1:通常情况下，BGP会检查对等体发来的路由的AS_PATH属性，如果其中已存在本地AS号，则BGP会忽略此路由，以免形成路由环路。

但是，在某些特殊的组网环境下（如MPLS L3VPN的Hub&Spoke组网），需要允许本地AS号在接收路由的AS_PATH属性中出现，否则无法正确发布路由。通过本配置，可以允许本地AS号在所接收的路由的AS_PATH属性中出现，并可同时配置允许出现的次数。

2: 在MPLS L3VPN中，如果PE和CE之间运行EBGP，由于BGP使用AS号检测路由环路，为保证路由信息的正确发送，需要为物理位置不同的站点分配不同的AS号。

如果物理分散的CE复用相同的AS号，就应该在PE上配置BGP的AS号替换功能。此功能是BGP的出口策略，在发布路由时有效。

使能了BGP的AS号替换功能后，当PE向指定对等体（CE）发布路由时，如果路由的AS_PATH中存在CE所在的AS号，则PE将该AS号替换成PE的AS号后，再发布该路由

R1:loopback0:1.1.1.1
R2:loopback0:2.2.2.2
R3:loopback0:3.3.3.3
R4:loopback0:4.4.4.4
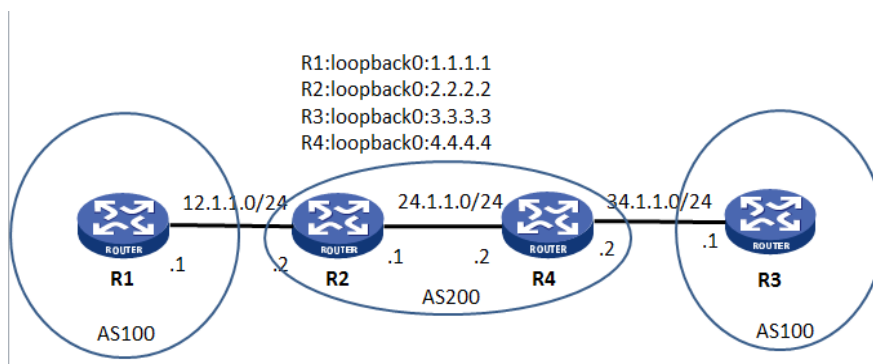
R1配置:

interface LoopBack0

 ip address 1.1.1.1 255.255.255.255

#

interface GigabitEthernet0/0

 port link-mode route

 ip address 12.1.1.1 255.255.255.0

 bgp 100

 network 1.1.1.1 255.255.255.255

 undo synchronization

 peer 12.1.1.2 as-number 200

R2配置:

version 5.20, Release 2509, Standard

#

 sysname R2

#

 mpls lsr-id 2.2.2.2

#

ip vpn-instance vpn1

 route-distinguisher 1:1

 vpn-target 1:1 export-extcommunity

 vpn-target 1:1 import-extcommunity

#

mpls

```
#
mpls ldp
#
interface LoopBack0
 ip address 2.2.2.2 255.255.255.255
#
interface GigabitEthernet0/0
 port link-mode route
 ip binding vpn-instance vpn1
 ip address 12.1.1.2 255.255.255.0
#
interface GigabitEthernet0/1
 port link-mode route
 ip address 24.1.1.1 255.255.255.0
 mpls
 mpls ldp
#
bgp 200              //和R4建立普通BGP邻居
 undo synchronization
 peer 4.4.4.4 as-number 200
 peer 4.4.4.4 connect-interface LoopBack0
#
 ipv4-family vpn-instance vpn1   //和R1建立邻居
  peer 12.1.1.1 as-number 100
#
 ipv4-family vpnv4            //和R4使能传递VPNv4能力
  peer 4.4.4.4 enable
#
ospf 1
 area 0.0.0.0
  network 24.1.1.0 0.0.0.255
  network 2.2.2.2 0.0.0.0
#
```

上述配置形成的邻居关系分别是:

display bgp peer

```
 * - Dynamically created peer
  Peer            AS  MsgRcvd  MsgSent OutQ PrefRcv Up/Down  State


  4.4.4.4          200     23    29   0     0 00:25:33 Established
```

display bgp vpnv4 all peer

```
 BGP local router ID : 24.1.1.1
 Local AS number : 200
 Total number of peers : 1          Peers in established state : 1


 * - Dynamically created peer
  Peer            AS  MsgRcvd  MsgSent OutQ PrefRcv Up/Down  State
```

display bgp vpnv4 vpn-instance vpn1 peer

 BGP local router ID : 24.1.1.1

 Local AS number : 200

 Total number of peers : 1   Peers in established state : 1

 * - Dynamically created peer
 Peer   AS MsgRcvd MsgSent OutQ PrefRcv Up/Down State

 12.1.1.1   100   34   30   0   1 00:31:52 Established
R3和R4配置对称,不赘述

此时查看BGP路由表:
display bgp routing-table   //R3是没有1.1.1.1的路由的

 Total Number of Routes: 1

 BGP Local router ID is 34.1.1.1
 Status codes: * - valid, ^ - VPN best, > - best, d - damped,
        h - history, i - internal, s - suppressed, S - Stale
        Origin : i - IGP, e - EGP, ? - incomplete

   Network   NextHop   MED   LocPrf   PrefVal Path/Ogn

* > 3.3.3.3/32   0.0.0.0   0   0   i
display bgp vpnv4 vpn-instance vpn1 routing-table

 Total Number of Routes: 2

 BGP Local router ID is 34.1.1.2
 Status codes: * - valid, ^ - VPN best, > - best, d - damped,
        h - history, i - internal, s - suppressed, S - Stale
        Origin : i - IGP, e - EGP, ? - incomplete

   Network   NextHop   MED   LocPrf   PrefVal Path/Ogn

* >i 1.1.1.1/32   2.2.2.2   0   100   0   100i
*^> 3.3.3.3/32   34.1.1.1   0   0   100i

//而R4上能学习到1.1.1.1路由，最优

下面三种方式可以让R3学习到1.1.1.1的路由：

  1) 号码变换
[R4-bgp-ipv4-vpn1]peer 34.1.1.1 substitute-as   //R4上配置
display bgp routing-table

 Total Number of Routes: 2

BGP Local router ID is 34.1.1.1

Status codes: * - valid, ^ - VPN best, > - best, d - damped,

       h - history, i - internal, s - suppressed, S - Stale

       Origin : i - IGP, e - EGP, ? - incomplete

Network	NextHop	MED	LocPrf	PrefVal	Path/Ogn
* > 1.1.1.1/32	34.1.1.2			0	200 200i

   2) Allow-as-loop

[R3-bgp]peer 34.1.1.2 allow-as-loop   //在R3配置

[R3-bgp]display bgp routing-table

Total Number of Routes: 2

BGP Local router ID is 34.1.1.1

Status codes: * - valid, ^ - VPN best, > - best, d - damped,

       h - history, i - internal, s - suppressed, S - Stale

       Origin : i - IGP, e - EGP, ? - incomplete

Network	NextHop	MED	LocPrf	PrefVal	Path/Ogn
* > 1.1.1.1/32	34.1.1.2			0	200 100i
* > 3.3.3.3/32	0.0.0.0	0		0	i

3) route-policy   //R4配置，改变原始AS编号

\#

 ip ip-prefix 1 index 10 permit 1.1.1.1 32

route-policy ggx permit node 10

 if-match ip-prefix 1

 apply as-path 300 400 replace

ipv4-family vpn-instance vpn1

 peer 34.1.1.1 as-number 100

 peer 34.1.1.1 route-policy ggx export

[R3]display bgp routing-table

Total Number of Routes: 2

BGP Local router ID is 34.1.1.1

Status codes: * - valid, ^ - VPN best, > - best, d - damped,

       h - history, i - internal, s - suppressed, S - Stale

       Origin : i - IGP, e - EGP, ? - incomplete

Network	NextHop	MED	LocPrf	PrefVal	Path/Ogn

```
* >  1.1.1.1/32      34.1.1.2                      0      200 300
                                                          400i
```

```
* >  1.1.1.1/32      34.1.1.2                      0      200 300
                                                          400i
```