Configuration de la découverte du point de terminaison du tunnel IPSec

Contenu

Introduction

Tunnel End-Point Discovery (TED) est une fonctionnalité du logiciel Cisco IOS® qui permet aux routeurs de détecter automatiquement les points de terminaison IP Security (IPsec). Le déploiement d'IPsec avec Internet Key Exchange (IKE) nécessite la configuration d'une carte de chiffrement pour chaque homologue qui identifie le point de terminaison auquel un tunnel sécurisé doit être établi. Cette approche ne s'adapte pas bien lorsqu'il y a de nombreux homologues auxquels des tunnels doivent être établis. Les crypto-cartes dynamiques simplifient un tel scénario en déterminant automatiquement l'homologue IPsec. Cela ne fonctionne que sur les routeurs qui reçoivent des requêtes IKE. TED permet aux routeurs qui lancent et reçoivent des requêtes IKE de découvrir dynamiquement le point de terminaison du tunnel IPsec.

TED utilise une sonde de détection qui est un paquet IKE spécial envoyé par l'homologue initiateur vers le réseau ou l'hôte de destination auquel le trafic d'origine était destiné. Puisque les sondes TED utilisent les adresses des entités protégées, les adresses doivent être routables globalement. TED ne fonctionne pas si la traduction d'adresses de réseau (NAT) est impliquée.

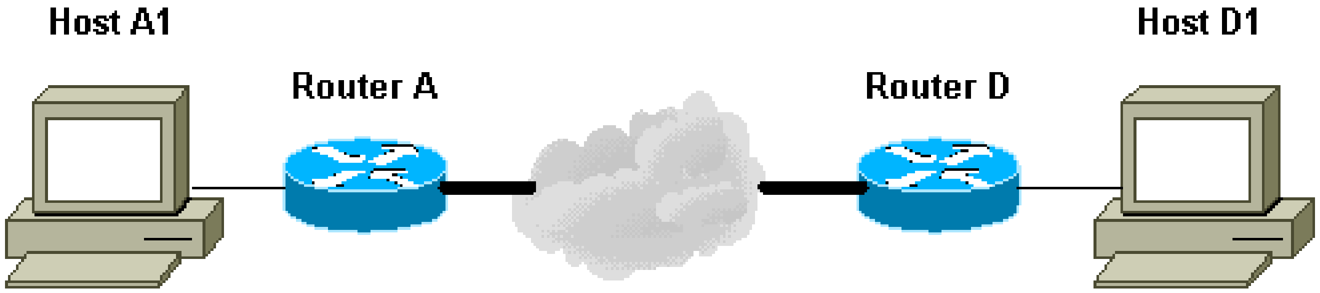
Conditions préalables

Conditions requises

Assurez-vous que vous répondez à ces exigences avant d'essayer cette configuration :

- Connaissance et configuration d'IPsec, comme indiqué dans une introduction au chiffrement IPSec (IP Security)

Cet exemple de réseau montre comment fonctionne le processus TED.



1. D1 envoie un paquet de données ciblé sur A1. SRC=D1 DST=A1
2. D le reçoit, constate qu'il n'a pas d'association de sécurité IPsec établie (mais qu'elle se situe dans la plage de la liste d'accès), abandonne le paquet et envoie un paquet de sonde TED (pour déterminer qui est l'homologue distant) ciblé sur A1, avec l'adresse IP de D intégrée dans la charge utile.SRC=D1DST=A1Données=IP_of_D
3. Le paquet de sonde TED arrive à A, qui le reconnaît comme un paquet de sonde TED. Il abandonne le paquet car tout trafic entre D1 et A1 doit être chiffré. Il envoie ensuite un paquet de réponse TED ciblé sur D avec l'adresse IP de A dans la charge utile. C'est parce que D doit savoir avec quel routeur il doit établir la SA IPsec, ce qui explique pourquoi D a initialement envoyé le paquet de sonde TED.SRC=ADST=DDonnées=IP_of_A
4. Le paquet de réponse TED arrive à D. Puisque D connaît maintenant le point de terminaison IKE, il peut initialiser le tunnel vers A en mode principal ou agressif.

Components Used

Les informations dans ce document sont basées sur les versions de logiciel et matériel suivantes :

- Logiciel Cisco IOS Version 12.2(27)
- Routeurs Cisco 2600

The information in this document was created from the devices in a specific lab environment. All of the devices used in this document started with a cleared (default) configuration. If your network is live, make sure that you understand the potential impact of any command.

Conventions

Pour plus d'informations sur les conventions utilisées dans ce document, reportez-vous à Conventions relatives aux conseils techniques Cisco.

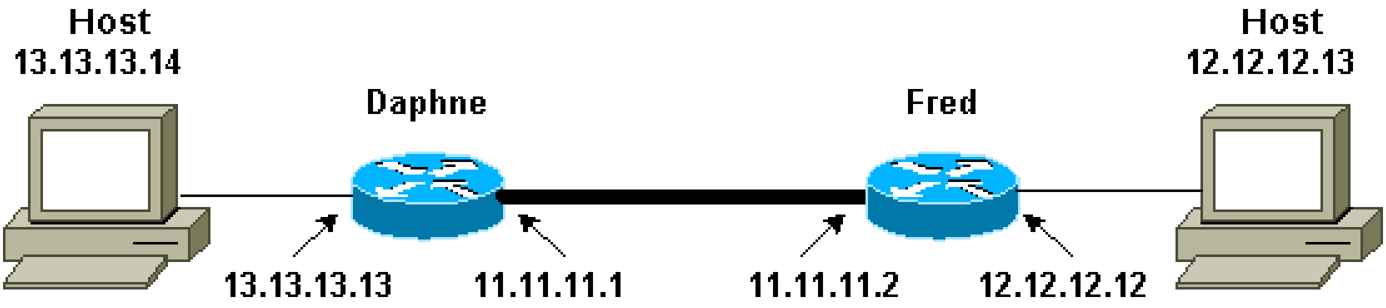
Configuration

Cette section vous fournit des informations pour configurer les fonctionnalités décrites dans ce document.

Remarque : Utilisez l'outil de recherche de commandes (clients inscrits seulement) pour en savoir plus sur les commandes figurant dans le présent document.

Diagramme du réseau

Ce document utilise la configuration réseau suivante :



Remarque : établissez le tunnel entre les routeurs Daphne et Fred.

Configurations

Ce document utilise les configurations suivantes :

- Daphné
- Fred

Configuration de Daphne

```
Daphne#show running-config
Building configuration...

Current configuration : 1426 bytes
!
version 12.2
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname Daphne
!
boot system flash  c2600-jk9s-mz.122-27.bin


enable password cisco
!

memory-size iomem 10
ip subnet-zero
!
!
no ip domain-lookup
!
!
!
!
!--- Defines the IKE policy. While using TED, the peer
!--- address associated with the pre-shared key should
be defined as wildcard !--- in the IKE policy, to
authenticate any discovered peer. crypto isakmp policy
10
 authentication pre-share
```

```
crypto isakmp key abc123 address 0.0.0.0 0.0.0.0
!
!
!--- Defines the transform to use for IPsec SAs. crypto
ipsec transform-set ted-transforms esp-des esp-md5-hmac
!
!--- Defines a dynamic crypto map to use for
establishing IPsec SAs. crypto dynamic-map ted-map 10
 set transform-set ted-transforms
 match address 101
!
!
!--- The 'discover' keyword used with the dynamic crypto
map !--- enables peer discovery. crypto map tedtag 10
ipsec-isakmp dynamic ted-map discover
!



!
interface FastEthernet0/0
 ip address 11.11.11.1 255.255.255.0
 duplex auto
 speed auto
 crypto map tedtag
!
interface FastEthernet0/1
 ip address 13.13.13.13 255.255.255.0
 duplex auto
 speed auto
!
ip classless
ip route 0.0.0.0 0.0.0.0 11.11.11.2
ip http server

!
!
!
!--- Defines the traffic to be encrypted using IPsec.
access-list 101 permit ip 13.13.13.0 0.0.0.255
12.12.12.0 0.0.0.255

!
!
!--- Output is suppressed. ! ! line con 0 line aux 0
line vty 0 4 login ! end
```

Configuration de Fred

```
fred#show running-config
Building configuration...

Current configuration : 1295 bytes
!
version 12.2
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname fred
!
boot system flash  c2600-jk9s-mz.122-27.bin
```

```
!
memory-size iomem 10
ip subnet-zero
!
!
!
!
!
!
!--- Defines the IKE policy. While using TED, the peer
!--- address associated with the pre-shared key should
be defined as wildcard !--- in the IKE policy, to
authenticate any discovered peer. crypto isakmp policy
10
 authentication pre-share
crypto isakmp key abc123 address 0.0.0.0 0.0.0.0
!
!
!--- Defines the transform to use for IPsec SAs. crypto
ipsec transform-set ted-transforms esp-des esp-md5-hmac
!
!--- Defines a dynamic crypto map used to establish
IPsec SAs. crypto dynamic-map ted-map 10
 set transform-set ted-transforms
 match address 101
!
!
!--- The 'discover' keyword used with the dynamic crypto
map !--- enables peer discovery. crypto map tedtag 10
ipsec-isakmp dynamic ted-map discover
!

!
!
interface FastEthernet0/0
 ip address 11.11.11.2 255.255.255.0
 duplex auto
 speed auto
 crypto map tedtag
!
interface FastEthernet0/1
 ip address 12.12.12.12 255.255.255.0
 duplex auto
 speed auto
!
ip classless
ip route 0.0.0.0 0.0.0.0 11.11.11.1
ip http server

!
!
!
!--- Defines the traffic encrypted using IPsec. access-
list 101 permit ip 12.12.12.0 0.0.0.255 13.13.13.0
0.0.0.255

!
!
!--- Output is suppressed. ! line con 0 line aux 0 line
vty 0 4 login ! end
```

Vérification

Référez-vous à cette section pour vous assurer du bon fonctionnement de votre configuration.

L'Outil Interpréteur de sortie (clients enregistrés uniquement) (OIT) prend en charge certaines commandes show. Utilisez l'OIT pour afficher une analyse de la sortie de la commande **show .**

- **show crypto isakmp sa** : affiche les associations de sécurité de phase 1 en affichant l'association de sécurité IKE du routeur. L'état affiché est QM_IDLE pour qu'une SA IKE soit considérée comme active et opérationnelle.
- **show crypto ipsec sa** - Affiche les associations de sécurité de phase 2 en affichant une liste détaillée des SA IPsec actives du routeur.
- **show crypto map** - Affiche les crypto-cartes configurées sur le routeur, ainsi que ses détails tels que les listes de contrôle d'accès, les jeux de transformation, les homologues, etc.
- **show crypto engine connections active** : affiche une liste des SA actives avec leurs interfaces, transformations et compteurs associés.

Exemple de sortie de show

Cette section capture les sorties de la commande **show** sur le routeur Daphne, lorsqu'une commande **ping** est exécutée sur l'hôte 13.13.13.4 destiné à l'hôte 12.12.12.13. Les sorties sur le routeur Fred sont également similaires. Les paramètres clés du résultat sont indiqués en gras. Référez-vous à Dépannage de la sécurité IP - Compréhension et utilisation des commandes de débogage pour une explication sur les sorties de la commande.

```
Daphne#show crypto isakmp sa
dst             src             state          conn-id    slot
11.11.11.2      11.11.11.1      QM_IDLE              2       0


Daphne#show crypto ipsec sa

interface: FastEthernet0/0
    Crypto map tag: tedtag, local addr. 11.11.11.1

   protected vrf:
   local  ident (addr/mask/prot/port): (13.13.13.0/255.255.255.0/0/0)
   remote ident (addr/mask/prot/port): (12.12.12.0/255.255.255.0/0/0)
   current_peer: 11.11.11.2
     PERMIT, flags={}
    #pkts encaps: 9, #pkts encrypt: 9, #pkts digest 9
    #pkts decaps: 9, #pkts decrypt: 9, #pkts verify 9
    #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.: 11.11.11.1, remote crypto endpt.: 11.11.11.2
     path mtu 1500, media mtu 1500
     current outbound spi: B326CBE6

     inbound esp sas:
      spi: 0xD8870500(3632727296)
        transform: esp-des esp-md5-hmac ,
        in use settings ={Tunnel, }
        slot: 0, conn id: 2000, flow_id: 1, crypto map: tedtag
        sa timing: remaining key lifetime (k/sec): (4414715/2524)
        IV size: 8 bytes
        replay detection support: Y

     inbound ah sas:

     inbound pcp sas:

     outbound esp sas:
      spi: 0xB326CBE6(3005664230)
        transform: esp-des esp-md5-hmac ,
        in use settings ={Tunnel, }
        slot: 0, conn id: 2001, flow_id: 2, crypto map: tedtag
        sa timing: remaining key lifetime (k/sec): (4414715/2524)
        IV size: 8 bytes
        replay detection support: Y

     outbound ah sas:

     outbound pcp sas:


Daphne#show crypto map
Crypto Map "tedtag" 10 ipsec-isakmp
        Dynamic map template tag: ted-map
        Discover enabled

Crypto Map "tedtag" 11 ipsec-isakmp
        Peer = 11.11.11.2
        Extended IP access list
            access-list  permit ip 13.13.13.0 0.0.0.255 12.12.12.0 0.0.0.255
            dynamic (created from dynamic map ted-map/10)
        Current peer: 11.11.11.2
        Security association lifetime: 4608000 kilobytes/3600 seconds
        PFS (Y/N): N
        Transform sets={ ted-transforms, }
        Interfaces using crypto map tedtag:
                FastEthernet0/0


Daphne#show crypto engine connections active
  ID Interface            IP-Address      State  Algorithm           Encrypt  Decrypt
   2 <none>               <none>          set    HMAC_SHA+DES_56_CB        0        0
2000 FastEthernet0/0      11.11.11.1      set    HMAC_MD5+DES_56_CB        0        9
2001 FastEthernet0/0      11.11.11.1      set    HMAC_MD5+DES_56_CB        9        0
```

Dépannage

Utilisez cette section pour dépanner votre configuration.

Dépannage des commandes

Remarque : Consulter les renseignements importants sur les commandes de débogage avant d’utiliser les commandes de **débogage**.

- debug crypto engine : affiche des informations sur le moteur de chiffrement qui exécute le processus de chiffrement et de déchiffrement.
- debug crypto ipsec — affiche les négociations IPsec de la Phase 2.
- debug crypto isakmp - Affiche les négociations IKE de la phase 1.

Exemple de sortie de débogage

Cette section capture les sorties de la commande **debug** sur les routeurs configurés avec IPsec, lorsqu'une commande **ping** est exécutée sur l'hôte 13.13.13.4 destiné à l'hôte 12.12.12.13.

- Daphné
- Fred

Daphné

```
Daphne#show debug
Cryptographic Subsystem:
  Crypto ISAKMP debugging is on
  Crypto Engine debugging is on
  Crypto IPSEC debugging is on
Daphne#
!--- TED process begins here. *Mar  1 02:07:18.850: IPSEC(tunnel discover request): ,
  (key eng. msg.) INBOUND local= 13.13.13.14, remote= 12.12.12.13,
    local_proxy= 13.13.13.0/255.255.255.0/0/0 (type=4),
    remote_proxy= 11.11.11.1/255.255.255.255/0/0 (type=1),
    protocol= ESP, transform= esp-des esp-md5-hmac ,
    lifedur= 3600s and 4608000kb,
    spi= 0x0(0), conn_id= 0, keysize= 0, flags= 0x4004 dest=FastEthernet0
    /0:11.11.11.2
*Mar  1 02:07:18.854: ISAKMP: received ke message (1/1)
*Mar  1 02:07:18.854: ISAKMP: GOT A PEER DISCOVERY MESSAGE FROM THE SA MANAGER!!!
*Mar  1 02:07:18.854: src = 13.13.13.14 to 12.12.12.13, protocol 3,
   transform 2, hmac 1
*Mar  1 02:07:18.854: proxy source is 13.13.13.0/255.255.255.0 and my
   address (not used now) is 11.11.11.1
!--- IKE uses UDP port 500. *Mar 1 02:07:18.854: ISAKMP: local port 500, remote port 500

*Mar  1 02:07:18.858: ISAKMP (0:1): no idb in request
*Mar  1 02:07:18.858: ISAKMP (1): ID payload
        next-payload : 5
        type         : 1
        protocol     : 17
        port         : 500
        length       : 8
*Mar  1 02:07:18.858: ISAKMP (1): Total payload length: 12
*Mar  1 02:07:18.858: 1st ID is 11.11.11.1
*Mar  1 02:07:18.862: 2nd ID is 13.13.13.0/255.255.255.0
*Mar  1 02:07:18.862: ISAKMP (0:1): beginning peer discovery exchange
!--- TED probe is sent to the original destination of the !--- IP packet that matches the crypto
access-list for encryption. *Mar  1 02:07:18.862: ISAKMP (0:1): sending packet to 12.12.12.13
(I)
PEER_DISCOVERY via FastEthernet0/0:11.11.11.2
!--- TED response is received and the peer discovered. *Mar  1 02:07:18.962: ISAKMP (0:1):
received packet from
11.11.11.2 (I) PEER_DISCOVERY
*Mar  1 02:07:18.966: ISAKMP (0:1): processing vendor id payload
*Mar  1 02:07:18.966: ISAKMP (0:1): speaking to another IOS box!
*Mar  1 02:07:18.966: ISAKMP (0:1): processing ID payload. message ID = 0
*Mar  1 02:07:18.966: ISAKMP:received payload type 16
*Mar  1 02:07:18.966: ISAKMP (0:1): received response to my peer discovery probe!
*Mar  1 02:07:18.966: ISAKMP (0:1): ted negotiated proxies:
 0 13.13.13.0/255.255.255.0:0, 12.12.12.0
/255.255.255.0:0
!--- Normal IKE process begins here to form a secure tunnel to the !--- peer discovered through
TED. *Mar  1 02:07:18.970: ISAKMP (0:1): initiating IKE to 11.11.11.2
 in response to probe.
*Mar  1 02:07:18.970: ISAKMP: local port 500, remote port 500
```

```
*Mar  1 02:07:18.970: ISAKMP (0:1): created new SA after peer-discovery
  with 11.11.11.2
*Mar  1 02:07:18.974: ISAKMP (0:2): sending packet to 11.11.11.2 (I) MM_NO_STATE
*Mar  1 02:07:18.974: ISAKMP (0:1): peer does not do paranoid keepalives.

*Mar  1 02:07:18.974: ISAKMP (0:1): deleting SA reason "delete_me flag/throw"
state (I) PEER_DISCOVE
RY (peer 12.12.12.13) input queue 0
*Mar  1 02:07:19.975: ISAKMP (0:1): purging SA., sa=82687F70, delme=82687F70
*Mar  1 02:07:19.975: CryptoEngine0: delete connection 1
*Mar  1 02:07:20.608: ISAKMP (0:2): received packet from 11.11.11.2 (I) MM_NO_STATE
*Mar  1 02:07:20.608: ISAKMP (0:2): processing SA payload. message ID = 0
*Mar  1 02:07:20.608: ISAKMP (0:2): found peer pre-shared key matching 11.11.11.2
 !--- IKE SAs are negotiated. *Mar  1 02:07:20.612: ISAKMP (0:2): Checking ISAKMP transform 1
 against priority 10 policy
*Mar  1 02:07:20.612: ISAKMP:      encryption DES-CBC
*Mar  1 02:07:20.612: ISAKMP:      hash SHA
*Mar  1 02:07:20.612: ISAKMP:      default group 1
*Mar  1 02:07:20.612: ISAKMP:      auth pre-share
*Mar  1 02:07:20.612: ISAKMP:      life type in seconds
*Mar  1 02:07:20.612: ISAKMP:      life duration (VPI) of  0x0 0x1 0x51 0x80
*Mar  1 02:07:20.612: ISAKMP (0:2): atts are acceptable. Next payload is 0
*Mar  1 02:07:20.616: CryptoEngine0: generate alg parameter
*Mar  1 02:07:20.781: CRYPTO_ENGINE: Dh phase 1 status: 0
*Mar  1 02:07:20.781: CRYPTO_ENGINE: Dh phase 1 status: 0
*Mar  1 02:07:20.781: ISAKMP (0:2): SA is doing pre-shared key authentication
      using id type ID_IPV4_ADDR
*Mar  1 02:07:20.797: ISAKMP (0:2): sending packet to 11.11.11.2 (I) MM_SA_SETUP
*Mar  1 02:07:22.972: ISAKMP (0:2): received packet from 11.11.11.2 (I) MM_SA_SETUP
*Mar  1 02:07:22.972: ISAKMP (0:2): processing KE payload. message ID = 0
*Mar  1 02:07:22.972: CryptoEngine0: generate alg parameter
*Mar  1 02:07:23.177: ISAKMP (0:2): processing NONCE payload. message ID = 0
*Mar  1 02:07:23.177: ISAKMP (0:2): found peer pre-shared key matching 11.11.11.2
*Mar  1 02:07:23.181: CryptoEngine0: create ISAKMP SKEYID for conn id 2
*Mar  1 02:07:23.181: ISAKMP (0:2): SKEYID state generated
*Mar  1 02:07:23.185: ISAKMP (0:2): processing vendor id payload
*Mar  1 02:07:23.185: ISAKMP (0:2): speaking to another IOS box!
*Mar  1 02:07:23.185: ISAKMP (2): ID payload
        next-payload : 8
        type         : 1
        protocol     : 17
        port         : 500
        length       : 8
*Mar  1 02:07:23.185: ISAKMP (2): Total payload length: 12
*Mar  1 02:07:23.185: CryptoEngine0: generate hmac context for conn id 2
*Mar  1 02:07:23.189: ISAKMP (0:2): sending packet to 11.11.11.2 (I) MM_KEY_EXCH
*Mar  1 02:07:23.277: ISAKMP (0:2): received packet from 11.11.11.2 (I) MM_KEY_EXCH
*Mar  1 02:07:23.281: ISAKMP (0:2): processing ID payload. message ID = 0
*Mar  1 02:07:23.281: ISAKMP (0:2): processing HASH payload. message ID = 0
*Mar  1 02:07:23.281: CryptoEngine0: generate hmac context for conn id 2
!--- Peer is authenticated. *Mar  1 02:07:23.285: ISAKMP (0:2): SA has been authenticated with
11.11.11.2
*Mar  1 02:07:23.285: ISAKMP (0:2): beginning Quick Mode exchange, M-ID of 409419560
*Mar  1 02:07:23.285: ISAKMP (0:2): asking for 1 spis from ipsec
*Mar  1 02:07:23.285: ISAKMP (0:2): had to get SPI's from ipsec.
*Mar  1 02:07:23.289: CryptoEngine0: clear dh number for conn id 1
*Mar  1 02:07:23.289: IPSEC(key_engine): got a queue event...
*Mar  1 02:07:23.289: IPSEC(spi_response): getting spi 4160804383 for SA
        from 11.11.11.1      to 11.11.11.2      for prot 3
*Mar  1 02:07:23.289: ISAKMP: received ke message (2/1)
*Mar  1 02:07:23.537: CryptoEngine0: generate hmac context for conn id 2
*Mar  1 02:07:23.541: ISAKMP (0:2): sending packet to 11.11.11.2 (I) QM_IDLE
*Mar  1 02:07:23.958: ISAKMP (0:2): received packet from 11.11.11.2 (I) QM_IDLE
*Mar  1 02:07:23.962: CryptoEngine0: generate hmac context for conn id 2
```

```
*Mar  1 02:07:23.962: ISAKMP (0:2): processing HASH payload. message ID = 409419560
*Mar  1 02:07:23.962: ISAKMP (0:2): processing SA payload. message ID = 409419560
!--- IPsec SAs are negotiated. *Mar  1 02:07:23.962: ISAKMP (0:2): Checking IPSec proposal 1
*Mar  1 02:07:23.962: ISAKMP: transform 1, ESP_DES
*Mar  1 02:07:23.966: ISAKMP:   attributes in transform:
*Mar  1 02:07:23.966: ISAKMP:      encaps is 1
*Mar  1 02:07:23.966: ISAKMP:      SA life type in seconds
*Mar  1 02:07:23.966: ISAKMP:      SA life duration (basic) of 3600
*Mar  1 02:07:23.966: ISAKMP:      SA life type in kilobytes
*Mar  1 02:07:23.966: ISAKMP:      SA life duration (VPI) of  0x0 0x46 0x50 0x0
*Mar  1 02:07:23.966: ISAKMP:      authenticator is HMAC-MD5
*Mar  1 02:07:23.970: validate proposal 0
*Mar  1 02:07:23.970: ISAKMP (0:2): atts are acceptable.
*Mar  1 02:07:23.970: IPSEC(validate_proposal_request): proposal part #1,
  (key eng. msg.) INBOUND local= 11.11.11.1, remote= 11.11.11.2,
    local_proxy= 13.13.13.0/255.255.255.0/0/0 (type=4),
    remote_proxy= 12.12.12.0/255.255.255.0/0/0 (type=4),
    protocol= ESP, transform= esp-des esp-md5-hmac ,
    lifedur= 0s and 0kb,
    spi= 0x0(0), conn_id= 0, keysize= 0, flags= 0x4
*Mar  1 02:07:23.974: validate proposal request 0
*Mar  1 02:07:23.974: ISAKMP (0:2): processing NONCE payload. message ID = 409419560
*Mar  1 02:07:23.974: ISAKMP (0:2): processing ID payload. message ID = 409419560
*Mar  1 02:07:23.974: ISAKMP (0:2): processing ID payload. message ID = 409419560
*Mar  1 02:07:23.974: CryptoEngine0: generate hmac context for conn id 2
*Mar  1 02:07:23.978: ipsec allocate flow 0
*Mar  1 02:07:23.978: ipsec allocate flow 0
!--- IPsec SAs are generated for inbound and outbound traffic. *Mar  1 02:07:23.986: ISAKMP
(0:2): Creating IPSec SAs
*Mar  1 02:07:23.986:         inbound SA from 11.11.11.2 to 11.11.11.1
        (proxy 12.12.12.0 to 13.13.13.0)
*Mar  1 02:07:23.986:         has spi 0xF800D61F and conn_id 2000 and flags 4
*Mar  1 02:07:23.986:         lifetime of 3600 seconds
*Mar  1 02:07:23.986:         lifetime of 4608000 kilobytes
*Mar  1 02:07:23.990: outbound SA from 11.11.11.1 to 11.11.11.2
(proxy 13.13.13.0 to 12.12.12.0     )
*Mar  1 02:07:23.990: has spi -1535570016 and conn_id 2001 and flags C
*Mar  1 02:07:23.990:         lifetime of 3600 seconds
*Mar  1 02:07:23.990:         lifetime of 4608000 kilobytes
*Mar  1 02:07:23.990: ISAKMP (0:2): sending packet to 11.11.11.2 (I) QM_IDLE
*Mar  1 02:07:23.994: ISAKMP (0:2): deleting node 409419560 error FALSE reason ""
*Mar  1 02:07:23.994: IPSEC(key_engine): got a queue event...
*Mar  1 02:07:23.994: IPSEC(initialize_sas): ,
  (key eng. msg.) INBOUND local= 11.11.11.1, remote= 11.11.11.2,
    local_proxy= 13.13.13.0/255.255.255.0/0/0 (type=4),
    remote_proxy= 12.12.12.0/255.255.255.0/0/0 (type=4),
    protocol= ESP, transform= esp-des esp-md5-hmac ,
    lifedur= 3600s and 4608000kb,
    spi= 0xF800D61F(4160804383), conn_id= 2000, keysize= 0, flags= 0x4
*Mar  1 02:07:23.998: IPSEC(initialize_sas): ,
  (key eng. msg.) OUTBOUND local= 11.11.11.1, remote= 11.11.11.2,
    local_proxy= 13.13.13.0/255.255.255.0/0/0 (type=4),
    remote_proxy= 12.12.12.0/255.255.255.0/0/0 (type=4),
    protocol= ESP, transform= esp-des esp-md5-hmac ,
    lifedur= 3600s and 4608000kb,
    spi= 0xA4790FA0(2759397280), conn_id= 2001, keysize= 0, flags= 0xC
*Mar  1 02:07:24.002: IPSEC(create_sa): sa created,
  (sa) sa_dest= 11.11.11.1, sa_prot= 50,
    sa_spi= 0xF800D61F(4160804383),
    sa_trans= esp-des esp-md5-hmac , sa_conn_id= 2000
*Mar  1 02:07:24.002: IPSEC(create_sa): sa created,
  (sa) sa_dest= 11.11.11.2, sa_prot= 50,
    sa_spi= 0xA4790FA0(2759397280),
    sa_trans= esp-des esp-md5-hmac , sa_conn_id= 2001
```

```
Daphne#
```

Fred

```
fred#show debug

Cryptographic Subsystem:
  Crypto ISAKMP debugging is on
  Crypto Engine debugging is on
  Crypto IPSEC debugging is on
fred#
!--- Receives the TED probe. *Mar  1 02:07:45.763: ISAKMP (0:0): received packet from
 13.13.13.14 (N) NEW SA
*Mar  1 02:07:45.767: ISAKMP: local port 500, remote port 500
*Mar  1 02:07:45.779: ISAKMP (0:1): processing vendor id payload
*Mar  1 02:07:45.783: ISAKMP (0:1): speaking to another IOS box!
*Mar  1 02:07:45.783: ISAKMP (0:1): processing ID payload. message ID = 0
*Mar  1 02:07:45.787: ISAKMP (0:1): processing ID payload. message ID =
 -1992472852
*Mar  1 02:07:45.791: ISAKMP (1): ID_IPV4_ADDR_SUBNET src 13.13.13.0
 /255.255.255.0 prot 0 port 0
*Mar  1 02:07:45.791: ISAKMP (0:1): processing vendor id payload
!--- Sends a response to the other peer for the TED probe. *Mar  1 02:07:45.795: ISAKMP (0:1):
responding to peer discovery probe!
*Mar  1 02:07:45.799: peer's address is 11.11.11.1
*Mar  1 02:07:45.799: src (him) 4, 13.13.13.0/255.255.255.0 to dst
(me) 0, 0.0.0.0/0.0.0.0
*Mar  1 02:07:45.803: ISAKMP (0:1): peer can handle TED V3: changing source
to 11.11.11.1 and dest to 11.11.11.2
*Mar  1 02:07:45.811: ISAKMP (1): ID payload
        next-payload : 239
        type         : 1
        protocol     : 17
        port         : 500
        length       : 8
*Mar  1 02:07:45.815: ISAKMP (1): Total payload length: 12
*Mar  1 02:07:45.819: ISAKMP (0:1): sending packet to 11.11.11.1 (R)
 PEER_DISCOVERY
*Mar  1 02:07:45.823: ISAKMP (0:1): peer does not do paranoid keepalives.

*Mar  1 02:07:45.823: ISAKMP (0:1): deleting SA reason "delete_me flag/throw"
state (R) PEER_DISCOVE
RY (peer 11.11.11.1) input queue 0
*Mar  1 02:07:45.827: ISAKMP (0:1): deleting node 0 error TRUE reason
"delete_me flag/throw"
 !--- IKE processing begins here. *Mar  1 02:07:45.871: ISAKMP (0:0): received packet from
11.11.11.1
(N) NEW SA
*Mar  1 02:07:45.875: ISAKMP: local port 500, remote port 500
*Mar  1 02:07:45.883: ISAKMP (0:2): processing SA payload. message ID = 0
*Mar  1 02:07:45.887: ISAKMP (0:2): found peer pre-shared key matching 11.11.11.1
!--- IKE SAs are negotiated. *Mar  1 02:07:45.887: ISAKMP (0:2): Checking ISAKMP transform 1
against priority 10 policy
*Mar  1 02:07:45.891: ISAKMP:      encryption DES-CBC
*Mar  1 02:07:45.891: ISAKMP:      hash SHA
*Mar  1 02:07:45.895: ISAKMP:      default group 1
*Mar  1 02:07:45.895: ISAKMP:      auth pre-share
*Mar  1 02:07:45.899: ISAKMP:      life type in seconds
*Mar  1 02:07:45.899: ISAKMP:      life duration (VPI) of  0x0 0x1 0x51 0x80
*Mar  1 02:07:45.903: ISAKMP (0:2): atts are acceptable. Next payload is 0
*Mar  1 02:07:45.907: CryptoEngine0: generate alg parameter
```

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*Mar  1 02:07:47.455: CRYPTO_ENGINE: Dh phase 1 status: 0
*Mar  1 02:07:47.455: CRYPTO_ENGINE: Dh phase 1 status: 0
*Mar  1 02:07:47.459: ISAKMP (0:2): SA is doing pre-shared key authentication
using id type ID_IPV4_
ADDR
*Mar  1 02:07:47.463: ISAKMP (0:2): sending packet to 11.11.11.1 (R) MM_SA_SETUP
*Mar  1 02:07:47.467: ISAKMP (0:1): purging SA., sa=2349E0, delme=2349E0
*Mar  1 02:07:47.471: ISAKMP (0:1): purging node 0
*Mar  1 02:07:47.475: CryptoEngine0: delete connection 1
*Mar  1 02:07:47.707: ISAKMP (0:2): received packet from 11.11.11.1 (R) MM_SA_SETUP
*Mar  1 02:07:47.711: ISAKMP (0:2): processing KE payload. message ID = 0
*Mar  1 02:07:47.715: CryptoEngine0: generate alg parameter
*Mar  1 02:07:49.767: ISAKMP (0:2): processing NONCE payload. message ID = 0
*Mar  1 02:07:49.775: ISAKMP (0:2): found peer pre-shared key matching 11.11.11.1
*Mar  1 02:07:49.783: CryptoEngine0: create ISAKMP SKEYID for conn id 2
*Mar  1 02:07:49.799: ISAKMP (0:2): SKEYID state generated
*Mar  1 02:07:49.803: ISAKMP (0:2): processing vendor id payload
*Mar  1 02:07:49.807: ISAKMP (0:2): speaking to another IOS box!
*Mar  1 02:07:49.815: ISAKMP (0:2): sending packet to 11.11.11.1 (R) MM_KEY_EXCH
*Mar  1 02:07:50.087: ISAKMP (0:2): received packet from 11.11.11.1 (R) MM_KEY_EXCH
*Mar  1 02:07:50.095: ISAKMP (0:2): processing ID payload. message ID = 0
*Mar  1 02:07:50.099: ISAKMP (0:2): processing HASH payload. message ID = 0
*Mar  1 02:07:50.103: CryptoEngine0: generate hmac context for conn id 2
!--- Peer is authenticated. *Mar  1 02:07:50.111: ISAKMP (0:2): SA has been authenticated with
11.11.11.1
*Mar  1 02:07:50.115: ISAKMP (2): ID payload
        next-payload : 8
        type         : 1
        protocol     : 17
        port         : 500
        length       : 8
*Mar  1 02:07:50.115: ISAKMP (2): Total payload length: 12
*Mar  1 02:07:50.119: CryptoEngine0: generate hmac context for conn id 2
*Mar  1 02:07:50.131: CryptoEngine0: clear dh number for conn id 1
*Mar  1 02:07:50.135: ISAKMP (0:2): sending packet to 11.11.11.1 (R) QM_IDLE
*Mar  1 02:07:50.451: ISAKMP (0:2): received packet from 11.11.11.1 (R) QM_IDLE
*Mar  1 02:07:50.467: CryptoEngine0: generate hmac context for conn id 2
*Mar  1 02:07:50.475: ISAKMP (0:2): processing HASH payload. message ID = 409419560
*Mar  1 02:07:50.475: ISAKMP (0:2): processing SA payload. message ID = 409419560
!--- IPsec SAs are negotiated. *Mar  1 02:07:50.479: ISAKMP (0:2): Checking IPSec proposal 1
*Mar  1 02:07:50.479: ISAKMP: transform 1, ESP_DES
*Mar  1 02:07:50.483: ISAKMP:   attributes in transform:
*Mar  1 02:07:50.483: ISAKMP:      encaps is 1
*Mar  1 02:07:50.487: ISAKMP:      SA life type in seconds
*Mar  1 02:07:50.487: ISAKMP:      SA life duration (basic) of 3600
*Mar  1 02:07:50.487: ISAKMP:      SA life type in kilobytes
*Mar  1 02:07:50.491: ISAKMP:      SA life duration (VPI) of  0x0 0x46 0x50 0x0
*Mar  1 02:07:50.495: ISAKMP:      authenticator is HMAC-MD5
*Mar  1 02:07:50.495: validate proposal 0
*Mar  1 02:07:50.499: ISAKMP (0:2): atts are acceptable.
*Mar  1 02:07:50.503: IPSEC(validate_proposal_request): proposal part #1,
  (key eng. msg.) INBOUND local= 11.11.11.2, remote= 11.11.11.1,
    local_proxy= 12.12.12.0/255.255.255.0/0/0 (type=4),
    remote_proxy= 13.13.13.0/255.255.255.0/0/0 (type=4),
    protocol= ESP, transform= esp-des esp-md5-hmac ,
    lifedur= 0s and 0kb,
    spi= 0x0(0), conn_id= 0, keysize= 0, flags= 0x4
*Mar  1 02:07:50.515: validate proposal request 0
*Mar  1 02:07:50.519: ISAKMP (0:2): processing NONCE payload. message
ID = 409419560
*Mar  1 02:07:50.523: ISAKMP (0:2): processing ID payload. message ID = 409419560
*Mar  1 02:07:50.523: ISAKMP (0:2): processing ID payload. message ID = 409419560
*Mar  1 02:07:50.527: ISAKMP (0:2): asking for 1 spis from ipsec
*Mar  1 02:07:50.535: IPSEC(key_engine): got a queue event...
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*Mar  1 02:07:50.543: IPSEC(spi_response): getting spi 2759397280 for SA
        from 11.11.11.2      to 11.11.11.1      for prot 3
*Mar  1 02:07:50.551: ISAKMP: received ke message (2/1)
*Mar  1 02:07:50.787: CryptoEngine0: generate hmac context for conn id 2
*Mar  1 02:07:50.803: ISAKMP (0:2): sending packet to 11.11.11.1 (R) QM_IDLE
*Mar  1 02:07:50.887: ISAKMP (0:2): received packet from 11.11.11.1 (R) QM_IDLE
*Mar  1 02:07:50.899: CryptoEngine0: generate hmac context for conn id 2
*Mar  1 02:07:50.907: ipsec allocate flow 0
*Mar  1 02:07:50.907: ipsec allocate flow 0
!--- IPsec SAs are generated for inbound and outbound traffic. *Mar  1 02:07:50.939: ISAKMP
(0:2): Creating IPSec SAs
*Mar  1 02:07:50.939:         inbound SA from 11.11.11.1 to 11.11.11.2
        (proxy 13.13.13.0 to 12.12.12.0)
*Mar  1 02:07:50.947:         has spi 0xA4790FA0 and conn_id 2000 and
flags 4
*Mar  1 02:07:50.947:         lifetime of 3600 seconds
*Mar  1 02:07:50.951:         lifetime of 4608000 kilobytes
*Mar  1 02:07:50.951: outbound SA from 11.11.11.2 to 11.11.11.1
(proxy 12.12.12.0 to 13.13.13.0     )
*Mar  1 02:07:50.959:  has spi -134162913 and conn_id 2001 and flags C
*Mar  1 02:07:50.959:         lifetime of 3600 seconds
*Mar  1 02:07:50.963:         lifetime of 4608000 kilobytes
*Mar  1 02:07:50.963: ISAKMP (0:2): deleting node 409419560 error FALSE
 reason "quick mode done (awa
it()"
*Mar  1 02:07:50.971: IPSEC(key_engine): got a queue event...
*Mar  1 02:07:50.971: IPSEC(initialize_sas): ,
  (key eng. msg.) INBOUND local= 11.11.11.2, remote= 11.11.11.1,
    local_proxy= 12.12.12.0/255.255.255.0/0/0 (type=4),
    remote_proxy= 13.13.13.0/255.255.255.0/0/0 (type=4),
    protocol= ESP, transform= esp-des esp-md5-hmac ,
    lifedur= 3600s and 4608000kb,
    spi= 0xA4790FA0(2759397280), conn_id= 2000, keysize= 0, flags= 0x4
*Mar  1 02:07:50.983: IPSEC(initialize_sas): ,
  (key eng. msg.) OUTBOUND local= 11.11.11.2, remote= 11.11.11.1,
    local_proxy= 12.12.12.0/255.255.255.0/0/0 (type=4),
    remote_proxy= 13.13.13.0/255.255.255.0/0/0 (type=4),
    protocol= ESP, transform= esp-des esp-md5-hmac ,
    lifedur= 3600s and 4608000kb,
    spi= 0xF800D61F(4160804383), conn_id= 2001, keysize= 0, flags= 0xC
*Mar  1 02:07:51.003: IPSEC(create_sa): sa created,
  (sa) sa_dest= 11.11.11.2, sa_prot= 50,
    sa_spi= 0xA4790FA0(2759397280),
    sa_trans= esp-des esp-md5-hmac , sa_conn_id= 2000
*Mar  1 02:07:51.007: IPSEC(create_sa): sa created,
  (sa) sa_dest= 11.11.11.1, sa_prot= 50,
    sa_spi= 0xF800D61F(4160804383),
    sa_trans= esp-des esp-md5-hmac , sa_conn_id= 2001

fred#
```

Informations connexes

- Déploiement d'IPsec
- Amélioration de la détection des points de terminaison de tunnel
- Support et documentation techniques - Cisco Systems