تكوين MDS إلى MDS متقن باستخدام FCIP

المحتويات

المقدمة

يقدم هذا المستند نموذجا لتكوين القناة الليفية المتقنة عبر محول الموجه متعدد الطبقات (MDS) عبر TCP/IP (FCIP) إلى MDS.

تصف FCIP الآليات التي تسمح بالترابط بين جزر شبكات منطقة التخزين (SAN) التي تعمل عبر القنوات الليفية (FC) عبر الشبكات القائمة على بروتوكول الإنترنت لتكوين شبكة منطقة تخزين (SAN) موحدة في بنية تعمل عبر القنوات الليفية (FC). تعتمد FCIP على خدمات الشبكة المستندة إلى IP لتوفير الاتصال بين جزر SAN عبر الشبكات المحلية أو شبكات المناطق الحضرية أو الشبكات الواسعة.

الشكل 1 - شبكات منطقة التخزين (SAN) ذات القنوات الليفية المتصلة بواسطة FCIP
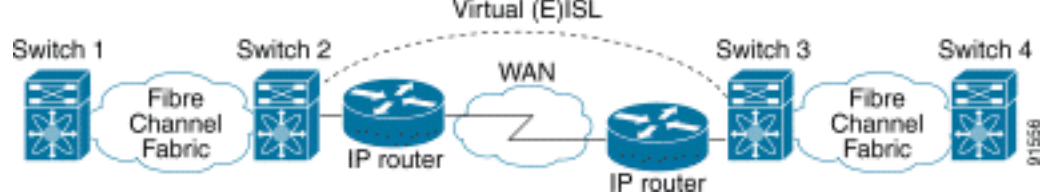
يستخدم FCIP بروتوكول التحكم في الإرسال (TCP) على المنفذ 3225 كنقل من طبقة الشبكة.

المتطلبات الأساسية

المتطلبات

تأكد من استيفاء المتطلبات التالية قبل أن تحاول إجراء هذا التكوين:

• يجب أن يكون العمود الفقري لبروتوكول الإنترنت في وضع التشغيل وأن يوفر النطاق الترددي المطلوب لدعم

التطبيقات التي تعمل عبر إرتباطات بروتوكول FCIP - قد يكون هذا هو مخطط الطبقة 2 (L2) أو الطبقة 3 (L3).

• إذا كان مخطط L3، فيجب إعداد الموجهات الوسيطة أو المحولات متعددة الطبقات وتكوينها لإعادة توجيه حركة مرور IP بشكل مناسب بين عناوين IP للمصدر والوجهة لأنفاق FCIP. إذا تم فرض جودة الخدمة (QoS) أو تنظيم حركة مرور البيانات على أي جهاز شبكة في المسار بين نظائر FCIP، فيجب إستشارة مدير الشبكة الذي يدير البنية الأساسية ل IP للحصول على التفاصيل الضرورية قبل تكوين أي معلومات ومميزات مرتبطة ب TCP على ملف تعريف FCIP لمحول المدير متعدد الطبقات (MDS).

• يجب أن تدعم محولات الإيثرنت المجاورة ل MDSs وأن يتم تكوينها لتوصيل 802.1Q إذا تم تكوين الواجهات الفرعية على وحدة خدمات تخزين (IP (IPS ل MDS.

المكونات المستخدمة

تستند المعلومات الواردة في هذا المستند إلى إصدارات البرامج والمكونات المادية التالية:

• MDS 9509 مع الوحدة النمطية لخدمة IPS (DS-X9308-SMIP) التي تشغل الإصدار 1.2(2a).
• MDS 9216 مع الوحدة النمطية لخدمة IPS (DS-X9308-SMIP) التي تشغل الإصدار 1.2(2a).
• مادة حفازة 6509 أن يركض مادة حفازة 7.4(3) (CatOS) (os)
• خادم HPQ Pro-P4 (Win2003) مع Emulex LP9K HBA
• صفيف تخزين IBM (ESS-2105-F20)

تم إنشاء المعلومات الواردة في هذا المستند من الأجهزة الموجودة في بيئة معملية خاصة. بدأت جميع الأجهزة المستخدمة في هذا المستند بتكوين ممسوح (افتراضي). إذا كانت شبكتك مباشرة، فتأكد من فهمك للتأثير المحتمل لأي أمر.

الاصطلاحات

راجع [اصطلاحات تلميحات Cisco التقنية للحصول على مزيد من المعلومات حول اصطلاحات المستندات.](#)

معلومات أساسية

تتكون FCIP من المواصفات التالية:

ANSI T11

1. يصف FC-SW-2 التشغيل والتفاعل بين محولات FC بما في ذلك E_Port وعملية البنية.
2. FC-BB-2 هي تخطيط يتعلق بتوسيع الشبكات المحولة عبر FC عبر العمود الفقري لشبكة TCP، ويحدد النماذج المرجعية التي تدعم E_Port و B_Port.

مجموعة العمل IETF IPS

1. يغطي FC عبر TCP متطلبات TCP/IP لنقل إطارات FC عبر شبكة IP.
2. تعرف عملية تضمين الإطار FC تنسيق تضمين الألياف الشائع.

يطلق على أي اتصال بيني بين محولين أو بنى SAN عبر FCIP إرتباط FCIP ويمكن أن يحتوي على اتصال TCP واحد أو أكثر. يقترن كل طرف من رابط FCIP بمنفذ E ظاهري (VE_Port) أو B_Port، حسب التنفيذ. ويصف كل من FC-BB و FC-BB-2 الفروق بين النهجين. تدعم وحدة خدمات IPS (DS-X9308-SMIP) كلا الوضعين ولكن الافتراضي إلى VE_Port، وهو أيضا الوضع الموصى به للتشغيل إذا كان جميع النظراء المعنيين هم وحدات -DS X9308-SMIP. في مخطط العينة هذا، تتم مناقشة معلمات FCIP عبر PortChannels، و TCP التي يجب تكوينها، و FSF (الإطار الخاص) الخاص.

التكوين

في هذا القسم، تُقدّم لك معلومات تكوين الميزات الموضحة في هذا المستند.

في MDSs، يلزمك أن تعتاد على أدلة تكوين IPS الخاصة بكل من النظامين الأساسيين. يمكنك العثور على أحدث إصدار من الأدلة في تكوين تخزين IP على Cisco.com.

ملاحظة: أستخدم أداة بحث الأوامر (للعملاء المسجلين فقط) للعثور على مزيد من المعلومات حول الأوامر المستخدمة في هذا المستند.

الرسم التخطيطي للشبكة

يستخدم هذا المستند إعداد الشبكة التالي:

الشكل 2 - المخطط 3
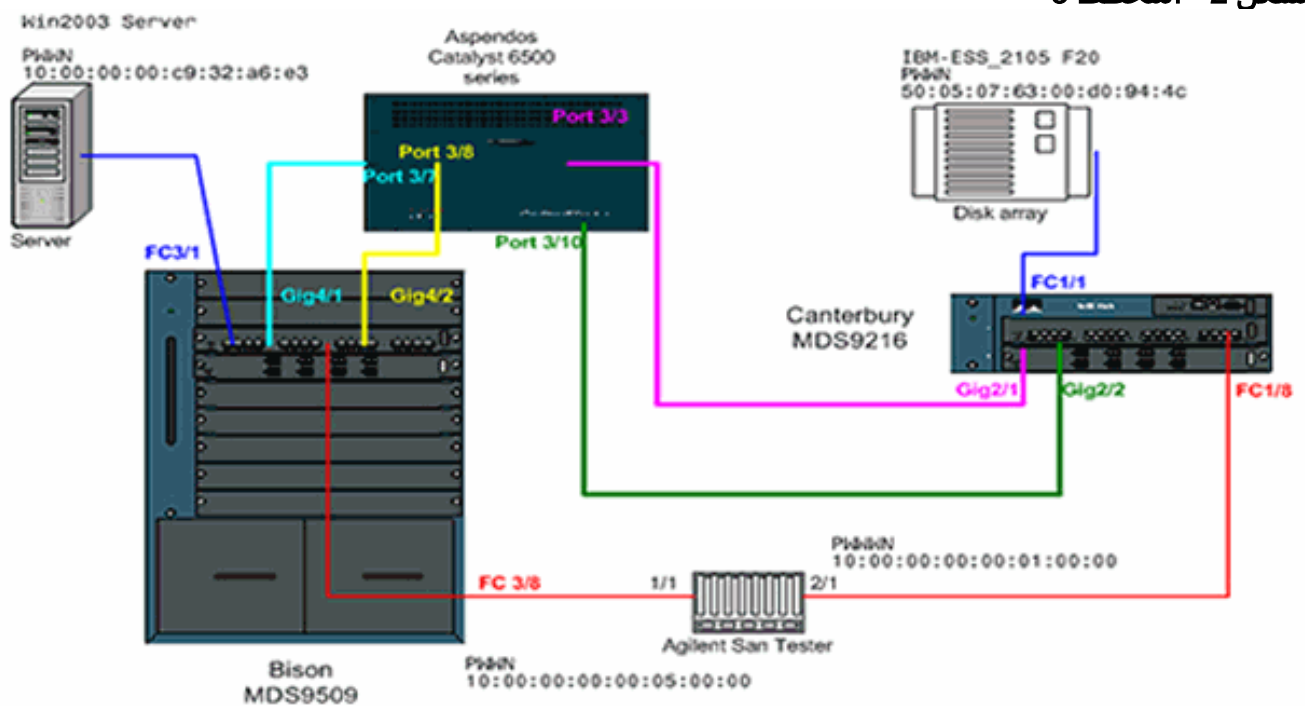
Topology 3 - PortChannel of two FCIP interfaces
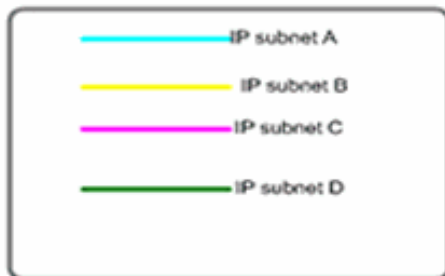
يصف المخطط 3 قناة منفذ FCIP واحدة مكونة من نفقين فرديين FCIP، وتكون واجهات النظير عبر سحابة IP. يتم تقسيم سحابة IP إلى محول متعدد الطبقات (6500 Catalyst) واحد يقوم بتوجيه حركة مرور البيانات من الشبكة الفرعية A إلى الشبكة الفرعية C ومن الشبكة الفرعية C إلى الشبكة الفرعية A (ومن الشبكة الفرعية B إلى الشبكة الفرعية D ومن الشبكة الفرعية D إلى الشبكة الفرعية A). يتم تحديد الشبكات الفرعية على النحو التالي:

- الشبكة الفرعية A: 100.100.100.0/30 - Bison int Gig4/1
- الشبكة الفرعية B: 100.100.100.4/30 - Bison int Gig4/2

<div dir="rtl">

- الشبكة الفرعية Canterbury Gig2/1 -200.200.200.0/30 :C
- الشبكة الفرعية Canterbury GIG2/2 - 200.200.200.4/30 :D

توفر البنية **الحد الأقصى لعرض النطاق الترددي من 100 ميجابت في الثانية** والحد الأدنى **لعرض النطاق الترددي من 100 ميجابت في الثانية**، وهو ملف التعريف الذي يتم تشغيله لحركة مرور IP ذات الصلة من خلال شبكة IP هذه . يبدي التشكيل أولى جانب من FCIP-based ميناء يقني و TCP حركة مرور تكييف. في الأقسام التالية FSF، سيتم شرح واجهات TCP الخاملة والطابع الزمني لـ FCIP بشكل إضافي.

التكوينات

يستخدم هذا المستند التكوينات التالية:

- [MDS 9509 (Bison) مع وحدة IPS-8](#)
- [MDS 9612 (Canterbury) مع وحدة IPS-8](#)

</div>

<div dir="rtl">

| MDS 9509 (Bison) مع وحدة IPS-8 |
</div>

```
bison# sh ver
Cisco Storage Area Networking Operating System (SAN-OS)
Software
TAC support: http://www.cisco.com/tac
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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
```

- لمزيد من التفاصيل حول PMTU، ارجع إلى [RFC 1191 - اكتشاف وحدة الحد الأقصى للنقل (MTU) للمسار](#) .
- لمزيد من التفاصيل حول المكدس، ارجع إلى [خيارات الإقرار الانتقائي لبروتوكول TCP](#) و[RFC 2883 - امتداد لخيار الإقرار الانتقائي (SACK) لبروتوكول TCP](#)

IPS-8 مع وحدة (MDS 9216 (Canterbury

```
                                                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
```

التحقق من الصحة

استخدم هذا القسم لتأكيد عمل التكوين بشكل صحيح.

تدعم أداة مترجم الإخراج (للعملاءالمسجلين فقط) بعض أوامر show. استخدم أداة مترجم الإخراج (OIT) لعرض تحليل مُخرَج الأمر show .

- show interface gig *x/y* — *يعرض حالة واجهة جيجابت ذات الصلة المرتبطة بملف تعريف FCIP.*
- show ips stats tcp int gig *x/y* — يعرض إحصائيات TCP والاتصالات النشطة لواجهة جيجابت ذات الصلة.
- show ips arp int gig *x/y* — يعرض كل إدخالات بروتوكول تحليل العنوان (ARP) لواجهة جيجابت ذات الصلة، الخطوة التالية أو النظير الذي يجب أن يكون موجودا في هذه القائمة.
- show ips ip route int gig *x/y* — يعرض المسارات المحددة التي تمر عبر واجهة جيجابت ذات الصلة.
- show interface fcip *x* يعرض — *حالة واجهة FCIP وجميع التفاصيل المتعلقة بنفق FCIP هذا.*
- show profile fcip *x* يعرض — *عنوان IP الذي يرتبط به التوصيف وجميع معلمات TCP التي تم تكوينها.*
- show int fcip *x* counters — يستخدم للتحقق من وجود أي إطارات تمر عبر نفق FCIP.
- show fcdomain vsan *x* — يسرد جميع التفاصيل المتعلقة بالمجال، والتي يتم إستخدامها للتحقق من تكوين البنية عبر نفق (نفق) FCIP.
- show fcns da vsan *x* — *يعرض جميع معرفات فئات PWWN و FC4 و FCIDs الخاصة بشبكة منطقة التخزين (VSAN) ذات الصلة، ويتم إستخدامها للتحقق من توزيع جميع الإدخالات المتوقعة عبر نفق (أنفاق) FCIP.*

استكشاف الأخطاء وإصلاحها

أستخدم هذا القسم لاستكشاف أخطاء التكوين وإصلاحها.

تأكد من إصدار أوامر show عدة مرات لإنشاء محفوظات العداد. العدادات التي لا تتعلق بنقطة في الوقت وتم تجميعها مرة واحدة فقط هي في الغالب عديمة الفائدة.

أستخدم التكوينات الموضحة أدناه لمزيد من أستكشاف الأخطاء وإصلاحها.

- MDS 9509 (البيسون)
- MDS 9216 (كانتربري)
- تكوين الإطارات الخاصة (Bison)
- تكوين الإطارات الخاصة (Canterbury)
- عرض سليم من بيسون وكانتربري - كانتربري
- عرض من بيسون وكانتربري - مجموعة الطابع الزمني

MDS 9509 (البيسون)

```
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
minutes input rate 312 bits/sec, 39 bytes/sec, 0 5
                                    frames/sec
minutes output rate 312 bits/sec, 39 bytes/sec, 0 5
                                    frames/sec
           packets input, 976566 bytes 8685
           multicast frames, 0 compressed 0
      input errors, 0 frame, 0 overrun 0 fifo 0
   packets output, 972382 bytes, 0 underruns 8679
         output errors, 0 collisions, 0 fifo 0
                            carrier errors 0


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
minutes input rate 16 bits/sec, 2 bytes/sec, 0 5
                                    frames/sec
minutes output rate 16 bits/sec, 2 bytes/sec, 0 5
                                    frames/sec
           packets input, 46496 bytes 590
           multicast frames, 0 compressed 0
      input errors, 0 frame, 0 overrun 0 fifo 0
    packets output, 30898 bytes, 0 underruns 547
         output errors, 0 collisions, 0 fifo 0
                            carrier errors 0


bison# sh ips stats tcp int gig 4/1

TCP Statistics for port GigabitEthernet4/1
                          Connection Stats
               active openings, 4 accepts 14
       failed attempts, 0 reset received, 14 4
                                    established
                             Segment stats
        received, 8505 sent, 0 retransmitted 8897
          bad segments received, 0 reset sent 0


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

```
       LISTEN              0.0.0.0:0    100.100.100.1:3225
                                                 0          0

                    bison# sh ips stats tcp int gig 4/2

              TCP Statistics for port GigabitEthernet4/2
                                    Connection Stats
                       active openings, 0 accepts 2
failed attempts, 0 reset received, 2 established 0
                                    Segment stats
             received, 43 sent, 0 retransmitted 598
             bad segments received, 0 reset sent 0


                             TCP Active Connections
        Local Address        Remote Address       State
                                           Send-Q  Recv-Q
  ESTABLISH  200.200.200.5:3225  100.100.100.5:65531
                                                 0          0

  ESTABLISH  200.200.200.5:3225  100.100.100.5:65533
                                                 0          0

     LISTEN              0.0.0.0:0    100.100.100.5:3225
                                                 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
                    Active TCP connections 2
     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
     Attempts for active connections, 7 close of 28
                                      connections
                              TCP Parameters
                       Path MTU 3000 bytes
        Current retransmission timeout is 200 ms
        Round trip time: Smoothed 5 ms, Variance: 6
   Advertised window: Current: 118 KB, Maximum: 118
                                  KB, Scale: 1
Peer receive window: Current: 118 KB, Maximum: 118
                                  KB, Scale: 1
```

```
                 Congestion window: Current: 10 KB, Slow start
                                              threshold: 118 KB
minutes input rate 120 bits/sec, 15 bytes/sec, 0 5
                                                     frames/sec
 minutes output rate 120 bits/sec, 15 bytes/sec, 5
                                                0 frames/sec
                   frames input, 379836 bytes 4077
          Class F frames input, 379100 bytes 4071
            Class 2/3 frames input, 736 bytes 6
              Error frames timestamp error 0 0
                frames output, 381064 bytes 4077
          Class F frames output, 380364 bytes 4071
             Class 2/3 frames output, 700 bytes 6
                  Error frames 0 reass frames 0


                                        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
                    Active TCP connections 2
   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
      Attempts for active connections, 0 close of 2
                                          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
  minutes input rate 32 bits/sec, 4 bytes/sec, 0 5
                                          frames/sec
 minutes output rate 32 bits/sec, 4 bytes/sec, 0 5
                                          frames/sec
                   frames input, 1232 bytes 8
           Class F frames input, 1232 bytes 8
           Class 2/3 frames input, 0 bytes 0
             Error frames timestamp error 0 0
```

```
                                      frames output, 1228 bytes 8
                 Class F frames output, 1228 bytes 8
                 Class 2/3 frames output, 0 bytes 0
                     Error frames 0 reass frames 0


                                     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
  minutes input rate 120 bits/sec, 15 bytes/sec, 0 5
                                           frames/sec
  minutes output rate 120 bits/sec, 15 bytes/sec, 0 5
                                           frames/sec
                 frames input, 369812 bytes 3969
           Class F frames input, 369076 bytes 3963
             Class 2/3 frames input, 736 bytes 6
                Error frames timestamp error 0 0
```

```
                     frames output, 371040 bytes 3969
           Class F frames output, 370340 bytes 3963
             Class 2/3 frames output, 700 bytes 6
               Error frames 0 reass frames 0
                                   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 (كانتربري)

```
                                 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
    minutes input rate 320 bits/sec, 40 bytes/sec, 0 5
                                               frames/sec
   minutes output rate 320 bits/sec, 40 bytes/sec, 0 5
                                               frames/sec
                   packets input, 993118 bytes 8844
                   multicast frames, 0 compressed 0
           input errors, 0 frame, 0 overrun 0 fifo 0
         packets output, 994686 bytes, 0 underruns 8855
                 output errors, 0 collisions, 0 fifo 0
                                   carrier errors 0


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


           canterbury# sh ips stats tcp int gig 2/1

          TCP Statistics for port GigabitEthernet2/1
                                    Connection Stats
                active openings, 10 accepts 18
         failed attempts, 0 reset received, 8 14
                                            established
                                     Segment stats
      received, 8923 sent, 0 retransmitted 8919
         bad segments received, 0 reset sent 0


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


           canterbury# sh ips stats tcp int gig 2/2

          TCP Statistics for port GigabitEthernet2/2
                                    Connection Stats
                active openings, 2 accepts 498
         failed attempts, 0 reset received, 2 498
                                            established
                                     Segment stats
       received, 579 sent, 0 retransmitted 556
         bad segments received, 0 reset sent 0


                               TCP Active Connections
      Local Address        Remote Address        State
                                         Send-Q  Recv-Q
 ESTABLISH  100.100.100.5:65531  200.200.200.5:3225
                                             0        0
 ESTABLISH  100.100.100.5:65533  200.200.200.5:3225
                                             0        0
    LISTEN           0.0.0.0:0  200.200.200.5:3225
                                             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
                       Active TCP connections 2
      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
      Attempts for active connections, 2 close of 18
                                         connections
                                     TCP Parameters
                            Path MTU 3000 bytes
         Current retransmission timeout is 200 ms
        Round trip time: Smoothed 5 ms, Variance: 6
  Advertised window: Current: 118 KB, Maximum: 118
                                     KB, Scale: 1
Peer receive window: Current: 118 KB, Maximum: 118
                                     KB, Scale: 1
     Congestion window: Current: 10 KB, Slow start
                                   threshold: 112 KB
minutes input rate 136 bits/sec, 17 bytes/sec, 0 5
                                          frames/sec
  minutes output rate 136 bits/sec, 17 bytes/sec, 5
                                      0 frames/sec
                    frames input, 391368 bytes 4189
            Class F frames input, 390668 bytes 4183
               Class 2/3 frames input, 700 bytes 6
               Error frames timestamp error 0 0
                   frames output, 390140 bytes 4189
           Class F frames output, 389404 bytes 4183
             Class 2/3 frames output, 736 bytes 6
                   Error frames 0 reass frames 0


                                     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
                                 Active TCP connections 2
        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
        Attempts for active connections, 0 close of 498
                                                 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
   minutes input rate 0 bits/sec, 0 bytes/sec, 0 5
                                             frames/sec
  minutes output rate 0 bits/sec, 0 bytes/sec, 0 5
                                             frames/sec
                      frames input, 1228 bytes 8
               Class F frames input, 1228 bytes 8
               Class 2/3 frames input, 0 bytes 0
               Error frames timestamp error 0 0
                    frames output, 1232 bytes 8
             Class F frames output, 1232 bytes 8
             Class 2/3 frames output, 0 bytes 0
                 Error frames 0 reass frames 0


                        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
   minutes input rate 120 bits/sec, 15 bytes/sec, 0 5
                                             frames/sec
  minutes output rate 120 bits/sec, 15 bytes/sec, 0 5
                                             frames/sec
                  frames input, 394068 bytes 4213
           Class F frames input, 393368 bytes 4207
               Class 2/3 frames input, 700 bytes 6
               Error frames timestamp error 0 0
```

```
                         frames output, 392844 bytes 4213
              Class F frames output, 392108 bytes 4207
                 Class 2/3 frames output, 736 bytes 6
                     Error frames 0 reass frames 0
                                        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
```

تكوين الإطارات الخاصة (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
                             Active TCP connections 2
       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
     Attempts for active connections, 9 close of 82
                                                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
         minutes input rate 46128 bits/sec, 5766 5
                              bytes/sec, 19 frames/sec
```

```
minutes output rate 194867736 bits/sec, 24358467 5
                          bytes/sec, 20732 frames/sec
                 frames input, 1729836 bytes 5841
        Class F frames input, 429444 bytes 4575
      Class 2/3 frames input, 1300392 bytes 1266
             Error frames timestamp error 0 0
        frames output, 7447938520 bytes 6339146
       Class F frames output, 431800 bytes 4576
      Class 2/3 frames output, 7447506720 6334570
                                                  bytes
               Error frames 0 reass frames 0


                                 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
                       Active TCP connections 2
    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
     Attempts for active connections, 1 close of 58
                                          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
   minutes input rate 0 bits/sec, 0 bytes/sec, 0 5
                                          frames/sec
  minutes output rate 0 bits/sec, 0 bytes/sec, 0 5
                                          frames/sec
                 frames input, 398160 bytes 415
           Class F frames input, 2460 bytes 16
        Class 2/3 frames input, 395700 bytes 399
             Error frames timestamp error 0 0
          frames output, 7147327176 bytes 6078322
```

```
        Class F frames output, 2460 bytes 16
 Class 2/3 frames output, 7147324716 6078306
                                        bytes
         Error frames 0 reass frames 0
```

تكوين الإطارات الخاصة (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
                     Active TCP connections 2
      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
      Attempts for active connections, 0 close of 2
                                    connections
                              TCP Parameters
                          Path MTU 3000 bytes
          Current retransmission timeout is 200 ms
        Round trip time: Smoothed 2 ms, Variance: 1
   Advertised window: Current: 118 KB, Maximum: 118
```

```
                                                          KB, Scale: 1
Peer receive window: Current: 118 KB, Maximum: 118
                                                          KB, Scale: 1
        Congestion window: Current: 10 KB, Slow start
                                              threshold: 112 KB
  minutes input rate 94347400 bits/sec, 11793425 5
                                    bytes/sec, 10031 frames/sec
 minutes output rate 144 bits/sec, 18 bytes/sec, 5
                                                      0 frames/sec
              frames input, 4685834196 bytes 3985861
           Class F frames input, 25228 bytes 219
Class 2/3 frames input, 4685808968 bytes 3985642
                Error frames timestamp error 0 0
                 frames output, 866780 bytes 1043
           Class F frames output, 23448 bytes 218
        Class 2/3 frames output, 843332 bytes 825
                  Error frames 0 reass frames 0


                               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
                    Active TCP connections 2
     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
    Attempts for active connections, 0 close of 500
                                          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
  minutes input rate 94399712 bits/sec, 11799964 5
```

```
                                     bytes/sec, 10034 frames/sec
     minutes output rate 0 bits/sec, 0 bytes/sec, 0 5
                                               frames/sec
          frames input, 11486944196 bytes 9769115
            Class F frames input, 2460 bytes 16
     Class 2/3 frames input, 11486941736 9769099
                                                    bytes
              Error frames timestamp error 0 0
                 frames output, 398160 bytes 415
           Class F frames output, 2460 bytes 16
       Class 2/3 frames output, 395700 bytes 399
                 Error frames 0 reass frames 0
```

عرض سلبي من بيسون وكانتربري - كانتربري

```
                                       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
                    active openings, 14 accepts 20
         failed attempts, 0 reset received, 14 14
                                            established
                                       Segment stats
 received, 3181301 sent, 0 retransmitted 12042719
           bad segments received, 0 reset sent 0


                                TCP Active Connections
     Local Address       Remote Address       State
                                            Send-Q  Recv-Q
 ESTABLISH  100.100.100.1:65368  200.200.200.1:3225
                                             0         0
 ESTABLISH  100.100.100.1:65370  200.200.200.1:3225
                                             0         0
 TIME_WAIT  100.100.100.1:65372  200.200.200.1:3225
                                             0         0
    LISTEN            0.0.0.0:0  200.200.200.1:3225
                                             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
              active openings, 4 accepts 500
      failed attempts, 0 reset received, 6 498
                                    established
                                  Segment stats
received, 3144627 sent, 0 retransmitted 11933351
         bad segments received, 0 reset sent 0


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

عرض من بيسون وكانتربري - مجموعة الطابع الزمني

```
!--- 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
                      Active TCP connections 2
    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
    Attempts for active connections, 10 close of 84
                                          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
  minutes input rate 0 bits/sec, 0 bytes/sec, 0 5
                                          frames/sec
  minutes output rate 0 bits/sec, 0 bytes/sec, 0 5
                                          frames/sec
                  frames input, 1743840 bytes 5988
         Class F frames input, 443184 bytes 4719
       Class 2/3 frames input, 1300656 bytes 1269
                 Error frames timestamp error 0 0
         frames output, 18028320932 bytes 15337275
         Class F frames output, 445544 bytes 4720
    Class 2/3 frames output, 18027875388 15332555
                                                 bytes
                Error frames 0 reass frames 0


  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
Active TCP connections 2
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
Attempts for active connections, 0 close of 2
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
minutes input rate 0 bits/sec, 0 bytes/sec, 0 5
frames/sec
minutes output rate 0 bits/sec, 0 bytes/sec, 0 5
frames/sec
```

```
                  frames input, 11084654892 bytes 9427366
            Class F frames input, 32716 bytes 295
      Class 2/3 frames input, 11084622176 9427071
                                                    bytes
     Error frames timestamp error 145359 145359
                 frames output, 874528 bytes 1122
           Class F frames output, 30932 bytes 294
       Class 2/3 frames output, 843596 bytes 828
                 Error frames 0 reass frames 0
```

معلومات ذات صلة

- [الصفحة الرئيسية للطراز T11](#)
- [مشاكل في إعادة تشغيل TCP البطيئة بعد الخمول](#)
- [المعيار RFC 1191 - اكتشاف مسار وحدات الحد الأقصى للنقل (MTU)](#)
- [المعيار RFC 1323 - امتدادات بروتوكول TCP لتوفير أداء فائق](#)
- [المعيار RFC 2018 - خيارات الإقرار الانتقائي لبروتوكول TCP](#)
- [RFC 2883 - امتداد لخيار الإقرار الانتقائي (SACK) لبروتوكول TCP](#)
- [المعيار RFC 3821 - قناة ليفية عبر بروتوكول TCP/IP (بروتوكول FCIP)](#)
- [الدعم التقني والمستندات - Cisco Systems](#)

حول هذه الترجمة

ترجمت Cisco هذا المستند باستخدام مجموعة من التقنيات الآلية
والبشرية لتقديم دعم للمستخدمين في جميع أنحاء العالم
بمحتوى الدعم الخاص بهم بلغتهم الأم. يُرجى ملاحظة أن أفضل ترجمة آلية لن تكون دقيقة كما
هو الحال مع الترجمة الاحترافية التي يقدمها مترجم محترف. تخلي Cisco
Systems مسؤوليتها عن دقة هذه الترجمات وتوصي بالرجوع دائمًا إلى
المستند الإنجليزي الأصلي (الرابط متوفر).