FC MD Switches配置示例的分析器和SPAN

目录

简介

与思科路由器产品线的调试功能类似，思科MDS存储交换机具有光纤通道(FC)分析器来检查数据包。FC分析器检查进出交换机提供的实体的数据包。FC分析器能够调试交换机负责接收或发送到存储设备的帧。FC分析器无法检查终端站之间的帧。

要检查会话流，应使用MDS交换机的交换端口分析器(SPAN)功能。与思科以太网交换机上的SPAN功能非常相似，MDS产品线上的SPAN将数据复制到SPAN目标端口，以便第三方设备可以收集数据。

先决条件

要求

本文档没有任何特定的要求。

使用的组件

本文档中的信息基于以下软件和硬件版本：

- 思科MDS 9216交换机
- 思科MDS 9509交换机

- 两者都运行存储区域网络操作系统(SAN-OS)1.2.1a。

本文档中的信息都是基于特定实验室环境中的设备编写的。本文档中使用的所有设备最初均采用原始（默认）配置。如果您使用的是真实网络，请确保您已经了解所有命令的潜在影响。

规则

有关文件规则的更多信息请参见“ Cisco技术提示规则”。

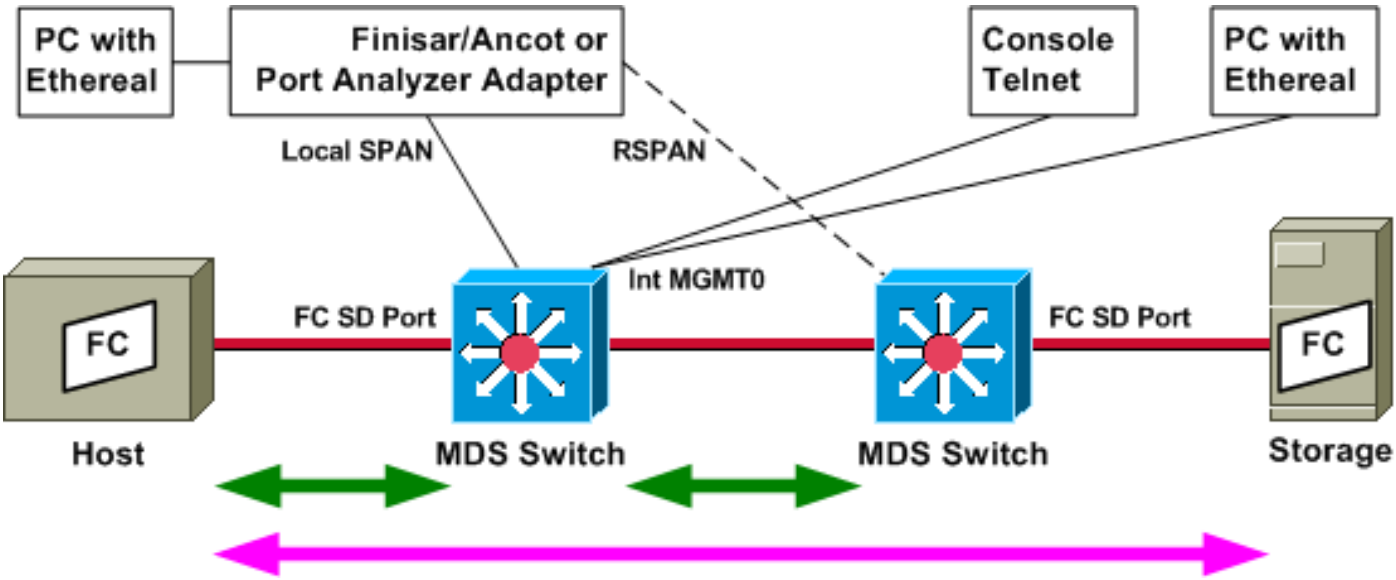
背景理论

您必须知道何时使用FC分析器工具以及何时使用SPAN功能。

FC分析器是收集发往MDS管理引擎或从MDS管理引擎发起的帧的工具。使用此工具可以看到节点到交换机或交换机到交换机的流量。

SPAN是允许临时到交换机的帧复制到第二个端口进行分析的功能。使用此方法可以看到节点到节点流量。

请参阅此图了解图示：



绿色箭头显示可使用FC分析器工具跟踪的流量，而粉红色箭头显示可使用SPAN方法捕获的流量。FC分析器无法观察从主机到存储的流量。在左侧的交换机上运行FC分析器时，只能看到从主机到交换机或从右侧交换机的流量。

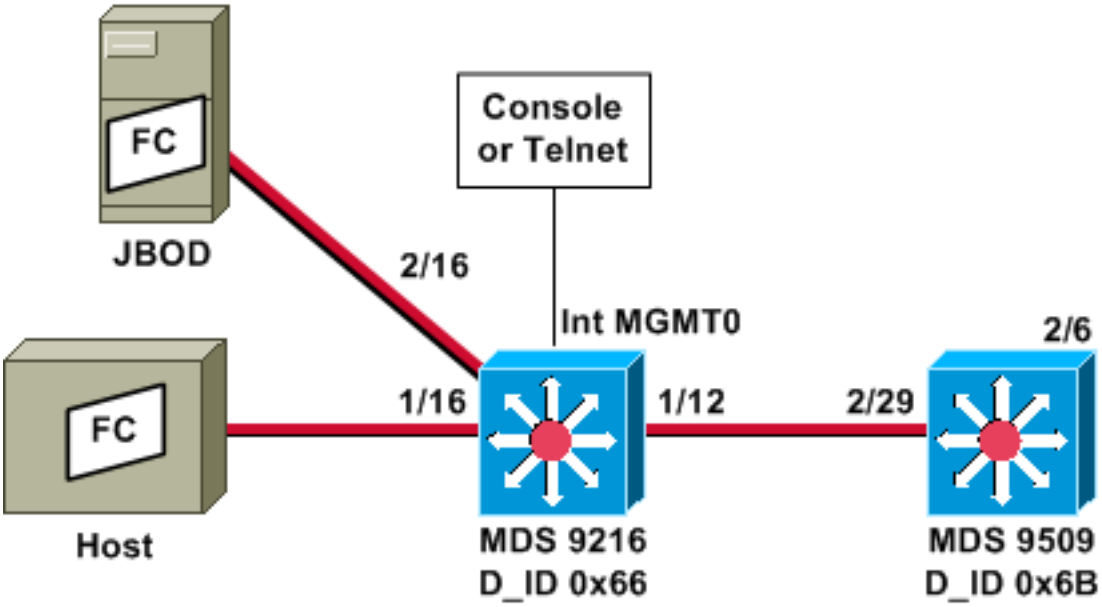
SPAN可用于跟踪交换机上任何端口的进（出）和（出）流量。远程SPAN(RSPAN)（如上图所示）可用于收集左侧交换机主机端口中的帧和主机端口中的帧，分析器连接到右侧交换机。

配置

本部分提供有关如何配置本文档所述功能的信息。

注：要查找有关本文档中使用的命令的其他信息，请使用命令查找工具(仅注册客户)。

配置本地FC分析器



注意：目的是收集源自或发往9612管理引擎的FC帧。不使用FC分析器工具收集从主机到JBOD的帧。

FC分析器本地通过控制台连接或Telnet从命令行界面(CLI)运行。您可以运行一个简短的显示来仅显示每个帧的一小部分，也可以运行详细的跟踪来显示整个帧。

跟踪在配置模式下启动，按Ctrl-C时停止。默认情况下，仅捕获100个帧。要捕获100多个帧，请将**limit-captured-frames**命令选项添加到用于启动跟踪的命令中。

您还可以使用显示过滤器将跟踪的输出限制为仅限特定帧。

```
!--- VSAN 13 (0xd) is used here as example. MDS9216# show fcdomain domain-list vsan 13

Number of domains: 2
Domain ID              WWN
---------    -----------------------
0x66(102)    20:0d:00:05:30:00:47:9f [Local] [Principal]
0x6b(107)    20:0d:00:05:30:00:51:1f

MDS9216# show fcns data vsan 13

VSAN 13:
--------------------------------------------------------------------------
FCID        TYPE  PWWN                    (VENDOR)        FC4-TYPE:FEATURE
--------------------------------------------------------------------------
0x6600dc    NL    21:00:00:20:37:15:a2:49 (Seagate)       scsi-fcp:target
0x6600e0    NL    21:00:00:04:cf:6e:4a:8c (Seagate)       scsi-fcp:target
0x6600e1    NL    21:00:00:04:cf:6e:37:8b (Seagate)       scsi-fcp:target
0x660101    NL    10:00:00:01:73:00:81:82 (JNI)
0x660201    N     10:00:00:05:30:00:47:9f (Cisco)         ipfc
0x6b0001    N     10:00:00:05:30:00:51:23 (Cisco)         ipfc

Total number of entries = 6
!--- Configure FC analyzer for brief output. MDS9216# config t

Enter configuration commands, one per line.  End with CNTL/Z.

MDS9216(config)# fcanalyzer local brief display-filter mdshdr.vsan==0xd
```

```
Capturing on eth2
  0.000000     ff.ff.fd -> ff.ff.fd     SW_ILS HLO
  0.000095     ff.ff.fd -> ff.ff.fd     FC Link Ctl, ACK1
 18.721559     ff.ff.fd -> ff.ff.fd     SW_ILS HLO
 18.721879     ff.ff.fd -> ff.ff.fd     FC Link Ctl, ACK1
 19.970287     ff.ff.fd -> ff.ff.fd     SW_ILS HLO
 19.970368     ff.ff.fd -> ff.ff.fd     FC Link Ctl, ACK1
 38.941558     ff.ff.fd -> ff.ff.fd     SW_ILS HLO
 38.941849     ff.ff.fd -> ff.ff.fd     FC Link Ctl, ACK1
 39.940546     ff.ff.fd -> ff.ff.fd     SW_ILS HLO
 39.940628     ff.ff.fd -> ff.ff.fd     FC Link Ctl, ACK1
```

在下一个示例中，您有相同的数据。但是，此时命令中省略了**brief**选项，以提供每个数据包的详细视图。

```
MDS9216(config)# fcanalyzer local display-filter mdshdr.vsan==0xd

Capturing on eth2
Frame 1 (100 bytes on wire, 100 bytes captured)
    Arrival Time: Jul  4, 2003 12:31:18.310251000
    Time delta from previous packet: 0.000000000 seconds
    Time relative to first packet: 0.000000000 seconds
    Frame Number: 1
    Packet Length: 100 bytes
    Capture Length: 100 bytes
Ethernet II, Src: 00:00:00:00:00:0a, Dst: 00:00:00:00:ee:00
    Destination: 00:00:00:00:ee:00 (00:00:00:00:ee:00)
    Source: 00:00:00:00:00:0a (00:00:00:00:00:0a)
    Type: Unknown (0xfcfc)
Vegas (FC, SOFf/EOFn)
    Vegas Header
        .000 .... = Version: 0
        .... 0000 = Andiamo Type: Normal FC frame (0)
        #MPLS Labels: 0
        Packet Len: 70
        TTL: 255
        0111 .... = User Priority: 7
        .... 0000 0010 11.. = Dst Index: 0x000b
        .... ..00 1111 1111 = Src Index: 0x00ff
        Ctrl Bits: Index Directed frame (0x01)
        Timestamp: 42678
        .... .000 = Status: 0 (0)
        0000 0... = Reason Code: 0 (0x00)
        .... 0000 0000 1101 = VSAN: 13
        Checksum: 0
    Vegas Trailer
        EOF: EOFn (3)
        CRC: 4022250974
Fibre Channel
    R_CTL: 0x02
    Dest Addr: ff.ff.fd
    CS_CTL: 0x00
    Src Addr: ff.ff.fd
    Type: SW_ILS (0x22)
    F_CTL: 0x380000 (Exchange Originator, Seq Initiator, Exchg First,
                    Exchg Last, Seq Last, CS_CTL, Last Data Frame - No Info,
                    ABTS - Abort/MS, )
    SEQ_ID: 0xe7
    DF_CTL: 0x00
    SEQ_CNT: 0
    OX_ID: 0x1eb4
    RX_ID: 0xffff
    Parameter: 0x00000000
```

```
SW_ILS
    Cmd Code: HLO (0x14)
    FSPF Header
        Version: 0x02
        AR Number: 0x00
        Authentication Type: 0x00
        Originating Domain ID: 102
        Authentication: 0000000000000000
    Options: 00000000
    Hello Interval (secs): 20
    Dead Interval (secs): 80
    Recipient Domain ID: 107
    Originating Port Idx: 0x01000b

Frame 2 (60 bytes on wire, 60 bytes captured)
    Arrival Time: Jul  4, 2003 12:31:18.310563000
    Time delta from previous packet: 0.000312000 seconds
    Time relative to first packet: 0.000312000 seconds
    Frame Number: 2
    Packet Length: 60 bytes
    Capture Length: 60 bytes
Ethernet II, Src: 00:00:00:00:00:00, Dst: 00:00:00:00:00:00
    Destination: 00:00:00:00:00:00 (00:00:00:00:00:00)
    Source: 00:00:00:00:00:00 (00:00:00:00:00:00)
    Type: Unknown (0x0000)
Vegas (FC, SOFf/EOFt)
    Vegas Header
        .000 .... = Version: 0
        .... 0000 = Andiamo Type: Normal FC frame (0)
        #MPLS Labels: 0
        Packet Len: 30
        TTL: 255
        0111 .... = User Priority: 7
        .... 0011 1111 11.. = Dst Index: 0x00ff
        .... ..00 0000 1011 = Src Index: 0x000b
        Ctrl Bits: 0 (0x00)
        Timestamp: 42679
        .... .000 = Status: 0 (0)
        0000 0... = Reason Code: 0 (0x00)
        .... 0000 0000 1101 = VSAN: 13
        Checksum: 241
    Vegas Trailer
        EOF: EOFt (1)
        CRC: 1019832848
Fibre Channel
    R_CTL: 0xc0(ACK1)
    Dest Addr: ff.ff.fd
    CS_CTL: 0x00
    Src Addr: ff.ff.fd
    Type: Unknown (0x00)
    F_CTL: 0xf80000 (Exchange Responder, Seq Recipient, Exchg First,
                    Exchg Last, Seq Last, CS_CTL, Last Data Frame - No Info,
                    ABTS - Cont, )
    SEQ_ID: 0xe7
    DF_CTL: 0x00
    SEQ_CNT: 0
    OX_ID: 0x1eb4
    RX_ID: 0x1e66
    Parameter: 0x00000001

Frame 3 (100 bytes on wire, 100 bytes captured)
    Arrival Time: Jul  4, 2003 12:31:19.309559000
    Time delta from previous packet: 0.998996000 seconds
    Time relative to first packet: 0.999308000 seconds
```

```
    Frame Number: 3
    Packet Length: 100 bytes
    Capture Length: 100 bytes
Ethernet II, Src: 00:00:00:00:00:00, Dst: 00:00:00:00:00:00
    Destination: 00:00:00:00:00:00 (00:00:00:00:00:00)
    Source: 00:00:00:00:00:00 (00:00:00:00:00:00)
    Type: Unknown (0x0000)
Vegas (FC, SOFf/EOFn)
    Vegas Header
        .000 .... = Version: 0
        .... 0000 = Andiamo Type: Normal FC frame (0)
        #MPLS Labels: 0
        Packet Len: 70
        TTL: 255
        0111 .... = User Priority: 7
        .... 0011 1111 11.. = Dst Index: 0x00ff
        .... ..00 0000 1011 = Src Index: 0x000b
        Ctrl Bits: 0 (0x00)
        Timestamp: 42779
        .... .000 = Status: 0 (0)
        0000 0... = Reason Code: 0 (0x00)
        .... 0000 0000 1101 = VSAN: 13
        Checksum: 101
    Vegas Trailer
        EOF: EOFn (3)
        CRC: 4200187557
Fibre Channel
    R_CTL: 0x02
    Dest Addr: ff.ff.fd
    CS_CTL: 0x00
    Src Addr: ff.ff.fd
    Type: SW_ILS (0x22)
    F_CTL: 0x380000 (Exchange Originator, Seq Initiator, Exchg First,
                    Exchg Last, Seq Last, CS_CTL, Last Data Frame - No Info,
                    ABTS - Abort/MS, )
    SEQ_ID: 0xe7
    DF_CTL: 0x00
    SEQ_CNT: 0
    OX_ID: 0x1e67
    RX_ID: 0xffff
    Parameter: 0x00000000
SW_ILS
    Cmd Code: HLO (0x14)
    FSPF Header
        Version: 0x02
        AR Number: 0x00
        Authentication Type: 0x00
        Originating Domain ID: 107
        Authentication: 0000000000000000
    Options: 00000000
    Hello Interval (secs): 20
    Dead Interval (secs): 80
    Recipient Domain ID: 102
    Originating Port Idx: 0x01011c

Frame 4 (60 bytes on wire, 60 bytes captured)
    Arrival Time: Jul  4, 2003 12:31:19.309646000
    Time delta from previous packet: 0.000087000 seconds
    Time relative to first packet: 0.999395000 seconds
    Frame Number: 4
    Packet Length: 60 bytes
    Capture Length: 60 bytes
Ethernet II, Src: 00:00:00:00:00:0a, Dst: 00:00:00:00:ee:00
    Destination: 00:00:00:00:ee:00 (00:00:00:00:ee:00)
```

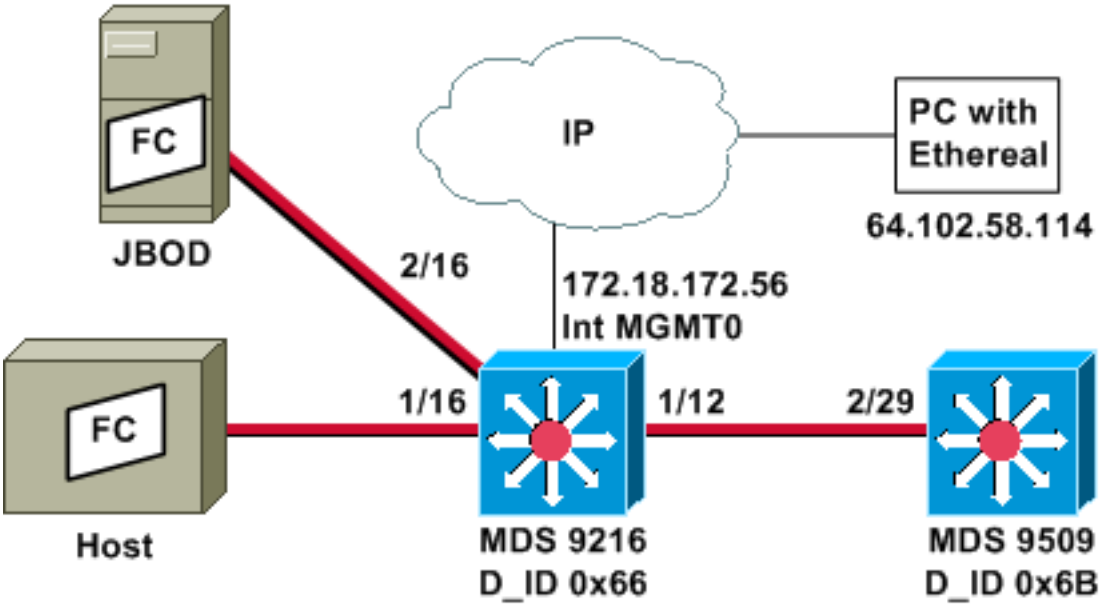
```
    Source: 00:00:00:00:00:0a (00:00:00:00:00:0a)
    Type: Unknown (0xfcfc)
Vegas (FC, SOFf/EOFt)
    Vegas Header
        .000 .... = Version: 0
        .... 0000 = Andiamo Type: Normal FC frame (0)
        #MPLS Labels: 0
        Packet Len: 30
        TTL: 255
        0111 .... = User Priority: 7
        .... 0000 0010 11.. = Dst Index: 0x000b
        .... ..00 1111 1111 = Src Index: 0x00ff
        Ctrl Bits: Index Directed frame (0x01)
        Timestamp: 42778
        .... .000 = Status: 0 (0)
        0000 0... = Reason Code: 0 (0x00)
        .... 0000 0000 1101 = VSAN: 13
        Checksum: 0
    Vegas Trailer
        EOF: EOFt (1)
        CRC: 4022250974
Fibre Channel
    R_CTL: 0xc0(ACK1)
    Dest Addr: ff.ff.fd
    CS_CTL: 0x00
    Src Addr: ff.ff.fd
    Type: Unknown (0x00)
    F_CTL: 0xf80000 (Exchange Responder, Seq Recipient, Exchg First,
                    Exchg Last, Seq Last, CS_CTL, Last Data Frame - No Info,
                    ABTS - Cont, )
    SEQ_ID: 0xe7
    DF_CTL: 0x00
    SEQ_CNT: 0
    OX_ID: 0x1e67
    RX_ID: 0x1eb5
    Parameter: 0x00000001
```

同样，还显示了简短的跟踪。但是，这次，端口1/16上的PC被拔掉并重新插入，以强制登录。您会看到帧进出另一台FC交换机，以及帧进出连接的本地节点(PC)。

```
MDS9216(config)# fcanalyzer local brief display-filter mdshdr.vsan==0xd

Capturing on eth2
  0.000000     ff.ff.fd -> ff.ff.fd     SW_ILS HLO
  0.000310     ff.ff.fd -> ff.ff.fd     FC Link Ctl, ACK1
  0.999598     ff.ff.fd -> ff.ff.fd     SW_ILS HLO
  0.999684     ff.ff.fd -> ff.ff.fd     FC Link Ctl, ACK1
 19.990040     ff.ff.fd -> ff.ff.fd     SW_ILS HLO
 19.990295     ff.ff.fd -> ff.ff.fd     FC Link Ctl, ACK1
 20.990602     ff.ff.fd -> ff.ff.fd     SW_ILS HLO
 20.990682     ff.ff.fd -> ff.ff.fd     FC Link Ctl, ACK1
 26.028780     ff.fc.66 -> ff.fc.6b     SW_ILS SW_RSCN
 26.029087     ff.fc.6b -> ff.fc.66     FC Link Ctl, ACK1
 26.029541     ff.fc.6b -> ff.fc.66     SW_ILS SW_ACC (SW_RSCN)
 26.029596     ff.fc.66 -> ff.fc.6b     FC Link Ctl, ACK1
 31.151197     00.00.01 -> ff.ff.fe     FC ELS FLOGI
 31.162809     ff.ff.fe -> 66.01.01     FC ELS ACC (FLOGI)
 31.162841     ff.ff.fe -> 66.01.01     FC ELS ACC (FLOGI)
 31.163139     66.01.01 -> ff.ff.fd     FC ELS SCR
 31.163583     ff.ff.fd -> 66.01.01     FC ELS ACC (SCR)
 31.163603     ff.ff.fd -> 66.01.01     FC ELS ACC (SCR)
 31.163835     66.01.01 -> ff.ff.fc     FC ELS PLOGI
 31.163965     ff.ff.fc -> 66.01.01     FC ELS ACC (PLOGI)
```

```
 31.163985     ff.ff.fc -> 66.01.01     FC ELS ACC (PLOGI)
 31.164186     66.01.01 -> ff.ff.fc     dNS GA_NXT
 31.164305     ff.fc.66 -> ff.fc.6b     SW_ILS SW_RSCN
 31.164479     ff.fc.6b -> ff.fc.66     FC Link Ctl, ACK1
 31.164628     ff.fc.6b -> ff.fc.66     SW_ILS SW_ACC (SW_RSCN)
 31.164670     ff.fc.66 -> ff.fc.6b     FC Link Ctl, ACK1
 31.165030     ff.ff.fc -> 66.01.01     dNS ACC (GA_NXT)
 31.165050     ff.ff.fc -> 66.01.01     dNS ACC (GA_NXT)
 31.165125     ff.fc.6b -> ff.fc.66     dNS GE_ID
 31.165193     ff.fc.66 -> ff.fc.6b     FC Link Ctl, ACK1
 31.165419     66.01.01 -> ff.ff.fc     dNS GA_NXT
 31.165577     ff.fc.66 -> ff.fc.6b     dNS ACC (GE_ID)
 31.165781     ff.ff.fc -> 66.01.01     dNS ACC (GA_NXT)
 31.165804     ff.ff.fc -> 66.01.01     dNS ACC (GA_NXT)
 31.165943     ff.fc.6b -> ff.fc.66     FC Link Ctl, ACK1
 31.166063     66.01.01 -> ff.ff.fc     dNS GA_NXT
 31.166870     ff.ff.fc -> 66.01.01     dNS ACC (GA_NXT)
 31.166892     ff.ff.fc -> 66.01.01     dNS ACC (GA_NXT)
 31.167268     66.01.01 -> ff.ff.fc     dNS GA_NXT
 31.167529     ff.ff.fc -> 66.01.01     dNS ACC (GA_NXT)
 31.167549     ff.ff.fc -> 66.01.01     dNS ACC (GA_NXT)
 31.168704     66.01.01 -> ff.ff.fc     dNS GA_NXT
 31.169272     ff.ff.fc -> 66.01.01     dNS ACC (GA_NXT)
 31.169294     ff.ff.fc -> 66.01.01     dNS ACC (GA_NXT)
 31.169568     66.01.01 -> ff.ff.fc     dNS GA_NXT
 31.170453     ff.ff.fc -> 66.01.01     dNS ACC (GA_NXT)
 31.170473     ff.ff.fc -> 66.01.01     dNS ACC (GA_NXT)
 31.170756     66.01.01 -> ff.ff.fc     dNS GA_NXT
 31.170975     ff.ff.fc -> 66.01.01     dNS ACC (GA_NXT)
 31.170994     ff.ff.fc -> 66.01.01     dNS ACC (GA_NXT)
 31.171400     66.01.01 -> 66.02.01     FC ELS PLOGI
 31.171562     66.02.01 -> 66.01.01     FC ELS ACC (PLOGI)
 31.171581     66.02.01 -> 66.01.01     FC ELS ACC (PLOGI)
 31.171752     66.01.01 -> 66.02.01     FC ELS PRLI
 31.171812     66.02.01 -> 66.01.01     FC ELS LS_RJT (PRLI)
 31.171832     66.02.01 -> 66.01.01     FC ELS LS_RJT (PRLI)
 31.173863     66.01.01 -> ff.ff.fc     FC ELS LOGO
 31.175020     ff.ff.fc -> 66.01.01     FC ELS ACC (LOGO)
 31.175047     ff.ff.fc -> 66.01.01     FC ELS ACC (LOGO)
 31.175182     66.01.01 -> ff.ff.fc     FC ELS PLOGI
 31.175290     ff.ff.fc -> 66.01.01     FC ELS ACC (PLOGI)
 31.175310     ff.ff.fc -> 66.01.01     FC ELS ACC (PLOGI)
 31.175632     66.01.01 -> ff.ff.fa     FC ELS PLOGI
 31.175753     ff.ff.fa -> 66.01.01     FC ELS ACC (PLOGI)
 31.175777     ff.ff.fa -> 66.01.01     FC ELS ACC (PLOGI)
 32.460020     ff.fc.66 -> 66.01.01     FC ELS PLOGI
 32.460050     ff.fc.66 -> 66.01.01     FC ELS PLOGI
 32.460207     66.01.01 -> ff.fc.66     FC ELS ACC (PLOGI)
 32.460246     66.01.01 -> ff.fc.66     FC ELS ACC (PLOGI)
 32.460340     ff.fc.66 -> 66.01.01     FC ELS PRLI
 32.460362     ff.fc.66 -> 66.01.01     FC ELS PRLI
 32.460492     66.01.01 -> ff.fc.66     FC ELS LS_RJT (PRLI)
 32.460525     66.01.01 -> ff.fc.66     FC ELS LS_RJT (PRLI)
 32.461839     ff.fc.66 -> 66.01.01     FC ELS LOGO
 32.461866     ff.fc.66 -> 66.01.01     FC ELS LOGO
 32.462046     66.01.01 -> ff.fc.66     FC ELS ACC (LOGO)
 32.462080     66.01.01 -> ff.fc.66     FC ELS ACC (LOGO)

MDS9216(config)# ^C

MDS9216(config)# exit
```

为远程FC分析器配置



注意：目的是收集源自或发往9612管理引擎的FC帧。不使用FC分析器工具收集从主机到JBOD的帧。

FC分析器远程在使用Ethereal 0.9(9)或更高 版和WinPcap的PC上运行 。PC的IP地址在发出的命令中指定，该命令用于在MDS CLI上启动FC分析器跟踪。在PC上，还必须从命令行启动Ethereal，并且必须在命令中指定MDS管理接口的IP地址。

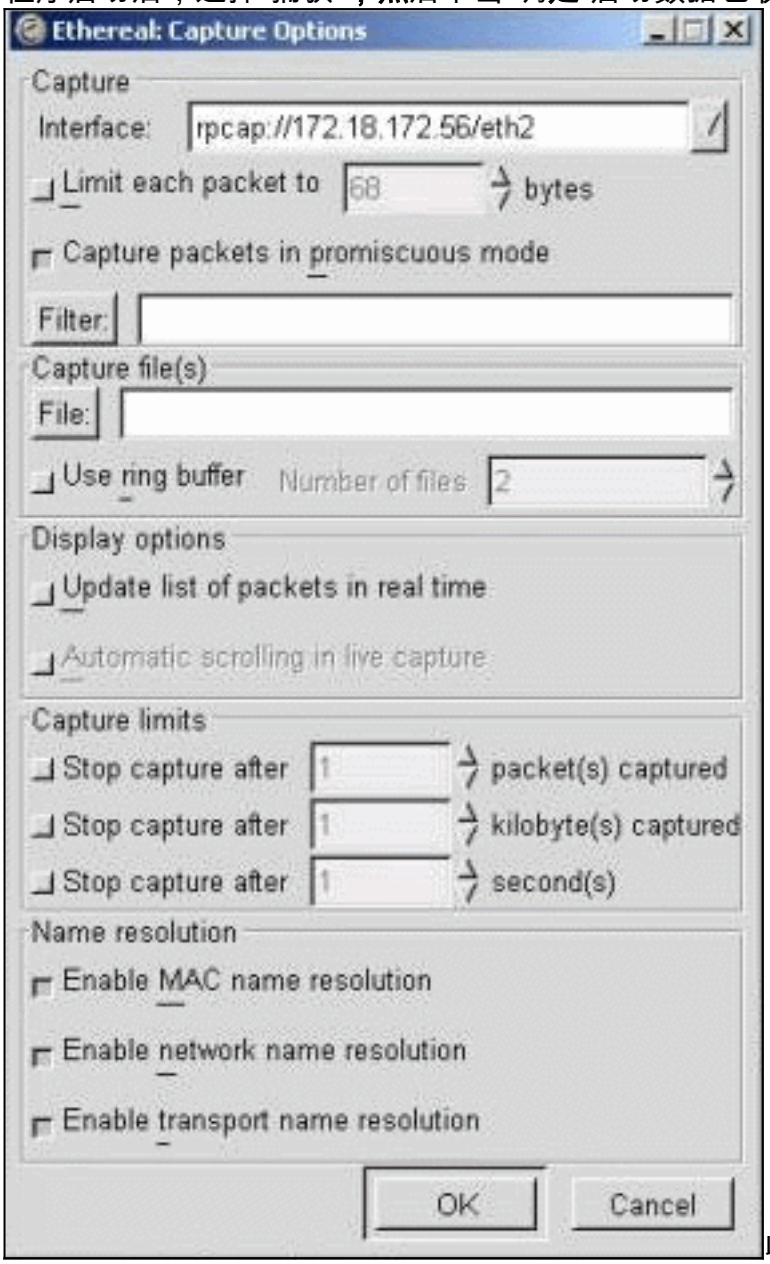
1. 要停止MDS FC分析器跟踪，必须从CLI按Ctrl-C。

```
MDS9216# config t

Enter configuration commands, one per line.  End with CNTL/Z.

MDS9216(config)# fcanalyzer remote 64.102.58.114

MDS9216(config)# ^C
```

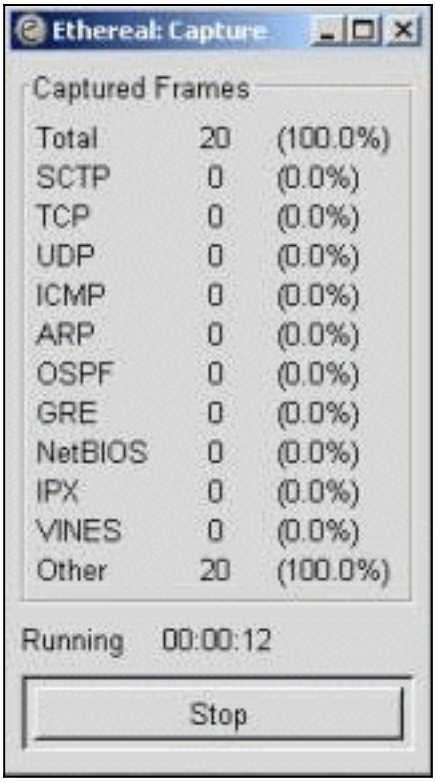
   请勿在上一命令上指定活动选项，或者启动Ethereal时，您需要在PC上的命令行中添加其他选项。添加active关键字通常意味着您还必须配置TCP端口号。建议使用默认值。
2. 在PC上，验证IP地址，然后启动Ethereal远程捕获程序。

```
d:\> ipconfig

Windows 2000 IP Configuration

Ethernet adapter wireless:

        Connection-specific DNS Suffix  . : cisco.com
        IP Address. . . . . . . . . . . . : 64.102.58.114
        Subnet Mask . . . . . . . . . . . : 255.255.255.128
        Default Gateway . . . . . . . . . : 64.102.58.1

Ethernet adapter builtinE:

        Connection-specific DNS Suffix  . : cisco.com
        Autoconfiguration IP Address. . . : 169.254.219.141
        Subnet Mask . . . . . . . . . . . : 255.255.0.0
        Default Gateway . . . . . . . . . :

d:\> cd ethereal099

D:\Ethereal099> ethereal099 -i rpcap://172.18.172.56/eth2
```

3. 程序启动后，选择“捕获”，然后单击“确定”启动数据包收集。

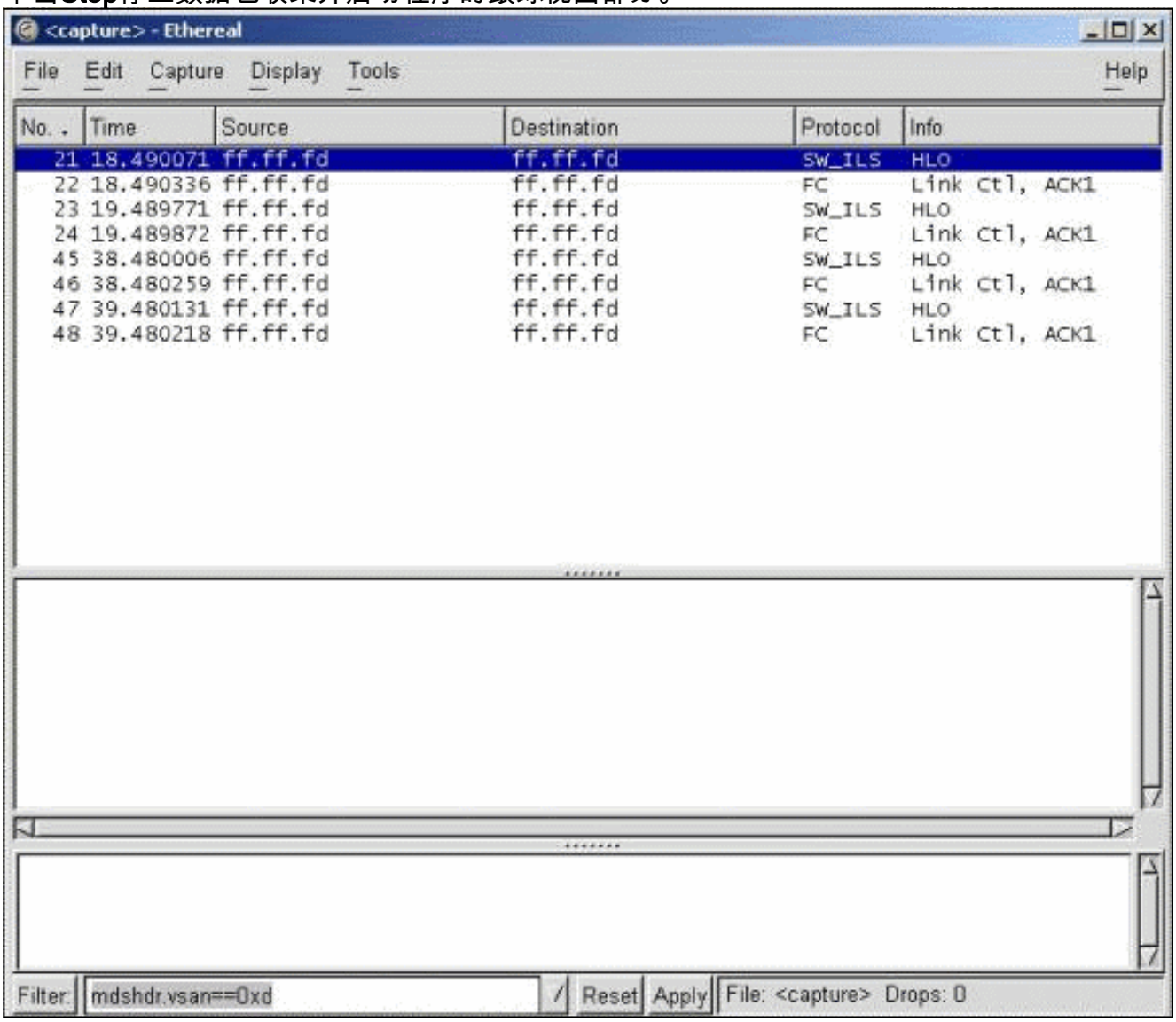


收集的FC数据包在摘要显示示为“其他



”。

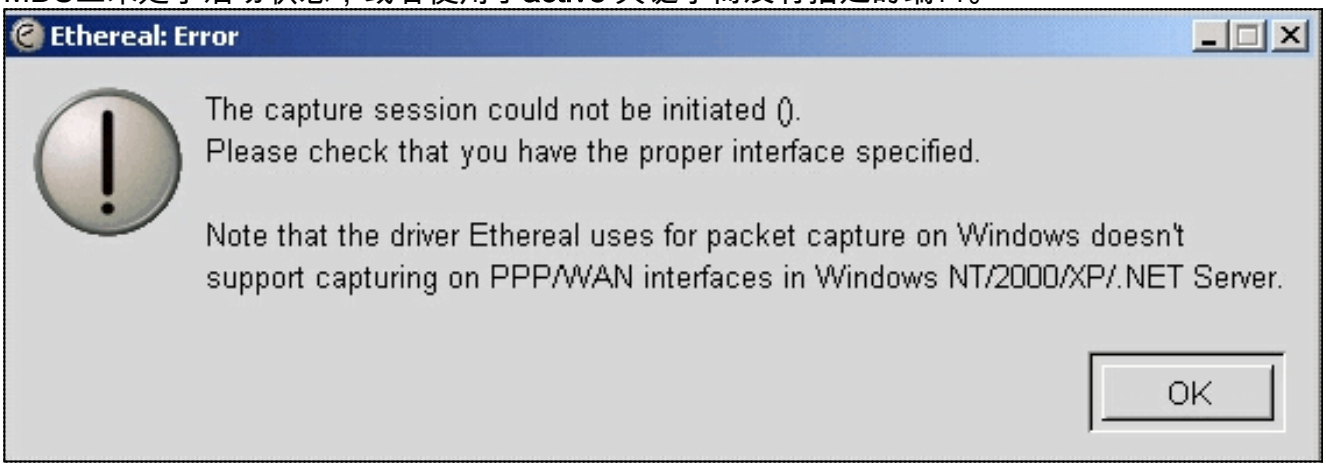
4. 单击**Stop**停止数据包收集并启动程序的跟踪视图部分。



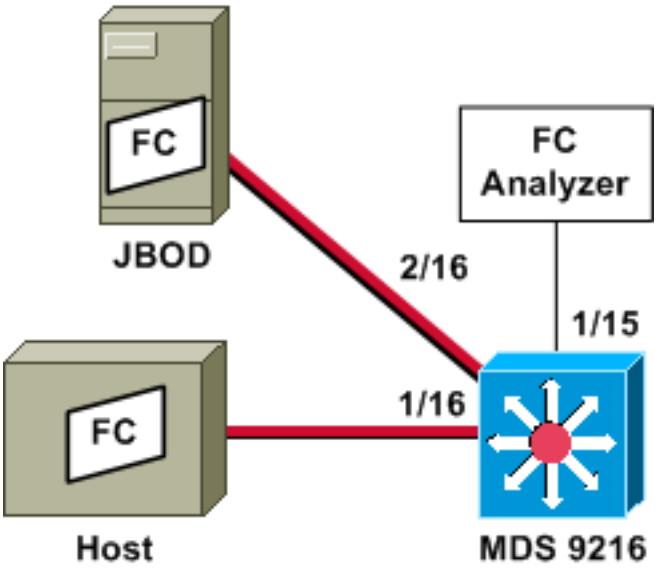
您可以使用过滤器将显示限制为特定流量流。

5. 如果远程捕获启动出现问题，您可能会看到与下一映像中类似的错误屏幕。FC分析器在

MDS上未处于活动状态，或者使用了**active** 关键字而没有指定的端口。



为本地SPAN配置



注意：目的是收集FC帧（在端口1/15上使用FC分析器），并从9216的端口1/16上的主机进出。

端口1/15上的FC分析器显示有序集，但不显示在正在进行SPAN的链路上出现的有序集。FC分析器设备可以是端口分析器适配器(PAA)和运行Ethereal的PC，类似于Finisar设备。

MDS 9216配置

```
MDS9216# show run

vsan 13

vsan 13 interface fc1/16
vsan 13 interface fc2/16

boot system bootflash:/m9200-ek9-mzg.1.2.0.77.bin
boot kickstart bootflash:/m9200-ek9-kickstart-mzg.1.2.0.77.bin

 interface fc1/15
switchport mode SD
switchport speed 2000
no shutdown
```

```
 interface fc1/16
no shutdown

 interface mgmt0
ip address 172.18.172.56 255.255.255.0

span session 1
destination interface fc1/15
source interface fc1/16 rx

source interface fc1/16 tx
```

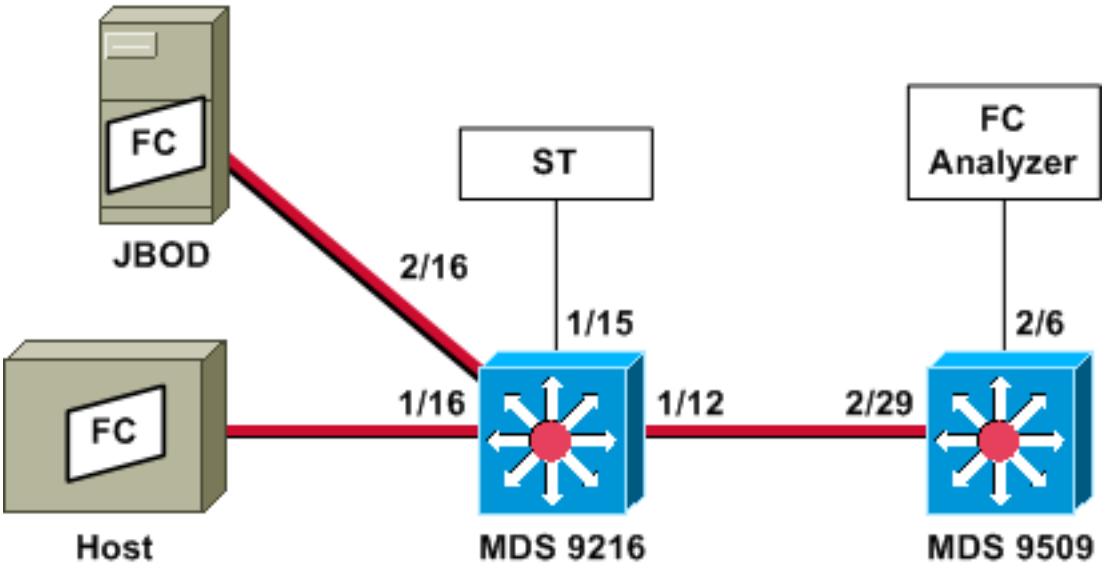
MDS 9216显示器

```
MDS9216# show interface fc 1/15

fc1/15 is up
    Hardware is Fibre Channel
    Port WWN is 20:0f:00:05:30:00:47:9e
    Admin port mode is SD
    Port mode is SD
    Port vsan is 1
    Speed is 2 Gbps
    Beacon is turned off
    5 minutes input rate 73704 bits/sec, 9213 bytes/sec, 13 frames/sec
    5 minutes output rate 2275584 bits/sec, 284448 bytes/sec, 430 frames/sec
      2839098 frames input, 1883173240 bytes
        0 discards, 0 errors
        0 CRC,  0 unknown class
        0 too long, 0 too short
      3049460 frames output, 2038253240 bytes
        0 discards, 0 errors
      0 input OLS, 0 LRR, 0 NOS, 0 loop inits
      0 output OLS, 0 LRR, 0 NOS, 0 loop inits

MDS9216# show interface fc 1/16

fc1/16 is up
    Hardware is Fibre Channel
    Port WWN is 20:10:00:05:30:00:47:9e
    Admin port mode is auto, trunk mode is on
    Port mode is FL, FCID is 0x660100
    Port vsan is 13
    Speed is 2 Gbps
    Transmit B2B Credit is 0
    Receive B2B Credit is 16
    Receive data field Size is 2112
    Beacon is turned off
    5 minutes input rate 771568 bits/sec, 96446 bytes/sec, 171 frames/sec
    5 minutes output rate 1503144 bits/sec, 187893 bytes/sec, 258 frames/sec
      1238843 frames input, 691853044 bytes
        0 discards, 0 errors
        0 CRC,  0 unknown class
        0 too long, 0 too short
      1864744 frames output, 1357707740 bytes
        0 discards, 0 errors
      0 input OLS, 0 LRR, 0 NOS, 49 loop inits
      10 output OLS, 0 LRR, 10 NOS, 14 loop inits

MDS9216# show interface fc 2/16

fc2/16 is up
    Hardware is Fibre Channel
```

```
    Port WWN is 20:50:00:05:30:00:47:9e
    Admin port mode is FX
    Port mode is FL, FCID is 0x660000
    Port vsan is 13
    Speed is 1 Gbps
    Transmit B2B Credit is 0
    Receive B2B Credit is 12
    Receive data field Size is 2112
    Beacon is turned off
    5 minutes input rate 1647552 bits/sec, 205944 bytes/sec, 283 frames/sec
    5 minutes output rate 845624 bits/sec, 105703 bytes/sec, 188 frames/sec
      1867680 frames input, 1361393600 bytes
        0 discards, 0 errors
        0 CRC,  0 unknown class
        0 too long, 0 too short
      1241179 frames output, 694505284 bytes
        0 discards, 0 errors
      0 input OLS, 0 LRR, 0 NOS, 2 loop inits
      0 output OLS, 0 LRR, 0 NOS, 2 loop inits

MDS9216# show fcns data vsan 13

VSAN 13:
--------------------------------------------------------------------------
FCID        TYPE  PWWN                    (VENDOR)        FC4-TYPE:FEATURE
--------------------------------------------------------------------------
0x6600dc    NL    21:00:00:20:37:15:a2:49 (Seagate)       scsi-fcp:target
0x6600e0    NL    21:00:00:04:cf:6e:4a:8c (Seagate)       scsi-fcp:target
0x6600e1    NL    21:00:00:04:cf:6e:37:8b (Seagate)       scsi-fcp:target
0x660101    NL    10:00:00:01:73:00:81:82 (JNI)

Total number of entries = 4

MDS9216# show span session brief

-------------------------------------------------------
 Session  Admin          Oper           Destination
          State          State          Interface
-------------------------------------------------------
 1        no suspend     active         fc1/15

MDS9216# show span session 1

Session 1 (active)
   Destination is fc1/15
   No session filters configured
   Ingress (rx) sources are
     fc1/16,
   Egress (tx) sources are
     fc1/16,

MDS9216# show span internal info session 1

===================================
Admin Configuration for session [1]
===================================
Name:
Destination port: [100e000] [fc1/15] Flags [1]
State: [0] not suspended
Session Flags: [0] <>
Session Filter rx:  none
Session Filter tx:  none
Source interface - rx: fc1/16
Source interface - tx: fc1/16
```

```
Source vsan (rx):  none
Session [1] is UNLOCKED txn[0] cfg[0] rid[80000000]
==================================
Runtime Data for session [1]
==================================
Status <active: 0 inactive 1> : [0] active
State reason:[0] Flags [6]rx_span_bit [0] tx_span_bit[1] ( 4s invalid)
oper configured PHYSICAL ports
fc1/16
PHYSICAL ports undergoing configuration
none
PHYSICAL ports in error state
none
PHYSICAL ports (incl. dest) link status
fc1/15, fc1/16
```

为远程SPAN配置



注意：目的是收集FC帧（通过FC分析器连接到9509），并从9216上的主机进行收集。ST接口必须安装千兆接口转换器(GBIC)，速度必须与9509上的Span目标(SD)端口匹配。

在尝试配置RSPAN之前，请确保以下几点得到解决：

- 所有交换机必须运行MDS代码1.2或更高版本。
- 不应将电缆连接到Span终端(ST)端口的小型封装热插拔(SFP)。
- 在开始收集帧之前，请确保FC隧道已启用。
- FC分析器可以是运行Ethereal的PAA和PC，类似于Finisar设备。

如果SPAN源交换机和SPAN目标交换机之间有任何中间交换机，请遵循以下步骤：

1. 在与隧道源和目标相同的子网中创建活动VSAN接口。
2. 启用IP路由.
3. 启用FC隧道。
4. 使用SAN-OS 1.2或更高版本。

MDS 9216配置

```
MDS9216# show version
```

```
Cisco Storage Area Networking Operating System (SAN-OS) Software
TAC support: http://www.cisco.com/tac
Copyright (c) 2002-2003 by Cisco Systems, Inc. All rights reserved.
The copyright for certain works contained herein are owned by
Andiamo Systems, Inc. and/or other third parties and are used and
distributed under license.

Software
  BIOS:      version 1.0.7
  loader:    version 1.0(3a)
  kickstart: version 1.2(1) [build 1.2(0.77)] [gdb]
  system:    version 1.2(1) [build 1.2(0.77)] [gdb]

  BIOS compile time:       03/20/03
  kickstart image file is: bootflash:/m9200-ek9-kickstart-mzg.1.2.0.77.bin
  kickstart compile time:  6/29/2003 0:00:00
  system image file is:    bootflash:/m9200-ek9-mzg.1.2.0.77.bin
  system compile time:     6/29/2003 0:00:00

Hardware
  RAM 963108 kB

  bootflash: 503808 blocks (block size 512b)
  slot0:          0 blocks (block size 512b)

  MDS9216 uptime is 0 days 21 hours 28 minute(s) 20 second(s)

  Last reset at 50030 usecs after Thu Jul  3 13:09:31 2003
    Reason: Reset Requested by CLI command reload
    System version: 1.2(0.45c)

MDS9216# show run

Building Configuration ...

 interface fc-tunnel 13
destination 10.0.0.2
source 10.0.0.1
no shutdown

vsan database
vsan 13

 interface vsan13
ip address 10.0.0.1 255.255.255.0
no shutdown

vsan 13 interface fc1/16
vsan 13 interface fc2/16

boot system bootflash:/m9200-ek9-mzg.1.2.0.77.bin
boot kickstart bootflash:/m9200-ek9-kickstart-mzg.1.2.0.77.bin
fc-tunnel enable

ip routing
zone default-zone permit vsan 13

 interface fc1/12
no shutdown

 interface fc1/15
switchport mode ST
switchport speed 1000
rspan-tunnel interface fc-tunnel 13
```

```
no shutdown

 interface fc1/16
no shutdown

 interface fc2/16
no shutdown

 interface mgmt0
ip address 172.18.172.56 255.255.255.0

span session 1
destination interface fc-tunnel 13
source interface fc1/16 rx

source interface fc1/16 tx
!--- Output suppressed.
```

MDS 9216显示器

```
MDS9216# show interface fc 1/16

fc1/16 is up
    Hardware is Fibre Channel
    Port WWN is 20:10:00:05:30:00:47:9e
    Admin port mode is auto, trunk mode is on
    Port mode is FL, FCID is 0x660100
    Port vsan is 13
    Speed is 2 Gbps
    Transmit B2B Credit is 0
    Receive B2B Credit is 16
    Receive data field Size is 2112
    Beacon is turned off
    5 minutes input rate 1480080 bits/sec, 185010 bytes/sec, 331 frames/sec
    5 minutes output rate 2907712 bits/sec, 363464 bytes/sec, 498 frames/sec
      574444 frames input, 320246452 bytes
        0 discards, 0 errors
        0 CRC,  0 unknown class
        0 too long, 0 too short
      865170 frames output, 629303788 bytes
        0 discards, 0 errors
      0 input OLS, 0 LRR, 0 NOS, 10 loop inits
      5 output OLS, 0 LRR, 5 NOS, 9 loop inits

MDS9216# show interface fc 2/16

fc2/16 is up
    Hardware is Fibre Channel
    Port WWN is 20:50:00:05:30:00:47:9e
    Admin port mode is FX
    Port mode is FL, FCID is 0x660000
    Port vsan is 13
    Speed is 1 Gbps
    Transmit B2B Credit is 0
    Receive B2B Credit is 12
    Receive data field Size is 2112
    Beacon is turned off
    5 minutes input rate 2905056 bits/sec, 363132 bytes/sec, 498 frames/sec
    5 minutes output rate 1480184 bits/sec, 185023 bytes/sec, 330 frames/sec
      867932 frames input, 632889576 bytes
        0 discards, 0 errors
        0 CRC,  0 unknown class
        0 too long, 0 too short
```

```
      576681 frames output, 322771132 bytes
        0 discards, 0 errors
      0 input OLS, 0 LRR, 0 NOS, 2 loop inits
      0 output OLS, 0 LRR, 0 NOS, 2 loop inits

MDS9216# show interface fc 1/15

fc1/15 is up
    Hardware is Fibre Channel
    Port WWN is 20:0f:00:05:30:00:47:9e
    Admin port mode is ST
    Port mode is ST
    Port vsan is 1
    Speed is 1 Gbps
    Rspan tunnel is fc-tunnel 13
    Beacon is turned off
    5 minutes input rate 4391896 bits/sec, 548987 bytes/sec, 827 frames/sec
    5 minutes output rate 4391896 bits/sec, 548987 bytes/sec, 820 frames/sec
      1431232 frames input, 941079708 bytes
        0 discards, 0 errors
        0 CRC,  0 unknown class
        0 too long, 0 too short
      1406853 frames output, 941079708 bytes
        0 discards, 0 errors
      0 input OLS, 0 LRR, 0 NOS, 0 loop inits
      0 output OLS, 0 LRR, 0 NOS, 0 loop inits

MDS9216# show interface fc 1/12

fc1/12 is trunking
    Hardware is Fibre Channel
    Port WWN is 20:0c:00:05:30:00:47:9e
    Peer port WWN is 20:5d:00:05:30:00:51:1e
    Admin port mode is auto, trunk mode is on
    Port mode is TE
    Port vsan is 1
    Speed is 2 Gbps
    Transmit B2B Credit is 12
    Receive B2B Credit is 255
    Receive data field Size is 2112
    Beacon is turned off
    Trunk vsans (admin allowed and active) (1-5,13,20,777)
    Trunk vsans (up)                       (1,13)
    Trunk vsans (isolated)                 (2-5,20,777)
    Trunk vsans (initializing)             ()
    5 minutes input rate 384 bits/sec, 48 bytes/sec, 0 frames/sec
    5 minutes output rate 4458296 bits/sec, 557287 bytes/sec, 827 frames/sec
      19865 frames input, 2220112 bytes
        0 discards, 0 errors
        0 CRC,  0 unknown class
        0 too long, 0 too short
      1468709 frames output, 971064244 bytes
        0 discards, 0 errors
      0 input OLS, 2 LRR, 0 NOS, 0 loop inits
      2 output OLS, 2 LRR, 0 NOS, 2 loop inits

MDS9216# show interface fc-tunnel 13

fc-tunnel 13 is up
Dest   IP Addr: 10.0.0.2   Tunnel ID: 13
Source IP Addr: 10.0.0.1   LSP ID: 1
Explicit Path Name:
Outgoing interface: fc1/12
Outgoing Label(s) to Insert: 10005:0:1:ff'h
```

```
Record Routes:
10.0.0.2

MDS9216# show interface vsan 13

vsan13 is up, line protocol is up
    WWPN is 10:00:00:05:30:00:47:9f, FCID is 0x660201
    Internet address is 10.0.0.1/24
    MTU 1500 bytes, BW 1000000 Kbit
    2207 packets input, 170332 bytes, 0 errors, 0 multicast
    14952 packets output, 2225444 bytes, 0 errors, 0 dropped

MDS9216# show span session 1

Session 1 (active)
   Destination is fc-tunnel 13
   No session filters configured
   Ingress (rx) sources are
     fc1/16,
   Egress (tx) sources are
     fc1/16,

MDS9216# show fc-tunnel internal states

number of sessions : 1
Sess: 10.0.0.2 Tunnel-ID 13 Ext-Tunnel-ID 10.0.0.1

MDS9216# show fc-tunnel internal data

vsan interfaces:
  vsan 13: 10.0.0.1/255.255.255.0  [2]
  vsan 2: 15.0.0.4/255.255.255.0  [2]
next hop switch information:
  10.0.0.2 {vsan (13), 0x6b0001/8}: [4] fc1/12
layer 2 interfaces:
  fc1/12: Trunking, Up
```

MDS 9509配置

```
RTP-9509-1# show run

Building Configuration ...
vsan database
vsan 13

 interface vsan13
ip address 10.0.0.2 255.255.255.0
no shutdown

vsan 13 interface fc2/16

boot system bootflash:/m9500-sf1ek9-mzg.1.2.0.77.bin sup-1
boot kickstart bootflash:/m9500-sf1ek9-kickstart-mzg.1.2.0.77.bin sup-1
boot system bootflash:/m9500-sf1ek9-mzg.1.2.0.77.bin sup-2
boot kickstart bootflash:/m9500-sf1ek9-kickstart-mzg.1.2.0.77.bin sup-2

fc-tunnel enable
fc-tunnel tunnel-id-map 13 interface fc2/6

ip routing

switchname RTP-9509-1
```

```
 interface fc2/6
switchport mode SD
switchport speed 1000
no shutdown

 interface fc2/29
switchport mode E
no shutdown

 interface mgmt0
ip address 172.18.172.57 255.255.255.0
```

MDS 9509显示器

```
RTP-9509-1# show interface fc 2/29

fc2/29 is trunking
    Hardware is Fibre Channel
    Port WWN is 20:5d:00:05:30:00:51:1e
    Peer port WWN is 20:0c:00:05:30:00:47:9e
    Admin port mode is E, trunk mode is on
    Port mode is TE
    Port vsan is 501
    Speed is 2 Gbps
    Transmit B2B Credit is 255
    Receive B2B Credit is 12
    Receive data field Size is 2112
    Beacon is turned off
    Trunk vsans (admin allowed and active) (1,13,86,100,501)
    Trunk vsans (up)                       (1,13)
    Trunk vsans (isolated)                 (86,100,501)
    Trunk vsans (initializing)             ()
    5 minutes input rate 4497752 bits/sec, 562219 bytes/sec, 835 frames/sec
    5 minutes output rate 344 bits/sec, 43 bytes/sec, 0 frames/sec
      1934604 frames input, 1285716656 bytes
        0 discards, 0 errors
        0 CRC,  0 unknown class
        0 too long, 0 too short
      16903 frames output, 932076 bytes
        0 discards, 0 errors
      1 input OLS, 1 LRR, 2 NOS, 0 loop inits
      3 output OLS, 1 LRR, 2 NOS, 0 loop inits

RTP-9509-1# show interface fc 2/6

fc2/6 is up
    Hardware is Fibre Channel
    Port WWN is 20:46:00:05:30:00:51:1e
    Admin port mode is SD
    Port mode is SD
    Port vsan is 1
    Speed is 1 Gbps
    Beacon is turned off
    5 minutes input rate 0 bits/sec, 0 bytes/sec, 0 frames/sec
    5 minutes output rate 4421448 bits/sec, 552681 bytes/sec, 835 frames/sec
      0 frames input, 0 bytes
        0 discards, 0 errors
        0 CRC,  0 unknown class
        0 too long, 0 too short
      1912319 frames output, 1263982444 bytes
        0 discards, 0 errors
      0 input OLS, 0 LRR, 0 NOS, 0 loop inits
      0 output OLS, 0 LRR, 0 NOS, 0 loop inits
```

```
RTP-9509-1# show interface fc-tunnel 13
                              ^
% invalid interface range detected at '^' marker.
!--- This is because the tunnel is not defined on the 9509. RTP-9509-1# show interface vsan 13

vsan13 is up, line protocol is up
    WWPN is 10:00:00:05:30:00:51:23, FCID is 0x6b0001
    Internet address is 10.0.0.2/24
    MTU 1500 bytes, BW 1000000 Kbit
    15071 packets input, 2243728 bytes, 0 errors, 1 multicast
    2342 packets output, 185864 bytes, 0 errors, 0 dropped

RTP-9509-1# show fc-tunnel tunnel-id-map

tunnel id  egress interface
     13             fc2/6
     14

RTP-9509-1# show fc-tunnel internal states

number of sessions : 1
Sess: 10.0.0.2 Tunnel-ID 13 Ext-Tunnel-ID 10.0.0.1

RTP-9509-1# show fc-tunnel internal data

vsan interfaces:
  vsan 13: 10.0.0.2/255.255.255.0  [2]
next hop switch information:
layer 2 interfaces:
  fc2/6: Non-Trunking, Up
```

端口分析器适配器设备注释

以太网端口为铜缆，可自动检测1 Gbps或100 Mbps的速度。必须在PC上安装Ethereal 0.9(9)或更高版本和WinPcap。

FC端口需要SFP和LC到LC电缆才能连接到MDS。

以下是PAA上的交换机设置：

- 交换机位置从左到右编号为1、2、3和4。
- 在下一个列表中，1表示DIP开关为ON或UP。0示DIP开关为DOWN或OFF。

```
0001 1G  NTM
1001 1G  ETM
0101 1G  STM
0011 1G  DTM

0000 2G  NTM
1000 2G  ETM
0100 2G  STM
0010 2G  DTM

1111 1G  MNM
!--- Used for diagnostics only.
```

- 交换机4指示速度（开= 1G，关= 2G）。 交换机1、2和3规定截断模式。任何更改都需要重新通电。

以下是模式：

- 无截断模式(NTM)- FC帧在不进行任何修改的情况下传递。

- 以太网截断模式(ETM) — 将负载大小从528条线路减小到368条线路，将FC帧截断到最多1496字节。
- 浅截断模式(STM) — 将负载大小从528条线路减小到58条线路，将FC帧截断到最多256字节。
- 深度截断模式(DTM) — 将负载大小从528条线路减小到10条线路，将FC帧截断到最多64字节。

验证

当前没有可用于此配置的验证过程。

故障排除

目前没有针对此配置的故障排除信息。

相关信息

- MDS 9000多层交换机硬件支持
- 存储联网产品技术支持
- 技术支持 - Cisco Systems