' Path Attribute included in the BGP Update packet
- As the route is propagated through other Autonomous Systems, they prepend their AS number to the AS Path
- Shorter AS Paths are preferred

- C1B receives 2 paths to 203.0.113.0/24 via BGP:
- A preferred path from C1A with an AS path of 65001 65012
- From SP2 with an AS path of 65002 65003 65012



AS Path

- The AS Path for each route can be seen in the BGP table
- The last AS in the AS Path is the originating (destination) AS
- The first AS in the AS Path is the neighboring AS

```
C1B#show ip bgp
```

```
BGP table version is 11, local router ID is 192.168.0.2
```

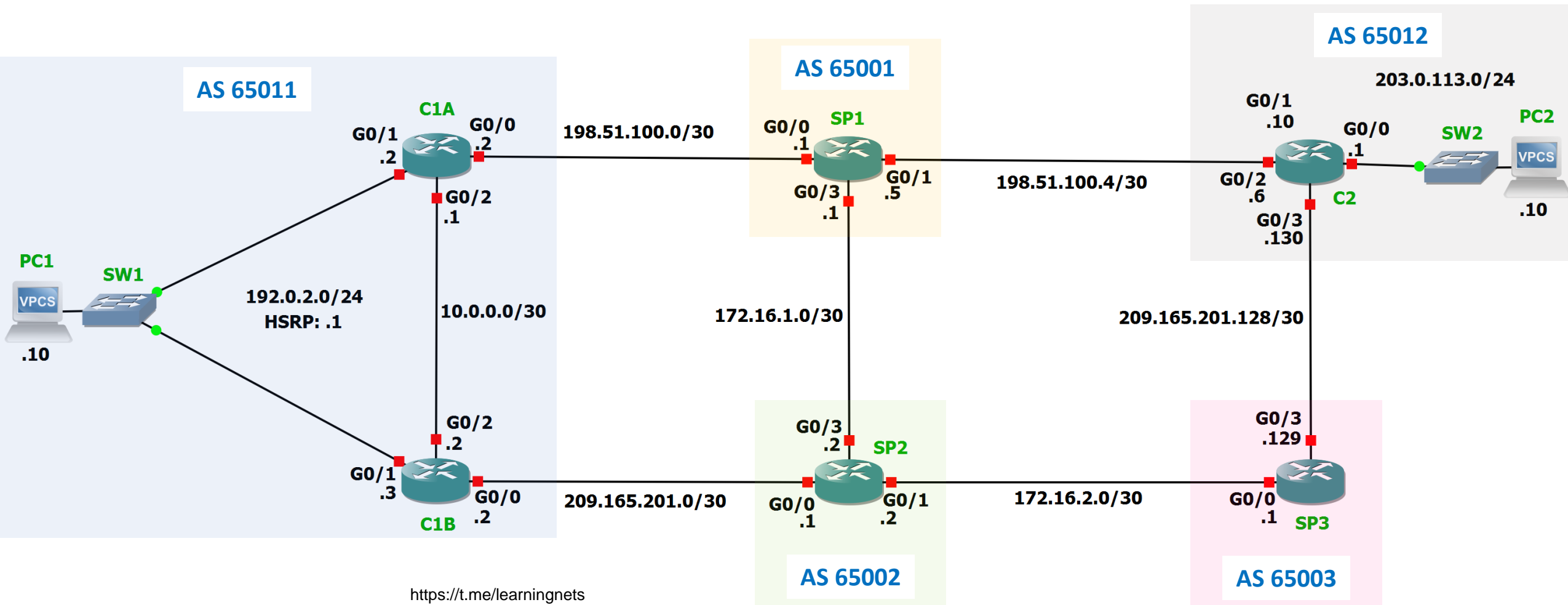
```
Status codes: s suppressed, d damped, h history, * valid, > best, i - internal,  
r RIB-failure, S Stale, m multipath, b backup-path, f RT-Filter,  
x best-external, a additional-path, c RIB-compressed,  
t secondary path,
```

```
Origin codes: i - IGP, e - EGP, ? - incomplete
```

```
RPKI validation codes: V valid, I invalid, N Not found
```

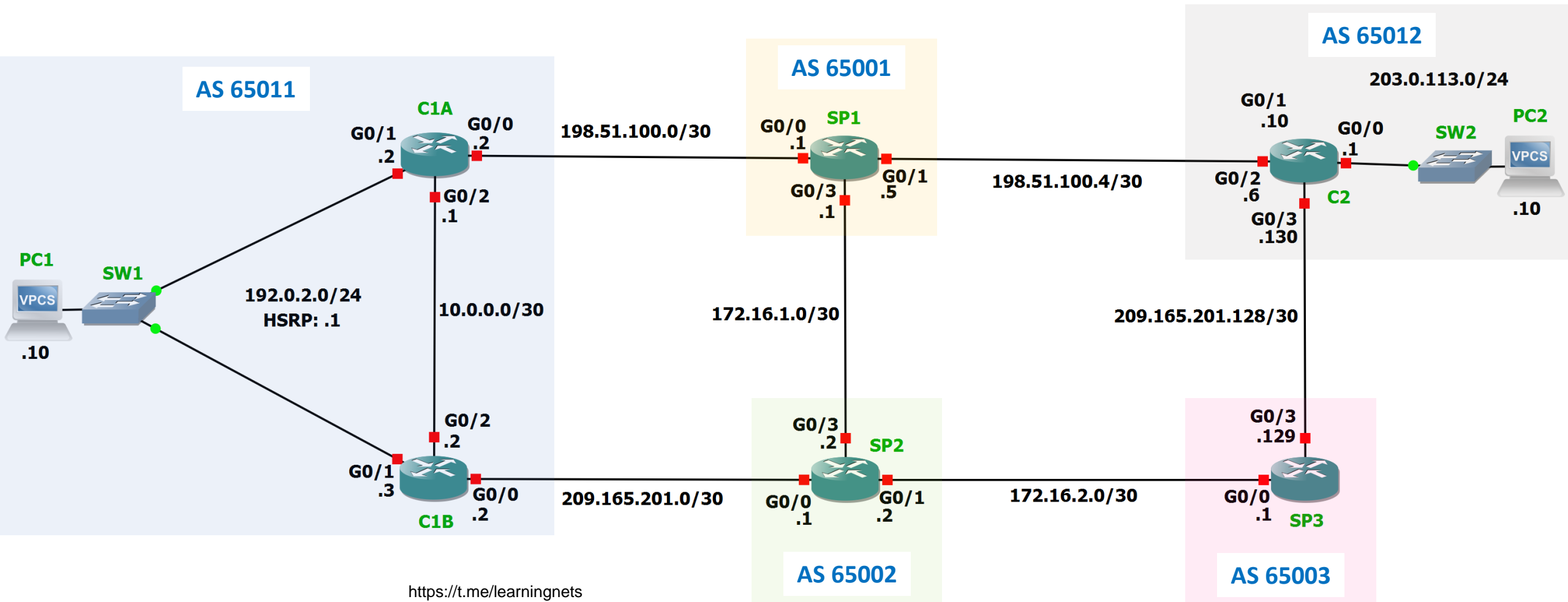
	Network	Next Hop	Metric	LocPrf	Weight	Path
*>i	203.0.113.0	192.168.0.1	0	100	0	65001 65012 i
*		209.165.201.1			0	65002 65003 65012 i
*>	192.0.2.0	0.0.0.0 (Itself)	0		32768	i

- C2 receives 2 paths to 192.0.2.0/24 via BGP:
- A preferred path from SP1 with an AS path of 65001 65011
- From SP3 with an AS path of 65003 65002 65011



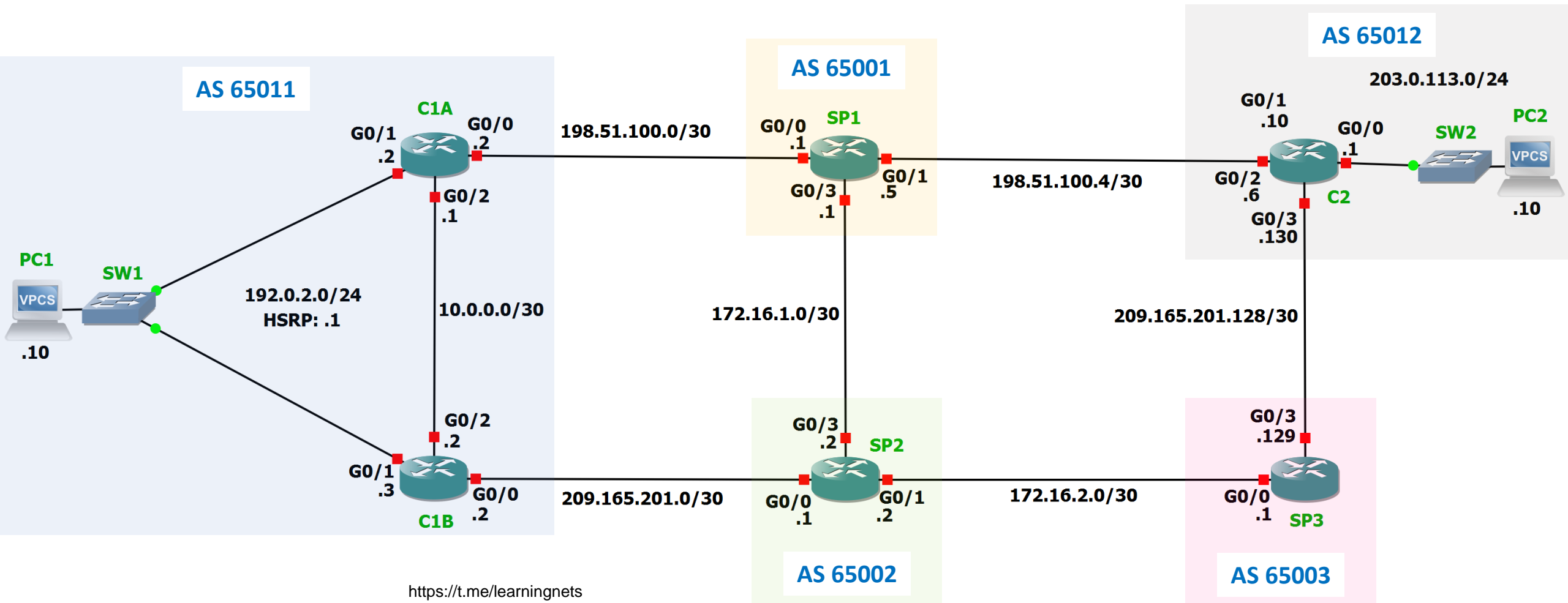
```
C1A#show ip bgp
! truncated
```

Network	Next Hop	Metric	LocPrf	Weight	Path
* i 192.0.2.0	192.168.0.2 (C1B)	0	100	0	i
*>	0.0.0.0 (Itself)	0		32768	i



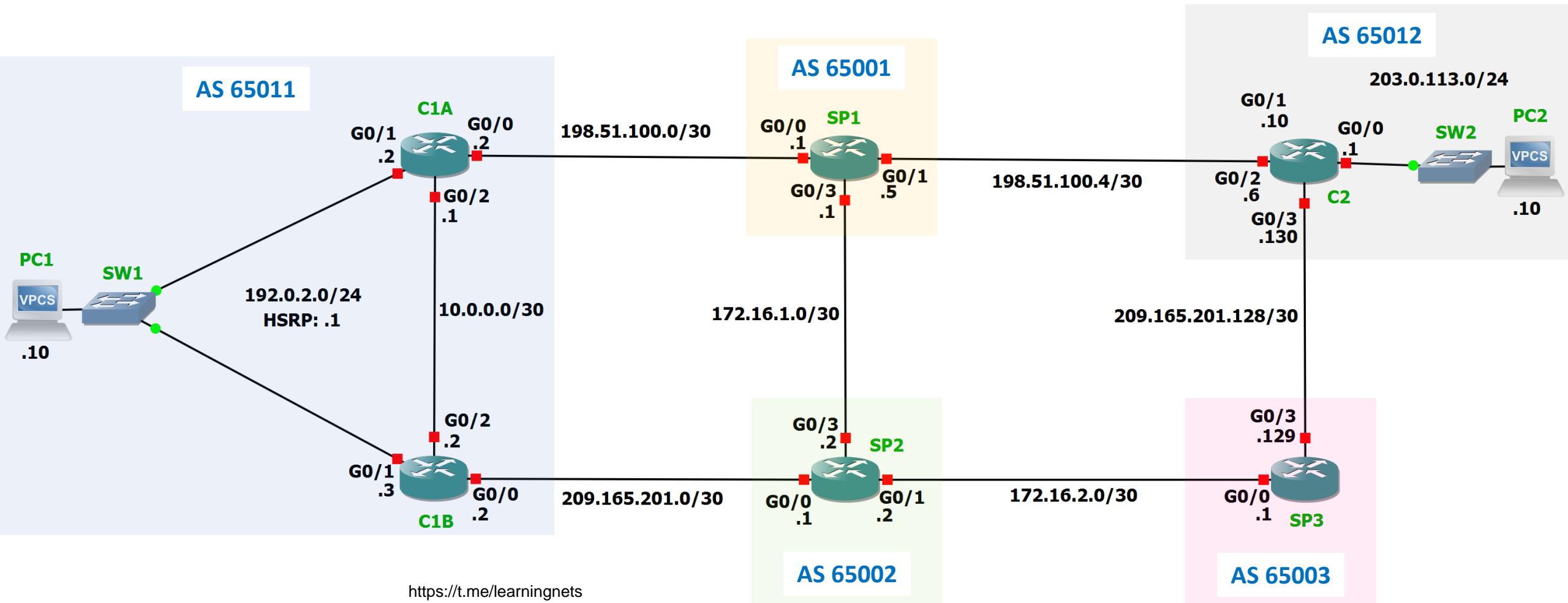
```
C1B#show ip bgp
! truncated
```

Network	Next Hop	Metric	LocPrf	Weight	Path
* i 192.0.2.0	192.168.0.1 (C1A)	0	100	0	i
*>	0.0.0.0 (Itself)	0		32768	i



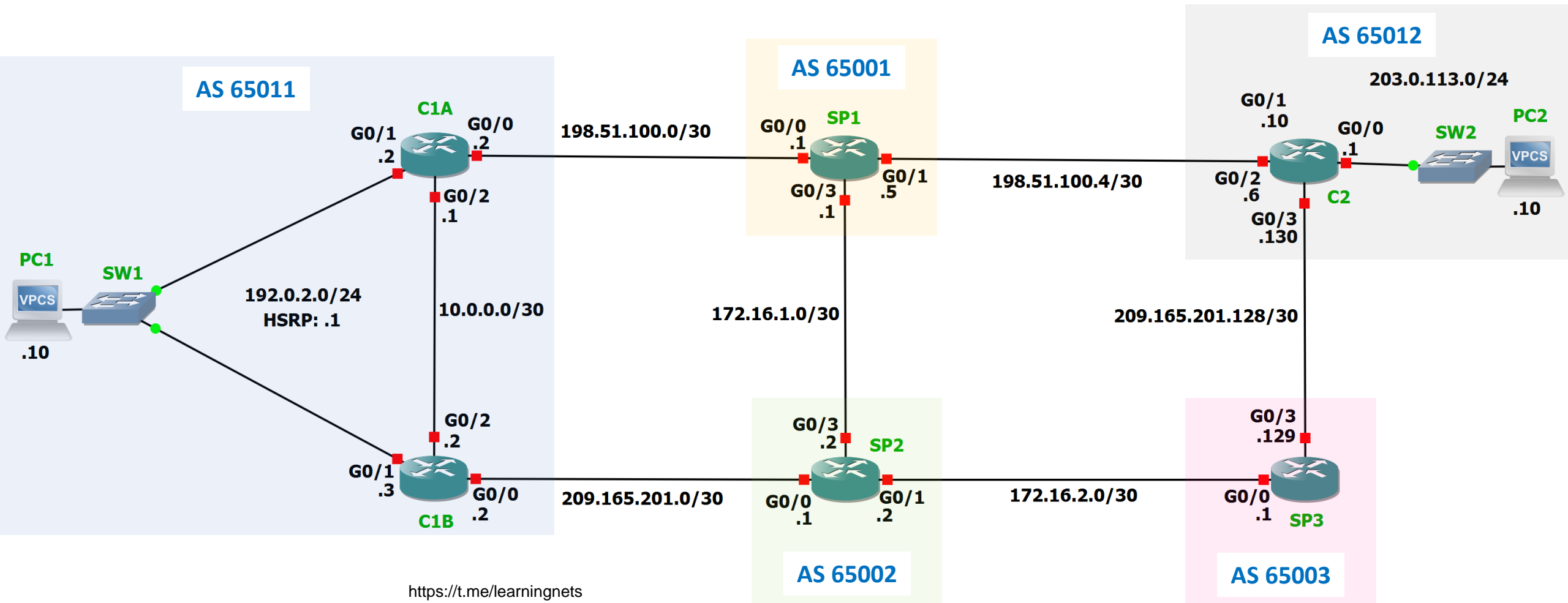
```
SP1#show ip bgp
! truncated
```

Network	Next Hop	Metric	LocPrf	Weight	Path
*> 192.0.2.0	198.51.100.2	0	0	65011	i
*	172.16.1.2			0	65002 65011 i



```
SP2#show ip bgp
! truncated
```

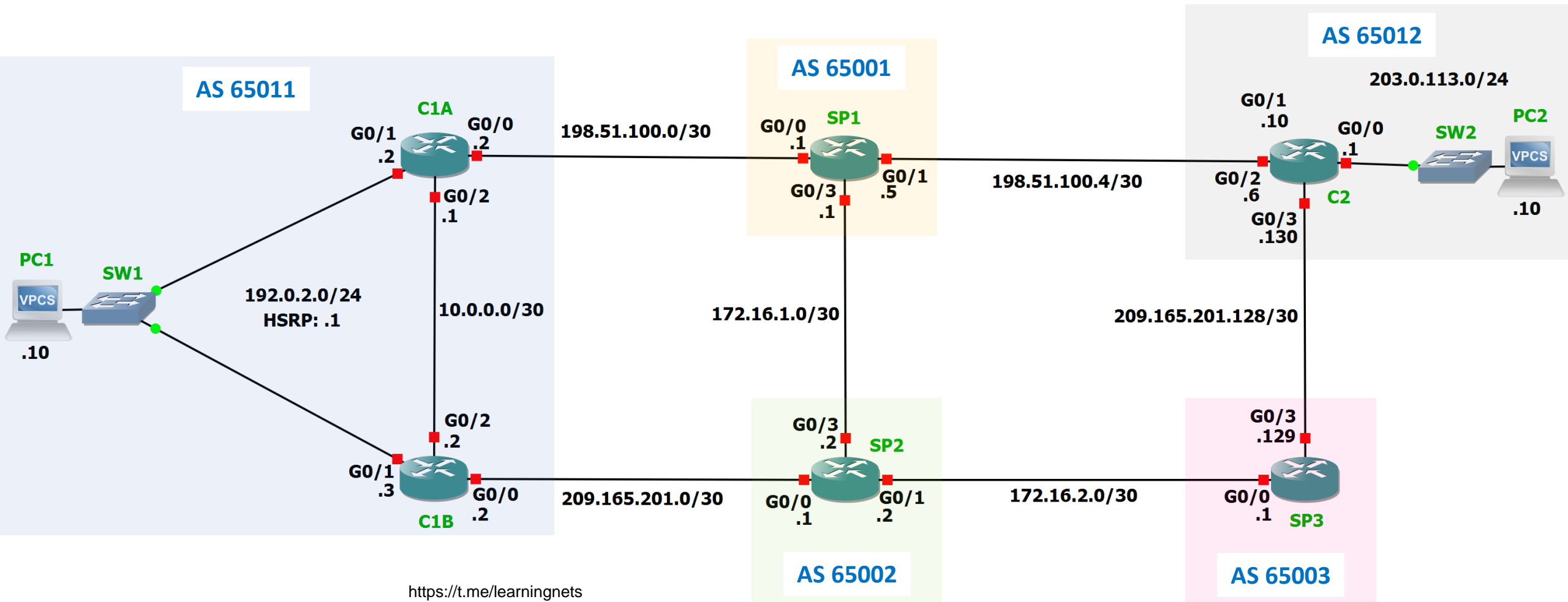
Network	Next Hop	Metric	LocPrf	Weight	Path
* 192.0.2.0	172.16.1.1			0	65001 65011 i
*>	209.165.201.2	0		0	65011 i



```
SP3#show ip bgp
```

```
! truncated
```

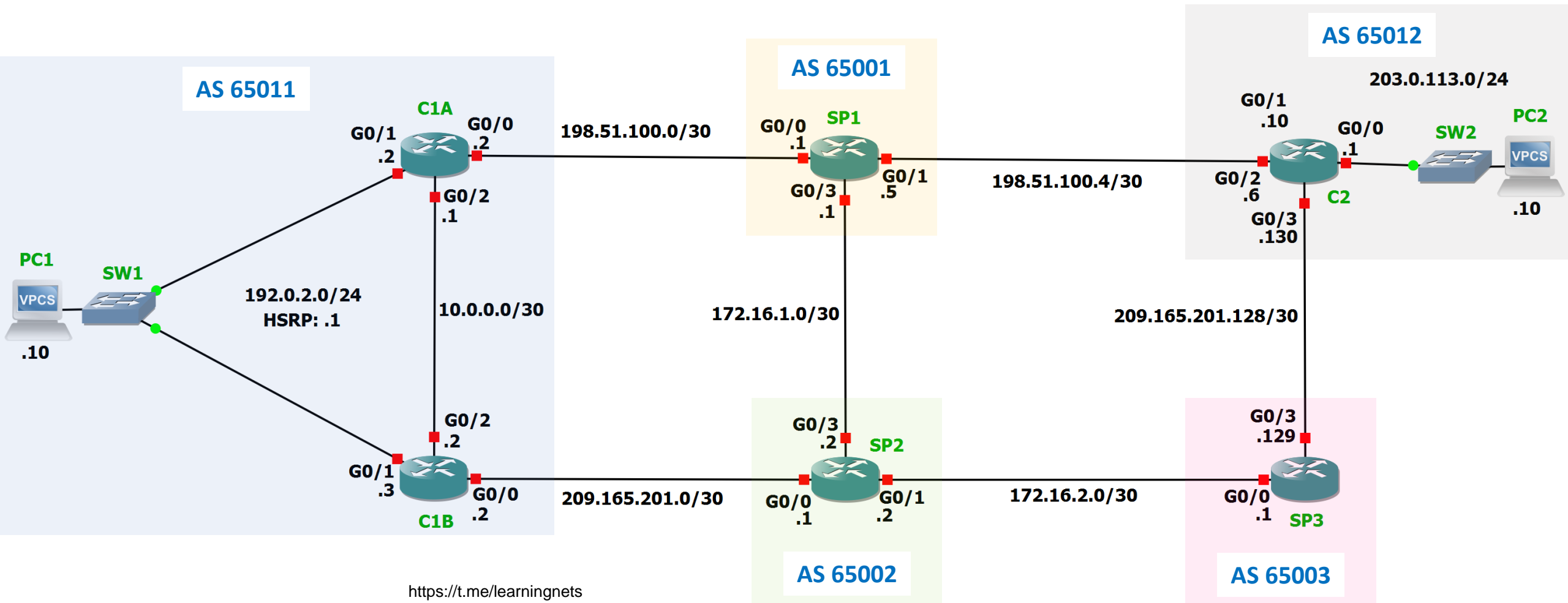
Network	Next Hop	Metric	LocPrf	Weight	Path
* 192.0.2.0	209.165.201.130	0	65012	65001	65011 i
*>	172.16.2.2	0	65002	65011	i



```
C2#show ip bgp
```

```
! truncated
```

Network	Next Hop	Metric	LocPrf	Weight	Path
* 192.0.2.0	209.165.201.129	0	65003	65002	65011 i
*>	198.51.100.5	0	65001	65011	i



eBGP Loop Prevention



- If a BGP router receives a route with its own AS in the AS Path, it will discard the route to prevent a routing loop
- SP1 learns the route to 192.0.2.0/24 from C1A with an AS Path of '65011'
- It advertises it to SP2 with an AS Path of '65001 65011'
- If SP2 advertised it to C1B with an AS Path of '65002 65001 65011', C1B would reject the route because it contains 65011 in the AS Path