Konfigurieren eines IPsec-Routers Dynamische LAN-to-LAN-Peer- und VPN-Clients

Inhalt

Einführung

Diese Konfiguration zeigt eine LAN-zu-LAN-Konfiguration zwischen zwei Routern in einer Hub-Spoke-Umgebung. Cisco VPN-Clients stellen außerdem eine Verbindung zum Hub her und verwenden Xauth (Extended Authentication).

Der Spoke-Router erhält in diesem Szenario seine IP-Adresse dynamisch über DHCP. Die Verwendung des Dynamic Host Configuration Protocol (DHCP) ist häufig in Situationen erforderlich, in denen das Spoke-System über ein DSL- oder Kabelmodem mit dem Internet verbunden ist. Der Grund hierfür ist, dass der ISP häufig IP-Adressen dynamisch bereitstellt, indem er DHCP für diese preisgünstigen Verbindungen verwendet.

Ohne weitere Konfiguration ist die Verwendung eines vorinstallierten Platzhalterschlüssels auf dem Hub-Router in dieser Situation nicht möglich. Dies liegt daran, dass Xauth für die VPN-Client-Verbindungen die LAN-zu-LAN-Verbindung unterbricht. Wenn Sie Xauth deaktivieren, wird jedoch die Fähigkeit zur Authentifizierung von VPN-Clients verringert.

Die Einführung von ISAKMP-Profilen in der Cisco IOS® Software Version 12.2(15)T ermöglicht diese Konfiguration, da Sie andere Verbindungseigenschaften (VPN-Client-Gruppe, Peer-IP-Adresse, vollqualifizierter Domänenname [FQDN] usw.) und nicht nur die Peer-IP-Adresse abgleichen können. Die ISAKMP-Profile sind Gegenstand dieser Konfiguration.

Hinweis: Sie können auch das **no-xauth-**Schlüsselwort mit dem **crypto isakmp-Schlüsselbefehl** verwenden, um Xauth für LAN-zu-LAN-Peers zu umgehen. Weitere Informationen finden Sie unter Möglichkeit, Xauth für statische IPsec-Peers zu deaktivieren und IPsec zwischen zwei Routern und einem Cisco VPN-Client 4.x zu konfigurieren.

Die Spoke-Router-Konfiguration in diesem Dokument kann auf allen anderen Spoke-Routern repliziert werden, die mit demselben Hub verbunden sind. Der einzige Unterschied zwischen Spokes ist die Zugriffsliste, die auf den zu verschlüsselnden Datenverkehr verweist.

Weitere Informationen zum Szenario, in dem Sie einen Router als EzVPN-Client und -Server auf derselben Schnittstelle konfigurieren können, finden Sie im Konfigurationsbeispiel EzVPN-Client und -Server.

Weitere Informationen finden Sie unter LAN-to-LAN-Tunnel auf einem VPN 300-Konzentrator mit einer für DHCP konfigurierten PIX-Firewall zur Konfiguration der Cisco VPN 300 Concentrator-Serie für die dynamische Erstellung von IPsec-Tunneln mit Remote-Cisco PIX-Firewalls, die DHCP verwenden, um IP-Adressen auf ihren öffentlichen Schnittstellen abzurufen.

Weitere Informationen finden Sie unter IPsec LAN-to-LAN-Tunnel auf einem VPN 3000 Concentrator mit einem für die DHCP-Konfiguration konfigurierten Cisco IOS Router. Beispiel zur Konfiguration der VPN 300 Concentrator-Serie, um IPsec-Tunnel dynamisch mit Remote-VPN-Geräten zu erstellen, die dynamische IP-Adressen auf ihren öffentlichen Schnittstellen empfangen.

Weitere Informationen finden Sie unter IPsec Between a Static IOS Router and a Dynamic PIX/ASA 7.x with NAT Configuration Example (IPsec zwischen einem statischen IOS-Router und einem dynamischen PIX/ASA 7.x mit NAT-Konfigurationsbeispiel, damit die PIX/ASA Security Appliance dynamische IPsec-Verbindungen vom IOS®-Router akzeptieren kann.

Voraussetzungen

Anforderungen

Für dieses Dokument bestehen keine speziellen Anforderungen.

Verwendete Komponenten

IPsec-Profile wurden in Version 12.2(15)T der Cisco IOS-Software eingeführt. Aufgrund der Cisco Bug-ID CSCea7140 (nur registrierte Kunden) müssen Sie die Cisco IOS-Softwareversion 12.3(3) oder höher oder die Cisco IOS-Softwareversion 12.3(2)T oder höher ausführen, damit diese Konfiguration erfolgreich ausgeführt werden kann. Diese Konfigurationen wurden mit den folgenden Softwareversionen getestet:

- Cisco IOS Software Release 12.3(6a) auf dem Hub-Router
- Cisco IOS Software Release 12.2(23a) auf dem Spoke-Router (kann eine beliebige Verschlüsselungsversion sein)
- Cisco VPN Client Version 4.0(4) unter Windows 2000

Die Informationen in diesem Dokument wurden von den Geräten in einer bestimmten Laborumgebung erstellt. Alle in diesem Dokument verwendeten Geräte haben mit einer leeren (Standard-)Konfiguration begonnen. Wenn Ihr Netzwerk in Betrieb ist, stellen Sie sicher, dass Sie die potenziellen Auswirkungen eines Befehls verstehen.

Konventionen

Weitere Informationen zu Dokumentkonventionen finden Sie unter Cisco Technical Tips Conventions (Technische Tipps zu Konventionen von Cisco).

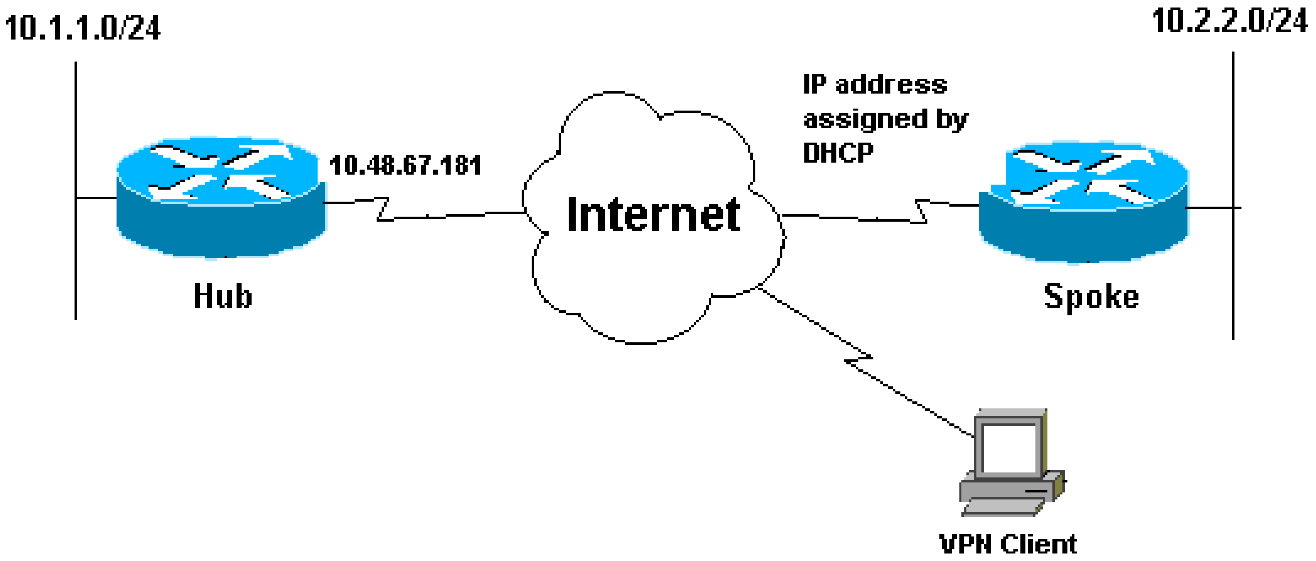
Konfigurieren

In diesem Abschnitt erhalten Sie Informationen zum Konfigurieren der in diesem Dokument beschriebenen Funktionen.

Hinweis: Verwenden Sie das Command Lookup Tool (nur registrierte Kunden), um weitere Informationen zu den in diesem Dokument verwendeten Befehlen zu erhalten.

Netzwerkdiagramm

In diesem Dokument wird die in diesem Diagramm dargestellte Netzwerkeinrichtung verwendet.



Konfigurationen

In diesem Dokument wird die folgende Netzwerkeinrichtung verwendet:

- Hub-Konfiguration
- Spoke-Konfiguration

Hub-Konfiguration

```
version 12.3
service timestamps debug datetime msec
service timestamps log datetime msec
service password-encryption
!
hostname Hub
!
no logging on
!
username gfullage password 7 0201024E070A0E2649
aaa new-model
```

```
!
!
aaa authentication login clientauth local
aaa authorization network groupauthor local
aaa session-id common
ip subnet-zero
!
!
no ip domain lookup
!
!  !--- Keyring that defines wildcard pre-shared key.
crypto keyring spokes
  pre-shared-key address 0.0.0.0 0.0.0.0 key cisco123
!
crypto isakmp policy 10
 encr 3des
 authentication pre-share
 group 2
!  !--- VPN Client configuration for group "testgroup"
!--- (this name is configured in the VPN Client). crypto
isakmp client configuration group testgroup
 key cisco321
 dns 1.1.1.1 2.2.2.2
 wins 3.3.3.3 4.4.4.4
 domain cisco.com
 pool ippool
!
!--- Profile for LAN-to-LAN connection, that references
!--- the wildcard pre-shared key and a wildcard !---
identity (this is what is broken in !--- Cisco bug ID
CSCea77140) and no Xauth. crypto isakmp profile L2L
   description LAN-to-LAN for spoke router(s) connection
   keyring spokes
   match identity address 0.0.0.0  !--- Profile for VPN
Client connections, that matches !--- the "testgroup"
group and defines the Xauth properties. crypto isakmp
profile VPNclient
   description VPN clients profile
   match identity group testgroup
   client authentication list clientauth
   isakmp authorization list groupauthor
   client configuration address respond
!
!
crypto ipsec transform-set myset esp-3des esp-sha-hmac
!
!--- Two instances of the dynamic crypto map !---
reference the two previous IPsec profiles. crypto
dynamic-map dynmap 5
 set transform-set myset
 set isakmp-profile VPNclient
crypto dynamic-map dynmap 10
 set transform-set myset
 set isakmp-profile L2L
!
!
!--- Crypto-map only references the two !--- instances
of the previous dynamic crypto map. crypto map mymap 10
ipsec-isakmp dynamic dynmap
!
!
!
interface FastEthernet0/0
 description Outside interface
 ip address 10.48.67.181 255.255.255.224
 no ip mroute-cache
 duplex auto
 speed auto
 crypto map mymap
!
interface FastEthernet0/1
 description Inside interface
 ip address 10.1.1.1 255.255.254.0

 duplex auto
 speed auto
 no keepalive
!
ip local pool ippool 10.5.5.1 10.5.5.254
no ip http server
no ip http secure-server
ip classless
ip route 0.0.0.0 0.0.0.0 10.48.66.181

!
!
call rsvp-sync
!
!
dial-peer cor custom
!
!
line con 0
 exec-timeout 0 0
 escape-character 27
line aux 0
line vty 0 4
 password 7 121A0C041104
!
!
end
```

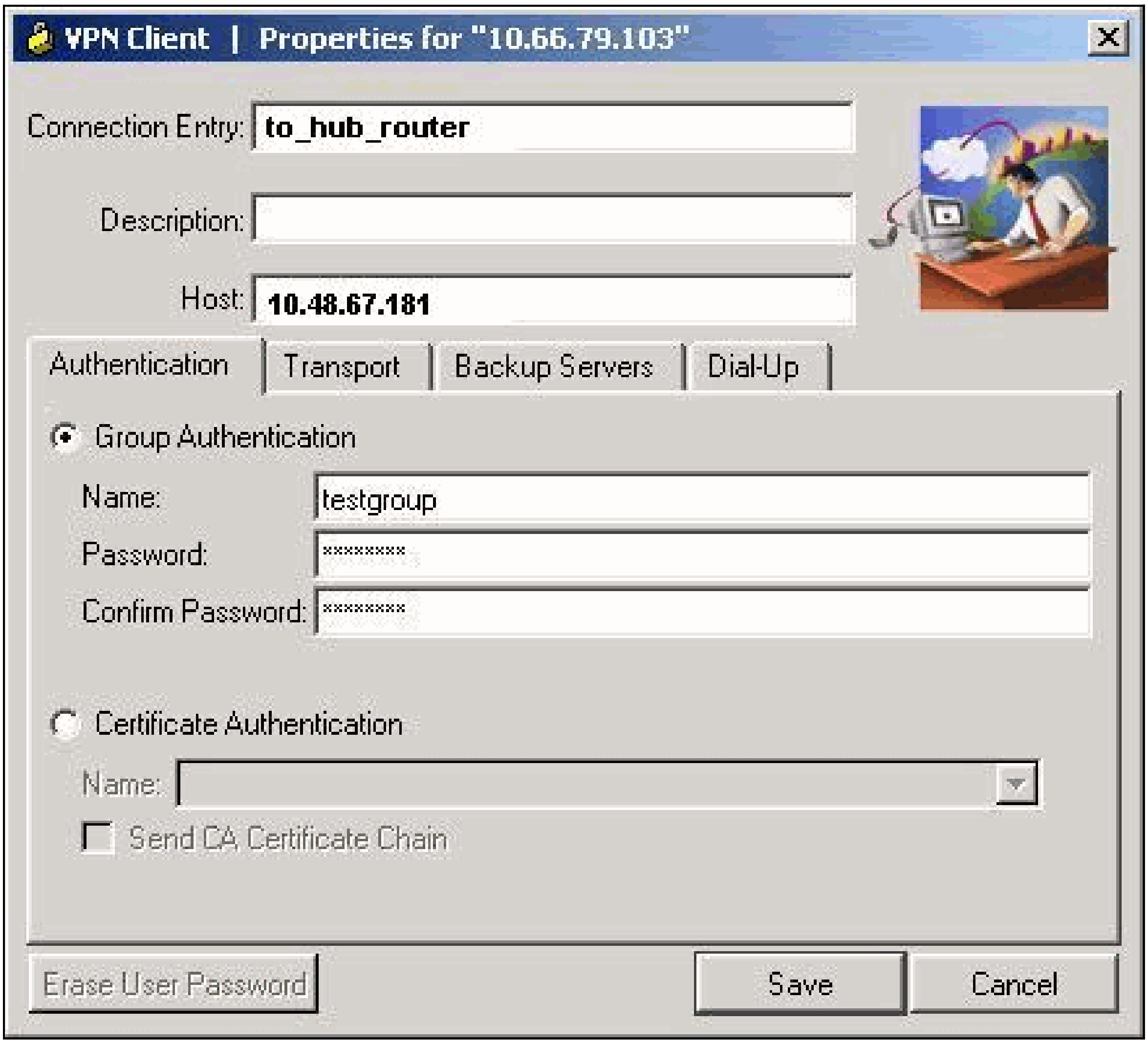
Spoke-Konfiguration

```

version 12.2
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname Spoke
!
no logging on
!
ip subnet-zero
no ip domain lookup
!
ip cef
!
!
crypto isakmp policy 10
 encr 3des
 authentication pre-share
 group 2
crypto isakmp key cisco123 address 10.48.67.181
!
!
crypto ipsec transform-set myset esp-3des esp-sha-hmac
```

```
!
!--- Standard crypto map on the spoke router !--- that
references the known hub IP address. crypto map mymap 10
ipsec-isakmp
 set peer 10.48.67.181
 set transform-set myset
 match address 100
!
!
controller ISA 5/1
!
!
interface FastEthernet0/0
 description Outside interface

 ip address dhcp
 duplex auto
 speed auto
 crypto map mymap
!
interface FastEthernet0/1
 description Inside interface
 ip address 10.2.2.2 255.255.255.0
 duplex auto
 speed auto
 no keepalive
!
interface ATM1/0
 no ip address
 shutdown
 no atm ilmi-keepalive
!
ip classless
ip route 0.0.0.0 0.0.0.0 10.100.2.3
no ip http server
no ip http secure-server
!
!
!--- Standard access-list that references traffic to be
!--- encrypted. This is the only thing that needs !---
to be changed between different spoke routers. access-
list 100 permit ip 10.2.0.0 0.0.255.255 10.1.0.0
0.0.255.255
!
!
call rsvp-sync
!
!
mgcp profile default
!
!
line con 0
 exec-timeout 0 0
line aux 0
line vty 0 4
 password cisco
 login
!
!
end
```

VPN-Client

Erstellen Sie einen neuen Verbindungseintrag, der auf die IP-Adresse des Hub-Routers verweist. Der Gruppenname in diesem Beispiel lautet "testgroup", das Kennwort lautet "cisco321". Dies wird in der Hub-Router-Konfiguration angezeigt.



Connection Entry: to_hub_router

Description:

Host: 10.48.67.181

● Group Authentication

Name: testgroup

Password: ********

Confirm Password: ********

○ Certificate Authentication

Name:

□ Send CA Certificate Chain

Überprüfen

In diesem Abschnitt überprüfen Sie, ob Ihre Konfiguration ordnungsgemäß funktioniert.

Debug-Befehle, die auf dem Hub-Router ausgeführt werden, können bestätigen, dass die richtigen Parameter für die Spoke- und VPN-Clientverbindungen zugeordnet sind.

Das Output Interpreter Tool (nur registrierte Kunden) (OIT) unterstützt bestimmte **show**-Befehle. Verwenden Sie das OIT, um eine Analyse der **Ausgabe des** Befehls **show anzuzeigen**.

Hinweis: Beachten Sie vor der Verwendung von **Debug-**Befehlen die Informationen zu Debug-Befehlen.

- **show ip interface**: Zeigt die IP-Adresszuweisung zum Spoke-Router an.
- **show crypto isakmp sa detail**: Zeigt die IKE-SAs an, die zwischen den IPsec-Initiatoren eingerichtet wurden. Beispielsweise der Spoke-Router, der VPN-Client und der Hub-Router.
- **show crypto ipsec sa**: Zeigt die IPsec-SAs an, die zwischen den IPsec-Initiatoren eingerichtet wurden. Beispielsweise der Spoke-Router, der VPN-Client und der Hub-Router.
- **debug crypto isakmp**: Zeigt Meldungen über IKE-Ereignisse (Internet Key Exchange) an.

- **debug crypto ipsec**: Zeigt IPsec-Ereignisse an.
- **debug crypto engine**: Zeigt Crypto Engine-Ereignisse an.

Dies ist die Ausgabe des Befehls **show ip interface f0/0**.

```
spoke#show ip interface f0/0
FastEthernet0/1 is up, line protocol is up
Internet address is 10.100.2.102/24
Broadcast address is 255.255.255.255
Address determined by DHCP
```

Dies ist die Ausgabe des Befehls **show crypto isakmp sa detail**.

```
hub#show crypto isakmp sa detail

Codes: C - IKE configuration mode, D - Dead Peer Detection

       K - Keepalives, N - NAT-traversal

       X - IKE Extended Authentication

       psk - Preshared key, rsig - RSA signature

       renc - RSA encryption



C-id  Local           Remote          I-VRF    Encr Hash Auth DH Lifetime Cap.

1     10.48.67.181    10.100.2.102             3des sha  psk  2   04:15:43

2     10.48.67.181    10.51.82.100             3des sha          2   05:31:58 CX
```

Dies ist die Ausgabe des Befehls **show crypto ipsec sa**.

```
hub#show crypto ipsec sa

interface: FastEthernet0/0
Crypto map tag: mymap, local addr. 10.48.67.181

protected vrf:
local ident (addr/mask/prot/port): (0.0.0.0/0.0.0.0/0/0)
remote ident (addr/mask/prot/port): (10.5.5.1/255.255.255.255/0/0)
current_peer: 10.51.82.100:500
PERMIT, flags={}
#pkts encaps: 8, #pkts encrypt: 8, #pkts digest 8
#pkts decaps: 189, #pkts decrypt: 189, #pkts verify 189
#pkts compressed: 0, #pkts decompressed: 0
#pkts not compressed: 0, #pkts compr. failed: 0
#pkts not decompressed: 0, #pkts decompress failed: 0
#send errors 0, #recv errors 0

local crypto endpt.: 10.48.67.181, remote crypto endpt.: 10.51.82.100
path mtu 1500, ip mtu 1500
current outbound spi: B0C0F4AC

inbound esp sas:
spi: 0x7A1AB8F3(2048571635)
transform: esp-3des esp-sha-hmac ,
in use settings ={Tunnel, }
slot: 0, conn id: 2004, flow_id: 5, crypto map: mymap
sa timing: remaining key lifetime (k/sec): (4602415/3169)
IV size: 8 bytes
replay detection support: Y

inbound ah sas:

inbound pcp sas:

outbound esp sas:
spi: 0xB0C0F4AC(2965435564)
transform: esp-3des esp-sha-hmac ,
in use settings ={Tunnel, }
slot: 0, conn id: 2005, flow_id: 6, crypto map: mymap
sa timing: remaining key lifetime (k/sec): (4602445/3169)
IV size: 8 bytes
replay detection support: Y

outbound ah sas:

outbound pcp sas:

protected vrf:
local ident (addr/mask/prot/port): (10.1.0.0/255.255.0.0/0/0)
remote ident (addr/mask/prot/port): (10.2.0.0/255.255.0.0/0/0)
current_peer: 10.100.2.102:500
PERMIT, flags={}
#pkts encaps: 19, #pkts encrypt: 19, #pkts digest 19
#pkts decaps: 19, #pkts decrypt: 19, #pkts verify 19
#pkts compressed: 0, #pkts decompressed: 0
#pkts not compressed: 0, #pkts compr. failed: 0
#pkts not decompressed: 0, #pkts decompress failed: 0
#send errors 0, #recv errors 0

local crypto endpt.: 10.48.67.181, remote crypto endpt.: 10.100.2.102
path mtu 1500, ip mtu 1500
current outbound spi: 5FBE5408

inbound esp sas:
spi: 0x9CD7288C(2631346316)
transform: esp-3des esp-sha-hmac ,
in use settings ={Tunnel, }
slot: 0, conn id: 2002, flow_id: 3, crypto map: mymap
sa timing: remaining key lifetime (k/sec): (4569060/2071)
IV size: 8 bytes
replay detection support: Y

inbound ah sas:

inbound pcp sas:

outbound esp sas:
spi: 0x5FBE5408(1606308872)
transform: esp-3des esp-sha-hmac ,
in use settings ={Tunnel, }
slot: 0, conn id: 2003, flow_id: 4, crypto map: mymap
sa timing: remaining key lifetime (k/sec): (4569060/2070)
IV size: 8 bytes
replay detection support: Y

outbound ah sas:

outbound pcp sas:
```

Diese Debug-Ausgabe wurde auf dem Hub-Router erfasst, wenn der Spoke-Router IKE- und IPsec-SAs initiiert.

```
ISAKMP (0:0): received packet from 10.100.2.102 dport 500 sport 500
              Global (N) NEW SA
ISAKMP: local port 500, remote port 500
ISAKMP: insert sa successfully sa = 63D5BE0C
ISAKMP (0:1): Input = IKE_MESG_FROM_PEER, IKE_MM_EXCH
ISAKMP (0:1): Old State = IKE_READY New State = IKE_R_MM1

ISAKMP (0:1): processing SA payload. message ID = 0
ISAKMP: Looking for a matching key for 10.100.2.102 in default
ISAKMP: Looking for a matching key for 10.100.2.102 in spokes : success
ISAKMP (0:1): found peer pre-shared key matching 10.100.2.102
ISAKMP (0:1) local preshared key found
ISAKMP : Scanning profiles for xauth ... L2L VPNclient
ISAKMP (0:1) Authentication by xauth preshared
ISAKMP (0:1): Checking ISAKMP transform 1 against priority 10 policy
ISAKMP: encryption 3DES-CBC
ISAKMP: hash SHA
ISAKMP: default group 2
ISAKMP: auth pre-share
ISAKMP: life type in seconds
ISAKMP: life duration (VPI) of 0x0 0x1 0x51 0x80
ISAKMP (0:1): atts are acceptable. Next payload is 0
CryptoEngine0: generate alg parameter
CRYPTO_ENGINE: Dh phase 1 status: 0
CRYPTO_ENGINE: Dh phase 1 status: 0
ISAKMP (0:1): Input = IKE_MESG_INTERNAL, IKE_PROCESS_MAIN_MODE
ISAKMP (0:1): Old State = IKE_R_MM1 New State = IKE_R_MM1

ISAKMP (0:1): sending packet to 10.100.2.102 my_port 500 peer_port
              500 (R) MM_SA_SETUP
ISAKMP (0:1): Input = IKE_MESG_INTERNAL, IKE_PROCESS_COMPLETE
ISAKMP (0:1): Old State = IKE_R_MM1 New State = IKE_R_MM2

ISAKMP (0:1): received packet from 10.100.2.102 dport 500 sport 500
              Global (R) MM_SA_SETUP
ISAKMP (0:1): Input = IKE_MESG_FROM_PEER, IKE_MM_EXCH
ISAKMP (0:1): Old State = IKE_R_MM2 New State = IKE_R_MM3

ISAKMP (0:1): processing KE payload. message ID = 0
CryptoEngine0: generate alg parameter
ISAKMP (0:1): processing NONCE payload. message ID = 0
ISAKMP: Looking for a matching key for 10.100.2.102 in default
ISAKMP: Looking for a matching key for 10.100.2.102 in spokes : success
ISAKMP (0:1): found peer pre-shared key matching 10.100.2.102
CryptoEngine0: create ISAKMP SKEYID for conn id 1
ISAKMP (0:1): SKEYID state generated
ISAKMP (0:1): processing vendor id payload
ISAKMP (0:1): speaking to another IOS box!
ISAKMP (0:1): Input = IKE_MESG_INTERNAL, IKE_PROCESS_MAIN_MODE
ISAKMP (0:1): Old State = IKE_R_MM3 New State = IKE_R_MM3

ISAKMP (0:1): sending packet to 10.100.2.102 my_port 500 peer_port 500
              (R) MM_KEY_EXCH
ISAKMP (0:1): Input = IKE_MESG_INTERNAL, IKE_PROCESS_COMPLETE
ISAKMP (0:1): Old State = IKE_R_MM3 New State = IKE_R_MM4

ISAKMP (0:1): received packet from 10.100.2.102 dport 500 sport 500
              Global (R) MM_KEY_EXCH
ISAKMP (0:1): Input = IKE_MESG_FROM_PEER, IKE_MM_EXCH
ISAKMP (0:1): Old State = IKE_R_MM4 New State = IKE_R_MM5

ISAKMP (0:1): processing ID payload. message ID = 0
ISAKMP (0:1): ID payload
next-payload : 8
type : 1
address : 10.100.2.102
protocol : 17
port : 500
length : 12
ISAKMP (0:1): peer matches L2L profile
ISAKMP: Looking for a matching key for 10.100.2.102 in default
ISAKMP: Looking for a matching key for 10.100.2.102 in spokes : success
ISAKMP (0:1): Found ADDRESS key in keyring spokes
ISAKMP (0:1): processing HASH payload. message ID = 0
CryptoEngine0: generate hmac context for conn id 1
ISAKMP (0:1): SA authentication status: authenticated
ISAKMP (0:1): SA has been authenticated with 10.100.2.102
ISAKMP (0:1): Input = IKE_MESG_INTERNAL, IKE_PROCESS_MAIN_MODE
ISAKMP (0:1): Old State = IKE_R_MM5 New State = IKE_R_MM5

ISAKMP (0:1): SA is doing pre-shared key authentication using id type ID_IPV4_ADDR
ISAKMP (0:1): ID payload
next-payload : 8
type : 1
address : 10.48.67.181
protocol : 17
port : 500
length : 12
ISAKMP (1): Total payload length: 12
CryptoEngine0: generate hmac context for conn id 1
CryptoEngine0: clear dh number for conn id 1
ISAKMP (0:1): sending packet to 10.100.2.102 my_port 500 peer_port 500
              (R) MM_KEY_EXCH
ISAKMP (0:1): Input = IKE_MESG_INTERNAL, IKE_PROCESS_COMPLETE
ISAKMP (0:1): Old State = IKE_R_MM5 New State = IKE_P1_COMPLETE

ISAKMP (0:1): Input = IKE_MESG_INTERNAL, IKE_PHASE1_COMPLETE
ISAKMP (0:1): Old State = IKE_P1_COMPLETE New State = IKE_P1_COMPLETE

!--- IKE phase 1 is complete. ISAKMP (0:1): received packet from 10.100.2.102 dport 500 sport
500 Global (R) QM_IDLE ISAKMP: set new node 904613356 to QM_IDLE CryptoEngine0: generate hmac
context for conn id 1 ISAKMP (0:1): processing HASH payload. message ID = 904613356 ISAKMP
(0:1): processing SA payload. message ID = 904613356 ISAKMP (0:1): Checking IPSec proposal 1
ISAKMP: transform 1, ESP_3DES ISAKMP: attributes in transform: ISAKMP: encaps is 1 (Tunnel)
ISAKMP: SA life type in seconds ISAKMP: SA life duration (basic) of 3600 ISAKMP: SA life type in
kilobytes ISAKMP: SA life duration (VPI) of 0x0 0x46 0x50 0x0 ISAKMP: authenticator is HMAC-SHA
CryptoEngine0: validate proposal ISAKMP (0:1): atts are acceptable.
IPSEC(validate_proposal_request): proposal part #1,
(key eng. msg.) INBOUND local= 10.48.67.181, remote= 10.100.2.102,
local_proxy= 10.1.0.0/255.255.0.0/0/0 (type=4),
remote_proxy= 10.2.0.0/255.255.0.0/0/0 (type=4),
protocol= ESP, transform= esp-3des esp-sha-hmac (Tunnel),
lifedur= 0s and 0kb,
spi= 0x0(0), conn_id= 0, keysize= 0, flags= 0x2
CryptoEngine0: validate proposal request
IPSEC(kei_proxy): head = mymap, map->ivrf = , kei->ivrf =
IPSEC(kei_proxy): head = mymap, map->ivrf = , kei->ivrf =
ISAKMP (0:1): processing NONCE payload. message ID = 904613356
ISAKMP (0:1): processing ID payload. message ID = 904613356
ISAKMP (0:1): processing ID payload. message ID = 904613356
ISAKMP (0:1): asking for 1 spis from ipsec
ISAKMP (0:1): Node 904613356, Input = IKE_MESG_FROM_PEER, IKE_QM_EXCH
ISAKMP (0:1): Old State = IKE_QM_READY New State = IKE_QM_SPI_STARVE
```

```
IPSEC(key_engine): got a queue event...
IPSEC(spi_response): getting spi 4172528328 for SA from 10.48.67.181 to
                     10.100.2.102 for prot 3
ISAKMP: received ke message (2/1)
CryptoEngine0: generate hmac context for conn id 1
ISAKMP (0:1): sending packet to 10.100.2.102 my_port 500 peer_port 500 (R) QM_IDLE
ISAKMP (0:1): Node 904613356, Input = IKE_MESG_FROM_IPSEC, IKE_SPI_REPLY
ISAKMP (0:1): Old State = IKE_QM_SPI_STARVE New State = IKE_QM_R_QM2
ISAKMP (0:1): received packet from 10.100.2.102 dport 500 sport 500 Global
              (R) QM_IDLE
CryptoEngine0: generate hmac context for conn id 1
CryptoEngine0: ipsec allocate flow
CryptoEngine0: ipsec allocate flow
ISAKMP (0:1): Creating IPSec SAs
inbound SA from 10.100.2.102 to 10.48.67.181 (f/i) 0/ 0
(proxy 10.2.0.0 to 10.1.0.0)
has spi 0xF8B3BAC8 and conn_id 2000 and flags 2
lifetime of 3600 seconds
lifetime of 4608000 kilobytes
has client flags 0x0
outbound SA from 10.48.67.181 to 10.100.2.102 (f/i) 0/ 0
(proxy 10.1.0.0 to 10.2.0.0 )
has spi 1757151497 and conn_id 2001 and flags A
lifetime of 3600 seconds
lifetime of 4608000 kilobytes
has client flags 0x0
ISAKMP (0:1): deleting node 904613356 error FALSE reason "quick mode done (await)"
ISAKMP (0:1): Node 904613356, Input = IKE_MESG_FROM_PEER, IKE_QM_EXCH
ISAKMP (0:1): Old State = IKE_QM_R_QM2 New State = IKE_QM_PHASE2_COMPLETE
IPSEC(key_engine): got a queue event...
IPSEC(initialize_sas): ,
(key eng. msg.) INBOUND local= 10.48.67.181, remote= 10.100.2.102,
local_proxy= 10.1.0.0/255.255.0.0/0/0 (type=4),
remote_proxy= 10.2.0.0/255.255.0.0/0/0 (type=4),
protocol= ESP, transform= esp-3des esp-sha-hmac (Tunnel),
lifedur= 3600s and 4608000kb,
spi= 0xF8B3BAC8(4172528328), conn_id= 2000, keysize= 0, flags= 0x2
IPSEC(initialize_sas): ,
(key eng. msg.) OUTBOUND local= 10.48.67.181, remote= 10.100.2.102,
local_proxy= 10.1.0.0/255.255.0.0/0/0 (type=4),
remote_proxy= 10.2.0.0/255.255.0.0/0/0 (type=4),
protocol= ESP, transform= esp-3des esp-sha-hmac (Tunnel),
lifedur= 3600s and 4608000kb,
spi= 0x68BC0109(1757151497), conn_id= 2001, keysize= 0, flags= 0xA
IPSEC(kei_proxy): head = mymap, map->ivrf = , kei->ivrf =
IPSEC(kei_proxy): head = mymap, map->ivrf = , kei->ivrf =
IPSEC(add mtree): src 10.1.0.0, dest 10.2.0.0, dest_port 0

IPSEC(create_sa): sa created,
(sa) sa_dest= 10.48.67.181, sa_prot= 50,
sa_spi= 0xF8B3BAC8(4172528328),
sa_trans= esp-3des esp-sha-hmac , sa_conn_id= 2000
IPSEC(create_sa): sa created,
(sa) sa_dest= 10.100.2.102, sa_prot= 50,
sa_spi= 0x68BC0109(1757151497),
sa_trans= esp-3des esp-sha-hmac , sa_conn_id= 2001
```

Diese Debug-Ausgabe wurde auf dem Hub-Router erfasst, wenn der VPN-Client IKE- und IPsec-SAs initiiert.

```
ISAKMP (0:0): received packet from 10.51.82.100 dport 500 sport 500 Global
              (N) NEW SA
ISAKMP: local port 500, remote port 500
```

```
ISAKMP: insert sa successfully sa = 63D3D804
ISAKMP (0:2): processing SA payload. message ID = 0
ISAKMP (0:2): processing ID payload. message ID = 0
ISAKMP (0:2): ID payload
next-payload : 13
type : 11
group id : testgroup
protocol : 17
port : 500
length : 17
ISAKMP (0:2): peer matches VPNclient profile
ISAKMP: Looking for a matching key for 10.51.82.100 in default
ISAKMP: Looking for a matching key for 10.51.82.100 in spokes : success
ISAKMP: Created a peer struct for 10.51.82.100, peer port 500
ISAKMP: Locking peer struct 0x644AFC7C, IKE refcount 1 for
        crypto_ikmp_config_initialize_sa
ISAKMP (0:2): Setting client config settings 644AFCF8
ISAKMP (0:2): (Re)Setting client xauth list and state
ISAKMP (0:2): processing vendor id payload
ISAKMP (0:2): vendor ID seems Unity/DPD but major 215 mismatch
ISAKMP (0:2): vendor ID is Xauth
ISAKMP (0:2): processing vendor id payload
ISAKMP (0:2): vendor ID is DPD
ISAKMP (0:2): processing vendor id payload
ISAKMP (0:2): vendor ID seems Unity/DPD but major 123 mismatch
ISAKMP (0:2): vendor ID is NAT-T v2
ISAKMP (0:2): processing vendor id payload
ISAKMP (0:2): vendor ID seems Unity/DPD but major 194 mismatch
ISAKMP (0:2): processing vendor id payload
ISAKMP (0:2): vendor ID is Unity
ISAKMP (0:2) Authentication by xauth preshared

!--- Check of ISAKMP transforms against the configured ISAKMP policy. ISAKMP (0:2): Checking
ISAKMP transform 9 against priority 10 policy ISAKMP: encryption 3DES-CBC ISAKMP: hash SHA
ISAKMP: default group 2 ISAKMP: auth XAUTHInitPreShared ISAKMP: life type in seconds ISAKMP:
life duration (VPI) of 0x0 0x20 0xC4 0x9B ISAKMP (0:2): atts are acceptable. Next payload is 3
CryptoEngine0: generate alg parameter
CRYPTO_ENGINE: Dh phase 1 status: 0
CRYPTO_ENGINE: Dh phase 1 status: 0
ISAKMP (0:2): processing KE payload. message ID = 0
CryptoEngine0: generate alg parameter
ISAKMP (0:2): processing NONCE payload. message ID = 0
ISAKMP (0:2): vendor ID is NAT-T v2
ISAKMP (0:2): Input = IKE_MESG_FROM_PEER, IKE_AM_EXCH
ISAKMP (0:2): Old State = IKE_READY New State = IKE_R_AM_AAA_AWAIT

ISAKMP: got callback 1
CryptoEngine0: create ISAKMP SKEYID for conn id 2
ISAKMP (0:2): SKEYID state generated
ISAKMP (0:2): constructed NAT-T vendor-02 ID
ISAKMP (0:2): SA is doing pre-shared key authentication plus XAUTH
              using id type ID_IPV4_ADDR
ISAKMP (0:2): ID payload
next-payload : 10
type : 1
address : 10.48.67.181
protocol : 17
port : 0
length : 12
ISAKMP (2): Total payload length: 12
CryptoEngine0: generate hmac context for conn id 2
ISAKMP (0:2): sending packet to 10.51.82.100 my_port 500 peer_port 500
             (R) AG_INIT_EXCH
ISAKMP (0:2): Input = IKE_MESG_FROM_AAA, PRESHARED_KEY_REPLY
ISAKMP (0:2): Old State = IKE_R_AM_AAA_AWAIT New State = IKE_R_AM2

ISAKMP (0:2): received packet from 10.51.82.100 dport 500 sport 500 Global
             (R) AG_INIT_EXCH
ISAKMP (0:2): processing HASH payload. message ID = 0
CryptoEngine0: generate hmac context for conn id 2
ISAKMP (0:2): processing NOTIFY INITIAL_CONTACT protocol 1
spi 0, message ID = 0, sa = 63D3D804
ISAKMP (0:2): SA authentication status: authenticated
ISAKMP (0:2): Process initial contact,
bring down existing phase 1 and 2 SA's with local 10.48.67.181 remote
        10.51.82.100 remote port 500
ISAKMP (0:2): returning IP addr to the address pool
IPSEC(key_engine): got a queue event...
ISAKMP:received payload type 17
ISAKMP:received payload type 17
ISAKMP (0:2): SA authentication status: authenticated
ISAKMP (0:2): SA has been authenticated with 10.51.82.100
CryptoEngine0: clear dh number for conn id 1
ISAKMP: Trying to insert a peer 10.48.67.181/10.51.82.100/500/,
        and inserted successfully.
ISAKMP: set new node 1257790711 to CONF_XAUTH
CryptoEngine0: generate hmac context for conn id 2
ISAKMP (0:2): sending packet to 10.51.82.100 my_port 500 peer_port 500 (R) QM_IDLE
ISAKMP (0:2): purging node 1257790711
ISAKMP: Sending phase 1 responder lifetime 86400

ISAKMP (0:2): Input = IKE_MESG_FROM_PEER, IKE_AM_EXCH
ISAKMP (0:2): Old State = IKE_R_AM2 New State = IKE_P1_COMPLETE

ISAKMP (0:2): Need XAUTH
ISAKMP (0:2): Input = IKE_MESG_INTERNAL, IKE_PHASE1_COMPLETE
ISAKMP (0:2): Old State = IKE_P1_COMPLETE New State = IKE_XAUTH_AAA_START_LOGIN_AWAIT

ISAKMP: got callback 1
ISAKMP: set new node 955647754 to CONF_XAUTH

!--- Extended authentication begins. ISAKMP/xauth: request attribute XAUTH_USER_NAME_V2
ISAKMP/xauth: request attribute XAUTH_USER_PASSWORD_V2
CryptoEngine0: generate hmac context for conn id 2
ISAKMP (0:2): initiating peer config to 10.51.82.100. ID = 955647754
ISAKMP (0:2): sending packet to 10.51.82.100 my_port 500 peer_port 500
             (R) CONF_XAUTH
ISAKMP (0:2): Input = IKE_MESG_FROM_AAA, IKE_AAA_START_LOGIN
ISAKMP (0:2): Old State = IKE_XAUTH_AAA_START_LOGIN_AWAIT New State =
              IKE_XAUTH_REQ_SENT

ISAKMP (0:2): received packet from 10.51.82.100 dport 500 sport 500 Global
             (R) CONF_XAUTH
ISAKMP (0:2): processing transaction payload from 10.51.82.100. message
              ID = 955647754
CryptoEngine0: generate hmac context for conn id 2
ISAKMP: Config payload REPLY

!--- Username/password received from the VPN Client. ISAKMP/xauth: reply attribute
XAUTH_USER_NAME_V2
ISAKMP/xauth: reply attribute XAUTH_USER_PASSWORD_V2
ISAKMP (0:2): deleting node 955647754 error FALSE reason "done with
              xauth request/reply exchange"
ISAKMP (0:2): Input = IKE_MESG_FROM_PEER, IKE_CFG_REPLY
ISAKMP (0:2): Old State = IKE_XAUTH_REQ_SENT New State =
             IKE_XAUTH_AAA_CONT_LOGIN_AWAIT

ISAKMP: got callback 1
```

```
ISAKMP: set new node -1118110738 to CONF_XAUTH
CryptoEngine0: generate hmac context for conn id 2
ISAKMP (0:2): initiating peer config to 10.51.82.100. ID = -1118110738
ISAKMP (0:2): sending packet to 10.51.82.100 my_port 500 peer_port
              500 (R) CONF_XAUTH
ISAKMP (0:2): Input = IKE_MESG_FROM_AAA, IKE_AAA_CONT_LOGIN
ISAKMP (0:2): Old State = IKE_XAUTH_AAA_CONT_LOGIN_AWAIT New State =
              IKE_XAUTH_SET_SENT

ISAKMP (0:2): received packet from 10.51.82.100 dport 500 sport 500 Global
             (R) CONF_XAUTH
ISAKMP (0:2): processing transaction payload from 10.51.82.100. message
              ID = -1118110738
CryptoEngine0: generate hmac context for conn id 2

 !--- Success ISAKMP: Config payload ACK ISAKMP (0:2): XAUTH ACK Processed
ISAKMP (0:2): deleting node -1118110738 error FALSE reason "done with transaction"
ISAKMP (0:2): Input = IKE_MESG_FROM_PEER, IKE_CFG_ACK
ISAKMP (0:2): Old State = IKE_XAUTH_SET_SENT New State = IKE_P1_COMPLETE

ISAKMP (0:2): Input = IKE_MESG_INTERNAL, IKE_PHASE1_COMPLETE
ISAKMP (0:2): Old State = IKE_P1_COMPLETE New State = IKE_P1_COMPLETE

ISAKMP (0:2): received packet from 10.51.82.100 dport 500 sport 500
              Global (R) QM_IDLE
ISAKMP: set new node -798495444 to QM_IDLE
ISAKMP (0:2): processing transaction payload from 10.51.82.100. message
              ID = -798495444
CryptoEngine0: generate hmac context for conn id 2
ISAKMP: Config payload REQUEST
ISAKMP (0:2): checking request:
ISAKMP: IP4_ADDRESS
ISAKMP: IP4_NETMASK
ISAKMP: IP4_DNS
ISAKMP: IP4_NBNS
ISAKMP: ADDRESS_EXPIRY
ISAKMP: UNKNOWN Unknown Attr: 0x7000
ISAKMP: UNKNOWN Unknown Attr: 0x7001
ISAKMP: DEFAULT_DOMAIN
ISAKMP: SPLIT_INCLUDE
ISAKMP: UNKNOWN Unknown Attr: 0x7003
ISAKMP: UNKNOWN Unknown Attr: 0x7007
ISAKMP: UNKNOWN Unknown Attr: 0x7009
ISAKMP: APPLICATION_VERSION
ISAKMP: UNKNOWN Unknown Attr: 0x7008
ISAKMP: UNKNOWN Unknown Attr: 0x700A
ISAKMP: UNKNOWN Unknown Attr: 0x7005
ISAKMP (0:2): Input = IKE_MESG_FROM_PEER, IKE_CFG_REQUEST
ISAKMP (0:2): Old State = IKE_P1_COMPLETE New State = IKE_CONFIG_AUTHOR_AAA_AWAIT

ISAKMP: got callback 1
ISAKMP (0:2): attributes sent in message:
Address: 0.2.0.0
ISAKMP (0:2): allocating address 10.5.5.1
ISAKMP: Sending private address: 10.5.5.1
ISAKMP: Sending IP4_DNS server address: 1.1.1.1
ISAKMP: Sending IP4_DNS server address: 2.2.2.2
ISAKMP: Sending IP4_NBNS server address: 3.3.3.3
ISAKMP: Sending IP4_NBNS server address: 4.4.4.4
ISAKMP: Sending ADDRESS_EXPIRY seconds left to use the address: 86386
ISAKMP (0/2): Unknown Attr: UNKNOWN (0x7000)
ISAKMP (0/2): Unknown Attr: UNKNOWN (0x7001)
ISAKMP: Sending DEFAULT_DOMAIN default domain name: cisco.com
ISAKMP (0/2): Unknown Attr: UNKNOWN (0x7003)
ISAKMP (0/2): Unknown Attr: UNKNOWN (0x7007)
ISAKMP (0/2): Unknown Attr: UNKNOWN (0x7009)
ISAKMP: Sending APPLICATION_VERSION string: Cisco Internetwork Operating
       System Software
IOS (tm) 7200 Software (C7200-IK9S-M), Version 12.3(6a), RELEASE SOFTWARE (fc4)
Copyright (c) 1986-2004 by cisco Systems, Inc.
Compiled Fri 02-Apr-04 15:52 by kellythw
ISAKMP (0/2): Unknown Attr: UNKNOWN (0x7008)
ISAKMP (0/2): Unknown Attr: UNKNOWN (0x700A)
ISAKMP (0/2): Unknown Attr: UNKNOWN (0x7005)
CryptoEngine0: generate hmac context for conn id 2
ISAKMP (0:2): responding to peer config from 10.51.82.100. ID = -798495444
ISAKMP (0:2): sending packet to 10.51.82.100 my_port 500 peer_port 500 (R) CONF_ADDR
ISAKMP (0:2): deleting node -798495444 error FALSE reason ""
ISAKMP (0:2): Input = IKE_MESG_FROM_AAA, IKE_AAA_GROUP_ATTR
ISAKMP (0:2): Old State = IKE_CONFIG_AUTHOR_AAA_AWAIT New State = IKE_P1_COMPLETE

ISAKMP (0:2): Input = IKE_MESG_INTERNAL, IKE_PHASE1_COMPLETE
ISAKMP (0:2): Old State = IKE_P1_COMPLETE New State = IKE_P1_COMPLETE

 !--- IKE phase 1 and Config Mode complete. !--- Check of IPsec proposals against configured
transform set(s). ISAKMP (0:2): Checking IPSec proposal 12 ISAKMP: transform 1, ESP_3DES ISAKMP:
attributes in transform: ISAKMP: authenticator is HMAC-SHA ISAKMP: encaps is 1 (Tunnel) ISAKMP:
SA life type in seconds ISAKMP: SA life duration (VPI) of 0x0 0x20 0xC4 0x9B CryptoEngine0:
validate proposal ISAKMP (0:2): atts are acceptable. IPSEC(validate_proposal_request): proposal
part #1, (key eng. msg.) INBOUND local= 10.48.67.181, remote= 10.51.82.100, local_proxy=
0.0.0.0/0.0.0.0/0/0 (type=4), remote_proxy= 10.5.5.1/255.255.255.255/0/0 (type=1), protocol=
ESP, transform= esp-3des esp-sha-hmac (Tunnel), lifedur= 0s and 0kb, spi= 0x0(0), conn_id= 0,
keysize= 0, flags= 0x2 CryptoEngine0: validate proposal request IPSEC(kei_proxy): head = mymap,
map->ivrf = , kei->ivrf = IPSEC(kei_proxy): head = mymap, map->ivrf = , kei->ivrf = ISAKMP
(0:2): processing NONCE payload. message ID = 381726614 ISAKMP (0:2): processing ID payload.
message ID = 381726614 ISAKMP (0:2): processing ID payload. message ID = 381726614 ISAKMP (0:2):
asking for 1 spis from ipsec ISAKMP (0:2): Node 381726614, Input = IKE_MESG_FROM_PEER,
IKE_QM_EXCH ISAKMP (0:2): Old State = IKE_QM_READY New State = IKE_QM_SPI_STARVE
IPSEC(key_engine): got a queue event... IPSEC(spi_response): getting spi 2048571635 for SA from
10.48.67.181 to 10.51.82.100 for prot 3 ISAKMP: received ke message (2/1) CryptoEngine0:
generate hmac context for conn id 2 ISAKMP (0:2): sending packet to 10.51.82.100 my_port 500
peer_port 500 (R) QM_IDLE ISAKMP (0:2): Node 381726614, Input = IKE_MESG_FROM_IPSEC,
IKE_SPI_REPLY ISAKMP (0:2): Old State = IKE_QM_SPI_STARVE New State = IKE_QM_R_QM2 ISAKMP (0:2):
received packet from 10.51.82.100 dport 500 sport 500 Global (R) QM_IDLE CryptoEngine0: generate
hmac context for conn id 2 CryptoEngine0: ipsec allocate flow CryptoEngine0: ipsec allocate flow
ISAKMP: Locking peer struct 0x644AFC7C, IPSEC refcount 1 for for stuff_ke ISAKMP (0:2): Creating
IPSec SAs inbound SA from 10.51.82.100 to 10.48.67.181 (f/i) 0/ 0 (proxy 10.5.5.1 to 0.0.0.0)
has spi 0x7A1AB8F3 and conn_id 2004 and flags 2 lifetime of 2147483 seconds has client flags 0x0
outbound SA from 10.48.67.181 to 10.51.82.100 (f/i) 0/ 0 (proxy 0.0.0.0 to 10.5.5.1 ) has spi -
1329531732 and conn_id 2005 and flags A lifetime of 2147483 seconds has client flags 0x0 ISAKMP
(0:2): deleting node 381726614 error FALSE reason "quick mode done (await)" ISAKMP (0:2): Node
381726614, Input = IKE_MESG_FROM_PEER, IKE_QM_EXCH ISAKMP (0:2): Old State = IKE_QM_R_QM2 New
State = IKE_QM_PHASE2_COMPLETE IPSEC(key_engine): got a queue event... IPSEC(initialize_sas): ,
(key eng. msg.) INBOUND local= 10.48.67.181, remote= 10.51.82.100,
local_proxy= 0.0.0.0/0.0.0.0/0/0 (type=4),
remote_proxy= 10.5.5.1/0.0.0.0/0/0 (type=1),
protocol= ESP, transform= esp-3des esp-sha-hmac (Tunnel),
lifedur= 2147483s and 0kb,
spi= 0x7A1AB8F3(2048571635), conn_id= 2004, keysize= 0, flags= 0x2
IPSEC(initialize_sas): ,
(key eng. msg.) OUTBOUND local= 10.48.67.181, remote= 10.51.82.100,
local_proxy= 0.0.0.0/0.0.0.0/0/0 (type=4),
remote_proxy= 10.5.5.1/0.0.0.0/0/0 (type=1),
protocol= ESP, transform= esp-3des esp-sha-hmac (Tunnel),
lifedur= 2147483s and 0kb,
spi= 0xB0C0F4AC(2965435564), conn_id= 2005, keysize= 0, flags= 0xA
IPSEC(kei_proxy): head = mymap, map->ivrf = , kei->ivrf =
IPSEC(kei_proxy): head = mymap, map->ivrf = , kei->ivrf =
IPSEC(add mtree): src 0.0.0.0, dest 10.5.5.1, dest_port 0

IPSEC(create_sa): sa created,
(sa) sa_dest= 10.48.67.181, sa_prot= 50,
sa_spi= 0x7A1AB8F3(2048571635),
sa_trans= esp-3des esp-sha-hmac , sa_conn_id= 2004
IPSEC(create_sa): sa created,
(sa) sa_dest= 10.51.82.100, sa_prot= 50,
sa_spi= 0xB0C0F4AC(2965435564),
sa_trans= esp-3des esp-sha-hmac , sa_conn_id= 2005
```

Überprüfen der Sequenznummern der Crypto Map

Wenn statische und dynamische Peers auf derselben Crypto Map konfiguriert werden, ist die Reihenfolge der Einträge in der Crypto Map sehr wichtig. Die Sequenznummer des dynamischen Crypto Map-Eintrags **muss** höher sein als alle anderen statischen Crypto Map-Einträge. Wenn die statischen Einträge höher als der dynamische Eintrag sind, schlagen Verbindungen mit diesen Peers fehl.

Hier sehen Sie ein Beispiel für eine ordnungsgemäß nummerierte Crypto Map, die einen statischen Eintrag und einen dynamischen Eintrag enthält. Beachten Sie, dass der dynamische Eintrag die höchste Sequenznummer hat und dass noch Platz ist, um zusätzliche statische Einträge hinzuzufügen:

```
crypto dynamic-map dynmap 20
set transform-set myset
crypto map mymap 10 ipsec-isakmp
match address 100
set peer 172.16.77.10
set transform-set myset
crypto map mymap 60000 ipsec-isakmp dynamic dynmap
```

Fehlerbehebung

Für diese Konfiguration sind derzeit keine spezifischen Informationen zur Fehlerbehebung verfügbar.

Zugehörige Informationen

- IPsec-Profilkonfiguration
- Cisco IOS Softwareversion 12.2(15)T Neue Funktionen
- Support-Seite für IPsec-Aushandlung/IKE-Protokoll
- Technischer Support und Dokumentation - Cisco Systems