Site-to-site tunnelheid tussen IOS-routers met SEAL-voorbeeldconfiguratie

Inhoud

Inleiding

Het Software Encryption Algorithm (SEAL) is een alternatief algoritme voor Data Encryption Standard (DES), Triple DES (3DES) en Advanced Encryption Standard (AES). SEAL-encryptie gebruikt een coderingssleutel met 160 bits en heeft een lagere impact op de CPU in vergelijking met andere op software gebaseerde algoritmen. Dit document illustreert hoe u een LAN-to-LAN (site-to-site) IPSec-tunnel kunt configureren met behulp van SEAL.

Voorwaarden

Vereisten

Er zijn geen specifieke vereisten van toepassing op dit document.

Gebruikte componenten

De informatie in dit document is gebaseerd op de volgende software- en hardware-versies:

- Cisco 7200 Series routers voor Cisco IOS®-softwarerelease 12.3(7)T

De informatie in dit document is gebaseerd op de apparaten in een specifieke laboratoriumomgeving. Alle apparaten die in dit document worden beschreven, hadden een opgeschoonde (standaard)configuratie. Als uw netwerk live is, moet u de potentiële impact van elke opdracht begrijpen.

Conventies

Raadpleeg voor meer informatie over documentconventies de technische Tips van Cisco.

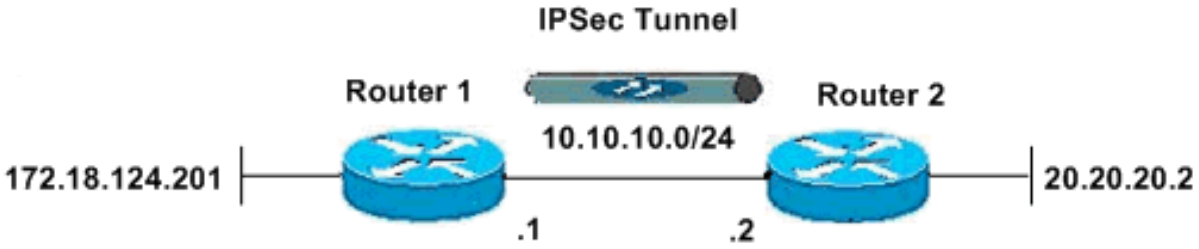
Configureren

Deze sectie bevat informatie over het configureren van de functies die in dit document worden beschreven.

N.B.: Gebruik het Opdrachtupgereedschap (alleen geregistreerde klanten) om meer informatie te vinden over de opdrachten die in dit document worden gebruikt.

Netwerkdiagram

Het netwerk in dit document is als volgt opgebouwd:



Configuraties

Dit document gebruikt deze configuraties:

- router 1
- router 2

router 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
```

router 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
```

Verifiëren

Deze sectie verschaft informatie die u kunt gebruiken om te bevestigen dat uw configuratie correct werkt.

Bepaalde opdrachten met **show worden ondersteund door de tool** Output Interpreter (alleen voor geregistreerde klanten). Hiermee kunt u een analyse van de output van opdrachten met **show genereren.**

- **toon crypto kaart**-verifieert de configuratie op de router.Deze output wordt overgenomen van router 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
```

Problemen oplossen

Deze sectie bevat informatie waarmee u problemen met de configuratie kunt oplossen.

Opdrachten voor troubleshooting

Bepaalde opdrachten met **show worden ondersteund door de tool** Output Interpreter (alleen voor geregistreerde klanten). Hiermee kunt u een analyse van de output van opdrachten met **show genereren.**

Opmerking: Voordat u **debug-**opdrachten afgeeft, raadpleegt u Belangrijke informatie over Debug Commands.

[ISAMP- en IPSec-knooppunten]

- **toon het debuggen**—displays informatie over de types van het debuggen die ingeschakeld zijn voor uw router.

```
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_MESG_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
```

Opdrachten tonen

- **toon crypto isakmp sa**-Toont het Internet Security Association Management Protocol (ISAKMP) Security Association (SA) dat tussen peers is gebouwd.

```
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
```

- **toon crypto ipsec sa**-shows the IPSec SA tussen peers.

```
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:
```

Beperkingen met ESP-selectieset omzetten

Er zijn drie beperkingen op het gebruik van de **esp-**transformatie set:

- De **esp-verzegeltransformator** kan alleen worden gebruikt als er geen crypto versnellers aanwezig zijn. Deze beperking is aanwezig omdat geen huidige crypto versnellers de SEAL encryptie transformator set implementeren, en als een crypto versneller aanwezig is, zal deze alle IPSec verbindingen verwerken die met IKE zijn overeengekomen. Als een crypto accelerator aanwezig is, zal de Cisco IOS software de transformatie set om te zetten toestaan, maar het zal waarschuwen dat het niet gebruikt zal worden zolang de crypto accelerator is ingeschakeld.
- De **esp-verzegeltransformatie** kan alleen gebruikt worden in combinatie met een authenticatie transformatie set, namelijk één van deze: **esp-md5-hmac, esp-sha-hmac, ah-md5-hmac** of **ah-sha-hmac**. Deze beperking is aanwezig omdat SEAL-encryptie met name zwak is als het op bescherming tegen wijzigingen van het gecodeerde pakket aankomt. Om een dergelijke zwakte te te voorkomen, is een reeks van de authenticatie transformaties vereist (de reeks van de Verificatie wordt ontworpen om dergelijke aanvallen te besturen.) Als u probeert een IPSec transformatie set te configureren met behulp van SEAL zonder een authenticatie transformatie set, wordt er een fout gegenereerd en wordt de transformatie set verworpen.
- De **esp-afdichtingsset** kan niet worden gebruikt met een handmatig vastgehouden crypto-kaart. Deze beperking is aanwezig omdat een dergelijke configuratie dezelfde sleutelstroom voor elke herstart zou hergebruiken, wat de beveiliging in gevaar zou brengen. Vanwege het veiligheidsprobleem is een dergelijke configuratie verboden. Als u probeert om handmatig ingevoerde crypto in kaart te brengen met een SEAL-gebaseerde transformatiereeks, wordt er een fout gegenereerd en wordt de transformatiereeks verworpen.

Gerelateerde informatie

- IPsec-ondersteuningspagina
- Technische ondersteuning en documentatie – Cisco Systems