BGP Communities

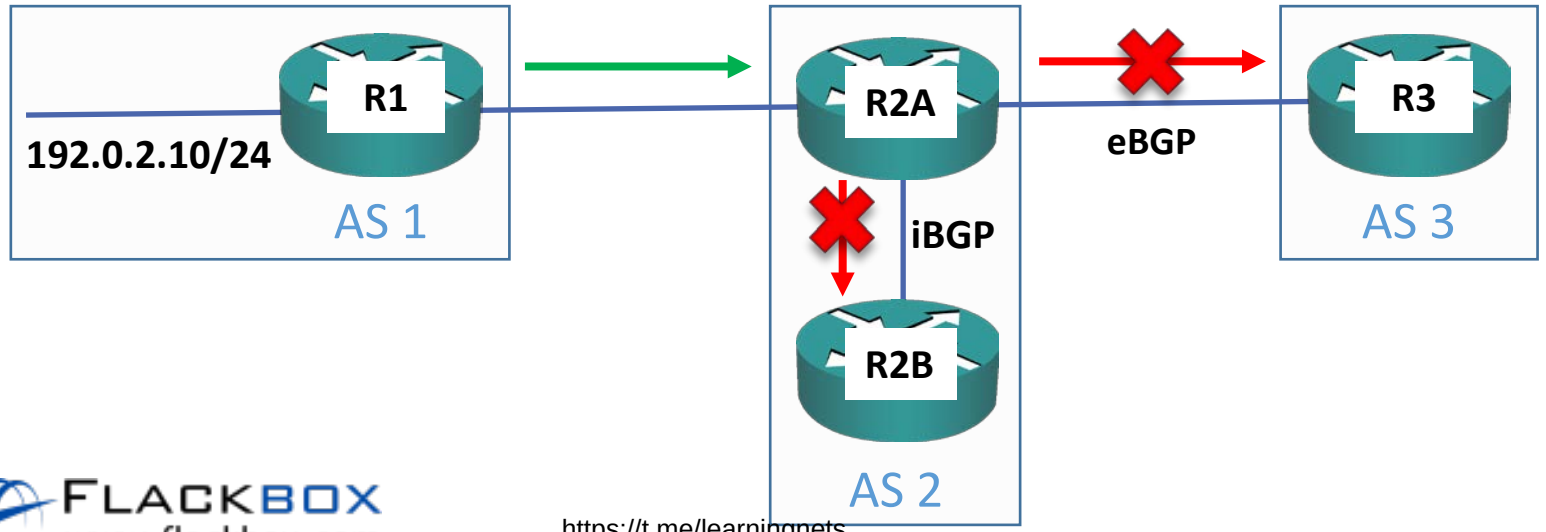
- BGP Communities are a means of tagging BGP routes to ensure consistent filtering or route selection policy
- A community attribute can be set on a group of network prefixes to indicate that they should be treated the same way
- A BGP router can add Communities to routes in incoming and outgoing Updates or when redistributing
- A BGP router can filter routes in incoming or outgoing updates or select preferred routes based on communities

BGP Well Known Communities

- There are four ‘Well Known’ communities in the BGP standard:
  - **Internet:** Advertise prefix to all BGP neighbors
  - **No-Advertise:** Don’t advertise prefix to any BGP neighbors
  - **No-Export:** Don’t advertise prefix to any eBGP neighbors
  - **Local-AS:** Don’t advertise prefix outside this Confederation Sub-AS

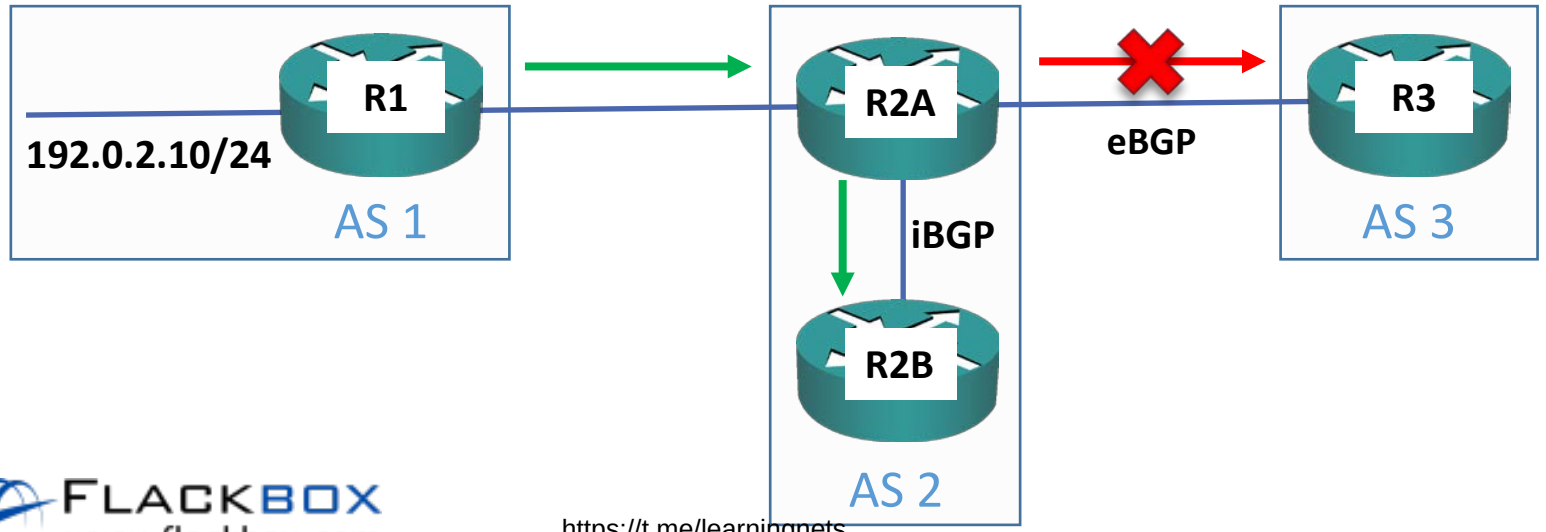
No-Advertise

- **No-Advertise:** Don't advertise prefix to any BGP neighbors
- 192.0.2.10/24 has No-Advertise community set outbound on R1 to R2A, or inbound on R2A from R1
- R2A receives the route
- It does not advertise it to any neighbors



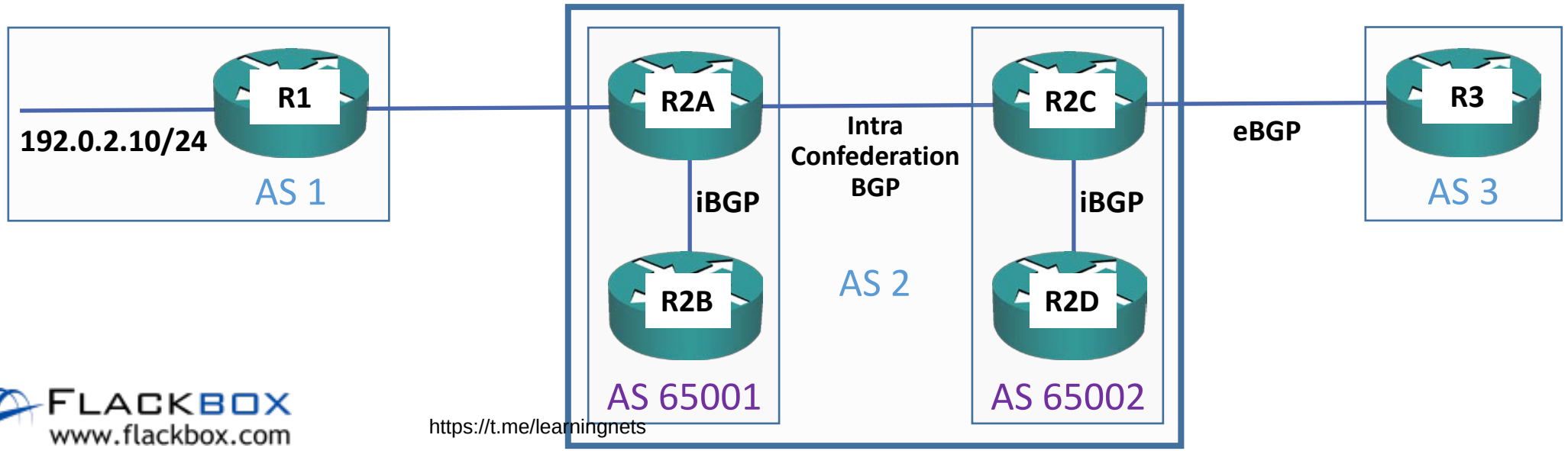
No-Export

- **No-Export:** Don't advertise prefix to any eBGP neighbors
- 192.0.2.10/24 has No-Export community set outbound on R1 to R2A, or inbound on R2A from R1
- R2A receives the route
- It advertises it to its iBGP neighbor R2B
- It does **NOT** advertise it to its eBGP neighbor R3



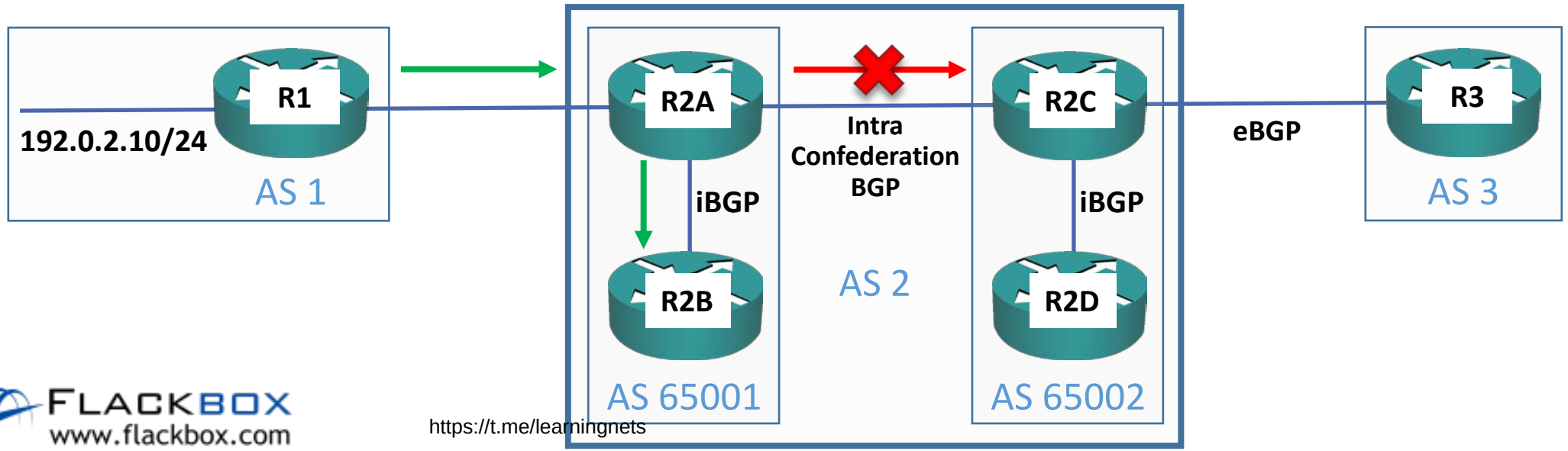
Confederations

- Confederations are used to provide scalability in large autonomous systems
- They split the AS into sub-autonomous systems
- Intraconfederation BGP sessions between sub-ASs are treated in the same way as eBGP
- This negates the need for a full mesh between all routers in the AS



Local-AS

- **Local-AS:** Don't advertise prefix outside this Confederation Sub-AS
- 192.0.2.10/24 has Local-AS community set outbound on R1 to R2A, or inbound on R2A from R1
- R2A receives the route
- It advertises it to its sub-AS neighbor R2B
- It does **NOT** advertise it to its intraconfederation BGP neighbor R2C



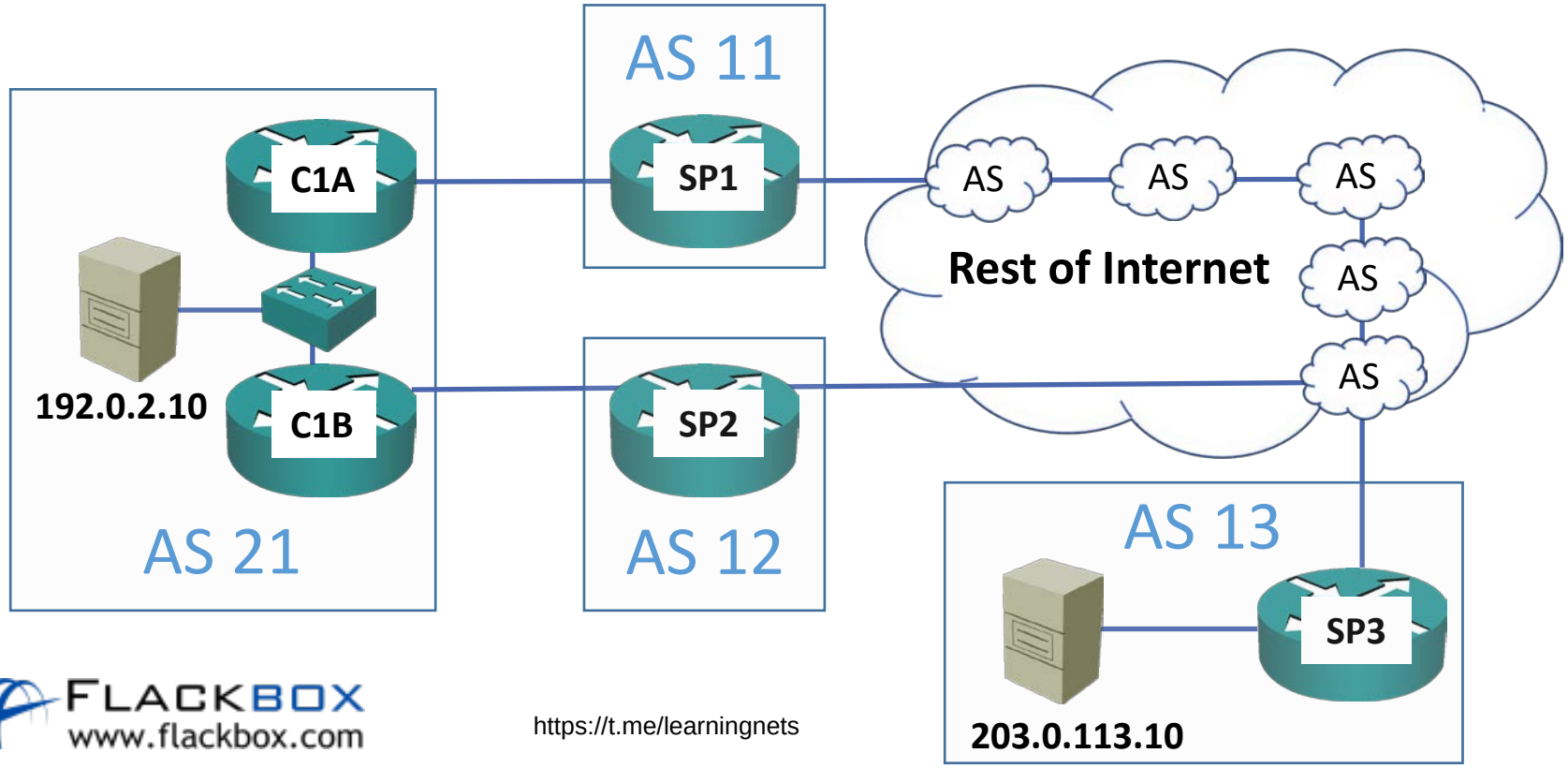
Community Propagation

- Communities are stripped in all outgoing updates by default
- To send communities:

```
R1(config)# router bgp 65001
R1(config)# neighbor 1.1.1.1 send-community
```

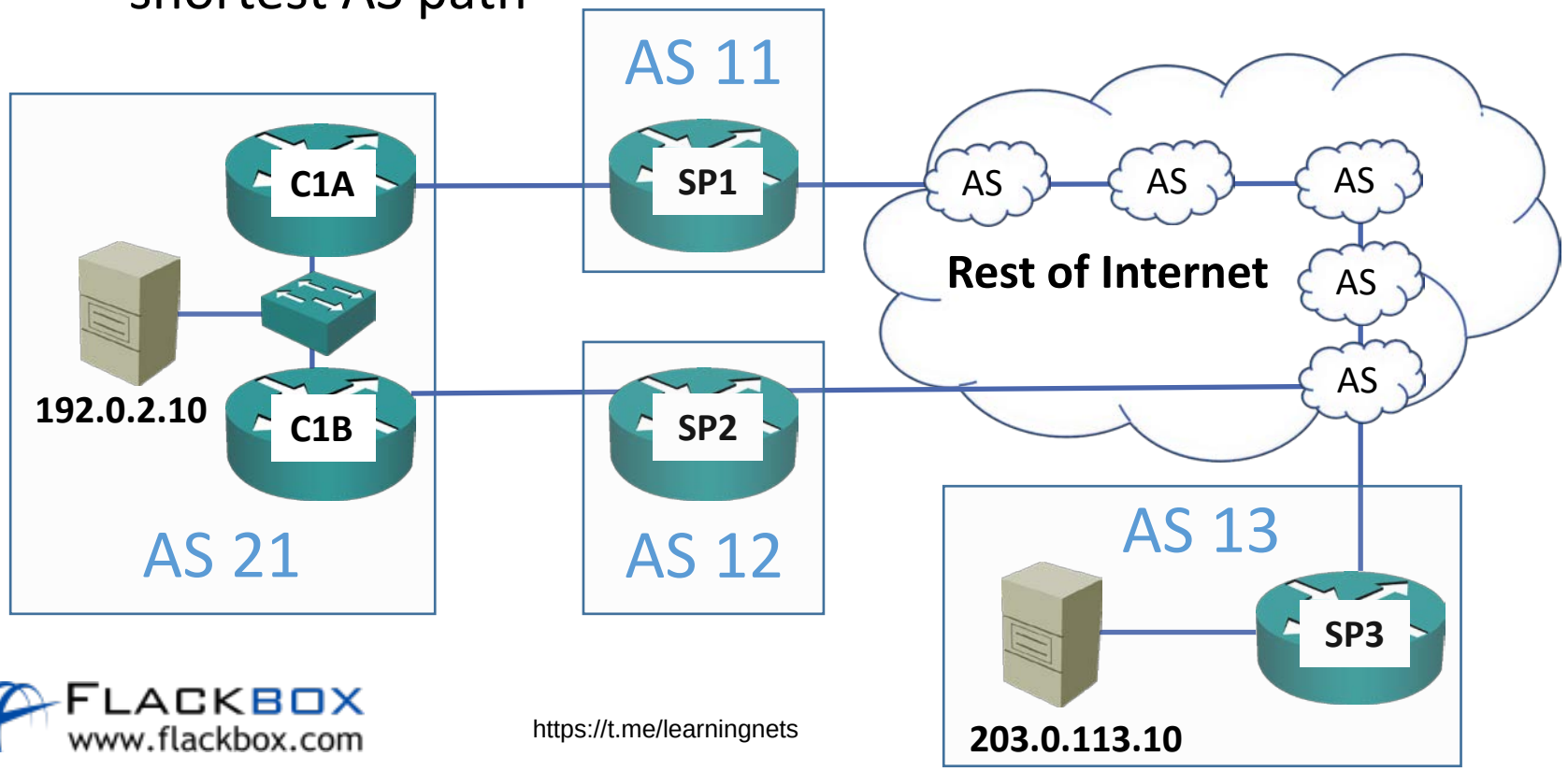
Communities Example – Preventing Transit

- Prevent an enterprise advertising external Internet routes as being available through themselves and becoming a transit network
- Use 'No-Export' community to stop Internet routes being advertised back out to eBGP neighbors



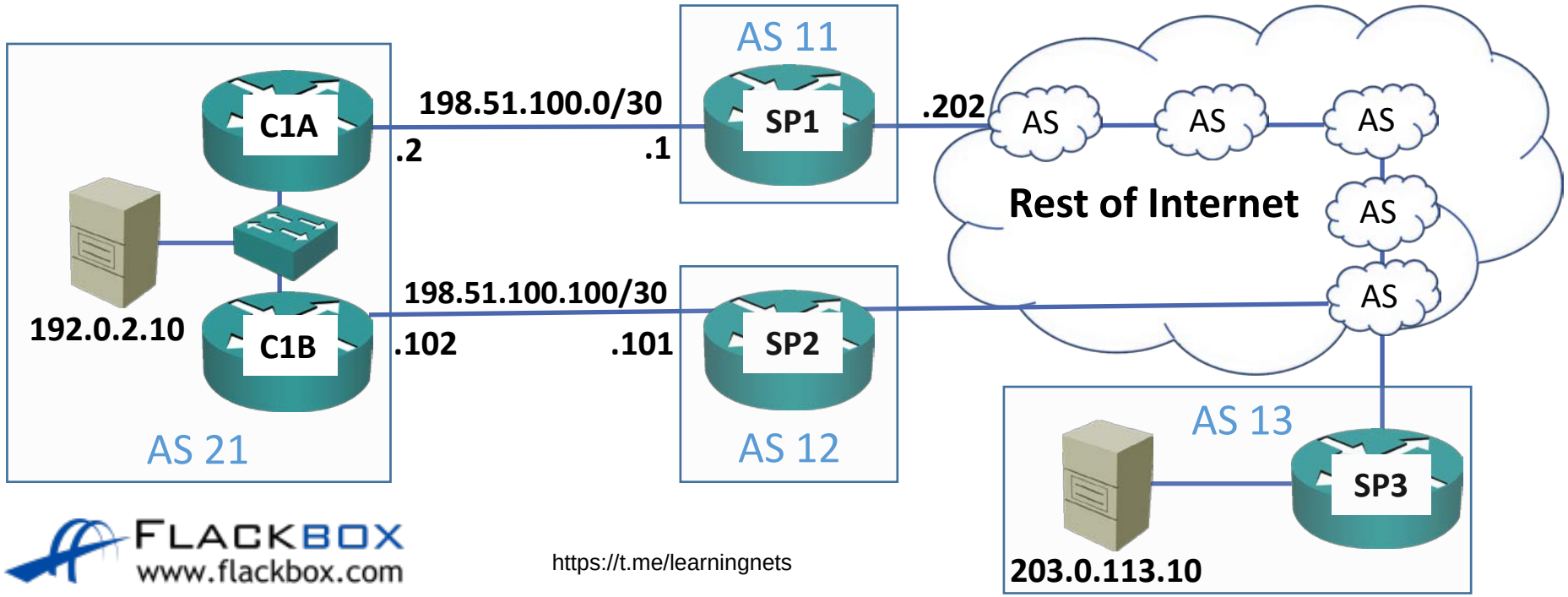
Multi-Homed Customer with BGP - Transit

- AS 21 should only advertise its own 192.0.2.0/24 network to its ISPs
- If AS 21 advertises Internet routes to its ISPs (the default), it could become a transit AS
- AS 11 will send traffic to 203.0.113.10 via 'C1A > C1B > SP2 > Internet' as that is the shortest AS path



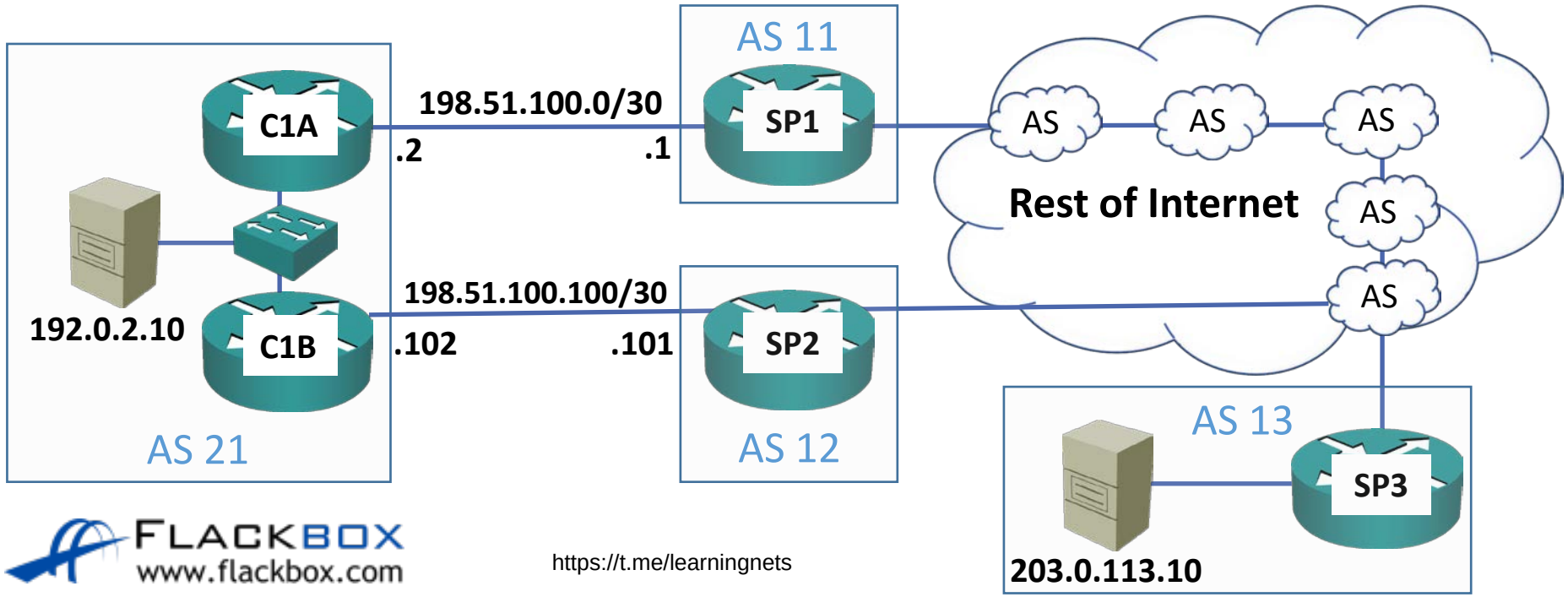
Verification – show ip bgp (Before Policy)

```
SP1#show ip bgp
 Network          Next Hop            Metric LocPrf Weight Path
*> 192.0.2.0       198.51.100.2             0             0 21 i
*>                 198.51.100.202                         0 18 17 16 15 14 12 21 i
*> 203.0.113.0     198.51.100.2                           0 21 12 14 13 i
*                  198.51.100.202                         0 18 17 16 15 14 13 i
! truncated
```



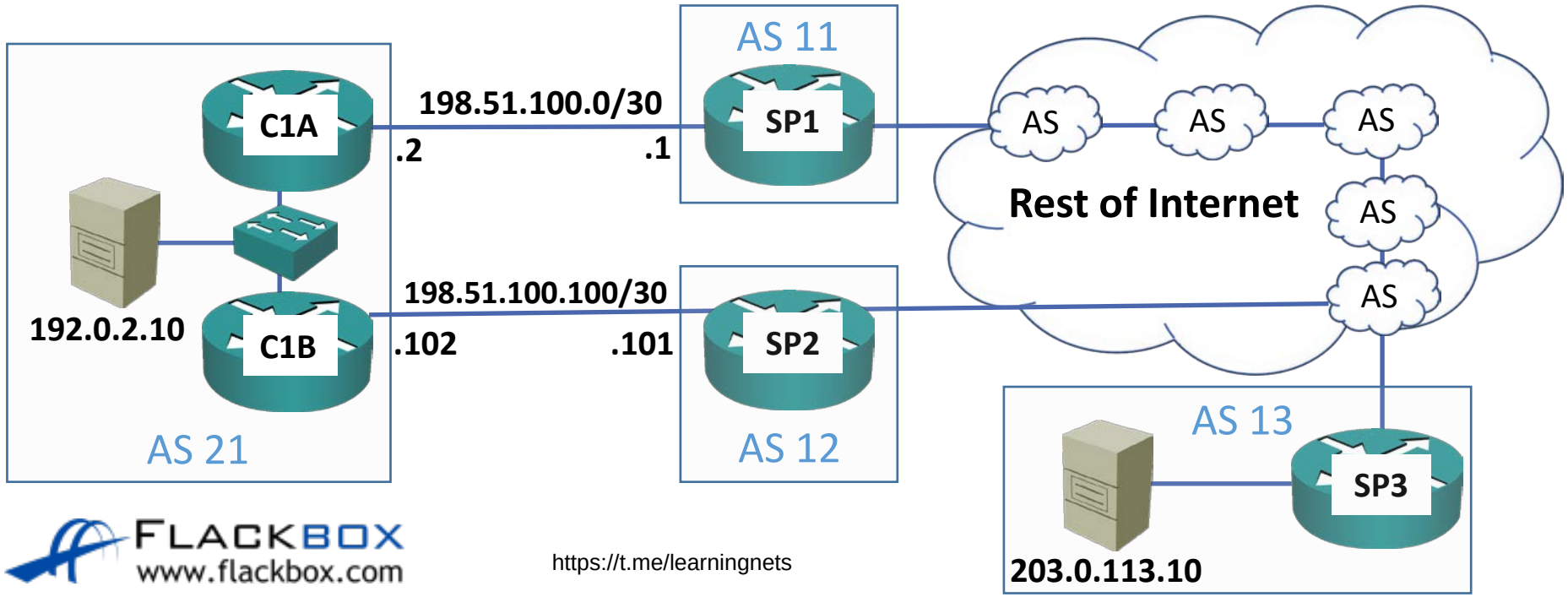
Enterprise Preventing Transit - C1B

```
C1B(config)# route-map NO_TRANSIT permit 10
C1B(config-route-map)# set community no-export
C1B(config)# router bgp 21
C1B(config-router)# neighbor 198.51.100.101 route-map NO_TRANSIT in
C1B(config-router)# neighbor 192.168.0.1 send-community (C1A)
```



Enterprise Preventing Transit - C1A

```
C1A(config)# route-map NO_TRANSIT permit 10
C1A(config-route-map)# set community no-export
C1A(config)# router bgp 21
C1A(config-router)# neighbor 198.51.100.1 route-map NO_TRANSIT in
C1A(config-router)# neighbor 192.168.0.2 send-community (C1B)
```



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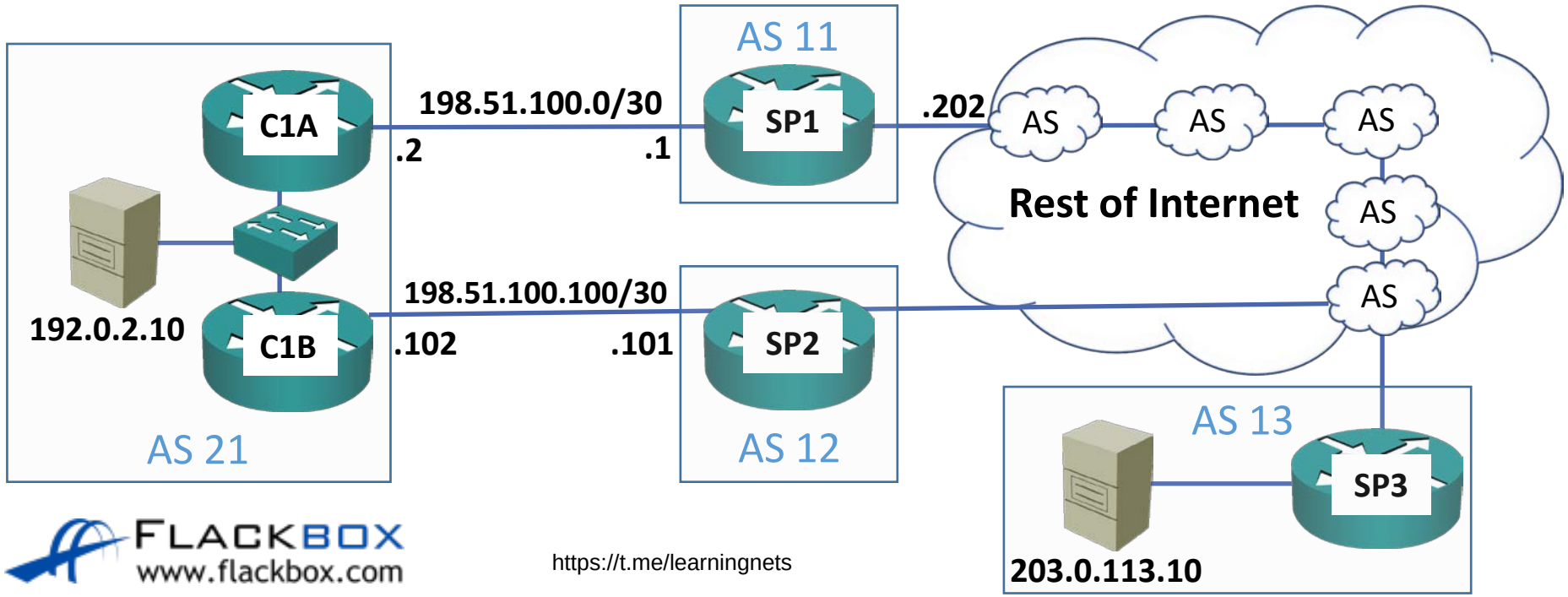
*> 203.0.113.0     198.51.100.2                           0 21 12 14 13 i
*                  198.51.100.202                         0 18 17 16 15 14 13 i
! truncated
```



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*> 192.0.2.0       198.51.100.2             0             0 21 i
*>                 198.51.100.202                         0 18 17 16 15 14 12 21 i
*  203.0.113.0     198.51.100.202                         0 18 17 16 15 14 13 i
! truncated
```