



CCIE Professional Development

Routing TCP/IP

Volume II

Second Edition

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```

route-map SET_MED_UPSTREAM, permit, sequence 10
  Match clauses:
  Set clauses:
    metric 100
  Policy routing matches: 0 packets, 0 bytes
R2#

```

```

R3#sh run | sec bgp
router bgp 30
  bgp log-neighbor-changes
  neighbor 10.0.0.5 remote-as 10
  neighbor 10.0.0.5 route-map SET_MED_UPSTREAM out
  neighbor 10.0.0.14 remote-as 40
R3#
R3#sh route-map SET_MED_UPSTREAM
route-map SET_MED_UPSTREAM, permit, sequence 10
  Match clauses:
  Set clauses:
    metric 50
  Policy routing matches: 0 packets, 0 bytes
R3#

```

```

R1#sh ip bgp
BGP table version is 3, local router ID is 10.0.0.5
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
*   172.16.10.0/24   10.0.0.6              50                   0 30 40 i
*>  10.0.0.2         10.0.0.2             100                   0 20 40 i
R1#

```

3. Three ASs are interconnected as illustrated in Figure 4-17. The administrator of AS30 needs to enforce a policy to have all inbound traffic from AS20 to AS30 use the high bandwidth R3-R5 link and use only the R2-R4 link in case the primary link fails. To implement this policy, she decides to use AS prepending. However, after configuring the AS prepending on R2, traffic still prefers the R2-R4 link. Why is that?

BGP configurations on R2, R3, R4, and R5 are shown in Example 4-114.

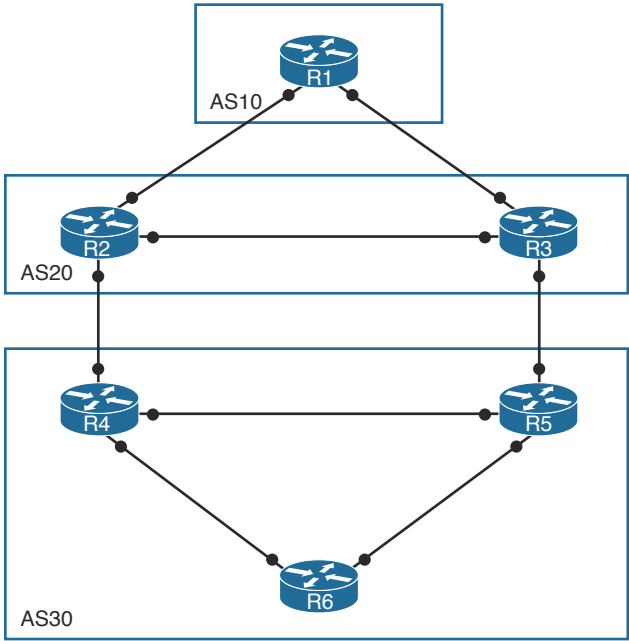


Figure 4-17 Network Topology for Troubleshooting Exercise 2

Example 4-114 Before and After AS Prepending Configurations

Before AS Prepending is Applied

```
R2#sh ip bgp
BGP table version is 10, local router ID is 192.168.255.2
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
*> 172.16.60.0/24	10.0.0.14	11	200	0	30 i
*> 172.17.0.0	10.0.0.14	11	200	0	30 i
* i 192.168.255.1/32	10.0.0.5	0	100	0	10 i
*>	10.0.0.1	0		0	10 i
*> 192.168.255.2/32	0.0.0.0	0		32768	i
r>i 192.168.255.3/32	192.168.255.3	0	100	0	i
*> 192.168.255.4/32	10.0.0.14	0	200	0	30 i
*> 192.168.255.5/32	10.0.0.14		200	0	30 i
*> 192.168.255.6/32	10.0.0.14		200	0	30 i

R2#

R3#sh ip bgp

BGP table version is 9, local router ID is 192.168.255.3

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
*>i 172.16.60.0/24	10.0.0.14	11	200	0 30	i
*	10.0.0.18	11		0 30	i
*>i 172.17.0.0	10.0.0.14	11	200	0 30	i
*	10.0.0.18	11		0 30	i
* i 192.168.255.1/32	10.0.0.1	0	100	0 10	i
*>	10.0.0.5	0		0 10	i
r>i 192.168.255.2/32	192.168.255.2	0	100	0	i
*> 192.168.255.3/32	0.0.0.0	0		32768	i
*>i 192.168.255.4/32	10.0.0.14	0	200	0 30	i
*	10.0.0.18			0 30	i
*>i 192.168.255.5/32	10.0.0.14	0	200	0 30	i
*	10.0.0.18	0		0 30	i
*>i 192.168.255.6/32	10.0.0.14	0	200	0 30	i
*	10.0.0.18			0 30	i

R3#

R1#traceroute 172.16.60.6 so 192.168.255.1

Type escape sequence to abort.

Tracing the route to 172.16.60.6

VRF info: (vrf in name/id, vrf out name/id)

```

 1 10.0.0.2 6 msec 6 msec 5 msec
 2 10.0.0.14 6 msec 6 msec 5 msec
 3 10.0.0.26 6 msec 6 msec 6 msec

```

AS Prepending Configuration

AS Prepending Configuration

R4#sh run | sec bgp

router bgp 30

bgp router-id 192.168.255.4

bgp log-neighbor-changes

network 172.16.60.0 mask 255.255.255.0

network 172.17.0.0

network 192.168.255.4 mask 255.255.255.255

neighbor 10.0.0.13 remote-as 20

```

neighbor 10.0.0.13 route-map AS_PREPENDING out
neighbor 192.168.255.5 remote-as 30
neighbor 192.168.255.5 update-source Loopback0
neighbor 192.168.255.6 remote-as 30
neighbor 192.168.255.6 update-source Loopback0
R4#
R4#sh route-map AS_PREPENDING
route-map AS_PREPENDING, permit, sequence 10
  Match clauses:
  Set clauses:
    as-path prepend 30 30
  Policy routing matches: 0 packets, 0 bytes
R4#

```

After AS Prepending Is Configured

```

R2#sh ip bgp
BGP table version is 10, local router ID is 192.168.255.2
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
*>	172.16.60.0/24	10.0.0.14	11	200	0	30 i
*>	172.17.0.0	10.0.0.14	11	200	0	30 i
* i	192.168.255.1/32	10.0.0.5	0	100	0	10 i
*>		10.0.0.1	0		0	10 i
*>	192.168.255.2/32	0.0.0.0	0		32768	i
r>i	192.168.255.3/32	192.168.255.3	0	100	0	i
*>	192.168.255.4/32	10.0.0.14	0	200	0	30 i
*>	192.168.255.5/32	10.0.0.14		200	0	30 i
*>	192.168.255.6/32	10.0.0.14		200	0	30 i

R2#

R3#sh ip bgp

```

BGP table version is 9, local router ID is 192.168.255.3
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
*>i	172.16.60.0/24	10.0.0.14	11	200	0	30 i
*		10.0.0.18	11		0	30 i

```

*>i 172.17.0.0      10.0.0.14      11    200    0 30 i
*                  10.0.0.18      11          0 30 i
* i 192.168.255.1/32 10.0.0.1      0    100    0 10 i
*>                  10.0.0.5      0          0 10 i
r>i 192.168.255.2/32 192.168.255.2  0    100    0 i
*> 192.168.255.3/32 0.0.0.0      0          32768 i
*>i 192.168.255.4/32 10.0.0.14    0    200    0 30 i
*                  10.0.0.18      0          0 30 i
*>i 192.168.255.5/32 10.0.0.14    0    200    0 30 i
*                  10.0.0.18      0          0 30 i
*>i 192.168.255.6/32 10.0.0.14    0    200    0 30 i
*                  10.0.0.18      0          0 30 i
R3#

```

BGP Configuration on R2 and R3

R2#**sh run | sec bgp**

```

router bgp 20
  bgp router-id 192.168.255.2
  bgp log-neighbor-changes
  network 192.168.255.2 mask 255.255.255.255
  neighbor 10.0.0.1 remote-as 10
  neighbor 10.0.0.14 remote-as 30
  neighbor 10.0.0.14 route-map SET_LOCAL_PREF in
  neighbor 192.168.255.3 remote-as 20
  neighbor 192.168.255.3 update-source Loopback0

```

R2#

R2#**sh route-map SET_LOCAL_PREF**

```

route-map SET_LOCAL_PREF, permit, sequence 10
  Match clauses:
  Set clauses:
    local-preference 200
  Policy routing matches: 0 packets, 0 bytes

```

R2#

R3#**sh run | sec bgp**

```

router bgp 20
  bgp router-id 192.168.255.3
  bgp log-neighbor-changes
  network 192.168.255.3 mask 255.255.255.255
  neighbor 10.0.0.5 remote-as 10
  neighbor 10.0.0.18 remote-as 30
  neighbor 192.168.255.2 remote-as 20
  neighbor 192.168.255.2 update-source Loopback0

```

R3#

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