使用NAT配置路由器到VPN客戶端、模式配置、萬用字元預共用金鑰

目錄

簡介

此示例配置說明了為模式配置（使用者從池獲取IP地址）、萬用字元預共用金鑰（所有PC客戶端共用一個公共金鑰）和網路地址轉換(NAT)配置的路由器。 在此配置中，非現場使用者可以進入網路，並從池中分配內部IP地址。對於使用者而言，他們似乎位於網路內部。由於涉及私有編址（因而涉及NAT），因此必須告知路由器要轉換什麼和不轉換。

必要條件

需求

本文件沒有特定需求。

採用元件

本文中的資訊係根據以下軟體和硬體版本：

- Cisco IOS®軟體版本12.0.7T或更高版本
- 支援此軟體版本的硬體
- CiscoSecure VPN Client 1.0/10A或1.1(分別顯示為2.0.7/E或2.1.12，請轉到**幫助 > About**以選中)

本文中的資訊是根據特定實驗室環境內的裝置所建立。文中使用到的所有裝置皆從已清除（預設

）的組態來啟動。如果您的網路正在作用，請確保您已瞭解任何指令可能造成的影響。

慣例

如需文件慣例的詳細資訊，請參閱思科技術提示慣例。

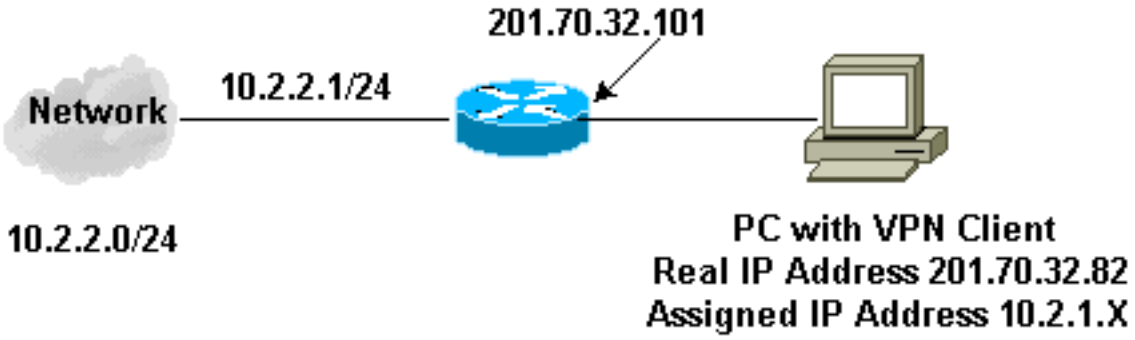
設定

本節提供用於設定本文件中所述功能的資訊。

注意：要查詢有關本文檔中使用的命令的其他資訊，請使用命令查詢工具(僅限註冊客戶)。

網路圖表

本檔案會使用下圖中所示的網路設定。



組態

本檔案會使用這些設定。

- VPN使用者端
- 路由器

VPN客戶端配置

```
Network Security policy:

1- Myconn
        My Identity = ip address
                Connection security: Secure
                Remote Party Identity and addressing
                        ID Type: IP subnet
                        10.2.2.0
                        Port all Protocol all

                Connect using secure tunnel
                        ID Type: IP address
                        201.70.32.101

        Authentication (Phase 1)
        Proposal 1
                Authentication method: pre-shared key
```

```
                Encryp Alg: DES
                Hash Alg: MD5
                SA life: Unspecified
                Key Group: DH 1

        Key exchange (Phase 2)
        Proposal 1
                Encapsulation ESP
                Encrypt Alg: DES
                Hash Alg: MD5
                Encap: tunnel
                SA life: Unspecified
                no AH

2- Other Connections
            Connection security: Non-secure
            Local Network Interface
                Name: Any
                IP Addr: Any
                Port: All
```

路由器配置

```
Current configuration:
!
version 12.0
service timestamps debug uptime
service timestamps log uptime
no service password-encryption
!
hostname Router
!
enable secret 5 $1$v5OP$mPuiEQn8ULa8hVMYVOV1D.
enable password ww
!
ip subnet-zero
!
cns event-service server
!
!--- IKE configuration.  crypto isakmp policy 1
hash md5
authentication pre-share
crypto isakmp key cisco123 address 0.0.0.0
crypto isakmp client configuration address-pool local
ourpool
!
!--- IPSec configuration. crypto ipsec transform-set
trans1 esp-des esp-md5-hmac
!
crypto dynamic-map dynmap 10
set transform-set trans1
!
crypto map intmap client configuration address initiate
crypto map intmap client configuration address respond
crypto map intmap 10 ipsec-isakmp dynamic dynmap
 !
 interface Ethernet0
ip address 201.70.32.101 255.255.255.0
 no ip directed-broadcast
ip nat outside
no ip route-cache
no ip mroute-cache
 crypto map intmap
```

```
 !
interface Serial1
ip address 10.2.2.1 255.255.255.0
no ip directed-broadcast
ip nat inside
!
 ip local pool ourpool 10.2.1.1 10.2.1.254
ip nat pool outsidepool 201.70.32.150 201.70.32.160
netmask 255.255.255.0
!--- Except the private network to private network
traffic !--- from the NAT process. ip nat inside source
route-map nonat pool outsidepool
 ip classless
ip route 0.0.0.0 0.0.0.0 201.70.32.1
no ip http server
!--- Except the private network to private network
traffic !--- from the NAT process. access-list 101 deny
ip 10.2.2.0 0.0.0.255 10.2.1.0 0.0.0.255 access-list 101
permit ip 10.2.2.0 0.0.0.255 any route-map nonat permit
10 match ip address 101 ! line con 0 transport input
none line aux 0 line vty 0 4 password ww login ! end
```

驗證

本節提供的資訊可用於確認您的組態是否正常運作。

輸出直譯器工具(僅供註冊客戶使用)支援某些show命令，此工具可讓您檢視show命令輸出的分析。

- show crypto engine connections active — 顯示加密和解密的資料包。
- show crypto ipsec sa — 顯示第2階段安全關聯。
- show crypto isakmp sa — 顯示第1階段安全關聯。

疑難排解

本節提供的資訊可用於對組態進行疑難排解。

疑難排解指令

注意：發出debug命令之前，請參閱有關Debug命令的重要資訊**。**

這些調試必須在兩台IPSec路由器（對等體）上運行。 必須在兩個對等體上清除安全關聯。

- debug crypto ipsec — 顯示第2階段的IPSec協商。
- debug crypto isakmp — 顯示第1階段的ISAKMP協商。
- debug crypto engine — 顯示加密的流量。
- clear crypto isakmp — 清除與第1階段相關的安全關聯。
- clear crypto sa — 清除與第2階段相關的安全關聯。

調試輸出示例

路由器調試

```
Apr 18 15:17:59: ISAKMP (4): received packet from
    201.70.32.82 (R) MM_NO_STATE
Apr 18 15:17:59: ISAKMP (4): received packet from
    201.70.32.82 (R) MM_NO_STATE
Apr 18 15:18:03: ISAKMP (0): received packet from
    201.70.32.82 (N) NEW SA
Apr 18 15:18:03: ISAKMP (0:5): processing SA payload.
    message ID = 0
Apr 18 15:18:03: ISAKMP (0:5): Checking ISAKMP transform
1
    against priority 1 policy
Apr 18 15:18:03: ISAKMP:      encryption DES-CBC
Apr 18 15:18:03: ISAKMP:      hash MD5
Apr 18 15:18:03: ISAKMP:      default group 1
Apr 18 15:18:03: ISAKMP:      auth pre-share
Apr 18 15:18:03: ISAKMP (0:5): atts are acceptable.
    Next payload is 0
Apr 18 15:18:03: CryptoEngine0: generate alg parameter
Apr 18 15:18:05: CRYPTO_ENGINE: Dh phase 1 status: 0
Apr 18 15:18:05: CRYPTO_ENGINE: Dh phase 1 status: 0
Apr 18 15:18:05: ISAKMP (0:5): SA is doing pre-shared
    key authentication
Apr 18 15:18:05: ISAKMP (5): SA is doing pre-shared
    key authentication using id type ID_IPV4_ADDR
Apr 18 15:18:05: ISAKMP (5): sending packet to
    201.70.32.82 (R) MM_SA_SETUP
Apr 18 15:18:05: ISAKMP (5): received packet from
    201.70.32.82 (R) MM_SA_SETUP
Apr 18 15:18:05: ISAKMP (0:5): processing KE payload.
    message ID = 0
Apr 18 15:18:05: CryptoEngine0: generate alg parameter
Apr 18 15:18:05: CRYPTO_ENGINE: Dh phase 1 status: 0
Apr 18 15:18:05: CRYPTO_ENGINE: Dh phase 1 status: 0
Apr 18 15:18:05: ISAKMP (0:5): SA is doing pre-shared
    key authentication
Apr 18 15:18:05: ISAKMP (5): SA is doing pre-shared
    key authentication using id
type ID_IPV4_ADDR
Apr 18 15:18:05: ISAKMP (5): sending packet to
    201.70.32.82 (R) MM_SA_SETUP
Apr 18 15:18:05: ISAKMP (5): received packet from
    201.70.32.82 (R) MM_SA_SETUP
Apr 18 15:18:05: ISAKMP (0:5): processing KE payload.
    message ID = 0
Apr 18 15:18:05: CryptoEngine0: generate alg parameter
Apr 18 15:18:07: ISAKMP (0:5): processing NONCE payload.
    message ID = 0
Apr 18 15:18:07: CryptoEngine0: create ISAKMP SKEYID for
    conn id 5
Apr 18 15:18:07: ISAKMP (0:5): SKEYID state generated
Apr 18 15:18:07: ISAKMP (0:5): processing vendor id
payload
Apr 18 15:18:07: ISAKMP (0:5): processing vendor id
payload
Apr 18 15:18:07: ISAKMP (5): sending packet to
201.70.32.82
    (R) MM_KEY_EXCH
Apr 18 15:18:07: ISAKMP (0:4): purging SA.
Apr 18 15:18:07: ISAKMP (0:4): purging node -1412157317
Apr 18 15:18:07: ISAKMP (0:4): purging node 1875403554
Apr 18 15:18:07: CryptoEngine0: delete connection 4
Apr 18 15:18:08: ISAKMP (5): received packet from
    201.70.32.82 (R) MM_KEY_EXCH
Apr 18 15:18:08: ISAKMP (0:5): processing ID payload.
```

```
    message ID = 0
Apr 18 15:18:08: ISAKMP (0:5): processing HASH payload.
    message ID = 0
Apr 18 15:18:08: CryptoEngine0: generate hmac context
    for conn id 5
Apr 18 15:18:08: ISAKMP (5): processing NOTIFY payload
    24578 protocol 1 spi 0, message ID = 0
Apr 18 15:18:08: ISAKMP (0:5): SA has been authenticated
    with 201.70.32.82
Apr 18 15:18:08: ISAKMP (5): ID payload
        next-payload : 8
        type         : 1
        protocol     : 17
        port         : 500
        length       : 8
Apr 18 15:18:08: ISAKMP (5): Total payload length: 12
Apr 18 15:18:08: CryptoEngine0: generate hmac context
    for conn id 5
Apr 18 15:18:08: CryptoEngine0: clear dh number
    for conn id 1
Apr 18 15:18:08: ISAKMP (5): sending packet to
    201.70.32.82 (R) QM_IDLE
Apr 18 15:18:08: ISAKMP (5): received packet from
    201.70.32.82 (R) QM_IDLE
Apr 18 15:18:08: ISAKMP (0:5): Locking struct 14D0DC
    on allocation
Apr 18 15:18:08: ISAKMP (0:5): allocating address
    10.2.1.1
Apr 18 15:18:08: CryptoEngine0: generate hmac context
    for conn id 5
Apr 18 15:18:08: ISAKMP (0:5): initiating peer config to
    201.70.32.82. message ID = 1226793520
Apr 18 15:18:08: ISAKMP (5): sending packet to
201.70.32.82
    (R) QM_IDLE
Apr 18 15:18:09: ISAKMP (5): received packet from
201.70.32.82
    (R) QM_IDLE
Apr 18 15:18:09: ISAKMP (0:5): processing transaction
payload
    from 201.70.32.82. message ID = 1226793520
Apr 18 15:18:09: ISAKMP: recieved config from
201.70.32.82   .
Apr 18 15:18:09: CryptoEngine0: generate hmac context
    for conn id 5
Apr 18 15:18:09: ISAKMP:     Config payload type: 4
Apr 18 15:18:09: ISAKMP (0:5): peer accepted the
address!
Apr 18 15:18:09: ISAKMP (0:5): adding static route for
10.2.1.1
Apr 18 15:18:09: ISAKMP (0:5): deleting node 1226793520
Apr 18 15:18:09: CryptoEngine0: generate hmac context
for
    conn id 5
Apr 18 15:18:09: ISAKMP (0:5): processing SA payload.
    message ID = -617682048
Apr 18 15:18:09: ISAKMP (0:5): Checking IPSec proposal 1
Apr 18 15:18:09: ISAKMP: transform 1, ESP_DES
Apr 18 15:18:09: ISAKMP:   attributes in transform:
Apr 18 15:18:09: ISAKMP:      authenticator is HMAC-MD5
Apr 18 15:18:09: ISAKMP:      encaps is 1
Apr 18 15:18:09: validate proposal 0
Apr 18 15:18:09: ISAKMP (0:5): atts are acceptable.
Apr 18 15:18:09: IPSEC(validate_proposal_request):
```

```
    proposal part #1, (key eng. msg.) dest=
201.70.32.101,
    src= 201.70.32.82, dest_proxy=
10.2.2.0/255.255.255.0/0/0
    (type=4), src_proxy= 10.2.1.1/255.255.255.255/0/0
(type=1),
    protocol= ESP, transform= esp-des esp-md5-hmac ,
    lifedur= 0s and 0kb, spi= 0x0(0), conn_id= 0,
keysize= 0,
    flags= 0x4
Apr 18 15:18:09: validate proposal request 0
Apr 18 15:18:09: ISAKMP (0:5): processing NONCE payload.
    message ID = -617682048
Apr 18 15:18:09: ISAKMP (0:5): processing ID payload.
    message ID = -617682048
Apr 18 15:18:09: ISAKMP (5): ID_IPV4_ADDR src 10.2.1.1
    prot 0 port 0
Apr 18 15:18:09: ISAKMP (0:5): processing ID payload.
    message ID = -617682048
Apr 18 15:18:09: ISAKMP (5): ID_IPV4_ADDR_SUBNET dst
    10.2.2.0/255.255.255.0 prot 0 port 0
Apr 18 15:18:09: IPSEC(key_engine): got a queue event...
Apr 18 15:18:09: IPSEC(spi_response): getting spi
    153684796 for SA from 201.70.32.82    to
201.70.32.101
    for prot 3
Apr 18 15:18:09: CryptoEngine0: generate hmac context
    for conn id 5
Apr 18 15:18:09: ISAKMP (5): sending packet to
201.70.32.82
    (R) QM_IDLE
Apr 18 15:18:09: ISAKMP (5): received packet from
201.70.32.82
    (R) QM_IDLE
Apr 18 15:18:09: CryptoEngine0: generate hmac context
    for conn id 5
Apr 18 15:18:09: ISAKMP (0:5): processing SA payload.
    message ID = -1078114754
Apr 18 15:18:09: ISAKMP (0:5): Checking IPSec proposal 1
Apr 18 15:18:10: ISAKMP: transform 1, ESP_DES
Apr 18 15:18:10: ISAKMP:   attributes in transform:
Apr 18 15:18:10: ISAKMP:      authenticator is HMAC-MD5
Apr 18 15:18:10: ISAKMP:      encaps is 1
Apr 18 15:18:10: validate proposal 0
Apr 18 15:18:10: ISAKMP (0:5): atts are acceptable.
Apr 18 15:18:10: IPSEC(validate_proposal_request):
    proposal part #1, (key eng. msg.) dest=
201.70.32.101,
    src= 201.70.32.82, dest_proxy=
10.2.2.0/255.255.255.0/0/0
    (type=4), src_proxy= 10.2.1.1/255.255.255.255/0/0
(type=1),
    protocol= ESP, transform= esp-des esp-md5-hmac ,
    lifedur= 0s and 0kb, spi= 0x0(0), conn_id= 0,
keysize= 0,
    flags= 0x4
Apr 18 15:18:10: validate proposal request 0
Apr 18 15:18:10: ISAKMP (0:5): processing NONCE payload.
    message ID = -1078114754
Apr 18 15:18:10: ISAKMP (0:5): processing ID payload.
    message ID = -1078114754
Apr 18 15:18:10: ISAKMP (5): ID_IPV4_ADDR src 10.2.1.1
    prot 0 port 0
Apr 18 15:18:10: ISAKMP (0:5): processing ID payload.
```

```
    message ID = -1078114754
Apr 18 15:18:10: ISAKMP (5): ID_IPV4_ADDR_SUBNET dst
    10.2.2.0/255.255.255.0 prot 0 port 0
Apr 18 15:18:10: IPSEC(key_engine): got a queue event...
Apr 18 15:18:10: IPSEC(spi_response): getting spi
224008976
    for SA from 201.70.32.82    to 201.70.32.101
    for prot 3
Apr 18 15:18:10: CryptoEngine0: generate hmac context
    for conn id 5
Apr 18 15:18:10: ISAKMP (5): sending packet to
201.70.32.82
    (R) QM_IDLE
Apr 18 15:18:10: ISAKMP (5): received packet from
201.70.32.82
    (R) QM_IDLE
Apr 18 15:18:10: CryptoEngine0: generate hmac context
    for conn id 5
Apr 18 15:18:10: ipsec allocate flow 0
Apr 18 15:18:10: ipsec allocate flow 0
Apr 18 15:18:10: ISAKMP (0:5): Creating IPSec SAs
Apr 18 15:18:10:         inbound SA from 201.70.32.82
    to 201.70.32.101   (proxy 10.2.1.1        to
10.2.2.0)
Apr 18 15:18:10:         has spi 224008976 and conn_id
2000
    and flags 4
Apr 18 15:18:10:         outbound SA from 201.70.32.101
    to 201.70.32.82    (proxy 10.2.2.0        to
10.2.1.1)
Apr 18 15:18:10:         has spi -1084694986 and conn_id
2001
    and flags 4
Apr 18 15:18:10: ISAKMP (0:5): deleting node -1078114754
Apr 18 15:18:10: IPSEC(key_engine): got a queue event...
Apr 18 15:18:10: IPSEC(initialize_sas): ,
  (key eng. msg.) dest= 201.70.32.101, src=
201.70.32.82,
    dest_proxy= 10.2.2.0/255.255.255.0/0/0 (type=4),
    src_proxy= 10.2.1.1/0.0.0.0/0/0 (type=1),
    protocol= ESP, transform= esp-des esp-md5-hmac ,
    lifedur= 0s and 0kb,
    spi= 0xD5A1B10(224008976), conn_id= 2000, keysize=
0,
    flags= 0x4
Apr 18 15:18:10: IPSEC(initialize_sas): ,
  (key eng. msg.) src= 201.70.32.101, dest=
201.70.32.82,
    src_proxy= 10.2.2.0/255.255.255.0/0/0 (type=4),
    dest_proxy= 10.2.1.1/0.0.0.0/0/0 (type=1),
    protocol= ESP, transform= esp-des esp-md5-hmac ,
    lifedur= 0s and 0kb,
    spi= 0xBF58DE36(3210272310), conn_id= 2001, keysize=
0,
    flags= 0x4
Apr 18 15:18:10: IPSEC(create_sa): sa created,
  (sa) sa_dest= 201.70.32.101, sa_prot= 50,
    sa_spi= 0xD5A1B10(224008976),
    sa_trans= esp-des esp-md5-hmac , sa_conn_id= 2000
Apr 18 15:18:10: IPSEC(create_sa): sa created,
  (sa) sa_dest= 201.70.32.82, sa_prot= 50,
    sa_spi= 0xBF58DE36(3210272310),
    sa_trans= esp-des esp-md5-hmac , sa_conn_id= 2001
Apr 18 15:18:10: ISAKMP: Locking struct 14D0DC for IPSEC
```

```
Apr 18 15:18:24: ISAKMP (0:5): retransmitting
    phase 2 -617682048 ...
Apr 18 15:18:24: ISAKMP (5): sending packet to
201.70.32.82
    (R) QM_IDLE

Router#show crypto ipsec
Apr 18 15:18:39: ISAKMP (0:5): retransmitting
    phase 2 -617682048 ...
Apr 18 15:18:39: ISAKMP (5): sending packet to
201.70.32.82
    (R) QM_IDLE      sa

interface: Ethernet0
    Crypto map tag: intmap, local addr. 201.70.32.101

   local  ident (addr/mask/prot/port):
   (10.2.2.0/255.255.255.0/0/0)
   remote ident (addr/mask/prot/port):
   (10.2.1.1/255.255.255.255/0/0)
   current_peer: 201.70.32.82
     PERMIT, flags={}
    #pkts encaps: 7, #pkts encrypt: 7, #pkts digest 7
    #pkts decaps: 7, #pkts decrypt: 7, #pkts verify 7
    #pkts compressed: 0, #pkts decompressed: 0
    #pkts not compressed: 0, #pkts compr. failed: 0,
    #pkts decompress failed: 0
    #send errors 0, #recv errors 0

     local crypto endpt.: 201.70.32.101, remote
     crypto endpt.: 201.70.32.82
     path mtu 1500, media mtu 1500
     current outbound spi: BF58DE36

     inbound esp sas:
      spi: 0xD5A1B10(224008976)
        transform: esp-des esp-md5-hmac ,
        in use settings ={Tunnel, }
        slot: 0, conn id: 2000, flow_id: 1,
        crypto map: intmap
        sa timing: remaining key lifetime
       (k/sec): (4607999/3500)
        IV size: 8 bytes
        replay detection support: Y


     inbound ah sas:


     inbound pcp sas:


     outbound esp sas:
      spi: 0xBF58DE36(3210272310)
        transform: esp-des esp-md5-hmac ,
        in use settings ={Tunnel, }
        slot: 0, conn id: 2001, flow_id: 2,
     crypto map: intmap
        sa timing: remaining key lifetime
        (k/sec): (4607999/3500)
        IV size: 8 bytes
        replay detection support: Y
```

```
     outbound ah sas:

     outbound pcp sas:

Router#sho crypto engine connections active

  ID Interface       IP-Address      State  Algorithm
Encrypt  Decrypt
   5                     set    HMAC_MD5+DES_56_CB
0        0
2000 Ethernet0       201.70.32.101   set
HMAC_MD5+DES_56_CB  0        7
2001 Ethernet0       201.70.32.101   set
HMAC_MD5+DES_56_CB  7        0
Crypto adjacency count : Lock: 0, Unlock: 0
```

VPN客戶端資訊

```
Client configuration:
C:\>ping -t 10.2.2.5
Reply from 10.2.2.5: bytes=32 time<0ms TTL=352

Reply from 10.2.2.5: bytes=32 time<10ms TTL=352

From Logview:
14:25:34.044 New Connection - Initiating IKE
    Phase 1 (IP ADDR=201.70.32.101)

14:25:34.144 New Connection - SENDING>>>> ISAKMP
    OAK MM (SA)
14:25:35.886 New Connection - RECEIVED<<< ISAKMP
    OAK MM (SA)
14:25:36.067 New Connection - SENDING>>>> ISAKMP
    OAK MM (KE, NON, VID, VID)
14:25:38.310 New Connection - RECEIVED<<< ISAKMP
    OAK MM (KE, NON, VID)
14:25:38.460 New Connection - SENDING>>>> ISAKMP
    OAK MM *(ID, HASH, NOTIFY:STATUS_INITIAL_CONTACT)
14:25:38.610 New Connection - RECEIVED<<< ISAKMP
    OAK MM *(ID, HASH)
14:25:38.710 New Connection - Established IKE SA
14:25:38.811 New Connection - Initiating IKE Phase
    2 with Client IDs (message id
: B01876)
14:25:38.911   Initiator = IP ADDR=201.70.32.82,
    prot = 0 port = 0

14:25:39.011   Responder = IP
SUBNET/MASK=10.2.2.0/255.255.255.0,
    prot = 0 port = 0

14:25:39.111 New Connection - SENDING>>>>
    ISAKMP OAK QM *(HASH, SA, NON, ID, ID)
14:25:39.251 New Connection - RECEIVED<<< ISAKMP
    OAK TRANS *(HASH, ATTR)
14:25:39.351 New Connection - Received Private IP
    Address = IP ADDR=10.2.1.1

14:25:39.451 New Connection - Discarding IPSec SA
    negotiation (message id: B01876)
14:25:39.552 New Connection - SENDING>>>> ISAKMP OAK
    TRANS *(HASH, ATTR)
14:25:40.022 New Connection - Received message for
```

```
discarded
    IPSec SA negotiation (message id: B01876)
14:25:40.122 New Connection - Initiating IKE Phase 2
with
    Client IDs (message id: C8CB0CE)
14:25:40.223   Initiator = IP ADDR=10.2.1.1, prot = 0
port = 0
14:25:40.323   Responder = IP
SUBNET/MASK=10.2.2.0/255.255.255.0,
    prot = 0 port = 0
14:25:40.423 New Connection - SENDING>>>> ISAKMP OAK
    QM *(HASH, SA, NON, ID, ID)
14:25:40.873 New Connection - RECEIVED<<< ISAKMP OAK
    QM *(HASH, SA, NON, ID, ID,
 NOTIFY:STATUS_RESP_LIFETIME)
14:25:40.974 New Connection - SENDING>>>> ISAKMP OAK
    QM *(HASH)
14:25:41.074 New Connection - Loading IPSec SA
    (Message ID = C8CB0CE OUTBOUND SPI = 19A22423
    INBOUND SPI = E4829433)
14:25:41.174
```

相關資訊

- 配置IPSec網路安全
- 配置Internet金鑰交換安全協定
- IPSec簡介
- IP安全(IPSec)產品支援頁面
- 技術支援 - Cisco Systems