

Усложненная конфигурация MDS к MDS с FCIP

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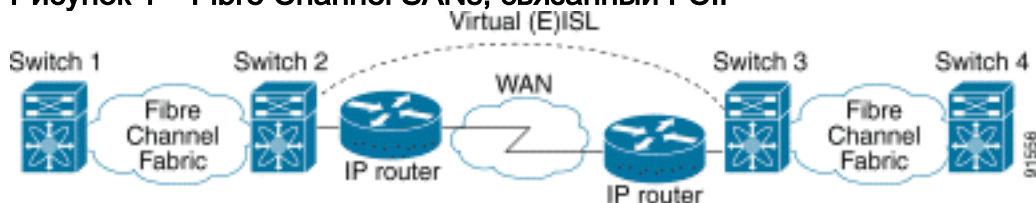
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Введение

Этот документ предоставляет пример конфигурации для тщательно продуманного Fibre Channel По TCP/IP (FCIP) Многоуровневый направляющий коммутатор (MDS) к MDS.

FCIP описывает механизмы, которые позволяют взаимодействию изолированных участков сетей хранения данных Fibre Channel (FC) (SANs) по Сетям на основе IP формировать унифицированный SAN в одиночной матрице FC. FCIP полагается на сервисы Сети на основе IP для обеспечения подключения между группами SAN по локальным сетям, общегородским сетям или Wide Area Network.

Рисунок 1 – Fibre Channel SANs, связанный FCIP



FCIP использует Протокол TCP на порту 3225 как транспорт сетевого уровня.

Предварительные условия

Требования

Убедитесь, что вы обеспечили выполнение следующих требований, прежде чем

попробовать эту конфигурацию:

- Магистраль IP должна быть в рабочем состоянии и отправить необходимую пропускную способность для поддержки приложений, которые натываются на ссылки FCIP — это могло быть Уровнем 2 (L2) или Уровнем 3 (L3) топология.
- Если это - топология L3, промежуточные маршрутизаторы или многоуровневые коммутаторы должны быть установлены и настроены для соответствующей передачи IP - трафика между источником и IP - адресами назначения туннелей FCIP. Если Качество обслуживания (QoS) или формирование трафика принуждены в каком-либо сетевом устройстве в пути между узлами FCIP, с менеджером сети, управляющим Инфраструктурой IP, нужно консультироваться для получения необходимых подробных данных прежде, чем настроить любые связанные с TCP параметры и функции на профиле (профилях) FCIP Многоуровневого направляющего коммутатора (MDS).
- Коммутаторы Ethernet, смежные с системами передачи данных (MDS), должны поддерживать и быть настроены для канала связи 802.1Q, если подынтерфейсы настроены на сервисном модуле системы передачи данных IP-хранения (IPS).

Используемые компоненты

Сведения, содержащиеся в данном документе, касаются следующих версий программного обеспечения и оборудования:

- MDS 9509 с сервисным модулем IPS (DS-X9308-SMIP), который выполняет версию 1.2. (2a)
- MDS 9216 с сервисным модулем IPS (DS-X9308-SMIP), который выполняет версию 1.2. (2a)
- Catalyst 6509, который выполняет операционную систему Catalyst (CatOS) 7.4 (3)
- Сервер Win2003 (HPQ Pro-Liant-P4) с адаптером Emulex LP9K HBA
- Массив IBM Storage (ESS-2105-F20)

Сведения, представленные в этом документе, были получены от устройств, работающих в специальной лабораторной среде. Все устройства, описанные в этом документе, были запущены с чистой (стандартной) конфигурацией. В рабочей сети необходимо изучить потенциальное воздействие всех команд до их использования.

Условные обозначения

[Дополнительные сведения об условных обозначениях см. в документе Условные обозначения технических терминов Cisco.](#)

Общие сведения

FCIP состоит из этих спецификаций:

T11 ANSI

1. FC-SW-2 описывает операцию и взаимодействие коммутаторов FC включая E_Port и работу матрицы.
2. FC-BB-2 является сопоставлением, которое принадлежит расширению коммутируемых

сетей FC через магистральную часть сети TCP и определяет эталонные модели, которые поддерживают E_Port и B_Port.

[Рабочая группа IETF IPS](#)

1. FC по TCP покрывает требования TCP/IP для передачи кадров FC по IP - сети.
2. Инкапсуляция кадра FC определяет общий формат инкапсуляции волокна.

Соединение между двумя SAN коммутаторами или матрицами через FCIP называют ссылкой FCIP и может содержать один или несколько TCP - подключений. Каждый конец ссылки FCIP привязан к Действительному порту E (VE_port) или B_port, в зависимости от реализации. FC-BB и FC-BB-2 описывают различия между обоими подходами. Модуль служб IPS (DS-X9308-SMIP) поддерживает режимы Both, но настройки по умолчанию к VE_Port, который является также рекомендуемым режимом, чтобы работать, если все соответствующие узлы являются модулями DS-X9308-SMIP. В этом примере топологии, FCIP по PortChannels, параметры TCP для настройки, и FSF (специальный кадр) обсуждены параметры конфигурации.

[Настройка](#)

В этом разделе содержатся сведения о настройке функций, описанных в этом документе.

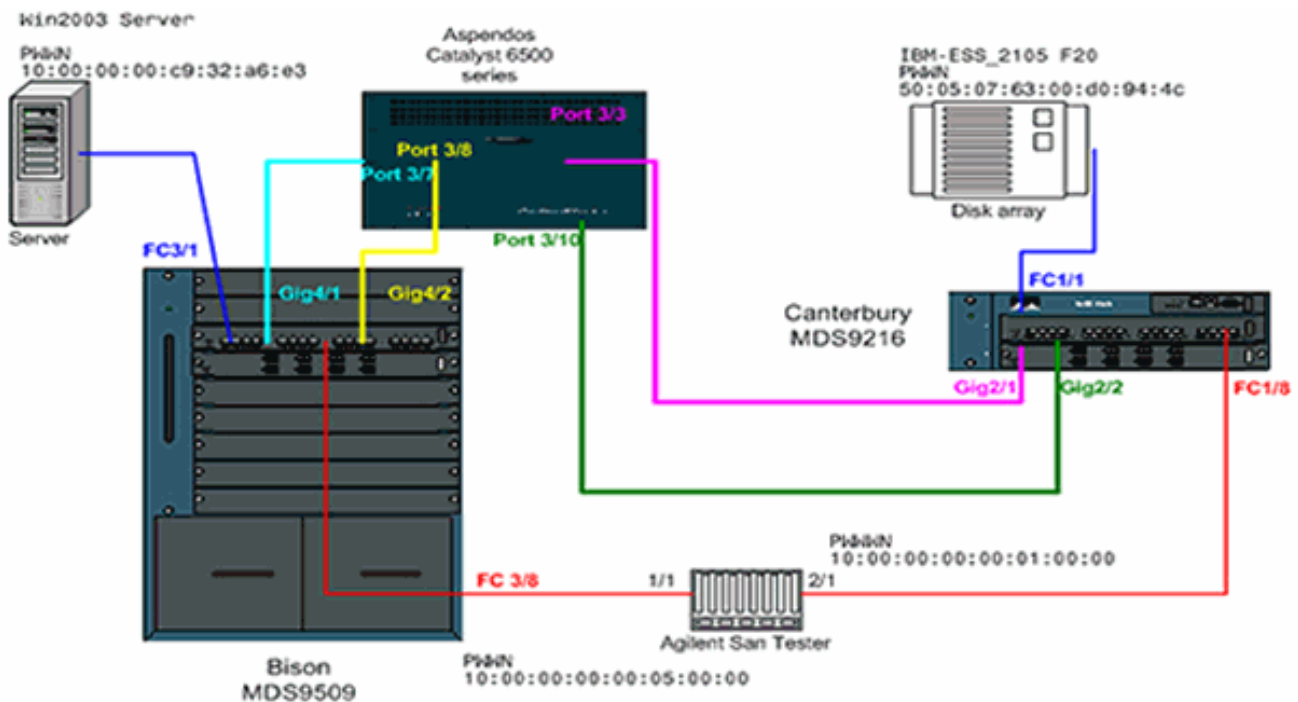
В системах передачи данных необходимо ознакомиться с руководством по конфигурации IPS для обеих платформ. Можно найти актуальнейшую версию руководств в [Настройке IP-системами](#) Хранения на Cisco.com.

Примечание: [Чтобы получить подробные сведения о командах в данном документе, используйте Средство поиска команд \(только для зарегистрированных клиентов\).](#)

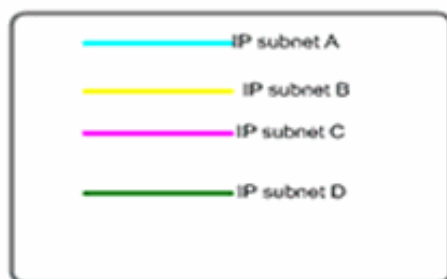
[Схема сети](#)

В настоящем документе используется следующая схема сети:

Рисунок 2 – топология 3



Topology 3 - PortChannel of two FCIP interfaces



Топология 3 изображает один Port Channel FCIP, сформированный двумя отдельными туннелями FCIP; интерфейсы между равноправными узлами через облако IP. Облако IP свернуто в один многоуровневый коммутатор (Catalyst 6500), который направляет трафик от подсети к подсети С и и от подсети С к подсети (и от подсети В к подсети D и от подсети D к подсети А). Подсети определены следующим образом:

- Подсеть А: 100.100.100.0/30 - Bison int Gig4/1
- Подсеть В: 100.100.100.4/30 - Bison int Gig4/2
- Подсеть С: 200.200.200.0/30-Кентербери Gig2/1
- Подсеть D: 200.200.200.4/30 - Кентербери Gig2/2

Топология предоставляет известную **Максимальную пропускную способность 100 Мбит/с** и **Минимальную пропускную способность 100 Мбит/с**, которая является профилем, работающим для нашего соответствующего IP - трафика через это облако IP. Начальная конфигурация показывает аспекты основанного на FCIP создания условий Канализирования и Трафика TCP порта. В последующих разделах FSF, Пассивные интерфейсы TCP и Метка времени FCIP будут объяснены далее.

Конфигурации

Эти конфигурации используются в данном документе:

- [\(Бизон\) MDS 9509 с модулем IPS-8](#)

- [\(Кентербери\) MDS 9612 с модулем IPS-8](#)

(Бизон) MDS 9509 с модулем 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.
```

- Для получения дополнительной информации на PMTU, обратитесь к [RFC 1191 - Обнаружение MTU-маршрута](#).
- Для получения дополнительной информации на SACK, обратитесь к [RFC 2018 - TCP Выборочные Опции Подтверждения](#) и [RFC 2883 - Расширение к Выборочному Подтверждению \(SACK\) Опция для TCP](#)

(Кентербери) MDS 9216 с модулем 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 fcl/1 interface fcl/2 interface fcl/3
interface fcl/4 interface fcl/5 interface fcl/6
interface fcl/7 interface fcl/8 interface fcl/9
interface fcl/10 interface fcl/11 interface fcl/12
interface fcl/13 interface fcl/14 interface fcl/15
interface fcl/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
```

Проверка

Этот раздел позволяет убедиться, что конфигурация работает правильно.

[Средство Output Interpreter \(OIT\) \(только для зарегистрированных клиентов\) поддерживает определенные команды show.](#) Посредством OIT можно анализировать выходные данные команд show.

- **show interface gig x/y** — Отображает статус соответствующего Гигабитного интерфейса, связанного с профилем FCIP.
- **покажите, что int gig tcp ips stat x/y** — Отображает статистику TCP и активные соединения для соответствующего Гигабитного интерфейса.
- **покажите, что ips arp int gig x/y** — Отображает все записи Протокола ARP для соответствующего Гигабитного интерфейса; следующий переход или узел должны присутствовать в этом списке.
- **покажите, что int gig ip route ips x/y** — Отображает определенные маршруты, идущие через соответствующий Гигабитный интерфейс.
- **show interface fcip x** — Отображает статус интерфейса FCIP и все подробные данные, отнесенные в этот туннель FCIP.
- **покажите, что профиль fcip x** — Отображает IP-адрес, с которым профиль связан и все настроенные параметры TCP.
- **покажите интервал fcip x счетчики** — Используемый к проверке, если существуют какие-либо кадры, проходящие туннель FCIP.
- **покажите, что fcdomain vsan x** — Перечисляет все связанные с доменом подробные данные; используемый, чтобы проверить, что матрица сформирована через туннель (туннели) FCIP.
- **покажите, что fcns da vsan x** — Отображает весь rwwn, FC4-типы и FCID соответствующего VSAN; используемый, чтобы проверить, что все ожидаемые записи распределены через туннель (туннели) FCIP.

Устранение неполадок

Используйте этот раздел для устранения неполадок своей конфигурации.

Обязательно выполните **команды показа** многократно для построения встречной истории. Счетчики, которые не отнесены к моменту времени и просто собраны только однажды, главным образом бесполезны.

Используйте конфигурации, показанные ниже для дальнейшего устранения проблем.

- [\(Бизон\) MDS 9509](#)
- [\(Кентербери\) MDS 9216](#)
- [Специальная конфигурация кадра \(бизон\)](#)
- [Специальная конфигурация кадра \(Кентербери\)](#)
- [Показ от Бизона и Кентербери - пассивный статус Canterbury](#)
- [Показ от Бизона и Кентербери - Метка времени установлен](#)

(Бизон) MDS 9509

```

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 fcipl-2 fcipl 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 -----
-----

```

(Кентербери) MDS 9216

```
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.

```

Специальная конфигурация кадра (бизон)

```

!--- 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
```

Специальная конфигурация кадра (Кентербери)

```
interface fcipl
channel-group 2 force
no shutdown
use-profile 200
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 peer-info ipaddr 100.100.100.5 special-
frame peer-wnn 20:00:00:05:30:00:7a:de profile-id 2
canterbury# sh int fcip 1 fcipl 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

```

Показ от Бизона и Кентербери - пассивный статус Canterbury

```

interface fcip1
channel-group 2 force
no shutdown
use-profile 200
passive-mode peer-info ipaddr 100.100.100.1 special-
frame peer-wnn 20:00:00:05:30:00:7a:de profile-id 1
interface fcip2 channel-group 2 force no shutdown use-
profile 201 passive-mode peer-info ipaddr 100.100.100.5
special-frame peer-wnn 20:00:00:05:30:00:7a:de profile-
id 2 canterbury# sh ips stats tcp int gig 2/1 TCP
Statistics for port GigabitEthernet2/1 Connection Stats
20 active openings, 14 accepts 14 failed attempts, 0
reset received, 14 established Segment stats 12042719
received, 3181301 sent, 0 retransmitted 0 bad segments

```

```

received, 0 reset sent TCP Active Connections Local
Address Remote Address State Send-Q Recv-Q
200.200.200.1:3225 100.100.100.1:65368 ESTABLISH 0 0
200.200.200.1:3225 100.100.100.1:65370 ESTABLISH 0 0
200.200.200.1:3225 100.100.100.1:65372 TIME_WAIT 0 0
200.200.200.1:3225 0.0.0.0:0 LISTEN 0 0 !--- Both FCIP
interfaces for Canterbury are configured to be passive;
this !--- results in the above TCP statistics where
Canterbury, despite being !--- configured with the
highest IP addresses for both tunnels, did not !---
initiate the TCP connections. Its peer, Bison,
initiates. canterbury# sh ips stats tcp int gig 2/2 TCP
Statistics for port GigabitEthernet2/2 Connection Stats
500 active openings, 4 accepts 498 failed attempts, 0
reset received, 6 established Segment stats 11933351
received, 3144627 sent, 0 retransmitted 0 bad segments
received, 0 reset sent TCP Active Connections Local
Address Remote Address State Send-Q Recv-Q
200.200.200.5:3225 100.100.100.5:65415 ESTABLISH 0 0
200.200.200.5:3225 100.100.100.5:65417 ESTABLISH 0 0
200.200.200.5:64535 100.100.100.5:3225 TIME_WAIT 0 0
200.200.200.5:3225 0.0.0.0:0 LISTEN 0 0

```

Показ от Бизона и Кентербери - Метка времени установлен

```

!--- 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
```

Дополнительные сведения

- [Главная страница T11](#)
- [Проблемы в перезапуске slowstart TCP после простаивающий](#)
- [Обнаружение MTU маршрута RFC 1191](#)
- [RFC 1323 - расширения TCP для высокой производительности](#)
- [RFC 2018 - TCP выборочные опции подтверждения](#)
- [RFC 2883 - расширение к выборочному подтверждению \(SACK\) опция для TCP](#)
- [RFC 3821 - стандарт Fibre Channel через TCP/IP \(FCIP\)](#)
- [Cisco Systems – техническая поддержка и документация](#)