Configurazione elaborata da MDS a MDS con FCIP

Sommario

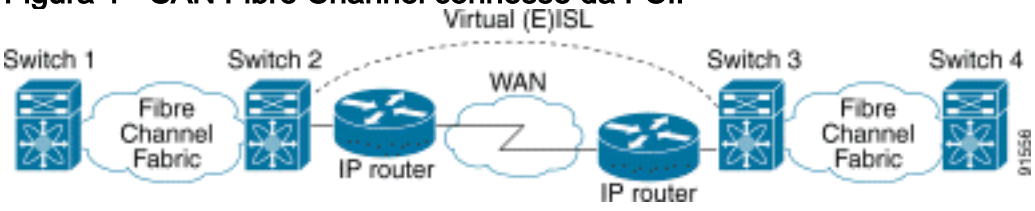
Introduzione
Prerequisiti
Requisiti
Componenti usati
Convenzioni
Premesse
Configurazione
Esempio di rete
Configurazioni
Verifica
Risoluzione dei problemi
Informazioni correlate

Introduzione

In questo documento viene fornita una configurazione di esempio per elaborati switch Multilayer Director (MDS) da Fibre Channel over TCP/IP (FCIP) a MDS.

FCIP descrive i meccanismi che consentono l'interconnessione di isole di reti SAN (Storage Area Network) Fibre Channel (FC) su reti IP per formare una SAN unificata in un unico fabric FC. FCIP si basa su servizi di rete IP per fornire la connettività tra le isole SAN su reti LAN, metropolitane o WAN.

Figura 1 - SAN Fibre Channel connesse da FCIP



FCIP utilizza il protocollo TCP (Transmission Control Protocol) sulla porta 3225 come trasporto a livello di rete.

Prerequisiti

Requisiti

Prima di provare questa configurazione, accertarsi di soddisfare i seguenti requisiti:

- La backbone IP deve essere operativa e fornire la larghezza di banda necessaria per supportare le applicazioni che vengono eseguite sui collegamenti FCIP—questa potrebbe essere una topologia di layer 2 (L2) o di layer 3 (L3).
- Se si tratta di una topologia L3, i router intermedi o gli switch multilivello devono essere configurati e configurati in modo da inoltrare correttamente il traffico IP tra gli indirizzi IP di origine e destinazione dei tunnel FCIP. Se viene applicato Quality of Service (QoS) o Traffic Shaping a qualsiasi dispositivo di rete nel percorso tra i peer FCIP, è necessario consultare il gestore della rete che amministra l'infrastruttura IP per ottenere i dettagli necessari prima di configurare i parametri e le funzionalità relativi al TCP sui profili FCIP di Multilayer Director Switch (MDS).
- Gli switch Ethernet adiacenti ai dispositivi MDS devono supportare e essere configurati per il trunking 802.1Q se sul modulo dei servizi IPS (MDS IP Storage) sono configurate sottointerfacce.

Componenti usati

Le informazioni fornite in questo documento si basano sulle seguenti versioni software e hardware:

- MDS 9509 con IPS Service Module (DS-X9308-SMIP) con versione 1.2.1(2a)
- MDS 9216 con IPS Service Module (DS-X9308-SMIP) con versione 1.2.1(2a)
- Catalyst 6509 con software Catalyst OS (CatOS) 7.4(3)
- Server Win2003 (HPQ Pro-Liant-P4) con HBA LP9K Emulex
- Array di storage IBM (ESS-2105-F20)

Le informazioni discusse in questo documento fanno riferimento a dispositivi usati in uno specifico ambiente di emulazione. Su tutti i dispositivi menzionati nel documento la configurazione è stata ripristinata ai valori predefiniti. Se la rete è operativa, valutare attentamente eventuali conseguenze derivanti dall'uso dei comandi.

Convenzioni

Per ulteriori informazioni sulle convenzioni usate, consultare il documento Cisco sulle convenzioni nei suggerimenti tecnici.

Premesse

La tecnologia FCIP è composta dalle seguenti specifiche:

ANSI T11

1. FC-SW-2 descrive il funzionamento e l'interazione degli switch FC, incluso E_Port e il funzionamento del fabric.
2. FC-BB-2 è una mappatura che riguarda l'estensione delle reti a commutazione FC attraverso una backbone di rete TCP e definisce modelli di riferimento che supportano E_Port e B_Port.

Gruppo di lavoro IETF IPS

1. La tecnologia FC su TCP copre i requisiti TCP/IP per il trasporto dei frame FC su una rete IP.
2. L'incapsulamento del frame FC definisce il formato comune di incapsulamento della fibra.

L'interconnessione tra due switch SAN o fabric su FCIP è detta collegamento FCIP e può contenere una o più connessioni TCP. Ogni estremità di un collegamento FCIP è associata a una porta E virtuale (VE_port) o a una porta B, a seconda dell'implementazione. FC-BB e FC-BB-2 descrivono le differenze tra entrambi gli approcci. Il modulo dei servizi IPS (DS-X9308-SMIP) supporta entrambe le modalità, ma per impostazione predefinita viene utilizzato VE_Port, che è anche la modalità consigliata se tutti i peer interessati sono moduli DS-X9308-SMIP. In questa topologia di esempio, vengono discussi i parametri FCIP over PortChannels, TCP da configurare e FSF (Special Frame).

Configurazione

In questa sezione vengono presentate le informazioni necessarie per configurare le funzionalità descritte più avanti nel documento.

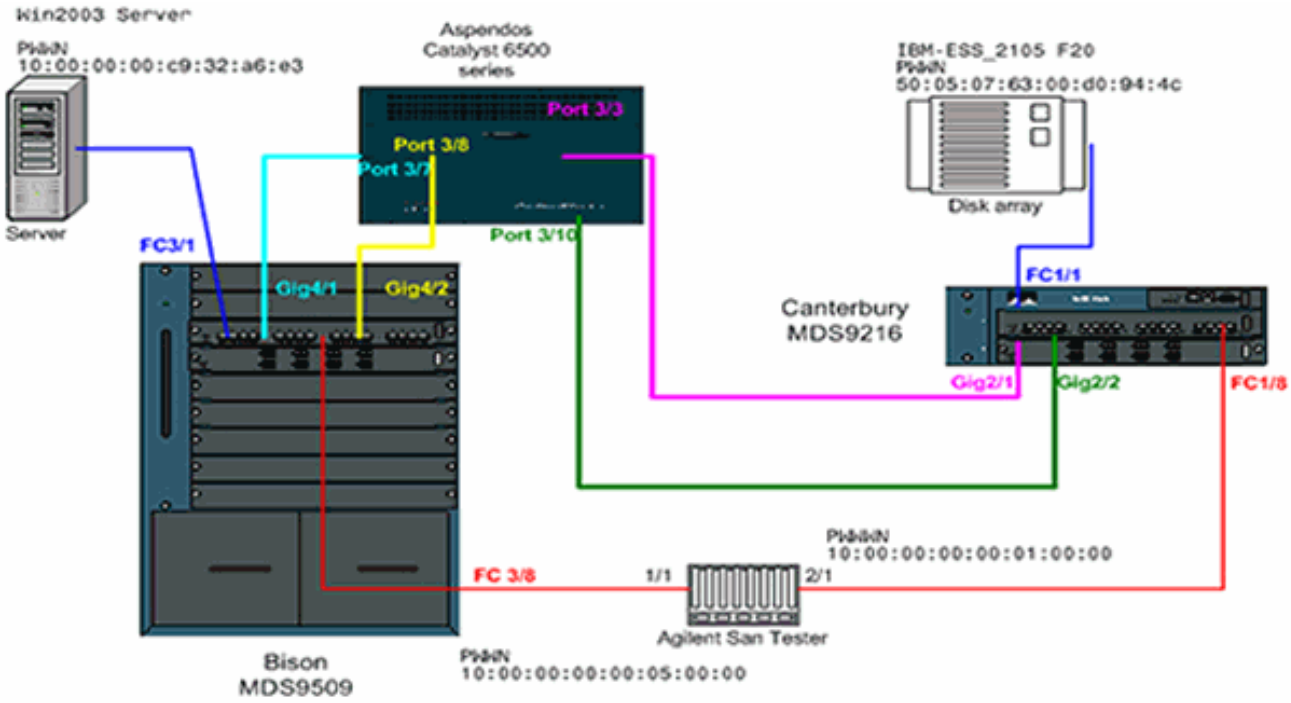
Sui sistemi MDS è necessario acquisire familiarità con le guide alla configurazione IPS per entrambe le piattaforme. La versione più aggiornata dei manuali è disponibile all'indirizzo Configuring IP Storage (Configurazione dello storage IP) sul sito Cisco.com.

Nota: per ulteriori informazioni sui comandi menzionati in questo documento, usare lo strumento di ricerca dei comandi (solo utenti registrati).

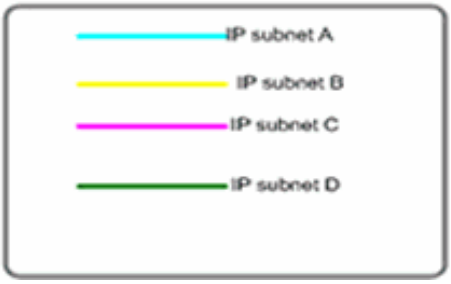
Esempio di rete

Nel documento viene usata questa impostazione di rete:

Figura 2 - Topologia 3



Topology 3 - PortChannel of two FCIP interfaces



La topologia 3 mostra un canale della porta FCIP formato da due singoli tunnel FCIP; le interfacce peer si trovano su un cloud IP. Il cloud IP è compresso in uno switch multilivello (Catalyst 6500) che instrada il traffico dalla subnet A alla subnet C e dalla subnet C alla subnet A (e dalla subnet B alla subnet D e dalla subnet D alla subnet A). Le subnet sono definite come segue:

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

La topologia fornisce una **larghezza di banda massima** nota **di 100 Mbps** e una larghezza di **banda minima di 100 Mbps**, che è il profilo in esecuzione per il traffico IP rilevante attraverso questo cloud IP. La configurazione iniziale mostra gli aspetti del channeling delle porte basato su FCIP e del condizionamento del traffico TCP. Nelle sezioni successive, FSF, Interfacce TCP passive e Timestamp FCIP verranno spiegati più avanti.

Configurazioni

Nel documento vengono usate queste configurazioni:

- MDS 9509 (Bison) con modulo IPS-8
- MDS 9612 (Canterbury) con modulo IPS-8

MDS 9509 (Bison) con modulo 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.
```

- Per ulteriori dettagli sulla PMTU, fare riferimento alla RFC 1191 - Path MTU discovery .
- Per ulteriori informazioni sullo SACK, fare riferimento a RFC 2018 - TCP Selective Acknowledgement Options e RFC 2883 - An Extension to the Selective Acknowledgement (SACK) Option per TCP

MDS 9216 (Canterbury) con modulo 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$mtU03/60PRUIfjl.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
```

Verifica

Per verificare che la configurazione funzioni correttamente, consultare questa sezione.

Lo strumento Output Interpreter (solo utenti registrati) (OIT) supporta alcuni comandi **show**. Usare l'OIT per visualizzare un'analisi dell'output del comando **show**.

- **show interface gig *x/y*: visualizza lo stato dell'interfaccia Gigabit associata al profilo FCIP.**
- **show ips stats tcp int gig *x/y*** : visualizza le statistiche TCP e le connessioni attive per l'interfaccia Gigabit interessata.
- **show ips arp int gig *x/y*: visualizza tutte le voci ARP (Address Resolution Protocol) per l'interfaccia Gigabit interessata;** nell'elenco deve essere presente l'hop o il peer successivo.
- **show ips ip route int gig *x/y*: visualizza le route specifiche che passano attraverso l'interfaccia Gigabit interessata.**
- **show interface fcip *x*: restituisce lo stato dell'interfaccia FCIP e tutti i dettagli relativi al tunnel FCIP.**
- show profile fcip *x: visualizza l'indirizzo IP a cui è associato il profilo e tutti i parametri TCP configurati.*
- **show int fcip *x* counters**: consente di verificare la presenza di frame che attraversano il tunnel FCIP.
- **show fcdomain vsan *x*: visualizza un elenco di tutti i dettagli relativi al dominio.** utilizzata per verificare che l'infrastruttura sia in formato nei tunnel FCIP.
- **show fcns da vsan *x*: visualizza tutti i tipi pwwn, FC4 e FCID della VSAN interessata;** utilizzata per verificare che tutte le voci previste siano distribuite sui tunnel FCIP.

Risoluzione dei problemi

Utilizzare questa sezione per risolvere i problemi relativi alla configurazione.

Accertarsi di usare più volte i comandi **show** per creare una cronologia dei contatori. I contatori che non sono correlati a un point in time e sono raccolti solo una volta sono per lo più inutili.

Utilizzare le configurazioni riportate di seguito per ulteriori operazioni di risoluzione dei problemi.

- MDS 9509 (Bison)
- MDS 9216 (Canterbury)
- Configurazione speciale del frame (Bison)
- Configurazione speciale del frame (Canterbury)
- Esposizione da Bison e Canterbury - Canterbury passive
- Display di Bison e 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
    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
0       0

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-
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.
```

Configurazione speciale del frame (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-wwn 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
```

Configurazione speciale del frame (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
```

Esposizione da Bison e 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-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
special-frame peer-wwn 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
```

Display di Bison e 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 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-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-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
      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
```

Informazioni correlate

- Home page T11
- Problemi di riavvio lento TCP dopo inattività
- RFC 1191 - Rilevamento dell'MTU del percorso
- RFC 1323 - Estensioni TCP per prestazioni elevate
- RFC 2018 - Opzioni di conferma selettiva TCP
- RFC 2883 - Estensione dell'opzione di conferma selettiva (SACK) per TCP
- RFC 3821 - Fibre Channel over TCP/IP (FCIP)
- Documentazione e supporto tecnico – Cisco Systems