排除以太网冲突故障

Contents

Introduction

本文档将概述与以太网冲突相关的不同计数器，并说明如何排除以下错误信息报告（取决于不同平台）的以太网冲突相关问题：

- %AMDP2_FE-5-COLL
- %DEC21140-5-COLL
- %ILACC-5-COLL
- %LANCE-5-COLL
- %PQUICC-5-COLL
- %PQUICC_ETHER-5-COLL
- %PQUICC_FE-5-COLL
- %QUICC_ETHER-5-COLL
- %AMDP2_FE-5-LATECOLL
- %DEC21140-5-LATECOLL
- %ILACC-5-LATECOLL
- %LANCE-5-LATECOLL
- %PQUICC-5-LATECOLL
- %PQUICC_ETHER-5-LATECOLL
- %PQUICC_FE-5-LATECOLL
- %QUICC_ETHER-5-LATECOLL
- %SIBYTE-4-SB_EXCESS_COLL

Note: 本文档中的信息只适用于半双工以太网。在全双工以太网中，冲突检测已禁用。

Prerequisites

Requirements

There are no specific requirements for this document.

Components Used

This document is not restricted to specific software and hardware versions.

The information in this document was created from the devices in a specific lab environment.All of the devices used in this document started with a cleared (default) configuration.If your network is live, make sure that you understand the potential impact of any command.

Conventions

Refer to Cisco Technical Tips Conventions for more information on document conventions.

什么是冲突？

冲突是以太网用于的机制控制访问和分配在共享的媒介要同时传输的位置中的共享带宽。由于媒体共享，机制必须存在两个位置能发现的地方他们要同时传输。此机制便是冲突检测。

以太网使用 *CSMA/CD（载波侦听多路访问/冲突检测）* 作为其冲突检测方法。这是以太网操作的一个简化示例：

1. 站点 A 想要发送帧。首先，它检查媒体是否可用（载波侦听）。如果它不是，等待，直到在媒体的当前发送方完成了。
2. 假设位置A相信媒体是可用的并且尝试发送帧。由于媒体共享(多路访问)，其他发送方也许也尝试同时发送。这时，站点 B 尝试与站点 A 同时发送帧。
3. 在之后，位置A和B站意识到有尝试另一个的设备发送帧(冲突发现)。每个站点将随机等待一段时间，然后再次发送帧。冲突以后的时间分成多个时隙；站点 A 和站点 B 各选择一个随机的时隙，以尝试重传。
4. 如果位置A和B站在同一slot尝试重新传输，他们扩大slot的数量。每个位置然后选择一新的slot，从而减少重新传输的可能性在同一slot。

总之，冲突是方式由对共享的媒介的仲裁的访问随着时间的推移分配数据流负载。冲突并不是一件坏事；它对更正以太网操作非常重要。

一些有用信息：

- 最大时隙限制为 1024。
- 冲突机制中同一帧的最多重传次数为 16。如果连续失败 16 次，则算作是过度冲突。

延迟计数器

下面是 **show interface** 命令的输出示例：

```
router#show interface ethernet 0
Ethernet0 is up, line protocol is up
  Hardware is Lance, address is 0010.7b36.1be8 (bia 0010.7b36.1be8)
  Internet address is 10.200.40.74/22
  MTU 1500 bytes, BW 10000 Kbit, DLY 1000 usec,
     reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation ARPA, loopback not set
  Keepalive set (10 sec)
  ARP type: ARPA, ARP Timeout 04:00:00
  Last input 00:00:00, output 00:00:06, output hang never
  Last clearing of "show interface" counters never
  Input queue: 1/75/1/0 (size/max/drops/flushes); Total output drops: 0
  Queueing strategy: random early detection(RED)
  Output queue :0/40 (size/max)
  5 minute input rate 1000 bits/sec, 2 packets/sec
  5 minute output rate 0 bits/sec, 0 packets/sec
     2058015 packets input, 233768993 bytes, 1 no buffer
     Received 1880947 broadcasts, 0 runts, 0 giants, 1 throttles
     3 input errors, 0 CRC, 0 frame, 0 overrun, 3 ignored
     0 input packets with dribble condition detected
     298036 packets output, 32280269 bytes, 0 underruns
     0 output errors, 10 collisions, 0 interface resets
     0 babbles, 0 late collision, 143 deferred
     0 lost carrier, 0 no carrier
     0 output buffer failures, 0 output buffers swapped out
```

延迟计数器数接口设法发送帧的次数，但是检出载波繁忙在第一次尝试(载波侦听)。这不构成问题，是正常以太网操作的一部分。

冲突计数器

下面是 **show interface** 命令的另一输出示例：

```
router#show interface ethernet 0
Ethernet0 is up, line protocol is up
  Hardware is Lance, address is 0010.7b36.1be8 (bia 0010.7b36.1be8)
  Internet address is 10.200.40.74/22
  MTU 1500 bytes, BW 10000 Kbit, DLY 1000 usec,
     reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation ARPA, loopback not set
  Keepalive set (10 sec)
  ARP type: ARPA, ARP Timeout 04:00:00
  Last input 00:00:00, output 00:00:06, output hang never
  Last clearing of "show interface" counters never
  Input queue: 1/75/1/0 (size/max/drops/flushes); Total output drops: 0
  Queueing strategy: random early detection(RED)
  Output queue :0/40 (size/max)
  5 minute input rate 1000 bits/sec, 2 packets/sec
  5 minute output rate 0 bits/sec, 0 packets/sec
     2058015 packets input, 233768993 bytes, 1 no buffer
```

```
     Received 1880947 broadcasts, 0 runts, 0 giants, 1 throttles
     3 input errors, 0 CRC, 0 frame, 0 overrun, 3 ignored
     0 input packets with dribble condition detected
     298036 packets output, 32280269 bytes, 0 underruns
     0 output errors, 10 collisions, 0 interface resets
     0 babbles, 0 late collision, 143 deferred
     0 lost carrier, 0 no carrier
     0 output buffer failures, 0 output buffers swapped out
```

按照此处的说明，冲突不构成问题。冲突计数器可计算发送帧时发生一次或多次冲突的帧的数量。

冲突计数器可以是被分解为的**单一冲突**和**多次冲突**正如在此输出的**show controller命令**：

```
router#show interface ethernet 0
Ethernet0 is up, line protocol is up
  Hardware is Lance, address is 0010.7b36.1be8 (bia 0010.7b36.1be8)
  Internet address is 10.200.40.74/22
  MTU 1500 bytes, BW 10000 Kbit, DLY 1000 usec,
     reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation ARPA, loopback not set
  Keepalive set (10 sec)
  ARP type: ARPA, ARP Timeout 04:00:00
  Last input 00:00:00, output 00:00:06, output hang never
  Last clearing of "show interface" counters never
  Input queue: 1/75/1/0 (size/max/drops/flushes); Total output drops: 0
  Queueing strategy: random early detection(RED)
  Output queue :0/40 (size/max)
  5 minute input rate 1000 bits/sec, 2 packets/sec
  5 minute output rate 0 bits/sec, 0 packets/sec
     2058015 packets input, 233768993 bytes, 1 no buffer
     Received 1880947 broadcasts, 0 runts, 0 giants, 1 throttles
     3 input errors, 0 CRC, 0 frame, 0 overrun, 3 ignored
     0 input packets with dribble condition detected
     298036 packets output, 32280269 bytes, 0 underruns
     0 output errors, 10 collisions, 0 interface resets
     0 babbles, 0 late collision, 143 deferred
     0 lost carrier, 0 no carrier
     0 output buffer failures, 0 output buffers swapped out
```

这意味着八(从10)帧当中在一次冲突以后成功传输;另外两个帧要求多个冲突以仲裁对媒体的访问。

增长的**冲突比率**(冲突的数量分开的packets output的编号)不指示一个问题：它仅仅表示网络的流入负载增加。因为另一个位置被添加了到网络，此的示例可能是。

没有集限制为“多少次冲突是坏”或最大冲突比率。

总而言之，当分析网络性能或问题时，冲突计数器并不能提供很有用的统计数据。

最近的冲突

为使冲突检测功能正常工作，对检测冲突的时间段进行了限制（512 位时间）。对于以太网，该限制为 51.2 us（微秒），对于快速以太网，为 5.12 us。对于以太网站点，传输开始后，冲突检测最高可达 51.2 微秒，或者换句话说最高可达到帧的第 512 位。

当位置时发现冲突，在发送了512th位其帧后，算作是**最近的冲突**。

延迟冲突由以下错误消息报告：

```
router#show interface ethernet 0
Ethernet0 is up, line protocol is up
  Hardware is Lance, address is 0010.7b36.1be8 (bia 0010.7b36.1be8)
  Internet address is 10.200.40.74/22
  MTU 1500 bytes, BW 10000 Kbit, DLY 1000 usec,
     reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation ARPA, loopback not set
  Keepalive set (10 sec)
  ARP type: ARPA, ARP Timeout 04:00:00
  Last input 00:00:00, output 00:00:06, output hang never
  Last clearing of "show interface" counters never
  Input queue: 1/75/1/0 (size/max/drops/flushes); Total output drops: 0
  Queueing strategy: random early detection(RED)
  Output queue :0/40 (size/max)
  5 minute input rate 1000 bits/sec, 2 packets/sec
  5 minute output rate 0 bits/sec, 0 packets/sec
     2058015 packets input, 233768993 bytes, 1 no buffer
     Received 1880947 broadcasts, 0 runts, 0 giants, 1 throttles
     3 input errors, 0 CRC, 0 frame, 0 overrun, 3 ignored
     0 input packets with dribble condition detected
     298036 packets output, 32280269 bytes, 0 underruns
     0 output errors, 10 collisions, 0 interface resets
     0 babbles, 0 late collision, 143 deferred
     0 lost carrier, 0 no carrier
     0 output buffer failures, 0 output buffers swapped out
```

确切的错误信息根据平台不同而有所不同。您在输出能检查额外冲突的数量的show interface ethernet [interface number]命令中。

```
router#show interface ethernet 0
Ethernet0 is up, line protocol is up
  Hardware is Lance, address is 0010.7b36.1be8 (bia 0010.7b36.1be8)
  Internet address is 10.200.40.74/22
  MTU 1500 bytes, BW 10000 Kbit, DLY 1000 usec,
     reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation ARPA, loopback not set
  Keepalive set (10 sec)
  ARP type: ARPA, ARP Timeout 04:00:00
  Last input 00:00:00, output 00:00:06, output hang never
  Last clearing of "show interface" counters never
  Input queue: 1/75/1/0 (size/max/drops/flushes); Total output drops: 0
  Queueing strategy: random early detection(RED)
  Output queue :0/40 (size/max)
  5 minute input rate 1000 bits/sec, 2 packets/sec
  5 minute output rate 0 bits/sec, 0 packets/sec
     2058015 packets input, 233768993 bytes, 1 no buffer
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     3 input errors, 0 CRC, 0 frame, 0 overrun, 3 ignored
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     298036 packets output, 32280269 bytes, 0 underruns
     0 output errors, 10 collisions, 0 interface resets
     0 babbles, 0 late collision, 143 deferred
     0 lost carrier, 0 no carrier
     0 output buffer failures, 0 output buffers swapped out
```

Note: 站点报告延迟冲突仅仅表示存在问题；延迟冲突一般不是问题的原因。可能的原因通常是网络中布线不正确或集线器数量不符合要求。损坏的网络接口卡(NIC)能也导致最近的冲突。

Excessive Collision

如讨论前，重试次数的最大数量在补偿算法设置到16。这意味着，如果接口不能分配能传输其帧，不用另一次冲突16次的slot，放弃。帧将不会传输，并标记为**过度冲突**。

过度冲突由以下错误消息报告：

```
router#show interface ethernet 0
Ethernet0 is up, line protocol is up
  Hardware is Lance, address is 0010.7b36.1be8 (bia 0010.7b36.1be8)
  Internet address is 10.200.40.74/22
  MTU 1500 bytes, BW 10000 Kbit, DLY 1000 usec,
     reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation ARPA, loopback not set
  Keepalive set (10 sec)
  ARP type: ARPA, ARP Timeout 04:00:00
  Last input 00:00:00, output 00:00:06, output hang never
  Last clearing of "show interface" counters never
  Input queue: 1/75/1/0 (size/max/drops/flushes); Total output drops: 0
  Queueing strategy: random early detection(RED)
  Output queue :0/40 (size/max)
  5 minute input rate 1000 bits/sec, 2 packets/sec
  5 minute output rate 0 bits/sec, 0 packets/sec
     2058015 packets input, 233768993 bytes, 1 no buffer
     Received 1880947 broadcasts, 0 runts, 0 giants, 1 throttles
     3 input errors, 0 CRC, 0 frame, 0 overrun, 3 ignored
     0 input packets with dribble condition detected
     298036 packets output, 32280269 bytes, 0 underruns
     0 output errors, 10 collisions, 0 interface resets
     0 babbles, 0 late collision, 143 deferred
     0 lost carrier, 0 no carrier
     0 output buffer failures, 0 output buffers swapped out
```

确切的错误信息根据平台不同而有所不同。

Note: 发送重试计数(TRC)计数器是指示关联信息包的传输重试次数的数量的4位字段。最大计数为15。然而，如果发生重试错误，计数将返回为零。仅在这种情况下，TRC 值为零应理解为十六。TRC由控制器写到帧的最后传输描述符，或者，当错误终止一个帧。

Note: 时间延迟反射计(TDR)计数器是从开始数时间的一个内部计数器(在瞬间100纳秒(ns)其中每一)发射对冲突的出现时间。由于发射移动大约每瞬间35英尺，此值是有用确定对电缆故障的大致的长度。

您在输出能检查额外冲突的数量的**show controller ethernet [interface number]命令中**。

```
router#show controller ethernet 0
LANCE unit 0, idb 0xFA6C4, ds 0xFC218, regaddr = 0x2130000, reset_mask 0x2
IB at 0x606E64: mode=0x0000, mcfilter 0000/0000/0100/0000
station address 0010.7b36.1be8  default station address 0010.7b36.1be8
buffer size 1524
RX ring with 16 entries at 0x606EA8
Rxhead = 0x606EC8 (4), Rxp = 0xFC244 (4)
00 pak=0x0FCBF4 Ds=0x60849E status=0x80 max_size=1524 pak_size=66
01 pak=0x10087C Ds=0x6133B6 status=0x80 max_size=1524 pak_size=66
02 pak=0x0FDE94 Ds=0x60BA7E status=0x80 max_size=1524 pak_size=203
03 pak=0x100180 Ds=0x611F82 status=0x80 max_size=1524 pak_size=66
04 pak=0x0FD09C Ds=0x609216 status=0x80 max_size=1524 pak_size=66
05 pak=0x0FE590 Ds=0x60CEB2 status=0x80 max_size=1524 pak_size=66
06 pak=0x100AD0 Ds=0x613A72 status=0x80 max_size=1524 pak_size=66
07 pak=0x0FD9EC Ds=0x60AD06 status=0x80 max_size=1524 pak_size=66
08 pak=0x0FF830 Ds=0x610492 status=0x80 max_size=1524 pak_size=348
```

```
09 pak=0x1003D4 Ds=0x61263E status=0x80 max_size=1524 pak_size=343
10 pak=0x0FEA38 Ds=0x60DC2A status=0x80 max_size=1524 pak_size=66
11 pak=0x100D24 Ds=0x61412E status=0x80 max_size=1524 pak_size=64
12 pak=0x0FC74C Ds=0x607726 status=0x80 max_size=1524 pak_size=64
13 pak=0x0FD798 Ds=0x60A64A status=0x80 max_size=1524 pak_size=66
14 pak=0x0FE7E4 Ds=0x60D56E status=0x80 max_size=1524 pak_size=64
15 pak=0x0FD2F0 Ds=0x6098D2 status=0x80 max_size=1524 pak_size=66
TX ring with 4 entries at 0x606F68, tx_count = 0
TX_head = 0x606F80 (3), head_txp = 0xFC294 (3)
TX_tail = 0x606F80 (3), tail_txp = 0xFC294 (3)
00 pak=0x000000 Ds=0x63491E status=0x03 status2=0x0000 pak_size=332
01 pak=0x000000 Ds=0x634FDA status=0x03 status2=0x0000 pak_size=327
02 pak=0x000000 Ds=0x630A9E status=0x03 status2=0x0000 pak_size=60
03 pak=0x000000 Ds=0x630A9E status=0x03 status2=0x0000 pak_size=60
3 missed datagrams, 0 overruns
0 transmitter underruns, 0 excessive collisions
8 single collisions, 2 multiple collisions
0 dma memory errors, 0 CRC errors

0 alignment errors, 0 runts, 0 giants
0 tdr, 0 spurious initialization done interrupts
0 no enp status, 0 buffer errors, 0 overflow errors
0 TX_buff, 1 throttled, 1 enabled
Lance csr0 = 0x73
```

过度冲突表示出现问题。常见原因是作为在共享以太网、被中断的NIC或者完全许多位置的全双工被连接的设备在共享的媒介。过度冲突可以通过硬编码指定速度和双工来解决。

在 Cisco Catalyst 交换机中，如果 service internal 模式打开，每次出现过度冲突时将显示 %SIBYTE-4-SB_EXCESS_COLL 系统消息。当 service internal 模式关闭时，仅当过度冲突达到某一固定阈值时，系统才输出此消息。在这种情况下，出现此消息可能表示存在真正的冲突。当 service internal 模式打开时，每出现一次过度冲突，系统即输出此消息。这也许是由一些硬件噪声造成的。service internal 模式打开时，偶尔出现此消息是正常的。您可以发出 **no service internal** 命令以关闭此日志记录，并查看此操作对错误日志的影响。

Related Information

- comp.dcom.lans.ethernet 常见问题
- 技术报告：在局域网交换和迁移的问题从共享LAN环境
- Technical Support & Documentation - Cisco Systems