

# Configuration élaborée MDS à MDS avec FCIP

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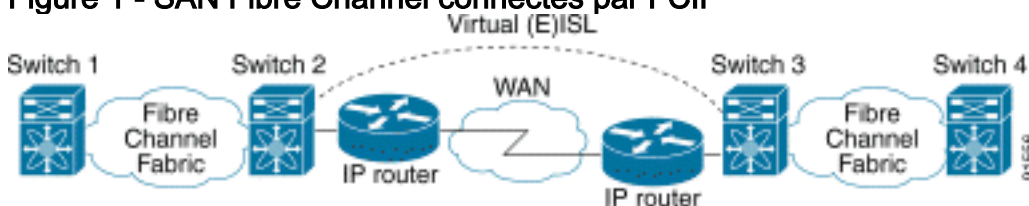
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## Introduction

Ce document fournit un exemple de configuration pour le commutateur MDS (Multilayer Director Switch) Fibre Channel Over TCP/IP (FCIP) élaboré vers MDS.

FCIP décrit les mécanismes qui permettent l'interconnexion d'îlots de réseaux SAN Fibre Channel (FC) sur des réseaux IP pour former un SAN unifié dans une structure FC unique. FCIP s'appuie sur des services réseau IP pour fournir la connectivité entre les îlots SAN sur des réseaux locaux, métropolitains ou étendus.

Figure 1 - SAN Fibre Channel connectés par FCIP



Le protocole FCIP utilise le protocole TCP (Transmission Control Protocol) sur le port 3225 comme transport de couche réseau.

## Conditions préalables

### Conditions requises

Assurez-vous que vous répondez à ces exigences avant d'essayer cette configuration :

- Le réseau fédérateur IP doit être opérationnel et fournir la bande passante requise pour

prendre en charge les applications qui s'exécutent sur les liaisons FCIP. Il peut s'agir d'une topologie de couche 2 (L2) ou de couche 3 (L3).

- S'il s'agit d'une topologie de couche 3, les routeurs intermédiaires ou les commutateurs multicouches doivent être configurés et configurés pour transférer correctement le trafic IP entre les adresses IP source et de destination des tunnels FCIP. Si la qualité de service (QoS) ou le formatage du trafic est appliqué sur n'importe quel périphérique réseau du chemin entre les homologues FCIP, le gestionnaire de réseau administrant l'infrastructure IP doit être consulté pour obtenir les détails nécessaires avant de configurer les paramètres et fonctions liés au protocole TCP sur le ou les profils FCIP MDS (Multilayer Director Switch).
- Les commutateurs Ethernet adjacents aux MDS doivent prendre en charge et être configurés pour l'agrégation 802.1Q si des sous-interfaces sont configurées sur le module de services de stockage IP (IPS) MDS.

## Components Used

Les informations contenues dans ce document sont basées sur les versions de matériel et de logiciel suivantes :

- MDS 9509 avec module de service IPS (DS-X9308-SMIP) qui exécute la version 1.2.(2a)
- MDS 9216 avec module de service IPS (DS-X9308-SMIP) qui exécute la version 1.2.(2a)
- Catalyst 6509 qui exécute Catalyst OS (CatOS) 7.4(3)
- Serveur Win2003 (HPQ Pro-Liant-P4) avec adaptateur HBA Emulex LP9K
- Baie de stockage 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.

## Conventions

Pour plus d'informations sur les conventions utilisées dans ce document, reportez-vous à [Conventions relatives aux conseils techniques Cisco](#).

## Informations générales

FCIP comprend les spécifications suivantes :

### ANSI T11

1. FC-SW-2 décrit le fonctionnement et l'interaction des commutateurs FC, y compris E\_Port et le fonctionnement du fabric.
2. FC-BB-2 est un mappage qui se rapporte à l'extension des réseaux commutés FC sur un réseau fédérateur TCP et qui définit des modèles de référence qui prennent en charge E\_Port et B\_Port.

### Groupe de travail IETF IPS

1. FC sur TCP couvre les exigences TCP/IP pour le transport des trames FC sur un réseau IP.

2. L'encapsulation de trame FC définit le format d'encapsulation de fibre commun.

Une interconnexion entre deux commutateurs ou fabrics SAN à travers FCIP est appelée liaison FCIP et peut contenir une ou plusieurs connexions TCP. Chaque extrémité d'une liaison FCIP est associée à un port E virtuel (VE\_port) ou B\_port, selon la mise en oeuvre. FC-BB et FC-BB-2 décrivent les différences entre les deux approches. Le module de services IPS (DS-X9308-SMIP) prend en charge les deux modes, mais prend par défaut la valeur VE\_Port, qui est également le mode recommandé à exécuter si tous les homologues concernés sont des modules DS-X9308-SMIP. Dans cet exemple de topologie, les paramètres FCIP sur PortChannels, TCP à configurer et FSF (trame spéciale) de configuration sont abordés.

## [Configuration](#)

Cette section vous fournit des informations pour configurer les fonctionnalités décrites dans ce document.

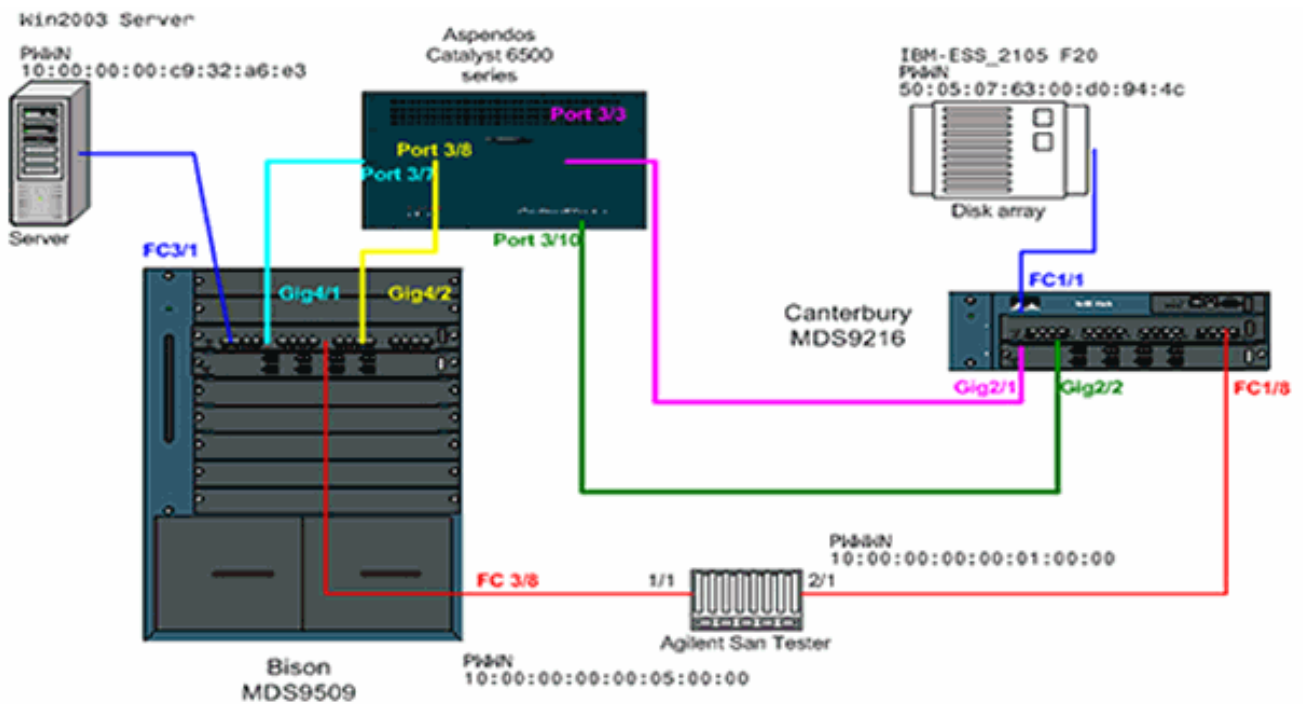
Sur les MDS, vous devez vous familiariser avec les guides de configuration IPS des deux plateformes. Vous trouverez la version la plus récente des manuels sur [Configuration du stockage IP](#) sur Cisco.com.

**Remarque :** Utilisez [l'outil de recherche de commandes](#) (clients [inscrits](#) seulement) pour en savoir plus sur les commandes figurant dans le présent document.

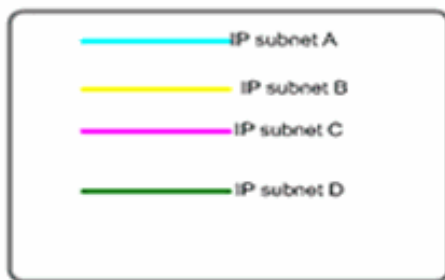
## [Diagramme du réseau](#)

Ce document utilise la configuration réseau suivante :

**Figure 2 - Topologie 3**



**Topology 3 - PortChannel of two FCIP interfaces**



La topologie 3 représente un canal de port FCIP formé par deux tunnels FCIP individuels ; les interfaces homologues se trouvent sur un cloud IP. Le nuage IP est réduit en un commutateur multicouche (Catalyst 6500) qui achemine le trafic du sous-réseau A au sous-réseau C et du sous-réseau C au sous-réseau A (et du sous-réseau B au sous-réseau D et du sous-réseau D au sous-réseau A). Les sous-réseaux sont définis comme suit :

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

La topologie fournit une **bande passante maximale** connue de **100 Mbits/s** et une **bande passante minimale de 100 Mbits/s**, qui est le profil exécuté pour notre trafic IP pertinent via ce nuage IP . La configuration initiale présente les aspects de la canalisation de ports FCIP et du conditionnement du trafic TCP. Dans les sections suivantes, FSF, Passive TCP interfaces et FCIP Timestamp seront expliqués plus en détail.

## [Configurations](#)

Ce document utilise les configurations suivantes :

- [MDS 9509 \(Bison\) avec module IPS-8](#)
- [MDS 9612 \(Canterbury\) avec module IPS-8](#)

## MDS 9509 (Bison) avec module 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.*

- Pour plus de détails sur PMTU, référez-vous à [RFC 1191 - Découverte MTU du chemin](#).
- Pour plus de détails sur SACK, référez-vous à [RFC 2018 - TCP Selective Acknowledgement Options](#) et [RFC 2883 - An Extension to the Selective Acknowledgement Option \(SACK\) pour TCP](#)

## MDS 9216 (Canterbury) avec module 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:/sl22a boot
kickstart bootflash:/kl22a 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 $l$KcCrqxlu$mtU03/60PRUIfjl.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

```

## Vérification



Référez-vous à cette section pour vous assurer du bon fonctionnement de votre configuration.

L'[Outil Interpréteur de sortie \(clients enregistrés uniquement\) \(OIT\)](#) prend en charge certaines [commandes show](#). Utilisez l'OIT pour afficher une analyse de la sortie de la commande **show**.

- **show interface gig x/y** - Affiche l'état de l'interface Gigabit pertinente liée au profil FCIP.
- **show ips stats tcp int gig x/y** - Affiche les statistiques TCP et les connexions actives pour l'interface Gigabit appropriée.
- **show ips arp int gig x/y** - Affiche toutes les entrées ARP (Address Resolution Protocol) pour l'interface Gigabit appropriée ; le prochain saut ou homologue doit être présent dans cette liste.
- **show ips ip route int gig x/y** - Affiche les routes spécifiques traversant l'interface Gigabit appropriée.
- **show interface fcip x** : affiche l'état de l'interface FCIP et tous les détails relatifs à ce tunnel FCIP.
- **show profile fcip x** : affiche l'adresse IP à laquelle le profil est lié et tous les paramètres TCP configurés.
- **show int fcip x counters** - Permet de vérifier si des trames traversent le tunnel FCIP.
- **show fcdomain vsan x** : répertorie tous les détails relatifs au domaine ; utilisé pour vérifier que le fabric est formé à travers le ou les tunnels FCIP.
- **show fcns da vsan x** : affiche tous les types pwwn, FC4-Types et FCID du VSAN concerné ; utilisé pour vérifier que toutes les entrées attendues sont distribuées à travers le ou les tunnels FCIP.

## Dépannage

Utilisez cette section pour dépanner votre configuration.

Veillez à exécuter plusieurs fois les commandes **show** pour créer un historique de compteur. Les compteurs qui ne sont pas liés à un point dans le temps et qui ne sont collectés qu'une seule fois sont pour la plupart inutiles.

Utilisez les configurations indiquées ci-dessous pour effectuer un dépannage supplémentaire.

- [MDS 9509 \(Bison\)](#)
- [MDS 9216 \(Canterbury\)](#)
- [Configuration de trame spéciale \(Bison\)](#)
- [Configuration de trame spéciale \(Canterbury\)](#)
- [Affichage de Bison and Canterbury - Canterbury passive](#)
- [Affichage à partir de Bison et Canterbury - Horodatage](#)

### 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
-----	-----	-----
<b>port-channel 1</b>	<b>Downstream</b>	<b>Disabled</b>
-----	-----	-----

## 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-
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
-----
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.

```

### Configuration de trame spéciale (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-wnn 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-wwn 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

```

## Configuration de trame spéciale (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
```

## Affichage de Bison and Canterbury - Canterbury passive

```
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		
0	0	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

### Affichage à partir de Bison et Canterbury - Horodatage

```
!--- 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-wnn 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-wnn 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 reass 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-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
```

```
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
```

## Informations connexes

- [Page d'accueil T11](#)
- [Problèmes dans le redémarrage lent TCP après inactivité](#)
- [RFC 1191 - Découverte de MTU de chemin](#)
- [RFC 1323 - Extensions TCP pour hautes performances](#)
- [RFC 2018 - Options d'accusé de réception sélectif TCP](#)
- [RFC 2883 - Extension de l'option SACK \(Selective Acknowledgement\) pour TCP](#)
- [RFC 3821 - Fibre Channel over TCP/IP \(FCIP\)](#)
- [Support et documentation techniques - Cisco Systems](#)