

IOS IPSec et IKE met au point - Dépannage principal du mode IKEv1

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Introduction

Ce document fournit des informations pour comprendre met au point sur le logiciel de Cisco IOS®

quand le mode principal et la clé pré-partagée (PSK) sont utilisés.

Ce document fournit également des informations sur la façon dont traduire certain mettent au point des lignes dans une configuration.

Ces thèmes ne sont pas discutés :

- Dépassement du trafic après que le tunnel ait été établi
- Concepts de base d'IPSec ou d'Échange de clés Internet (IKE)

Principale question

L'IKE et l'IPSec met au point tendent à obtenir cryptique. Le centre d'assistance technique Cisco (TAC) utilise souvent ces bogues pour comprendre où un problème avec l'**établissement de tunnel** VPN d'IPSec se trouve.

Scénario

Le mode principal est typiquement utilisé entre les tunnels entre réseaux locaux, ou en cas d'Accès à distance (EzVPN) quand des Certificats sont utilisés pour l'authentification.

Ceux met au point sont d'un périphérique de Cisco IOS qui exécute la version logicielle 15.2(1)T.

Deux scénarios principaux sont décrits dans ce document :

- Côté de demandeur IOS
- Côté de responder IOS

Dans ce document, un tunnel basé sur VTI entre deux sites est établi, basé sur l'IPv6.

Remarques :

Utilisez le [Command Lookup Tool](#) (clients [enregistrés](#) seulement) afin d'obtenir plus d'informations sur les commandes utilisées dans ce document.

Référez-vous aux [informations importantes sur les commandes de débogage](#) avant d'utiliser les commandes de **débogage**.

Debugs utilisés

- [debug crypto isakmp](#)
- [debug crypto ipsec](#)
- kmi de debug crypto

Configuration de routeur IOS

Crypto configuration

```
crypto isakmp policy 10
authentication pre-share

crypto isakmp key cisco address ipv6 ::/0

crypto ipsec transform-set TRA esp-aes esp-sha-hmac
mode transport

crypto ipsec profile PRO
set transform-set TRA

interface Tunnel23
ip address 192.168.23.2 255.255.255.0
ipv6 address FE80::23:2 link-local
tunnel source Ethernet0/0
tunnel mode ipsec ipv6
tunnel destination 2001: DB8::3
tunnel protection ipsec profile PRO
```

L'autre côté

```
crypto isakmp policy 10
authentication pre-share

crypto isakmp key cisco address ipv6 ::/0

crypto ipsec transform-set TRA esp-aes esp-sha-hmac
mode transport

crypto ipsec profile PRO
set transform-set TRA

interface Tunnel23
ip address 192.168.23.3 255.255.255.0
ipv6 address FE80::23:3 link-local
tunnel source Ethernet0/0
tunnel mode ipsec ipv6
tunnel destination 2001: DB8::2
tunnel protection ipsec profile PRO
```

Débogage

Côté de responder IOS

Message principal 1 (MM1) de mode

La proposition initiale pour l'IKE inclut :

- Cryptage
- Hachage
- Groupe de Protocole DH (Diffie-Hellman)
- Vie

```

*Sep 21 08:33:43.377: ISAKMP (0) : received packet from 2001: DB8::2 dport 500
sport 500 Global (N) NEW SA
*Sep 21 08:33:43.377: ISAKMP: Created a peer struct for 2001: DB8::2, peer port
500
*Sep 21 08:33:43.377: ISAKMP: New peer created peer = 0x8E45588
peer_handle = 0x8000000A
*Sep 21 08:33:43.377: ISAKMP: Locking peer struct 0x8E45588, refcount 1 for
crypto_isakmp_process_block
*Sep 21 08:33:43.377: ISAKMP: local port 500, remote port 500
*Sep 21 08:33:43.377: ISAKMP: (0):insert sa successfully sa = 6D12A00
*Sep 21 08:33:43.377: ISAKMP: (0):Input = IKE_MSG_FROM_PEER, IKE_MM_EXCH
*Sep 21 08:33:43.377: ISAKMP: (0): Old State = IKE_READY New State = IKE_R_MM1
*Sep 21 08:33:43.377: ISAKMP: (0): processing SA payload. message ID = 0
*Sep 21 08:33:43.377: ISAKMP: (0):found peer pre-shared key matching 2001:
DB8::2
*Sep 21 08:33:43.377: ISAKMP: (0): local preshared key found
*Sep 21 08:33:43.377: ISAKMP: Scanning profiles for xauth ...
*Sep 21 08:33:43.377: ISAKMP: (0):Checking ISAKMP transform 1 against priority
10 policy
*Sep 21 08:33:43.377: ISAKMP:         encryption DES-CBC
*Sep 21 08:33:43.377: ISAKMP:         hash SHA
*Sep 21 08:33:43.377: ISAKMP:         default group 1
*Sep 21 08:33:43.377: ISAKMP:         auth pre-share
*Sep 21 08:33:43.377: ISAKMP:         life type in seconds
*Sep 21 08:33:43.377: ISAKMP:         life duration (VPI) of 0x0 0x1 0x51 0x80
*Sep 21 08:33:43.377: ISAKMP: (0):atts are acceptable. Next payload is 0
*Sep 21 08:33:43.377: ISAKMP: (0):Acceptable atts:actual life: 0
*Sep 21 08:33:43.377: ISAKMP: (0):Acceptable atts:life: 0
*Sep 21 08:33:43.377: ISAKMP: (0):Fill atts in sa vpi_length:4
*Sep 21 08:33:43.377: ISAKMP: (0):Fill atts in sa life_in_seconds:86400
*Sep 21 08:33:43.377: ISAKMP: (0):Returning Actual lifetime: 86400
*Sep 21 08:33:43.377: ISAKMP: (0):: Started lifetime timer: 86400.

*Sep 21 08:33:43.377: ISAKMP: (0):Input = IKE_MSG_INTERNAL,
IKE_PROCESS_MAIN_MODE
*Sep 21 08:33:43.377: ISAKMP: (0): Old State = IKE_R_MM1 New State = IKE_R_MM1

```

Configuration relative :

```

crypto isakmp policy 10
authentication pre-share

```

Message principal 2 (MM2) de mode - envoi de notre réponse

```

*Sep 21 08:33:43.377: ISAKMP: (0): sending packet to 2001: DB8::2 my_port 500
peer_port 500 (R) MM_SA_SETUP
*Sep 21 08:33:43.377: ISAKMP: (0): Sending an IKE IPv6 Packet.
*Sep 21 08:33:43.377: ISAKMP: (0):Input = IKE_MSG_INTERNAL,
IKE_PROCESS_COMPLETE
*Sep 21 08:33:43.377: ISAKMP: (0): Old State = IKE_R_MM1 New State = IKE_R_MM2

```

Message principal 3 (MM3) de mode

Inclut :

- Détection de Traduction d'adresses de réseau (NAT)
- Partie une d'échange CAD

```

*Sep 21 08:33:43.381: ISAKMP (0): received packet from 2001:DB8::2 dport 500
sport 500 Global (R) MM_SA_SETUP
*Sep 21 08:33:43.381: ISAKMP: (0):Input = IKE_MSG_FROM_PEER, IKE_MM_EXCH

```

```

*Sep 21 08:33:43.381: ISAKMP: (0): Old State = IKE_R_MM2 New State = IKE_R_MM3
*Sep 21 08:33:43.381: ISAKMP: (0): processing KE payload. message ID = 0
*Sep 21 08:33:43.393: ISAKMP: (0): processing NONCE payload. message ID = 0
*Sep 21 08:33:43.393: ISAKMP: (0):found peer pre-shared key matching 2001:
DB8::2
*Sep 21 08:33:43.393: ISAKMP: (1011): processing vendor id payload
*Sep 21 08:33:43.393: ISAKMP: (1011): vendor ID is DPD
*Sep 21 08:33:43.393: ISAKMP: (1011): processing vendor id payload
*Sep 21 08:33:43.393: ISAKMP: (1011): speaking to another IOS box!
*Sep 21 08:33:43.393: ISAKMP: (1011): processing vendor id payload
*Sep 21 08:33:43.393: ISAKMP: (1011): vendor ID seems Unity/DPD but major 0
mismatch
*Sep 21 08:33:43.393: ISAKMP: (1011): vendor ID is XAUTH
*Sep 21 08:33:43.393: ISAKMP: (1011):Input = IKE_MESG_INTERNAL,
IKE_PROCESS_MAIN_MODE
*Sep 21 08:33:43.393: ISAKMP: (1011): Old State = IKE_R_MM3 New State =
IKE_R_MM3

```

Message principal 4 (MM4) de mode

Inclut :

- Charge utile NAT de détection
- Suite d'échange CAD

```

*Sep 21 08:33:43.405: ISAKMP: (1011): sending packet to 2001: DB8::2 my_port
500 peer_port 500 (R) MM_KEY_EXCH
*Sep 21 08:33:43.405: ISAKMP: (1011): Sending an IKE IPv6 Packet.
*Sep 21 08:33:43.405: ISAKMP: (1011):Input = IKE_MESG_INTERNAL,
IKE_PROCESS_COMPLETE
*Sep 21 08:33:43.405: ISAKMP: (1011): Old State = IKE_R_MM3 New State =
IKE_R_MM4

```

Le message principal 5 (MM5) de mode - demandeur envoie son identité

Inclut :

- Les informations d'identité locales
- Clé

```

*Sep 21 08:33:43.425: ISAKMP (1011): received packet from 2001: DB8::2 dport
500 sport 500 Global (R) MM_KEY_EXCH
*Sep 21 08:33:43.425: ISAKMP: (1011):Input = IKE_MESG_FROM_PEER, IKE_MM_EXCH
*Sep 21 08:33:43.425: ISAKMP: (1011): Old State = IKE_R_MM4 New State =
IKE_R_MM5

*Sep 21 08:33:43.425: ISAKMP: (1011): processing ID payload. message ID = 0
*Sep 21 08:33:43.425: ISAKMP (1011): ID payload
    next-payload : 8
    type          : 5
    address       : 2001: DB8::2
    protocol      : 17
    port         : 500
    length        : 24
*Sep 21 08:33:43.425: ISAKMP: (0):: peer matches *none* of the profiles
*Sep 21 08:33:43.425: ISAKMP: (1011): processing HASH payload. message ID = 0
*Sep 21 08:33:43.425: ISAKMP: (1011): processing NOTIFY INITIAL_CONTACT
protocol 1 spi 0, message ID = 0, sa = 0x6D12A00
*Sep 21 08:33:43.425: ISAKMP: (1011): SA authentication status: authenticated

```

```

*Sep 21 08:33:43.425: ISAKMP: (1011): SA has been authenticated with 2001:
DB8::2
*Sep 21 08:33:43.425: ISAKMP: (1011): SA authentication status: authenticated
*Sep 21 08:33:43.425: ISAKMP: (1011): Process initial contact, bring down
existing phase 1 and 2 SA's with local 2001: DB8::3 remote 2001: DB8::2
remote port 500
*Sep 21 08:33:43.425: ISAKMP: Trying to insert a peer 2001: DB8::3/2001:
DB8::2/500/, and inserted successfully 8E45588.
*Sep 21 08:33:43.425: ISAKMP: (1011):Input = IKE_MESG_INTERNAL,
IKE_PROCESS_MAIN_MODE
*Sep 21 08:33:43.425: ISAKMP: (1011): Old State = IKE_R_MM5 New State =
IKE_R_MM5

```

Le message principal 6 (MM6) de mode - responder envoie son identité. Fin de Phase 1.

Inclut :

- Identité distante envoyée du pair
- Décision finale concernant le groupe de tunnel de choisir

```

*Sep 21 08:33:43.425: IPSEC(key_engine): got a queue event with 1 KMI message(s)
*Sep 21 08:33:43.425: ISAKMP: (1011): SA is doing pre-shared key authentication
using id type ID_IPV6_ADDR
*Sep 21 08:33:43.425: ISAKMP (1011): ID payload
  next-payload : 8
  type          : 5
  address       : 2001: DB8::3
  protocol      : 17
  port         : 500
  length       : 24
*Sep 21 08:33:43.425: ISAKMP: (1011):Total payload length: 24
*Sep 21 08:33:43.425: ISAKMP: (1011): sending packet to 2001: DB8::2 my_port
500 peer_port 500 (R) MM_KEY_EXCH
*Sep 21 08:33:43.425: ISAKMP: (1011): Sending an IKE IPv6 Packet.
*Sep 21 08:33:43.425: ISAKMP: (1011):Input = IKE_MESG_INTERNAL,
IKE_PROCESS_COMPLETE
*Sep 21 08:33:43.425: ISAKMP: (1011): Old State = IKE_R_MM5 New State =
IKE_P1_COMPLETE

```

Configuration relative :

```
crypto isakmp identity ...
```

Message rapide 1 (QM1) de mode

```

*Sep 21 08:33:43.433: ISAKMP (1011): received packet from 2001: DB8::2 dport
500 sport 500 Global (R) QM_IDLE
*Sep 21 08:33:43.433: ISAKMP: set new node 1371333358 to QM_IDLE
*Sep 21 08:33:43.433: ISAKMP: (1011): processing HASH payload. message ID =
1371333358
*Sep 21 08:33:43.433: ISAKMP: (1011): processing SA payload. message ID =
1371333358
*Sep 21 08:33:43.433: ISAKMP: (1011):Checking IPSec proposal 1
*Sep 21 08:33:43.433: ISAKMP: transform 1, ESP_AES
*Sep 21 08:33:43.433: ISAKMP:   attributes in transform:
*Sep 21 08:33:43.433: ISAKMP:     encaps is 1 (Tunnel)
*Sep 21 08:33:43.433: ISAKMP:     SA life type in seconds
*Sep 21 08:33:43.433: ISAKMP:     SA life duration (basic) of 3600
*Sep 21 08:33:43.433: ISAKMP:     SA life type in kilobytes
*Sep 21 08:33:43.433: ISAKMP:     SA life duration (VPI) of 0x0 0x46 0x50 0x0
*Sep 21 08:33:43.433: ISAKMP:     authenticator is HMAC-SHA

```

```

*Sep 21 08:33:43.433: ISAKMP:      key length is 128
*Sep 21 08:33:43.433: ISAKMP: (1011):atts are acceptable.
*Sep 21 08:33:43.433: IPSEC(validate_proposal_request): proposal part #1
*Sep 21 08:33:43.433: IPSEC(validate_proposal_request): proposal part #1,
(key eng. msg.) INBOUND local= 2001: DB8::3:0, remote= 2001: DB8::2:0,
  local_proxy= ::/0/256/0,
  remote_proxy= ::/0/256/0,
  protocol= ESP, transform= NONE (Tunnel),
  lifedur= 0s and 0kb,
  spi= 0x0(0), conn_id= 0, keysize= 128, flags= 0x0
*Sep 21 08:33:43.433: ISAKMP: (1011): processing NONCE payload. message ID =
1371333358
*Sep 21 08:33:43.433: ISAKMP: (1011): processing ID payload. message ID =
1371333358
*Sep 21 08:33:43.433: ISAKMP: (1011): processing ID payload. message ID =
1371333358
*Sep 21 08:33:43.433: ISAKMP: (1011):QM Responder gets spi
*Sep 21 08:33:43.433: ISAKMP: (1011):Node 1371333358, Input =
IKE_MSG_FROM_PEER, IKE_QM_EXCH
*Sep 21 08:33:43.433: ISAKMP: (1011): Old State = IKE_QM_READY  New State =
IKE_QM_SPI_STARVE

```

Configuration appropriée :

```

*Sep 21 08:33:43.433: ISAKMP (1011): received packet from 2001: DB8::2 dport
500 sport 500 Global (R) QM_IDLE
*Sep 21 08:33:43.433: ISAKMP: set new node 1371333358 to QM_IDLE
*Sep 21 08:33:43.433: ISAKMP: (1011): processing HASH payload. message ID =
1371333358
*Sep 21 08:33:43.433: ISAKMP: (1011): processing SA payload. message ID =
1371333358
*Sep 21 08:33:43.433: ISAKMP: (1011):Checking IPsec proposal 1
*Sep 21 08:33:43.433: ISAKMP: transform 1, ESP_AES
*Sep 21 08:33:43.433: ISAKMP:      attributes in transform:
*Sep 21 08:33:43.433: ISAKMP:      encaps is 1 (Tunnel)
*Sep 21 08:33:43.433: ISAKMP:      SA life type in seconds
*Sep 21 08:33:43.433: ISAKMP:      SA life duration (basic) of 3600
*Sep 21 08:33:43.433: ISAKMP:      SA life type in kilobytes
*Sep 21 08:33:43.433: ISAKMP:      SA life duration (VPI) of  0x0 0x46 0x50 0x0
*Sep 21 08:33:43.433: ISAKMP:      authenticator is HMAC-SHA
*Sep 21 08:33:43.433: ISAKMP:      key length is 128
*Sep 21 08:33:43.433: ISAKMP: (1011):atts are acceptable.
*Sep 21 08:33:43.433: IPSEC(validate_proposal_request): proposal part #1
*Sep 21 08:33:43.433: IPSEC(validate_proposal_request): proposal part #1,
(key eng. msg.) INBOUND local= 2001: DB8::3:0, remote= 2001: DB8::2:0,
  local_proxy= ::/0/256/0,
  remote_proxy= ::/0/256/0,
  protocol= ESP, transform= NONE (Tunnel),
  lifedur= 0s and 0kb,
  spi= 0x0(0), conn_id= 0, keysize= 128, flags= 0x0
*Sep 21 08:33:43.433: ISAKMP: (1011): processing NONCE payload. message ID =
1371333358
*Sep 21 08:33:43.433: ISAKMP: (1011): processing ID payload. message ID =
1371333358
*Sep 21 08:33:43.433: ISAKMP: (1011): processing ID payload. message ID =
1371333358
*Sep 21 08:33:43.433: ISAKMP: (1011):QM Responder gets spi
*Sep 21 08:33:43.433: ISAKMP: (1011):Node 1371333358, Input =
IKE_MSG_FROM_PEER, IKE_QM_EXCH
*Sep 21 08:33:43.433: ISAKMP: (1011): Old State = IKE_QM_READY  New State =
IKE_QM_SPI_STARVE

```

Message rapide 2 (QM2) de mode

Inclut :

- L'extrémité distante envoie des paramètres
- Le plus court des deux vies proposées de la phase 2 est choisi

```
*Sep 21 08:33:43.433: ISAKMP (1011): received packet from 2001: DB8::2 dport
500 sport 500 Global (R) QM_IDLE
*Sep 21 08:33:43.433: ISAKMP: set new node 1371333358 to QM_IDLE
*Sep 21 08:33:43.433: ISAKMP: (1011): processing HASH payload. message ID =
1371333358
*Sep 21 08:33:43.433: ISAKMP: (1011): processing SA payload. message ID =
1371333358
*Sep 21 08:33:43.433: ISAKMP: (1011):Checking IPsec proposal 1
*Sep 21 08:33:43.433: ISAKMP: transform 1, ESP_AES
*Sep 21 08:33:43.433: ISAKMP: attributes in transform:
*Sep 21 08:33:43.433: ISAKMP: encaps is 1 (Tunnel)
*Sep 21 08:33:43.433: ISAKMP: SA life type in seconds
*Sep 21 08:33:43.433: ISAKMP: SA life duration (basic) of 3600
*Sep 21 08:33:43.433: ISAKMP: SA life type in kilobytes
*Sep 21 08:33:43.433: ISAKMP: SA life duration (VPI) of 0x0 0x46 0x50 0x0
*Sep 21 08:33:43.433: ISAKMP: authenticator is HMAC-SHA
*Sep 21 08:33:43.433: ISAKMP: key length is 128
*Sep 21 08:33:43.433: ISAKMP: (1011):atts are acceptable.
*Sep 21 08:33:43.433: IPSEC(validate_proposal_request): proposal part #1
*Sep 21 08:33:43.433: IPSEC(validate_proposal_request): proposal part #1,
(key eng. msg.) INBOUND local= 2001: DB8::3:0, remote= 2001: DB8::2:0,
local_proxy= ::/0/256/0,
remote_proxy= ::/0/256/0,
protocol= ESP, transform= NONE (Tunnel),
lifedur= 0s and 0kb,
spi= 0x0(0), conn_id= 0, keysize= 128, flags= 0x0
*Sep 21 08:33:43.433: ISAKMP: (1011): processing NONCE payload. message ID =
1371333358
*Sep 21 08:33:43.433: ISAKMP: (1011): processing ID payload. message ID =
1371333358
*Sep 21 08:33:43.433: ISAKMP: (1011): processing ID payload. message ID =
1371333358
*Sep 21 08:33:43.433: ISAKMP: (1011):QM Responder gets spi
*Sep 21 08:33:43.433: ISAKMP: (1011):Node 1371333358, Input =
IKE_MSG_FROM_PEER, IKE_QM_EXCH
*Sep 21 08:33:43.433: ISAKMP: (1011): Old State = IKE_QM_READY New State =
IKE_QM_SPI_STARVE
```

Configuration appropriée :

```
*Sep 21 08:33:43.433: ISAKMP (1011): received packet from 2001: DB8::2 dport
500 sport 500 Global (R) QM_IDLE
*Sep 21 08:33:43.433: ISAKMP: set new node 1371333358 to QM_IDLE
*Sep 21 08:33:43.433: ISAKMP: (1011): processing HASH payload. message ID =
1371333358
*Sep 21 08:33:43.433: ISAKMP: (1011): processing SA payload. message ID =
1371333358
*Sep 21 08:33:43.433: ISAKMP: (1011):Checking IPsec proposal 1
*Sep 21 08:33:43.433: ISAKMP: transform 1, ESP_AES
*Sep 21 08:33:43.433: ISAKMP: attributes in transform:
*Sep 21 08:33:43.433: ISAKMP: encaps is 1 (Tunnel)
*Sep 21 08:33:43.433: ISAKMP: SA life type in seconds
*Sep 21 08:33:43.433: ISAKMP: SA life duration (basic) of 3600
*Sep 21 08:33:43.433: ISAKMP: SA life type in kilobytes
*Sep 21 08:33:43.433: ISAKMP: SA life duration (VPI) of 0x0 0x46 0x50 0x0
*Sep 21 08:33:43.433: ISAKMP: authenticator is HMAC-SHA
*Sep 21 08:33:43.433: ISAKMP: key length is 128
*Sep 21 08:33:43.433: ISAKMP: (1011):atts are acceptable.
```



```

*Sep 21 08:33:43.433: IPSEC(validate_proposal_request): proposal part #1
*Sep 21 08:33:43.433: IPSEC(validate_proposal_request): proposal part #1,
(key eng. msg.) INBOUND local= 2001: DB8::3:0, remote= 2001: DB8::2:0,
  local_proxy= ::/0/256/0,
  remote_proxy= ::/0/256/0,
  protocol= ESP, transform= NONE (Tunnel),
  lifedur= 0s and 0kb,
  spi= 0x0(0), conn_id= 0, keysize= 128, flags= 0x0
*Sep 21 08:33:43.433: ISAKMP: (1011): processing NONCE payload. message ID =
1371333358
*Sep 21 08:33:43.433: ISAKMP: (1011): processing ID payload. message ID =
1371333358
*Sep 21 08:33:43.433: ISAKMP: (1011): processing ID payload. message ID =
1371333358
*Sep 21 08:33:43.433: ISAKMP: (1011):QM Responder gets spi
*Sep 21 08:33:43.433: ISAKMP: (1011):Node 1371333358, Input =
IKE_MSG_FROM_PEER, IKE_QM_EXCH
*Sep 21 08:33:43.433: ISAKMP: (1011): Old State = IKE_QM_READY New State =
IKE_QM_SPI_STARVE

```

Le message rapide 3 (QM3) de mode - la phase deux devrait être complet et interface de tunnel en hausse

```

*Sep 21 08:33:43.437: %LINEPROTO-5-UPDOWN: Line protocol on Interface Tunnel23,
changed state to up
*Sep 21 08:33:43.437: ISAKMP (1011): received packet from 2001: DB8::2 dport
500 sport 500 Global (R) QM_IDLE
*Sep 21 08:33:43.437: ISAKMP: (1011): deleting node 1371333358 error FALSE
reason "QM done (await)"
*Sep 21 08:33:43.437: ISAKMP: (1011):Node 1371333358, Input =
IKE_MSG_FROM_PEER, IKE_QM_EXCH
*Sep 21 08:33:43.437: ISAKMP: (1011): Old State = IKE_QM_R_QM2 New State =
IKE_QM_PHASE2_COMPLETE
*Sep 21 08:33:43.437: IPSEC(key_engine): got a queue event with 1 KMI message(s)
*Sep 21 08:33:43.437: IPSEC(key_engine_enable_outbound): rec'd enable notify
from ISAKMP

```

Routeur IOS - Demandeur

Message principal 1 (MM1) de mode - contact initial

Inclut :

- Id de constructeur (VID)
- Capacités
- Propositions de Phase 1
- Association de sécurité d'IKE (SA)
- IPSec crée déjà un modèle pour SAS

```

*Sep 21 08:33:43.437: %LINEPROTO-5-UPDOWN: Line protocol on Interface Tunnel23,
changed state to up
*Sep 21 08:33:43.437: ISAKMP (1011): received packet from 2001: DB8::2 dport
500 sport 500 Global (R) QM_IDLE
*Sep 21 08:33:43.437: ISAKMP: (1011): deleting node 1371333358 error FALSE
reason "QM done (await)"
*Sep 21 08:33:43.437: ISAKMP: (1011):Node 1371333358, Input =
IKE_MSG_FROM_PEER, IKE_QM_EXCH

```

```
*Sep 21 08:33:43.437: ISAKMP: (1011): Old State = IKE_QM_R_QM2 New State =  
IKE_QM_PHASE2_COMPLETE  
*Sep 21 08:33:43.437: IPSEC(key_engine): got a queue event with 1 KMI message(s)  
*Sep 21 08:33:43.437: IPSEC(key_engine_enable_outbound): rec'd enable notify  
from ISAKMP
```

Configuration appropriée :

```
*Sep 21 08:33:43.437: %LINEPROTO-5-UPDOWN: Line protocol on Interface Tunnel23,  
changed state to up  
*Sep 21 08:33:43.437: ISAKMP (1011): received packet from 2001: DB8::2 dport  
500 sport 500 Global (R) QM_IDLE  
*Sep 21 08:33:43.437: ISAKMP: (1011): deleting node 1371333358 error FALSE  
reason "QM done (await)"  
*Sep 21 08:33:43.437: ISAKMP: (1011):Node 1371333358, Input =  
IKE_MSG_FROM_PEER, IKE_QM_EXCH  
*Sep 21 08:33:43.437: ISAKMP: (1011): Old State = IKE_QM_R_QM2 New State =  
IKE_QM_PHASE2_COMPLETE  
*Sep 21 08:33:43.437: IPSEC(key_engine): got a queue event with 1 KMI message(s)  
*Sep 21 08:33:43.437: IPSEC(key_engine_enable_outbound): rec'd enable notify  
from ISAKMP
```

Message principal 2 (MM2) de mode - réponse pour parafer le contact

Inclut :

- Le pair choisit la stratégie de Protocole ISAKMP (Internet Security Association and Key Management Protocol) pour l'utiliser
- IKE SA

```
*Sep 21 08:33:43.437: %LINEPROTO-5-UPDOWN: Line protocol on Interface Tunnel23,  
changed state to up  
*Sep 21 08:33:43.437: ISAKMP (1011): received packet from 2001: DB8::2 dport  
500 sport 500 Global (R) QM_IDLE  
*Sep 21 08:33:43.437: ISAKMP: (1011): deleting node 1371333358 error FALSE  
reason "QM done (await)"  
*Sep 21 08:33:43.437: ISAKMP: (1011):Node 1371333358, Input =  
IKE_MSG_FROM_PEER, IKE_QM_EXCH  
*Sep 21 08:33:43.437: ISAKMP: (1011): Old State = IKE_QM_R_QM2 New State =  
IKE_QM_PHASE2_COMPLETE  
*Sep 21 08:33:43.437: IPSEC(key_engine): got a queue event with 1 KMI message(s)  
*Sep 21 08:33:43.437: IPSEC(key_engine_enable_outbound): rec'd enable notify  
from ISAKMP
```

Message principal 3 (MM3) de mode - détection NAT et échange de Diffie-Hellman

Inclut :

- Charge utile NAT et informations parasites de détection
- Initiation d'échange CAD
- Support de Dead Peer Detection (DPD)

```
*Sep 21 08:33:43.437: %LINEPROTO-5-UPDOWN: Line protocol on Interface Tunnel23,  
changed state to up  
*Sep 21 08:33:43.437: ISAKMP (1011): received packet from 2001: DB8::2 dport  
500 sport 500 Global (R) QM_IDLE  
*Sep 21 08:33:43.437: ISAKMP: (1011): deleting node 1371333358 error FALSE  
reason "QM done (await)"  
*Sep 21 08:33:43.437: ISAKMP: (1011):Node 1371333358, Input =
```

IKE_MSG_FROM_PEER, IKE_QM_EXCH

*Sep 21 08:33:43.437: ISAKMP: (1011): Old State = IKE_QM_R_QM2 New State =
IKE_QM_PHASE2_COMPLETE

*Sep 21 08:33:43.437: IPSEC(key_engine): got a queue event with 1 KMI message(s

*Sep 21 08:33:43.437: IPSEC(key_engine_enable_outbound): rec'd enable notify
from ISAKMP

Message principal 4 (MM4) de mode - détection NAT et échange de Diffie-Hellman

Inclut :

- Charge utile NAT de détection
- Initiation d'échange CAD
- VIDs supplémentaire (DPD, support d'Unity)
- La connaissance de parler à un autre périphérique IOS

*Sep 21 08:33:43.273: ISAKMP (0): received packet from 2001: DB8::3 dport 500
sport 500 Global (I) MM_SA_SETUP

*Sep 21 08:33:43.273: ISAKMP: (0):Input = IKE_MSG_FROM_PEER, IKE_MM_EXCH

*Sep 21 08:33:43.273: ISAKMP: (0): Old State = IKE_I_MM3 New State = IKE_I_MM4

*Sep 21 08:33:43.273: ISAKMP: (0): processing KE payload. message ID = 0

*Sep 21 08:33:43.281: ISAKMP: (0): processing NONCE payload. message ID = 0

*Sep 21 08:33:43.281: ISAKMP: (0):found peer pre-shared key matching 2001:
DB8::3

*Sep 21 08:33:43.281: ISAKMP: (1011): processing vendor id payload

*Sep 21 08:33:43.281: ISAKMP: (1011): vendor ID is Unity

*Sep 21 08:33:43.281: ISAKMP: (1011): processing vendor id payload

*Sep 21 08:33:43.281: ISAKMP: (1011): vendor ID is DPD

*Sep 21 08:33:43.281: ISAKMP: (1011): processing vendor id payload

*Sep 21 08:33:43.281: ISAKMP: (1011): speaking to another IOS box!

*Sep 21 08:33:43.281: ISAKMP: (1011):Input = IKE_MSG_INTERNAL,
IKE_PROCESS_MAIN_MODE

*Sep 21 08:33:43.281: ISAKMP: (1011): Old State = IKE_I_MM4 New State =
IKE_I_MM4

Le message principal 5 (MM5) de mode - envoyez l'identité

Inclut :

- Identité distante de pair (ID)

*Sep 21 08:33:43.293: ISAKMP: (1011): Send initial contact

*Sep 21 08:33:43.293: ISAKMP: (1011): SA is doing pre-shared key authentication
using id type ID_IPV6_ADDR

*Sep 21 08:33:43.293: ISAKMP (1011): ID payload

next-payload : 8

type : 5

address : 2001: DB8::2

protocol : 17

port : 500

length : 24

*Sep 21 08:33:43.293: ISAKMP: (1011):Total payload length: 24

*Sep 21 08:33:43.293: ISAKMP: (1011): sending packet to 2001: DB8::3 my_port
500 peer_port 500 (I) MM_KEY_EXCH

*Sep 21 08:33:43.293: ISAKMP: (1011): Sending an IKE IPv6 Packet.

*Sep 21 08:33:43.293: ISAKMP: (1011):Input = IKE_MSG_INTERNAL,
IKE_PROCESS_COMPLETE

*Sep 21 08:33:43.293: ISAKMP: (1011): Old State = IKE_I_MM4 New State =

IKE_I_MM5

Configuration appropriée :

```
*Sep 21 08:33:43.293: ISAKMP: (1011): Send initial contact
*Sep 21 08:33:43.293: ISAKMP: (1011): SA is doing pre-shared key authentication
using id type ID_IPV6_ADDR
*Sep 21 08:33:43.293: ISAKMP (1011): ID payload
    next-payload : 8
    type          : 5
    address      : 2001: DB8::2
    protocol     : 17
    port         : 500
    length       : 24
*Sep 21 08:33:43.293: ISAKMP: (1011):Total payload length: 24
*Sep 21 08:33:43.293: ISAKMP: (1011): sending packet to 2001: DB8::3 my_port
500 peer_port 500 (I) MM_KEY_EXCH
*Sep 21 08:33:43.293: ISAKMP: (1011): Sending an IKE IPv6 Packet.
*Sep 21 08:33:43.293: ISAKMP: (1011):Input = IKE_MESG_INTERNAL,
IKE_PROCESS_COMPLETE
*Sep 21 08:33:43.293: ISAKMP: (1011): Old State = IKE_I_MM4  New State =
IKE_I_MM5
```

Le message principal 6 (MM6) de mode - identité distante de pair, Phase 1 est établi

Inclut :

- Temps de rekey commencés
- Identité distante (dans ce cas une adresse)
- Décision de débarquer sur un profil

```
*Sep 21 08:33:43.297: ISAKMP (1011): received packet from 2001: DB8::3 dport
500 sport 500 Global (I) MM_KEY_EXCH
*Sep 21 08:33:43.297: ISAKMP: (1011): processing ID payload. message ID = 0
*Sep 21 08:33:43.297: ISAKMP (1011): ID payload
    next-payload : 8
    type          : 5
    address      : 2001: DB8::3
    protocol     : 17
    port         : 500
    length       : 24
*Sep 21 08:33:43.297: ISAKMP: (0):: peer matches *none* of the profiles
*Sep 21 08:33:43.297: ISAKMP: (1011): processing HASH payload. message ID = 0
*Sep 21 08:33:43.297: ISAKMP: (1011): SA authentication status: authenticated
*Sep 21 08:33:43.297: ISAKMP: (1011): SA has been authenticated with 2001:
DB8::3
*Sep 21 08:33:43.297: ISAKMP: Trying to insert a peer 2001: DB8::2/2001:
DB8::3/500/, and inserted successfully 9344BE8.
*Sep 21 08:33:43.297: ISAKMP: (1011):Input = IKE_MESG_FROM_PEER, IKE_MM_EXCH
*Sep 21 08:33:43.297: ISAKMP: (1011): Old State = IKE_I_MM5  New State =
IKE_I_MM6
*Sep 21 08:33:43.297: ISAKMP: (1011):Input = IKE_MESG_INTERNAL,
IKE_PROCESS_MAIN_MODE
*Sep 21 08:33:43.297: ISAKMP: (1011): Old State = IKE_I_MM6  New State =
IKE_I_MM6
*Sep 21 08:33:43.301: ISAKMP: (1011):Input = IKE_MESG_INTERNAL,
IKE_PROCESS_COMPLETE
*Sep 21 08:33:43.301: ISAKMP: (1011): Old State = IKE_I_MM6  New State =
IKE_P1_COMPLETE
```

Configuration appropriée :

```
*Sep 21 08:33:43.297: ISAKMP (1011): received packet from 2001: DB8::3 dport
500 sport 500 Global (I) MM_KEY_EXCH
*Sep 21 08:33:43.297: ISAKMP: (1011): processing ID payload. message ID = 0
*Sep 21 08:33:43.297: ISAKMP (1011): ID payload
    next-payload : 8
    type          : 5
    address       : 2001: DB8::3
    protocol      : 17
    port          : 500
    length        : 24
*Sep 21 08:33:43.297: ISAKMP: (0):: peer matches *none* of the profiles
*Sep 21 08:33:43.297: ISAKMP: (1011): processing HASH payload. message ID = 0
*Sep 21 08:33:43.297: ISAKMP: (1011): SA authentication status: authenticated
*Sep 21 08:33:43.297: ISAKMP: (1011): SA has been authenticated with 2001:
DB8::3
*Sep 21 08:33:43.297: ISAKMP: Trying to insert a peer 2001: DB8::2/2001:
DB8::3/500/, and inserted successfully 9344BE8.
*Sep 21 08:33:43.297: ISAKMP: (1011):Input = IKE_MESG_FROM_PEER, IKE_MM_EXCH
*Sep 21 08:33:43.297: ISAKMP: (1011): Old State = IKE_I_MM5 New State =
IKE_I_MM6

*Sep 21 08:33:43.297: ISAKMP: (1011):Input = IKE_MESG_INTERNAL,
IKE_PROCESS_MAIN_MODE
*Sep 21 08:33:43.297: ISAKMP: (1011): Old State = IKE_I_MM6 New State =
IKE_I_MM6

*Sep 21 08:33:43.301: ISAKMP: (1011):Input = IKE_MESG_INTERNAL,
IKE_PROCESS_COMPLETE
*Sep 21 08:33:43.301: ISAKMP: (1011): Old State = IKE_I_MM6 New State =
IKE_P1_COMPLETE
```

Le message rapide 1 (QM1) de mode - pair commence le Phase 2

Inclut :

- Id distants et locaux de proxy
- Jeu de transformations

```
*Sep 21 08:33:43.297: ISAKMP (1011): received packet from 2001: DB8::3 dport
500 sport 500 Global (I) MM_KEY_EXCH
*Sep 21 08:33:43.297: ISAKMP: (1011): processing ID payload. message ID = 0
*Sep 21 08:33:43.297: ISAKMP (1011): ID payload
    next-payload : 8
    type          : 5
    address       : 2001: DB8::3
    protocol      : 17
    port          : 500
    length        : 24
*Sep 21 08:33:43.297: ISAKMP: (0):: peer matches *none* of the profiles
*Sep 21 08:33:43.297: ISAKMP: (1011): processing HASH payload. message ID = 0
*Sep 21 08:33:43.297: ISAKMP: (1011): SA authentication status: authenticated
*Sep 21 08:33:43.297: ISAKMP: (1011): SA has been authenticated with 2001:
DB8::3
*Sep 21 08:33:43.297: ISAKMP: Trying to insert a peer 2001: DB8::2/2001:
DB8::3/500/, and inserted successfully 9344BE8.
*Sep 21 08:33:43.297: ISAKMP: (1011):Input = IKE_MESG_FROM_PEER, IKE_MM_EXCH
*Sep 21 08:33:43.297: ISAKMP: (1011): Old State = IKE_I_MM5 New State =
IKE_I_MM6
```

```
*Sep 21 08:33:43.297: ISAKMP: (1011):Input = IKE_MESG_INTERNAL,
IKE_PROCESS_MAIN_MODE
*Sep 21 08:33:43.297: ISAKMP: (1011): Old State = IKE_I_MM6 New State =
IKE_I_MM6
```

```
*Sep 21 08:33:43.301: ISAKMP: (1011):Input = IKE_MESG_INTERNAL,
IKE_PROCESS_COMPLETE
*Sep 21 08:33:43.301: ISAKMP: (1011): Old State = IKE_I_MM6 New State =
IKE_P1_COMPLETE
```

Configuration appropriée :

```
*Sep 21 08:33:43.297: ISAKMP (1011): received packet from 2001: DB8::3 dport
500 sport 500 Global (I) MM_KEY_EXCH
```

```
*Sep 21 08:33:43.297: ISAKMP: (1011): processing ID payload. message ID = 0
```

```
*Sep 21 08:33:43.297: ISAKMP (1011): ID payload
```

```
next-payload : 8
```

```
type : 5
```

```
address : 2001: DB8::3
```

```
protocol : 17
```

```
port : 500
```

```
length : 24
```

```
*Sep 21 08:33:43.297: ISAKMP: (0):: peer matches *none* of the profiles
```

```
*Sep 21 08:33:43.297: ISAKMP: (1011): processing HASH payload. message ID = 0
```

```
*Sep 21 08:33:43.297: ISAKMP: (1011): SA authentication status: authenticated
```

```
*Sep 21 08:33:43.297: ISAKMP: (1011): SA has been authenticated with 2001:
```

```
DB8::3
```

```
*Sep 21 08:33:43.297: ISAKMP: Trying to insert a peer 2001: DB8::2/2001:
```

```
DB8::3/500/, and inserted successfully 9344BE8.
```

```
*Sep 21 08:33:43.297: ISAKMP: (1011):Input = IKE_MESG_FROM_PEER, IKE_MM_EXCH
```

```
*Sep 21 08:33:43.297: ISAKMP: (1011): Old State = IKE_I_MM5 New State =
```

```
IKE_I_MM6
```

```
*Sep 21 08:33:43.297: ISAKMP: (1011):Input = IKE_MESG_INTERNAL,
```

```
IKE_PROCESS_MAIN_MODE
```

```
*Sep 21 08:33:43.297: ISAKMP: (1011): Old State = IKE_I_MM6 New State =
```

```
IKE_I_MM6
```

```
*Sep 21 08:33:43.301: ISAKMP: (1011):Input = IKE_MESG_INTERNAL,
```

```
IKE_PROCESS_COMPLETE
```

```
*Sep 21 08:33:43.301: ISAKMP: (1011): Old State = IKE_I_MM6 New State =
```

```
IKE_P1_COMPLETE
```

Message rapide 2 (QM2) de mode

Inclut :

- Confirmation des identités de proxy
- Type de tunnel
- Configurations parfaites de secret d'expédition (PFS)

```
*Sep 21 08:33:43.297: ISAKMP (1011): received packet from 2001: DB8::3 dport
500 sport 500 Global (I) MM_KEY_EXCH
```

```
*Sep 21 08:33:43.297: ISAKMP: (1011): processing ID payload. message ID = 0
```

```
*Sep 21 08:33:43.297: ISAKMP (1011): ID payload
```

```
next-payload : 8
```

```
type : 5
```

```
address : 2001: DB8::3
```

```
protocol : 17
```

```
port : 500
```

```
length : 24
```

```
*Sep 21 08:33:43.297: ISAKMP: (0):: peer matches *none* of the profiles
```

```

*Sep 21 08:33:43.297: ISAKMP: (1011): processing HASH payload. message ID = 0
*Sep 21 08:33:43.297: ISAKMP: (1011): SA authentication status: authenticated
*Sep 21 08:33:43.297: ISAKMP: (1011): SA has been authenticated with 2001:
DB8::3
*Sep 21 08:33:43.297: ISAKMP: Trying to insert a peer 2001: DB8::2/2001:
DB8::3/500/, and inserted successfully 9344BE8.
*Sep 21 08:33:43.297: ISAKMP: (1011):Input = IKE_MSG_FROM_PEER, IKE_MM_EXCH
*Sep 21 08:33:43.297: ISAKMP: (1011): Old State = IKE_I_MM5 New State =
IKE_I_MM6

*Sep 21 08:33:43.297: ISAKMP: (1011):Input = IKE_MSG_INTERNAL,
IKE_PROCESS_MAIN_MODE
*Sep 21 08:33:43.297: ISAKMP: (1011): Old State = IKE_I_MM6 New State =
IKE_I_MM6

*Sep 21 08:33:43.301: ISAKMP: (1011):Input = IKE_MSG_INTERNAL,
IKE_PROCESS_COMPLETE
*Sep 21 08:33:43.301: ISAKMP: (1011): Old State = IKE_I_MM6 New State =
IKE_P1_COMPLETE

```

Configuration appropriée :

```

*Sep 21 08:33:43.297: ISAKMP (1011): received packet from 2001: DB8::3 dport
500 sport 500 Global (I) MM_KEY_EXCH
*Sep 21 08:33:43.297: ISAKMP: (1011): processing ID payload. message ID = 0
*Sep 21 08:33:43.297: ISAKMP (1011): ID payload
    next-payload : 8
    type          : 5
    address       : 2001: DB8::3
    protocol      : 17
    port          : 500
    length        : 24
*Sep 21 08:33:43.297: ISAKMP: (0):: peer matches *none* of the profiles
*Sep 21 08:33:43.297: ISAKMP: (1011): processing HASH payload. message ID = 0
*Sep 21 08:33:43.297: ISAKMP: (1011): SA authentication status: authenticated
*Sep 21 08:33:43.297: ISAKMP: (1011): SA has been authenticated with 2001:
DB8::3
*Sep 21 08:33:43.297: ISAKMP: Trying to insert a peer 2001: DB8::2/2001:
DB8::3/500/, and inserted successfully 9344BE8.
*Sep 21 08:33:43.297: ISAKMP: (1011):Input = IKE_MSG_FROM_PEER, IKE_MM_EXCH
*Sep 21 08:33:43.297: ISAKMP: (1011): Old State = IKE_I_MM5 New State =
IKE_I_MM6

*Sep 21 08:33:43.297: ISAKMP: (1011):Input = IKE_MSG_INTERNAL,
IKE_PROCESS_MAIN_MODE
*Sep 21 08:33:43.297: ISAKMP: (1011): Old State = IKE_I_MM6 New State =
IKE_I_MM6

*Sep 21 08:33:43.301: ISAKMP: (1011):Input = IKE_MSG_INTERNAL,
IKE_PROCESS_COMPLETE
*Sep 21 08:33:43.301: ISAKMP: (1011): Old State = IKE_I_MM6 New State =
IKE_P1_COMPLETE

```

Message rapide 3 (QM3) de mode - établissement de Phase 2

Inclut :

- Configuration des index de stratégie de sécurité (SPI) pour passer le trafic

```

*Sep 21 08:33:43.305: ISAKMP: (1011): Sending an IKE IPv6 Packet.
*Sep 21 08:33:43.305: ISAKMP: (1011): deleting node 1371333358 error FALSE
reason "No Error"

```

```

*Sep 21 08:33:43.305: ISAKMP: (1011):Node 1371333358, Input =
IKE_MSG_FROM_PEER, IKE_QM_EXCH
*Sep 21 08:33:43.305: ISAKMP: (1011): Old State = IKE_QM_I_QM1 New State =
IKE_QM_PHASE2_COMPLETE
*Sep 21 08:33:43.305: IPSEC(key_engine): got a queue event with 1 KMI message(s)
*Sep 21 08:33:43.305: IPSEC(crypto_ipsec_create_ipsec_sas): Map found
Tunnel23-head-0
*Sep 21 08:33:43.305: IPSEC(crypto_ipsec_sa_find_ident_head): reconnecting
with the same proxies and peer 2001: DB8::3
*Sep 21 08:33:43.305: IPSEC(create_sa): sa created,
(sa) sa_dest= 2001: DB8::2, sa_proto= 50,
sa_spi= 0x45F16A9A(1173449370),
sa_trans= esp-aes esp-sha-hmac , sa_conn_id= 305
sa_lifetime(k/sec)= (4608000/3439)
*Sep 21 08:33:43.305: IPSEC(create_sa): sa created,
(sa) sa_dest= 2001: DB8::3, sa_proto= 50,
sa_spi= 0x221A7153(572158291),
sa_trans= esp-aes esp-sha-hmac , sa_conn_id= 306
sa_lifetime(k/sec)= (4608000/3439)
R2(config-if)#
*Sep 21 08:33:43.309: %LINEPROTO-5-UPDOWN: Line protocol on Interface
Tunnel23, changed state to up

```

Vérification de tunnel

```
sh crypto ipsec sa
```

```
interface: Tunnel23
```

```
  Crypto map tag: Tunnel23-head-0, local addr 2001: DB8::2
```

```
protected vrf: (none)
```

```
local ident (addr/mask/prot/port): (::/0/0/0)
```

```
remote ident (addr/mask/prot/port): (::/0/0/0)
```

```
current_peer 2001: DB8::3 port 500
```

```
  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 not decompressed: 0, #pkts decompress failed: 0
```

```
#send errors 0, #recv errors 0
```

```
local crypto endpt.: 2001: DB8::2,
```

```
remote crypto endpt.: 2001: DB8::3
```

```
path mtu 1500, ipv6 mtu 1500, ipv6 mtu idb Ethernet0/0
```

```
current outbound spi: 0x221A7153(572158291)
```

```
PFS (Y/N): N, DH group: none
```

```
inbound esp sas:
```

```
  spi: 0x45F16A9A(1173449370)
```

```
    transform: esp-aes esp-sha-hmac ,
```

```
    in use settings = {Tunnel, }
```

```
    conn id: 305, flow_id: SW:305, sibling_flags 80000041, crypto map:
```

```
Tunnel23-head-0
```

```
  sa timing: remaining key lifetime (k/sec): (4183789/3408)
```

```
  IV size: 16 bytes
```

```
  replay detection support: Y
```

```
  Status: ACTIVE
```

```
inbound ah sas:
```

```
inbound pcp sas:
```



```
outbound esp sas:
  spi: 0x221A7153(572158291)
  transform: esp-aes esp-sha-hmac ,
  in use settings ={Tunnel, }
  conn id: 306, flow_id: SW:306, sibling_flags 80000041, crypto map:
Tunnel23-head-0
  sa timing: remaining key lifetime (k/sec): (4183790/3408)
  IV size: 16 bytes
  replay detection support: Y
  Status: ACTIVE
```

```
R2(config-if)#do ping fe80::23:3
Output Interface: tunnel23
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to FE80::23:3, timeout is 2 seconds:
Packet sent with a source address of FE80::23:2%Tunnel23
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 8/11/20 ms
R2(config-if)#do sh crypto ipsec sa | i caps|ident
  local ident (addr/mask/prot/port): (::/0/0/0)
  remote ident (addr/mask/prot/port): (::/0/0/0)
    #pkts encaps: 9, #pkts encrypt: 9, #pkts digest: 9
    #pkts decaps: 9, #pkts decrypt: 9, #pkts verify: 9
```

Le tunnel est haut et passant le trafic.

[Informations connexes](#)

- [Article de Wikipedia sur IPSec](#) ; la norme et les références contiennent beaucoup d'informations utiles.
- [De la note en tech de debugs ASA IPsec et d'IKE \(mode IKEv1 agressif\) dépannage](#)
- [ASA IPsec et IKE met au point \(mode IKEv1 principal\) dépannage de TechNote](#)
- [Support et documentation techniques - Cisco Systems](#)