

对MD基本配置的MD与FCIP

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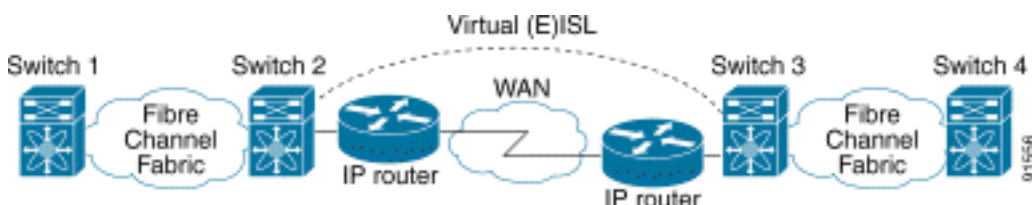
简介

本文提供一个示例配置，关于MDS基本的TCP/IP光纤信道 (FCIP)多层导向交换机(MDS)。

此配置示例与 SAN-OS 的 1.2 和 1.3 版本有关。SAN-OS 2.0 版本中的一些参数发生了变化。请参考 2.0 SAN-OS 配置指南和版本说明。

FCIP描述了在基于IP的光纤信道(FC)存储区域网络 (SAN) 岛实现互连的机制，以便在单个FC光组织中组成统一的SAN。FCIP依靠基于IP的网络服务，在通过局域网、城域网或广域网的SAN岛之间提供连通性。

由 FCIP 连接的光纤通道 SAN



FCIP 在端口 3225 上使用传输控制协议 (TCP) 作为一种网络层传输技术。

先决条件

要求

IP骨干网必须是可运行的，并提供所需的带宽，以支持在FCIP链路上 - 可能是第二层(L2)拓扑或第三层(L3)拓扑 - 运行的应用。如果必须配置L3、中间路由器或多层交换机来正确转发FCIP隧道的

IP数据流源IP地址和目的地IP地址。如果在FCIP对等体路径上的任何网络设备中强制执行服务质量 (QoS) 或流量整形，那么在MDS FCIP配置文件上配置任何TCP的相关参数和功能之前，应参考管理IP结构的网络管理器，以了解必要的详细资料。

[使用的组件](#)

本文档中的信息基于下列软件和硬件版本：

- 具备 IP Storage (IPS) 服务模块 (DS-X9308-SMIP) 1.2.(2a) 运行版本的 MDS 9509
- 具备 IPS 服务模块 (DS-X9308-SMIP) 1.2.(2a) 运行版本的 MDS 9509
- 带有Emulex LP9K HBA的Win2003服务器(HPQ Pro-Liant-P4)
- IBM 存储阵列 (ESS-2105-F20)

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](#)

有关文档规则的详细信息，请参阅 [Cisco 技术提示规则](#)。

[背景信息](#)

FCIP 包括以下规格：

ANSI T11

1. FC-SW-2描述FC交换机的操作和交互作用包括E_Port和结构操作。
2. FC-BB-2是适合通过TCP网络主干的FC交换网络扩展的映射，它同时还定义了支持E_端口 和 B_端口的参考模型。

IETF IPS 工作组

1. TCP的FC包括在一个IP网络上传输FC帧的TCP/IP要求。
2. FC 帧封装可定义普通的光纤封装格式。

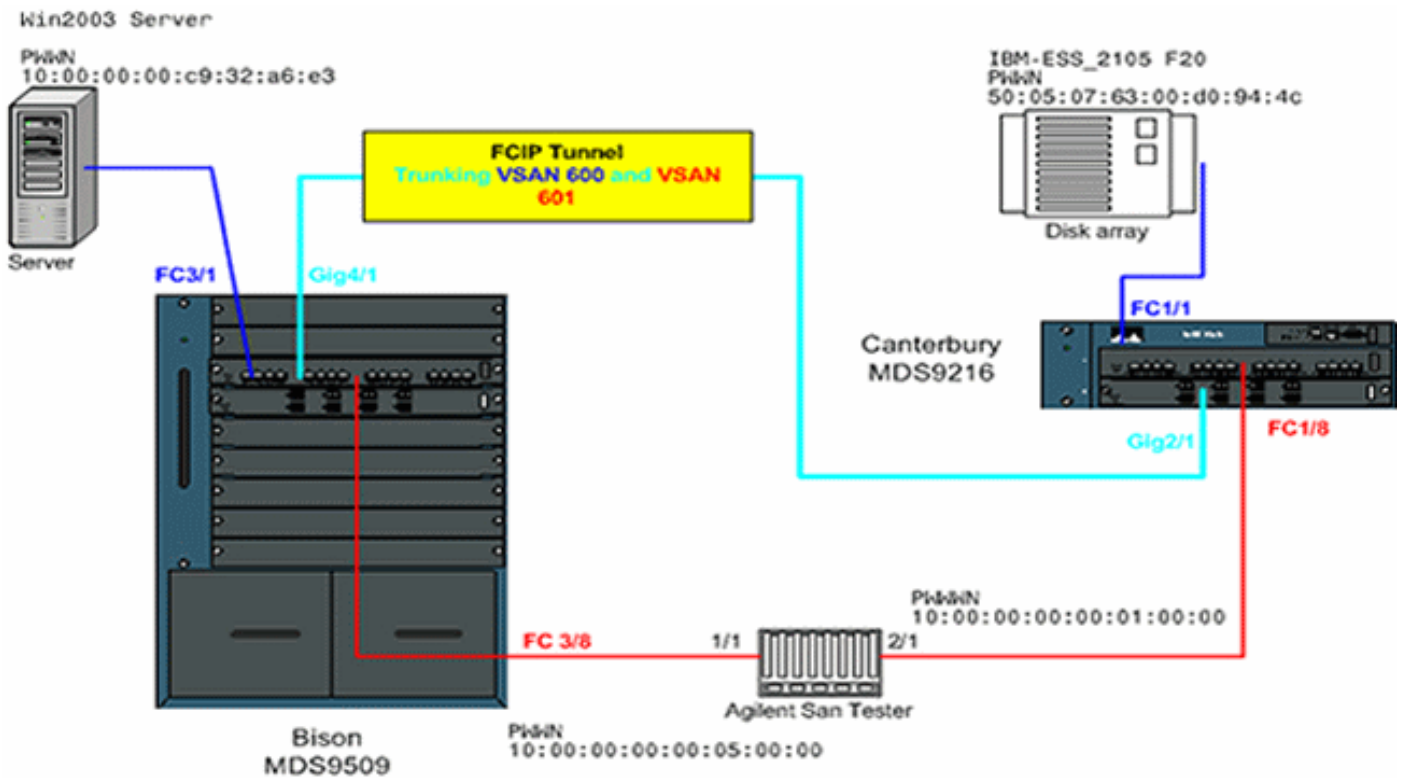
在2个SAN交换机或整个FCIP上的结构互连被称为FCIP链路，它能包含一条或多条TCP连接。FCIP链路的每个结尾与虚拟E端口(VE_端口)或B_端口连接，这取决于实施情况。FC-BB 和 FC-BB-2 可描述两种方法之间的区别。IP业务模块(DS-X9308-SMIP)支持两种模式，但默认为VE_Port，如果所有相关对等体都是DS-X9308-SMIP模块，VE_Port也是推荐运行的模式。MDS平台上的VE_Port功能还支持TE 端口功能，此功能使它能够在在一个FCIP实例上支持来自多个VSAN的中继数据流。

[配置](#)

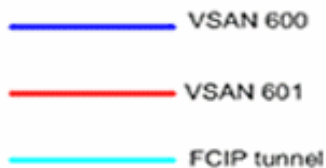
在MDS上，您需要用适于两个平台的IPS配置指南进行自我熟悉。手册的最新版本为[配置 IP 存储](#)。

[网络图](#)

本文档使用下图所示的网络设置。



Topology 1 - FCIP tunnel 1Gbps Back-to-back



此图表显示了一个典型的实验室设置，其中没有其他的网络设备在两台MDS交换机的两个千兆以太网(GE)接口之间连接。这是 FCIP安装的MDS的最简单形式，一般用于用户实验室，以验证基本功能。在 VSAN 600 中，Emulex LightPulse 9000 HBA 将 Windows 2003 服务器连接至 MDS 9509 (Bison)，将 IBM 存储阵列连接至 MDS9216 (Canterbury)，在其中可配置 Windows 2003 服务器的 LUN。

Agilent SAN测试设备用作仿真器，用两个装置安装VSAN 601，并且生成大量的FC-2非-FCP后台流量。增加外围设备使配置更可实现，并可在两台参与交换机的被分配名称服务器中拥有大量条目。本文不关注端到端连通性，不包括服务器或存储阵列的截屏画面。外围设备不了解FCIP，并且它的运行就好象两个MDS之间的EISL链路在一条正常FC链路上运行一样。

配置

本文档使用如下所示的配置。

- [具备 IPS-8 模块的 MDS9509 \(Bison\)](#)
- [具备 IPS-8 模块的 MDS9216 \(Canterbury\)](#)

具备 IPS-8 模块的 MDS9509 (Bison)

```
bison# sh ver 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 1.0.8 loader: version 1.2(2) kickstart: version 1.2(2a) system: version 1.2(2a) BIOS compile time: 08/07/03 kickstart image file is: bootflash:/k122a kickstart compile time: 9/23/2003 11:00:00 system image file is: bootflash:/sl22a system compile time: 10/8/2003 18:00:00 Hardware RAM 1024584 kB bootflash: 500736 blocks (block size 512b) slot0: 0 blocks (block size 512b) bison uptime is 1 days 15 hours 45 minute(s) 44 second(s) Last reset Reason: Unknown System version: 1.2(2a) Service: bison# sh run Building Configuration ... fcip profile 1 ip address 100.100.100.1 !--- FCIP profile 1 is bound to the local relevant IPS interface. In this !--- example, it is the IP address of interface Gig4/1. vsan database vsan 600 vsan 601 fcdomain priority 1 vsan 1 fcdomain domain 1 preferred vsan 1 fcdomain domain 1 preferred vsan 600 fcdomain domain 1 preferred vsan 601 interface fcip1 no shutdown switchport trunk allowed vsan 600-601 use-profile 1 peer-info ipaddr 100.100.100.2 !--- Interface FCIP 1 is configured to act as an EISL port carrying traffic !--- for both VSAN 600 and VSAN 601 across the tunnel. The FCIP interface, !--- in most respects, is configured identical then any normal FC interface !--- acting as ISL or EISL. Bind this interface to FCIP profile 1, and define !--- the peer-ip address 100.100.100.2, which is the address of the MDS9216's !--- Gig 2/1 interface in the example. vsan database vsan 600 interface fc3/1 vsan 601 interface fc3/2 vsan 601 interface fc3/8 vsan 600 interface fc3/16 zone name z-fcip2 vsan 600 member pwwn 50:05:07:63:00:d0:94:4c member pwwn 10:00:00:00:c9:32:a6:e3 zone name Zone_a1 vsan 601 member pwwn 10:00:00:00:00:01:00:00 member pwwn 10:00:00:00:00:05:00:00 zoneset distribute full vsan 600 zoneset name zs-fcip2 vsan 600 member z-fcip2 zoneset name Agilent_1 vsan 601 member Zone_a1 zoneset activate name zs-fcip2 vsan 600 zoneset activate name Agilent_1 vsan 601 interface GigabitEthernet4/1 ip address 100.100.100.1 255.255.255.252 no shutdown !--- Note that Gig4/1 in the default state is configured with an MTU size of !--- 1500 bytes, if the network topology allows for larger end-to-end frame !--- sizes known as jumbo frames. !--- The default value may be changed to a higher value. A good value is !--- 3000 bytes, because this would avoid the fragmentation of full 2048 FC !--- frames into multiple TCP segments. Not all networking equipment can handle !--- jumbo frames, so the default value of 1500 bytes is a conservative !--- approach to avoid connectivity issues while bringing up the FCIP tunnel.
```

具备 IPS-8 模块的 MDS 9216 (Canterbury)

```
canterbury# sh ver 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 1.0.8 loader: version 1.2(2) kickstart: version 1.2(2a) system: version 1.2(2a) BIOS compile time: 08/07/03 kickstart image file is: bootflash:/k122a kickstart
```

```
compile time: 9/23/2003 11:00:00 system image file is:
bootflash:/sl22a system compile time: 10/8/2003 18:00:00
Hardware RAM 960072 kB bootflash: 500736 blocks (block
size 512b) slot0: 0 blocks (block size 512b) canterbury
uptime is 6 days 22 hours 35 minute(s) 37 second(s) Last
reset at 995484 usecs after Wed Nov 5 15:05:04 2003
Reason: Reset by installer System version: 1.2(1a)
Service: canterbury# sh run Building Configuration ...
fcip profile 1 ip address 100.100.100.2 !--- At this
side of the tunnel, choose the same profile number that
you !--- used on the peer to make management easier.
This is not mandatory, !--- and you can choose another
value between 1 and 255. vsan database vsan 600 vsan 601
fcdomain domain 2 preferred vsan 600 fcdomain domain 2
preferred vsan 601 interface fcip1 no shutdown
switchport trunk allowed vsan 600-601 use-profile 1
peer-info ipaddr 100.100.100.1 !--- FCIP interface 1 is
chosen for arbitrary reasons. You can choose another !--
- FCIP number and still tunnel to the peer FCIP 1
instance. !--- It is important that you bind the correct
profile-id to your FCIP interface !--- of choice. Allow
the same VSANS that you allowed on the peer FCIP
interface, !--- which is good practice in general for
normal EISL trunks. The peer ip-address !--- is the IP
address of the MDS9505s interface Gig4/1 !--- in the
Network Diagram above. vsan database vsan 600 interface
fc1/1 vsan 601 interface fc1/8 vsan 600 interface fc1/16
zone name z-fcip2 vsan 600 member pwwn
50:05:07:63:00:d0:94:4c member pwwn
10:00:00:00:c9:32:a6:e3 zone default-zone permit vsan
777 zoneset distribute full vsan 600 zoneset name zs-
fcip2 vsan 600 member z-fcip2 zoneset activate name zs-
fcip2 vsan 600 zoneset activate name Agilent_1 vsan 601
interface GigabitEthernet2/1 ip address 100.100.100.2
255.255.255.252 no shutdown
```

验证

本部分所提供的信息可用于确认您的配置是否正常工作。

- **show interface gig x/y** - 显示绑定到 FCIP 配置文件的相关千兆接口的状态。
- **show ips stats tcp int gig x/y**---显示相关千兆接口的TCP统计数据 and 活动连接。
- **show ips arp int gig x/y** - 显示相关千兆接口的所有地址解析协议 (ARP) 条目；对端的下一跳应该存在于此列表中。
- **show ips ip route int gig x/y** - 显示通过相关千兆接口的特定路由。
- **show interface fcip x**——显示FCIP接口状态和与此FCIP隧道相关的全部详情。
- **show profile fcip x** ——显示文件夹所捆绑的IP地址，以及所有配置的TCP参数。
- **show int fcip x counters**——用于检查是否有任何帧通过FCIP隧道。
- **show fcdomain vsan x** - 列出所有与域相关的详细信息；过去常常验证结构在FCIP隧道间被形成。
- **show fcns da vsan x** ---显示与VSAN相关的所有pwwn、FC4-类型和FCID;用于验证所有期望的条目通过FCIP隧道被分配。

故障排除

务必多次发出上述 **show** 命令以建立计数器历史记录。与时点无有关并且只收集一次的计数器通常没有用。

请使用下方所示的配置进行更多故障排除。

- [MDS9509 \(Bison\)](#)
- [MDS9216 \(Canterbury\)](#)

MDS9509 (Bison)

```
GigabitEthernet4/1 is up
  Hardware is GigabitEthernet, address is
0005.3000.a85a
  Internet address is 100.100.100.1/30
  MTU 1500 bytes  !...default value
  Port mode is IPS
  Speed is 1 Gbps
  Beacon is turned off
  Auto-Negotiation is turned on
  5 minutes input rate 320 bits/sec, 40 bytes/sec, 0
frames/sec
  5 minutes output rate 312 bits/sec, 39 bytes/sec, 0
frames/sec
  933169199 packets input, 998306879592 bytes
    12 multicast frames, 0 compressed
    0 input errors, 0 frame, 0 overrun 0 fifo
  337209366 packets output, 214303313560 bytes, 0
underruns
    0 output errors, 0 collisions, 0 fifo
    0 carrier errors

  bison# sh ips stats tcp int gig 4/1 TCP Statistics for
port GigabitEthernet4/1 Connection Stats 272 active
openings, 107 accepts 206 failed attempts, 0 reset
received, 163 established Segment stats 932985717
received, 337201993 sent, 7 retransmitted 0 bad segments
received, 103 reset sent TCP Active Connections Local
Address Remote Address State Send-Q Recv-Q
100.100.100.1:3225 100.100.100.2:65128 ESTABLISH 0 0
100.100.100.1:3225 100.100.100.2:65130 ESTABLISH 0 0
100.100.100.1:3225 0.0.0.0:0 LISTEN 0 0 !--- By default,
MDS establishes two TCP connections per FCIP tunnel
instance. bison# sh ips stats tcp int gig 4/1 de TCP
Statistics for port GigabitEthernet4/1 TCP send stats
337202017 segments, 222637392068 bytes 130562402 data,
205533417 ack only packets 503 control (SYN/FIN/RST), 0
probes, 1105737 window updates 7 segments retransmitted,
2208 bytes 4 retransmitted while on ethernet send queue,
40061909 packets split 250922624 delayed acks sent TCP
receive stats 932985742 segments, 921498012 data packets
in sequence, 936715052100 bytes in sequence 770241
predicted ack, 856752348 predicted data 0 bad checksum,
0 multi/broadcast, 0 bad offset 0 no memory drops, 0
short segments 0 duplicate bytes, 16 duplicate packets 0
partial duplicate bytes, 0 partial duplicate packets
53128 out-of-order bytes, 165 out-of-order packets 0
packet after window, 0 bytes after window 5 packets
after close 76225562 acks, 192030009160 ack bytes, 0 ack
toomuch, 5851 duplicate acks 0 ack packets left of
snd_una, 0 non-4 byte aligned packets 9124012 window
updates, 0 window probe 1381 pcb hash miss, 984 no port,
103 bad SYN, 0 paws drops TCP Connection Stats 272
```

```

attempts, 107 accepts, 163 established 511 closed, 3
drops, 206 conn drops 3 drop in retransmit timeout, 20
drop in keepalive timeout 0 drop in persist drops, 0
connections drained TCP Miscellaneous Stats 61792500
segments timed, 76225541 rtt updated 124 retransmit
timeout, 0 persist timeout 5760 keepalive timeout, 5740
keepalive probes TCP SACK Stats 0 recovery episodes, 0
data packets, 0 data bytes 0 data packets retransmitted,
0 data bytes retransmitted 0 connections closed, 0
retransmit timeouts TCP SYN Cache Stats 107 entries, 107
connections completed, 0 entries timed out 0 dropped due
to overflow, 0 dropped due to RST 0 dropped due to ICMP
unreach, 0 dropped due to bucket overflow 0 abort due to
no memory, 0 duplicate SYN, 0 no-route SYN drop 0 hash
collisions, 0 retransmitted TCP Active Connections Local
Address Remote Address State Send-Q Recv-Q
100.100.100.1:3225 100.100.100.2:65128 ESTABLISH 0 0
100.100.100.1:3225 100.100.100.2:65130 ESTABLISH 0 0
100.100.100.1:3225 0.0.0.0:0 LISTEN 0 0 bison# bison# sh
ips stats tcp int gig 4/1 de TCP Statistics for port
GigabitEthernet4/1 TCP send stats 337202017 segments,
222637392068 bytes 130562402 data, 205533417 ack only
packets 503 control (SYN/FIN/RST), 0 probes, 1105737
window updates 7 segments retransmitted, 2208 bytes 4
retransmitted while on ethernet send queue, 40061909
packets split 250922624 delayed acks sent TCP receive
stats 932985742 segments, 921498012 data packets in
sequence, 936715052100 bytes in sequence 770241
predicted ack, 856752348 predicted data 0 bad checksum,
0 multi/broadcast, 0 bad offset 0 no memory drops, 0
short segments 0 duplicate bytes, 16 duplicate packets 0
partial duplicate bytes, 0 partial duplicate packets
53128 out-of-order bytes, 165 out-of-order packets 0
packet after window, 0 bytes after window 5 packets
after close 76225562 acks, 192030009160 ack bytes, 0 ack
toomuch, 5851 duplicate acks 0 ack packets left of
snd_una, 0 non-4 byte aligned packets 9124012 window
updates, 0 window probe 1381 pcb hash miss, 984 no port,
103 bad SYN, 0 paws drops TCP Connection Stats 272
attempts, 107 accepts, 163 established 511 closed, 3
drops, 206 conn drops 3 drop in retransmit timeout, 20
drop in keepalive timeout 0 drop in persist drops, 0
connections drained TCP Miscellaneous Stats 61792500
segments timed, 76225541 rtt updated 124 retransmit
timeout, 0 persist timeout 5760 keepalive timeout, 5740
keepalive probes TCP SACK Stats 0 recovery episodes, 0
data packets, 0 data bytes 0 data packets retransmitted,
0 data bytes retransmitted 0 connections closed, 0
retransmit timeouts TCP SYN Cache Stats 107 entries, 107
connections completed, 0 entries timed out 0 dropped due
to overflow, 0 dropped due to RST 0 dropped due to ICMP
unreach, 0 dropped due to bucket overflow 0 abort due to
no memory, 0 duplicate SYN, 0 no-route SYN drop 0 hash
collisions, 0 retransmitted TCP Active Connections Local
Address Remote Address State Send-Q Recv-Q
100.100.100.1:3225 100.100.100.2:65128 ESTABLISH 0 0
100.100.100.1:3225 100.100.100.2:65130 ESTABLISH 0 0
100.100.100.1:3225 0.0.0.0:0 LISTEN 0 0 bison# !--- Most
of the TCP details displayed above can be used to
determine the !--- health of your FCIP tunnel, provided
that there is a one-to-one relationship !--- between the
FCIP tunnel and the physical interface. Note that for
this !--- particular FCIP instance, both TCP connections
were initiated from this peer, !--- which you can derive

```

```
from the local address x.x.x.x:3225 statement. bison# sh
ips arp interface gig 4/1 Protocol Address Age (min)
Hardware Addr Type Interface Internet 100.100.100.2 9
0005.3000.ade6 ARPA GigabitEthernet4/1 bison# bison# sh
ips ip route int gig 4/1 Codes: C - connected, S -
static No default gateway C 100.100.100.0/30 is directly
connected, GigabitEthernet4/1 bison# !--- The FCIP
tunnel is connected in a back-to-back fashion. Issue the
!--- sh ips ip route command to get the directly
connected IP subnet. !--- In a more realistic situation,
where you would need to configure a !--- next-hop to
reach the FCIP peer ip-address, this command would show
!--- the configured routes through the relevant
interfaces. bison# sh fcip profile 1 FCIP Profile 1
Internet Address is 100.100.100.1 (interface
GigabitEthernet4/1) Listen Port is 3225 TCP parameters
SACK is enabled PMTU discovery is enabled, reset timeout
is 3600 sec Keep alive is 60 sec Minimum retransmission
timeout is 200 ms Maximum number of re-transmissions is
4 Send buffer size is 0 KB Maximum allowed bandwidth is
1000000 kbps Minimum available bandwidth is 15000 kbps
Estimated round trip time is 1000 usec Congestion window
monitoring is enabled, burst size is 10 KB !--- The
profile parameters are an easy way to directly verify
your !--- configured TCP parameters per FCIP instance.
bison# sh int fcip 1 fcip1 is trunking Hardware is
GigabitEthernet Port WWN is 20:c2:00:05:30:00:7a:de Peer
port WWN is 20:42:00:0c:30:6c:24:40 Admin port mode is
auto, trunk mode is on Port mode is TE vsan is 1 Trunk
vsans (allowed active) (600-601) Trunk vsans
(operational) (600-601) Trunk vsans (up) (600-601) Trunk
vsans (isolated) () Trunk vsans (initializing) () Using
Profile id 1 (interface GigabitEthernet4/1) Peer
Information Peer Internet address is 100.100.100.2 and
port is 3225 Special Frame is disabled Maximum number of
TCP connections is 2 Time Stamp is disabled QOS control
code point is 0 QOS data code point is 0 B-port mode
disabled TCP Connection Information 2 Active TCP
connections Control connection: Local
100.100.100.1:3225, Remote 100.100.100.2:65128 Data
connection: Local 100.100.100.1:3225, Remote
100.100.100.2:65130 272 Attempts for active connections,
58 close of connections TCP Parameters Path MTU 1500
bytes Current retransmission timeout is 200 ms Round
trip time: Smoothed 2 ms, Variance: 1 Advertised window:
Current: 118 KB, Maximum: 118 KB, Scale: 1 Peer receive
window: Current: 118 KB, Maximum: 118 KB, Scale: 1
Congestion window: Current: 10 KB, Slow start threshold:
112 KB 5 minutes input rate 120 bits/sec, 15 bytes/sec,
0 frames/sec 5 minutes output rate 120 bits/sec, 15
bytes/sec, 0 frames/sec 72182460 frames input,
135382910244 bytes 34626 Class F frames input, 3190588
bytes 72147834 Class 2/3 frames input, 135379719656
bytes 0 Error frames timestamp error 0 47823751 frames
output, 97610768920 bytes 34632 Class F frames output,
3194464 bytes 47789119 Class 2/3 frames output,
97607574456 bytes 0 Error frames 373 reass frames !---
You can see the specific details per FCIP interface, as
they are taken !--- into account by a running FCIP
instance. You can also derive the TCP !--- parameters of
the peer with this output. bison# sh fcdomain vsan 600
The local switch is the Principal Switch. Local switch
run time information: State: Stable Local switch WWN:
22:58:00:05:30:00:7a:df Running fabric name:
```



```

22:58:00:05:30:00:7a:df Running priority: 2 Current
domain ID: 0x01(1) Local switch configuration
information: State: Enabled FCID persistence: Disabled
Auto-reconfiguration: Disabled Contiguous-allocation:
Disabled Configured fabric name: 20:01:00:05:30:00:28:df
Configured priority: 128 Configured domain ID: 0x01(1)
(preferred) Principal switch run time information:
Running priority: 2 Interface Role RCF-reject -----
----- fcip1 Downstream
Disabled -----
bison# sh fcdomain vsan 601 The local switch is the
Principal Switch. Local switch run time information:
State: Stable Local switch WWN: 22:59:00:05:30:00:7a:df
Running fabric name: 22:59:00:05:30:00:7a:df Running
priority: 2 Current domain ID: 0x01(1) Local switch
configuration information: State: Enabled FCID
persistence: Disabled Auto-reconfiguration: Disabled
Contiguous-allocation: Disabled Configured fabric name:
20:01:00:05:30:00:28:df Configured priority: 128
Configured domain ID: 0x01(1) (preferred) Principal
switch run time information: -----
----- fcip1 Downstream Disabled -----
----- bison# sh fcdomain vsan
601 The local switch is the Principal Switch. Local
switch run time information: State: Stable Local switch
WWN: 22:59:00:05:30:00:7a:df Running fabric name:
22:59:00:05:30:00:7a:df Running priority: 2 Current
domain ID: 0x01(1) Local switch configuration
information: State: Enabled FCID persistence: Disabled
Auto-reconfiguration: Disabled Contiguous-allocation:
Disabled Configured fabric name: 20:01:00:05:30:00:28:df
Configured priority: 128 Configured domain ID: 0x01(1)
(preferred) Principal switch run time information:
Running priority: 2 Interface Role RCF-reject -----
----- fcip1 Downstream
Disabled -----
bison# !--- Similar to normal (E)ISL troubleshooting,
verify that !--- your fabric is formed as expected.
bison# sh fcns da vsan 600-601 VSAN 600: -----
-----
--- FCID TYPE PWWN (VENDOR) FC4-TYPE:FEATURE -----
-----
----- 0x010001 N 10:00:00:00:c9:32:a6:e3 (Emulex)
scsi-fcp:init 0x020001 N 50:05:07:63:00:d0:94:4c (IBM)
scsi-fcp:target fc.. Total number of entries = 2 VSAN
601: -----
----- FCID TYPE PWWN (VENDOR) FC4-
TYPE:FEATURE -----
----- 0x010001 N
10:00:00:00:c9:32:a6:e2 (Emulex) scsi-fcp:init 0x010100
N 10:00:00:00:00:05:00:00 0x020100 N
10:00:00:00:00:01:00:00 Total number of entries = 3

```

MDS9216 (Canterbury)

```

canterbury# sh int gig 2/1 GigabitEthernet2/1 is up
Hardware is GigabitEthernet, address is 0005.3000.ade6
Internet address is 100.100.100.2/30 MTU 1500 bytes Port
mode is IPS Speed is 1 Gbps Beacon is turned off Auto-
Negotiation is turned on 5 minutes input rate 312
bits/sec, 39 bytes/sec, 0 frames/sec 5 minutes output
rate 312 bits/sec, 39 bytes/sec, 0 frames/sec 337277325
packets input, 214308964948 bytes 12 multicast frames, 0
compressed 0 input errors, 0 frame, 0 overrun 0 fifo
932989688 packets output, 998294817662 bytes, 0

```

```
underruns 0 output errors, 0 collisions, 0 fifo 0
carrier errors canterbury# sh ips arp int gig 2/1
Protocol Address Age (min) Hardware Addr Type Interface
Internet 100.100.100.1 7 0005.3000.a85a ARPA
GigabitEthernet2/1 canterbury# canterbury# sh ips ip
route int gig 2/1 Codes: C - connected, S - static No
default gateway C 100.100.100.0/30 is directly
connected, GigabitEthernet2/1 canterbury# canterbury# sh
ips stats tcp int gig 2/1 de TCP Statistics for port
GigabitEthernet2/1 TCP send stats 932982227 segments,
1022389174048 bytes 921498559 data, 11061499 ack only
packets 401 control (SYN/FIN/RST), 0 probes, 421342
window updates 454 segments retransmitted, 972180 bytes
291 retransmitted while on ethernet send queue,
223642028 packets split 76162595 delayed acks sent TCP
receive stats 337204879 segments, 130561386 data packets
in sequence, 192030387428 bytes in sequence 156457374
predicted ack, 65996627 predicted data 0 bad checksum, 0
multi/broadcast, 0 bad offset 0 no memory drops, 0 short
segments 48 duplicate bytes, 3542 duplicate packets 48
partial duplicate bytes, 1 partial duplicate packets
4336 out-of-order bytes, 131 out-of-order packets 0
packet after window, 0 bytes after window 0 packets
after close 268794983 acks, 936715866930 ack bytes, 0
ack toomuch, 4152 duplicate acks 0 ack packets left of
snd_una, 0 non-4 byte aligned packets 50179371 window
updates, 0 window probe 1251 pcb hash miss, 1061 no
port, 0 bad SYN, 0 paws drops TCP Connection Stats 204
attempts, 73 accepts, 155 established 357 closed, 64
drops, 70 conn drops 4 drop in retransmit timeout, 10
drop in keepalive timeout 0 drop in persist drops, 0
connections drained TCP Miscellaneous Stats 233047332
segments timed, 268794618 rtt updated 105 retransmit
timeout, 0 persist timeout 105 keepalive timeout, 94
keepalive probes TCP SACK Stats 3 recovery episodes,
25938540 data packets, 71110030772 data bytes 180 data
packets retransmitted, 272884 data bytes retransmitted 1
connections closed, 388 retransmit timeouts TCP SYN
Cache Stats 93 entries, 73 connections completed, 0
entries timed out 0 dropped due to overflow, 18 dropped
due to RST 0 dropped due to ICMP unreachable, 0 dropped due
to bucket overflow 0 abort due to no memory, 6 duplicate
SYN, 0 no-route SYN drop 0 hash collisions, 8
retransmitted TCP Active Connections Local Address
Remote Address State Send-Q Recv-Q 100.100.100.2:65128
100.100.100.1:3225 ESTABLISH 0 0 100.100.100.2:65130
100.100.100.1:3225 ESTABLISH 0 0 100.100.100.2:3225
0.0.0.0:0 LISTEN 0 0 0.0.0.0:3260 0.0.0.0:0 LISTEN 0 0
canterbury# !--- This MDS initiated both TCP connections
for FCIP 1. Although no passive !--- statement was
configured on the peer MDS, MDS9216 Canterbury has the
!--- highest IP address configured on the tunnel. This
makes the other side !--- disconnect its TCP connection.
canterbury# sh fcip profile 1 FCIP Profile 1 Internet
Address is 100.100.100.2 (interface GigabitEthernet2/1)
Listen Port is 3225 TCP parameters SACK is enabled PMTU
discovery is enabled, reset timeout is 3600 sec Keep
alive is 60 sec Minimum retransmission timeout is 200 ms
Maximum number of re-transmissions is 4 Send buffer size
is 0 KB Maximum allowed bandwidth is 1000000 kbps
Minimum available bandwidth is 15000 kbps Estimated
round trip time is 1000 usec Congestion window
monitoring is enabled, burst size is 10 KB canterbury#
sh interface fcip 1 fcip1 is trunking Hardware is
```

```
GigabitEthernet Port WWN is 20:42:00:0c:30:6c:24:40 Peer
port WWN is 20:c2:00:05:30:00:7a:de Admin port mode is
auto, trunk mode is auto Port mode is TE vsan is 1 Trunk
vsans (allowed active) (600-601) Trunk vsans
(operational) (600-601) Trunk vsans (up) (600-601) Trunk
vsans (isolated) () Trunk vsans (initializing) () Using
Profile id 1 (interface GigabitEthernet2/1) Peer
Information Peer Internet address is 100.100.100.1 and
port is 3225 Special Frame is disabled Maximum number of
TCP connections is 2 Time Stamp is disabled QOS control
code point is 0 QOS data code point is 0 B-port mode
disabled TCP Connection Information 2 Active TCP
connections Control connection: Local
100.100.100.2:65128, Remote 100.100.100.1:3225 Data
connection: Local 100.100.100.2:65130, Remote
100.100.100.1:3225 204 Attempts for active connections,
72 close of connections TCP Parameters Path MTU 1500
bytes Current retransmission timeout is 200 ms Round
trip time: Smoothed 2 ms, Variance: 1 Advertized window:
Current: 118 KB, Maximum: 118 KB, Scale: 1 Peer receive
window: Current: 118 KB, Maximum: 118 KB, Scale: 1
Congestion window: Current: 10 KB, Slow start threshold:
112 KB 5 minutes input rate 120 bits/sec, 15 bytes/sec,
0 frames/sec 5 minutes output rate 120 bits/sec, 15
bytes/sec, 0 frames/sec 91063905 frames input,
192030052404 bytes 41991 Class F frames input, 3931568
bytes 91021914 Class 2/3 frames input, 192026120836
bytes 0 Error frames timestamp error 0 753551524 frames
output, 936716093696 bytes 42028 Class F frames output,
3909128 bytes 753509496 Class 2/3 frames output,
936712184568 bytes 0 Error frames 40061908 reass frames
canterbury#
```

相关信息

- [RFC 3821 - 基于 TCP/IP 的光纤通道 \(FCIP\)](#)
- [T11 主页](#)
- [技术支持 - Cisco Systems](#)