

Module 7 – Securing Routing Policy Using Route Map

Objective: All the routers are pre-configured with basic interface, OSPF and BGP configuration according to the following topology diagram. At this stage all POP routers are sending and receiving every prefixes it learn from other peers to and from the CPE routers. Without any policy filter lab network is acting as transit for all customer and upstream peers. You need to create proper policy filter (Using route policy) to make sure organizational business policy is reflected into your configuration and that will secure your network to operate smoothly.

Prerequisites: Knowledge of Huawei router CLI, ACL, regular expression, IPv6 etc.

The following will be the common topology and IP address plan used for the labs.

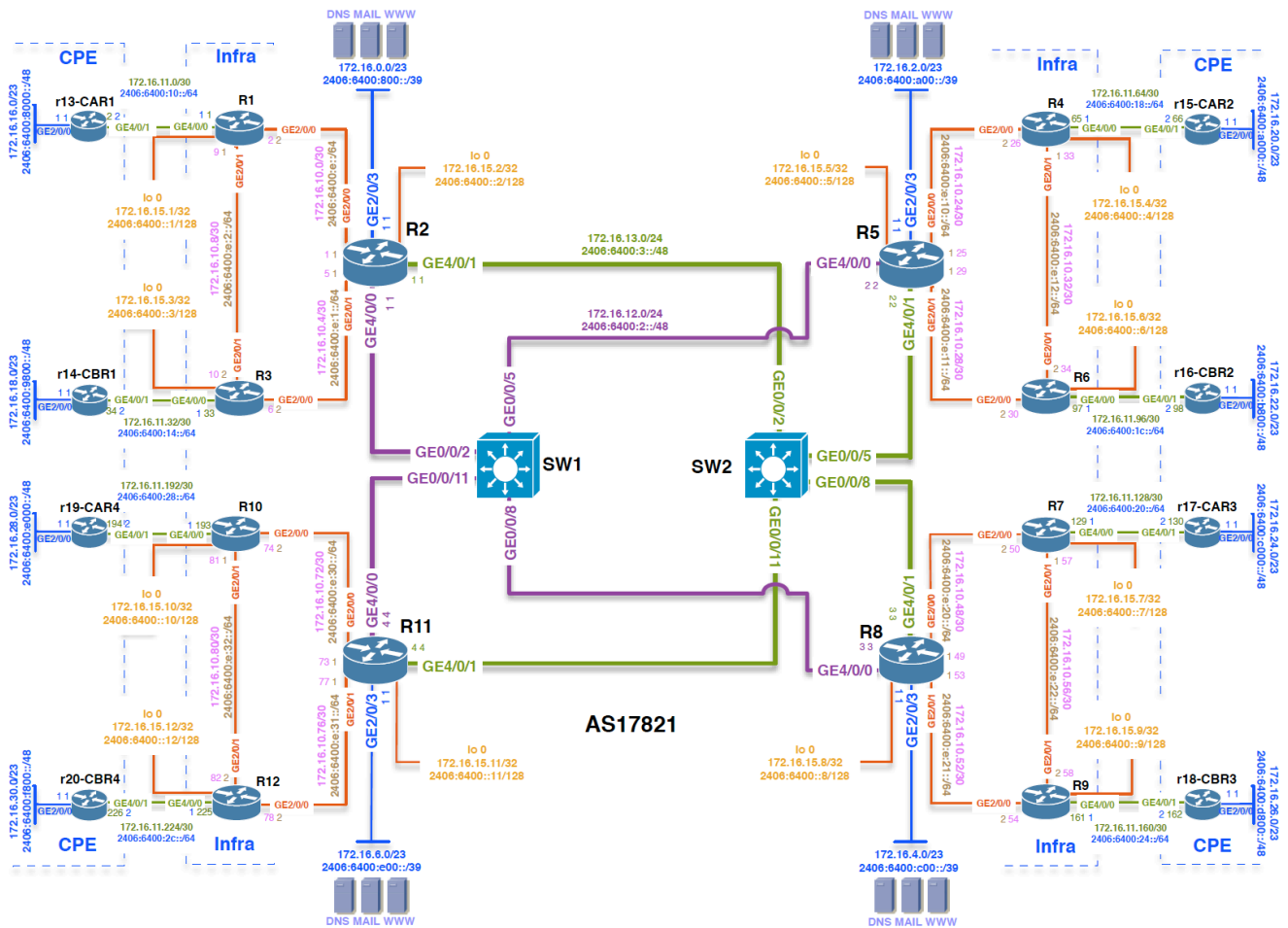


Figure 1 – ISP Lab Basic Configuration

Lab Notes

All the required prefix filters need to be applied on to the edge routers. In our lab we need to create filter on POP routers i.e. R1, R3, R4, R6, R7, R9, R10, R12 and CPE routers R13, R14, R15, R16, R17, R18, R19, R20 for both IN and OUT direction. This is how we will secure our perimeter routers (Both Service provider and Customer) by filtering unwanted prefixes and eventually unauthorised traffic. There is a significant difference between filtering traffic using ACL (Data plane) and prefix list (Control plane). Before you start configuring filters please check routing tables on both edge and CPE routers and note down the available prefixes. Then look at the prefix exchange policy in next section, configure required route map and verify the outcome by looking at the routing table again on both POP and CPE routers.

It is advisable to spend some time (Before your start the lab) to be familiar with the network topology, addressing plan, check routing table, BGP table, received and advertised prefix to all BGP peers etc.

Route Exchange Policy:

a. POP Router OUT

1. ISP sends its **own prefix & originated locally**. Create ACL to match ISP prefix, create as-path access list to match prefix originated locally.
2. ISP sends other **directly connected customer prefix & legitimate prefix length**. Create prefix list to match /32 and /48, create as-path access list to match directly connected customer.
3. Group all policy in a route map with proper sequence number.
4. Attach it in POP router OUR direction

b. POP Router IN

1. ISP accepts its **customer prefix & originated by the customer AS**. Create ACL to match customer prefix, create as-path access list to match prefix originated by customer AS.
2. Group those policy in a route map with proper sequence number.
3. Attach it in POP router IN direction

c. CEP Router IN

1. Customer routers accept **default prefix** from ISP & **ISP own aggregated prefix**. Create ACL to match default prefix, ISP own aggregated.
2. Customer routers accept **legitimate prefixes** of ISP's **directly connected other customer prefix**. Create prefix list to match legitimate prefixes and as-path access list to match prefixes originated by ISP and ISP directly connected customers.
3. Group all policy in a route map with proper sequence number.
4. Attach it in CEP router IN direction.

d. CEP Router OUT

1. Customer router send **its own prefix & originated by its own AS number**. Create ACL to match its own prefix, and as-path access list to match prefix originated locally.
2. Group all policy in a route map with proper sequence number.
3. Attach it in CEP router OUT direction.

e. List of Prefixes and AS numbers

1. ISP Prefix: 2406:6400::/32
2. ISP AS number 17821
3. Customer prefixes and AS number:
R13 2406:6400:8000::/48, AS 65001
R14 2406:6400:9800::/48, AS 65002
R15 2406:6400:a000::/48, AS 65003
R16 2406:6400:b800::/48, AS 65004
R17 2406:6400:c000::/48, AS 65005
R18 2406:6400:d800::/48, AS 65006
R19 2406:6400:e000::/48, AS 65007
R20 2406:6400:f800::/48, AS 65008

Lab Exercise

a) Configuration steps for POP router OUT:

1. IPv6 prefix list configuration on edge router to match ISP aggregated prefix.

Here is an example configuration for POP router R1

```
system-view
ip ipv6-prefix IPV6-MY-PREFIX index 15 permit 2406:6400:: 32
```

2. IPv6 aggregation prefix filter to match /32 and /48 prefix length.

Here is an example configuration for POP router R1

```
ip ipv6-prefix IPV6-CUSTOMER-OUT index 20 permit :: 0 greater-equal 32
less-equal 32
ip ipv6-prefix IPV6-CUSTOMER-OUT index 25 permit :: 0 greater-equal 48
less-equal 48
```

3. AS path filter to match prefix originated locally to this AS.

Here is an example configuration for POP router R1

```
ip as-path-filter 100 permit ^$
```

4. AS path filter to match prefix originated from direct connected customer using their AS number.

Here is an example configuration for POP router R1

```
ip as-path-filter 101 permit ^[0-9]+$
```

5. Create route-policy to match ISP aggregated prefix and originated by ISP ASN.

Here is an example configuration for POP router R1

```
route-policy IPV6-CUSTOMER-OUT permit node 10
if-match as-path-filter 100
if-match ipv6 address prefix-list IPV6-MY-PREFIX
```

6. Create route- policy to match aggregation filter and direct customer originated prefix

Here is an example configuration for POP router R1

```
route-policy IPV6-CUSTOMER-OUT permit node 20
if-match as-path-filter 101
if-match ipv6 address prefix-list IPV6-CUSTOMER-OUT
quit
```

7. Add route-map to BGP neighbor or peer group

Here is an example configuration for POP router R1

```
bgp 17821
ipv6-family unicast
peer IPV6-eBGP-CUSTOMER-REG1-POP1 route-policy IPV6-CUSTOMER-OUT
export
quit
quit
quit
```

8. Send dynamic refresh to your BGP peer for the new policy to be activated.

Here is an example configuration for POP router R1

```
refresh bgp ipv6 2406:6400:10::2 export
save
```

b) Configuration steps for POP router IN:

1. IPv6 prefix-list match customer prefix.

Here is an example configuration for POP router R1

```
system-view
ip ipv6-prefix IPV6-CAR1-IN index 15 permit 2406:6400:8000:: 48
```

2. AS path match customer AS number.

Here is an example configuration for POP router R1

```
ip as-path-filter 150 permit _65001$
```

3. Create route-map to match customer prefix and customer origin AS..

Here is an example configuration for POP router R1

```
route-policy IPV6-CUST-CAR1-IN permit node 10
if-match as-path-filter 150
if-match ipv6 address prefix-list IPV6-CAR1-IN
quit
```

4. Add route-map to BGP neighbor.

Here is an example configuration for POP router R1

```
bgp 17821
ipv6-family unicast
peer 2406:6400:10::2 route-policy IPV6-CUST-CAR1-IN import
quit
quit
quit
```

5. Send dynamic refresh to your BGP peer for the new policy to be activated.

Here is an example configuration for POP router R13

```
refresh bgp ipv6 2406:6400:10::2 import
save
```

c) Configuration steps for CPE router IN:

1. IPv6 prefix list configuration on CPE router to match default prefix and ISP aggregated prefix.

Here is an example configuration for POP router R13

```
system-view
ip ipv6-prefix IPV6-ISP-PREFIX index 10 permit :: 0
ip ipv6-prefix IPV6-ISP-PREFIX index 15 permit 2406:6400:: 32
```

2. IPv6 aggregation prefix filter to match /32 and /48 prefix length.

Here is an example configuration for POP router R13

```
ip ipv6-prefix IPV6-AGGREGATION-IN index 20 permit :: 0 greater-equal
32 less-equal 32
ip ipv6-prefix IPV6-AGGREGATION-IN index 25 permit :: 0 greater-equal
48 less-equal 48
```

3. AS path filter to match prefix originated ISP and originated by ISP direct customer.

Here is an example configuration for POP router R13

```
ip as-path-filter 100 permit _17821$
ip as-path-filter 101 permit _17821_
```

4. Create route-policy to match ISP prefix and origin by ISP AS.

Here is an example configuration for POP router R13

```
route-policy IPV6-ISP-IN permit node 10
if-match as-path-filter 100
if-match ipv6 address prefix-list IPV6-ISP-PREFIX
```

5. Create route-map to match other prefix via ISP and with legitimate prefix length (/32 & /48).

Here is an example configuration for POP router R13

```
route-policy IPV6-ISP-IN permit node 20
if-match as-path-filter 101
if-match ipv6 address prefix-list IPV6-AGGREGATION-IN
quit
```

6. Add route-map to BGP neighbor.

Here is an example configuration for POP router R13

```
bgp 65001
ipv6-family unicast
peer 2406:6400:10::1 route-policy IPV6-ISP-IN import
quit
quit
quit
```

7. Send dynamic refresh to your BGP peer for the new policy to be activated.

Here is an example configuration for POP router R13

```
refresh bgp ipv6 2406:6400:10::1 import
save
```

d) Configuration steps for CPE router OUT:

1. IPv6 prefix-list match customer prefix

Here is an example configuration for POP router R13

```
system-view
ip ipv6-prefix IPV6-MY-PREFIX-OUT index 15 permit 2406:6400:8000:: 48
```

2. AS path match customer AS number.

Here is an example configuration for POP router R13

```
ip as-path-filter 200 permit ^$
```

3. Create route-map to match customer prefix and customer origin AS.

Here is an example configuration for POP router R13

```
route-policy IPV6-MY-PREFIX-OUT permit node 10
if-match as-path-filter 200
if-match ipv6 address prefix-list IPV6-MY-PREFIX-OUT
quit
```

4. Add route-map to BGP neighbor.

Here is an example configuration for POP router R13

```
bgp 65001
ipv6-family unicast
peer 2406:6400:10::1 route-policy IPV6-MY-PREFIX-OUT export
quit
quit
quit
```



5. Send dynamic refresh to your BGP peer for the new policy to be activated.

Here is an example configuration for POP router R13

```
refresh bgp ipv6 2406:6400:10::1 export
save
```

Workshop templates for reference purpose only:

Router 1 Out

```
system-view
ip ipv6-prefix IPV6-MY-PREFIX index 15 permit 2406:6400:: 32
ip ipv6-prefix IPV6-CUSTOMER-OUT index 20 permit :: 0 greater-equal 32 less-
equal 32
ip ipv6-prefix IPV6-CUSTOMER-OUT index 25 permit :: 0 greater-equal 48 less-
equal 48
ip as-path-filter 100 permit ^$
ip as-path-filter 101 permit ^[0-9]+$
route-policy IPV6-CUSTOMER-OUT permit node 10
if-match as-path-filter 100
if-match ipv6 address prefix-list IPV6-MY-PREFIX
route-policy IPV6-CUSTOMER-OUT permit node 20
if-match as-path-filter 101
if-match ipv6 address prefix-list IPV6-CUSTOMER-OUT
quit
bgp 17821
ipv6-family unicast
peer IPV6-eBGP-CUSTOMER-REG1-POP1 route-policy IPV6-CUSTOMER-OUT export
quit
quit
quit
refresh bgp ipv6 2406:6400:10::2 export
save
```

Router 1 In

```
system-view
ip ipv6-prefix IPV6-CAR1-IN index 15 permit 2406:6400:8000:: 48
ip as-path-filter 150 permit _65001$
route-policy IPV6-CUST-CAR1-IN permit node 10
if-match as-path-filter 150
if-match ipv6 address prefix-list IPV6-CAR1-IN
quit
bgp 17821
ipv6-family unicast
peer 2406:6400:10::2 route-policy IPV6-CUST-CAR1-IN import
quit
quit
quit
refresh bgp ipv6 2406:6400:10::2 import
save
```

Router 13 In

```
system-view
ip ipv6-prefix IPV6-ISP-PREFIX index 10 permit :: 0
ip ipv6-prefix IPV6-ISP-PREFIX index 15 permit 2406:6400:: 32
ip ipv6-prefix IPV6-AGGREGATION-IN index 20 permit :: 0 greater-equal 32 less-
equal 32
ip ipv6-prefix IPV6-AGGREGATION-IN index 25 permit :: 0 greater-equal 48 less-
equal 48
ip as-path-filter 100 permit _17821$
ip as-path-filter 101 permit _17821_
```




```
route-policy IPV6-ISP-IN permit node 10
if-match as-path-filter 100
if-match ipv6 address prefix-list IPV6-ISP-PREFIX
route-policy IPV6-ISP-IN permit node 20
if-match as-path-filter 101
if-match ipv6 address prefix-list IPV6-AGGREGATION-IN
quit
bgp 65001
ipv6-family unicast
peer 2406:6400:10::1 route-policy IPV6-ISP-IN import
quit
quit
quit
refresh bgp ipv6 2406:6400:10::1 import
save
```

Router 13 Out

```
system-view
ip ipv6-prefix IPV6-MY-PREFIX-OUT index 15 permit 2406:6400:8000:: 48
ip as-path-filter 200 permit ^$
route-policy IPV6-MY-PREFIX-OUT permit node 10
if-match as-path-filter 200
if-match ipv6 address prefix-list IPV6-MY-PREFIX-OUT
quit
bgp 65001
ipv6-family unicast
peer 2406:6400:10::1 route-policy IPV6-MY-PREFIX-OUT export
quit
quit
quit
refresh bgp ipv6 2406:6400:10::1 export
save
```

Router 3 Out

```
system-view
ip ipv6-prefix IPV6-MY-PREFIX index 15 permit 2406:6400:: 32
ip ipv6-prefix IPV6-CUSTOMER-OUT index 20 permit :: 0 greater-equal 32 less-
equal 32
ip ipv6-prefix IPV6-CUSTOMER-OUT index 25 permit :: 0 greater-equal 48 less-
equal 48
ip as-path-filter 100 permit ^$
ip as-path-filter 101 permit ^[0-9]+$
route-policy IPV6-CUSTOMER-OUT permit node 10
if-match as-path-filter 100
if-match ipv6 address prefix-list IPV6-MY-PREFIX
route-policy IPV6-CUSTOMER-OUT permit node 20
if-match as-path-filter 101
if-match ipv6 address prefix-list IPV6-CUSTOMER-OUT
quit
bgp 17821
ipv6-family unicast
peer IPV6-eBGP-CUSTOMER-REG1-POP2 route-policy IPV6-CUSTOMER-OUT export
quit
quit
quit
refresh bgp ipv6 2406:6400:14::2 export
save
```

Router 3 In

```
system-view
ip ipv6-prefix IPV6-CBR1-IN index 15 permit 2406:6400:9800:: 48
ip as-path-filter 150 permit _65002$
route-policy IPV6-CUST-CBR1-IN permit node 10
if-match as-path-filter 150
if-match ipv6 address prefix-list IPV6-CBR1-IN
quit
bgp 17821
ipv6-family unicast
peer 2406:6400:14::2 route-policy IPV6-CUST-CBR1-IN import
quit
quit
quit
refresh bgp ipv6 2406:6400:14::2 import
save
```

Router 14 In

```
system-view
ip ipv6-prefix IPV6-ISP-PREFIX index 10 permit :: 0
ip ipv6-prefix IPV6-ISP-PREFIX index 15 permit 2406:6400:: 32
ip ipv6-prefix IPV6-AGGREGATION-IN index 20 permit :: 0 greater-equal 32 less-
equal 32
ip ipv6-prefix IPV6-AGGREGATION-IN index 25 permit :: 0 greater-equal 48 less-
equal 48
ip as-path-filter 100 permit _17821$
ip as-path-filter 101 permit _17821_
route-policy IPV6-ISP-IN permit node 10
if-match as-path-filter 100
if-match ipv6 address prefix-list IPV6-ISP-PREFIX
route-policy IPV6-ISP-IN permit node 20
if-match as-path-filter 101
if-match ipv6 address prefix-list IPV6-AGGREGATION-IN
quit
bgp 65002
ipv6-family unicast
peer 2406:6400:14::1 route-policy IPV6-ISP-IN import
quit
quit
quit
refresh bgp ipv6 2406:6400:14::1 import
save
```

Router 14 Out

```
system-view
ip ipv6-prefix IPV6-MY-PREFIX-OUT index 15 permit 2406:6400:9800:: 48
ip as-path-filter 200 permit ^$
route-policy IPV6-MY-PREFIX-OUT permit node 10
if-match as-path-filter 200
if-match ipv6 address prefix-list IPV6-MY-PREFIX-OUT
quit
bgp 65002
ipv6-family unicast
peer 2406:6400:14::1 route-policy IPV6-MY-PREFIX-OUT export
quit
quit
quit
```



```
refresh bgp ipv6 2406:6400:14::1 export
save
```

Router 4 Out

```
system-view
ip ipv6-prefix IPV6-MY-PREFIX index 15 permit 2406:6400:: 32
ip ipv6-prefix IPV6-CUSTOMER-OUT index 20 permit :: 0 greater-equal 32 less-
equal 32
ip ipv6-prefix IPV6-CUSTOMER-OUT index 25 permit :: 0 greater-equal 48 less-
equal 48
ip as-path-filter 100 permit ^$
ip as-path-filter 101 permit ^[0-9]+$
route-policy IPV6-CUSTOMER-OUT permit node 10
if-match as-path-filter 100
if-match ipv6 address prefix-list IPV6-MY-PREFIX
route-policy IPV6-CUSTOMER-OUT permit node 20
if-match as-path-filter 101
if-match ipv6 address prefix-list IPV6-CUSTOMER-OUT
quit
bgp 17821
ipv6-family unicast
peer IPV6-eBGP-CUSTOMER-REG2-POP1 route-policy IPV6-CUSTOMER-OUT export
quit
quit
quit
refresh bgp ipv6 2406:6400:18::2 export
save
```

Router 4 In

```
system-view
ip ipv6-prefix IPV6-CAR2-IN index 15 permit 2406:6400:A000:: 48
ip as-path-filter 150 permit _65003$
route-policy IPV6-CUST-CAR2-IN permit node 10
if-match as-path-filter 150
if-match ipv6 address prefix-list IPV6-CAR2-IN
quit
bgp 17821
ipv6-family unicast
peer 2406:6400:18::2 route-policy IPV6-CUST-CAR2-IN import
quit
quit
quit
refresh bgp ipv6 2406:6400:18::2 import
save
```

Router 15 In

```
system-view
ip ipv6-prefix IPV6-ISP-PREFIX index 10 permit :: 0
ip ipv6-prefix IPV6-ISP-PREFIX index 15 permit 2406:6400:: 32
ip ipv6-prefix IPV6-AGGREGATION-IN index 20 permit :: 0 greater-equal 32 less-
equal 32
ip ipv6-prefix IPV6-AGGREGATION-IN index 25 permit :: 0 greater-equal 48 less-
equal 48
ip as-path-filter 100 permit _17821$
ip as-path-filter 101 permit _17821_
route-policy IPV6-ISP-IN permit node 10
if-match as-path-filter 100
```

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```
if-match ipv6 address prefix-list IPV6-ISP-PREFIX
route-policy IPV6-ISP-IN permit node 20
if-match as-path-filter 101
if-match ipv6 address prefix-list IPV6-AGGREGATION-IN
quit
bgp 65003
ipv6-family unicast
peer 2406:6400:18::1 route-policy IPV6-ISP-IN import
quit
quit
quit
refresh bgp ipv6 2406:6400:18::1 import
save
```

Router 15 Out

```
system-view
ip ipv6-prefix IPV6-MY-PREFIX-OUT index 15 permit 2406:6400:A000:: 48
ip as-path-filter 200 permit ^$
route-policy IPV6-MY-PREFIX-OUT permit node 10
if-match as-path-filter 200
if-match ipv6 address prefix-list IPV6-MY-PREFIX-OUT
quit
bgp 65003
ipv6-family unicast
peer 2406:6400:18::1 route-policy IPV6-MY-PREFIX-OUT export
quit
quit
quit
refresh bgp ipv6 2406:6400:18::1 export
save
```

Router 6 Out

```
system-view
ip ipv6-prefix IPV6-MY-PREFIX index 15 permit 2406:6400:: 32
ip ipv6-prefix IPV6-CUSTOMER-OUT index 20 permit :: 0 greater-equal 32 less-
equal 32
ip ipv6-prefix IPV6-CUSTOMER-OUT index 25 permit :: 0 greater-equal 48 less-
equal 48
ip as-path-filter 100 permit ^$
ip as-path-filter 101 permit ^[0-9]+$
route-policy IPV6-CUSTOMER-OUT permit node 10
if-match as-path-filter 100
if-match ipv6 address prefix-list IPV6-MY-PREFIX
route-policy IPV6-CUSTOMER-OUT permit node 20
if-match as-path-filter 101
if-match ipv6 address prefix-list IPV6-CUSTOMER-OUT
quit
bgp 17821
ipv6-family unicast
peer IPV6-eBGP-CUSTOMER-REG2-POP2 route-policy IPV6-CUSTOMER-OUT export
quit
quit
quit
refresh bgp ipv6 2406:6400:1C::2 export
save
```



Router 6 In

```
system-view
ip ipv6-prefix IPV6-CBR2-IN index 15 permit 2406:6400:B800:: 48
ip as-path-filter 150 permit _65004$
route-policy IPV6-CUST-CBR2-IN permit node 10
if-match as-path-filter 150
if-match ipv6 address prefix-list IPV6-CBR2-IN
quit
bgp 17821
ipv6-family unicast
peer 2406:6400:1C::2 route-policy IPV6-CUST-CBR2-IN import
quit
quit
quit
refresh bgp ipv6 2406:6400:1C::2 import
save
```

Router 16 In

```
system-view
ip ipv6-prefix IPV6-ISP-PREFIX index 10 permit :: 0
ip ipv6-prefix IPV6-ISP-PREFIX index 15 permit 2406:6400:: 32
ip ipv6-prefix IPV6-AGGREGATION-IN index 20 permit :: 0 greater-equal 32 less-
equal 32
ip ipv6-prefix IPV6-AGGREGATION-IN index 25 permit :: 0 greater-equal 48 less-
equal 48
ip as-path-filter 100 permit _17821$
ip as-path-filter 101 permit _17821_
route-policy IPV6-ISP-IN permit node 10
if-match as-path-filter 100
if-match ipv6 address prefix-list IPV6-ISP-PREFIX
route-policy IPV6-ISP-IN permit node 20
if-match as-path-filter 101
if-match ipv6 address prefix-list IPV6-AGGREGATION-IN
quit
bgp 65004
ipv6-family unicast
peer 2406:6400:1C::1 route-policy IPV6-ISP-IN import
quit
quit
quit
refresh bgp ipv6 2406:6400:1C::1 import
save
```

Router 16 Out

```
system-view
ip ipv6-prefix IPV6-MY-PREFIX-OUT index 15 permit 2406:6400:B800:: 48
ip as-path-filter 200 permit ^$
route-policy IPV6-MY-PREFIX-OUT permit node 10
if-match as-path-filter 200
if-match ipv6 address prefix-list IPV6-MY-PREFIX-OUT
quit
bgp 65004
ipv6-family unicast
peer 2406:6400:1C::1 route-policy IPV6-MY-PREFIX-OUT export
quit
quit
quit
refresh bgp ipv6 2406:6400:1C::1 export
```

save

Router 7 Out

```
system-view
ip ipv6-prefix IPV6-MY-PREFIX index 15 permit 2406:6400:: 32
ip ipv6-prefix IPV6-CUSTOMER-OUT index 20 permit :: 0 greater-equal 32 less-
equal 32
ip ipv6-prefix IPV6-CUSTOMER-OUT index 25 permit :: 0 greater-equal 48 less-
equal 48
ip as-path-filter 100 permit ^$
ip as-path-filter 101 permit ^[0-9]+$
route-policy IPV6-CUSTOMER-OUT permit node 10
if-match as-path-filter 100
if-match ipv6 address prefix-list IPV6-MY-PREFIX
route-policy IPV6-CUSTOMER-OUT permit node 20
if-match as-path-filter 101
if-match ipv6 address prefix-list IPV6-CUSTOMER-OUT
quit
bgp 17821
ipv6-family unicast
peer IPV6-eBGP-CUSTOMER-REG3-POP1 route-policy IPV6-CUSTOMER-OUT export
quit
quit
quit
refresh bgp ipv6 2406:6400:20::2 export
save
```

Router 7 In

```
system-view
ip ipv6-prefix IPV6-CAR2-IN index 15 permit 2406:6400:C000:: 48
ip as-path-filter 150 permit _65005$
route-policy IPV6-CUST-CAR3-IN permit node 10
if-match as-path-filter 150
if-match ipv6 address prefix-list IPV6-CAR3-IN
quit
bgp 17821
ipv6-family unicast
peer 2406:6400:20::2 route-policy IPV6-CUST-CAR3-IN import
quit
quit
quit
refresh bgp ipv6 2406:6400:20::2 import
save
```

Router 17 In

```
system-view
ip ipv6-prefix IPV6-ISP-PREFIX index 10 permit :: 0
ip ipv6-prefix IPV6-ISP-PREFIX index 15 permit 2406:6400:: 32
ip ipv6-prefix IPV6-AGGREGATION-IN index 20 permit :: 0 greater-equal 32 less-
equal 32
ip ipv6-prefix IPV6-AGGREGATION-IN index 25 permit :: 0 greater-equal 48 less-
equal 48
ip as-path-filter 100 permit _17821$
ip as-path-filter 101 permit _17821_
route-policy IPV6-ISP-IN permit node 10
if-match as-path-filter 100
```



```
if-match ipv6 address prefix-list IPV6-ISP-PREFIX
route-policy IPV6-ISP-IN permit node 20
if-match as-path-filter 101
if-match ipv6 address prefix-list IPV6-AGGREGATION-IN
quit
bgp 65005
ipv6-family unicast
peer 2406:6400:20::1 route-policy IPV6-ISP-IN import
quit
quit
quit
refresh bgp ipv6 2406:6400:20::1 import
save
```

Router 17 Out

```
system-view
ip ipv6-prefix IPV6-MY-PREFIX-OUT index 15 permit 2406:6400:C000:: 48
ip as-path-filter 200 permit ^$
route-policy IPV6-MY-PREFIX-OUT permit node 10
if-match as-path-filter 200
if-match ipv6 address prefix-list IPV6-MY-PREFIX-OUT
quit
bgp 65005
ipv6-family unicast
peer 2406:6400:20::1 route-policy IPV6-MY-PREFIX-OUT export
quit
quit
quit
refresh bgp ipv6 2406:6400:20::1 export
save
```

Router 9 Out

```
system-view
ip ipv6-prefix IPV6-MY-PREFIX index 15 permit 2406:6400:: 32
ip ipv6-prefix IPV6-CUSTOMER-OUT index 20 permit :: 0 greater-equal 32 less-
equal 32
ip ipv6-prefix IPV6-CUSTOMER-OUT index 25 permit :: 0 greater-equal 48 less-
equal 48
ip as-path-filter 100 permit ^$
ip as-path-filter 101 permit ^[0-9]+$
route-policy IPV6-CUSTOMER-OUT permit node 10
if-match as-path-filter 100
if-match ipv6 address prefix-list IPV6-MY-PREFIX
route-policy IPV6-CUSTOMER-OUT permit node 20
if-match as-path-filter 101
if-match ipv6 address prefix-list IPV6-CUSTOMER-OUT
quit
bgp 17821
ipv6-family unicast
peer IPV6-eBGP-CUSTOMER-REG3-POP2 route-policy IPV6-CUSTOMER-OUT export
quit
quit
quit
refresh bgp ipv6 2406:6400:24::2 export
save
```

Router 9 In

```
system-view
ip ipv6-prefix IPV6-CBR3-IN index 15 permit 2406:6400:D800:: 48
ip as-path-filter 150 permit _65006$
route-policy IPV6-CUST-CBR3-IN permit node 10
if-match as-path-filter 150
if-match ipv6 address prefix-list IPV6-CBR3-IN
quit
bgp 17821
ipv6-family unicast
peer 2406:6400:24::2 route-policy IPV6-CUST-CBR3-IN import
quit
quit
quit
refresh bgp ipv6 2406:6400:24::2 import
save
```

Router 18 In

```
system-view
ip ipv6-prefix IPV6-ISP-PREFIX index 10 permit :: 0
ip ipv6-prefix IPV6-ISP-PREFIX index 15 permit 2406:6400:: 32
ip ipv6-prefix IPV6-AGGREGATION-IN index 20 permit :: 0 greater-equal 32 less-
equal 32
ip ipv6-prefix IPV6-AGGREGATION-IN index 25 permit :: 0 greater-equal 48 less-
equal 48
ip as-path-filter 100 permit _17821$
ip as-path-filter 101 permit _17821_
route-policy IPV6-ISP-IN permit node 10
if-match as-path-filter 100
if-match ipv6 address prefix-list IPV6-ISP-PREFIX
route-policy IPV6-ISP-IN permit node 20
if-match as-path-filter 101
if-match ipv6 address prefix-list IPV6-AGGREGATION-IN
quit
bgp 65006
ipv6-family unicast
peer 2406:6400:24::1 route-policy IPV6-ISP-IN import
quit
quit
quit
refresh bgp ipv6 2406:6400:24::1 import
save
```

Router 18 Out

```
system-view
ip ipv6-prefix IPV6-MY-PREFIX-OUT index 15 permit 2406:6400:D800:: 48
ip as-path-filter 200 permit ^$
route-policy IPV6-MY-PREFIX-OUT permit node 10
if-match as-path-filter 200
if-match ipv6 address prefix-list IPV6-MY-PREFIX-OUT
quit
bgp 65006
ipv6-family unicast
peer 2406:6400:24::1 route-policy IPV6-MY-PREFIX-OUT export
quit
quit
```




```
quit
refresh bgp ipv6 2406:6400:24::1 export
save
```

Router 10 Out

```
system-view
ip ipv6-prefix IPV6-MY-PREFIX index 15 permit 2406:6400:: 32
ip ipv6-prefix IPV6-CUSTOMER-OUT index 20 permit :: 0 greater-equal 32 less-
equal 32
ip ipv6-prefix IPV6-CUSTOMER-OUT index 25 permit :: 0 greater-equal 48 less-
equal 48
ip as-path-filter 100 permit ^$
ip as-path-filter 101 permit ^[0-9]+$
route-policy IPV6-CUSTOMER-OUT permit node 10
if-match as-path-filter 100
if-match ipv6 address prefix-list IPV6-MY-PREFIX
route-policy IPV6-CUSTOMER-OUT permit node 20
if-match as-path-filter 101
if-match ipv6 address prefix-list IPV6-CUSTOMER-OUT
quit
bgp 17821
ipv6-family unicast
peer IPV6-eBGP-CUSTOMER-REG4-POP1 route-policy IPV6-CUSTOMER-OUT export
quit
quit
quit
refresh bgp ipv6 2406:6400:28::2 export
save
```

Router 10 In

```
system-view
ip ipv6-prefix IPV6-CAR4-IN index 15 permit 2406:6400:E000:: 48
ip as-path-filter 150 permit _65007$
route-policy IPV6-CUST-CAR4-IN permit node 10
if-match as-path-filter 150
if-match ipv6 address prefix-list IPV6-CAR4-IN
quit
bgp 17821
ipv6-family unicast
peer 2406:6400:28::2 route-policy IPV6-CUST-CAR4-IN import
quit
quit
quit
refresh bgp ipv6 2406:6400:28::2 import
save
```

Router 19 In

```
system-view
ip ipv6-prefix IPV6-ISP-PREFIX index 10 permit :: 0
ip ipv6-prefix IPV6-ISP-PREFIX index 15 permit 2406:6400:: 32
ip ipv6-prefix IPV6-AGGREGATION-IN index 20 permit :: 0 greater-equal 32 less-
equal 32
ip ipv6-prefix IPV6-AGGREGATION-IN index 25 permit :: 0 greater-equal 48 less-
equal 48
ip as-path-filter 100 permit _17821$
ip as-path-filter 101 permit _17821_
```

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```
route-policy IPV6-ISP-IN permit node 10
if-match as-path-filter 100
if-match ipv6 address prefix-list IPV6-ISP-PREFIX
route-policy IPV6-ISP-IN permit node 20
if-match as-path-filter 101
if-match ipv6 address prefix-list IPV6-AGGREGATION-IN
quit
bgp 65007
ipv6-family unicast
peer 2406:6400:28::1 route-policy IPV6-ISP-IN import
quit
quit
quit
refresh bgp ipv6 2406:6400:28::1 import
save
```

Router 19 Out

```
system-view
ip ipv6-prefix IPV6-MY-PREFIX-OUT index 15 permit 2406:6400:E000:: 48
ip as-path-filter 200 permit ^$
route-policy IPV6-MY-PREFIX-OUT permit node 10
if-match as-path-filter 200
if-match ipv6 address prefix-list IPV6-MY-PREFIX-OUT
quit
bgp 65007
ipv6-family unicast
peer 2406:6400:28::1 route-policy IPV6-MY-PREFIX-OUT export
quit
quit
quit
refresh bgp ipv6 2406:6400:28::1 export
save
```

Router 12 Out

```
system-view
ip ipv6-prefix IPV6-MY-PREFIX index 15 permit 2406:6400:: 32
ip ipv6-prefix IPV6-CUSTOMER-OUT index 20 permit :: 0 greater-equal 32 less-
equal 32
ip ipv6-prefix IPV6-CUSTOMER-OUT index 25 permit :: 0 greater-equal 48 less-
equal 48
ip as-path-filter 100 permit ^$
ip as-path-filter 101 permit ^[0-9]+$
route-policy IPV6-CUSTOMER-OUT permit node 10
if-match as-path-filter 100
if-match ipv6 address prefix-list IPV6-MY-PREFIX
route-policy IPV6-CUSTOMER-OUT permit node 20
if-match as-path-filter 101
if-match ipv6 address prefix-list IPV6-CUSTOMER-OUT
quit
bgp 17821
ipv6-family unicast
peer IPV6-eBGP-CUSTOMER-REG4-POP2 route-policy IPV6-CUSTOMER-OUT export
quit
quit
quit
refresh bgp ipv6 2406:6400:2C::2 export
save
```

Router 12 In

```
system-view
ip ipv6-prefix IPV6-CBR4-IN index 15 permit 2406:6400:F800:: 48
ip as-path-filter 150 permit _65008$
route-policy IPV6-CUST-CBR4-IN permit node 10
if-match as-path-filter 150
if-match ipv6 address prefix-list IPV6-CBR4-IN
quit
bgp 17821
ipv6-family unicast
peer 2406:6400:2C::2 route-policy IPV6-CUST-CBR4-IN import
quit
quit
quit
refresh bgp ipv6 2406:6400:2C::2 import
save
```

Router 20 In

```
system-view
ip ipv6-prefix IPV6-ISP-PREFIX index 10 permit ::0
ip ipv6-prefix IPV6-ISP-PREFIX index 15 permit 2406:6400:: 32
ip ipv6-prefix IPV6-AGGREGATION-IN index 20 permit :: 0 greater-equal 32 less-
equal 32
ip ipv6-prefix IPV6-AGGREGATION-IN index 25 permit :: 0 greater-equal 48 less-
equal 48
ip as-path-filter 100 permit _17821$
ip as-path-filter 101 permit _17821_
route-policy IPV6-ISP-IN permit node 10
if-match as-path-filter 100
if-match ipv6 address prefix-list IPV6-ISP-PREFIX
route-policy IPV6-ISP-IN permit node 20
if-match as-path-filter 101
if-match ipv6 address prefix-list IPV6-AGGREGATION-IN
quit
bgp 65008
ipv6-family unicast
peer 2406:6400:2C::1 route-policy IPV6-ISP-IN import
quit
quit
quit
refresh bgp ipv6 2406:6400:2C::1 import
save
```

Router 20 Out

```
system-view
ip ipv6-prefix IPV6-MY-PREFIX-OUT index 15 permit 2406:6400:F800:: 48
ip as-path-filter 200 permit ^$
route-policy IPV6-MY-PREFIX-OUT permit node 10
if-match as-path-filter 200
if-match ipv6 address prefix-list IPV6-MY-PREFIX-OUT
quit
bgp 65008
ipv6-family unicast
peer 2406:6400:2C::1 route-policy IPV6-MY-PREFIX-OUT export
quit
```

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```
quit  
quit  
refresh bgp ipv6 2406:6400:2C::1 export  
save
```