

# 在使用SEAL的IOS路由器之间的站点到站点隧道的配置示例

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## 简介

软件加密算法 (SEAL) 是针对数据加密标准 (DES)、三重 DES (3DES) 和高级加密标准 (AES) 的替代算法。SEAL 加密将使用一个 160 位的加密密钥，与其它基于软件的算法相比，它对 CPU 的影响更小一些。本文档阐述了如何使用 SEAL 配置 LAN 到 LAN ( 站点到站点 ) IPSec 隧道。

## 先决条件

### 要求

本文档没有任何特定的要求。

### 使用的组件

本文档中的信息基于以下软件和硬件版本：

- 运行 Cisco IOS® 软件版本 12.3(7)T 的 Cisco 7200 系列路由器

本文档中的信息都是基于特定实验室环境中的设备编写的。本文档中使用的所有设备最初均采用原始 ( 默认 ) 配置。如果您使用的是真实网络，请确保您已经了解所有命令的潜在影响。

### 规则

有关文档规则的详细信息，请参阅 [Cisco 技术提示规则](#)。

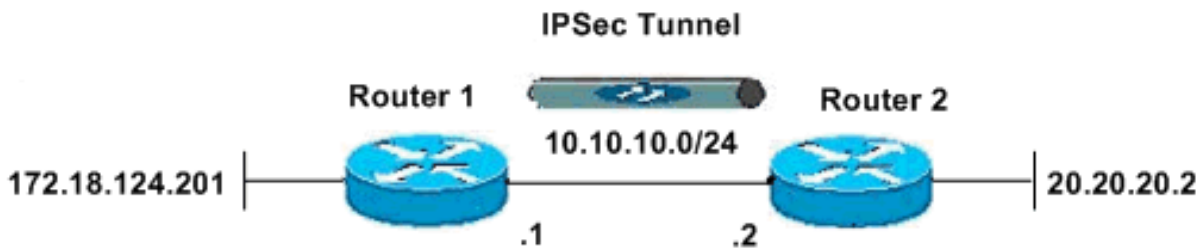
## 配置

本部分提供有关如何配置本文档所述功能的信息。

**注意：** 有关本文档所用命令的详细信息，请使用 [命令查找工具](#) ( [仅限注册用户](#) )。

## 网络图

本文档使用以下网络设置：



## 配置

本文档使用以下配置：

- [路由器 1](#)
- [路由器 2](#)

### 路由器 1

```
version 12.3
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname R1
!
boot-start-marker
boot-end-marker
!
!
clock timezone EST -5
no aaa new-model
ip subnet-zero
no ip domain lookup
!
!
ip cef
ip audit po max-events 100
no ftp-server write-enable
!
!
!
!
!---- ISAKMP policy configuration. crypto isakmp policy 1
```

```

encr aes 256 hash md5 authentication pre-share group 2
crypto isakmp key cisco123 address 10.10.10.2 ! !---
Define a transform set with SEAL. !--- If you use the
esp-seal transform set and a crypto !--- accelerator is
present, you receive a warning. !--- The configuration
is accepted, but it !--- is ignored as long as the
accelerator is present. !--- If you use the esp-seal
transform set with either of !--- the other two
limitations, you receive an error !--- and the
configuration is rejected. crypto ipsec transform-set
cisco esp-seal esp-sha-hmac ! !--- Define a transform
set with SEAL. crypto map cisco 10 ipsec-isakmp set peer
10.10.10.2 set transform-set cisco match address 100 ! !
! interface Ethernet0/0 ip address 172.18.124.201
255.255.255.0 ! !--- Apply crypto-map to the public
interface. interface Ethernet1/0 ip address 10.10.10.1
255.255.255.0 crypto map cisco ! ip classless ip route
0.0.0.0 0.0.0.0 10.10.10.2 no ip http server no ip http
secure-server ! ! !--- Access Control List (ACL) that
defines the networks to encrypt. access-list 100 permit
ip 172.18.124.0 0.0.0.255 20.20.20.0 0.0.0.255 ! ! !
control-plane ! ! line con 0 exec-timeout 0 0 line aux 0
line vty 0 4 password ww login ! ! end

```

## 路由器 2

```

version 12.3
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname R2
!
boot-start-marker
boot-end-marker
!
!
clock timezone EST -5
no aaa new-model
ip subnet-zero
no ip domain lookup
!
!
ip cef
ip audit po max-events 100
no ftp-server write-enable
!
!
!
!
!--- ISAKMP policy configuration. crypto isakmp policy 1
encr aes 256 hash md5 authentication pre-share group 2
crypto isakmp key cisco123 address 10.10.10.1 ! !---
Define a transform set with SEAL. !--- If you use the
esp-seal transform set and a crypto !--- accelerator is
present, you receive a warning. !--- The configuration
is accepted, but it !--- is ignored as long as the
accelerator is present. !--- If you use the esp-seal
transform set with either of !--- the other two
limitations, you receive an error !--- and the
configuration is rejected. crypto ipsec transform-set
cisco esp-seal esp-sha-hmac ! !--- Define a transform
set with SEAL. crypto map cisco 10 ipsec-isakmp set peer
10.10.10.1 set transform-set cisco match address 100 ! !
! ! !--- Apply crypto-map to the public interface.

```

```
interface Ethernet0/0 ip address 10.10.10.2
255.255.255.0 crypto map cisco ! interface Ethernet0/0
ip address 20.20.20.2 255.255.255.0 ! ip classless ip
route 0.0.0.0 0.0.0.0 10.10.10.1 no ip http server no ip
http secure-server ! ! !--- ACL defines the networks to
encrypt. access-list 100 permit ip 20.20.20.0 0.0.0.255
172.18.124.0 0.0.0.255 ! ! control-plane ! ! line con
0 exec-timeout 0 0 line aux 0 line vty 0 4 password ww
login ! ! end
```

## 验证

本部分所提供的信息可用于确认您的配置是否正常工作。

[命令输出解释程序工具](#) ( [仅限注册用户](#) ) 支持某些 **show** 命令，使用此工具可以查看对 **show** 命令输出的分析。

- **show crypto map** —验证在路由器的配置。此输出取自路由器 1。R1#**show crypto map**  
Crypto Map "cisco" 10 ipsec-isakmp  
Peer = 10.10.10.2  
Extended IP access list 100  
access-list 100 permit ip 172.18.124.0 0.0.0.255 20.20.20.0 0.0.0.255  
Current peer: 10.10.10.2  
Security association lifetime: 4608000 kilobytes/3600 seconds  
PFS (Y/N): N  
Transform sets={  
cisco,  
}  
Interfaces using crypto map cisco:  
Ethernet1/0

## 故障排除

本部分提供的信息可用于对配置进行故障排除。

### 故障排除命令

[命令输出解释程序工具](#) ( [仅限注册用户](#) ) 支持某些 **show** 命令，使用此工具可以查看对 **show** 命令输出的分析。

**注意：** 在发出 **debug** 命令之前，请参阅[有关 Debug 命令的重要信息](#)。

### ISAMP 和 IPsec 调试

- **show debugging** —显示关于为您的路由器启用调试的种类的信息。

```
R1#show debugging
Cryptographic Subsystem:
Crypto ISAKMP debugging is on
Crypto IPSEC debugging is on

R1#
*Apr 18 05:59:20.491: ISAKMP (0:0): received packet
from 10.10.10.2 dport 500 sport 500 Global (N) NEW SA
```

\*Apr 18 05:59:20.491: ISAKMP: Created a peer struct for  
10.10.10.2, peer port 500  
\*Apr 18 05:59:20.491: ISAKMP: Locking peer struct 0x25F0BD8,  
IKE refcount 1 for crypto\_isakmp\_process\_block  
\*Apr 18 05:59:20.491: ISAKMP: local port 500, remote port 500  
\*Apr 18 05:59:20.519: insert sa successfully sa = 2398188  
\*Apr 18 05:59:20.519: ISAKMP:(0:1:SW:1):Input = IKE\_MESG\_FROM\_PEER, IKE\_MM\_EXCH  
\*Apr 18 05:59:20.519: ISAKMP:(0:1:SW:1):Old State = IKE\_READY  
New State = IKE\_R\_MM1

\*Apr 18 05:59:20.579: ISAKMP:(0:1:SW:1): processing SA payload. message ID = 0  
\*Apr 18 05:59:20.579: ISAKMP:(0:1:SW:1): processing vendor id payload  
\*Apr 18 05:59:20.579: ISAKMP:(0:1:SW:1): vendor ID seems Unity/DPD  
but major 157 mismatch  
\*Apr 18 05:59:20.579: ISAKMP:(0:1:SW:1): vendor ID is NAT-T v3  
\*Apr 18 05:59:20.579: ISAKMP:(0:1:SW:1): processing vendor id payload  
\*Apr 18 05:59:20.579: ISAKMP:(0:1:SW:1): vendor ID seems Unity/DPD  
but major 123 mismatch  
\*Apr 18 05:59:20.579: ISAKMP:(0:1:SW:1): vendor ID is NAT-T v2  
\*Apr 18 05:59:20.579: ISAKMP: Looking for a matching key for  
10.10.10.2 in default : success  
\*Apr 18 05:59:20.579: ISAKMP:(0:1:SW:1):found peer pre-shared key  
matching 10.10.10.2  
\*Apr 18 05:59:20.579: ISAKMP:(0:1:SW:1): local preshared key found  
\*Apr 18 05:59:20.579: ISAKMP : Scanning profiles for xauth ...  
\*Apr 18 05:59:20.579: ISAKMP:(0:1:SW:1):Checking ISAKMP transform 1  
against priority 1 policy  
\*Apr 18 05:59:20.579: ISAKMP: encryption AES-CBC  
\*Apr 18 05:59:20.579: ISAKMP: keylength of 256  
\*Apr 18 05:59:20.579: ISAKMP: hash MD5  
\*Apr 18 05:59:20.579: ISAKMP: default group 2  
\*Apr 18 05:59:20.579: ISAKMP: auth pre-share  
\*Apr 18 05:59:20.579: ISAKMP: life type in seconds  
\*Apr 18 05:59:20.579: ISAKMP: life duration (VPI) of 0x0 0x1 0x51 0x80  
\*Apr 18 05:59:20.579: ISAKMP:(0:1:SW:1):atts are acceptable. Next payload is 0  
\*Apr 18 05:59:20.579: ISAKMP:(0:1:SW:1): processing vendor id payload  
\*Apr 18 05:59:20.579: ISAKMP:(0:1:SW:1): vendor ID seems Unity/DPD  
but major 157 mismatch  
\*Apr 18 05:59:20.579: ISAKMP:(0:1:SW:1): vendor ID is NAT-T v3  
\*Apr 18 05:59:20.579: ISAKMP:(0:1:SW:1): processing vendor id payload  
\*Apr 18 05:59:20.579: ISAKMP:(0:1:SW:1): vendor ID seems Unity/DPD  
but major 123 mismatch  
\*Apr 18 05:59:20.579: ISAKMP:(0:1:SW:1): vendor ID is NAT-T v2  
\*Apr 18 05:59:20.579: ISAKMP:(0:1:SW:1):Input = IKE\_MESG\_INTERNAL,  
IKE\_PROCESS\_MAIN\_MODE  
\*Apr 18 05:59:20.579: ISAKMP:(0:1:SW:1):Old State = IKE\_R\_MM1 New  
State = IKE\_R\_MM1

\*Apr 18 05:59:20.619: ISAKMP:(0:1:SW:1): constructed NAT-T vendor-03 ID  
\*Apr 18 05:59:20.619: ISAKMP:(0:1:SW:1): sending packet to 10.10.10.2  
my\_port 500 peer\_port 500 (R) MM\_SA\_SETUP  
\*Apr 18 05:59:20.619: ISAKMP:(0:1:SW:1):Input = IKE\_MESG\_INTERNAL,  
IKE\_PROCESS\_COMPLETE  
\*Apr 18 05:59:20.619: ISAKMP:(0:1:SW:1):Old State = IKE\_R\_MM1 New  
State = IKE\_R\_MM2

\*Apr 18 05:59:20.911: ISAKMP (0:134217729): received packet from  
10.10.10.2 dport 500 sport 500 Global (R) MM\_SA\_SETUP  
\*Apr 18 05:59:20.911: ISAKMP:(0:1:SW:1):Input = IKE\_MESG\_FROM\_PEER,  
IKE\_MM\_EXCH  
\*Apr 18 05:59:20.911: ISAKMP:(0:1:SW:1):Old State = IKE\_R\_MM2  
New State = IKE\_R\_MM3

\*Apr 18 05:59:20.939: ISAKMP:(0:1:SW:1): processing KE payload. message ID = 0

\*Apr 18 05:59:20.939: ISAKMP:(0:1:SW:1): processing NONCE  
payload. message ID = 0

\*Apr 18 05:59:20.991: ISAKMP: Looking for a matching key for  
10.10.10.2 in default : success

\*Apr 18 05:59:20.991: ISAKMP:(0:1:SW:1):found peer pre-shared  
key matching 10.10.10.2

\*Apr 18 05:59:20.991: ISAKMP:(0:1:SW:1):SKEYID state generated

\*Apr 18 05:59:20.991: ISAKMP:(0:1:SW:1): processing vendor id payload

\*Apr 18 05:59:20.991: ISAKMP:(0:1:SW:1): vendor ID is Unity

\*Apr 18 05:59:20.991: ISAKMP:(0:1:SW:1): processing vendor id payload

\*Apr 18 05:59:20.991: ISAKMP:(0:1:SW:1): vendor ID is DPD

\*Apr 18 05:59:20.991: ISAKMP:(0:1:SW:1): processing vendor id payload

\*Apr 18 05:59:20.991: ISAKMP:(0:1:SW:1): speaking to another IOS box!

\*Apr 18 05:59:20.991: ISAKMP:received payload type 17

\*Apr 18 05:59:20.991: ISAKMP:received payload type 17

\*Apr 18 05:59:20.991: ISAKMP:(0:1:SW:1):Input = IKE\_MESG\_INTERNAL,  
IKE\_PROCESS\_MAIN\_MODE

\*Apr 18 05:59:20.991: ISAKMP:(0:1:SW:1):Old State = IKE\_R\_MM3 New  
State = IKE\_R\_MM3

\*Apr 18 05:59:21.051: ISAKMP:(0:1:SW:1): sending packet to  
10.10.10.2 my\_port 500 peer\_port 500 (R) MM\_KEY\_EXCH

\*Apr 18 05:59:21.051: ISAKMP:(0:1:SW:1):Input = IKE\_MESG\_INTERNAL,  
IKE\_PROCESS\_COMPLETE

\*Apr 18 05:59:21.051: ISAKMP:(0:1:SW:1):Old State = IKE\_R\_MM3  
New State = IKE\_R\_MM4

\*Apr 18 05:59:21.279: ISAKMP (0:134217729): received packet  
from 10.10.10.2 dport 500 sport 500 Global (R) MM\_KEY\_EXCH

\*Apr 18 05:59:21.279: ISAKMP:(0:1:SW:1):Input = IKE\_MESG\_FROM\_PEER,  
IKE\_MM\_EXCH

\*Apr 18 05:59:21.279: ISAKMP:(0:1:SW:1):Old State = IKE\_R\_MM4  
New State = IKE\_R\_MM5

\*Apr 18 05:59:21.311: ISAKMP:(0:1:SW:1): processing ID payload. message ID = 0

\*Apr 18 05:59:21.311: ISAKMP (0:134217729): ID payload  
next-payload : 8  
type : 1  
address : 10.10.10.2  
protocol : 17  
port : 500  
length : 12

\*Apr 18 05:59:21.311: ISAKMP:(0:1:SW:1):: peer matches \*none\* of the profiles

\*Apr 18 05:59:21.311: ISAKMP:(0:1:SW:1): processing HASH  
payload. message ID = 0

\*Apr 18 05:59:21.311: ISAKMP:(0:1:SW:1): processing NOTIFY  
INITIAL\_CONTACT protocol 1  
spi 0, message ID = 0, sa = 2398188

\*Apr 18 05:59:21.311: ISAKMP:(0:1:SW:1):SA authentication status:  
authenticated

\*Apr 18 05:59:21.311: ISAKMP:(0:1:SW:1): Process initial contact,  
bring down existing phase 1 and 2 SA's with local 10.10.10.1  
remote 10.10.10.2 remote port 500

\*Apr 18 05:59:21.311: ISAKMP:(0:1:SW:1):SA authentication status:  
authenticated

\*Apr 18 05:59:21.311: ISAKMP:(0:1:SW:1):SA has been authenticated  
with 10.10.10.2

\*Apr 18 05:59:21.311: ISAKMP: Trying to insert a peer  
10.10.10.1/10.10.10.2/500/, and inserted successfully.

\*Apr 18 05:59:21.311: ISAKMP:(0:1:SW:1):: peer matches  
\*none\* of the profiles

\*Apr 18 05:59:21.311: ISAKMP:(0:1:SW:1):Input = IKE\_MESG\_INTERNAL,  
IKE\_PROCESS\_MAIN\_MODE

\*Apr 18 05:59:21.311: ISAKMP:(0:1:SW:1):Old State =

IKE\_R\_MM5 New State = IKE\_R\_MM5

```
*Apr 18 05:59:21.331: IPSEC(key_engine): got a queue event with 1 kei messages
*Apr 18 05:59:21.391: ISAKMP:(0:1:SW:1):SA is doing
pre-shared key authentication using id type ID_IPV4_ADDR
*Apr 18 05:59:21.391: ISAKMP (0:134217729): ID payload
next-payload : 8
type : 1
address : 10.10.10.1
protocol : 17
port : 500
length : 12
*Apr 18 05:59:21.391: ISAKMP:(0:1:SW:1):Total payload length: 12
*Apr 18 05:59:21.391: ISAKMP:(0:1:SW:1): sending packet to
10.10.10.2 my_port 500 peer_port 500 (R) MM_KEY_EXCH
*Apr 18 05:59:21.391: ISAKMP:(0:1:SW:1):Input = IKE_MESG_INTERNAL,
IKE_PROCESS_COMPLETE
*Apr 18 05:59:21.391: ISAKMP:(0:1:SW:1):Old State = IKE_R_MM5
New State = IKE_P1_COMPLETE

*Apr 18 05:59:21.439: ISAKMP:(0:1:SW:1):Input = IKE_MESG_INTERNAL,
IKE_PHASE1_COMPLETE
*Apr 18 05:59:21.439: ISAKMP:(0:1:SW:1):Old State = IKE_P1_COMPLETE
New State = IKE_P1_COMPLETE

*Apr 18 05:59:21.779: ISAKMP (0:134217729): received packet from
10.10.10.2 dport 500 sport 500 Global (R) QM_IDLE
*Apr 18 05:59:21.779: ISAKMP: set new node 1056009800 to QM_IDLE
*Apr 18 05:59:21.779: ISAKMP:(0:1:SW:1): processing HASH payload.
message ID = 1056009800
*Apr 18 05:59:21.779: ISAKMP:(0:1:SW:1): processing SA payload.
message ID = 1056009800
*Apr 18 05:59:21.779: ISAKMP:(0:1:SW:1):Checking IPsec proposal 1
*Apr 18 05:59:21.779: ISAKMP: transform 1, ESP_SEAL
*Apr 18 05:59:21.779: ISAKMP: attributes in transform:
*Apr 18 05:59:21.779: ISAKMP: encaps is 1 (Tunnel)
*Apr 18 05:59:21.779: ISAKMP: SA life type in seconds
*Apr 18 05:59:21.779: ISAKMP: SA life duration (basic) of 3600
*Apr 18 05:59:21.779: ISAKMP: SA life type in kilobytes
*Apr 18 05:59:21.779: ISAKMP: SA life duration (VPI) of 0x0 0x46 0x50 0x0
*Apr 18 05:59:21.779: ISAKMP: authenticator is HMAC-SHA
*Apr 18 05:59:21.779: ISAKMP:(0:1:SW:1):atts are acceptable.
*Apr 18 05:59:21.779: IPSEC(validate_proposal_request): proposal part #1,
(key eng. msg.) INBOUND local= 10.10.10.1, remote= 10.10.10.2,
local_proxy= 172.18.124.0/255.255.255.0/0/0 (type=4),
remote_proxy= 20.20.20.0/255.255.255.0/0/0 (type=4),
protocol= ESP, transform= esp-seal esp-sha-hmac (Tunnel),
lifedur= 0s and 0kb,
spi= 0x0(0), conn_id= 0, keysize= 0, flags= 0x2
*Apr 18 05:59:21.779: IPSEC(kei_proxy): head = cisco,
map->ivrf = , kei->ivrf =
*Apr 18 05:59:21.779: ISAKMP:(0:1:SW:1): processing NONCE
payload. message ID = 1056009800
*Apr 18 05:59:21.779: ISAKMP:(0:1:SW:1): processing ID
payload. message ID = 1056009800
*Apr 18 05:59:21.779: ISAKMP:(0:1:SW:1): processing ID
payload. message ID = 1056009800
*Apr 18 05:59:21.779: ISAKMP:(0:1:SW:1): asking for 1 spis from ipsec
*Apr 18 05:59:21.779: ISAKMP:(0:1:SW:1):Node 1056009800,
Input = IKE_MESG_FROM_PEER, IKE_QM_EXCH
*Apr 18 05:59:21.779: ISAKMP:(0:1:SW:1):Old State =
IKE_QM_READY New State = IKE_QM_SPI_STARVE
*Apr 18 05:59:21.799: IPSEC(key_engine): got a queue event with 1 kei messages
*Apr 18 05:59:21.799: IPSEC(spi_response): getting spi 3711321544 for SA
```

from 10.10.10.1 to 10.10.10.2 for prot 3  
\*Apr 18 05:59:21.811: ISAKMP: received ke message (2/1)  
\*Apr 18 05:59:22.079: IPsec: Flow\_switching Allocated flow  
for flow\_id 134217729  
\*Apr 18 05:59:22.079: IPsec: Flow\_switching Allocated flow  
for flow\_id 134217730  
\*Apr 18 05:59:22.199: %CRYPTO-5-SESSION\_STATUS: Crypto tunnel  
is UP . Peer 10.10.10.2:500 Id: 10.10.10.2  
\*Apr 18 05:59:22.199: ISAKMP: Locking peer struct 0x25F0BD8,  
IPSEC refcount 1 for for stuff\_ke  
\*Apr 18 05:59:22.199: ISAKMP:(0:1:SW:1): Creating IPsec SAs  
\*Apr 18 05:59:22.199: inbound SA from 10.10.10.2 to 10.10.10.1 (f/i) 0/ 0  
(proxy 20.20.20.0 to 172.18.124.0)  
\*Apr 18 05:59:22.199: has spi 0xDD3645C8 and conn\_id 2000 and flags 2  
\*Apr 18 05:59:22.199: lifetime of 3600 seconds  
\*Apr 18 05:59:22.199: lifetime of 4608000 kilobytes  
\*Apr 18 05:59:22.199: has client flags 0x0  
\*Apr 18 05:59:22.199: outbound SA from 10.10.10.1 to 10.10.10.2 (f/i) 0/0  
(proxy 172.18.124.0 to 20.20.20.0)  
\*Apr 18 05:59:22.199: has spi 1918479069 and conn\_id 2001 and flags A  
\*Apr 18 05:59:22.199: lifetime of 3600 seconds  
\*Apr 18 05:59:22.199: lifetime of 4608000 kilobytes  
\*Apr 18 05:59:22.199: has client flags 0x0  
\*Apr 18 05:59:22.199: ISAKMP:(0:1:SW:1): sending packet to  
10.10.10.2 my\_port 500 peer\_port 500 (R) QM\_IDLE  
\*Apr 18 05:59:22.199: ISAKMP:(0:1:SW:1):Node 1056009800,  
Input = IKE\_MESG\_FROM\_IPSEC, IKE\_SPI\_REPLY  
\*Apr 18 05:59:22.199: ISAKMP:(0:1:SW:1):Old State = IKE\_QM\_SPI\_STARVE  
New State = IKE\_QM\_R\_QM2  
\*Apr 18 05:59:22.211: IPSEC(key\_engine): got a queue event with 2 kei messages  
\*Apr 18 05:59:22.211: IPSEC(initialize\_sas): ,  
(key eng. msg.) INBOUND local= 10.10.10.1, remote= 10.10.10.2,  
local\_proxy= 172.18.124.0/255.255.255.0/0/0 (type=4),  
remote\_proxy= 20.20.20.0/255.255.255.0/0/0 (type=4),  
protocol= ESP, transform= **esp-seal** esp-sha-hmac (Tunnel),  
lifedur= 3600s and 4608000kb,  
spi= 0xDD3645C8(3711321544), conn\_id= 134219728, keysize= 0, flags= 0x2  
\*Apr 18 05:59:22.211: IPSEC(initialize\_sas): ,  
(key eng. msg.) OUTBOUND local= 10.10.10.1, remote= 10.10.10.2,  
local\_proxy= 172.18.124.0/255.255.255.0/0/0 (type=4),  
remote\_proxy= 20.20.20.0/255.255.255.0/0/0 (type=4),  
protocol= ESP, transform= **esp-seal** esp-sha-hmac (Tunnel),  
lifedur= 3600s and 4608000kb,  
spi= 0x7259AADD(1918479069), conn\_id= 134219729, keysize= 0, flags= 0xA  
\*Apr 18 05:59:22.211: IPSEC(kei\_proxy): head = cisco,  
map->ivrf = , kei->ivrf =  
\*Apr 18 05:59:22.211: IPSEC(crypto\_ipsec\_sa\_find\_ident\_head):  
reconnecting with the same proxies and 10.10.10.2  
\*Apr 18 05:59:22.211: IPSEC(mtree\_add\_ident): src 172.18.124.0,  
dest 20.20.20.0, dest\_port 0  
  
\*Apr 18 05:59:22.211: IPSEC(create\_sa): sa created,  
(sa) sa\_dest= 10.10.10.1, sa\_prot= 50,  
sa\_spi= 0xDD3645C8(3711321544),  
sa\_trans= esp-seal esp-sha-hmac , sa\_conn\_id= 134219728  
\*Apr 18 05:59:22.211: IPSEC(create\_sa): sa created,  
(sa) sa\_dest= 10.10.10.2, sa\_prot= 50,  
sa\_spi= 0x7259AADD(1918479069),  
sa\_trans= esp-seal esp-sha-hmac , sa\_conn\_id= 134219729  
\*Apr 18 05:59:22.339: ISAKMP (0:134217729): received packet  
from 10.10.10.2 dport 500 sport 500 Global (R) QM\_IDLE  
\*Apr 18 05:59:22.339: ISAKMP:(0:1:SW:1):deleting node 1056009800  
error FALSE reason "quick mode done (await)"  
\*Apr 18 05:59:22.339: ISAKMP:(0:1:SW:1):Node 1056009800, Input =



IKE\_MSG\_FROM\_PEER, IKE\_QM\_EXCH

\*Apr 18 05:59:22.339: ISAKMP:(0:1:SW:1):Old State = IKE\_QM\_R\_QM2

New State = IKE\_QM\_PHASE2\_COMPLETE

## 显示命令

- **show crypto isakmp sa** - 显示对等体之间建立的 Internet 安全连接和密钥管理协议 (ISAKMP) 安全关联 (SA)。

```
R1#show crypto isakmp sa
dst src state conn-id slot
10.10.10.1 10.10.10.2 QM_IDLE 1 0
```

```
R2#show crypto isakmp sa
dst src state conn-id slot
10.10.10.1 10.10.10.2 QM_IDLE 1 0
```

- **show crypto ipsec sa** - 显示对等体之间建立的 IPsec SA。

```
R1#show crypto ipsec sa
interface: Ethernet1/0
Crypto map tag: cisco, local addr. 10.10.10.1
```

```
protected vrf:
local ident (addr/mask/prot/port): (172.18.124.0/255.255.255.0/0/0)
remote ident (addr/mask/prot/port): (20.20.20.0/255.255.255.0/0/0)
current_peer: 10.10.10.2:500
PERMIT, flags={origin_is_acl,}
#pkts encaps: 776, #pkts encrypt: 776, #pkts digest: 776
#pkts decaps: 776, #pkts decrypt: 776, #pkts verify: 776
#pkts compressed: 0, #pkts decompressed: 0
#pkts not compressed: 0, #pkts compr. failed: 0
#pkts not decompressed: 0, #pkts decompress failed: 0
#send errors 0, #recv errors 0
```

```
local crypto endpt.: 10.10.10.1, remote crypto endpt.: 10.10.10.2
path mtu 1500, media mtu 1500
current outbound spi: 7259AADD
```

```
inbound esp sas:
spi: 0xDD3645C8(3711321544)
transform: esp-seal esp-sha-hmac ,
in use settings ={Tunnel, }
slot: 0, conn id: 2000, flow_id: 1, crypto map: cisco
crypto engine type: Software, engine_id: 1
sa timing: remaining key lifetime (k/sec): (4565513/3382)
ike_cookies: 67432FCF F809B638 B84C0CD6 B0BCFFC3
IV size: 0 bytes
replay detection support: Y
```

```
inbound ah sas:
```

```
inbound pcp sas:
```

```
outbound esp sas:
spi: 0x7259AADD(1918479069)
transform: esp-seal esp-sha-hmac ,
in use settings ={Tunnel, }
slot: 0, conn id: 2001, flow_id: 2, crypto map: cisco
crypto engine type: Software, engine_id: 1
sa timing: remaining key lifetime (k/sec): (4565518/3382)
ike_cookies: 67432FCF F809B638 B84C0CD6 B0BCFFC3
IV size: 0 bytes
replay detection support: Y
```

```
outbound ah sas:
```

outbound pcp sas:

R1#

R2#show crypto ipsec sa

```
interface: Ethernet0/0
Crypto map tag: cisco, local addr. 10.10.10.2

protected vrf:
local ident (addr/mask/prot/port): (20.20.20.0/255.255.255.0/0/0)
remote ident (addr/mask/prot/port): (172.18.124.0/255.255.255.0/0/0)
current_peer: 10.10.10.1:500
PERMIT, flags={origin_is_acl,}
#pkts encaps: 776, #pkts encrypt: 776, #pkts digest: 38
#pkts decaps: 776, #pkts decrypt: 776, #pkts verify: 38
#pkts compressed: 0, #pkts decompressed: 0
#pkts not compressed: 0, #pkts compr. failed: 0
#pkts not decompressed: 0, #pkts decompress failed: 0
#send errors 1, #recv errors 0

local crypto endpt.: 10.10.10.2, remote crypto endpt.: 10.10.10.1
path mtu 1500, media mtu 1500
current outbound spi: DD3645C8

inbound esp sas:
spi: 0x7259AADD(1918479069)
transform: esp-seal esp-sha-hmac ,
in use settings = {Tunnel, }
slot: 0, conn id: 2000, flow_id: 3, crypto map: cisco
crypto engine type: Software, engine_id: 1
sa timing: remaining key lifetime (k/sec): (4536995/3410)
ike_cookies: B84C0CD6 B0BCFFC3 67432FCF F809B638
IV size: 0 bytes
replay detection support: Y

inbound ah sas:

inbound pcp sas:

outbound esp sas:
spi: 0xDD3645C8(3711321544)
transform: esp-seal esp-sha-hmac ,
in use settings = {Tunnel, }
slot: 0, conn id: 2001, flow_id: 4, crypto map: cisco
crypto engine type: Software, engine_id: 1
sa timing: remaining key lifetime (k/sec): (4537000/3409)
ike_cookies: B84C0CD6 B0BCFFC3 67432FCF F809B638
IV size: 0 bytes
replay detection support: Y

outbound ah sas:

outbound pcp sas:
```

## [esp-seal 转换集的限制](#)

关于 **esp-seal** 转换集的使用有三条限制：

- 只能在没有加密加速器的条件下使用 **esp-seal** 转换集。提出此限制是因为当前没有加密加速器

实施了 SEAL 加密转换集，如果存在加密加速器，它将处理通过 IKE 协商的所有 IPSec 连接。如果存在加密加速器，Cisco IOS 软件仍将允许配置转换集，但它会提出这样的警告 - 只要启用加密加速器就不会使用转换集。

- **esp-seal** 转换集只能与身份验证转换集配合使用，即 **esp-md5-hmac**、**esp-sha-hmac**、**ah-md5-hmac** 或 **ah-sha-hmac**。提出此限制是因为，当涉及针对加密数据包的修改行为提供保护时，SEAL 加密的功能会尤其弱。因此，为防止这样的弱点遭到攻击利用，就会要求使用身份验证转换集（专为击退此类攻击而设计）。如果您尝试使用 SEAL 配置 IPSec 转换集但同时没有使用身份验证转换集，就会生成错误，并且该转换集将遭到拒绝。
- **esp-seal** 转换集不能与手动采取密钥保护的加密映射一起使用。提出此限制是因为，此类配置将在每次重新引导时重新使用同一个密钥流，这样就会损害安全性。考虑到安全问题，禁止这样的配置。如果您尝试使用基于 SEAL 的转换集配置手动采取密钥保护的加密映射，就会生成错误，并且该转换集将遭到拒绝。

## 相关信息

- [IPSec 支持页面](#)
- [技术支持和文档 - Cisco Systems](#)