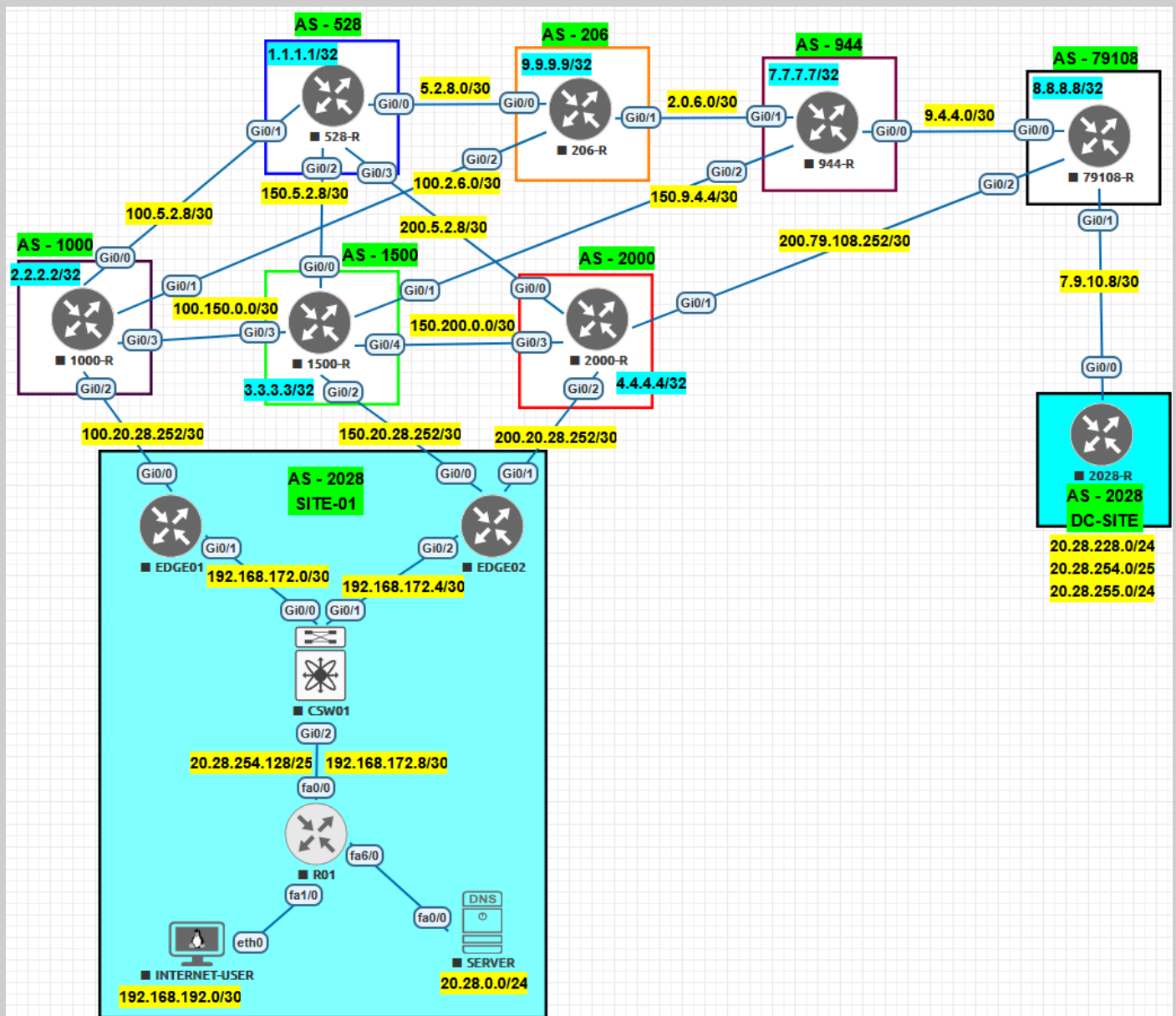


BGP Route Filtering and Route Manipulation in an Enterprise Network



Lab Requirements

1. Configure AS-2028 Site-01 to receive a default route for Internet access and specific routes to its remote Data Center (DC) prefixes.
2. Configure the eBGP neighbors of AS-2028 to permit the acceptance of remote DC routes containing AS-2028's local AS number in the AS_PATH.
3. Ensure AS-2028 is not used as a transit AS for third-party traffic.
4. Configure the exit AS preference for remote DC traffic in the following priority order:

- ➔ Primary: AS-2000
- ➔ Secondary: AS-1500
- ➔ Tertiary: AS-1000

5. Configure the exit AS preference for Internet traffic in the following priority order:

- ➔ Primary: AS-1000
- ➔ Secondary: AS-1500
- ➔ Tertiary: AS-2000

Preparing for Task 4 & Task 5,

	Default Route	Remote DC Prefixes
To AS-1000: EDGE-01	Local Preference - 300	Local Preference - 100
To AS-1500: EDGE-02	Local Preference - 200	Local Preference - 200
To AS-2000: EDGE-02	Local Preference - 100	Local Preference - 300

In this lab write-up, I will not present all of the configurations. Instead, I will show only the configurations necessary to meet the lab requirements, along with the verification commands and their corresponding outputs to validate the implementation.

Configurations

Task 1, 4 & 5

Configuring Task 1, 4 and 5

EDGE-01

```
ip prefix-list DEFAULT-ROUTE seq 5 permit 0.0.0.0/0
```

```
!
```

```
ip prefix-list MY-DC seq 5 permit 20.28.228.0/24
```

```
ip prefix-list MY-DC seq 10 permit 20.28.255.0/24
```

```
ip prefix-list MY-DC seq 15 permit 20.28.254.0/25
```

```
!
```

```
route-map DEFAULT_PLUS permit 10
  match ip address prefix-list MY-DC
route-map DEFAULT_PLUS permit 20
  match ip address prefix-list DEFAULT-ROUTE
  set local-preference 300
!
router bgp 2028
  bgp router-id 172.16.255.1
  address-family ipv4
    bgp nexthop trigger delay 0
    neighbor 100.20.28.253 route-map DEFAULT_PLUS in
  exit-address-family
!
```

EDGE-02

```
ip prefix-list DEFAULT-ROUTE seq 5 permit 0.0.0.0/0
!
ip prefix-list MY-DC seq 5 permit 20.28.228.0/24
ip prefix-list MY-DC seq 10 permit 20.28.255.0/24
ip prefix-list MY-DC seq 15 permit 20.28.254.0/25
!
route-map DEFAULT-PLUS-AS-1500 permit 10
  match ip address prefix-list MY-DC
  set local-preference 200
route-map DEFAULT-PLUS-AS-1500 permit 20
```

```
match ip address prefix-list DEFAULT-ROUTE
set local-preference 200
!
route-map DEFAULT-PLUS-AS-2000 permit 10
match ip address prefix-list MY-DC
set local-preference 300
route-map DEFAULT-PLUS-AS-2000 permit 20
match ip address prefix-list DEFAULT-ROUTE
!
router bgp 2028
  bgp router-id 172.16.255.2
  address-family ipv4
    bgp nexthop trigger delay 0
    neighbor 150.20.28.253 route-map DEFAULT-PLUS-AS-1500 in
    neighbor 200.20.28.253 route-map DEFAULT-PLUS-AS-2000 in
  exit-address-family
!
```

Task 2

Configuring the eBGP neighbors of AS-2028 to permit the acceptance of remote DC routes containing AS-2028's local AS number in the AS_PATH

EDGE-01

```
router bgp 2028
  bgp router-id 172.16.255.1
  address-family ipv4
```

```
bgp nexthop trigger delay 0
neighbor 100.20.28.253 allowas-in
exit-address-family
!
```

EDGE-02

```
router bgp 2028
bgp router-id 172.16.255.2
address-family ipv4
bgp nexthop trigger delay 0
neighbor 150.20.28.253 allowas-in
neighbor 200.20.28.253 allowas-in
exit-address-family
!
```

2028-R

```
router bgp 2028
bgp router-id 7.9.10.10
address-family ipv4
neighbor 7.9.10.9 allowas-in
exit-address-family
!
```

Task 3

Configuring AS-2028 is not used as a transit AS for third-party traffic

EDGE-01

```
ip as-path access-list 1 permit ^$
```

!

router bgp 2028

bgp router-id 172.16.255.1

address-family ipv4

bgp nexthop trigger delay 0

neighbor 100.20.28.253 filter-list 1 out

exit-address-family

!

EDGE-02

ip as-path access-list 1 permit ^\$

!

router bgp 2028

bgp router-id 172.16.255.2

address-family ipv4

bgp nexthop trigger delay 0

neighbor 150.20.28.253 filter-list 1 out

neighbor 200.20.28.253 filter-list 1 out

exit-address-family

!

Verification**CSW-01**

CSW-01#sh ip bgp | be Net

	Network	Next Hop	Metric	LocPrf	Weight	Path
*>i	0.0.0.0	172.16.255.1	0	300	0	1000 i
*>i	20.28.0.0/24	172.16.255.3	0	100	0	i
*>i	20.28.228.0/24	172.16.255.2	0	200	0	1500 944 79108 2028 i
*>i	20.28.254.0/25	172.16.255.2	0	200	0	1500 2000 79108 2028 i
*>	20.28.254.128/25	0.0.0.0	0		32768	i
*>i	20.28.255.0/24	172.16.255.2	0	200	0	1500 944 79108 2028 i

USER

```

USER#trace 8.8.8.8
Type escape sequence to abort.
Tracing the route to 8.8.8.8
VRF info: (vrf in name/id, vrf out name/id)
  1 20.28.0.254 60 msec 52 msec 48 msec
  2 192.168.172.9 52 msec 52 msec 56 msec
  3 192.168.172.2 52 msec 52 msec 52 msec
  4 100.20.28.253 48 msec 52 msec 52 msec
  5 100.150.0.2 52 msec 52 msec 52 msec
  6 150.9.4.6 52 msec 52 msec 32 msec
  7 9.4.4.2 52 msec * 32 msec

```

```

USER#trace 20.28.255.1
Type escape sequence to abort.
Tracing the route to 20.28.255.1
VRF info: (vrf in name/id, vrf out name/id)
  1 20.28.0.254 52 msec 56 msec 56 msec
  2 192.168.172.9 52 msec 52 msec 52 msec
  3 192.168.172.6 56 msec 52 msec 52 msec
  4 200.20.28.253 52 msec 52 msec 48 msec
  5 200.79.108.254 48 msec 56 msec 56 msec
  6 7.9.10.10 56 msec * 36 msec

```

Failover Test When AS-1000 goes down**CSW-01**

```

CSW-01#sh ip bgp | be Net

```

Network	Next Hop	Metric	LocPrf	Weight	Path
*>i 0.0.0.0	172.16.255.2	0	200	0	1500 i
*>i 20.28.0.0/24	172.16.255.3	0	100	0	i
*>i 20.28.228.0/24	172.16.255.2	0	200	0	1500 944 79108 2028 i
*>i 20.28.254.0/25	172.16.255.2	0	200	0	1500 2000 79108 2028 i
*> 20.28.254.128/25	0.0.0.0	0		32768	i
*>i 20.28.255.0/24	172.16.255.2	0	200	0	1500 944 79108 2028 i

USER

```

USER#trace 8.8.8.8
Type escape sequence to abort.
Tracing the route to 8.8.8.8
VRF info: (vrf in name/id, vrf out name/id)
  1 20.28.0.254 52 msec 52 msec 52 msec
  2 192.168.172.9 60 msec 52 msec 56 msec
  3 192.168.172.6 48 msec 56 msec 48 msec
  4 150.20.28.253 48 msec 56 msec 52 msec
  5 150.9.4.6 52 msec 52 msec 52 msec
  6 9.4.4.2 48 msec * 48 msec

```

```

USER#trace 20.28.255.1
Type escape sequence to abort.
Tracing the route to 20.28.255.1
VRF info: (vrf in name/id, vrf out name/id)
 1 20.28.0.254 52 msec 56 msec 52 msec
 2 192.168.172.9 56 msec 48 msec 52 msec
 3 192.168.172.6 52 msec 52 msec 56 msec
 4 200.20.28.253 52 msec 52 msec 16 msec
 5 200.79.108.254 16 msec 20 msec 16 msec
 6 7.9.10.10 16 msec * 48 msec

```

Failover Test When AS-2000 goes down

CSW-01

```

CSW-01#sh ip bgp | be Net
      Network          Next Hop           Metric LocPrf Weight Path
 *>i  0.0.0.0           172.16.255.1             0   300      0 1000 i
 *>i  20.28.0.0/24       172.16.255.3             0   100      0 i
 *>i  20.28.228.0/24     172.16.255.2             0   200      0 1500 944 79108 2028 i
 *>i  20.28.254.0/25     172.16.255.2             0   200      0 1500 2000 79108 2028 i
 *>   20.28.254.128/25  0.0.0.0                  0           32768 i
 *>i  20.28.255.0/24     172.16.255.2             0   200      0 1500 944 79108 2028 i

```

USER

```

USER#trace 8.8.8.8
Type escape sequence to abort.
Tracing the route to 8.8.8.8
VRF info: (vrf in name/id, vrf out name/id)
 1 20.28.0.254 52 msec 52 msec 48 msec
 2 192.168.172.9 52 msec 48 msec 56 msec
 3 192.168.172.2 52 msec 56 msec 52 msec
 4 100.20.28.253 48 msec 52 msec 56 msec
 5 100.150.0.2 56 msec 28 msec 48 msec
 6 150.9.4.6 52 msec 52 msec 52 msec
 7 9.4.4.2 48 msec * 32 msec

```

```

USER#trace 20.28.255.1
Type escape sequence to abort.
Tracing the route to 20.28.255.1
VRF info: (vrf in name/id, vrf out name/id)
 1 20.28.0.254 56 msec 52 msec 48 msec
 2 192.168.172.9 56 msec 52 msec 52 msec
 3 192.168.172.6 48 msec 52 msec 52 msec
 4 150.20.28.253 52 msec 56 msec 52 msec
 5 150.9.4.6 52 msec 56 msec 52 msec
 6 9.4.4.2 48 msec 52 msec 52 msec
 7 7.9.10.10 56 msec * 32 msec

```


Here is the full BGP configuration for the edge routers**EDGE-01**

```
router bgp 2028

  bgp router-id 172.16.255.1

  neighbor 100.20.28.253 remote-as 1000
  neighbor 100.20.28.253 password kolwin
  neighbor 172.16.255.254 remote-as 2028
  neighbor 172.16.255.254 password kolwin
  neighbor 172.16.255.254 update-source Loopback0
!
address-family ipv4
  bgp nexthop trigger delay 0
  neighbor 100.20.28.253 activate
  neighbor 100.20.28.253 allowas-in
  neighbor 100.20.28.253 route-map DEFAULT_PLUS in
  neighbor 100.20.28.253 filter-list 1 out
  neighbor 172.16.255.254 activate
  neighbor 172.16.255.254 next-hop-self
exit-address-family
!
```

EDGE-02

```
router bgp 2028

  bgp router-id 172.16.255.2

  neighbor 150.20.28.253 remote-as 1500
```

```
neighbor 150.20.28.253 password kolwin
neighbor 172.16.255.254 remote-as 2028
neighbor 172.16.255.254 password kolwin
neighbor 172.16.255.254 update-source Loopback0
neighbor 200.20.28.253 remote-as 2000
neighbor 200.20.28.253 password kolwin
!
address-family ipv4
  bgp nexthop trigger delay 0
  neighbor 150.20.28.253 activate
  neighbor 150.20.28.253 allowas-in
  neighbor 150.20.28.253 route-map DEFAULT-PLUS-AS-1500 in
  neighbor 150.20.28.253 filter-list 1 out
  neighbor 172.16.255.254 activate
  neighbor 172.16.255.254 next-hop-self
  neighbor 200.20.28.253 activate
  neighbor 200.20.28.253 allowas-in
  neighbor 200.20.28.253 route-map DEFAULT-PLUS-AS-2000 in
  neighbor 200.20.28.253 filter-list 1 out
exit-address-family
!
```

2028-R

```
router bgp 2028
  bgp router-id 7.9.10.10
```

```
neighbor 7.9.10.9 remote-as 79108
neighbor 7.9.10.9 password kolwin
!
address-family ipv4
  network 20.28.228.0 mask 255.255.255.0
  network 20.28.254.0 mask 255.255.255.128
  network 20.28.255.0 mask 255.255.255.0
  neighbor 7.9.10.9 activate
  neighbor 7.9.10.9 allowas-in
  neighbor 7.9.10.9 route-map DEFAULT-PLUS in
exit-address-family
!
```

ika-net