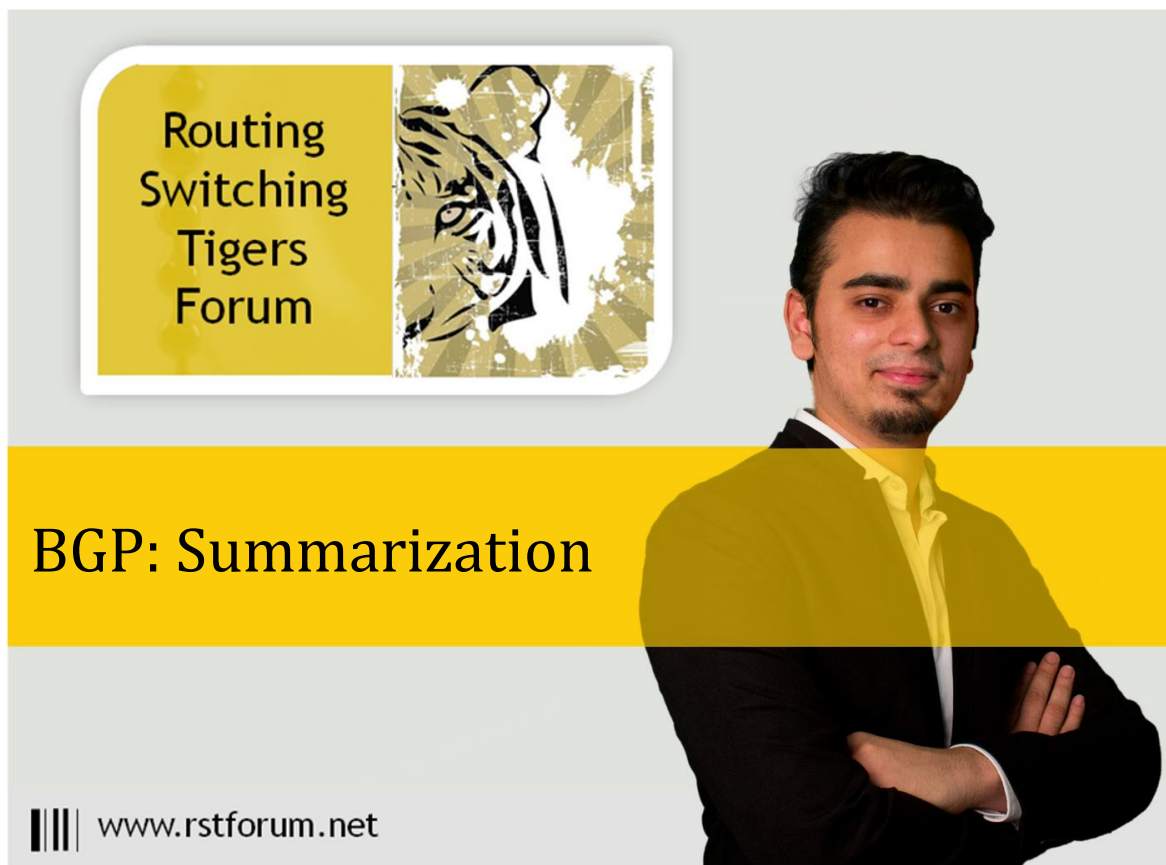


# LAB13: BGP – IPv6

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## *Disclaimer*

This Configuration Guide is designed to assist members to enhance their skills in respective technology area. While every effort has been made to ensure that all material is as complete and accurate as possible, the enclosed material is presented on an “as is” basis. Neither the authors nor Forum assume any liability or responsibility to any person or entity with respect to loss or damages incurred from the information contained in this guide. This Lab Guide was developed by RSTForum. Any similarities between material presented in this configuration guide and any other material is completely coincidental.



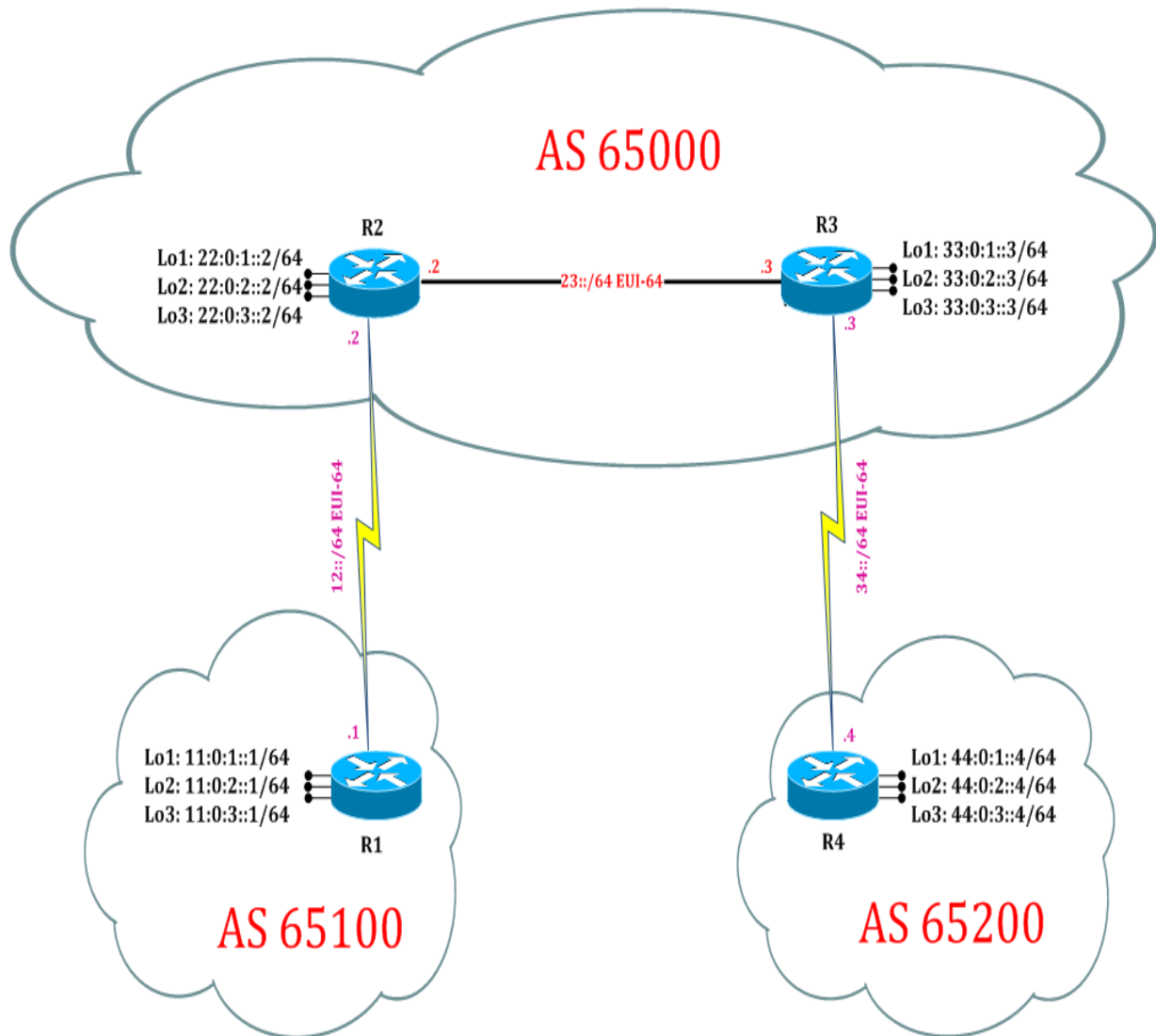
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**BGP: Summarization**

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# LAB 13: Diagram

Note: This Lab was developed on Cisco IOS Version 15.2(4) M1 ADVENTERPRISEK9-M.



# LAB 13: BGP IPv6 Summarization:

## Task 1: Configure IPv6 BGP Summarization

Step 1 In the configuration mode of router configure loopbacks with network address in sequence

```
R1:
interface loopback 1
ipv6 address 11:0:1::2/64
interface loopback 2
ipv6 address 11:0:2::2/64
interface loopback 3
ipv6 address 11:0:3::2/64
exit
```

Step 2 Summarize BGP routes in router mode

```
R1:
router bgp 65100
address-family ipv6
aggregate-address 11::/16
exit
```

Step 3 Verify receipt of summary route in other router's BGP table by following command:

```
R2# clear bgp ipv6 * soft
! (It will flush the bgp table and will learn fresh route.)
```

```
R2#show bgp ipv6 unicast
BGP table version is 14, local router ID is 22.0.3.2
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
Origin codes: i - IGP, e - EGP, ? - incomplete
```

Network	Next Hop	Metric	LocPrf	Weight	Path
*> 11::/16	11:0:1::1	0		0	65100 i
*> 11:0:1::/64	11:0:1::1	0		0	65100 i
*> 11:0:2::/64	11:0:1::1	0		0	65100 i
*> 11:0:3::/64	11:0:1::1	0		0	65100 i
*> 22:0:1::/64	::	0		32768	i
*> 22:0:2::/64	::	0		32768	i
*> 22:0:3::/64	::	0		32768	i
*>i 33:0:1::/64	33:0:1::3	0	100	0	i
*>i 33:0:2::/64	33:0:1::3	0	100	0	i
*>i 33:0:3::/64	33:0:1::3	0	100	0	i
*>i 44:0:1::/64	44:0:1::4	0	100	0	65200 i
*>i 44:0:2::/64	44:0:1::4	0	100	0	65200 i
*>i 44:0:3::/64	44:0:1::4	0	100	0	65200 i

```
R4# clear bgp ipv6 * soft
R4#show bgp ipv6 unicast
```

BGP table version is 14, local router ID is 44.0.3.4  
Status codes: s suppressed, d damped, h history, \* valid, > best, i - internal,  
r RIB-failure, S Stale  
Origin codes: i - IGP, e - EGP, ? - incomplete

Network	Next Hop	Metric	LocPrf	Weight	Path
*> 11::/16	33:0:1::3			0	65000 65100 i
*> 11:0:1::/64	33:0:1::3			0	65000 65100 i
*> 11:0:2::/64	33:0:1::3			0	65000 65100 i
*> 11:0:3::/64	33:0:1::3			0	65000 65100 i
*> 22:0:1::/64	33:0:1::3			0	65000 i
*> 22:0:2::/64	33:0:1::3			0	65000 i
*> 22:0:3::/64	33:0:1::3			0	65000 i
*> 33:0:1::/64	33:0:1::3	0		0	65000 i
*> 33:0:2::/64	33:0:1::3	0		0	65000 i
*> 33:0:3::/64	33:0:1::3	0		0	65000 i
*> 44:0:1::/64	0.0.0.0	0		32768	i
*> 44:0:2::/64	0.0.0.0	0		32768	i
*> 44:0:3::/64	0.0.0.0	0		32768	i

(If BGP will send only summary route of an network then the router which is sending summary route will stripped off all previous AS-tag and will send summarized route with fresh originating router, this will lead to Loops in BGP.To avoid loops, BGP send summarized as well as Individual routes to other routers.)

Step 4 Configure Summarize only BGP routes in router mode

```
R3:
router bgp 65000
address-family ipv6
aggregate-address 11::/16 summary-only
exit
```

Step 5 Verify receipt of summary route in other router's BGP table by following command

```
R4# clear bgp ipv6 * soft
R4#show bgp ipv6 unicast
```

BGP table version is 19, local router ID is 44.0.3.4  
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,  
Origin codes: i - IGP, e - EGP, ? - incomplete  
RPKI validation codes: V valid, I invalid, N Not found

Network	Next Hop	Metric	LocPrf	Weight	Path
*> 11::/16	33:0:1::3	0		0	65000 i
*> 22:0:1::/64	33:0:1::3			0	65000 i
*> 22:0:2::/64	33:0:1::3			0	65000 i
*> 22:0:3::/64	33:0:1::3			0	65000 i
*> 33:0:1::/64	33:0:1::3	0		0	65000 i
*> 33:0:2::/64	33:0:1::3	0		0	65000 i
*> 33:0:3::/64	33:0:1::3	0		0	65000 i
*> 44:0:1::/64	::	0		32768	i
*> 44:0:2::/64	::	0		32768	i
*> 44:0:3::/64	::	0		32768	i

(By summary-only command, BGP will send only summary route of network then the router which is sending summary route will stripped off all previous AS-tag and will send summarized route with fresh originating router.)

Step 6 Configure Summarize only as-set BGP routes in router mode

```
R3:
router bgp 65000
address-family ipv6
aggregate-address 11::/16 summary-only as-set
exit
```

Step 7 Verify receipt of summary route in other router's BGP table by following command

```
R4#show bgp ipv6 unicast
BGP table version is 19, local router ID is 44.0.3.4
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,
Origin codes: i - IGP, e - EGP, ? - incomplete
RPKI validation codes: V valid, I invalid, N Not found
```

Network	Next Hop	Metric	LocPrf	Weight	Path
*> 11::/16	33:0:1::3	0		0	65000 65100 i
*> 22:0:1::/64	33:0:1::3			0	65000 i
*> 22:0:2::/64	33:0:1::3			0	65000 i
*> 22:0:3::/64	33:0:1::3			0	65000 i
*> 33:0:1::/64	33:0:1::3	0		0	65000 i
*> 33:0:2::/64	33:0:1::3	0		0	65000 i
*> 33:0:3::/64	33:0:1::3	0		0	65000 i
*> 44:0:1::/64	::	0		32768	i
*> 44:0:2::/64	::	0		32768	i
*> 44:0:3::/64	::	0		32768	i

(By as-set command, only summary route as well as retaining all previous AS-tag is achieved.)