Troubleshoot Nexus 9000 Mac Move

Contents

Introduction

This document describes how to troubleshoot when there is mac move on Nexus 9000 and how to prevent it.

Prerequisites

- Understand the Concept of mac-learning on the Switch and NX-OS Configuration
- Troubleshoot Layer 2 Switching Issues

Background Information

```
2018 Nov 14 15:53:26.943 N9K %-SLOT1-5-BCM_L2_LEARN_DISABLE: MAC Learning Disabled unit=0
2018 Nov 14 15:53:27.769 N9K %-SLOT1-5-BCM_L2_LEARN_ENABLE: MAC Learning Enabled unit=0
```

You understand the concept of mac learning and how a table is maintained on a switch, when the switch receives a frame, and associates the MAC address of the sender with the LAN port where it was received. Under loop condition, it can happen that the same MAC is learned via two different ports on the switch.
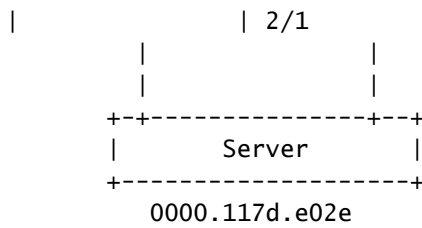
Topology

```
<#root>

+-----------+

Po6

      +------------+
|   N9K_1   +----------+   N9K_2   |
|           +----------+           |
+-----------+          +--+--------+
```

```
 |                  | 2/1
        |          |                |
        |          |                |
      +-+--------------+--+
      |        Server      |
      +-------------------+
          0000.117d.e02e
```

How to Troubleshoot

When BCM ASIC learns too many mac-addresses in a short duration, BCM_USD can disable/enable MAC learning in hardware and you can see this message that comes up. It could be caused if there are too many mac-moves/flaps/loops or new mac learns/moves exceed a certain threshold. By default, on Nexus9K, you cannot see the logs which specifically tell you that the switch experiences mac-moves. However, in case these movements are high, you end up seeing these logs.

```
2018 Nov 14 15:53:26.943 N9K %-SLOT1-5-BCM_L2_LEARN_DISABLE: MAC Learning Disabled unit=0
2018 Nov 14 15:53:27.769 N9K %-SLOT1-5-BCM_L2_LEARN_ENABLE: MAC Learning Enabled unit=0
2018 Nov 14 15:53:27.863 N9K %-SLOT1-5-BCM_L2_LEARN_DISABLE: MAC Learning Disabled unit=0
2018 Nov 14 15:53:28.770 N9K %-SLOT1-5-BCM_L2_LEARN_ENABLE: MAC Learning Enabled unit=0
```

These messages are indicative of an event in the mac table. When you have continuous mac moves in the environment, these messages can be seen. Basically, the switch received frames with the same source MAC on two or more interfaces at a very high rate. The switch has a mechanism to count the number of MAC move-backs and weigh them based on the number of times the MAC address moves. The dynamic MAC learning is disabled by the switch in order to protect the control-plane.

At this point, you can check the mac-move count to understand, if and how many mac-moves have been experienced on the device.

```
N9K# sh mac address-table  notification mac-move
MAC Move Notify Triggers: 1
  Number of MAC Addresses added: 612336
  Number of MAC Addresses moved: 612328
  Number of MAC Addresses removed: 0
```

The output of Number of MAC Addresses moved, suggests that the switch experiences mac-moves.

Configuration

The next obvious thing is to find out the mac address that causes this problem, the vlans, and the interface information where this is experienced. To look for this information, you need to raise the logging level of L2FM from the default value of 2 up to 5 on N9K platform.

```
N9K# sho logging level l2fm
Facility        Default Severity        Current Session Severity
--------        ----------------        ------------------------
l2fm                   2                          2

0(emergencies)         1(alerts)        2(critical)
3(errors)              4(warnings)      5(notifications)
6(information)         7(debugging)

N9K# conf t
Enter configuration commands, one per line. End with CNTL/Z.
N9K(config)# logging level l2fm 5
N9K(config)# end
N9K# sho logging level l2fm
Facility        Default Severity        Current Session Severity
--------        ----------------        ------------------------
l2fm                   2                          5

0(emergencies)         1(alerts)        2(critical)
3(errors)              4(warnings)      5(notifications)
6(information)         7(debugging)

Any mac moves at this point can be seen in the syslogs:

2018 Nov 14 16:04:23.881 N9K %L2FM-4-L2FM_MAC_MOVE2: Mac 0000.117d.e02e in vlan 741 has moved between Pc
2018 Nov 14 16:04:23.883 N9K %L2FM-4-L2FM_MAC_MOVE2: Mac 0000.117d.e02e in vlan 741 has moved between Pc
```

In such a case, you can detect and limit the number of times that a MAC address moves from one port to another.
Until Cisco NX-OS Release 6.0(2)U3(1), when a loop was detected between two ports, MAC learning was disabled for 180 seconds.

However, starting with 7.0(3)I7(3), you can now configure the switch to bring down the port with the lower interface index, when such a loop is detected when you use the **mac address-table loop-detect port-down** command.

```
N9K# conf t
Enter configuration commands, one per line. End with CNTL/Z.
N9K(config)# mac address-table loop-detect port-down
N9K(config)# exit
N9K#
```

Now, further loop detection after this command has been enabled, takes down the interface with lower interface index.

```
2018 Nov 13 19:33:54.773 N9K %ETHPORT-5-IF_DOWN_NONE: Interface port-channel6 is down (None)
2018 Nov 13 19:33:59.046 N9K %ETH_PORT_CHANNEL-5-PORT_DOWN: port-channel6: Ethernet2/1 is down
2018 Nov 13 19:33:59.049 N9K %ETH_PORT_CHANNEL-5-PORT_DOWN: port-channel6: Ethernet2/2 is down
2018 Nov 13 19:33:59.166 N9K %ETH_PORT_CHANNEL-5-FOP_CHANGED: port-channel6: first operational port chan
2018 Nov 13 19:33:59.235 N9K %ETHPORT-5-IF_DOWN_ERROR_DISABLED: Interface port-channel6 is down (Error
2018 Nov 13 19:33:59.244 N9K %ETHPORT-5-IF_DOWN_CFG_CHANGE: Interface Ethernet2/2 is down(Config change)
2018 Nov 13 19:33:59.252 N9K %ETHPORT-5-IF_DOWN_CFG_CHANGE: Interface Ethernet2/1 is down(Config change)
```

```
2018 Nov 13 19:34:05.269 N9K %ETHPORT-5-IF_DOWN_CHANNEL_ERR_DISABLED: Interface Ethernet2/2 is down (Ch
2018 Nov 13 19:34:05.303 N9K last message repeated 1 time
2018 Nov 13 19:34:05.303 N9K %ETHPORT-5-IF_DOWN_CHANNEL_ERR_DISABLED: Interface Ethernet2/1 is down (Ch
```

Verify

Use this command to verify the currently configured action.

```
N9K# show mac address-table loop-detect
Port Down Action Mac Loop Detect : disabled
```

You can confirm the index of the interface to verify if the correct interface was disabled, as per the feature.

<#root>

```
N9K# show system internal l2fm l2dbg macdb address 0000.117d.e02e vlan 741
Legend
------
Db:  0-MACDB, 1-GWMACDB, 2-SMACDB, 3-RMDB,    4-SECMACDB  5-STAGEDB
Src: 0-UNKNOWN, 1-L2FM, 2-PEER, 3-LC, 4-HSRP
     5-GLBP, 6-VRRP, 7-STP, 8-DOTX, 9-PSEC 10-CLI 11-PVLAN
     12-ETHPM, 13-ALW_LRN, 14-Non_PI_MOD, 15-MCT_DOWN, 16 - SDB
     17-OTV, 18-Deounce Timer, 19-AM, 20-PCM_DOWN, 21 - MCT_UP
     22-VxLAN, 23-L2RIB 24-CTRL, 25-UFDM
Slot:0 based for LCS 31-MCEC 20-OTV/ORIB

 VLAN: 741 MAC: 0000.117d.e02e
    Time                    If/swid    Db Op     Src Slot FE
    Wed Nov 14 16:04:28 2018 0x16000005 0  UPDATE 3   0    0
    Wed Nov 14 16:04:28 2018 0x16000005 0  REFRESH_DETECT 3   0    15
    Wed Nov 14 16:04:28 2018 0x1a000400 0  UPDATE 3   0    0
    Wed Nov 14 16:04:28 2018 0x1a000400 0  REFRESH_DETECT 3   0    15
    Wed Nov 14 16:04:28 2018 0x16000005 0  UPDATE 3   0    0

N9K# show int snmp-ifindex
-------------------------------------------------------------------------------
Port            IFMIB Ifindex (hex)
-------------------------------------------------------------------------------
mgmt0           83886080    (0x5000000 )
Eth1/1          436207616   (0x1a000000)
Eth1/2          436208128   (0x1a000200)

Eth1/3

        436208640   (0x1a000400)
<snip>

Po6

           369098757   (0x16000005)
```

Other Platforms

You can enable mac move notification on the other Nexus platforms with these commands.

```
N3K:
    mac address table notification mac-move
    logging level fwm 6
    logging monitor 6
N5K/N6K:
    mac address table notification mac-move
    logging level fwm 6
    logging monitor 6
N7K/N9K:
    logging level l2fm 5
IOS:
    mac address table notification mac-move

Note: To revert/remove these commands, simply use the `no` version of each command.
```

These commands are also available in Nexus5K/6K that run versions 6.0(2)N2(1) and later, to shut down the port:

```
N5K(config)# mac address-table loop-detect ?
   port-down  Take port-down action for mac loop detection

N5K(config)# mac address-table loop-detect port-down

Further, the following command is available on the platform to err-disable the edge-port on the MAC mov
N5K(config)# mac address-table loop-detect port-down edge-port
```

With NX-OS release 6.0(2)A8(1) on Nexus 3000, you can configure the action to bring down the port with the lower interface index when such a loop is detected.

```
N3K(config)# mac address-table loop-detect ?
    port-down  Take port-down action for mac loop detection

N3K(config)# mac address-table loop-detect port-down

The following command is available on this platform as well, to err-disable the edge-port on the MAC mov
N5K(config)# mac address-table loop-detect port-down edge-port
```

Related Information

- [Nexus L2FM-4-L2FM_MAC_MOVE Syslog Explained](#)
- [Nexus 5000 FAQ: What do You do when a Nxus 5000 Switch Displays the "FWM-2-STM LOOP DETECT" Message in the Log](#)