

MDS a MDS elabora la configuración con FCIP

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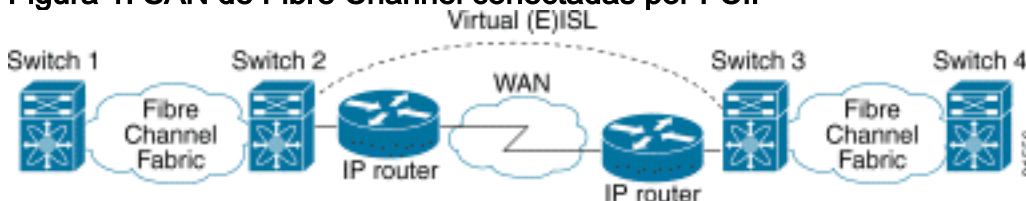
[Información Relacionada](#)

Introducción

Este documento proporciona una configuración de ejemplo para el switch de director multicapa (MDS) de canal de fibra sobre TCP/IP (FCIP) a MDS.

FCIP describe mecanismos que permiten la interconexión de islas de redes de área de almacenamiento (SAN) Fibre Channel (FC) a través de redes basadas en IP para formar una SAN unificada en un único fabric FC. FCIP se basa en servicios de red basados en IP para proporcionar la conectividad entre las islas SAN a través de redes de área local, redes de área metropolitana o redes de área extensa.

Figura 1: SAN de Fibre Channel conectadas por FCIP



FCIP utiliza el protocolo de control de transmisión (TCP) en el puerto 3225 como transporte de capa de red.

Prerequisites

Requirements

Asegúrese de cumplir estos requisitos antes de intentar esta configuración:

- La estructura básica IP debe estar operativa y ofrecer el ancho de banda necesario para admitir las aplicaciones que se ejecutan en los enlaces FCIP; podría ser una topología de capa 2 (L2) o capa 3 (L3).
- Si se trata de una topología L3, los routers intermedios o los switches multicapa deben configurarse y configurarse para reenviar de forma adecuada el tráfico IP entre las direcciones IP de origen y de destino de los túneles FCIP. Si se aplica la calidad de servicio (QoS) o el modelado del tráfico en cualquier dispositivo de red en la ruta entre los pares FCIP, se debe consultar al administrador de red que administra la infraestructura IP para obtener los detalles necesarios antes de configurar los parámetros y funciones relacionados con TCP en los perfiles FCIP del switch director multicapa (MDS).
- Los switches Ethernet adyacentes a las MDS deben ser compatibles y estar configurados para el enlace troncal 802.1Q si las subinterfaces están configuradas en el módulo de servicios MDS IP Storage (IPS).

Componentes Utilizados

La información que contiene este documento se basa en las siguientes versiones de software y hardware.

- MDS 9509 con módulo de servicio IPS (DS-X9308-SMIP) que ejecuta la versión 1.2.2(2a)
- MDS 9216 con módulo de servicio IPS (DS-X9308-SMIP) que ejecuta la versión 1.2.2(2a)
- Catalyst 6509 que ejecuta Catalyst OS (CatOS) 7.4(3)
- Win2003 Server (HPQ Pro-Liant-P4) con Emulex LP9K HBA
- Matriz de almacenamiento IBM (ESS-2105-F20)

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.

Convenciones

Consulte [Convenciones de Consejos Técnicos Cisco para obtener más información sobre las convenciones del documento.](#)

Antecedentes

FCIP consta de las siguientes especificaciones:

ANSI T11

1. FC-SW-2 describe el funcionamiento y la interacción de los switches FC, incluidos E_Port y el funcionamiento del fabric.
2. FC-BB-2 es un mapping que se relaciona con la extensión de redes conmutadas FC a través de una red troncal TCP, y define modelos de referencia que soportan E_Port y B_Port.

Grupo de trabajo IETF IPS

1. FC sobre TCP cubre los requisitos TCP/IP para el transporte de tramas FC a través de una

red IP.

2. La encapsulación de trama FC define el formato común de encapsulación de fibra.

Una interconexión entre dos switches o fabrics SAN a través de FCIP se denomina link FCIP y puede contener una o más conexiones TCP. Cada extremo de un enlace FCIP se asocia a un puerto E virtual (VE_port) o a un puerto B, según la implementación. FC-BB y FC-BB-2 están describiendo las diferencias entre ambos enfoques. El módulo de servicios IPS (DS-X9308-SMIP) es compatible con ambos modos, pero de forma predeterminada es VE_Port, que también es el modo recomendado para ejecutarse si todos los pares relevantes son módulos DS-X9308-SMIP. En esta topología de ejemplo, se analizan los parámetros de configuración de FCIP sobre PortChannels, TCP para configurar y FSF (trama especial).

Configurar

En esta sección encontrará la información para configurar las funciones descritas en este documento.

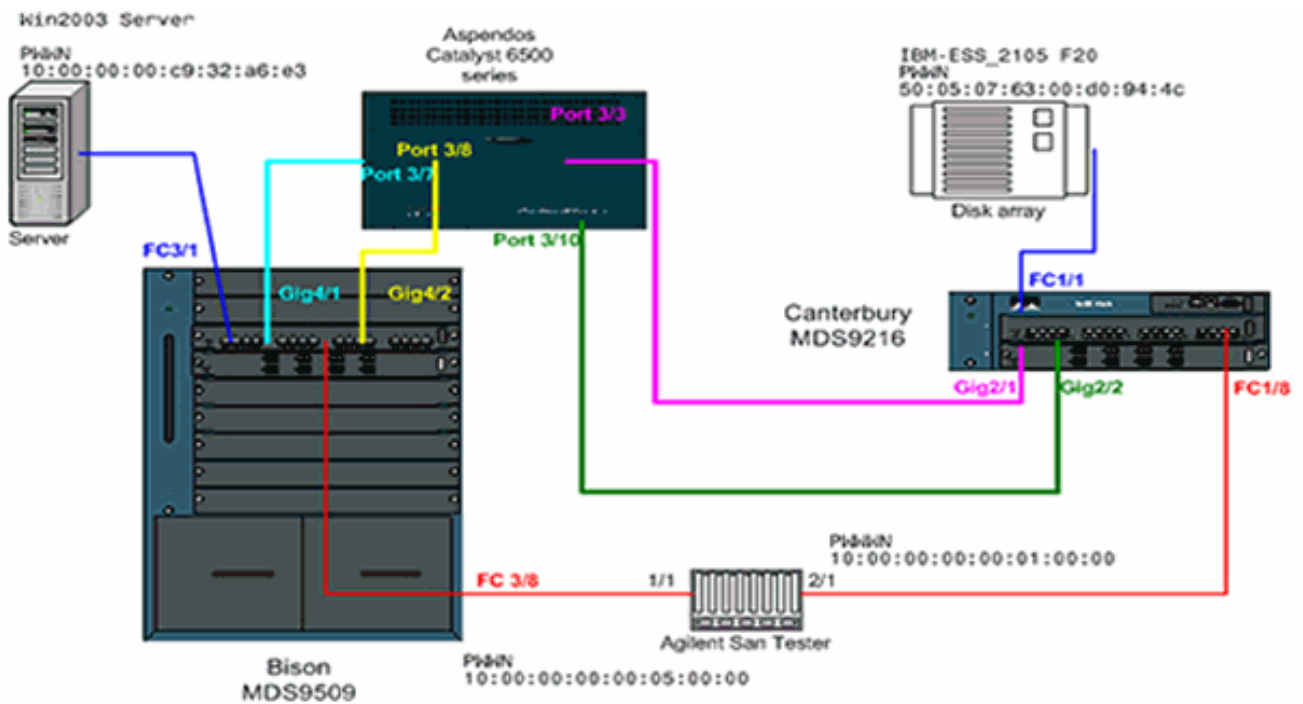
En las MDS, es necesario que se familiarice con las guías para la configuración de IPS para ambas plataformas. Puede encontrar la versión más reciente de los manuales en [Configuración del Almacenamiento IP](#) en Cisco.com.

Nota: Use la [Command Lookup Tool](#) (sólo [clientes registrados](#)) para obtener más información sobre los comandos utilizados en este documento.

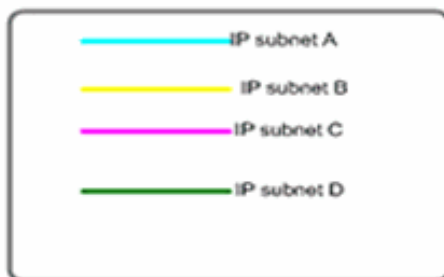
Diagrama de la red

En este documento, se utiliza esta configuración de red:

Figura 2: Topología 3



Topology 3 - PortChannel of two FCIP interfaces



La topología 3 representa un canal de puerto FCIP formado por dos túneles FCIP individuales; las interfaces de peer se encuentran en una nube IP. La nube IP se contrae en un switch multicapa (Catalyst 6500) que enruta el tráfico de la subred A a la subred C y de la subred C a la subred A (y de la subred B a la subred D y de la subred D a la subred A). Las subredes se definen de la siguiente manera:

- Subred A: 100.100.100.0/30 - Bison int Gig4/1
- Subred B: 100.100.100.4/30 - Bison int Gig4/2
- Subred C: 200.200.200.0/30 - Canterbury Gig2/1
- Subred D: 200.200.200.4/30 - Canterbury Gig2/2

La topología proporciona un **ancho de banda máximo** conocido de **100 Mbps** y un **ancho de banda mínimo de 100 Mbps**, que es el perfil que se ejecuta para nuestro tráfico IP relevante a través de esta nube IP. La configuración inicial muestra los aspectos de la canalización de puertos basada en FCIP y el acondicionamiento del tráfico TCP. En las secciones siguientes, se explicarán más a fondo las interfaces FSF, Pasivo TCP y FCIP Timestamp.

[Configuraciones](#)

En este documento, se utilizan estas configuraciones:

- [MDS 9509 \(Bison\) con módulo IPS-8](#)
- [MDS 9612 \(Canterbury\) con módulo IPS-8](#)

MDS 9509 (Bison) con módulo IPS-8

```
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
tcp max-bandwidth-mbps 100 min-available-bandwidth-mbps
100 round-trip-time-ms 10
!--- TCP bandwidth parameters defined specifically for
this FCIP tunnel. !--- Restricted to 100 Mbps max and
min. See the Note on TCP Parameters !--- comment section
in this table below for more details. fcip profile 2 ip
address 100.100.100.5 tcp max-bandwidth-mbps 100 min-
available-bandwidth-mbps 100 round-trip-time-ms 10 !---
TCP max and min bandwidth parameter are configured here
exactly the !--- same as for FCIP 1 because both tunnels
are combined in one PortChannel !--- interface and are
subject to the same bandwidth restrictions in the IP
core. vsan database vsan 600 vsan 601 fcdomain domain 1
preferred vsan 600 fcdomain domain 1 preferred vsan 601
interface port-channel 1 switchport trunk allowed vsan
600-601 interface fcip1 channel-group 1 force no
shutdown use-profile 1 peer-info ipaddr 200.200.200.1 !---
Interface FCIP 1 is a member of channel-group 1. The
```

```
force keyword makes it !--- adopt the specific settings
configured on interface port-channel 1. interface fcip2
channel-group 1 force no shutdown use-profile 2 peer-
info ipaddr 200.200.200.5 !--- Interface FCIP 2 is also
member of channel-group 1. boot system bootflash:/s122a
sup-1 boot kickstart bootflash:/k122a sup-1 boot system
bootflash:/s122a sup-2 boot kickstart bootflash:/k122a
sup-2 ip domain-name cisco.com ip name-server
144.254.10.123 ip route 200.200.200.0 255.255.255.252
100.100.100.2 distance 2 ip route 200.200.200.4
255.255.255.252 100.100.100.6 distance 2 !--- FCIP
interfaces are on separate IP subnets, so in order to
reach the FCIP !--- peer IP address, you need adequate
static routes to an L3 device that !--- knows how to
forward the packets to the final destination. Multiple
routes !--- to the same destination IP subnet are
allowed, and the distance parameter !--- can be used to
specify a preferred next hop. Multiple next hops would
!--- require a subnet mask providing for a larger number
of host; for example, !--- a 28-bit subnet mask. ssh key
dsa 768 force ssh server enable switchname bison zone
default-zone permit vsan 600-601 interface
GigabitEthernet4/1 ip address 100.100.100.1
255.255.255.252 switchport mtu 3000 no shutdown !--- MTU
size is defined as 3000 bytes. Make sure that all
intermediate network !--- devices between this interface
and the peer IP address are capable of !--- switching
and routing Jumbo frames. In order to avoid FC Frame
split, !--- an MTU value of 2300 is required; 3000 is
used in the configuration example !--- for simplicity.
FCIP TCP segments will normally never exceed 2264 bytes
for !--- TE ports or 2256 bytes for E ports, regardless
of the configured MTU size. interface GigabitEthernet4/2
ip address 100.100.100.5 255.255.255.252 switchport mtu
3000 no shutdown interface fc3/1 interface fc3/2
interface fc3/3 interface fc3/4 interface fc3/5
interface fc3/6 interface fc3/7 interface fc3/8
interface fc3/9 interface fc3/10 interface fc3/11
interface fc3/12 interface fc3/13 interface fc3/14
interface fc3/15 interface fc3/16 interface mgmt0 ip
address 10.48.69.151 255.255.255.128 !--- Note on TCP
Parameters !--- The following TCP parameters can be
individually configured per FCIP profile:
```

```
bison(config-profile)# tcp ?
```

```
cwm Enable congestion window monitoring
keepalive-timeout Set keep alive timeout in sec
max-bandwidth-kbps Configure maximum available path
bandwidth in Kbps
max-bandwidth-mbps Configure maximum available path
bandwidth in Mbps
max-retransmissions Maximum number of retransmissions
min-retransmit-time Set minimum retransmit time in
millisecond
pmtu-enable Enable PMTU Discovery
sack-enable Enable SACK option for TCP
send-buffer-size Send buffer size in KBytes
!--- The CWM parameter default value is 10K and should
be left untouched under !--- normal conditions.
Congestion window monitoring (CWM) is a way of !---
controlling burstiness after long idle times or loss of
Acks.
```

*!--- The **keepalive-timeout** is the TCP keepalive timeout value and is !--- set to 60 seconds by default, though it can range between 1 and 7200 seconds.*

*!--- The **max-** and **min-bandwidth** parameters program the TCP Maximum Window Size !--- (scaling factor) and engages an internal "shaper" functionality. !--- These values should be carefully chosen and requires understanding of the !--- intermediate network's end-to-end topology. The default values are to be !--- changed according to the aforementioned requirements. !--- The Round-trip-time can be derived once you have your FCIP tunnel up and !--- running by issuing the following command:*

```
bison# ips measure 200.200.200.1 interface  
gigabitethernet 4/1
```

Round trip time is 53 micro seconds (0.05 milliseconds)

*!--- Always add an additional margin of at least a few microseconds to this value. !--- The **max-retransmissions counter** is set to 4 by default. In a healthy network !-- - environment, this value should be left unchanged.*

*!--- The **max-retransmission timer** is set to 200 milliseconds. If you experience !--- extremely high retransmission counters, this value can be increased; but, !--- in general, changing this parameter is not required unless the RTT is !--- above 200 milliseconds.*

*!--- The **PMTU** (Path MTU discovery) is enabled by default. Best practice is to know !--- what is the maximum MTU size supported by all interfaces along the logical !--- path between both peers.*

*!--- The **SACK** feature (Selective Acknowledgment) is not enabled by default. !--- Consider enabling it when you have a lot of retransmissions occurring between !--- the two peers. SACK allows selective retransmissions of your window, which is !--- beneficial if larger maximum window sizes are configured and retransmissions !--- occur frequently. It is enabled in this sample configuration; when you do so, !--- make sure that it is enabled at both sides of the link.*

*!--- The **send-buffer-size** is the amount of buffers in addition to the TCP window !--- that are allowed to be transmitted out before starting to flow control the FC !--- sources. The default value is set to 0.*

- Para obtener más detalles sobre PMTU, consulte [RFC 1191 - Detección de MTU de Trayectoria](#).
- Para obtener más detalles sobre SACK, refiérase a [RFC 2018 - Opciones de Reconocimiento Selectivo de TCP](#) y [RFC 2883 - Una Extensión a la Opción de Reconocimiento Selectivo \(SACK\) para TCP](#)

MDS 9216 (Canterbury) con módulo IPS-8

```
canterbury# sh run
```

```
Building Configuration ...
```

```

fcip profile 200
ip address 200.200.200.1
tcp max-bandwidth-mbps 100 min-available-bandwidth-mbps
100 round-trip-time-ms 10

fcip profile 201
ip address 200.200.200.5
tcp max-bandwidth-mbps 100 min-available-bandwidth-mbps
100 round-trip-time-ms 10
!--- The TCP parameters are identical to what is
configured on the peering !--- FCIP interfaces. Only in
very specific cases should different values be !---
considered, for example, if the return-path(s) are
running across a different !--- part of the network or
if the application dictates asymmetrical values. vsan
database vsan 600 vsan 601 fcdomain domain 2 preferred
vsan 600 fcdomain domain 2 preferred vsan 601 interface
port-channel 2 switchport trunk mode auto switchport
trunk allowed vsan 600-601 interface fcip1 channel-group
2 force no shutdown use-profile 200 peer-info ipaddr
100.100.100.1 interface fcip2 channel-group 2 force no
shutdown use-profile 201 peer-info ipaddr 100.100.100.5
!--- Both FCIP 1 and FCIP 2 are bound to the same
channel-group 2. Also note that !--- there is no strict
relationship between profile-id and FCIP interface !---
numbering here, as this is not a requirement. From a
management and !--- troubleshooting perspective,
however, a "strict" relationship of both values !--- is
recommended. vsan database vsan 600 interface fc1/1 vsan
601 interface fc1/8 boot system bootflash:/s122a boot
kickstart bootflash:/k122a ip domain-name cisco.com ip
name-server 144.254.10.123 ip default-gateway
10.48.69.129 ip route 100.100.100.0 255.255.255.252
200.200.200.2 distance 2 ip route 100.100.100.4
255.255.255.252 200.200.200.6 distance 2 !--- IP routes
are defined for both FCIP peer IP addresses. The next
hop must be !--- aware of the best route to the peer's
addresses or to the relevant IP subnets. ssh key dsa 768
force ssh server enable switchname canterbury system
default switchport trunk mode auto username admin
password 5 $1$KcCrqxlu$mtU03/60PRUIfj1.aeEEc0 role
network-admin zone default-zone permit vsan 600-601
zoneset distribute full vsan 1-4093 interface
GigabitEthernet2/1 ip address 200.200.200.1
255.255.255.252 switchport mtu 3000 no shutdown
interface GigabitEthernet2/2 ip address 200.200.200.5
255.255.255.252 switchport mtu 3000 no shutdown
interface GigabitEthernet2/3 interface
GigabitEthernet2/4 interface GigabitEthernet2/5
interface GigabitEthernet2/6 interface
GigabitEthernet2/7 interface GigabitEthernet2/8
interface fc1/1 interface fc1/2 interface fc1/3
interface fc1/4 interface fc1/5 interface fc1/6
interface fc1/7 interface fc1/8 interface fc1/9
interface fc1/10 interface fc1/11 interface fc1/12
interface fc1/13 interface fc1/14 interface fc1/15
interface fc1/16 interface mgmt0 ip address 10.48.69.156
255.255.255.128 interface iscsi2/1 interface iscsi2/2
interface iscsi2/3 interface iscsi2/4 interface iscsi2/5
interface iscsi2/6 interface iscsi2/7 interface iscsi2/8

```

Verificación

Use esta sección para confirmar que su configuración funciona correctamente.

[La herramienta Output Interpreter Tool \(clientes registrados solamente\) \(OIT\) soporta ciertos comandos show.](#) Utilice la OIT para ver un análisis del resultado del comando show.

- **show interface gig x/y**—Muestra el estado de la interfaz Gigabit relevante enlazada al perfil FCIP.
- **show ips stats tcp int gig x/y**—Muestra las estadísticas TCP y las conexiones activas para la interfaz Gigabit relevante.
- **show ips arp int gig x/y**—Muestra todas las entradas del protocolo de resolución de direcciones (ARP) para la interfaz Gigabit correspondiente; el siguiente salto o par debe estar presente en esta lista.
- **show ips ip route int gig x/y**—Muestra las rutas específicas que atraviesan la interfaz Gigabit relevante.
- **show interface fcip x**—Muestra el estado de la interfaz FCIP y todos los detalles relacionados con este túnel FCIP.
- **show profile fcip x**—Muestra la dirección IP a la que está enlazado el perfil y todos los parámetros TCP configurados.
- **show int fcip x counters:** se utiliza para verificar si hay tramas que atraviesan el túnel FCIP.
- **show fcdomain vsan x**—Enumera todos los detalles relacionados con el dominio; se utiliza para verificar que el fabric se forma a través de los túneles FCIP.
- **show fcns da vsan x**—Muestra todos los tipos pwwn, FC4 y FCID de la VSAN relevante; se utiliza para verificar que todas las entradas esperadas se distribuyen a través de los túneles FCIP.

[Troubleshoot](#)

Use esta sección para resolver problemas de configuración.

Asegúrese de ejecutar los comandos **show** varias veces para generar un historial de contadores. Los contadores que no están relacionados con un momento determinado y que solo se recopilan una vez son en su mayoría inútiles.

Utilice las configuraciones que se muestran a continuación para obtener más información sobre la resolución de problemas.

- [MDS 9509 \(Bison\)](#)
- [MDS 9216 \(Canterbury\)](#)
- [Configuración especial de tramas \(Bison\)](#)
- [Configuración especial de tramas \(Canterbury\)](#)
- [Pantalla desde Bison y Canterbury - Canterbury pasivo](#)
- [Pantalla de Bison y Canterbury - Timestamp set](#)

MDS 9509 (Bison)

```
bison# sh int gig 4/1  
  
GigabitEthernet4/1 is up  
  Hardware is GigabitEthernet, address is  
0005.3000.a85a
```

```

Internet address is 100.100.100.1/30
MTU 3000 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
8685 packets input, 976566 bytes
0 multicast frames, 0 compressed
0 input errors, 0 frame, 0 overrun 0 fifo
8679 packets output, 972382 bytes, 0 underruns
0 output errors, 0 collisions, 0 fifo
0 carrier errors

bison# sh int gig 4/2

GigabitEthernet4/2 is up
Hardware is GigabitEthernet, address is
0005.3000.a85b
Internet address is 100.100.100.5/30
MTU 3000 bytes
Port mode is IPS
Speed is 1 Gbps
Beacon is turned off
Auto-Negotiation is turned on
5 minutes input rate 16 bits/sec, 2 bytes/sec, 0
frames/sec
5 minutes output rate 16 bits/sec, 2 bytes/sec, 0
frames/sec
590 packets input, 46496 bytes
0 multicast frames, 0 compressed
0 input errors, 0 frame, 0 overrun 0 fifo
547 packets output, 30898 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
14 active openings, 4 accepts
4 failed attempts, 0 reset received, 14
established
Segment stats
8897 received, 8505 sent, 0 retransmitted
0 bad segments received, 0 reset sent

TCP Active Connections
Local Address      Remote Address    State
Send-Q  Recv-Q
100.100.100.1:65480 200.200.200.1:3225 ESTABLISH
0        0
100.100.100.1:65482 200.200.200.1:3225 ESTABLISH
0        0
100.100.100.1:3225  0.0.0.0:0        LISTEN
0        0

bison# sh ips stats tcp int gig 4/2

TCP Statistics for port GigabitEthernet4/2
Connection Stats

```

2 active openings, 0 accepts
0 failed attempts, 0 reset received, 2 established
Segment stats
598 received, 43 sent, 0 retransmitted
0 bad segments received, 0 reset sent

TCP Active Connections

	Local Address	Remote Address	State
Send-Q	Recv-Q		
0	0	100.100.100.5:65531 200.200.200.5:3225	ESTABLISH
0	0	100.100.100.5:65533 200.200.200.5:3225	ESTABLISH
0	0	100.100.100.5:3225 0.0.0.0:0	LISTEN

bison# **sh int fcip1-2**

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

Belongs to port-channel 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 200.200.200.1 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 100.100.100.1:65480,
Remote 200.200.200.1:3225
Data connection: Local 100.100.100.1:65482, Remote
200.200.200.1:3225
28 Attempts for active connections, 7 close of
connections

TCP Parameters

Path MTU 3000 bytes
Current retransmission timeout is 200 ms
Round trip time: Smoothed 5 ms, Variance: 6

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: 118 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

4077 frames input, 379836 bytes

```
4071 Class F frames input, 379100 bytes
6 Class 2/3 frames input, 736 bytes
0 Error frames timestamp error 0
4077 frames output, 381064 bytes
4071 Class F frames output, 380364 bytes
6 Class 2/3 frames output, 700 bytes
0 Error frames 0 reass frames
```

fcip2 is trunking

```
Hardware is GigabitEthernet
Port WWN is 20:c6:00:05:30:00:7a:de
Peer port WWN is 20:46:00:0c:30:6c:24:40
Admin port mode is auto, trunk mode is on
Port mode is TE
vsan is 1
```

Belongs to port-channel 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 2 (interface GigabitEthernet4/2)
```

Peer Information

```
Peer Internet address is 200.200.200.5 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 100.100.100.5:65531,
Remote 200.200.200.5:3225
Data connection: Local 100.100.100.5:65533, Remote
200.200.200.5:3225
```

```
2 Attempts for active connections, 0 close of
connections
```

TCP Parameters

```
Path MTU 3000 bytes
Current retransmission timeout is 200 ms
Round trip time: Smoothed 0 ms, Variance: 0
```

Advertized window: Current: 118 KB, Maximum: 118

KB, Scale: 1

Peer receive window: Current: 118 KB, Maximum: 118

KB, Scale: 1

```
Congestion window: Current: 8 KB, Slow start
threshold: 118 KB
```

```
5 minutes input rate 32 bits/sec, 4 bytes/sec, 0
frames/sec
```

```
5 minutes output rate 32 bits/sec, 4 bytes/sec, 0
frames/sec
```

```
8 frames input, 1232 bytes
8 Class F frames input, 1232 bytes
0 Class 2/3 frames input, 0 bytes
0 Error frames timestamp error 0
8 frames output, 1228 bytes
8 Class F frames output, 1228 bytes
0 Class 2/3 frames output, 0 bytes
0 Error frames 0 reass frames
```

bison# **sh fcip pro 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 100000 kbps
Minimum available bandwidth is 100000 kbps
  Estimated round trip time is 10000 usec
  Congestion window monitoring is enabled, burst size
is 10 KB
```

```
bison# sh fcip pro 2
```

```
FCIP Profile 2
  Internet Address is 100.100.100.5 (interface
GigabitEthernet4/2)
  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 100000 kbps
Minimum available bandwidth is 100000 kbps
  Estimated round trip time is 10000 usec
  Congestion window monitoring is enabled, burst size
is 10 KB
```

```
bison# sh int port-channel 1
```

```
port-channel 1 is trunking
  Hardware is Fibre Channel
  Port WWN is 24:01:00:05:30:00:7a:de
  Admin port mode is auto, trunk mode is on
  Port mode is TE
  Port vsan is 1
  Speed is 2 Gbps
Trunk vsans (admin allowed and active) (600-601)
Trunk vsans (up) (600-601)
  Trunk vsans (isolated) ()
  Trunk vsans (initializing) ()
  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
  3969 frames input, 369812 bytes
    3963 Class F frames input, 369076 bytes
    6 Class 2/3 frames input, 736 bytes
    0 Error frames timestamp error 0
  3969 frames output, 371040 bytes
    3963 Class F frames output, 370340 bytes
    6 Class 2/3 frames output, 700 bytes
    0 Error frames 0 reass frames
Member[1] : fcip1
Member[2] : fcip2
```

```

bison# sh ips ip route interface gigabitethernet 4/1

Codes: C - connected, S - static
No default gateway

S 200.200.200.0/30 via 100.100.100.2, GigabitEthernet4/1
C 100.100.100.0/30 is directly connected,
GigabitEthernet4/1

bison# sh ips ip route interface gigabitethernet 4/2

Codes: C - connected, S - static
No default gateway

S 200.200.200.4/30 via 100.100.100.6, GigabitEthernet4/2
C 100.100.100.4/30 is directly connected,
GigabitEthernet4/2

bison# sh ips arp int gig 4/1

Protocol      Address      Age (min)    Hardware Addr
Type          Interface
Internet      100.100.100.2      8           0008.e21e.c7bc
ARPA          GigabitEthernet4/1
!--- Verify that the hardware address listed belongs to
the !--- next hop networking device.
bison# sh ips arp
int gig 4/2

Protocol      Address      Age (min)    Hardware Addr
Type          Interface
Internet      100.100.100.6      5           0008.e21e.c7bc
ARPA          GigabitEthernet4/2

bison# sh int port-channel 1 trunk vsan 600-601

port-channel 1 is trunking
  Vsan 600 is up, FCID is 0x010000
  Vsan 601 is up, FCID is 0x010000

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
-----

```

```
port-channel 1 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
```

```
-----  
port-channel 1 Downstream Disabled  
-----
```

MDS 9216 (Canterbury)

```
canterbury# sh int gig 2/1-2
```

GigabitEthernet2/1 is up

```
Hardware is GigabitEthernet, address is  
0005.3000.ade6  
Internet address is 200.200.200.1/30  
MTU 3000 bytes  
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 320 bits/sec, 40 bytes/sec, 0  
frames/sec  
8844 packets input, 993118 bytes  
0 multicast frames, 0 compressed  
0 input errors, 0 frame, 0 overrun 0 fifo  
8855 packets output, 994686 bytes, 0 underruns  
0 output errors, 0 collisions, 0 fifo  
0 carrier errors
```

GigabitEthernet2/2 is up

```
Hardware is GigabitEthernet, address is  
0005.3000.ade7  
Internet address is 200.200.200.5/30  
MTU 3000 bytes  
Port mode is IPS  
Speed is 1 Gbps  
Beacon is turned off
```

```
Auto-Negotiation is turned on
 5 minutes input rate 16 bits/sec, 2 bytes/sec, 0
frames/sec
 5 minutes output rate 8 bits/sec, 1 bytes/sec, 0
frames/sec
634 packets input, 39538 bytes
 0 multicast frames, 0 compressed
 0 input errors, 0 frame, 0 overrun 0 fifo
610 packets output, 47264 bytes, 0 underruns
 0 output errors, 0 collisions, 0 fifo
 0 carrier errors
```

```
canterbury# sh ips stats tcp int gig 2/1
```

```
TCP Statistics for port GigabitEthernet2/1
```

```
Connection Stats
```

```
 18 active openings, 10 accepts
 14 failed attempts, 0 reset received, 8
```

```
established
```

```
Segment stats
```

```
 8919 received, 8923 sent, 0 retransmitted
 0 bad segments received, 0 reset sent
```

```
TCP Active Connections
```

Local Address	Remote Address	State
Send-Q Recv-Q		
200.200.200.1:3225	100.100.100.1:65480	ESTABLISH
0	0	
200.200.200.1:3225	100.100.100.1:65482	ESTABLISH
0	0	
200.200.200.1:3225	0.0.0.0:0	LISTEN
0	0	

```
canterbury# sh ips stats tcp int gig 2/2
```

```
TCP Statistics for port GigabitEthernet2/2
```

```
Connection Stats
```

```
 498 active openings, 2 accepts
 498 failed attempts, 0 reset received, 2
```

```
established
```

```
Segment stats
```

```
 556 received, 579 sent, 0 retransmitted
 0 bad segments received, 0 reset sent
```

```
TCP Active Connections
```

Local Address	Remote Address	State
Send-Q Recv-Q		
200.200.200.5:3225	100.100.100.5:65531	ESTABLISH
0	0	
200.200.200.5:3225	100.100.100.5:65533	ESTABLISH
0	0	
200.200.200.5:3225	0.0.0.0:0	LISTEN
0	0	

```
canterbury# sh int fcip 1-2
```

```
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
```

```
Belongs to port-channel 2
```



```
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 200 (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 200.200.200.1:3225,
Remote 100.100.100.1:65480
  Data connection: Local 200.200.200.1:3225, Remote
100.100.100.1:65482
  18 Attempts for active connections, 2 close of
connections
TCP Parameters
  Path MTU 3000 bytes
  Current retransmission timeout is 200 ms
  Round trip time: Smoothed 5 ms, Variance: 6
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 136 bits/sec, 17 bytes/sec, 0
frames/sec
  5 minutes output rate 136 bits/sec, 17 bytes/sec,
0 frames/sec
  4189 frames input, 391368 bytes
    4183 Class F frames input, 390668 bytes
    6 Class 2/3 frames input, 700 bytes
    0 Error frames timestamp error 0
  4189 frames output, 390140 bytes
    4183 Class F frames output, 389404 bytes
    6 Class 2/3 frames output, 736 bytes
    0 Error frames 0 reass frames

fcip2 is trunking
Hardware is GigabitEthernet
Port WWN is 20:46:00:0c:30:6c:24:40
Peer port WWN is 20:c6:00:05:30:00:7a:de
Admin port mode is auto, trunk mode is auto
Port mode is TE
vsan is 1
Belongs to port-channel 2
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 201 (interface GigabitEthernet2/2)
Peer Information
  Peer Internet address is 100.100.100.5 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 200.200.200.5:3225,
Remote 100.100.100.5:65531
  Data connection: Local 200.200.200.5:3225, Remote
100.100.100.5:65533
  498 Attempts for active connections, 0 close of
connections
TCP Parameters
  Path MTU 3000 bytes
  Current retransmission timeout is 200 ms
  Round trip time: Smoothed 10 ms, Variance: 5
Advertized window: Current: 118 KB, Maximum: 118
KB, Scale: 1
Peer receive window: Current: 118 KB, Maximum: 118
KB, Scale: 1
  Congestion window: Current: 8 KB, Slow start
threshold: 112 KB
  5 minutes input rate 0 bits/sec, 0 bytes/sec, 0
frames/sec
  5 minutes output rate 0 bits/sec, 0 bytes/sec, 0
frames/sec
  8 frames input, 1228 bytes
  8 Class F frames input, 1228 bytes
  0 Class 2/3 frames input, 0 bytes
  0 Error frames timestamp error 0
  8 frames output, 1232 bytes
  8 Class F frames output, 1232 bytes
  0 Class 2/3 frames output, 0 bytes
  0 Error frames 0 reass frames

canterbury# sh int port 2

port-channel 2 is trunking
Hardware is Fibre Channel
Port WWN is 24:02:00:0c:30:6c:24:40
Admin port mode is auto, trunk mode is auto
Port mode is TE
Port vsan is 1
Speed is 2 Gbps
Trunk vsans (admin allowed and active) (600-601)
Trunk vsans (up) (600-601)
Trunk vsans (isolated) ()
Trunk vsans (initializing) ()
  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
  4213 frames input, 394068 bytes
  4207 Class F frames input, 393368 bytes
  6 Class 2/3 frames input, 700 bytes
  0 Error frames timestamp error 0
  4213 frames output, 392844 bytes
  4207 Class F frames output, 392108 bytes
  6 Class 2/3 frames output, 736 bytes
  0 Error frames 0 reass frames
Member[1] : fcip1
Member[2] : fcip2
```

```

canterbury# sh ips ip route interface gig 2/1

Codes: C - connected, S - static
No default gateway

S 100.100.100.0/30 via 200.200.200.2, GigabitEthernet2/1
C 200.200.200.0/30 is directly connected,
GigabitEthernet2/1

canterbury# sh ips ip route interface gig 2/2

Codes: C - connected, S - static
No default gateway

S 100.100.100.4/30 via 200.200.200.6, GigabitEthernet2/2
C 200.200.200.4/30 is directly connected,
GigabitEthernet2/2

canterbury# sh fcns da

VSAN 600:
-----
FCID      TYPE  PWWN                                (VENDOR)  FC4-
TYPE:FEATURE
-----
0x010001  N     10:00:00:00:c9:32:a6:e3  (Emulex)  scsi-
fcf:init
0x020001  N     50:05:07:63:00:d0:94:4c  (IBM)     scsi-
fcf:target fc..

Total number of entries = 2

VSAN 601:
-----
FCID      TYPE  PWWN                                (VENDOR)  FC4-
TYPE:FEATURE
-----
0x010100  N     10:00:00:00:00:05:00:00
0x020100  N     10:00:00:00:00:01:00:00
!--- Always verify that the fabric has formed with the
expected neighbor(s) !--- through FCIP E or TE port when
the configuration is completed.

```

Configuración especial de tramas (Bison)

```

!--- Special frames are used to improve security. !---
Before user-data is transmitted across an FCIP tunnel,
FSF verifies that !--- the peer is defined on the
configured wwn. interface fcip1 channel-group 1 force no
shutdown use-profile 1 peer-info ipaddr 200.200.200.1
special-frame peer-wwn 20:00:00:0c:30:6c:24:40 profile-
id 200

interface fcip2
channel-group 1 force
no shutdown
use-profile 2
peer-info ipaddr 200.200.200.5

```

```
special-frame peer-wnn 20:00:00:0c:30:6c:24:40 profile-  
id 201
```

```
!--- The peer-wnn is derived from the peer MDS by  
issuing the following command: canterbury# sh wwn switch
```

```
Switch WWN is 20:00:00:0c:30:6c:24:40
```

```
!--- This value is significant per peer switch, so it is  
used for all tunnels !--- towards this switch. This  
configuration shows the following: bison# sh int fcip 1-  
2
```

```
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
```

```
Belongs to port-channel 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 200.200.200.1 and port is  
3225
```

```
Special Frame is enabled
```

```
Peer switch WWN is 20:00:00:0c:30:6c:24:40
```

```
Peer profile id is 200
```

```
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 100.100.100.1:65372,
```

```
Remote 200.200.200.1:3225
```

```
Data connection: Local 100.100.100.1:65374, Remote  
200.200.200.1:3225
```

```
82 Attempts for active connections, 9 close of  
connections
```

```
TCP Parameters
```

```
Path MTU 3000 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: 106 KB, Slow start  
threshold: 118 KB
```

```
5 minutes input rate 46128 bits/sec, 5766  
bytes/sec, 19 frames/sec
```

```
5 minutes output rate 194867736 bits/sec, 24358467  
bytes/sec, 20732 frames/sec
```

```
5841 frames input, 1729836 bytes
```

```
4575 Class F frames input, 429444 bytes
```

```
1266 Class 2/3 frames input, 1300392 bytes
```

```
0 Error frames timestamp error 0
```

```
6339146 frames output, 7447938520 bytes
```

```
4576 Class F frames output, 431800 bytes
6334570 Class 2/3 frames output, 7447506720
bytes
0 Error frames 0 reass frames

fcip2 is trunking
Hardware is GigabitEthernet
Port WWN is 20:c6:00:05:30:00:7a:de
Peer port WWN is 20:46:00:0c:30:6c:24:40
Admin port mode is auto, trunk mode is on
Port mode is TE
vsan is 1
Belongs to port-channel 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 2 (interface GigabitEthernet4/2)
Peer Information
Peer Internet address is 200.200.200.5 and port is
3225
Special Frame is enabled
Peer switch WWN is 20:00:00:0c:30:6c:24:40
Peer profile id is 201
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 100.100.100.5:3225,
Remote 200.200.200.5:64535
Data connection: Local 100.100.100.5:3225, Remote
200.200.200.5:64537
58 Attempts for active connections, 1 close of
connections
TCP Parameters
Path MTU 3000 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: 106 KB, Slow start
threshold: 112 KB
5 minutes input rate 0 bits/sec, 0 bytes/sec, 0
frames/sec
5 minutes output rate 0 bits/sec, 0 bytes/sec, 0
frames/sec
415 frames input, 398160 bytes
16 Class F frames input, 2460 bytes
399 Class 2/3 frames input, 395700 bytes
0 Error frames timestamp error 0
6078322 frames output, 7147327176 bytes
16 Class F frames output, 2460 bytes
6078306 Class 2/3 frames output, 7147324716
bytes
0 Error frames 0 reass frames
```

Configuración especial de tramas (Canterbury)

```
interface fcip1
channel-group 2 force
no shutdown
use-profile 200
peer-info ipaddr 100.100.100.1
special-frame peer-wwn 20:00:00:05:30:00:7a:de profile-
id 1

interface fcip2
channel-group 2 force
no shutdown
use-profile 201
peer-info ipaddr 100.100.100.5
special-frame peer-wwn 20:00:00:05:30:00:7a:de profile-
id 2

canterbury# sh int 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
Belongs to port-channel 2
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 200 (interface GigabitEthernet2/1)
Peer Information
Peer Internet address is 100.100.100.1 and port is
3225
Special Frame is enabled
Peer switch WWN is 20:00:00:05:30:00:7a:de
Peer profile id is 1
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 200.200.200.1:3225,
Remote 100.100.100.1:65372
Data connection: Local 200.200.200.1:3225, Remote
100.100.100.1:65374
2 Attempts for active connections, 0 close of
connections
TCP Parameters
Path MTU 3000 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 94347400 bits/sec, 11793425
```

```
bytes/sec, 10031 frames/sec
  5 minutes output rate 144 bits/sec, 18 bytes/sec,
0 frames/sec
  3985861 frames input, 4685834196 bytes
    219 Class F frames input, 25228 bytes
    3985642 Class 2/3 frames input, 4685808968 bytes
    0 Error frames timestamp error 0
  1043 frames output, 866780 bytes
    218 Class F frames output, 23448 bytes
    825 Class 2/3 frames output, 843332 bytes
    0 Error frames 0 reass frames
```

```
canterbury# sh int fcip 2
```

```
fcip2 is trunking
  Hardware is GigabitEthernet
  Port WWN is 20:46:00:0c:30:6c:24:40
  Peer port WWN is 20:c6:00:05:30:00:7a:de
  Admin port mode is auto, trunk mode is auto
  Port mode is TE
  vsan is 1
  Belongs to port-channel 2
  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 201 (interface GigabitEthernet2/2)
  Peer Information
    Peer Internet address is 100.100.100.5 and port is
3225
```

Special Frame is enabled

Peer switch WWN is 20:00:00:05:30:00:7a:de

Peer profile id is 2

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 200.200.200.5:64535,

Remote 100.100.100.5:3225

Data connection: Local 200.200.200.5:64537, Remote
100.100.100.5:3225

500 Attempts for active connections, 0 close of
connections

TCP Parameters

Path MTU 3000 bytes

Current retransmission timeout is 300 ms

Round trip time: Smoothed 10 ms, Variance: 5

Advertized window: Current: 118 KB, Maximum: 118

KB, Scale: 1

Peer receive window: Current: 118 KB, Maximum: 118

KB, Scale: 1

Congestion window: Current: 8 KB, Slow start

threshold: 118 KB

5 minutes input rate 94399712 bits/sec, 11799964
bytes/sec, 10034 frames/sec

5 minutes output rate 0 bits/sec, 0 bytes/sec, 0
frames/sec

9769115 frames input, 11486944196 bytes

16 Class F frames input, 2460 bytes

9769099 Class 2/3 frames input, 11486941736

```
bytes
    0 Error frames timestamp error 0
    415 frames output, 398160 bytes
    16 Class F frames output, 2460 bytes
    399 Class 2/3 frames output, 395700 bytes
    0 Error frames 0 reass frames
```

Pantalla desde Bison y Canterbury - Canterbury pasivo

```
interface fcip1
channel-group 2 force
no shutdown
use-profile 200
passive-mode
peer-info ipaddr 100.100.100.1
special-frame peer-wnn 20:00:00:05:30:00:7a:de profile-
id 1
```

```
interface fcip2
channel-group 2 force
no shutdown
use-profile 201
passive-mode
peer-info ipaddr 100.100.100.5
special-frame peer-wnn 20:00:00:05:30:00:7a:de profile-
id 2
```

```
canterbury# sh ips stats tcp int gig 2/1
```

```
TCP Statistics for port GigabitEthernet2/1
Connection Stats
    20 active openings, 14 accepts
    14 failed attempts, 0 reset received, 14
established
Segment stats
    12042719 received, 3181301 sent, 0 retransmitted
    0 bad segments received, 0 reset sent
```

```
TCP Active Connections
  Local Address      Remote Address      State
Send-Q  Recv-Q
    200.200.200.1:3225  100.100.100.1:65368 ESTABLISH
0        0
    200.200.200.1:3225  100.100.100.1:65370 ESTABLISH
0        0
    200.200.200.1:3225  100.100.100.1:65372 TIME_WAIT
0        0
    200.200.200.1:3225  0.0.0.0:0          LISTEN
0        0
```

!--- Both FCIP interfaces for Canterbury are configured to be passive; this !--- results in the above TCP statistics where Canterbury, despite being !--- configured with the highest IP addresses for both tunnels, did not !--- initiate the TCP connections. Its peer, Bison, initiates.

```
canterbury# sh ips stats tcp int gig 2/2
```

```
TCP Statistics for port GigabitEthernet2/2
Connection Stats
    500 active openings, 4 accepts
    498 failed attempts, 0 reset received, 6
```



```

established
  Segment stats
    11933351 received, 3144627 sent, 0 retransmitted
    0 bad segments received, 0 reset sent

TCP Active Connections
  Local Address      Remote Address      State
Send-Q  Recv-Q
200.200.200.5:3225  100.100.100.5:65415 ESTABLISH
0        0
200.200.200.5:3225  100.100.100.5:65417 ESTABLISH
0        0
200.200.200.5:64535 100.100.100.5:3225  TIME_WAIT
0        0
200.200.200.5:3225  0.0.0.0:0          LISTEN
0        0

```

Pantalla de Bison y Canterbury - Timestamp set

```

!--- FCIP Time Stamp is enabled to allow the peer to
drop FCIP userdata if it !--- exceeds the specified
time-difference. The time difference is the maximum !---
value in transit of user data frames between two peer
FCIP entities. bison(config-if)# time-stamp acceptable-
diff 1000

```

Please enable NTP with a common time source on both MDS Switches that are on either side of the FCIP link

```

!--- Note that the value specified is in milliseconds
and, because a !--- time difference is specified, both
ends of the FCIP tunnel must have access !--- to the
same clock source through NTP. interface fcip1 channel-
group 1 force no shutdown use-profile 1 peer-info ipaddr
200.200.200.1 time-stamp acceptable-diff 1000
special-frame peer-wwn 20:00:00:0c:30:6c:24:40 profile-
id 200

```

```

interface fcip2
channel-group 1 force
no shutdown
use-profile 2
peer-info ipaddr 200.200.200.5
time-stamp acceptable-diff 1000
special-frame peer-wwn 20:00:00:0c:30:6c:24:40 profile-
id 201

```

```

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
  Belongs to port-channel 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 200.200.200.1 and port is
3225
  Special Frame is enabled
  Peer switch WWN is 20:00:00:0c:30:6c:24:40
  Peer profile id is 200
  Maximum number of TCP connections is 2
Time Stamp is enabled, acceptable time difference
1000 ms
  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 100.100.100.1:65368,
Remote 200.200.200.1:3225
  Data connection: Local 100.100.100.1:65370, Remote
200.200.200.1:3225
  84 Attempts for active connections, 10 close of
connections
  TCP Parameters
    Path MTU 3000 bytes
    Current retransmission timeout is 200 ms
    Round trip time: Smoothed 2 ms, Variance: 3
    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: 118 KB
    5 minutes input rate 0 bits/sec, 0 bytes/sec, 0
frames/sec
    5 minutes output rate 0 bits/sec, 0 bytes/sec, 0
frames/sec
    5988 frames input, 1743840 bytes
      4719 Class F frames input, 443184 bytes
      1269 Class 2/3 frames input, 1300656 bytes
      0 Error frames timestamp error 0
    15337275 frames output, 18028320932 bytes
      4720 Class F frames output, 445544 bytes
      15332555 Class 2/3 frames output, 18027875388
bytes
      0 Error frames 0 re-ass frames

canterbury(config-if)# time-stamp acceptable-diff 1000

Please enable NTP with a common time source on both MDS
Switches that are on
either side of the FCIP link

interface fcip1
channel-group 2 force
no shutdown
use-profile 200
passive-mode
peer-info ipaddr 100.100.100.1
time-stamp acceptable-diff 1000
special-frame peer-wwn 20:00:00:05:30:00:7a:de profile-
id 1

interface fcip2
channel-group 2 force
no shutdown
```

```
use-profile 201
passive-mode
peer-info ipaddr 100.100.100.5
time-stamp acceptable-diff 1000
special-frame peer-wnn 20:00:00:05:30:00:7a:de profile-
id 2

canterbury# sh int 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
  Belongs to port-channel 2
  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 200 (interface GigabitEthernet2/1)
  Peer Information
    Peer Internet address is 100.100.100.1 and port is
3225
    Passive mode is enabled
    Special Frame is enabled
    Peer switch WWN is 20:00:00:05:30:00:7a:de
    Peer profile id is 1
    Maximum number of TCP connections is 2
    Time Stamp is enabled, acceptable time difference
1000 ms
    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 200.200.200.1:3225,
Remote 100.100.100.1:65368
    Data connection: Local 200.200.200.1:3225, Remote
100.100.100.1:65370
    2 Attempts for active connections, 0 close of
connections
  TCP Parameters
    Path MTU 3000 bytes
    Current retransmission timeout is 200 ms
    Round trip time: Smoothed 6 ms, Variance: 6
    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 0 bits/sec, 0 bytes/sec, 0
frames/sec
    5 minutes output rate 0 bits/sec, 0 bytes/sec, 0
frames/sec
    9427366 frames input, 11084654892 bytes
    295 Class F frames input, 32716 bytes
    9427071 Class 2/3 frames input, 11084622176
bytes
    145359 Error frames timestamp error 145359
    1122 frames output, 874528 bytes
```

294 Class F frames output, 30932 bytes
828 Class 2/3 frames output, 843596 bytes
0 Error frames 0 reass frames

[Información Relacionada](#)

- [Página de inicio de T11](#)
- [Problemas en TCP de reinicio lento después de inactividad](#)
- [RFC 1191: detección de MTU de trayecto](#)
- [RFC 1323: extensiones TCP para alto rendimiento](#)
- [RFC 2018: opciones de reconocimiento selectivo de TCP](#)
- [RFC 2883: extensión de la opción de reconocimiento selectivo \(SACK\) para TCP](#)
- [RFC 3821 – Canal de fibra por TCP/IP \(FCIP\)](#)
- [Soporte Técnico y Documentación - Cisco Systems](#)