Configurando o Tunnel End-Point Discovery de IPSec

Contents

Introduction

O Tunnel End-Point Discovery (TED) é uma características do software Cisco IOS® que permitem que os roteadores descubram automaticamente os pontos finais da Segurança IP (IPsec). A implementação do IPsec com Internet Key Exchange (IKE) exige a configuração de um mapa de criptografia para cada par, que identifica o ponto final ao qual um túnel seguro deve ser estabelecido. Esta abordagem não é bem dimensionada quando há muitos pares a que os túneis devem ser estabelecidos. Os mapas de criptografia dinâmicos simplificam essa situação determinando automaticamente o par IPsec. Só funciona em roteadores que recebem solicitações IKE. O TED permite que os roteadores que iniciam e recebem solicitações IKE descubram dinamicamente o ponto final do túnel IPSec.

O TED usa uma sonda de descoberta que é um pacote IKE especial enviado do peer iniciador em direção à rede ou ao host de destino para o qual o tráfego original estava destinado. Como as sondas TED usam os endereços das entidades protegidas, os endereços devem ser globalmente roteáveis. O TED não funciona se a Network Address Translation (NAT) estiver envolvida.

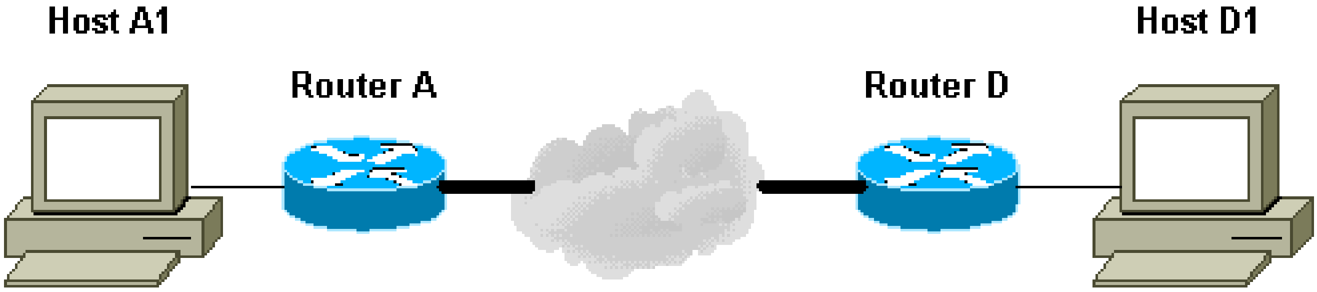
Prerequisites

Requirements

Certifique-se de atender a estes requisitos antes de tentar esta configuração:

- Conhecimento e configuração do IPsec conforme discutido em Uma Introdução à Criptografia de Segurança IP (IPSec)

Este exemplo de rede mostra como o processo TED funciona.



1. D1 envia um pacote de dados destinado a A1. SRC=D1 DST=A1
2. D a recebe, vê que não tem uma associação de segurança (SA) IPsec estabelecida (mas está dentro do intervalo da lista de acesso), descarta o pacote e envia um pacote de prova TED (para descobrir quem é o peer remoto) direcionado a A1, com o endereço IP de D incorporado no payload.SRC=D1DST=A1Data=IP_of_D
3. O pacote de prova TED chega em A, que o reconhece como um pacote de prova TED. Ele descarta o pacote porque qualquer tráfego entre D1 e A1 deve ser criptografado. Em seguida, ele envia um pacote de resposta TED direcionado a D com o endereço IP de A no payload. Isso ocorre porque D precisa saber com qual roteador precisa estabelecer a SA IPsec, e é por isso que D enviou inicialmente o pacote de prova TED.SRC=ADST=DData=IP_de_A
4. O pacote de resposta TED chega em D. Como D agora conhece o ponto de extremidade IKE, ele pode iniciar o túnel para A no modo principal ou no modo agressivo.

Componentes Utilizados

As informações neste documento são baseadas nestas versões de software e hardware.

- Software Cisco IOS versão 12.2(27)
- Roteadores 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

Consulte as Convenções de Dicas Técnicas da Cisco para obter mais informações sobre convenções de documentos.

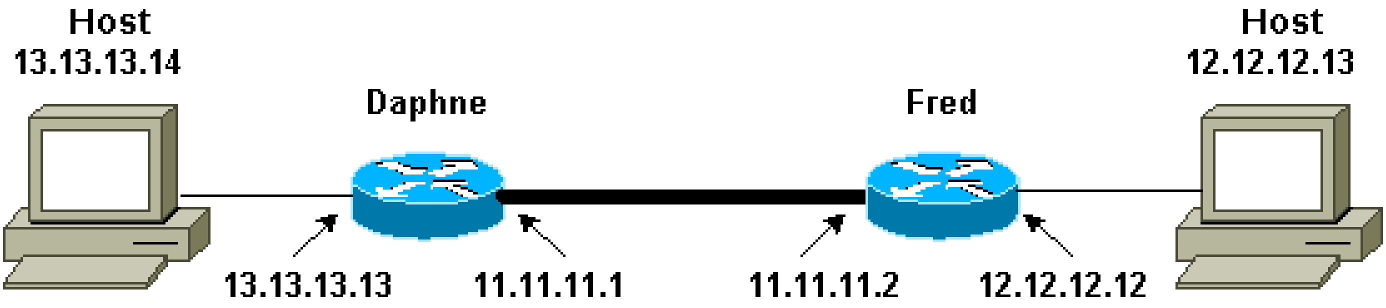
Configurar

Nesta seção, você encontrará informações para configurar os recursos descritos neste documento.

Nota:Use a Command Lookup Tool (somente clientes registrados) para obter mais informações sobre os comandos usados neste documento.

Diagrama de Rede

Este documento utiliza a seguinte configuração de rede:



Observação: estabeleça o túnel entre os roteadores Daphne e Fred.

Configurações

Este documento utiliza as seguintes configurações:

- Daphne
- Fred

Configuração 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
```

Configuração 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
```

Verificar

Use esta seção para confirmar se a sua configuração funciona corretamente.

A Output Interpreter Tool (somente clientes registrados) (OIT) oferece suporte a determinados comandos show. Use a OIT para exibir uma análise da saída do comando show.

- **show crypto isakmp sa** —Exibe as associações de segurança da fase 1 exibindo a SA IKE do roteador. O estado exibido é QM_IDLE para que um SA IKE seja considerado ativo e funcional.
- **show crypto ipsec sa** —Exibe as associações de segurança da fase 2 exibindo uma lista detalhada das SAs IPsec ativas do roteador.
- **show crypto map** —Exibe os mapas de criptografia configurados no roteador juntamente com seus detalhes, como listas de acesso de criptografia, conjuntos de transformação, peers e assim por diante.
- **show crypto engine connections ative** — Exibe uma lista de SAs ativos com suas interfaces, transformações e contadores associados.

Exemplo de saída de show

Esta seção captura as saídas do comando **show** no roteador Daphne, quando um comando **ping** é executado no host 13.13.13.4 destinado ao host 12.12.12.13. As saídas no roteador Fred também são semelhantes. Os principais parâmetros na saída são indicados em negrito. Consulte IP Security Troubleshooting - Understanding and Using debug Commands para obter uma explicação sobre as saídas do comando.

```
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
```

Troubleshoot

Use esta seção para resolver problemas de configuração.

Comandos para Troubleshooting

Nota:Consulte Informações Importantes sobre Comandos de Depuração antes de usar comandos debug.

- debug crypto engine —Exibe informações sobre o mecanismo de criptografia que executa o processo de criptografia e descriptografia.
- debug crypto ipsec — Exibe as negociações de IPSec de fase 2
- debug crypto isakmp —Exibe as negociações de IKE da fase 1.

Exemplo de saída de depuração

Esta seção captura as saídas do comando **debug** nos roteadores configurados com IPsec, quando um comando **ping** é executado no host 13.13.13.4 destinado ao host 12.12.12.13.

- Daphne
- Fred

Daphne

```
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

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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
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*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
*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
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*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...
*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#
```

Informações Relacionadas

- Implantação de IPsec
- Aprimoramento da descoberta de endpoints de túnel
- Suporte Técnico e Documentação - Cisco Systems