FiberstoreOS
BGP Configuration

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1.1 Overview

The Border Gateway Protocol (BGP) is an inter-Autonomous System routing protocol.

The primary function of a BGP speaking system is to exchange network reachability information with other BGP systems. This network reachability information includes information on the list of Autonomous Systems (ASes) that reachability information traverses. This information is sufficient for constructing a graph of AS connectivity for this reachability, from which routing loops may be pruned and, at the AS level, some policy decisions may be enforced.

BGP-4 provides a set of mechanisms for supporting Classless Inter-Domain Routing (CIDR) [RFC1518, RFC1519]. These mechanisms include support for advertising a set of destinations as an IP prefix and eliminating the concept of network "class" within BGP. BGP-4 also introduces mechanisms that allow aggregation of routes, including aggregation of AS paths.

Routing information exchanged via BGP supports only the destination-based forwarding paradigm, which assumes that a router forwards a packet based solely on the destination address carried in the IP header of the packet. This, in turn, reflects the set of policy decisions that can (and cannot) be enforced using BGP. BGP can support only those policies conforming to the destination-based forwarding paradigm.

For more BGP information please reference [RFC 1771, RFC 4271].

1.2 Basic Topology (EBGP)

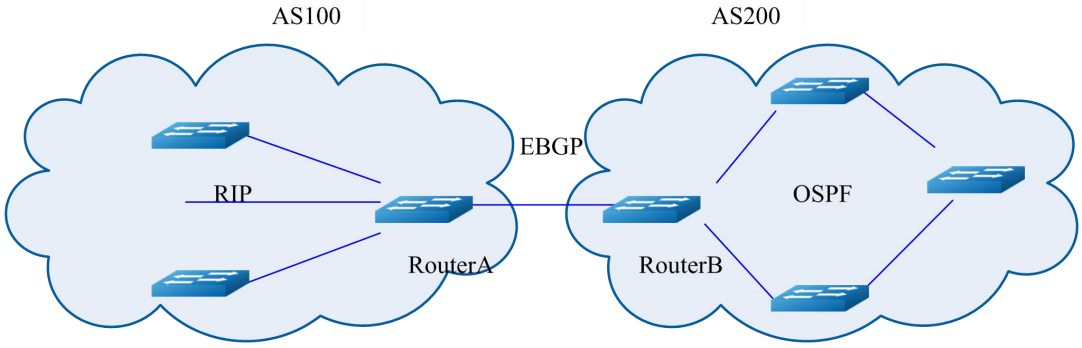

Figure 1-1 EBGP

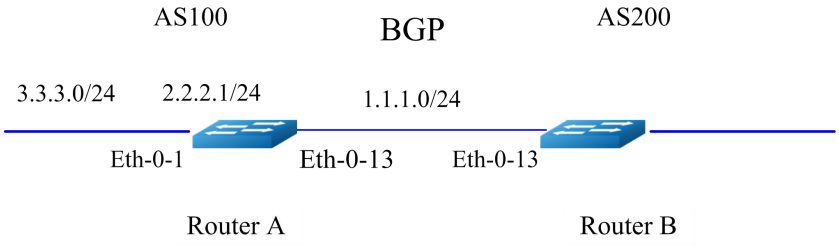

Figure 1-2 EBGP Topology

Following is the BGP configurations on Router A and Router B:

1.2.2 Configuration

Router A:

Switch #configure terminal	Enter the Configure mode.
Switch (config)#interface eth-0-13	Specify the interface (eth-0-13)to be configured and enter the Interface mode.
Switch (config-if)#no shutdown	Make interface eth-0-13 UP
Switch (config-if) # no switchport	Configure on physical port only, change this port to Layer3 interface.
Switch (config-if) # ip address 1.1.1.1/24	Configure IP address to 1.1.1.1/24.
Switch (config-if)#exit	Exit the Interface mode and enter the Configure mode.
Switch (config)#interface eth-0-1	Specify the interface (eth-0-1)to be configured and enter the Interface mode.
Switch (config-if)# no shutdown	Make interface eth-0-1 UP

Switch (config-if) # no switchport	Configure on physical port only, change this port to Layer3 interface.
Switch (config-if) # ip address 2.2.2.1/24	Configure IP address to 2.2.2.1/24.
Switch (config-if)#exit	Exit the Interface mode and enter the Configure mode.
Switch (config)#ip route 3.3.3.0/24 2.2.2.2	Add a static route 3.3.3.0/24 with nexthop 2.2.2.2
Switch (config)#router bgp 100	Creat bgp 100 and enter the router mode
Switch (config-router)#bgp router-id 10.10.10.10	Configure the bgp router-id
Switch (config-router)#neighbor 1.1.1.2 remote-as 200	Configure the ebgp neighbor with as 200
Switch (config)# neighbor 1.1.1.2 ebgp-multihop	Config the neighbor to ebgp-multihop
Switch (config-router)#network 4.0.0.0/8	Network the specified route 4.0.0.0/8
Switch (config-router)#redistribute static	Redistribute the static route into bgp
Switch (config-router)#redistribute connected	Redistribute the connect route into bgp
Switch (config-router)#exit	Exit the router mode and enter the Configure mode.

Router B:

Switch #configure terminal	Enter the Configure mode.
Switch (config)#interface eth-0-13	Specify the interface (eth-0-13)to be configured and enter the Interface mode.
Switch (config-if)#no shutdown	Make interface eth-0-13 UP
Switch (config-if) # no switchport	Configure on physical port only, change this port to Layer3 interface.
Switch (config-if) # ip address 1.1.1.2/24	Configure IP address to 1.1.1.2/24.
Switch (config-if)#exit	Exit the Interface mode and enter the Configure mode.
Switch (config)#router bgp 200	Creat bgp 200 and enter the router mode
Switch (config-router)#bgp router-id 11.11.11.11	Configure the bgp router-id
Switch (config-router)#neighbor 1.1.1.1 remote-as 100	Configure the ebgp neighbor with as 100

Switch (config)# neighbor 1.1.1.1 ebgp-multihop	Config the neighbor to ebgp-multihop
Switch (config-router)#redistribute connected	Redistribute the connect route into bgp
Switch (config-router)#exit	Exit the router mode and enter the Configure mode.

1.2.3 Validation

The result of show ip policy route-map is as follows.SwitchA# show ip bgp neighbors

```
BGP neighbor is 1.1.1.2, remote AS 200, local AS 100, external link
  BGP version 4, remote router ID 0.0.0.0
  BGP state = Active
  Last read 00:26:00, hold time is 180, keepalive interval is 60 seconds
  Received 0 messages, 0 notifications, 0 in queue
  Sent 0 messages, 0 notifications, 0 in queue
  Route refresh request: received 0, sent 0
  Minimum time between advertisement runs is 30 seconds
 For address family: IPv4 Unicast
  BGP table version 1, neighbor version 0
  Index 1, Offset 0, Mask 0x2
  0 accepted prefixes
  0 announced prefixes

 Connections established 0; dropped 0
  External BGP neighbor may be up to 255 hops away.
Next connect timer due in 87 seconds
```

SwitchB# show ip bgp neighbors

```
BGP neighbor is 1.1.1.1, remote AS 100, local AS 200, external link
  BGP version 4, remote router ID 0.0.0.0
  BGP state = Active
  Last read 00:21:39, hold time is 180, keepalive interval is 60 seconds
  Received 0 messages, 0 notifications, 0 in queue
  Sent 0 messages, 0 notifications, 0 in queue
  Route refresh request: received 0, sent 0
  Minimum time between advertisement runs is 30 seconds
 For address family: IPv4 Unicast
  BGP table version 1, neighbor version 0
  Index 1, Offset 0, Mask 0x2
  0 accepted prefixes
  0 announced prefixes

 Connections established 0; dropped 0
  External BGP neighbor may be up to 255 hops away.
Next connect timer due in 97 seconds
```

1.3 Basic topology(IBGP)

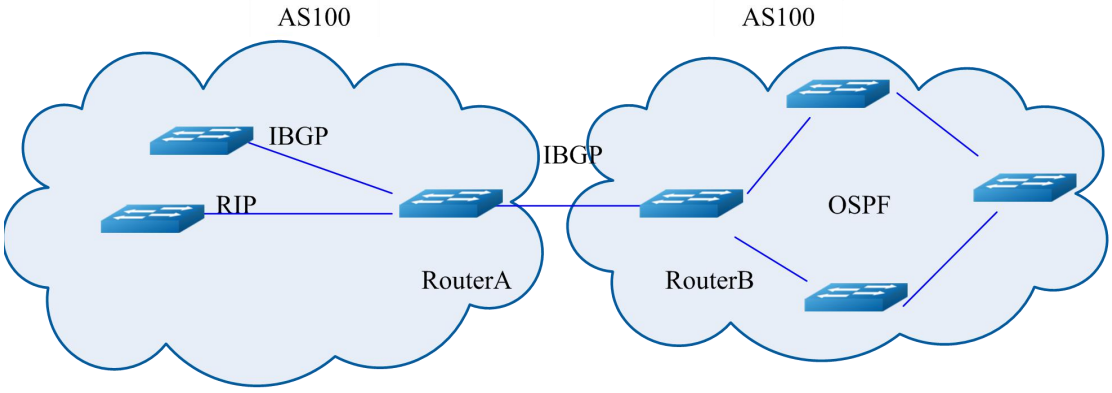

Figure 1-3 IBGP

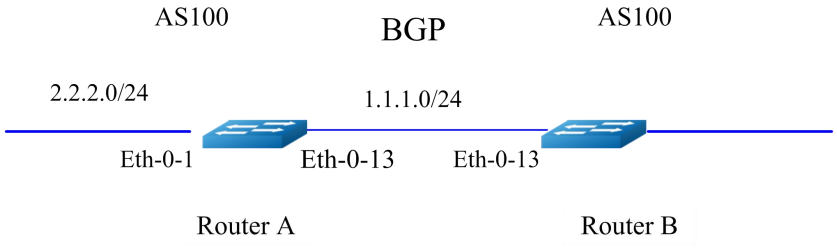

Figure 1-4 IBGP topology

1.3.2 Configuration

Router A:

Switch #configure terminal	Enter the Configure mode.
Switch (config)#interface eth-0-13	Specify the interface (eth-0-13)to be configured and enter the Interface mode.
Switch (config-if)#no shutdown	Make interface eth-0-13 UP
Switch (config-if) # no switchport	Configure on physical port only, change this port to Layer3 interface.
Switch (config-if) # ip address 1.1.1.1/24	Configure IP address to 1.1.1.1/24.
Switch (config-if)#exit	Exit the Interface mode and enter the Configure mode.
Switch (config)#interface loopback 0	Specify the interface (loopback 0)to be configured and enter the Interface mode.
Switch (config-if) # ip address 10.10.10.10/32	Configure IP address to 10.10.10.10/32.

Switch (config-if)#exit	Exit the Interface mode and enter the Configure mode.
Switch (config)# ip route 11.11.11.11/32 1.1.1.2	Add a static route 11.11.11.11/32 with nexthop 1.1.1.2
Switch (config)#interface eth-0-1	Specify the interface (eth-0-1)to be configured and enter the Interface mode.
Switch (config-if)# no shutdown	Make interface eth-0-1 UP
Switch (config-if) # no switchport	Configure on physical port only, change this port to Layer3 interface.
Switch (config-if) # ip address 2.2.2.1/24	Configure IP address to 2.2.2.1/24.
Switch (config-if)#exit	Exit the Interface mode and enter the Configure mode.
Switch (config)#ip route 3.3.3.0/24 2.2.2.2	Add a static route 3.3.3.0/24 with nexthop 2.2.2.2
Switch (config)#router bgp 100	Creat bgp 100 and enter the router mode
Switch (config-router)#bgp router-id 10.10.10.10	Configure the bgp router-id
Switch (config-router)#neighbor 11.11.11.11 remote-as 100	Configure the ibgp neighbor with as 100
Switch (config-router)#neighbor 11.11.11.11 update-source loopback 0	Configure the loopback 0 to be the update-source interface
Switch (config-router)#network 4.0.0.0/8	Network the specified route 4.0.0.0/8
Switch (config-router)#redistribute static	Redistribute the static route into bgp
Switch (config-router)#redistribute connected	Redistribute the connect route into bgp
Switch (config-router)#exit	Exit the router mode and enter the Configure mode.

Router B:

Switch #configure terminal	Enter the Configure mode.
Switch (config)#interface eth-0-13	Specify the interface (eth-0-13)to be configured and enter the Interface mode.
Switch (config-if)#no shutdown	Make interface eth-0-13 UP
Switch (config-if) # no switchport	Configure on physical port only, change this port to Layer3 interface.
Switch (config-if) # ip address 1.1.1.2/24	Configure IP address to 1.1.1.2/24.

Switch (config-if)#exit	Exit the Interface mode and enter the Configure mode.
Switch (config)#interface loopback 0	Specify the interface (loopback 0)to be configured and enter the Interface mode.
Switch (config-if) # ip address 11.11.11.11/32	Configure IP address to 11.11.11.11/32.
Switch (config-if)#exit	Exit the Interface mode and enter the Configure mode.
Switch (config)# ip route 10.10.10.10/32 1.1.1.1	Add a static route 10.10.10.10/32 with nexthop 1.1.1.1
Switch (config)#router bgp 100	Creat bgp 100 and enter the router mode
Switch (config-router)#bgp router-id 11.11.11.11	Configure the bgp router-id
Switch (config-router)#neighbor 10.10.10.10 remote-as 100	Configure the ibgp neighbor with as 100
Switch (config-router)#neighbor 10.10.10.10 update-source loopback 0	Configure the loopback 0 to be the update-source interface
Switch (config-router)#redistribute connected	Redistribute the connect route into bgp
Switch (config-router)#exit	Exit the router mode and enter the Configure mode.

1.3.3 Validation

The result of show ip policy route-map is as follows.

SwitchA# show ip bgp neighbors

```
BGP neighbor is 11.11.11.11, remote AS 100, local AS 100, internal link
  BGP version 4, remote router ID 0.0.0.0
  BGP state = Active
  Last read 00:02:32, hold time is 180, keepalive interval is 60 seconds
  Received 0 messages, 0 notifications, 0 in queue
  Sent 0 messages, 0 notifications, 0 in queue
  Route refresh request: received 0, sent 0
  Minimum time between advertisement runs is 5 seconds
  Update source is loopback0
 For address family: IPv4 Unicast
  BGP table version 1, neighbor version 0
  Index 1, Offset 0, Mask 0x2
  0 accepted prefixes
  0 announced prefixes

 Connections established 0; dropped 0
Next connect timer due in 62 seconds
```

SwitchB# show ip bgp neighbors

```
BGP neighbor is 10.10.10.10, remote AS 100, local AS 100, internal link
  BGP version 4, remote router ID 0.0.0.0
  BGP state = Active
  Last read 00:01:58, hold time is 180, keepalive interval is 60 seconds
  Received 0 messages, 0 notifications, 0 in queue
  Sent 0 messages, 0 notifications, 0 in queue
  Route refresh request: received 0, sent 0
  Minimum time between advertisement runs is 5 seconds
  Update source is loopback0
 For address family: IPv4 Unicast
  BGP table version 1, neighbor version 0
  Index 1, Offset 0, Mask 0x2
  0 accepted prefixes
  0 announced prefixes

 Connections established 0; dropped 0
Next connect timer due in 17 seconds
```