

MDS 9000 naar MDS Basic Configuration via FCIP

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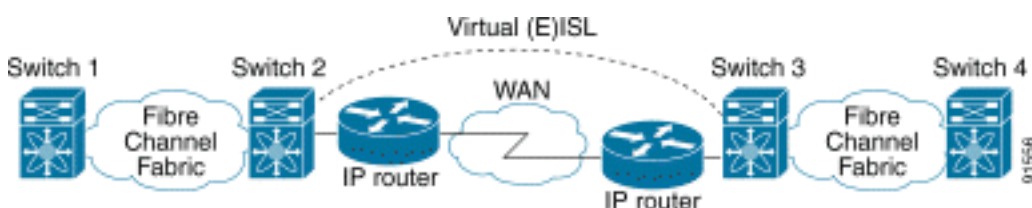
Inleiding

Dit document biedt een voorbeeldconfiguratie voor basis Fibre Channel over TCP/IP (FCIP) Multilayer Director Switch (MDS) aan MDS.

Deze steekproefconfiguratie is relevant voor 1.2 en 1.3 releases van SAN-OS. Sommige parameters veranderen in de 2.0 release van SAN-OS. Raadpleeg de 2.0 SAN-OS configuratiehandleiding en releaseaantekeningen.

FCIP beschrijft mechanismes die de onderlinge verbinding van eilanden van Fibre Channel (FC) Storage Area Networks (SAN's) via IP-gebaseerde netwerken mogelijk maken om een verenigd SAN in één FC-structuur te vormen. FCIP is gebaseerd op IP-gebaseerde netwerkservices om de connectiviteit tussen de SAN-eilanden te bieden via lokale gebiedsnetwerken, metropolitane gebiedsnetwerken of brede gebiedsnetwerken.

Fibre Channel SAN's verbonden door FCIP



FCIP gebruikt Transmission Control Protocol (TCP) op poort 3225 als een netwerklaagtransport.

Voorwaarden

Vereisten

De IP-backbone moet operationeel zijn en de gewenste bandbreedte leveren om de toepassingen te ondersteunen die via de FCIP-link(s) worden uitgevoerd - dit kan een Layer 2 (L2) of Layer 3 (L3) topologie zijn. Als L3, moeten de intermediaire routers of meerlaagse switches worden ingesteld en geconfigureerd om IP-verkeer tussen bron- en doeladressen van de FCIP-tunnels correct door te sturen. Als Quality of Service (QoS) of traffic shaping op elk netwerkapparaat in het pad tussen de FCIP-peers wordt afgedwongen, moet de netwerkbeheerder die de IP-infrastructuur beheert worden geraadpleegd om de benodigde details te verkrijgen voordat hij TCP-gerelateerde parameters en functies in het MDS FCIP-profiel of de MDS FCIP-profielen configureert.

Gebruikte componenten

De informatie in dit document is gebaseerd op de volgende software- en hardwareversies:

- MDS 9509 servicemodule (DS-X9308-SMIP) met IP-opslag (IPS), versie 1.2.2(2a)
- MDS 9216 met IPS-servicemodule (DS-X9308-SMIP), actieve versie 1.2.2(2a)
- Win2030 Server (HPQ Pro-Liant-P4) met Emulex LP9K HBA
- IBM-opslagarray (ESS-2105-F20)

De informatie in dit document is gebaseerd op de apparaten in een specifieke laboratoriumomgeving. Alle apparaten die in dit document worden beschreven, hadden een opgeschoonde (standaard)configuratie. Als uw netwerk live is, moet u de potentiële impact van elke opdracht begrijpen.

Conventies

Raadpleeg [Cisco Technical Tips Conventions](#) (Conventies voor technische tips van Cisco) voor meer informatie over documentconventies.

Achtergrondinformatie

FCIP bestaat uit de volgende specificaties:

ANSI T11

1. FC-SW-2 beschrijft de werking en interactie van FC-switches, waaronder E_Port- en fabricagebewerkingen.
2. FC-BB-2 is een mapping die betrekking heeft op de uitbreiding van FC-geschakelde netwerken over een TCP-netwerkbackbone, en definieert referentiemodellen die E_Port en B_Port ondersteunen.

IETF IPS-werkgroep

1. FC over TCP bestrijkt de TCP/IP-vereisten voor het transport van FC-frames via een IP-netwerk.

2. FC de kaderinsluiting definieert het gebruikelijke insluitingsformaat voor glasvezel.

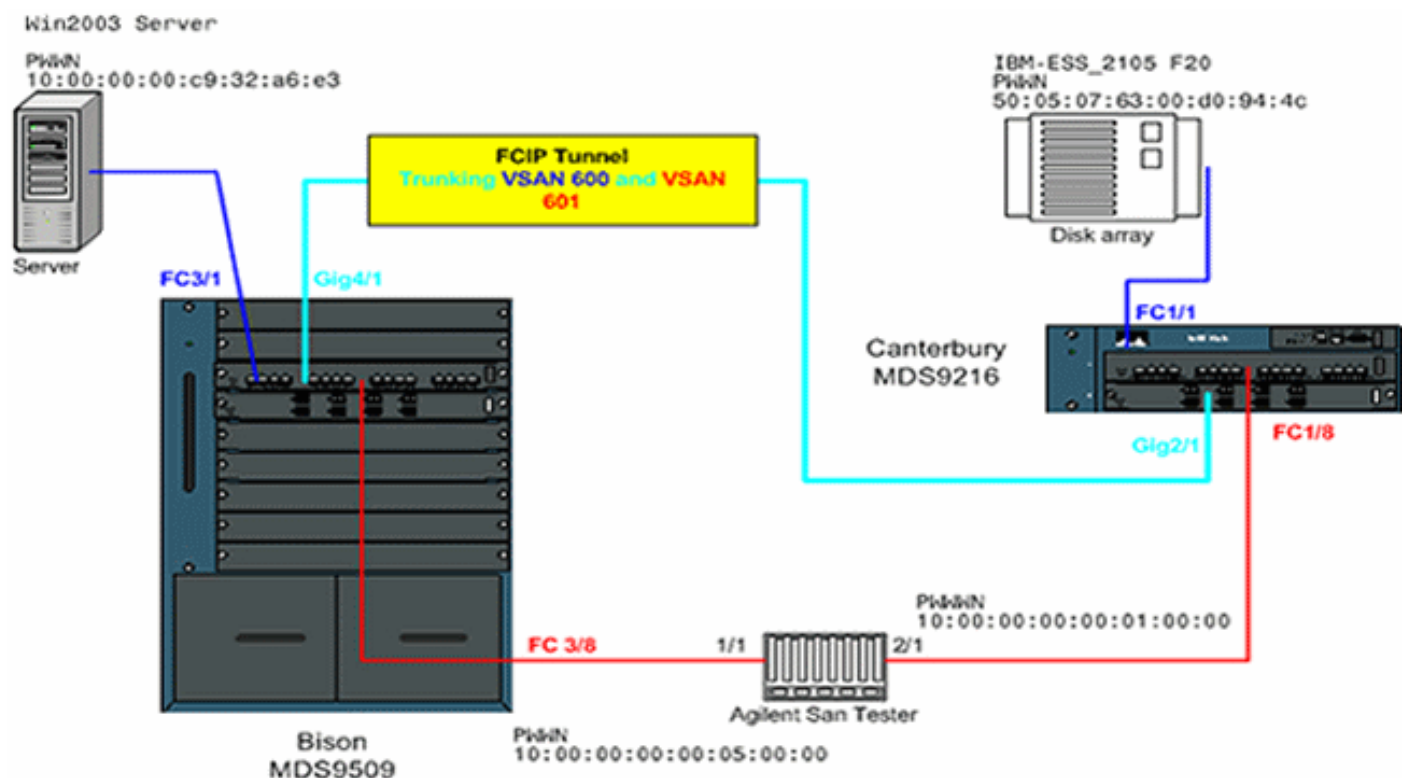
Een verbinding tussen twee SAN-switches of weefsels via FCIP wordt een FCIP-link genoemd en kan een of meer TCP-verbindingen bevatten. Elk eind van een verbinding van FCIP wordt geassocieerd met een Virtuele haven E (VE_port) of een B_port, afhankelijk van de implementatie. FC-BB en FC-BB-2 beschrijven de verschillen tussen beide benaderingen. De IP-servicesmodule (DS-X9308-SMIP) ondersteunt beide modi, maar standaard de VE_Port, die ook de aanbevolen modus is om te draaien als alle relevante peers DS-X9308-SMIP-modules zijn. De VE_Port-functionaliteit op MDS-platforms ondersteunt ook TE poortfunctionaliteit, wat het in staat maakt om verkeer van meerdere VSAN's over één FCIP-instantie te verplaatsen.

Configureren

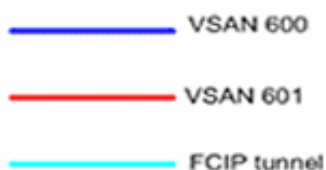
Op de MDS, moet u jezelf bekend maken met de IPS configuratie gidsen voor beide platforms. De meest huidige versie van de handleiding is het [configureren van IP-opslag](#).

Netwerkdigram

Dit document gebruikt de netwerkinstellingen die in het onderstaande schema zijn weergegeven.



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



Dit diagram toont een typisch laboratorium-opstelling waar geen extra netwerkapparatuur tussen beide Gigabit Ethernet (GE) interfaces van beide MDS switches wordt aangesloten. Dit is de eenvoudigste vorm van een MDS FCIP-installatie, en wordt doorgaans in de labs van de klant

gebruikt om de basisfunctionaliteit te controleren. In VSAN 600 sluit de Emulex LightPulse 9000 HBA de Windows 2003-server aan op MDS9509 genaamd Bison en een IBM-opslagarray verbonden met MDS9216 genaamd Canterbury, waar LUN's voor de Windows 2003-server zijn geconfigureerd.

Het agile SAN-testapparaat wordt gebruikt als emulator om VSAN 601 met twee apparaten te bevolken en om een substantieel FC-2 niet-FCP achtergrondverkeer te genereren. Deze randapparatuur wordt toegevoegd om de configuratie realistischer te maken en om substantiële indelingen te hebben in de gedistribueerde nameserver van beide deelnemende switches. De focus van dit document is geen end-to-end connectiviteit en er zijn geen screenshots van de server of de opslagarray opgenomen. De perifere apparatuur is niet op de hoogte van de FCIP en het gedraagt zich alsof de EISL-link tussen beide MDS's via een normale FC-link was actief.

Configuraties

Dit document maakt gebruik van de onderstaande configuraties.

- [MDS 9509 \(Bison\) met IPS-8 module](#)
- [MDS 9216 \(Canterbury\) met IPS-8 module](#)

MDS 9509 (Bison) met IPS-8 module

```
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:/s122a
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.
```

MDS 9216 (Canterbury) met IPS-8 module

```
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.
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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:/s122a
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
```

Verifiëren

Deze sectie verschaft informatie die u kunt gebruiken om te bevestigen dat uw configuratie correct

werkt.

- **Geef de interface x/y-status** weer van de relevante Gigabit-interface die aan het FCIP-profiel is gebonden.
- **toon IPS stats tcp int gig x/y** —Hiermee geeft u TCP-statistieken en actieve verbindingen weer voor de relevante Gigabit-interface.
- **tonen IPS arp int gig x/y**-Hiermee geeft u alle ARP-items van de adresresolutie weer voor de relevante Gigabit-interface; de volgende hop of peer moet in deze lijst voorkomen .
- **tonen IP route om x/y te geven** - Hiermee geeft u de specifieke routes die over de relevante Gigabit-interface gaan weer.
- **toon interface fcip x**-Hiermee geeft u de FCIP-interfacestatus en alle informatie die betrekking heeft op deze FCIP-tunnel weer.
- **Geef het profiel fcip x** - weer geeft het IP-adres weer waaraan het profiel is gebonden en alle geconfigureerde TCP-parameters.
- **Laat fcip x tellers zien** - gebruikt om te controleren of er frames zijn die door de FCIP tunnel gaan.
- **fcdomain vsan x** —Toont alle domeingerelateerde details; gebruikt om te controleren of het materiaal gevormd wordt door de FCIP-tunnel(s).
- **Fcns da vsan x**-displays alle poot, FC4-types en FCID's van de betreffende VSAN's laten zien; gebruikt om te verifiëren dat alle verwachte items zijn verdeeld over de FCIP-tunnel(s).

Problemen oplossen

Vergeet niet de opdrachten boven meerdere keren uit te geven om een tegengeschiedenis te bouwen. Tellers die niet op een bepaald moment in de tijd zitten en slechts één keer worden verzameld, zijn meestal nutteloos.

Gebruik de onderstaande configuraties voor meer problemen oplossen.

- [MDS 9509 \(Bison\)](#)
- [MDS 9216 \(Canterbury\)](#)

MDS 9509 (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 unreachable, 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 unreachable, 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-
fcip:init
0x020001 N 50:05:07:63:00:d0:94:4c (IBM) scsi-
fcip: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-
fcip: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
```

MDS 9216 (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#
```

[Gerelateerde informatie](#)

- [RFC 3821 - Fibre Channel over TCP/IP \(FCIP\)](#)
- [T11 startpagina](#)
- [Technische ondersteuning - Cisco-systemen](#)