تكوين IPSec بين محول عبارة الوصول Catalyst 4224 وموجه Cisco IOS

المحتويات

المقدمة

يوضح هذا المستند نموذج تكوين IPSec بين محول عبارة الوصول Cisco Catalyst 4224 وموجه Cisco الذي يشغل برنامج Cisco IOS®. يتم التشفير بين شبكة VLAN1 لبوابة الوصول (حيث يتم تطبيق خريطة التشفير) وواجهة FastEthernet0/1 للموجه.

المتطلبات الأساسية

المتطلبات

لا توجد متطلبات أساسية خاصة لهذا المستند.

المكونات المستخدمة

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

- برنامج IOS الإصدار 12.2(1)14 من Cisco
- برنامج IOS c4224 12.2(2)YC1

تم إنشاء المعلومات المُقدمة في هذا المستند من الأجهزة الموجودة في بيئة معملية خاصة. بدأت جميع الأجهزة المُستخدمة في هذا المستند بتكوين ممسوح (افتراضي). إذا كنت تعمل في شبكة مباشرة، فتأكد من فهمك للتأثير المحتمل لأي أمر قبل استخدامه.

الاصطلاحات

للحصول على مزيد من المعلومات حول اصطلاحات المستندات، ارجع إلى اصطلاحات تلميحات Cisco التقنية.

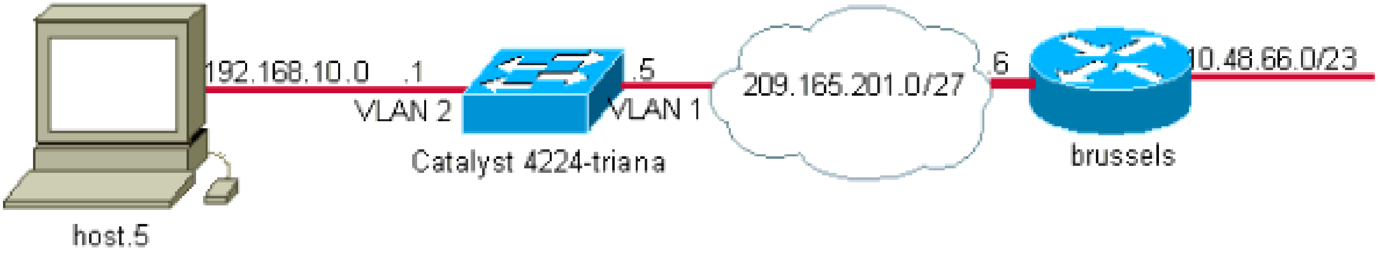
التكوين

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

ملاحظة: للعثور على معلومات إضافية حول الأوامر المستخدمة في هذا المستند، أستخدم أداة بحث الأوامر (للعملاء المسجلين فقط).

الرسم التخطيطي للشبكة

يستخدم هذا المستند إعداد الشبكة التالي:



التكوينات

يستخدم هذا المستند التكوينات التالية:

- محول عبارة الوصول Catalyst 4224
- موجه IOS من Cisco

محول عبارة الوصول Catalyst 4224

```
<#root>

triana#

show version

Cisco Internetwork Operating System Software
IOS (tm) c4224 Software (c4224-IK9O3SX3-M), Version 12.2(2)YC1,
EARLY DEPLOYMENT RELEASE SOFTWARE (fc2)

26 FastEthernet/IEEE 802.3 interface(s)
2 Serial(sync/async) network interface(s)
2 Channelized E1/PRI port(s)

1 Virtual Private Network (VPN) Module(s)
```

```
!--- Access gateway has onboard encryption service adapter.

8 Voice FXS interface(s)
256K bytes of non-volatile configuration memory.
31744K bytes of processor board System flash (Read/Write)

Configuration register is 0x2102

triana#

show run


Building configuration...

Current configuration : 5111 bytes
!
! Last configuration change at 13:56:01 UTC Wed May 29 2002
! NVRAM config last updated at 13:56:03 UTC Wed May 29 2002
!
version 12.2
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname triana
!
no logging buffered
enable password ww
!
memory-size iomem 25

!--- Create the VLANS as required.


vlan 1
name default


vlan 3
name VLAN0003

!--- Create the VLANS as required.


vlan 2
name data


vlan 999
name VLAN0999
!
ip subnet-zero
no ip domain-lookup
!
ip audit notify log
ip audit po max-events 100
ip ssh time-out 120
ip ssh authentication-retries 3
isdn switch-type primary-net5
voicecard mode toll-by-pass
!
!
```

```
!
!
!
!
!
ccm-manager mgcp
!

!--- Define Phase 1 policy.

crypto isakmp policy 10
authentication pre-share
crypto isakmp key yoursecretkey address 209.165.201.6

!
!

!--- Define Phase 2 policy.

crypto ipsec transform-set basic esp-des esp-md5-hmac

crypto mib ipsec flowmib history tunnel size 200
crypto mib ipsec flowmib history failure size 200
!

!--- Define Phase 2 policy (continued). !--- Define the encryption peer and crypto map parameters.

crypto map mymap 10 ipsec-isakmp
set peer 209.165.201.6
set transform-set basic
match address cryptoacl

!
!
no spanning-tree optimize bpdu transmission
no spanning-tree vlan 1
no spanning-tree vlan 2
no spanning-tree vlan 3
!
controller E1 2/0
!
controller E1 2/1
!
translation-rule 1
Rule 0 ^... 1
!
translation-rule 2
Rule 0 ^10.. 0
Rule 1 ^11.. 1
Rule 2 ^12.. 2
Rule 3 ^13.. 3
Rule 4 ^14.. 4
Rule 5 ^15.. 5
Rule 6 ^16.. 6
Rule 7 ^17.. 7
Rule 8 ^18.. 8
Rule 9 ^19.. 9
```

```
!
translation-rule 6
Rule 0 ^112. 119
!
translation-rule 7
Rule 0 ^1212 1196
!
translation-rule 3
Rule 0 ^. 0
!
translation-rule 9
Rule 0 ^. 9
!
translation-rule 99
Rule 0 ^90.. 0
Rule 1 ^91.. 1
Rule 2 ^92.. 2
Rule 3 ^93.. 3
Rule 4 ^94.. 4
Rule 5 ^95.. 5
Rule 6 ^96.. 6
Rule 7 ^97.. 7
Rule 8 ^98.. 8
Rule 9 ^99.. 9
!
translation-rule 999
Rule 0 ^2186 1196
!
translation-rule 1122
Rule 0 ^1122 528001
Rule 1 ^1121 519352
!
translation-rule 20
Rule 0 ^000 500
!
!
!
interface Loopback0
no ip address
!
interface FastEthernet0/0
no ip address
duplex auto
speed auto
!
interface Serial1/0
no ip address
no fair-queue
!
interface Serial1/1
no ip address
!
interface FastEthernet5/0
no ip address
duplex auto
speed auto
!
interface FastEthernet5/1
no ip address
shutdown
duplex auto
speed auto
```

```
switchport voice vlan 3
spanning-tree portfast
!

!--- For the lab setup, a host is connected on this port.

interface FastEthernet5/2
no ip address
duplex auto
speed auto


!--- Place the port in VLAN 2.

switchport access vlan 2
spanning-tree portfast

!
interface FastEthernet5/3
no ip address
shutdown
duplex auto
speed auto
switchport access vlan 999
spanning-tree portfast
!
interface FastEthernet5/4
no ip address
duplex auto
speed auto
switchport access vlan 2
switchport voice vlan 3
spanning-tree portfast
!
interface FastEthernet5/5
no ip address
duplex auto
speed auto
!
interface FastEthernet5/6
no ip address
duplex auto
speed auto
!
interface FastEthernet5/7
no ip address
duplex auto
speed auto
!
interface FastEthernet5/8
no ip address
duplex auto
speed auto
!
interface FastEthernet5/9
no ip address
duplex auto
speed auto
!
```

```
interface FastEthernet5/10
no ip address
duplex auto
speed auto
switchport trunk allowed vlan 1-3
switchport mode trunk

!--- By default, the port belongs to VLAN 1.


interface FastEthernet5/11
no ip address
duplex auto
speed auto


!
interface FastEthernet5/12
no ip address
duplex auto
speed auto
!
interface FastEthernet5/13
no ip address
duplex auto
speed auto
!
interface FastEthernet5/14
no ip address
duplex auto
speed auto
!
interface FastEthernet5/15
no ip address
duplex auto
speed auto
!
interface FastEthernet5/16
no ip address
duplex auto
speed auto
!
interface FastEthernet5/17
no ip address
duplex auto
speed auto
!
interface FastEthernet5/18
no ip address
duplex auto
speed auto
!
interface FastEthernet5/19
no ip address
duplex auto
speed auto
!
interface FastEthernet5/20
no ip address
duplex auto
speed auto
!
```

```
interface FastEthernet5/21
 no ip address
 duplex auto
 speed auto
!
interface FastEthernet5/22
 no ip address
 duplex auto
 speed auto
!
interface FastEthernet5/23
 no ip address
 duplex auto
 speed auto
!
interface FastEthernet5/24
 no ip address
 duplex auto
 speed auto
!

!--- Define an IP address and apply crypto map to enable !--- IPSec processing on this interface.

interface Vlan 1
 ip address 209.165.201.5 255.255.255.224
 crypto map mymap

!

!--- Define an IP address for VLAN 2.

interface Vlan 2
 ip address 192.168.10.1 255.255.255.0

!
ip classless

ip route 10.48.66.0 255.255.254.0 209.165.201.6

no ip http server
!
!

ip access-list extended cryptoacl
 remark This is crypto ACL
 permit ip 192.168.10.0 0.0.0.255 10.48.66.0 0.0.1.255

call rsvp-sync
!
voice-port 4/0
 output attenuation 0
!
voice-port 4/1
 output attenuation 0
!
voice-port 4/2
 output attenuation 0
!
```

```
voice-port 4/3
 output attenuation 0
!
voice-port 4/4
 output attenuation 0
!
voice-port 4/5
 output attenuation 0
!
voice-port 4/6
 output attenuation 0
!
voice-port 4/7
 output attenuation 0
!
mgcp
no mgcp timer receive-rtcp
!
mgcp profile default
!
dial-peer cor custom
!
!
!
dial-peer voice 1 voip
!
dial-peer voice 2 pots
 shutdown
!
!
line con 0
 exec-timeout 0 0
 length 0
line vty 0 4
 password ww
 login
!
end

triana#
```

```
!--- Define a static crypto map entry for the remote PIX !--- with mode ipsec-isakmp. !--- This indica
```

التحقق من الصحة

يوفر هذا القسم معلومات يمكنك إستخدامها للتأكد من أن التكوين يعمل بشكل صحيح. يتم التحقق من عملية IPSec باستخدام أوامر debug. يتم محاولة إختبار اتصال موسع من الموجه إلى مضيف خلف بوابة الوصول.

يتم دعم بعض أوامر العرض بواسطة أداة مترجم الإخراج (العملاء المسجلون فقط)، والتي تتيح لك عرض تحليل إخراج أمر العرض.

- show debug—يعرض إعدادات تصحيح الأخطاء الحالية.
- show crypto isakmp sa— يعرض جميع اقترانات أمان IKE (SAs) الحالية في نظير.
- show crypto ipSec—يعرض الإعدادات المستخدمة من قبل SAs الحالية.

استكشاف الأخطاء وإصلاحها

يوفر هذا القسم معلومات يمكنك استخدامها لاستكشاف أخطاء التكوين وإصلاحها.

أوامر استكشاف الأخطاء وإصلاحها

ملاحظة: قبل إصدار أوامر تصحيح الأخطاء، يرجى الاطلاع على المعلومات المهمة في أوامر تصحيح الأخطاء.

- debug crypto ipSec—يعرض أحداث IPSec.
- debug crypto isakmp—يعرض الرسائل المتعلقة بأحداث IKE.
- debug crypto engine—يعرض معلومات من محرك التشفير.

تصحيح الأخطاء للعينة

يوفر هذا القسم إخراج تصحيح الأخطاء لعينة عبارة الوصول والموجه.

- محول عبارة الوصول Catalyst 4224
- موجه IOS من Cisco

محول عبارة الوصول Catalyst 4224

<#root>

```
triana#
```

debug crypto ipsec

```
Crypto IPSEC debugging is on
triana#
```

```
debug crypto isakmp

Crypto ISAKMP debugging is on
triana#

debug crypto engine

Crypto Engine debugging is on
triana#

show debug


Cryptographic Subsystem:
Crypto ISAKMP debugging is on
Crypto Engine debugging is on
Crypto IPSEC debugging is on
triana#
May 29 18:01:57.746: ISAKMP (0:0): received packet from 209.165.201.6 (N) NEW SA
May 29 18:01:57.746: ISAKMP: local port 500, remote port 500
May 29 18:01:57.746: ISAKMP (0:1): Input = IKE_MESG_FROM_PEER, IKE_MM_EXCH
Old State = IKE_READY  New State = IKE_R_MM1
May 29 18:01:57.746: ISAKMP (0:1): processing SA payload. message ID = 0
May 29 18:01:57.746: ISAKMP (0:1): found peer pre-shared key
matching 209.165.201.6

!--- 4224 access gateway checks the attributes for Internet Security !--- Association & Key Management

May 29 18:01:57.746: ISAKMP (0:1): Checking ISAKMP transform 1
against priority 10 policy
May 29 18:01:57.746: ISAKMP:      encryption DES-CBC
May 29 18:01:57.746: ISAKMP:      hash SHA
May 29 18:01:57.746: ISAKMP:      default group 1
May 29 18:01:57.746: ISAKMP:      auth pre-share

!--- The received attributes are acceptable !--- against the configured set of attributes.

May 29 18:01:57.746: ISAKMP (0:1): atts are acceptable. Next payload is 0
May 29 18:01:57.746: CryptoEngine0: generate alg parameter
May 29 18:01:57.746: CryptoEngine0: CRYPTO_ISA_DH_CREATE(hw)(ipsec)
May 29 18:01:57.898: CRYPTO_ENGINE: Dh phase 1 status: 0
May 29 18:01:57.898: ISAKMP (0:1): Input = IKE_MESG_INTERNAL,
IKE_PROCESS_MAIN_MODE Old State = IKE_R_MM1  New State = IKE_R_MM1

May 29 18:01:57.898: ISAKMP (0:1): SA is doing pre-shared key authentication
using id type ID_IPV4_ADDR
May 29 18:01:57.898: ISAKMP (0:1): sending packet to 209.165.201.6 (R) MM_SA_SETUP
May 29 18:01:57.898: ISAKMP (0:1): Input = IKE_MESG_INTERNAL, IKE_PROCESS_COMPLETE
Old State = IKE_R_MM1  New State = IKE_R_MM2

May 29 18:01:58.094: ISAKMP (0:1): received packet from 209.165.201.6
(R) MM_SA_SETUP
May 29 18:01:58.094: ISAKMP (0:1): Input = IKE_MESG_FROM_PEER, IKE_MM_EXCH
Old State = IKE_R_MM2  New State = IKE_R_MM3

May 29 18:01:58.098: ISAKMP (0:1): processing KE payload. message ID = 0
May 29 18:01:58.098: CryptoEngine0: generate alg parameter
May 29 18:01:58.098: CryptoEngine0: CRYPTO_ISA_DH_SHARE_SECRET(hw)(ipsec)
May 29 18:01:58.246: ISAKMP (0:1): processing NONCE payload. message ID = 0
May 29 18:01:58.246: ISAKMP (0:1): found peer pre-shared key matching 209.165.201.6
May 29 18:01:58.250: CryptoEngine0: create ISAKMP SKEYID for conn id 1
May 29 18:01:58.250: CryptoEngine0: CRYPTO_ISA_SA_CREATE(hw)(ipsec)
May 29 18:01:58.250: ISAKMP (0:1): SKEYID state generated

May 29 18:01:58.250: ISAKMP (0:1): processing vendor id payload
May 29 18:01:58.250: ISAKMP (0:1): speaking to another IOS box!
May 29 18:01:58.250: ISAKMP (0:1): Input = IKE_MESG_INTERNAL, IKE_PROCESS_MAIN_MODE
Old State = IKE_R_MM3  New State = IKE_R_MM3

May 29 18:01:58.250: ISAKMP (0:1): sending packet to 209.165.201.6 (R) MM_KEY_EXCH
May 29 18:01:58.250: ISAKMP (0:1): Input = IKE_MESG_INTERNAL, IKE_PROCESS_COMPLETE
Old State = IKE_R_MM3  New State = IKE_R_MM4

May 29 18:01:58.490: ISAKMP (0:1): received packet from 209.165.201.6
(R) MM_KEY_EXCH
May 29 18:01:58.490: CryptoEngine0: CRYPTO_ISA_IKE_DECRYPT(hw)(ipsec)
May 29 18:01:58.490: ISAKMP (0:1): Input = IKE_MESG_FROM_PEER, IKE_MM_EXCH
Old State = IKE_R_MM4  New State = IKE_R_MM5

May 29 18:01:58.490: ISAKMP (0:1): processing ID payload. message ID = 0
May 29 18:01:58.490: ISAKMP (0:1): processing HASH payload. message ID = 0
May 29 18:01:58.490: CryptoEngine0: generate hmac context for conn id 1
May 29 18:01:58.490: CryptoEngine0: CRYPTO_ISA_IKE_HMAC(hw)(ipsec)

May 29 18:01:58.490: ISAKMP (0:1): SA has been authenticated with 209.165.201.6


!--- Phase 1 authentication is successful and the SA is authenticated.

May 29 18:01:58.494: ISAKMP (0:1): Input = IKE_MESG_INTERNAL, IKE_PROCESS_MAIN_MODE
Old State = IKE_R_MM5  New State = IKE_R_MM5

May 29 18:01:58.494: ISAKMP (1): ID payload
next-payload : 8
type         : 1
protocol     : 17
port         : 500
length       : 8
May 29 18:01:58.494: ISAKMP (1): Total payload length: 12
May 29 18:01:58.494: CryptoEngine0: generate hmac context for conn id 1
May 29 18:01:58.494: CryptoEngine0: CRYPTO_ISA_IKE_HMAC(hw)(ipsec)
May 29 18:01:58.494: CryptoEngine0: clear dh number for conn id 1
May 29 18:01:58.494: CryptoEngine0: CRYPTO_ISA_DH_DELETE(hw)(ipsec)
May 29 18:01:58.494: CryptoEngine0: CRYPTO_ISA_IKE_ENCRYPT(hw)(ipsec)
May 29 18:01:58.494: ISAKMP (0:1): sending packet to 209.165.201.6 (R) QM_IDLE
May 29 18:01:58.498: ISAKMP (0:1): Input = IKE_MESG_INTERNAL, IKE_PROCESS_COMPLETE
Old State = IKE_R_MM5  New State = IKE_P1_COMPLETE

May 29 18:01:58.518: ISAKMP (0:1): received packet from 209.165.201.6 (R) QM_IDLE
May 29 18:01:58.518: CryptoEngine0: CRYPTO_ISA_IKE_DECRYPT(hw)(ipsec)
May 29 18:01:58.518: CryptoEngine0: generate hmac context for conn id 1
May 29 18:01:58.518: CryptoEngine0: CRYPTO_ISA_IKE_HMAC(hw)(ipsec)
May 29 18:01:58.522: ISAKMP (0:1): processing HASH payload.
message ID = -1809462101
May 29 18:01:58.522: ISAKMP (0:1): processing SA payload.
message ID = -1809462101

May 29 18:01:58.522: ISAKMP (0:1): Checking IPSec proposal 1
May 29 18:01:58.522: ISAKMP: transform 1, ESP_DES
May 29 18:01:58.522: ISAKMP:   attributes in transform:
May 29 18:01:58.522: ISAKMP:      encaps is 1
May 29 18:01:58.522: ISAKMP:      SA life type in seconds
May 29 18:01:58.522: ISAKMP:      SA life duration (basic) of 3600
May 29 18:01:58.522: ISAKMP:      SA life type in kilobytes
May 29 18:01:58.522: ISAKMP:      SA life duration (VPI) of  0x0 0x46 0x50 0x0
May 29 18:01:58.522: ISAKMP:      authenticator is HMAC-MD5
May 29 18:01:58.522: validate proposal 0

May 29 18:01:58.522: ISAKMP (0:1): atts are acceptable.


May 29 18:01:58.522: IPSEC(validate_proposal_request): proposal part #1,

!--- After the attributes are negotiated, !--- IKE asks IPSec to validate the proposal.

(key eng. msg.) dest= 209.165.201.5, src= 209.165.201.6,
dest_proxy= 192.168.10.0/255.255.255.0/0/0 (type=4),
src_proxy= 10.48.66.0/255.255.254.0/0/0 (type=4),
protocol= ESP, transform= esp-des esp-md5-hmac ,
lifedur= 0s and 0kb,
spi= 0x0(0), conn_id= 0, keysize= 0, flags= 0x4

!--- spi is still zero because SAs have not been set.

May 29 18:01:58.522: validate proposal request 0
May 29 18:01:58.522: ISAKMP (0:1): processing NONCE payload.
message ID = -1809462101
May 29 18:01:58.522: ISAKMP (0:1): processing ID payload.
message ID = -1809462101
May 29 18:01:58.522: ISAKMP (1): ID_IPV4_ADDR_SUBNET src 10.48.66.0/255.255.254.0
prot 0 port 0
May 29 18:01:58.522: ISAKMP (0:1): processing ID payload.
message ID = -1809462101
May 29 18:01:58.522: ISAKMP (1): ID_IPV4_ADDR_SUBNET dst 192.168.10.0/255.255.255.0
prot 0 port 0
May 29 18:01:58.522: ISAKMP (0:1): asking for 1 spis from ipsec
May 29 18:01:58.522: ISAKMP (0:1): Node -1809462101, Input = IKE_MESG_FROM_PEER,
IKE_QM_EXCH
Old State = IKE_QM_READY  New State = IKE_QM_SPI_STARVE

May 29 18:01:58.526: IPSEC(key_engine): got a queue event...
May 29 18:01:58.526: IPSEC(spi_response): getting spi 3384026087 for SA
from 209.165.201.6   to 209.165.201.5   for prot 3
May 29 18:01:58.526: ISAKMP: received ke message (2/1)
May 29 18:01:58.774: CryptoEngine0: generate hmac context for conn id 1
May 29 18:01:58.774: CryptoEngine0: CRYPTO_ISA_IKE_HMAC(hw)(ipsec)
May 29 18:01:58.774: CryptoEngine0: CRYPTO_ISA_IKE_ENCRYPT(hw)(ipsec)
May 29 18:01:58.774: ISAKMP (0:1): sending packet to 209.165.201.6 (R) QM_IDLE
May 29 18:01:58.774: ISAKMP (0:1): Node -1809462101, Input = IKE_MESG_FROM_IPSEC,
IKE_SPI_REPLY
Old State = IKE_QM_SPI_STARVE  New State = IKE_QM_R_QM2

May 29 18:01:58.830: ISAKMP (0:1): received packet from 209.165.201.6 (R) QM_IDLE
May 29 18:01:58.830: CryptoEngine0: CRYPTO_ISA_IKE_DECRYPT(hw)(ipsec)
May 29 18:01:58.834: CryptoEngine0: generate hmac context for conn id 1
May 29 18:01:58.834: CryptoEngine0: CRYPTO_ISA_IKE_HMAC(hw)(ipsec)
May 29 18:01:58.834: ipsec allocate flow 0
May 29 18:01:58.834: ipsec allocate flow 0
May 29 18:01:58.834: CryptoEngine0: CRYPTO_ISA_IPSEC_KEY_CREATE(hw)(ipsec)
May 29 18:01:58.834: CryptoEngine0: CRYPTO_ISA_IPSEC_KEY_CREATE(hw)(ipsec)

May 29 18:01:58.838: ISAKMP (0:1): Creating IPSec SAs


May 29 18:01:58.838:         inbound SA from 209.165.201.6 to 209.165.201.5
(proxy 10.48.66.0 to 192.168.10.0)
```

```
May 29 18:01:58.838:        has spi 0xC9B423E7 and conn_id 50 and flags 4
May 29 18:01:58.838:        lifetime of 3600 seconds
May 29 18:01:58.838:        lifetime of 4608000 kilobytes
May 29 18:01:58.838:        outbound SA from 209.165.201.5   to 209.165.201.6
(proxy 192.168.10.0 to 10.48.66.0)
May 29 18:01:58.838:        has spi 561973207 and conn_id 51 and flags 4
May 29 18:01:58.838:        lifetime of 3600 seconds
May 29 18:01:58.838:        lifetime of 4608000 kilobytes
May 29 18:01:58.838: ISAKMP (0:1): deleting node -1809462101 error FALSE reason
"quick mode done (await()"
May 29 18:01:58.838: ISAKMP (0:1): Node -1809462101, Input = IKE_MESG_FROM_PEER,
IKE_QM_EXCH
Old State = IKE_QM_R_QM2  New State = IKE_QM_PHASE2_COMPLETE

May 29 18:01:58.838: IPSEC(key_engine): got a queue event...
May 29 18:01:58.838: IPSEC(initialize_sas): ,
(key eng. msg.) dest= 209.165.201.5, src= 209.165.201.6,
dest_proxy= 192.168.10.0/255.255.255.0/0/0 (type=4),
src_proxy= 10.48.66.0/255.255.254.0/0/0 (type=4),
protocol= ESP, transform= esp-des esp-md5-hmac ,
lifedur= 3600s and 4608000kb,
spi= 0xC9B423E7(3384026087), conn_id= 50, keysize= 0, flags= 0x4
```

!--- IPSec SAs are now initialized and encrypted !--- communication can now take place.

```
May 29 18:01:58.838: IPSEC(initialize_sas): ,
(key eng. msg.) src= 209.165.201.5, dest= 209.165.201.6,
src_proxy= 192.168.10.0/255.255.255.0/0/0 (type=4),
dest_proxy= 10.48.66.0/255.255.254.0/0/0 (type=4),
protocol= ESP, transform= esp-des esp-md5-hmac ,
lifedur= 3600s and 4608000kb,
spi= 0x217F07D7(561973207), conn_id= 51, keysize= 0, flags= 0x4
```

!--- IPSec SAs are now initialized and encrypted !--- communication can now take place.

```
May 29 18:01:58.838: IPSEC(create_sa): sa created,
(sa) sa_dest= 209.165.201.5, sa_prot= 50,
sa_spi= 0xC9B423E7(3384026087),
sa_trans= esp-des esp-md5-hmac , sa_conn_id= 50
May 29 18:01:58.838: IPSEC(create_sa): sa created,
(sa) sa_dest= 209.165.201.6, sa_prot= 50,
sa_spi= 0x217F07D7(561973207),
sa_trans= esp-des esp-md5-hmac , sa_conn_id= 51
```

!--- Observe that two IPSec SAs are created. !--- Recollect that IPSec SAs are bidirectional.

```
triana#
triana#
triana#
triana#
```

show crypto isakmp sa

```
dst                          src             state              conn-id    slot
        209.165.201.5   209.165.201.6   QM_IDLE          &n bsp;   1         0
```

```
triana#
```

show crypto ipsec sa

```
interface: Vlan 1

Crypto map tag: mymap, local addr. 209.165.201.5

local  ident (addr/mask/prot/port): (192.168.10.0/255.255.255.0/0/0)
remote ident (addr/mask/prot/port): (10.48.66.0/255.255.254.0/0/0)
current_peer: 209.165.201.6
PERMIT, flags={origin_is_acl,}


#pkts encaps: 4, #pkts encrypt: 4, #pkts digest 4
#pkts decaps: 4, #pkts decrypt: 4, #pkts verify 4


#pkts compressed: 0, #pkts decompressed: 0
#pkts not compressed: 0, #pkts compr. failed: 0, #pkts decompress failed: 0
#send errors 0, #recv errors 0

local crypto endpt.: 209.165.201.5, remote crypto endpt.: 209.165.201.6
path mtu 1500, media mtu 1500
current outbound spi: 217F07D7

inbound esp sas:
spi: 0xC9B423E7(3384026087)
transform: esp-des esp-md5-hmac ,
in use settings ={Tunnel, }
slot: 0, conn id: 50, flow_id: 1, crypto map: mymap
sa timing: remaining key lifetime (k/sec): (4607998/3536)
IV size: 8 bytes
replay detection support: Y

inbound ah sas:

inbound pcp sas:

outbound esp sas:
spi: 0x217F07D7(561973207)
transform: esp-des esp-md5-hmac ,
in use settings ={Tunnel, }
slot: 0, conn id: 51, flow_id: 2, crypto map: mymap
sa timing: remaining key lifetime (k/sec): (4607999/3536)
IV size: 8 bytes
replay detection support: Y

outbound ah sas:

outbound pcp sas:


triana#
```

Cisco نم IOS هجوم

<#root>

```
brussels#

show debug
```

```
Cryptographic Subsystem:
Crypto ISAKMP debugging is on
Crypto Engine debugging is on
Crypto IPSEC debugging is on
brussels#p
Protocol [ip]:
Target IP address: 192.168.10.5
Repeat count [5]:
Datagram size [100]:
Timeout in seconds [2]:
Extended commands [n]: y
Source address or interface: fastethernet0/0
Type of service [0]:
Set DF bit in IP header? [no]:
Validate reply data? [no]:
Data pattern [0xABCD]:
Loose, Strict, Record, Timestamp, Verbose[none]:
Sweep range of sizes [n]:
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.10.5, timeout is 2 seconds:

May 29 18:01:54.285: IPSEC(sa_request): ,
(key eng. msg.) src= 209.165.201.6, dest= 209.165.201.5,
src_proxy= 10.48.66.0/255.255.254.0/0/0 (type=4),
dest_proxy= 192.168.10.0/255.255.255.0/0/0 (type=4),
protocol= ESP, transform= esp-des esp-md5-hmac ,
lifedur= 3600s and 4608000kb,
spi= 0x217F07D7(561973207), conn_id= 0, keysize= 0, flags= 0x4004
May 29 18:01:54.285: ISAKMP: received ke message (1/1)
May 29 18:01:54.285: ISAKMP: local port 500, remote port 500
May 29 18:01:54.289: ISAKMP (0:1): beginning Main Mode exchange
May 29 18:01:54.289: ISAKMP (1): sending packet to 209.165.201.5 (I) MM_NO_STATE
May 29 18:01:54.461: ISAKMP (1): received packet from 209.165.201.5 (I) MM_NO_STATE
May 29 18:01:54.461: ISAKMP (0:1): processing SA payload. message ID = 0
May 29 18:01:54.461: ISAKMP (0:1): Checking ISAKMP transform 1
against priority 10 policy
May 29 18:01:54.465: ISAKMP:      encryption DES-CBC
May 29 18:01:54.465: ISAKMP:      hash SHA
May 29 18:01:54.465: ISAKMP:      default group 1
May 29 18:01:54.465: ISAKMP:      auth pre-share
```

May 29 18:01:54.465: ISAKMP (0:1): atts are acceptable. Next payload is 0

```
May 29 18:01:54.465: CryptoEngine0: generate alg parameter
May 29 18:01:54.637: CRYPTO_ENGINE: Dh phase 1 status: 0
May 29 18:01:54.637: CRYPTO_ENGINE: Dh phase 1 status: 0
May 29 18:01:54.637: ISAKMP (0:1): SA is doing pre-shared key authentication
May 29 18:01:54.637: ISAKMP (1): SA is doing pre-shared key authentication using
id type ID_IPV4_ADDR
May 29 18:01:54.641: ISAKMP (1): sending packet to 209.165.201.5 (I) MM_SA_SETUP
May 29 18:01:54.805: ISAKMP (1): received packet from 209.165.201.5 (I) MM_SA_SETUP
May 29 18:01:54.805: ISAKMP (0:1): processing KE payload. message ID = 0
May 29 18:01:54.805: CryptoEngine0: generate alg parameter
May 29 18:01:55.021: ISAKMP (0:1): processing NONCE payload. messa.!!!!
Success rate is 80 percent (4/5), round-trip min/avg/max = 20/21/24 ms
brussels#ge ID = 0
May 29 18:01:55.021: CryptoEngine0: create ISAKMP SKEYID for conn id 1
May 29 18:01:55.025: ISAKMP (0:1): SKEYID state generated
May 29 18:01:55.029: ISAKMP (0:1): processing vendor id payload
May 29 18:01:55.029: ISAKMP (0:1): speaking to another IOS box!
May 29 18:01:55.029: ISAKMP (1): ID payload
```

```
        next-payload : 8
        type         : 1
        protocol     : 17
        port         : 500
        length       : 8
May 29 18:01:55.029: ISAKMP (1): Total payload length: 12
May 29 18:01:55.029: CryptoEngine0: generate hmac context for conn id 1
May 29 18:01:55.033: ISAKMP (1): sending packet to 209.165.201.5 (I) MM_KEY_EXCH
May 29 18:01:55.049: ISAKMP (1): received packet from 209.165.201.5 (I) MM_KEY_EXCH
May 29 18:01:55.053: ISAKMP (0:1): processing ID payload. message ID = 0
May 29 18:01:55.053: ISAKMP (0:1): processing HASH payload. message ID = 0
May 29 18:01:55.053: CryptoEngine0: generate hmac context for conn id 1
May 29 18:01:55.057: ISAKMP (0:1): SA has been authenticated with 209.165.201.5

!--- Phase 1 is completed and Phase 2 starts now.

May 29 18:01:55.057: ISAKMP (0:1): beginning Quick Mode exchange,
   M-ID of -1809462101
May 29 18:01:55.061: CryptoEngine0: generate hmac context for conn id 1
May 29 18:01:55.065: ISAKMP (1): sending packet to 209.165.201.5 (I) QM_IDLE
May 29 18:01:55.065: CryptoEngine0: clear dh number for conn id 1
May 29 18:01:55.337: ISAKMP (1): received packet from 209.165.201.5 (I) QM_IDLE
May 29 18:01:55.341: CryptoEngine0: generate hmac context for conn id 1
May 29 18:01:55.345: ISAKMP (0:1): processing SA payload. message ID = -1809462101
May 29 18:01:55.345: ISAKMP (0:1): Checking IPSec proposal 1
May 29 18:01:55.345: ISAKMP: transform 1, ESP_DES
May 29 18:01:55.345: ISAKMP:   attributes in transform:
May 29 18:01:55.345: ISAKMP:      encaps is 1
May 29 18:01:55.345: ISAKMP:      SA life type in seconds
May 29 18:01:55.345: ISAKMP:      SA life duration (basic) of 3600
May 29 18:01:55.345: ISAKMP:      SA life type in kilobytes
May 29 18:01:55.345: ISAKMP:      SA life duration (VPI) of  0x0 0x46 0x50 0x0
May 29 18:01:55.349: ISAKMP:      authenticator is HMAC-MD5
May 29 18:01:55.349: validate proposal 0

May 29 18:01:55.349: ISAKMP (0:1): atts are acceptable.


May 29 18:01:55.349: IPSEC(validate_proposal_request): proposal part #1,

!--- After negotiating the attributes, IKE asks IPSec to !--- validate the proposal.

  (key eng. msg.) dest= 209.165.201.5, src= 209.165.201.6,
    dest_proxy= 192.168.10.0/255.255.255.0/0/0 (type=4),
    src_proxy= 10.48.66.0/255.255.254.0/0/0 (type=4),
    protocol= ESP, transform= esp-des esp-md5-hmac ,
    lifedur= 0s and 0kb,
    spi= 0x0(0), conn_id= 0, keysize= 0, flags= 0x4

!--- spi is still zero because SAs have not been set.

May 29 18:01:55.353: validate proposal request 0
May 29 18:01:55.357: ISAKMP (0:1): processing NONCE payload.
   message ID = -1809462101
May 29 18:01:55.357: ISAKMP (0:1): processing ID payload. message ID = -1809462101
May 29 18:01:55.357: ISAKMP (0:1): processing ID payload. message ID = -1809462101
May 29 18:01:55.357: CryptoEngine0: generate hmac context for conn id 1
May 29 18:01:55.361: ipsec allocate flow 0
May 29 18:01:55.361: ipsec allocate flow 0

May 29 18:01:55.369: ISAKMP (0:1): Creating IPSec SAs
May 29 18:01:55.369:         inbound SA from 209.165.201.5   to 209.165.201.6
        (proxy 192.168.10.0 to 10.48.66.0)
May 29 18:01:55.369:         has spi 561973207 and conn_id 2000 and flags 4
May 29 18:01:55.373:         lifetime of 3600 seconds
May 29 18:01:55.373:         lifetime of 4608000 kilobytes
May 29 18:01:55.373:         outbound SA from 209.165.201.6   to 209.165.201.5
        (proxy 10.48.66.0 to 192.168.10.0)
May 29 18:01:55.373:         has spi -910941209 and conn_id 2001 and flags 4
May 29 18:01:55.373:         lifetime of 3600 seconds
May 29 18:01:55.373:         lifetime of 4608000 kilobytes
May 29 18:01:55.377: ISAKMP (1): sending packet to 209.165.201.5 (I) QM_IDLE
May 29 18:01:55.377: ISAKMP (0:1): deleting node -1809462101 error FALSE reason ""
May 29 18:01:55.381: IPSEC(key_engine): got a queue event...
May 29 18:01:55.381: IPSEC(initialize_sas): ,
  (key eng. msg.) dest= 209.165.201.6, src= 209.165.201.5,
    dest_proxy= 10.48.66.0/255.255.254.0/0/0 (type=4),
    src_proxy= 192.168.10.0/255.255.255.0/0/0 (type=4),
    protocol= ESP, transform= esp-des esp-md5-hmac ,
    lifedur= 3600s and 4608000kb,
    spi= 0x217F07D7(561973207), conn_id= 2000, keysize= 0, flags= 0x4

!--- IPSec SAs are now initialized and encrypted !--- communication can now take place.

May 29 18:01:55.381: IPSEC(initialize_sas): ,
  (key eng. msg.) src= 209.165.201.6, dest= 209.165.201.5,
    src_proxy= 10.48.66.0/255.255.254.0/0/0 (type=4),
    dest_proxy= 192.168.10.0/255.255.255.0/0/0 (type=4),
    protocol= ESP, transform= esp-des esp-md5-hmac ,
    lifedur= 3600s and 4608000kb,
    spi= 0xC9B423E7(3384026087), conn_id= 2001, keysize= 0, flags= 0x4

!--- IPSec SAs are now initialized and encrypted !--- communication can now take place.

May 29 18:01:55.385: IPSEC(create_sa): sa created,
  (sa) sa_dest= 209.165.201.6, sa_prot= 50,
    sa_spi= 0x217F07D7(561973207),
    sa_trans= esp-des esp-md5-hmac , sa_conn_id= 2000
May 29 18:01:55.385: IPSEC(create_sa): sa created,
  (sa) sa_dest= 209.165.201.5, sa_prot= 50,
    sa_spi= 0xC9B423E7(3384026087),
    sa_trans= esp-des esp-md5-hmac , sa_conn_id= 2001

!--- Observe that two IPSec SAs are created. !--- Recollect that IPSec SAs are bidirectional.

brussels#

brussels#
show crypto isakmp sa


    dst            src             state         conn-id    slot
209.165.201.5  209.165.201.6   QM_IDLE             1          0

brussels#
show crypto ipsec sa



interface: FastEthernet0/1
    Crypto map tag: vpnmap, local addr. 209.165.201.6
```

```
local  ident (addr/mask/prot/port): (10.48.66.0/255.255.254.0/0/0)
remote ident (addr/mask/prot/port): (192.168.10.0/255.255.255.0/0/0)
current_peer: 209.165.201.5
PERMIT, flags={origin_is_acl,}

#pkts encaps: 4, #pkts encrypt: 4, #pkts digest 4
#pkts decaps: 4, #pkts decrypt: 4, #pkts verify 4


#pkts compressed: 0, #pkts decompressed: 0
#pkts not compressed: 0, #pkts compr. failed: 0, #pkts decompress failed: 0
#send errors 1, #recv errors 0

local crypto endpt.: 209.165.201.6, remote crypto endpt.: 209.165.201.5
path mtu 1500, media mtu 1500
current outbound spi: C9B423E7

inbound esp sas:
spi: 0x217F07D7(561973207)
transform: esp-des esp-md5-hmac ,
in use settings ={Tunnel, }
slot: 0, conn id: 2000, flow_id: 1, crypto map: vpnmap
sa timing: remaining key lifetime (k/sec): (4607998/3560)
IV size: 8 bytes
replay detection support: Y

inbound ah sas:

inbound pcp sas:

outbound esp sas:
spi: 0xC9B423E7(3384026087)
transform: esp-des esp-md5-hmac ,
in use settings ={Tunnel, }
slot: 0, conn id: 2001, flow_id: 2, crypto map: vpnmap
sa timing: remaining key lifetime (k/sec): (4607999/3560)
IV size: 8 bytes
replay detection support: Y

outbound ah sas:

outbound pcp sas:


brussels#
```

معلومات ذات صلة

- صفحة دعم IPSec
- مقدمة عن IPSec
- الدعم الفني - Cisco Systems

حول هذه الترجمة

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