问题分析报告 | 中国电信 CN2 网 | SR: 686940517 | 2019-6-17

中国电信北京 S3 设备 BGP 进程重启

故障分析报告

目录

问题描述

02:30，北京S3设备网管告警脱网，登陆设备发现BGP进程自动重启过多次，BGP重启时，所有BGP邻居重新建立，路由重新收敛，用户业务会受影响。

- 设备名称：BJ-BJ-DS-S-3.CN2.B
- 设备型号：ASR9K
- 软件版本：5.2.4

业务影响

BGP进程多次重启，用户业务多次瞬断。

事件过程

时间点	事件
17 日，2:29	北京 S3 设备网管告警脱网，登陆设备发现 BGP 进程自动重启过多次。
17 日，3:34	关闭 BGP NSR: nsr disable 后，无效，bgp 进程仍然 crash;
17 日，4:04	0/RSP0 切换到 0/RSP1 之后，观察 10 分钟，bgp 再次 crash；
17 日，4:30	Syslog 发现有几个 BFD 邻居一直在 flapping，关闭 bfd 邻居，无效，bgp 进程仍然 crash;
17 日，4:37	0/RSP1 切换到 0/RSP0 之后，04：48 bgp 发生 crash 后，至 6：31, bgp 进程未再发生 crash；
17 日，11:16	BGP 进程再次发生 crash，至 2:30 期间，发生多次 crash；
17 日，11:20	申请特批，开出两块引擎的 RMA 硬件，下午 6 点钟到货。
17 日，12:11	删除 4 个邻居的 softf-reconfigration inbound，仍然发生 crash；
17 日，02:15	关闭部分 RR 邻居，02:30 之后，BGP 邻居暂时稳定；
18 日，00:43	BGP 进程再次发生两次 crash，后续暂时稳定；
18 日，02:28	由于再次发生 crash，实施研发给的建议，将 maximum-paths 从 eibgp 修改为 ebgp；
20 日，08:23	将 VRF:CDMA-EPC-MGNT 下的 maximum-paths 从 ebgp+ibgp 修改为 ebgp。

问题分析

1. 自17日02:30到18日01:00期间，BGP进程发生多次crash，每次BGP进程crash之后，BGP邻居都会重新建立，

```
RP/0/RSP0/CPU0:Jun 18 00:43:54.966 : dumper[59]: %OS-DUMPER-7-DUMP_REQUEST : Dump request for process pkg/bin/bgp
RP/0/RSP0/CPU0:Jun 18 00:43:54.970 : dumper[59]: %OS-DUMPER-7-DUMP_ATTRIBUTE : Dump request with attribute 7 for process
pkg/bin/bgp
RP/0/RSP0/CPU0:Jun 18 00:43:54.971 : dumper[59]: %OS-DUMPER-4-SIGSEGV : Thread 18 received SIGSEGV - Segmentation Fault
RP/0/RSP0/CPU0:Jun 18 00:43:54.971 : dumper[59]: %OS-DUMPER-4-SIGSEGV_INFO : Accessed BadAddr 0x0 at PC 0xffffffff. Signal code 0
- Unknown SIGSEGV code. 0
RP/0/RSP0/CPU0:Jun 18 00:43:54.972 : dumper[59]: %OS-DUMPER-4-SIGNALCORE_INFO : Core for pid = 6082809 (pkg/bin/bgp) as signal
11 sent by pkg/bin/bgp@node0_RSP0_CPU0
RP/0/RSP0/CPU0:Jun 18 00:43:54.975 : dumper[59]: %OS-DUMPER-7-PROC_PAGES : Process memory pages 1092
RP/0/RSP0/CPU0:Jun 18 00:43:54.980 : dumper[59]: %OS-DUMPER-6-FALLBACK_CHOICE : Fall back choice:   0(harddisk:/dumper) in use
RP/0/RSP0/CPU0:Jun 18 00:43:54.981 : dumper[59]: %OS-DUMPER-6-REGISTERS_INFO :                r0       r1       r2       r3
RP/0/RSP0/CPU0:Jun 18 00:43:54.981 : dumper[59]: %OS-DUMPER-6-REGISTERS_INFO :    R0   00000000 e7ace140 500506b0
00000001
RP/0/RSP0/CPU0:Jun 18 00:43:54.981 : dumper[59]: %OS-DUMPER-6-REGISTERS_INFO :                r4       r5       r6       r7
RP/0/RSP0/CPU0:Jun 18 00:43:54.981 : dumper[59]: %OS-DUMPER-6-REGISTERS_INFO :    R4   00000144 00000004 50ad8a0c
00000000
RP/0/RSP0/CPU0:Jun 18 00:43:54.981 : dumper[59]: %OS-DUMPER-6-REGISTERS_INFO :                r8       r9       r10      r11
RP/0/RSP0/CPU0:Jun 18 00:43:54.981 : dumper[59]: %OS-DUMPER-6-REGISTERS_INFO :    R8   00000008 00000001 ec50ae88
00000008
RP/0/RSP0/CPU0:Jun 18 00:43:54.981 : dumper[59]: %OS-DUMPER-6-REGISTERS_INFO :               r12      r13      r14      r15
RP/0/RSP0/CPU0:Jun 18 00:43:54.981 : dumper[59]: %OS-DUMPER-6-REGISTERS_INFO :    R12  ec4f6e34 500506b0 ec4f6e10
e7acea28
RP/0/RSP0/CPU0:Jun 18 00:43:54.981 : dumper[59]: %OS-DUMPER-6-REGISTERS_INFO :               r16      r17      r18      r19
RP/0/RSP0/CPU0:Jun 18 00:43:54.981 : dumper[59]: %OS-DUMPER-6-REGISTERS_INFO :    R16  000a5170 ec4f0000 ec504bb0
00000000
RP/0/RSP0/CPU0:Jun 18 00:43:54.981 : dumper[59]: %OS-DUMPER-6-REGISTERS_INFO :               r20      r21      r22      r23
RP/0/RSP0/CPU0:Jun 18 00:43:54.981 : dumper[59]: %OS-DUMPER-6-REGISTERS_INFO :    R20  ec4fae88 e7aced10 516ceee0
51174024
RP/0/RSP0/CPU0:Jun 18 00:43:54.981 : dumper[59]: %OS-DUMPER-6-REGISTERS_INFO :               r24      r25      r26      r27
RP/0/RSP0/CPU0:Jun 18 00:43:54.981 : dumper[59]: %OS-DUMPER-6-REGISTERS_INFO :    R24  ec4fae88 4a10f7f8 ec4f6e34
00000003
RP/0/RSP0/CPU0:Jun 18 00:43:54.982 : dumper[59]: %OS-DUMPER-6-REGISTERS_INFO :               r28      r29      r30      r31
RP/0/RSP0/CPU0:Jun 18 00:43:54.982 : dumper[59]: %OS-DUMPER-6-REGISTERS_INFO :    R28  581ff400 00000008 00000008
e7ace140
RP/0/RSP0/CPU0:Jun 18 00:43:54.982 : dumper[59]: %OS-DUMPER-6-REGISTERS_INFO :               cnt      lr       msr      pc
RP/0/RSP0/CPU0:Jun 18 00:43:54.982 : dumper[59]: %OS-DUMPER-6-REGISTERS_INFO :    R32  4a4dea34 4a105d14 0000d932
4a101238
RP/0/RSP0/CPU0:Jun 18 00:43:54.982 : dumper[59]: %OS-DUMPER-6-REGISTERS_INFO :               cnd      xer
RP/0/RSP0/CPU0:Jun 18 00:43:54.982 : dumper[59]: %OS-DUMPER-6-REGISTERS_INFO :    R36  82022084 20000000
RP/0/RSP0/CPU0:Jun 18 00:43:54.982 : dumper[59]: %OS-DUMPER-6-TRACE_BACK : #0   0x4a101238
RP/0/RSP0/CPU0:Jun 18 00:43:55.202 : dumper[59]: %OS-DUMPER-6-TRACE_BACK : #1   0x4a105d14
RP/0/RSP0/CPU0:Jun 18 00:43:55.202 : dumper[59]: %OS-DUMPER-6-TRACE_BACK : #2   0x4a1045d4
RP/0/RSP0/CPU0:Jun 18 00:43:55.202 : dumper[59]: %OS-DUMPER-6-TRACE_BACK : #3   0x4a109740
RP/0/RSP0/CPU0:Jun 18 00:43:55.202 : dumper[59]: %OS-DUMPER-6-TRACE_BACK : #4   0x4a0b86f4
RP/0/RSP0/CPU0:Jun 18 00:43:55.202 : dumper[59]: %OS-DUMPER-6-TRACE_BACK : #5   0x4a236730
RP/0/RSP0/CPU0:Jun 18 00:43:55.202 : dumper[59]: %OS-DUMPER-6-TRACE_BACK : #6   0x4a236b8c
RP/0/RSP0/CPU0:Jun 18 00:43:55.202 : dumper[59]: %OS-DUMPER-6-TRACE_BACK : #7   0x4a237554
RP/0/RSP0/CPU0:Jun 18 00:43:55.202 : dumper[59]: %OS-DUMPER-6-TRACE_BACK : #8   0x4a0bbdf4
RP/0/RSP0/CPU0:Jun 18 00:43:55.202 : dumper[59]: %OS-DUMPER-6-TRACE_BACK : #9   0x4a236730
```

RP/0/RSP0/CPU0:Jun 18 00:43:55.202 : dumper[59]: %OS-DUMPER-6-TRACE_BACK : #10 0x4a236b8c
RP/0/RSP0/CPU0:Jun 18 00:43:55.202 : dumper[59]: %OS-DUMPER-6-TRACE_BACK : #11 0x4a237554
RP/0/RSP0/CPU0:Jun 18 00:43:55.202 : dumper[59]: %OS-DUMPER-6-TRACE_BACK : #12 0x4a0b8e30
RP/0/RSP0/CPU0:Jun 18 00:43:55.202 : dumper[59]: %OS-DUMPER-6-TRACE_BACK : #13 0x4a10657c
RP/0/RSP0/CPU0:Jun 18 00:43:55.202 : dumper[59]: %OS-DUMPER-6-TRACE_BACK : #14 0x4a107a18
RP/0/RSP0/CPU0:Jun 18 00:43:55.202 : dumper[59]: %OS-DUMPER-6-TRACE_BACK : #15 0x4a2b7688

所有BGP邻居重新建立，路由重新收敛。

RP/0/RSP0/CPU0:Jun 17 14:30:48.328 : bgp[1053]: %ROUTING-BGP-5-ADJCHANGE_DETAIL : neighbor 192.168.30.2 Up (VRF: CTVPN55238A-BT; AFI/SAFI: 1/1) (AS: 64807)
RP/0/RSP0/CPU0:Jun 17 14:30:48.949 : bgp[1053]: %ROUTING-BGP-5-ADJCHANGE_DETAIL : neighbor 10.251.133.34 Up (VRF: CDMA-NGN; AFI/SAFI: 1/1) (AS: 64992)
RP/0/RSP0/CPU0:Jun 17 14:30:48.988 : bgp[1053]: %ROUTING-BGP-5-ADJCHANGE_DETAIL : neighbor 2403:700:0:103e::1 Up (VRF: CTVPN52008-sony; AFI/SAFI: 2/1) (AS: 65456)
LC/0/5/CPU0:Jun 17 14:30:53.458 : bfd_agent[128]: %L2-BFD-6-SESSION_STATE_UP : BFD session to neighbor 10.251.133.34 on interface TenGigE0/5/0/2.2003 is up
RP/0/RSP0/CPU0:Jun 17 14:30:54.550 : bgp[1053]: %ROUTING-BGP-5-ADJCHANGE_DETAIL : neighbor 10.179.0.70 Up (VRF: CTVPN80132-TBJT; AFI/SAFI: 1/1) (AS: 64526)
LC/0/4/CPU0:Jun 17 14:30:54.553 : bfd_agent[128]: %L2-BFD-6-SESSION_STATE_UP : BFD session to neighbor 10.179.0.70 on interface GigabitEthernet0/4/0/0.156 is up
RP/0/RSP0/CPU0:Jun 17 14:30:56.774 : bgp[1053]: %ROUTING-BGP-5-ADJCHANGE_DETAIL : neighbor 10.27.249.214 Up (VRF: CTVPN53061-StandardCharter; AFI/SAFI: 1/1) (AS: 65025)
RP/0/RSP0/CPU0:Jun 17 14:30:57.813 : bgp[1053]: %ROUTING-BGP-5-ADJCHANGE_DETAIL : neighbor 10.0.27.122 Up (VRF: CTVPN54617-BMW; AFI/SAFI: 1/1) (AS: 65515)
LC/0/4/CPU0:Jun 17 14:30:57.813 : bfd_agent[128]: %L2-BFD-6-SESSION_STATE_UP : BFD session to neighbor 10.0.27.122 on interface GigabitEthernet0/4/0/10.188 is up
RP/0/RSP0/CPU0:Jun 17 14:30:57.843 : bgp[1053]: %ROUTING-BGP-5-ADJCHANGE_DETAIL : neighbor 192.120.52.50 Up (VRF: CTVPN55623-ATT-HP; AFI/SAFI: 1/1) (AS: 65505)
LC/0/4/CPU0:Jun 17 14:30:57.863 : bfd_agent[128]: %L2-BFD-6-SESSION_STATE_UP : BFD session to neighbor 192.120.52.50 on interface GigabitEthernet0/4/0/10.230 is up
RP/0/RSP0/CPU0:Jun 17 14:30:59.549 : bgp[1053]: %ROUTING-BGP-5-ADJCHANGE_DETAIL : neighbor 100.66.130.250 Up (VRF: CDMA-EPC-MGNT; AFI/SAFI: 1/1) (AS: 58564)
RP/0/RSP0/CPU0:Jun 17 14:30:59.993 : bgp[1053]: %ROUTING-BGP-5-ADJCHANGE_DETAIL : neighbor 172.26.6.1 Up (VRF: CTVPN55247-ZGDXXTJC; AFI/SAFI: 1/1) (AS: 65000)
LC/0/4/CPU0:Jun 17 14:30:59.998 : bfd_agent[128]: %L2-BFD-6-SESSION_STATE_UP : BFD session to neighbor 172.26.6.1 on interface GigabitEthernet0/4/0/0.227 is up
RP/0/RSP0/CPU0:Jun 17 14:31:00.039 : bgp[1053]: %ROUTING-BGP-5-ADJCHANGE_DETAIL : neighbor 172.24.154.253 Up (VRF: CTVPN53040-HuaRun; AFI/SAFI: 1/1) (AS: 65130)
RP/0/RSP0/CPU0:Jun 17 14:31:01.225 : bgp[1053]: %ROUTING-BGP-5-ADJCHANGE_DETAIL : neighbor 10.2.253.253 Up (VRF: CTVPN55109-BJSSWY; AFI/SAFI: 1/1) (AS: 65000)
RP/0/RSP0/CPU0:Jun 17 14:31:01.312 : bgp[1053]: %ROUTING-BGP-5-ADJCHANGE_DETAIL : neighbor 10.232.0.50 Up (VRF: CDMA-PI2; AFI/SAFI: 1/1) (AS: 64560)
RP/0/RSP0/CPU0:Jun 17 14:31:01.312 : bgp[1053]: %ROUTING-BGP-5-ADJCHANGE_DETAIL : neighbor 10.231.3.6 Up (VRF: CDMA-EPC-MGNT; AFI/SAFI: 1/1) (AS: 64560)
RP/0/RSP0/CPU0:Jun 17 14:31:01.314 : bgp[1053]: %ROUTING-BGP-5-ADJCHANGE_DETAIL : neighbor 115.169.96.218 Up (VRF: CDMA-EPC; AFI/SAFI: 1/1) (AS: 64560)
RP/0/RSP0/CPU0:Jun 17 14:31:01.314 : bgp[1053]: %ROUTING-BGP-5-ADJCHANGE_DETAIL : neighbor 115.168.32.70 Up (VRF: CDMA-PI0; AFI/SAFI: 1/1) (AS: 64560)
RP/0/RSP0/CPU0:Jun 17 14:31:01.314 : bgp[1053]: %ROUTING-BGP-5-ADJCHANGE_DETAIL : neighbor 10.233.21.6 Up (VRF: CDMA-PI1; AFI/SAFI: 1/1) (AS: 64560)
LC/0/7/CPU0:Jun 17 14:31:01.311 : bfd_agent[128]: %L2-BFD-6-SESSION_STATE_UP : BFD session to neighbor 10.232.0.50 on interface TenGigE0/7/0/0.3002 is up
LC/0/7/CPU0:Jun 17 14:31:01.336 : bfd_agent[128]: %L2-BFD-6-SESSION_STATE_UP : BFD session to neighbor 10.231.3.6 on interface TenGigE0/7/0/0.4006 is up
LC/0/7/CPU0:Jun 17 14:31:01.376 : bfd_agent[128]: %L2-BFD-6-SESSION_STATE_UP : BFD session to neighbor 115.169.96.218 on interface TenGigE0/7/0/0.4001 is up
RP/0/RSP0/CPU0:Jun 17 14:31:01.394 : bgp[1053]: %ROUTING-BGP-5-ADJCHANGE_DETAIL : neighbor 10.3.30.253 Up (VRF:

CTVPN55109-BJSSWY; AFI/SAFI: 1/1) (AS: 65000)
LC/0/7/CPU0:Jun 17 14:31:01.391 : bfd_agent[128]: %L2-BFD-6-SESSION_STATE_UP : BFD session to neighbor 115.168.32.70 on interface TenGigE0/7/0/0.3000 is up
LC/0/7/CPU0:Jun 17 14:31:01.436 : bfd_agent[128]: %L2-BFD-6-SESSION_STATE_UP : BFD session to neighbor 10.233.21.6 on interface TenGigE0/7/0/0.3001 is up
RP/0/RSP0/CPU0:Jun 17 14:31:01.474 : bgp[1053]: %ROUTING-BGP-5-ADJCHANGE_DETAIL : neighbor 10.0.3.1 Up (VRF: CTVPN55788-GDJLWJZP; AFI/SAFI: 1/1) (AS: 65003)
RP/0/RSP0/CPU0:Jun 17 14:31:01.562 : bgp[1053]: %ROUTING-BGP-5-ADJCHANGE_DETAIL : neighbor 10.206.254.10 Up (VRF: CTVPN1124-CTITDCN; AFI/SAFI: 1/1) (AS: 58565)
RP/0/RSP0/CPU0:Jun 17 14:31:01.565 : bgp[1053]: %ROUTING-BGP-5-ADJCHANGE_DETAIL : neighbor 115.170.11.230 Up (VRF: CDMA-EPC; AFI/SAFI: 1/1) (AS: 58565)
RP/0/RSP0/CPU0:Jun 17 14:31:02.378 : bgp[1053]: %ROUTING-BGP-5-ADJCHANGE_DETAIL : neighbor 172.17.130.6 Up (VRF: CTVPN80430-RBSXBJ; AFI/SAFI: 1/1) (AS: 64550)
RP/0/RSP0/CPU0:Jun 17 14:31:02.736 : bgp[1053]: %ROUTING-BGP-5-ADJCHANGE_DETAIL : neighbor 42.156.36.177 Up (VRF: CTVPN55560-CTGHK; AFI/SAFI: 1/1) (AS: 58564)
RP/0/RSP0/CPU0:Jun 17 14:31:02.749 : bgp[1053]: %ROUTING-BGP-5-ADJCHANGE_DETAIL : neighbor 115.170.11.210 Up (VRF: CDMA-EPC; AFI/SAFI: 1/1) (AS: 58564)
RP/0/RSP0/CPU0:Jun 17 14:31:02.749 : bgp[1053]: %ROUTING-BGP-5-ADJCHANGE_DETAIL : neighbor 10.218.43.10 Up (VRF: CDMA-PI1; AFI/SAFI: 1/1) (AS: 58564)
RP/0/RSP0/CPU0:Jun 17 14:31:02.749 : bgp[1053]: %ROUTING-BGP-5-ADJCHANGE_DETAIL : neighbor 42.156.36.129 Up (VRF: CTVPN55533-CTHK; AFI/SAFI: 1/1) (AS: 58564)
RP/0/RSP0/CPU0:Jun 17 14:31:02.749 : bgp[1053]: %ROUTING-BGP-5-ADJCHANGE_DETAIL : neighbor 203.223.16.50 Up (VRF: CTVPN55195-ZGDXGJGS; AFI/SAFI: 1/1) (AS: 58564)
LC/0/6/CPU0:Jun 17 14:31:02.746 : bfd_agent[128]: %L2-BFD-6-SESSION_STATE_UP : BFD session to neighbor 42.156.36.177 on interface TenGigE0/6/0/2.1006 is up
RP/0/RSP0/CPU0:Jun 17 14:31:02.782 : bgp[1053]: %ROUTING-BGP-5-ADJCHANGE_DETAIL : neighbor 132.37.94.61 Up (VRF: CTVPN55416-JTYWGGBFDCN; AFI/SAFI: 1/1) (AS: 65532)
RP/0/RSP0/CPU0:Jun 17 14:31:02.782 : bgp[1053]: %ROUTING-BGP-5-ADJCHANGE_DETAIL : neighbor 132.37.89.45 Up (VRF: CTVPN1131-ZGDX; AFI/SAFI: 1/1) (AS: 65532)
RP/0/RSP0/CPU0:Jun 17 14:31:02.846 : bgp[1053]: %ROUTING-BGP-5-ADJCHANGE_DETAIL : neighbor 100.66.130.66 Up (VRF: CDMA-EPC-MGNT; AFI/SAFI: 1/1) (AS: 58564)
LC/0/6/CPU0:Jun 17 14:31:02.856 : bfd_agent[128]: %L2-BFD-6-SESSION_STATE_UP : BFD session to neighbor 42.156.36.129 on interface TenGigE0/6/0/2.1005 is up
LC/0/6/CPU0:Jun 17 14:31:02.861 : bfd_agent[128]: %L2-BFD-6-SESSION_STATE_UP : BFD session to neighbor 203.223.16.50 on interface TenGigE0/6/0/2.503 is up
RP/0/RSP0/CPU0:Jun 17 14:31:03.010 : bgp[1053]: %ROUTING-BGP-5-ADJCHANGE_DETAIL : neighbor 10.236.0.58 Up (VRF: CDMA-NGN; AFI/SAFI: 1/1) (AS: 64560)
RP/0/RSP0/CPU0:Jun 17 14:31:03.010 : bgp[1053]: %ROUTING-BGP-5-ADJCHANGE_DETAIL : neighbor 115.168.64.26 Up (VRF: CDMA-PI0; AFI/SAFI: 1/1) (AS: 64560)
LC/0/7/CPU0:Jun 17 14:31:03.016 : bfd_agent[128]: %L2-BFD-6-SESSION_STATE_UP : BFD session to neighbor 10.236.0.58 on interface TenGigE0/7/0/2.2003 is up
LC/0/7/CPU0:Jun 17 14:31:03.031 : bfd_agent[128]: %L2-BFD-6-SESSION_STATE_UP : BFD session to neighbor 115.168.64.26 on interface TenGigE0/7/0/2.3000 is up
RP/0/RSP0/CPU0:Jun 17 14:31:03.054 : bgp[1053]: %ROUTING-BGP-5-ADJCHANGE_DETAIL : neighbor 10.160.162.73 Up (VRF: CTVPN55696-Richfit; AFI/SAFI: 1/1) (AS: 65450)
RP/0/RSP0/CPU0:Jun 17 14:31:03.074 : bgp[1053]: %ROUTING-BGP-5-ADJCHANGE_DETAIL : neighbor 132.37.94.2 Up (VRF: CTVPN1121-OTN-Hub; AFI/SAFI: 1/1) (AS: 65533)
RP/0/RSP0/CPU0:Jun 17 14:31:03.079 : bgp[1053]: %ROUTING-BGP-5-ADJCHANGE_DETAIL : neighbor 132.37.94.5 Up (VRF: CTVPN1018-GJCSH; AFI/SAFI: 1/1) (AS: 65534)
RP/0/RSP0/CPU0:Jun 17 14:31:03.301 : bgp[1053]: %ROUTING-BGP-5-ADJCHANGE_DETAIL : neighbor 10.232.0.46 Up (VRF: CDMA-PI2; AFI/SAFI: 1/1) (AS: 64560)
RP/0/RSP0/CPU0:Jun 17 14:31:03.303 : bgp[1053]: %ROUTING-BGP-5-ADJCHANGE_DETAIL : neighbor 115.168.32.66 Up (VRF: CDMA-PI0; AFI/SAFI: 1/1) (AS: 64560)
RP/0/RSP0/CPU0:Jun 17 14:31:03.303 : bgp[1053]: %ROUTING-BGP-5-ADJCHANGE_DETAIL : neighbor 115.169.96.214 Up (VRF: CDMA-EPC; AFI/SAFI: 1/1) (AS: 64560)
RP/0/RSP0/CPU0:Jun 17 14:31:03.303 : bgp[1053]: %ROUTING-BGP-5-ADJCHANGE_DETAIL : neighbor 10.231.3.2 Up (VRF: CDMA-EPC-MGNT; AFI/SAFI: 1/1) (AS: 64560)

LC/0/6/CPU0:Jun 17 14:31:03.301 : bfd_agent[128]: %L2-BFD-6-SESSION_STATE_UP : BFD session to neighbor 10.232.0.46 on interface TenGigE0/6/0/0.3002 is up

RP/0/RSP0/CPU0:Jun 17 14:31:03.307 : bgp[1053]: %ROUTING-BGP-5-ADJCHANGE_DETAIL : neighbor 10.233.21.2 Up (VRF: CDMA-PI1; AFI/SAFI: 1/1) (AS: 64560)

RP/0/RSP0/CPU0:Jun 17 14:31:03.318 : bgp[1053]: %ROUTING-BGP-5-ADJCHANGE_DETAIL : neighbor 10.236.0.62 Up (VRF: CDMA-NGN; AFI/SAFI: 1/1) (AS: 64560)

LC/0/6/CPU0:Jun 17 14:31:03.321 : bfd_agent[128]: %L2-BFD-6-SESSION_STATE_UP : BFD session to neighbor 10.236.0.62 on interface TenGigE0/6/0/1.2003 is up

LC/0/6/CPU0:Jun 17 14:31:03.326 : bfd_agent[128]: %L2-BFD-6-SESSION_STATE_UP : BFD session to neighbor 115.168.32.66 on interface TenGigE0/6/0/0.3000 is up

LC/0/6/CPU0:Jun 17 14:31:03.356 : bfd_agent[128]: %L2-BFD-6-SESSION_STATE_UP : BFD session to neighbor 115.169.96.214 on interface TenGigE0/6/0/0.4001 is up

LC/0/6/CPU0:Jun 17 14:31:03.371 : bfd_agent[128]: %L2-BFD-6-SESSION_STATE_UP : BFD session to neighbor 10.231.3.2 on interface TenGigE0/6/0/0.4006 is up

LC/0/6/CPU0:Jun 17 14:31:03.376 : bfd_agent[128]: %L2-BFD-6-SESSION_STATE_UP : BFD session to neighbor 10.233.21.2 on interface TenGigE0/6/0/0.3001 is up

RP/0/RSP0/CPU0:Jun 17 14:31:03.399 : bgp[1053]: %ROUTING-BGP-5-ADJCHANGE_DETAIL : neighbor 10.218.43.50 Up (VRF: CDMA-PI2; AFI/SAFI: 1/1) (AS: 58564)

RP/0/RSP0/CPU0:Jun 17 14:31:03.405 : bgp[1053]: %ROUTING-BGP-5-ADJCHANGE_DETAIL : neighbor 203.223.16.54 Up (VRF: CTVPN55195-ZGDXGJGS; AFI/SAFI: 1/1) (AS: 58564)

RP/0/RSP0/CPU0:Jun 17 14:31:03.405 : bgp[1053]: %ROUTING-BGP-5-ADJCHANGE_DETAIL : neighbor 115.170.11.222 Up (VRF: CDMA-EPC; AFI/SAFI: 1/1) (AS: 58564)

RP/0/RSP0/CPU0:Jun 17 14:31:03.405 : bgp[1053]: %ROUTING-BGP-5-ADJCHANGE_DETAIL : neighbor 42.156.36.185 Up (VRF: CTVPN55560-CTGHK; AFI/SAFI: 1/1) (AS: 58564)

RP/0/RSP0/CPU0:Jun 17 14:31:03.405 : bgp[1053]: %ROUTING-BGP-5-ADJCHANGE_DETAIL : neighbor 42.156.36.137 Up (VRF: CTVPN55533-CTHK; AFI/SAFI: 1/1) (AS: 58564)

RP/0/RSP0/CPU0:Jun 17 14:31:03.405 : bgp[1053]: %ROUTING-BGP-5-ADJCHANGE_DETAIL : neighbor 10.218.43.18 Up (VRF: CDMA-PI1; AFI/SAFI: 1/1) (AS: 58564)

LC/0/6/CPU0:Jun 17 14:31:03.431 : bfd_agent[128]: %L2-BFD-6-SESSION_STATE_UP : BFD session to neighbor 203.223.16.54 on interface TenGigE0/6/0/3.501 is up

LC/0/6/CPU0:Jun 17 14:31:03.516 : bfd_agent[128]: %L2-BFD-6-SESSION_STATE_UP : BFD session to neighbor 42.156.36.185 on interface TenGigE0/6/0/3.1006 is up

LC/0/6/CPU0:Jun 17 14:31:03.521 : bfd_agent[128]: %L2-BFD-6-SESSION_STATE_UP : BFD session to neighbor 42.156.36.137 on interface TenGigE0/6/0/3.1005 is up

BGP邻居在约在1分钟之内，重新建立，路由收敛完成。

RP/0/RSP0/CPU0:BJ-BJ-DS-S-3.CN2.B#show bgp table vpnv4 unicast

Tue Jun 18 11:22:50.628 GMT

Neighbor	VRF	Spk	AS	TblVer	InQ	OutQ	St/PfxRcd
59.43.8.1	default	0	4809	0	0	0	Idle (Admin)
59.43.8.191	default	0	4809	692521	0	0	172704
59.43.10.188	default	0	4809	692521	0	0	29892
59.43.10.193	default	0	4809	0	0	0	Idle (Admin)
132.31.0.217	CDMA-IT	0	64992	692525	0	0	1
132.31.0.225	CDMA-IT	0	64992	692525	0	0	1
115.169.96.214	CDMA-EPC	0	64560	692525	0	0	5
115.169.96.218	CDMA-EPC	0	64560	692525	0	0	5
115.170.11.34	CDMA-EPC	0	58564	0	0	0	Idle
115.170.11.210	CDMA-EPC	0	58564	692525	0	0	8
115.170.11.222	CDMA-EPC	0	58564	692525	0	0	8
115.170.11.230	CDMA-EPC	0	58565	692525	0	0	10
115.170.113.25	CDMA-EPC	0	64992	692525	0	0	4
115.170.113.194	CDMA-EPC	0	64992	692525	0	0	1
115.170.113.202	CDMA-EPC	0	64992	692525	0	0	1
10.236.0.58	CDMA-NGN	0	64560	692525	0	0	4
10.236.0.62	CDMA-NGN	0	64560	692525	0	0	4
10.251.133.2	CDMA-NGN	0	64992	692525	0	0	7
10.251.133.10	CDMA-NGN	0	64992	692525	0	0	7
10.251.133.34	CDMA-NGN	0	64992	692525	0	0	2
10.251.133.38	CDMA-NGN	0	64992	692525	0	0	2
115.168.32.66	CDMA-PI0	0	64560	692525	0	0	0

115.168.32.70	CDMA-PI0	0 64560	692525	0	0	0
115.168.64.26	CDMA-PI0	0 64560	692525	0	0	2
10.218.33.2	CDMA-PI1	0 64992	692525	0	0	2
10.218.33.6	CDMA-PI1	0 64992	692525	0	0	1
10.218.43.10	CDMA-PI1	0 58564	692525	0	0	2
10.218.43.18	CDMA-PI1	0 58564	692525	0	0	2
10.233.21.2	CDMA-PI1	0 64560	692525	0	0	6
10.233.21.6	CDMA-PI1	0 64560	692525	0	0	6
10.235.204.1	CDMA-PI1	0 64992	692525	0	0	33
10.235.204.17	CDMA-PI1	0 64992	692525	0	0	31
10.218.43.42	CDMA-PI2	0 58564	692525	0	0	0
10.218.43.50	CDMA-PI2	0 58564	692525	0	0	0
10.232.0.46	CDMA-PI2	0 64560	692525	0	0	1
10.232.0.50	CDMA-PI2	0 64560	692525	0	0	1
4.255.255.2	CTVPN195	0 64992	692525	0	0	1
4.255.255.10	CTVPN195	0 64992	692525	0	0	1
10.0.0.225	CTVPN1035	0 64992	692525	0	0	2
10.0.0.233	CTVPN1035	0 64992	692525	0	0	2
192.168.128.10	CTVPN1107	0 64992	692525	0	0	6
192.168.128.14	CTVPN1107	0 64992	692525	0	0	6
192.168.231.2	CTVPN1107	0 64992	692525	0	0	4
221.0.175.198	CTVPN54944	0 65183	0	0	0 Active	
10.255.127.242	CTVPN1107-1	0 58519	692527	0	0	5
169.254.37.246	CTVPN55984-N	0 65100	692528	0	0	3
169.254.38.66	CTVPN56025-C	0 65002	692528	0	0	5
10.231.3.2	CDMA-EPC-MGNT	0 64560	692528	0	0	2
10.231.3.6	CDMA-EPC-MGNT	0 64560	692528	0	0	2
10.231.165.9	CDMA-EPC-MGNT	0 64992	692528	0	0	1
100.66.130.66	CDMA-EPC-MGNT	0 58564	692528	0	0	1
100.66.130.250	CDMA-EPC-MGNT	0 58564	692528	0	0	1
10.235.188.2	CDMA-MGNT-HUB	0 64992	692528	0	0	6
10.235.188.6	CDMA-MGNT-HUB	0 64992	692528	0	0	5
10.255.235.2	CDMA-NGN-MGNT	0 64992	692528	0	0	4
10.255.235.6	CDMA-NGN-MGNT	0 64992	692528	0	0	4
10.255.235.34	CDMA-NGN-MGNT	0 64992	692528	0	0	2
10.255.235.38	CDMA-NGN-MGNT	0 64992	692528	0	0	1
10.99.45.1	CT-CN2-MANAGE	0 64992	692528	0	0	1
172.16.64.66	CTVPN1100-SOC	0 64992	692528	0	0	7
172.17.0.1	CTVPN1100-SOC	0 64998	0	0	0 Active	
172.22.128.5	CTVPN1100-SOC	0 64992	692528	0	0	7
172.30.18.2	CTVPN1104-IDC	0 64992	692528	0	0	2
172.16.2.222	CTVPN1042-WARN	0 64992	692528	0	0	3
132.37.89.45	CTVPN1131-ZGDX	0 65532	692529	0	0	16
132.37.89.53	CTVPN1131-ZGDX	0 64992	692529	0	0	5
198.19.19.66	CTVPN52520-BMW	0 65202	692529	0	0	200
218.30.52.70	CTVPN52529-ACS	0 65300	692529	0	0	2
10.74.32.241	CTVPN53450-GAP	0 64726	692529	0	0	1
10.74.72.241	CTVPN53450-GAP	0 64726	692529	0	0	1
10.74.188.245	CTVPN53450-GAP	0 64726	692529	0	0	1
10.74.240.241	CTVPN53450-GAP	0 64726	692529	0	0	1
10.75.240.245	CTVPN53450-GAP	0 64726	692529	0	0	1
172.16.28.29	CTVPN53450-GAP	0 65133	692529	0	0	4
172.31.0.174	CTVPN53801-ADP	0 65436	692529	0	0	31
10.0.9.62	CTVPN54617-BMW	0 65515	692529	0	0	1

BGP进程每次crash都会生成dumper文件

281740	-rw-	21272	Tue Jun 18 00:44:10 2019	bgp_1053.by.bgp.20190618-004355.node0_RSP0_CPU0.ppc.txt
281741	-rw-	210955	Tue Jun 18 00:44:10 2019	bgp_1053.by.bgp.20190618-004355.node0_RSP0_CPU0.ppc.cpu_info.Z
281742	-rw-	21274	Tue Jun 18 00:55:12 2019	bgp_1053.by.bgp.20190618-005456.node0_RSP0_CPU0.ppc.txt
281743	-rw-	422079	Tue Jun 18 00:55:12 2019	bgp_1053.by.bgp.20190618-005456.node0_RSP0_CPU0.ppc.cpu_info.Z

后台研发通过decode解码，bgp进程crash的原因为，在vpn路由导入时发生错误导致，命中已知软件bug：CSCuy72505。

```
0x4c081238: iox_assert
/san1/EFR/smu_r52x_5_2_4/workspace/inc/ppc-nto/global/iosxr-os/os/assert.h:48
```

```
/auto/smuarchive1/5.2.4/asr9k-px-5.2.4.CSCva45370/sym/ipv4/bgp/lib/obj-ppc-nto/libbgp_import.dll.sym

0x4c085d14: bgp_import_init_table_info
/san1/EFR/smu_r52x_5_2_4/workspace/ipv4/bgp/lib/src/bgp_import.c:1899
/auto/smuarchive1/5.2.4/asr9k-px-5.2.4.CSCva45370/sym/ipv4/bgp/lib/obj-ppc-nto/libbgp_import.dll.sym

0x4c02ce30: bgp_rd_table_walktree_cond
/san1/EFR/smu_r52x_5_2_4/workspace/ipv4/bgp/lib/table/src/bgp_rd_table.c:2249
/auto/smuarchive1/5.2.4/asr9k-px-5.2.4.CSCva45370/sym/ipv4/bgp/lib/table/obj-ppc-nto/libbgp_table.dll.sym

0x4c08657c: bgp_import_internal
/san1/EFR/smu_r52x_5_2_4/workspace/ipv4/bgp/lib/src/bgp_import.c:3629
/auto/smuarchive1/5.2.4/asr9k-px-5.2.4.CSCva45370/sym/ipv4/bgp/lib/obj-ppc-nto/libbgp_import.dll.sym

0x4c087a18: bgp_import_handler
/san1/EFR/smu_r52x_5_2_4/workspace/ipv4/bgp/lib/src/bgp_import.c:3838
/auto/smuarchive1/5.2.4/asr9k-px-5.2.4.CSCva45370/sym/ipv4/bgp/lib/obj-ppc-nto/libbgp_import.dll.sym

0x4a2b7688: _event_pulse_handler
/auto/srcarchive13/production/5.2.4/all/workspace/infra/infra/event_manager/src/event_async.c:377
/auto/ioxarchive4/sym/5.2.4_ASR9K/all/infra/infra/obj-ppc-nto/libinfra.dll.sym

0x4a2b5394: event_dispatch
/auto/srcarchive13/production/5.2.4/all/workspace/infra/infra/event_manager/src/event_manager.c:816
/auto/ioxarchive4/sym/5.2.4_ASR9K/all/infra/infra/obj-ppc-nto/libinfra.dll.sym

0x4ad82918: bgp_event_loop
/san1/EFR/smu_r52x_5_2_4/workspace/ipv4/bgp/lib/src/bgp_thread_util.c:209
/auto/smuarchive1/5.2.4/asr9k-px-5.2.4.CSCva45370/sym/ipv4/bgp/lib/obj-ppc-nto/libbgp_util_common.dll.sym

0x4c0820c8: bgp_import_thread
/san1/EFR/smu_r52x_5_2_4/workspace/ipv4/bgp/lib/src/bgp_import.c:5022
/auto/smuarchive1/5.2.4/asr9k-px-5.2.4.CSCva45370/sym/ipv4/bgp/lib/obj-ppc-nto/libbgp_import.dll.sym
```

Bug 信息：CSCuy72505

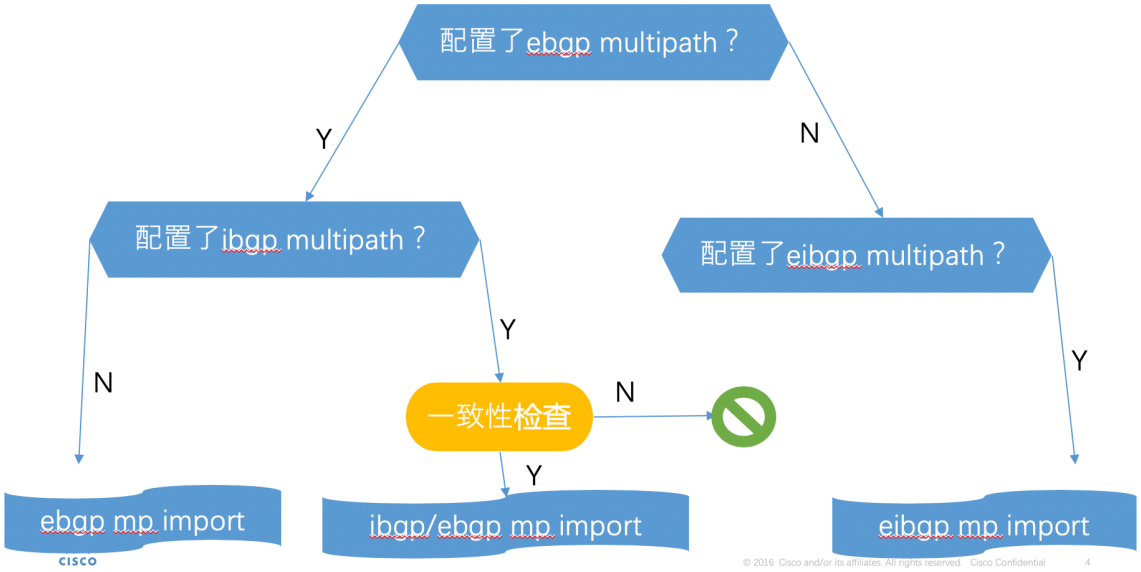
Symptom: Route is is not advertising in any IPv4/IPv6 space out to the providers that are locally attached.

Conditions: Customer has the mixed RD configuration in their network. They will see this issue often. dcpe using one RD and mspe using another RD for the same VRF. The recommendation is that either using the same RD for the same vrf on all PEs or use different RD on all PEs.

Workaround: There is no acceptable workaround

More Info: We have a bug in the soft-reconfigure path when the local RD is marked as Same RD and we have different RD imported path. If the RD is the SAME RD node which means it is locally configured and it is also a received RD from remote), Then for net which has different RD imported path, we will wrongly create the path with net RD as source RD whenever route-policy change. This only happens for net which has different RD imported path and the RD is marked as Has remote net. During the soft-reconfigure processing if the path is different RD imported path, we should not create the modified path. Since the net's sourced path will be changed according to policy, we should just let the import to update the path.

We have the Customer's configuration loaded. And create a local vrf test using the same RD as 12200:1000000005 on dcpe1.
On MSPE RD 12200:1000000005 will be SAME RD case. The net will has path imported from different RD (src RD 12200:1000000001)
and same RD imported path. Do few set/unset CM-BLEED community (change the inbound policy on mspe for neighbor RR1).
You will see extra path which is from different RD imported path but the src RD is local RD. You can remove the test vrf, you will still see the issue. The issue can be reproduced even without dcpe2 node.
Bug link:
https://bst.cloudapps.cisco.com/bugsearch/bug/CSCuy72505/?referring_site=ss&dtid=osscdc000283



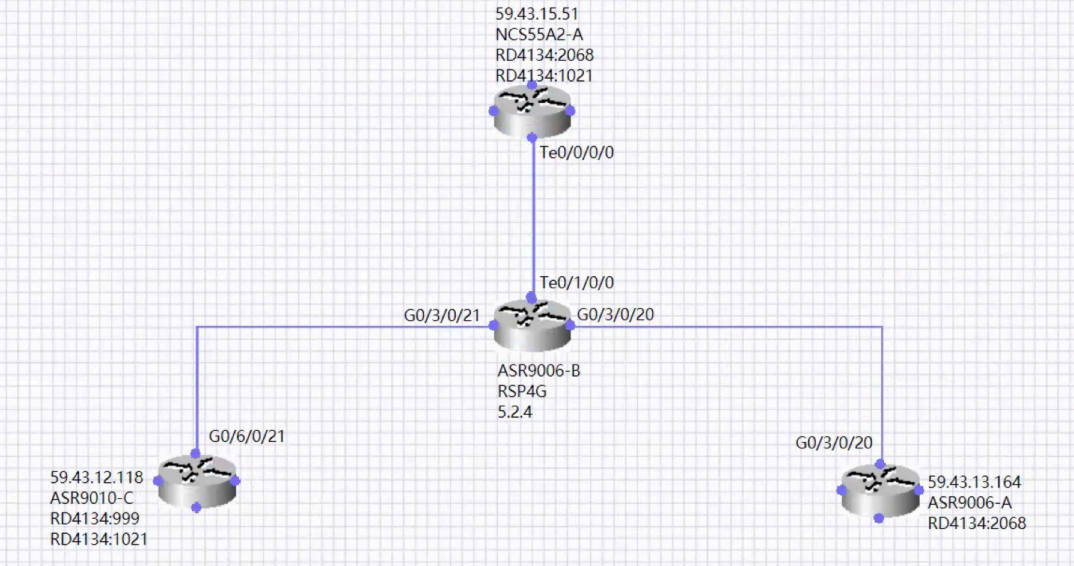
当VRF配置中启用multipath eibgp时，从其它两个PE学到同一条路由，其中一条是相同RD值，另一条是不同RD值，BGP在import这些路由后，此时是两条路由负载分担，当VPN路由best path有变动时，BGP底层优选路由判断逻辑发生错误，导致BGP进程发生crash。

临时解决办法：将VPN下的max-multipath eibgp 改为max-multipath ebgp

修复版本：5.3.4以上版本

测试环境故障场景复现

测试拓扑：



测试环境：

ASR9006-B 模拟北京 S3，软件版本：5.2.4+SMU

VRF: CDMA-MGNT-HUB --- RD:4134:999, RT:4134:99800，4134:99900, 4134:99901

VRF: CDMA-EPC-MGNT --- RD:4134:998，RT:4134:99800

ASR9010-C 模拟远端 PE-B，RD:4134:999

RT:4134:99800,4134:99900,4134:99901,4134:206800

ASR9006-A 模拟远端 PE-A，RD:4134:2068

RT: 4134:99901,4134:206800

NCS55A2-A 模拟远端 PE-C，RD:4134:2068

RT: 4134:99901,4134:206800

三台 PE 均发布：10.219.3.0/24 路由条目，但导出的 RT 值不同。

```
vrf CDMA-EPC-MGNT
  rd 4134:998
  bfd minimum-interval 150
  bfd multiplier 3
  address-family ipv4 unicast
   bgp dampening
   maximum-paths ebgp 8
   maximum-paths ibgp 8
   redistribute static
  !
vrf CDMA-MGNT-HUB
  rd 4134:999
  address-family ipv4 unicast
   maximum-paths eibgp 8
  !
 !
vrf CDMA-EPC-MGNT
 address-family ipv4 unicast
  import route-target
   4134:99800
  !
  export route-target
   4134:99800
  !
 !
!
vrf CDMA-MGNT-HUB
```

```
 address-family ipv4 unicast
  import route-target
   4134:99800
   4134:99900
   4134:99901
  !
  export route-target
   4134:99800
   4134:99900
  !
 !
!
```

修改 OSPF 接口 cost 前，配置及路由状态，10.219.3.0/24 路由的 best path 为 59.43.12.118。

```
RP/0/RSP0/CPU0:ASR9006-B#show run router bgp 4809 vrf CDMA-EPC-MGNT
Tue Jun 25 17:44:45.722 UTC
router bgp 4809
 vrf CDMA-EPC-MGNT
  rd 4134:998
  bfd minimum-interval 150
  bfd multiplier 3
  address-family ipv4 unicast
   maximum-paths ebgp 8
   maximum-paths ibgp 8
  !
 !
!
RP/0/RSP0/CPU0:ASR9006-B#show run router ospf 1
Tue Jun 25 17:44:01.897 UTC
router ospf 1
 log adjacency changes
 area 0
  interface Loopback0
  !
  interface Loopback1
  !
  interface GigabitEthernet0/3/0/20
  !
  interface GigabitEthernet0/3/0/20.100
   cost 100
  !
  interface GigabitEthernet0/3/0/20.200
   cost 100
  !
  interface GigabitEthernet0/3/0/21
   cost 100
  !
  interface TenGigE0/1/0/0
   cost 100
  !
 !
!
RP/0/RSP0/CPU0:ASR9006-B#show route 59.43.12.118

Routing entry for 59.43.12.118/32
  Known via "ospf 1", distance 110, metric 101, type intra area
  Installed Jun 27 06:08:15.008 for 02:06:09
  Routing Descriptor Blocks
    200.1.1.2, from 59.43.5.123, via GigabitEthernet0/3/0/21
      Route metric is 101
  No advertising protos.
RP/0/RSP0/CPU0:ASR9006-B#show route 59.43.13.164
```

```
Routing entry for 59.43.13.164/32
  Known via "ospf 1", distance 110, metric 101, type intra area
  Installed Jun 25 12:20:19.554 for 1d19h
  Routing Descriptor Blocks
    200.1.1.102, from 202.97.34.1, via GigabitEthernet0/3/0/20.100
      Route metric is 101
    200.1.1.106, from 202.97.34.1, via GigabitEthernet0/3/0/20.200
      Route metric is 101
  No advertising protos.
RP/0/RSP0/CPU0:ASR9006-B#show bgp vrf CDMA-EPC-MGNT 10.219.3.0/24
Tue Jun 25 17:46:34.905 UTC
BGP routing table entry for 10.219.3.0/24, Route Distinguisher: 4134:998
Versions:
  Process           bRIB/RIB  SendTblVer
  Speaker                 91          91
Last Modified: Jun 25 12:39:14.073 for 05:07:21
Paths: (1 available, best #1)
  Not advertised to any peer
  Path #1: Received by speaker 0
  Not advertised to any peer
  Local
    59.43.12.118 (metric 101) from 59.43.12.118 (59.43.5.123)
      Received Label 24011
      Origin IGP, metric 0, localpref 100, valid, internal, best, group-best, import-candidate, imported
      Received Path ID 0, Local Path ID 1, version 91
      Extended community: RT:4134:99800 RT:4134:99900 RT:4134:99901 RT:4134:206800
      Source VRF: CDMA-MGNT-HUB, Source Route Distinguisher: 4134:999
RP/0/RSP0/CPU0:ASR9006-B#show bgp vrf CDMA-MGNT-HUB 10.219.3.0/24
Tue Jun 25 17:46:48.732 UTC
BGP routing table entry for 10.219.3.0/24, Route Distinguisher: 4134:999
Versions:
  Process           bRIB/RIB  SendTblVer
  Speaker                 98          98
Last Modified: Jun 25 12:41:50.073 for 05:04:58
Paths: (3 available, best #1)
  Not advertised to any peer
  Path #1: Received by speaker 0
  Not advertised to any peer
  Local
    59.43.12.118 (metric 101) from 59.43.12.118 (59.43.5.123)
      Received Label 24011
      Origin IGP, metric 0, localpref 100, valid, internal, best, group-best, multipath, import-
candidate, imported
      Received Path ID 0, Local Path ID 1, version 98
      Extended community: RT:4134:99800 RT:4134:99900 RT:4134:99901 RT:4134:206800
      Source VRF: CDMA-MGNT-HUB, Source Route Distinguisher: 4134:999
  Path #2: Received by speaker 0
  Not advertised to any peer
  Local
    59.43.13.164 (metric 101) from 59.43.13.164 (59.43.5.124)
      Received Label 24040
      Origin IGP, metric 0, localpref 100, valid, internal, multipath, import-candidate, imported
      Received Path ID 0, Local Path ID 0, version 0
      Extended community: RT:4134:99901 RT:4134:206800
      Source VRF: default, Source Route Distinguisher: 4134:2068
  Path #3: Received by speaker 0
  Not advertised to any peer
  Local
    59.43.15.51 (metric 101) from 59.43.15.51 (59.43.15.51)
      Received Label 24012
      Origin IGP, metric 0, localpref 100, valid, internal, multipath, import-candidate, imported
      Received Path ID 0, Local Path ID 0, version 0
```

```
      Extended community: RT:4134:99901 RT:4134:206800
      Source VRF: default, Source Route Distinguisher: 4134:2068
RP/0/RSP0/CPU0:ASR9006-B#
```

修改 ASR9010-C 到 ASR9006-B 之间的链路 cost 值为 150,BGP 进程发生 crash。

```
RP/0/RSP0/CPU0:ASR9006-B(config)#router ospf 1
RP/0/RSP0/CPU0:ASR9006-B(config-ospf)#area 0
RP/0/RSP0/CPU0:ASR9006-B(config-ospf-ar)#interface GigabitEthernet0/3/0/21
RP/0/RSP0/CPU0:ASR9006-B(config-ospf-ar-if)#cost 150
RP/0/RSP0/CPU0:ASR9006-B(config-ospf-ar-if)#commit
Tue Jun 25 18:01:26.739 UTC
RP/0/RSP0/CPU0:ASR9006-B(config-ospf-ar-if)#end
RP/0/RSP0/CPU0:ASR9006-B#show context
Tue Jun 25 18:01:38.964 UTC

...

Core for pid = 1462638 (pkg/bin/bgp)
Core dump time: Tue Jun 25, 2019: 18:01:29
Process thread:17 received signal: 11 - SIGSEGV. Segmentation fault. Sender pid:1462638
Signal specific information: Signal code 0 - Unknown SIGSEGV code. Accessed BadAddr 0x0 at PC 0xffffffff.
Core for process at harddisk:/dumper/bgp_1053.by.bgp.20190625-180132.node0_RSP0_CPU0.ppc.Z
RP/0/RSP0/CPU0:ASR9006-B#show route 59.43.12.118

Routing entry for 59.43.12.118/32
  Known via "ospf 1", distance 110, metric 151, type intra area
  Installed Jun 27 08:15:04.257 for 00:00:07
  Routing Descriptor Blocks
    200.1.1.2, from 59.43.5.123, via GigabitEthernet0/3/0/21
      Route metric is 151
  No advertising protos.
RP/0/RSP0/CPU0:ASR9006-B#show route 59.43.13.164

Routing entry for 59.43.13.164/32
  Known via "ospf 1", distance 110, metric 101, type intra area
  Installed Jun 25 12:20:19.554 for 1d19h
  Routing Descriptor Blocks
    200.1.1.102, from 202.97.34.1, via GigabitEthernet0/3/0/20.100
      Route metric is 101
    200.1.1.106, from 202.97.34.1, via GigabitEthernet0/3/0/20.200
      Route metric is 101
  No advertising protos.
RP/0/RSP0/CPU0:ASR9006-B#
```

由于 CDMA-EPC-MGNT 和 CDMA-MGNT-HUB 两个 VRF 都有引入 RT:4134:99800 路由，从 VRF:CDMA-EPC-MGNT 看，没有路由条目，从 VRF:CDMA-MGNT-HUB 看到 10.219.3.0/24 路由下一跳 best path 由原来的：59.43.12.118 变成了：59.43.13.164（广东另外一台 PE），但此 PE 发布此路由的 RT 值为：4134:206800 和 4134:99901，没有包含 RT 值：4134:99800，所以此时，出现 RT 值为 4134:99800 路由 no best path 的情况，匹配到软件 bug 中的条件，no best path 情况，同时之前的 bestpath:59.43.12.118 成为非优选的条目存在，此时 VRF:CDMA-EPC-MGNT 在做路由撤销更新时，发生 BGP 进程的 crash。

```
RP/0/RSP0/CPU0:ASR9006-B#show bgp vrf CDMA-EPC-MGNT 10.219.3.0/24
Tue Jun 25 18:11:49.761 UTC
% Network not in table
RP/0/RSP0/CPU0:ASR9006-B#show bgp vrf CDMA-MGNT-HUB 10.219.3.0/24
Tue Jun 25 18:11:50.344 UTC
BGP routing table entry for 10.219.3.0/24, Route Distinguisher: 4134:999
Versions:
  Process           bRIB/RIB  SendTblVer
  Speaker                 0           0
Last Modified: Jun 25 18:11:43.073 for 00:00:07
Paths: (1 available, no best path)
```

```
  Not advertised to any peer
  Path #1: Received by speaker 0
  Not advertised to any peer
  Local
    59.43.12.118 (metric 151) from 59.43.12.118 (59.43.5.123)
      Received Label 24011
      Origin IGP, metric 0, localpref 100, valid, internal, not-in-vrf
      Received Path ID 0, Local Path ID 0, version 0
      Extended community: RT:4134:99800 RT:4134:99900 RT:4134:99901 RT:4134:206800
RP/0/RSP0/CPU0:ASR9006-B#show bgp vpnv4 un rd all 10.219.3.0/24
Tue Jun 25 18:12:08.725 UTC

Status codes: s suppressed, d damped, h history, * valid, > best
              i - internal, r RIB-failure, S stale, N Nexthop-discard
Origin codes: i - IGP, e - EGP, ? - incomplete
   Network            Next Hop            Metric LocPrf Weight Path
Route Distinguisher: 4134:999 (default for vrf CDMA-MGNT-HUB)
* i10.219.3.0/24      59.43.12.118             0    100      0 i
Route Distinguisher: 4134:1021 (default for vrf CDMA-NGN-MGNT)
* i10.219.3.0/24      59.43.12.118             0    100      0 i
* i                   59.43.15.51              0    100      0 i
Route Distinguisher: 4134:2068
* i10.219.3.0/24      59.43.13.164             0    100      0 i
* i                   59.43.15.51              0    100      0 i
RP/0/RSP0/CPU0:ASR9006-B#
```

解决办法验证：将 vrf CDMA-EPC-MGNT 下的负载方式修改为 maximum-paths eibgp 8 后，即使链路的 cost 为 150，路由优选路径正常，路由加表正常。

```
RP/0/RSP0/CPU0:ASR9006-B(config)#router bgp 4809
RP/0/RSP0/CPU0:ASR9006-B(config-bgp)#vrf CDMA-EPC-MGNT
RP/0/RSP0/CPU0:ASR9006-B(config-bgp-vrf)#address-family ipv4 unicast
RP/0/RSP0/CPU0:ASR9006-B(config-bgp-vrf-af)#no maximum-paths ebgp 8
RP/0/RSP0/CPU0:ASR9006-B(config-bgp-vrf-af)#no maximum-paths ibgp 8
RP/0/RSP0/CPU0:ASR9006-B(config-bgp-vrf-af)#maximum-paths eibgp 8
RP/0/RSP0/CPU0:ASR9006-B(config-bgp-vrf-af)#commit
Tue Jun 25 18:15:08.734 UTC
RP/0/RSP0/CPU0:ASR9006-B#show bgp vpnv4 un rd all 10.219.3.0/24
Tue Jun 25 18:15:41.274 UTC

Status codes: s suppressed, d damped, h history, * valid, > best
              i - internal, r RIB-failure, S stale, N Nexthop-discard
Origin codes: i - IGP, e - EGP, ? - incomplete
   Network            Next Hop            Metric LocPrf Weight Path
Route Distinguisher: 4134:101 (default for vrf CDMA-PI0)
*>i10.219.3.0/24      59.43.12.118             0    100      0 i
Route Distinguisher: 4134:998 (default for vrf CDMA-EPC-MGNT)
*>i10.219.3.0/24      59.43.12.118             0    100      0 i
Route Distinguisher: 4134:999 (default for vrf CDMA-MGNT-HUB)
* i10.219.3.0/24      59.43.12.118             0    100      0 i
*>i                   59.43.13.164             0    100      0 i
* i                   59.43.15.51              0    100      0 i
RP/0/RSP0/CPU0:ASR9006-B#show bgp vrf CDMA-MGNT-HUB 10.219.3.0/24
Tue Jun 25 18:16:04.101 UTC
BGP routing table entry for 10.219.3.0/24, Route Distinguisher: 4134:999
Versions:
  Process           bRIB/RIB  SendTblVer
  Speaker                 19          19
Last Modified: Jun 25 18:15:27.073 for 00:00:37
Paths: (3 available, best #2)
  Not advertised to any peer
  Path #1: Received by speaker 0
  Not advertised to any peer
  Local
```

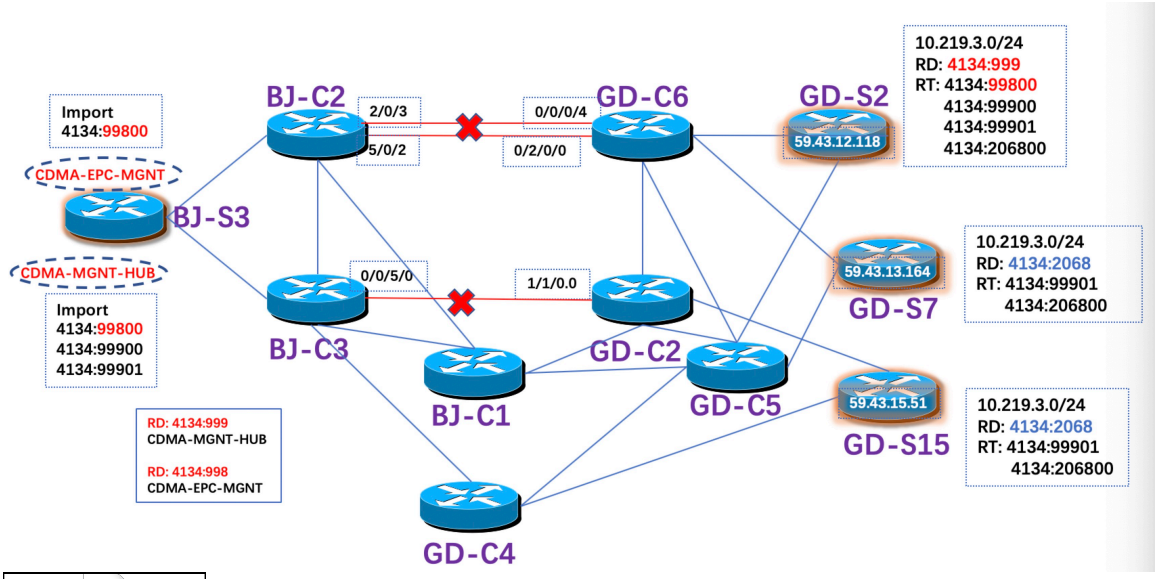
```
    59.43.12.118 (metric 151) from 59.43.12.118 (59.43.5.123)
      Received Label 24011
      Origin IGP, metric 0, localpref 100, valid, internal, multipath, import-candidate, imported, import
suspect
      Received Path ID 0, Local Path ID 0, version 0
      Extended community: RT:4134:99800 RT:4134:99900 RT:4134:99901 RT:4134:206800
      Source VRF: CDMA-MGNT-HUB, Source Route Distinguisher: 4134:999
  Path #2: Received by speaker 0
  Not advertised to any peer
  Local
    59.43.13.164 (metric 101) from 59.43.13.164 (59.43.5.124)
      Received Label 24040
      Origin IGP, metric 0, localpref 100, valid, internal, best, group-best, multipath, import-
candidate, imported, import suspect
      Received Path ID 0, Local Path ID 1, version 19
      Extended community: RT:4134:99901 RT:4134:206800
      Source VRF: default, Source Route Distinguisher: 4134:2068
  Path #3: Received by speaker 0
  Not advertised to any peer
  Local
    59.43.15.51 (metric 101) from 59.43.15.51 (59.43.15.51)
      Received Label 24012
      Origin IGP, metric 0, localpref 100, valid, internal, multipath, import-candidate, imported, import
suspect
      Received Path ID 0, Local Path ID 0, version 0
      Extended community: RT:4134:99901 RT:4134:206800
      Source VRF: default, Source Route Distinguisher: 4134:2068
RP/0/RSP0/CPU0:ASR9006-B#
```

等待 10 分钟后，检查没有再发现 BGP 进程 crash

```
RP/0/RSP0/CPU0:ASR9006-B#show context
Tue Jun 25 18:25:12.020 UTC
…
Core for pid = 5267705 (pkg/bin/bgp)
Core dump time: Tue Jun 25, 2019: 18:12:13
Process thread:17 received signal: 11 - SIGSEGV. Segmentation fault. Sender pid:5267705
Signal specific information: Signal code 0 - Unknown SIGSEGV code. Accessed BadAddr 0x0 at PC 0xffffffff.
Core for process at harddisk:/dumper/bgp_1053.by.bgp.20190625-181216.node0_RSP0_CPU0.ppc.Z
```

现网故障场景分析

现网拓扑：



链路flapping记录.xlsx

A 端设备名称	A 端接口	A 端 IP 地址	B 端 IP 地址	B 端接口	B 端设备名称	接口 down	接口 up
BJ-BJ-JA-C-2.CN2	xe-2/0/3.0	59.43.135.81	59.43.135.82	TenGigE0/0/0/4	GD-GZ-TH-C-6.CN2	Jun 17 02:02:35 Jun 17 10:54:34 Jun 18 00:43:52 Jun 18 00:54:53 Jun 22 17:43:27	Jun 17 04:57:12 Jun 17 14:35:01 Jun 18 00:46:13 Jun 18 00:55:52
BJ-BJ-JA-C-2.CN2	5/0/2.0	59.43.17.29	59.43.17.30	POS0/2/0/0	GD-GZ-TH-C-6.CN2	Jun 17 02:02:35 Jun 17 10:54:34 Jun 18 00:43:52 Jun 18 00:54:53 Jun 22 17:43:27	Jun 17 04:57:12 Jun 17 14:35:01 Jun 18 00:46:13 Jun 18 00:55:52
BJ-BJ-DS-C-3.CN2	POS0/0/5/0	59.43.17.113	59.43.17.114	so-1/1/0.0	GD-GZ-JCX-C-2.CN2	Jun 17 02:02:35 Jun 17 10:54:34 Jun 18 00:43:52 Jun 18 00:54:53 Jun 22 17:43:27	Jun 17 04:57:12 Jun 17 14:35:01 Jun 18 00:46:13 Jun 18 00:55:52

故障期间，现网中北京C设备到广东C设备之间的链路中断，原来北京S3到广东S2走最短路径，经过北京C2，广东C6到达广东S2，中间链路中断后，北京S3经过北京C3，广东C4,广东C5到达广东S2，关于RT值为4134:99800 VPN路由:10.219.3.0/24的best path的路径metric变大，会触发BGP的路由更新动作，但此时由于VRF:CDMA-EPC-MGNT配置的是maximum-paths ebgp + maximum-paths ibgp的方式，而且之前的bestpath:59.43.12.118成为非优选的条目存在。

由于CDMA-EPC-MGNT和CDMA-MGNT-HUB两个VRF都有引入RT:4134:99800路由，从VRF:CDMA-EPC-MGNT看，没有路由条目，从VRF:CDMA-MGNT-HUB看到10.219.3.0/24路由下一跳best path由原来的59.43.12.118变成了：59.43.13.164（广东另一外PE），但此PE发布此路由的RT值为4134:206800和4134:99901，没有RT值：4134:99800，所以此时，出现RT值为4134:99800路由no best path的情况，匹配到软件bug中的条件，no best path情况，并且有非优选的条目存在，如测试环境的事例，关于10.219.3.0/24路由的best

path由原来的：59.43.12.118变成了：59.43.13.164（广东另外一台PE），同时之前的bestpath:59.43.12.118成为非优选的条目存在，此时VRF:CDMA-EPC-MGNT在做路由撤销更新时，会进入到错误的逻辑判断过程，误认为是错误的结果，为尝试修正错误，强制将BGP进程进行了重启。

BGP进程重启后，由于中断链路没有恢复，关于RT值为4134:99800路由:10.219.3.0/24的best path的路径仍然没有，而且表项中仍有未优选的路由存在，BGP进程每10分钟的检查更新动作是周期进行的，所以在链路未恢复的时间段内，每10分钟BGP进程发生一次crash，直到链路恢复正常后，关于RT值为4134:99800路由:10.219.3.0/24的best path的路径best path恢复，BGP导入路由成功，BGP进程不再发生crash。

```
RP/0/RSP0/CPU0:BJ-BJ-DS-S-3.CN2.B#show bgp vrf CDMA-MGNT-HUB 10.219.3.0/24
Thu Jun 27 00:01:43.190 GMT
BGP routing table entry for 10.219.3.0/24, Route Distinguisher: 4134:999
Versions:
  Process           bRIB/RIB  SendTblVer
  Speaker           10073626    10073626
Last Modified: Jun 25 01:37:20.011 for 1d22h
Paths: (3 available, best #1)
  Advertised to CE update-groups (with more than one peer):
    0.2
  Path #1: Received by speaker 0
  Advertised to CE update-groups (with more than one peer):
    0.2
  Local
    59.43.12.118 (metric 7000) from 59.43.8.1 (59.43.1.91)
      Received Label 32964
      Origin incomplete, metric 0, localpref 100, valid, internal, best, group-best, import-candidate, imported
      Received Path ID 0, Local Path ID 1, version 10073626
      Extended community: RT:4134:99800 RT:4134:99900 RT:4134:99901 RT:4134:206800
      Originator: 59.43.1.91, Cluster list: 0.0.0.100, 0.0.1.244
      Source VRF: CDMA-MGNT-HUB, Source Route Distinguisher: 4134:999
  Path #2: Received by speaker 0
  Not advertised to any peer
  Local
    59.43.13.164 (metric 7000) from 59.43.8.1 (59.43.4.76)
      Received Label 32937
      Origin incomplete, metric 0, localpref 100, valid, internal, import-candidate, imported
      Received Path ID 0, Local Path ID 0, version 0
      Extended community: RT:4134:99901 RT:4134:206800
      Originator: 59.43.4.76, Cluster list: 0.0.0.100, 0.0.2.88
      Source VRF: default, Source Route Distinguisher: 4134:2068
  Path #3: Received by speaker 0
  Not advertised to any peer
  Local
```

```
    59.43.12.118 (metric 7000) from 59.43.8.191 (59.43.1.91)
      Received Label 32964
      Origin incomplete, metric 0, localpref 100, valid, internal, import-candidate, imported
      Received Path ID 0, Local Path ID 0, version 0
      Extended community: RT:4134:99800 RT:4134:99900 RT:4134:99901 RT:4134:206800
      Originator: 59.43.1.91, Cluster list: 0.0.0.100, 0.0.1.244
      Source VRF: CDMA-MGNT-HUB, Source Route Distinguisher: 4134:999
RP/0/RSP0/CPU0:BJ-BJ-DS-S-3.CN2.B#show bgp vrf CDMA-EPC-MGNT 10.219.3.0/24
Thu Jun 27 00:01:57.686 GMT
BGP routing table entry for 10.219.3.0/24, Route Distinguisher: 4134:998
Versions:
  Process           bRIB/RIB  SendTblVer
  Speaker           10073333    10073333
Last Modified: Jun 25 01:37:20.011 for 1d22h
Paths: (1 available, best #1)
  Advertised to CE update-groups (with more than one peer):
    0.2
  Path #1: Received by speaker 0
  Advertised to CE update-groups (with more than one peer):
    0.2
  Local
    59.43.12.118 (metric 7000) from 59.43.8.1 (59.43.1.91)
      Received Label 32964
      Origin incomplete, metric 0, localpref 100, valid, internal, best, group-best, import-candidate, imported
      Received Path ID 0, Local Path ID 1, version 10073333
      Extended community: RT:4134:99800 RT:4134:99900 RT:4134:99901 RT:4134:206800
      Originator: 59.43.1.91, Cluster list: 0.0.0.100, 0.0.1.244
      Source VRF: CDMA-MGNT-HUB, Source Route Distinguisher: 4134:999
RP/0/RSP0/CPU0:BJ-BJ-DS-S-3.CN2.B#
```

问题结论

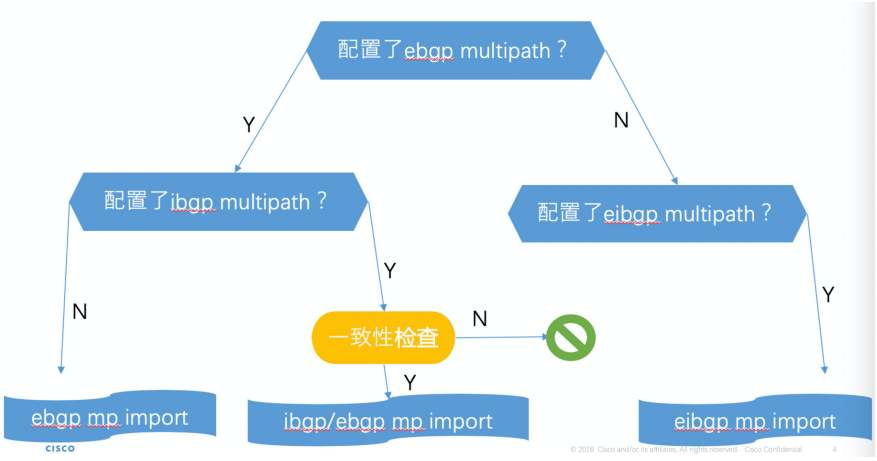
故障期间，北京C设备到广东C设备之间有3条电路同时中断，北京S3到广东S设备的路由跳数增加，导致关于RT值为4134:99800 VPN路由:10.219.3.0/24的best path的路径metric变大，由于BGP路由下一跳的best path有变化，会触发BGP的路由更新动作，VRF:CDMA-EPC-MGNT配置的是maximum-paths ebgp + maximum-paths ibgp的方式，而且表项中仍有未优选的路由存在。

由于CDMA-EPC-MGNT和CDMA-MGNT-HUB两个VRF都有引入RT:4134:99800路由，从VRF:CDMA-EPC-MGNT看，没有路由条目，从VRF:CDMA-MGNT-HUB看到10.219.3.0/24路由下一跳best path由59.43.12.118变成59.43.13.164（广东另一台PE），但此PE发布此路由的RT值为4134:206800和4134:99901，没有北京S3设备需要引入的RT值4134:99800，所以

此时，出现RT值为4134:99800路由no best path的情况，命中软件bug：CSCuy72505，BGP路由在no best path 情况下，并且有非优选的条目存在，此时VRF:CDMA-EPC-MGNT在做路由撤销更新时，会进入到错误的逻辑判断过程，误认为是错误的结果，为尝试修正错误，强制将BGP进程进行了重启。

BGP进程重启后，由于中断链路没有恢复，关于RT值为4134:99800路由:10.219.3.0/24的best path的路径仍然没有，而且表项中仍有未优选的路由存在，BGP进程每10分钟的检查更新动作是周期进行的，所以在链路未恢复的时间段内，每10分钟BGP进程发生一次crash，直到链路恢复正常后，关于RT:4134:99800路由10.219.3.0/24的best path的路径恢复，BGP导入路由成功，BGP进程不再发生crash。

将vrf CDMA-EPC-MGNT下的负载方式修改为maximum-paths eibgp 8后，不检查BGP下一跳路由的metric值，即使链路的metric变大，路由仍然会加入路由表。



建议解决方法

1. 将VRF:CDMA-EPC-MGNT下的maximum-paths ibgp+ebgp改为maximum-paths eibgp 。
2. 现网 RSP-4G 升级 6.1.4 版本有硬件限制，建议使用临时解决办法。