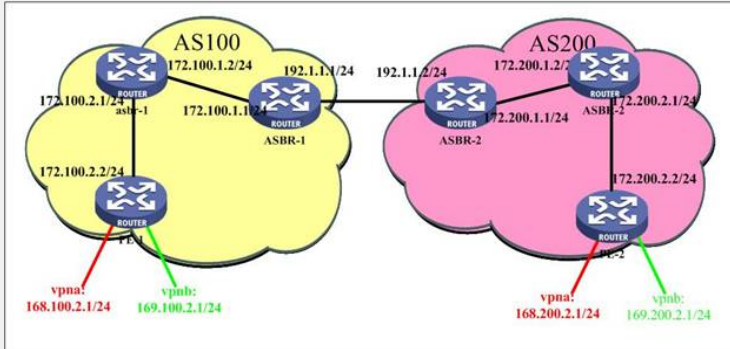


Typical Configuration of Inter-AS VPN-OptionC

[Requirements]

Realize the interworking of BGP/MPLS VPN services across ASs by means of OptionC.

[Networking diagram]



[Configuration script]

Configuration script (PE-1)

```

#
sysname PE-1
#
router id 202.100.1.3
#
mpls lsr-id 202.100.1.3
#
radius scheme system
#
mpls
#
mpls ldp
#
ip vpn-instance vpna
route-distinguisher 100:1
vpn-target 100:1 export-extcommunity
vpn-target 100:1 import-extcommunity
#
ip vpn-instance vpnb
route-distinguisher 101:1
vpn-target 101:1 export-extcommunity
vpn-target 101:1 import-extcommunity
#
domain system
#
interface Serial2/0/0
link-protocol ppp
ip address 172.100.2.2 255.255.255.0
mpls
mpls ldp enable
#
interface NULL0
#
interface LoopBack0
ip address 202.100.1.3 255.255.255.255
#
interface LoopBack10
ip binding vpn-instance vpna
ip address 168.100.2.1 255.255.255.0
#
interface LoopBack11
ip binding vpn-instance vpnb
ip address 169.100.2.1 255.255.255.0
#
bgp 100
undo synchronization
group in internal
peer in label-route-capability /Enable the peer group to process the lab
eled IPv4 route/
peer in connect-interface LoopBack0
peer 202.100.1.2 group in /Set up iBGP with asbr-
1/
#
ipv4-family vpn-instance vpna
import-route direct
undo synchronization
#
ipv4-family vpn-instance vpnb
import-route direct
undo synchronization
#
ipv4-family vpv4
peer in enable
peer 202.100.1.2 group in
#
ospf 1
area 0.0.0.0
network 172.100.2.0 0.0.0.255
network 202.100.1.3 0.0.0.0
#
user-interface con 0
user-interface vty 0 4
#
return

```

Configuration script (asbr-1)

```

#
sysname asbr-1
#
router id 202.100.1.2
#
mpls lsr-id 202.100.1.2
#
radius scheme system
#
mpls
#
mpls ldp
#

```

```

ip vpn-instance vpna
route-distinguisher 100:1
vpn-target 100:1 export-extcommunity
vpn-target 100:1 import-extcommunity
#
ip vpn-instance vpb
route-distinguisher 101:1
vpn-target 101:1 export-extcommunity
vpn-target 101:1 import-extcommunity
#
domain system
#
interface Serial2/0/0
link-protocol ppp
ip address 172.100.1.2 255.255.255.0
mpls
mpls ldp enable
#
interface Serial2/0/1
link-protocol ppp
ip address 172.100.2.1 255.255.255.0
mpls
mpls ldp enable
#
interface NULL0
#
interface LoopBack0
ip address 202.100.1.2 255.255.255.255
#
interface LoopBack10
ip binding vpn-instance vpna
ip address 168.100.1.1 255.255.255.0
#
interface LoopBack11
ip binding vpn-instance vpb
ip address 169.100.1.1 255.255.255.0
#
bgp 100
undo synchronization
group ASBR1 internal
peer ASBR1 label-route-capability /Enable the peer group to process the labeled IPv4 route/
peer ASBR1 connect-interface LoopBack0 /Set up iBGP with ASBR-1/
group PE1 internal
peer PE1 label-route-capability /Enable the peer group to process the labeled IPv4 route/
peer PE1 reflect-client
peer PE1 advertise-community /Advertise the community attribute to the peer group/
peer PE1 connect-interface LoopBack0
peer 202.100.1.3 group PE1 /Set up iBGP with PE-1/
group ex external
peer ex ebgp-max-hop
peer ex connect-interface LoopBack0
peer 202.200.1.2 group ex as-number 200 /Set up multi-hop eBGP with asbr-2/
#
ipv4-family vpn-instance vpna
import-route direct
undo synchronization
#
ipv4-family vpn-instance vpb
import-route direct
undo synchronization
#
ipv4-family vpv4
peer PE1 enable
peer PE1 reflect-client
peer 202.100.1.3 group PE1
peer ex enable
peer ex next-hop-invariable /Set not to change the next hop of route sent to the eBGP peer/
peer 202.200.1.2 group ex
#
ospf 1
area 0.0.0.0
network 172.100.1.0 0.0.0.255
network 172.100.2.0 0.0.0.255
network 202.100.1.2 0.0.0.0
#
user-interface con 0
user-interface vty 0 4
#
return

```

Configuration script (ASBR-1)

```

#
sysname ASBR-1
#
router id 202.100.1.1
#
mpls lsr-id 202.100.1.1
#
radius scheme system
#
mpls
#
mpls ldp
#
domain system
#
acl number 2000
rule 0 permit source 202.100.1.3 0
#
interface Ethernet1/0/0
ip address 192.1.1.1 255.255.255.0
mpls
mpls ldp enable
#
interface Serial2/0/0
link-protocol ppp
ip address 172.100.1.1 255.255.255.0
mpls
mpls ldp enable
#
interface NULL0
#
interface LoopBack0
ip address 202.100.1.1 255.255.255.255
#
bgp 100
network 202.100.1.2 255.255.255.255
network 202.100.1.3 255.255.255.255
network 202.100.1.1 255.255.255.255
undo synchronization
group in internal
peer in label-route-capability      /Enable the peer group to process the label
d IPv4 route/
peer in next-hop-local              /Specify the next hop to itself/
peer in route-policy rr export      /Apply the rr policy/
peer in connect-interface LoopBack0
peer 202.100.1.2 group in           /Set up iBGP with asbr-2/
group ex external
peer ex as-number 200
peer ex label-route-capability      /Enable the peer group to process the label
ed IPv4 route/
peer ex route-policy asbr export    /Apply the asbr policy/
peer 192.1.1.2 group ex             /Set up eBGP with ASBR-2/
#
ospf 1
area 0.0.0.0
network 172.100.1.0 0.0.0.255
network 202.100.1.1 0.0.0.0
#
route-policy asbr permit node 10
if-match acl 2000
apply mpls-label
route-policy asbr permit node 20
route-policy rr permit node 10
if-match mpls-label
apply mpls-label
route-policy rr permit node 20
#
user-interface con 0
user-interface vty 0 4
#
return

```

Configuration script (ASBR-2)

```

#
sysname ASBR-2
#
router id 202.200.1.1
#
mpls lsr-id 202.200.1.1
#
radius scheme system
#
mpls
#
mpls ldp
#
domain system
#
acl number 2000
rule 0 permit source 202.200.1.3 0
#
interface Ethernet1/0/0
ip address 192.1.1.2 255.255.255.0
mpls
mpls ldp enable
#
interface Serial2/0/0
link-protocol ppp
ip address 172.200.1.1 255.255.255.0
mpls
mpls ldp enable
#
interface NULL0
#
interface LoopBack0
ip address 202.200.1.1 255.255.255.255
#
bgp 200
network 202.200.1.2 255.255.255.255
network 202.200.1.3 255.255.255.255
network 202.200.1.1 255.255.255.255
undo synchronization
group ex external
peer ex as-number 100
peer ex label-route-capability
/Enable the peer group to process the labeled IPv4 route/
peer ex route-policy asbr export /Apply the asbr policy/
peer 192.1.1.1 group ex /Set up eBGP with ASBR-1/
group in internal
peer in label-route-capability /Enable the peer group to process the labeled IPv4 route/
peer in next-hop-local /Specify the next hop to itself/
peer in route-policy rr export /Apply the rr policy/
peer in connect-interface LoopBack0
peer 202.200.1.2 group in /Set up eBGP with asbr-2/
#
ospf 1
import-route direct
area 0.0.0.0
network 172.200.1.0 0.0.0.255
network 202.200.1.1 0.0.0.0
#
route-policy asbr permit node 10
if-match acl 2000
apply mpls-label
route-policy asbr permit node 20
route-policy rr permit node 10
if-match mpls-label
apply mpls-label
route-policy rr permit node 20
#
user-interface con 0
user-interface vty 0 4
#
return

```

Configuration script (asbr-2)

```

#
sysname asbr-2
#
router id 202.200.1.2
#
mpls lsr-id 202.200.1.2
#
radius scheme system
#
mpls
#
mpls ldp
#
ip vpn-instance vpna

```

```

route-distinguisher 100:1
vpn-target 100:1 export-extcommunity
vpn-target 100:1 import-extcommunity
#
ip vpn-instance vpnb
route-distinguisher 101:1
vpn-target 101:1 export-extcommunity
vpn-target 101:1 import-extcommunity
#
domain system
#
interface Serial2/0/0
link-protocol ppp
ip address 172.200.1.2 255.255.255.0
mpls
mpls ldp enable
#
interface Serial2/0/1
link-protocol ppp
ip address 172.200.2.1 255.255.255.0
mpls
mpls ldp enable
#
interface NULL0
#
interface LoopBack0
ip address 202.200.1.2 255.255.255.255
#
interface LoopBack10
ip binding vpn-instance vpna
ip address 168.200.1.1 255.255.255.0
#
interface LoopBack11
ip binding vpn-instance vpnb
ip address 169.200.1.1 255.255.255.0
#
bgp 200
undo synchronization
group ex external
peer ex ebgp-max-hop
peer ex connect-interface LoopBack0
peer 202.100.1.2 group ex as-number 100 /Set up multi-hop eBGP with asbr-1/
group ASBR2 internal
peer ASBR2 label-route-capability /Enable the peer group to process the la
beled IPv4 route/
peer ASBR2 connect-interface LoopBack0
peer 202.200.1.1 group ASBR2
group PE2 internal
peer PE2 label-route-capability
/Enable the peer group to process the labeled IPv4 route/
peer PE2 reflect-client
peer PE2 advertise-community /Advertise the community attribute to the
peer group/
peer PE2 connect-interface LoopBack0
peer 202.200.1.3 group PE2 /Set up iBGP with PE-2/
#
ipv4-family vpn-instance vpna
import-route direct
undo synchronization
#
ipv4-family vpn-instance vpnb
import-route direct
undo synchronization
#
ipv4-family vpnv4
peer ex enable
peer ex next-hop-invariable /Set not to change the next hop of route sent t
o the eBGP peer/
peer 202.100.1.2 group ex
peer PE2 enable
peer PE2 reflect-client
peer 202.200.1.3 group PE2
#
ospf 1
area 0.0.0.0
network 172.200.1.0 0.0.0.255
network 172.200.2.0 0.0.0.255
network 202.200.1.2 0.0.0.0
#
user-interface con 0
user-interface vty 0 4
#
return

```

Configuration script (PE-2)

```

#
sysname PE-2
#
router id 202.200.1.3
#
mpls lsr-id 202.200.1.3
#
radius scheme system
#
mpls
#
mpls ldp
#
ip vpn-instance vpna
route-distinguisher 100:1
vpn-target 100:1 export-extcommunity
vpn-target 100:1 import-extcommunity
#
ip vpn-instance vpnb
route-distinguisher 101:1
vpn-target 101:1 export-extcommunity
vpn-target 101:1 import-extcommunity
#
domain system
#
interface Serial2/0/0
link-protocol ppp
ip address 172.200.2.2 255.255.255.0
mpls
mpls ldp enable
#
interface NULL0
#
interface LoopBack0
ip address 202.200.1.3 255.255.255.255
#
interface LoopBack10
ip binding vpn-instance vpna
ip address 168.200.2.1 255.255.255.0
#
interface LoopBack11
ip binding vpn-instance vpnb
ip address 169.200.2.1 255.255.255.0
#
bgp 200
undo synchronization
group in internal
peer in label-route-capability /Enable the peer group to process the labeled IP
v4 route/
peer in connect-interface LoopBack0
peer 202.200.1.2 group in /Set up iBGP with asbr-2/
#
ipv4-family vpn-instance vpna
import-route direct
undo synchronization
#
ipv4-family vpn-instance vpnb
import-route direct
undo synchronization
#
ipv4-family vpv4
peer in enable
peer 202.200.1.2 group in
#
ospf 1
area 0.0.0.0
network 172.200.2.0 0.0.0.255
network 202.200.1.3 0.0.0.0
#
user-interface con 0
user-interface vty 0 4
#
return

```

[Verification]

An MP-iBGP connection has been set up between asbr-1 and PE-1/ASBR-1, and an MP-eBGP connection has been set up between asbr-1 and asbr-2.

```
<asbr-1>disp bgp peer
```

Peer	AS-num	Ver	Queued-Tx	Msg-Rx	Msg-Tx	Up/Down	State
202.200.1.2	200	4	0	422	424	06:58:21	Established
202.100.1.1	100	4	0	429	421	06:59:07	Established
202.100.1.3	100	4	0	420	425	06:59:14	Established

PE-1 private route:

```
<PE-1>disp ip routing-table vpn-instance vpna
vpna  Route Information
Routing Table: vpna  Route-Distinguisher: 100:1
Destination/Mask  Protocol Pre Cost    Nexthop    Interface
168.100.1.0/24   BGP      256 0      202.100.1.2 InLoopBack0
168.100.2.0/24   DIRECT   0 0        168.100.2.1 LoopBack10
168.100.2.1/32   DIRECT   0 0        127.0.0.1   InLoopBack0
168.200.1.0/24   BGP      256 0      202.200.1.2 InLoopBack0
168.200.2.0/24   BGP      256 0      202.200.1.3 InLoopBack0
```

PE-1 private label:

```
<PE-1>disp mpls l3vpn-lsp vpn-instance vpna
```

LSP Information: L3vpn Ingress Lsp

TOTAL: 3 Record(s) Found.

Vpn-instance Name: vpna Route Distinguisher: 100:1

NO	FEC	NEXTHOP	OUTER-LABEL	OUT-INTERFACE
1	168.100.1.0/24	172.100.2.1	3(vpn)	S2/0/0
2	168.200.2.0/24	172.100.2.1	1030(vpn)	S2/0/0
3	168.200.1.0/24	172.100.2.1	1031(vpn)	S2/0/0

LSP Information: L3vpn Egress Lsp

TOTAL: 1 Record(s) Found.

NO	VRFNAME	INNER-LABEL	NEXTHOP	OUT-INTERFACE
1	vpna	1024	0.0.0.0	InLoop0

LSP Information: L3vpn Transit Lsp

TOTAL: 0 Record(s) Found.

[Tip]

The next hop of the PE in private network is not changed in the preceding configuration.