

LAB5: BGP – IPv4

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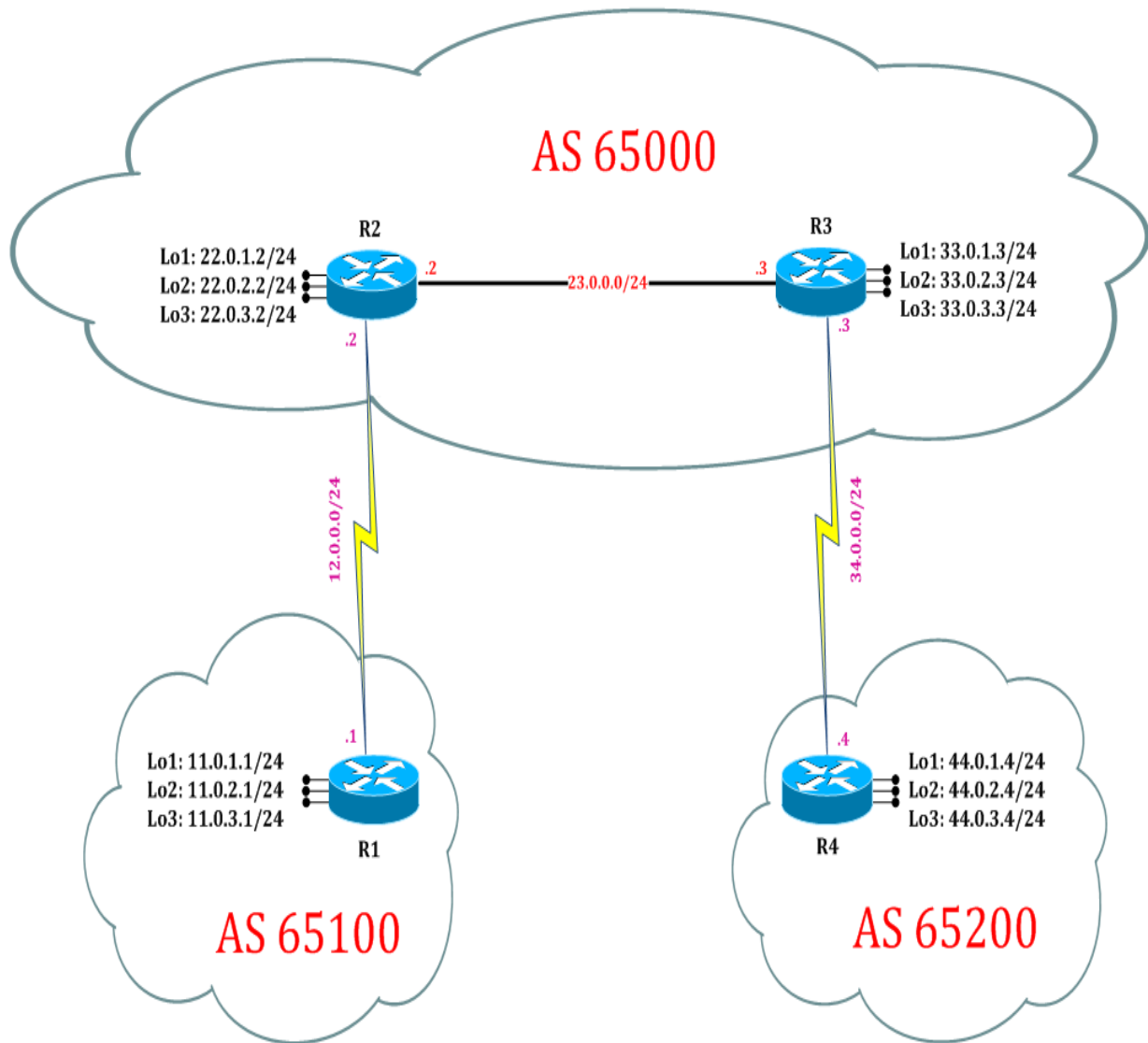
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BGP: Summarization

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LAB 5: Diagram

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



LAB 5: BGP Summarization

Task 1: Configure IPv4 BGP Summarization

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

```
R1:
interface loopback 1
ip address 11.0.1.1 255.255.255.0
interface loopback 2
ip address 11.0.2.1 255.255.255.0
interface loopback 3
ip address 11.0.3.1 255.255.255.0
exit
```

Step 2 Summarize BGP routes in router mode

```
R1:
router bgp 65100
address-family ipv4
aggregate-address 11.0.0.0 255.255.252.0
exit
```

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

```
R2# clear ip bgp * soft
! (It will learn fresh route without making TCP link down.)
```

```
R2#show ip bgp
```

```
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, 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
*> 11.0.0.0/22	11.0.1.1	0		0	65100 i
*> 11.0.1.0/24	11.0.1.1	0		0	65100 i
*> 11.0.2.0/24	11.0.1.1	0		0	65100 i
*> 11.0.3.0/24	11.0.1.1	0		0	65100 i
*> 22.0.1.0/24	0.0.0.0	0		32768	i
*> 22.0.2.0/24	0.0.0.0	0		32768	i
*> 22.0.3.0/24	0.0.0.0	0		32768	i
*>i 33.0.1.0/24	33.0.1.3	0	100	0	i
*>i 33.0.2.0/24	33.0.1.3	0	100	0	i

```
*>i 33.0.3.0/24 33.0.1.3 0 100 0 i
*>i 44.0.1.0/24 44.0.1.4 0 100 0 65200 i
*>i 44.0.2.0/24 44.0.1.4 0 100 0 65200 i
*>i 44.0.3.0/24 44.0.1.4 0 100 0 65200 i
*>i44.0.3.0/24 44.0.1.4 0 100 0 65200 i
```

```
R4# clear ip bgp * soft
R4#show ip bgp
```

BGP table version is 62, 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
*> 11.0.0.0/22	33.0.1.3			0	65000 65100 i
*> 11.0.1.0/24	33.0.1.3			0	65000 65100 i
*> 11.0.2.0/24	33.0.1.3			0	65000 65100 i
*> 11.0.3.0/24	33.0.1.3			0	65000 65100 i
*> 22.0.1.0/24	33.0.1.3			0	65000 i
*> 22.0.2.0/24	33.0.1.3			0	65000 i
*> 22.0.3.0/24	33.0.1.3			0	65000 i
*> 33.0.1.0/24	33.0.1.3	0		0	65000 i
*> 33.0.2.0/24	33.0.1.3	0		0	65000 i
*> 33.0.3.0/24	33.0.1.3	0		0	65000 i
*> 44.0.1.0/24	0.0.0.0	0		32768	i
*> 44.0.2.0/24	0.0.0.0	0		32768	i
*> 44.0.3.0/24	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 ipv4
aggregate-address 11.0.0.0 255.255.252.0 summary-only
exit
```

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

```
R4# clear ip bgp * soft
```

```
R4#show ip bgp
```

BGP table version is 18, 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
*> 11.0.0.0/22	33.0.1.3	0		0	65000 i
*> 22.0.1.0/24	33.0.1.3			0	65000 i
*> 22.0.2.0/24	33.0.1.3			0	65000 i
*> 22.0.3.0/24	33.0.1.3			0	65000 i
*> 33.0.1.0/24	33.0.1.3	0		0	65000 i
*> 33.0.2.0/24	33.0.1.3	0		0	65000 i
*> 33.0.3.0/24	33.0.1.3	0		0	65000 i
*> 44.0.1.0/24	0.0.0.0	0		32768	i
*> 44.0.2.0/24	0.0.0.0	0		32768	i
*> 44.0.3.0/24	0.0.0.0	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 ipv4  
aggregate-address 11.0.0.0 255.255.252.0 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
*> 11.0.0.0/22	33.0.1.3	0		0	65000 65100 i
*> 22.0.1.0/24	33.0.1.3			0	65000 i
*> 22.0.2.0/24	33.0.1.3			0	65000 i
*> 22.0.3.0/24	33.0.1.3			0	65000 i
*> 33.0.1.0/24	33.0.1.3	0		0	65000 i
*> 33.0.2.0/24	33.0.1.3	0		0	65000 i
*> 33.0.3.0/24	33.0.1.3	0		0	65000 i
*> 44.0.1.0/24	0.0.0.0	0		32768	i
*> 44.0.2.0/24	0.0.0.0	0		32768	i
*> 44.0.3.0/24	0.0.0.0	0		32768	i

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