静态寻址ASA和使用CCP的动态寻址Cisco IOS路由器之间的动态IPsec隧道配置示例

目录

简介

本文档提供了如何使PIX/ASA安全设备接受来自Cisco IOS®路由器的动态IPsec连接的示例配置。在此场景中，IPsec隧道仅在从路由器端启动时建立。由于动态IPsec配置，ASA无法启动VPN隧道。

通过此配置，PIX 安全设备可以创建到远程 VPN 路由器的动态 IPsec LAN 到 LAN (L2L) 隧道。此路由器从其Internet服务提供商动态接收其外部公有IP地址。动态主机配置协议 (DHCP) 可提供此机制，以便动态地分配提供商提供的 IP 地址。这样，当主机不再需要这些 IP 地址时，就可以重用它们。

路由器上的配置是使用Cisco Configuration Professional(CCP)完成的。CCP是基于GUI的设备管理工具，允许您配置基于Cisco IOS的路由器。有关如何使用CCP配置路由器的详细信息，请参阅使用Cisco Configuration Professional的基本路由器配置。

有关使用ASA和Cisco IOS路由器建立IPsec隧道的详细信息和配置示例，请参阅使用ASA的站点到站点VPN(L2L)。

有关使用PIX和Cisco IOS路由器建立动态IPSec隧道的详细信息和配置示例，请参阅使用IOS的站点到站点VPN(L2L)。

先决条件

要求

在尝试此配置之前，请确保ASA和路由器都具有Internet连接，以建立IPSEC隧道。

使用的组件

本文档中的信息基于以下软件和硬件版本：

- 运行Cisco IOS软件版本12.4的Cisco IOS路由器1812
- Cisco ASA 5510软件版本8.0.3

本文档中的信息都是基于特定实验室环境中的设备编写的。本文档中使用的所有设备最初均采用原始（默认）配置。如果您使用的是真实网络，请确保您已经了解所有命令的潜在影响。

规则

有关文档约定的更多信息，请参考 Cisco 技术提示约定。

背景信息

在此场景中，192.168.100.0网络位于ASA后面，192.168.200.0网络位于Cisco IOS路由器后面。假设路由器通过DHCP从其ISP获取其公有地址。由于这在ASA端的静态对等体配置中造成问题，您需要采用动态加密配置的方式在ASA和Cisco IOS路由器之间建立站点到站点隧道。

ASA端的Internet用户将转换为其外部接口的IP地址。假设Cisco IOS路由器端未配置NAT。

现在，在ASA端上配置以建立动态隧道的主要步骤如下：

1. 第1阶段ISAKMP相关配置
2. NAT免除配置
3. 动态加密映射配置

Cisco IOS路由器配置了静态加密映射，因为假定ASA具有静态公有IP地址。这是要在Cisco IOS路由器端配置以建立动态IPSEC隧道的主要步骤的列表。

1. 第1阶段ISAKMP相关配置
2. 静态加密映射相关配置

这些配置中对这些步骤进行了详细说明。

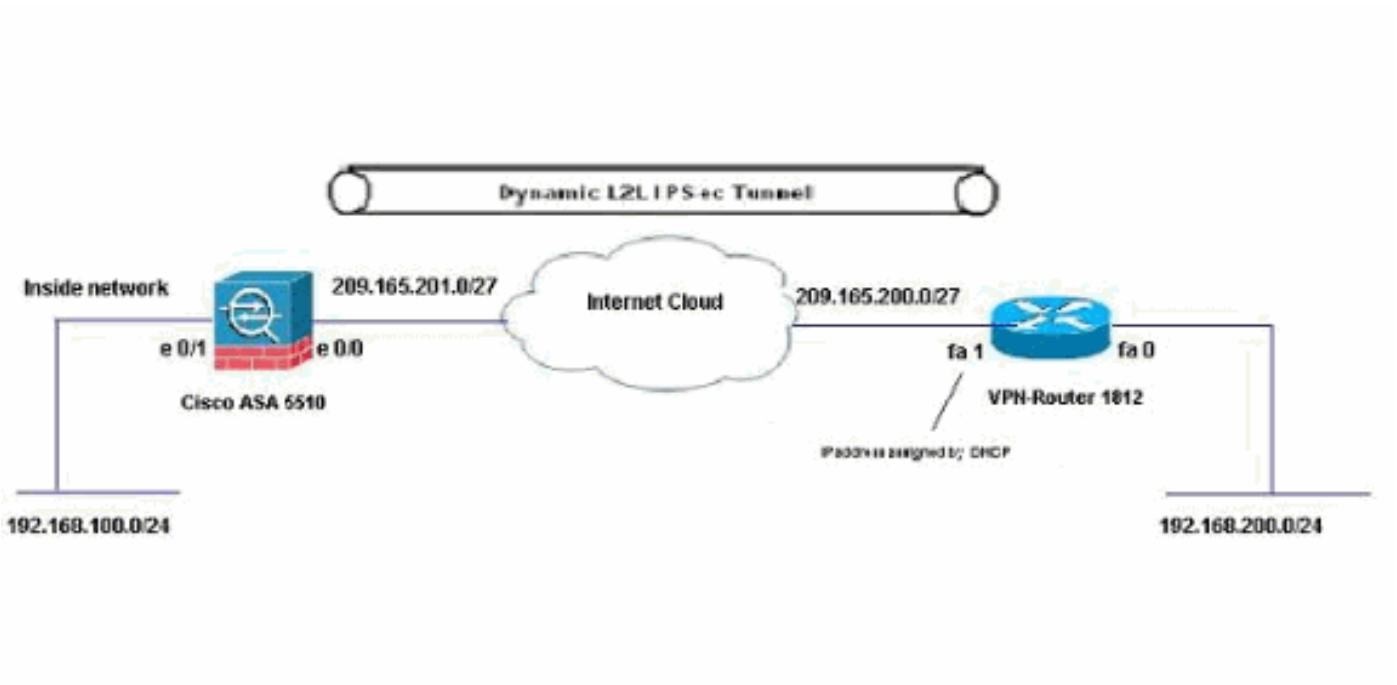
配置

本部分提供有关如何配置本文档所述功能的信息。

注意：使用命令查找工具(仅限注册客户)可获取有关本节中使用的命令的详细信息。

网络图

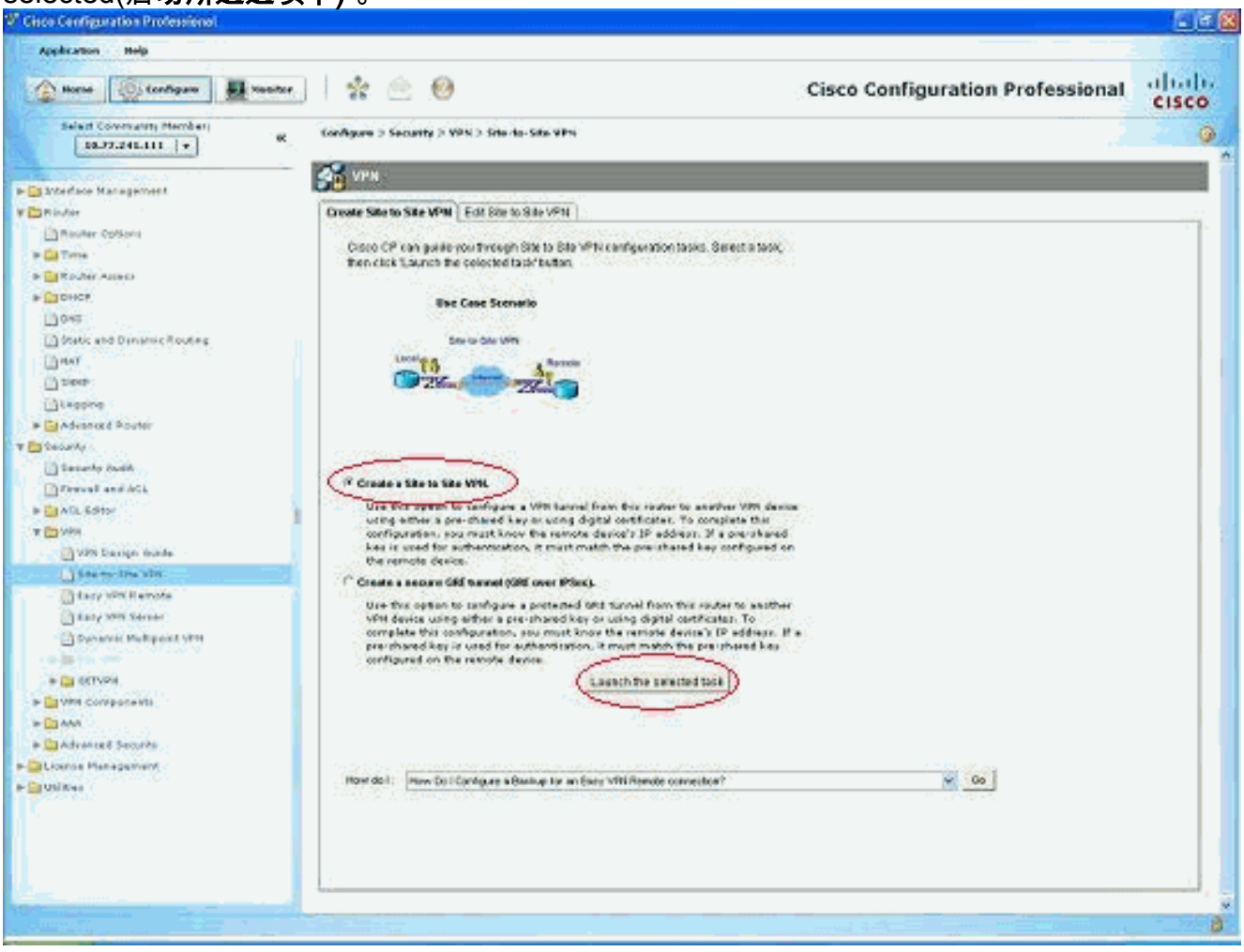
本文档使用以下网络设置：



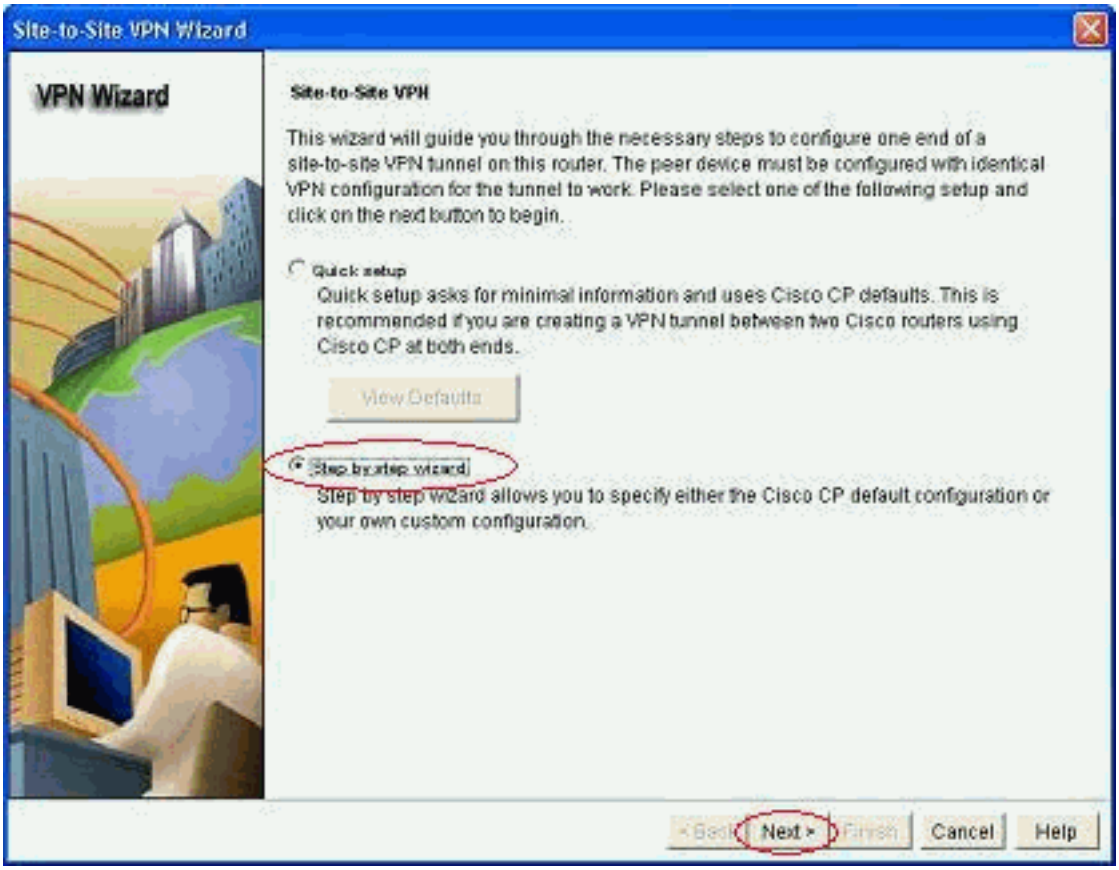
配置

这是带CCP的VPN路由器上的IPsec VPN配置。请完成以下步骤：

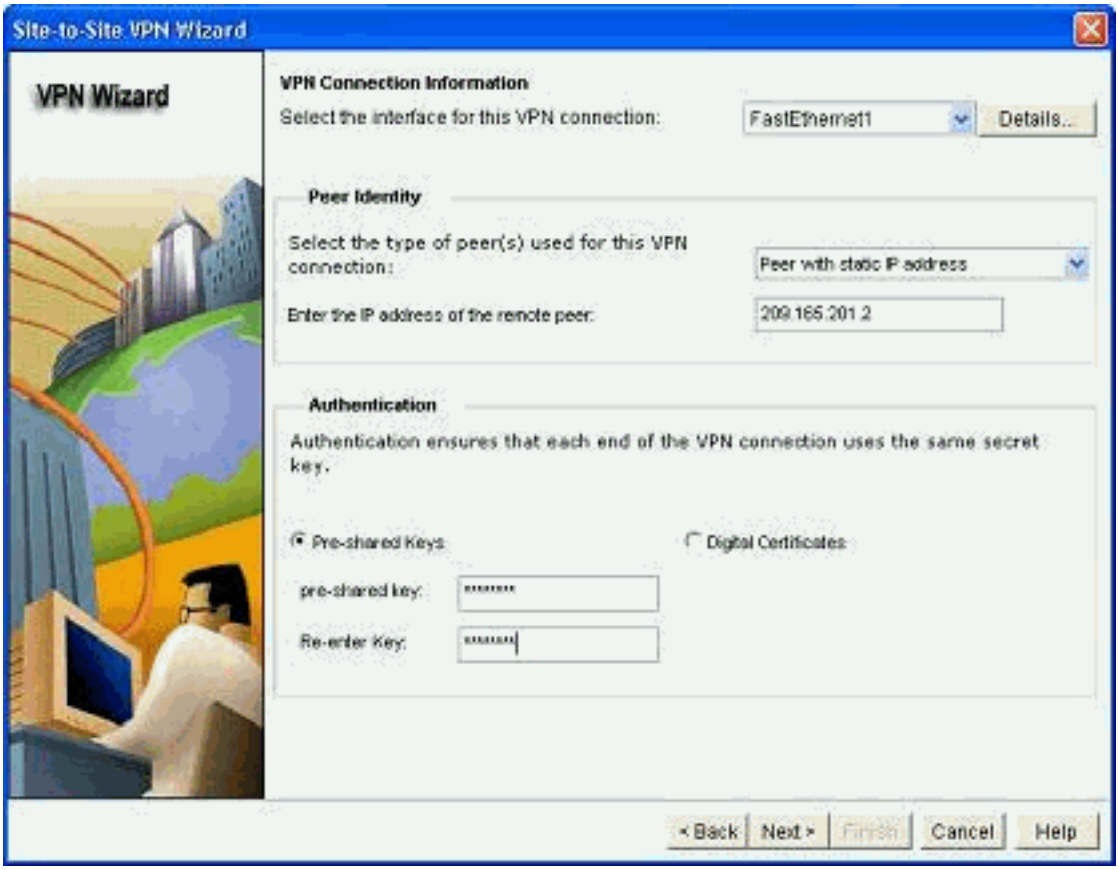
1. 打开CCP应用并选择**Configure > Security > VPN > Site to Site VPN**。单击“Launch the selected(启**动所选选项卡)”**。



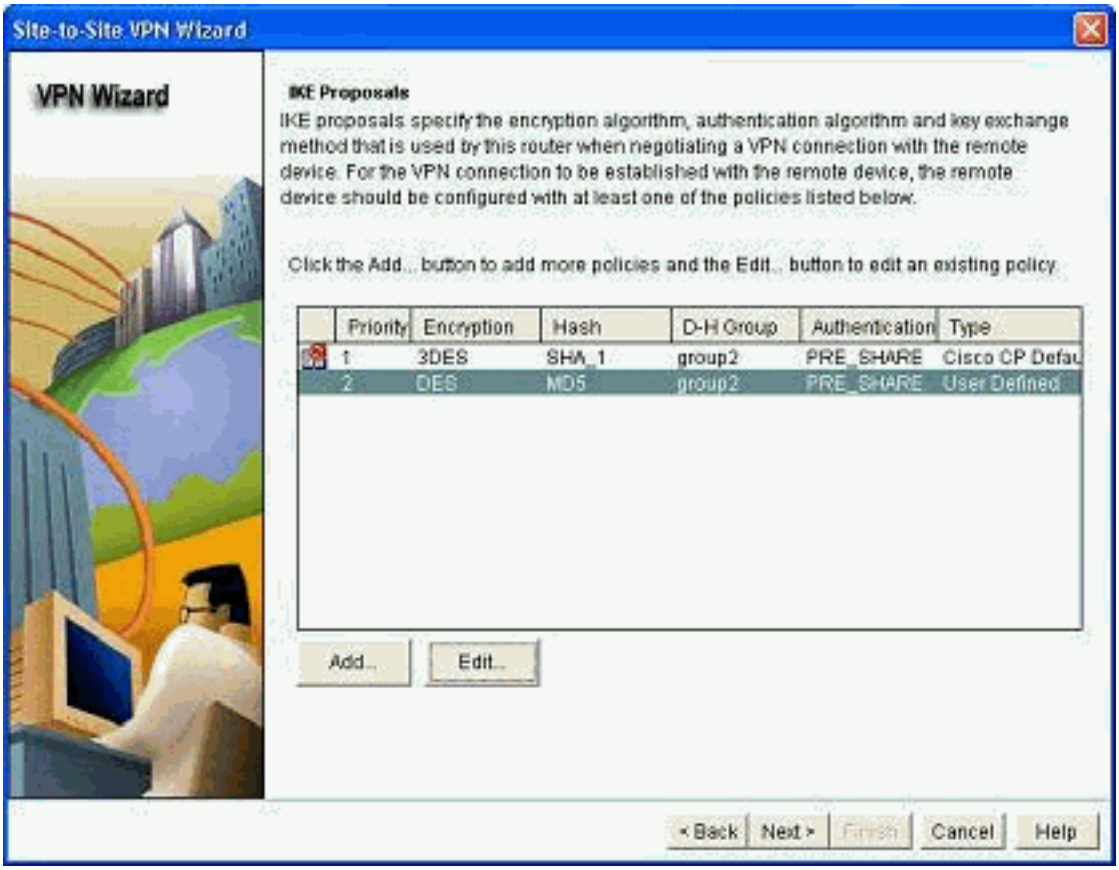
2. 选择**“分步向导”，然**后单击“下**一步”**。



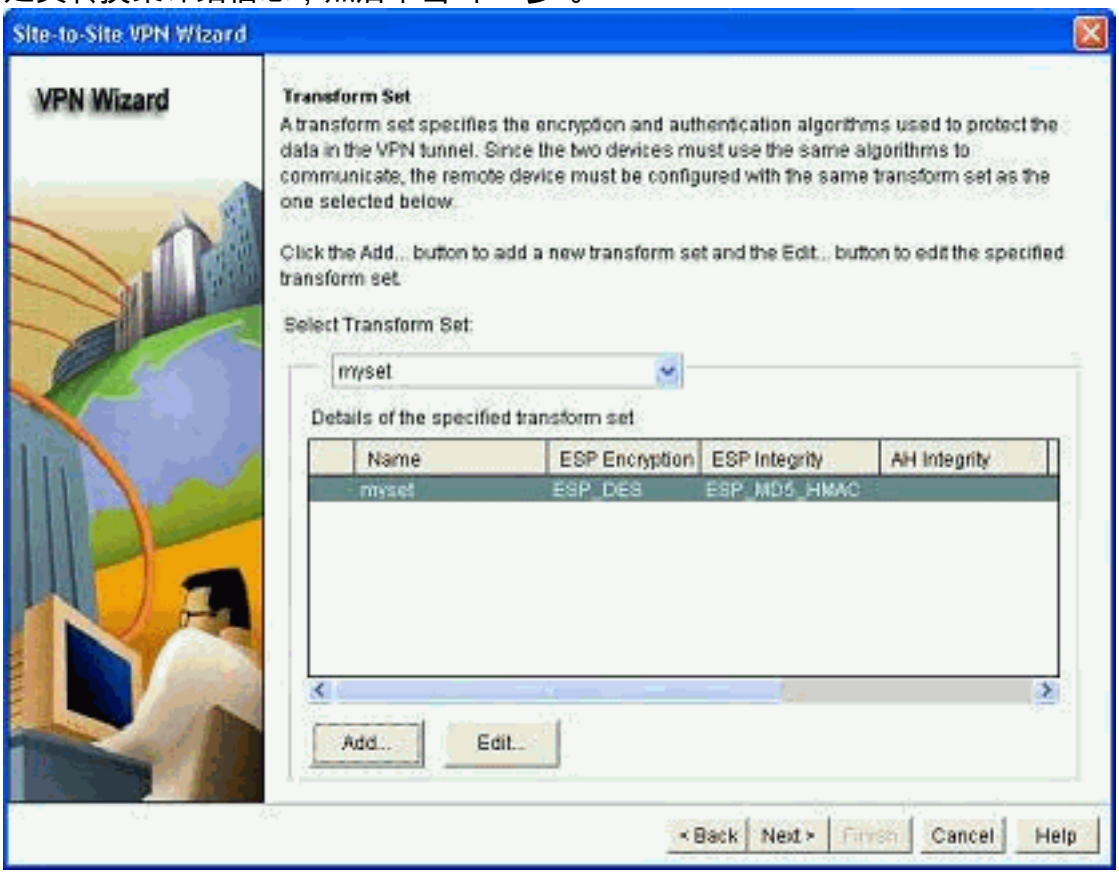
3. 填写远程对等体IP地址以及身份验证详细信息。



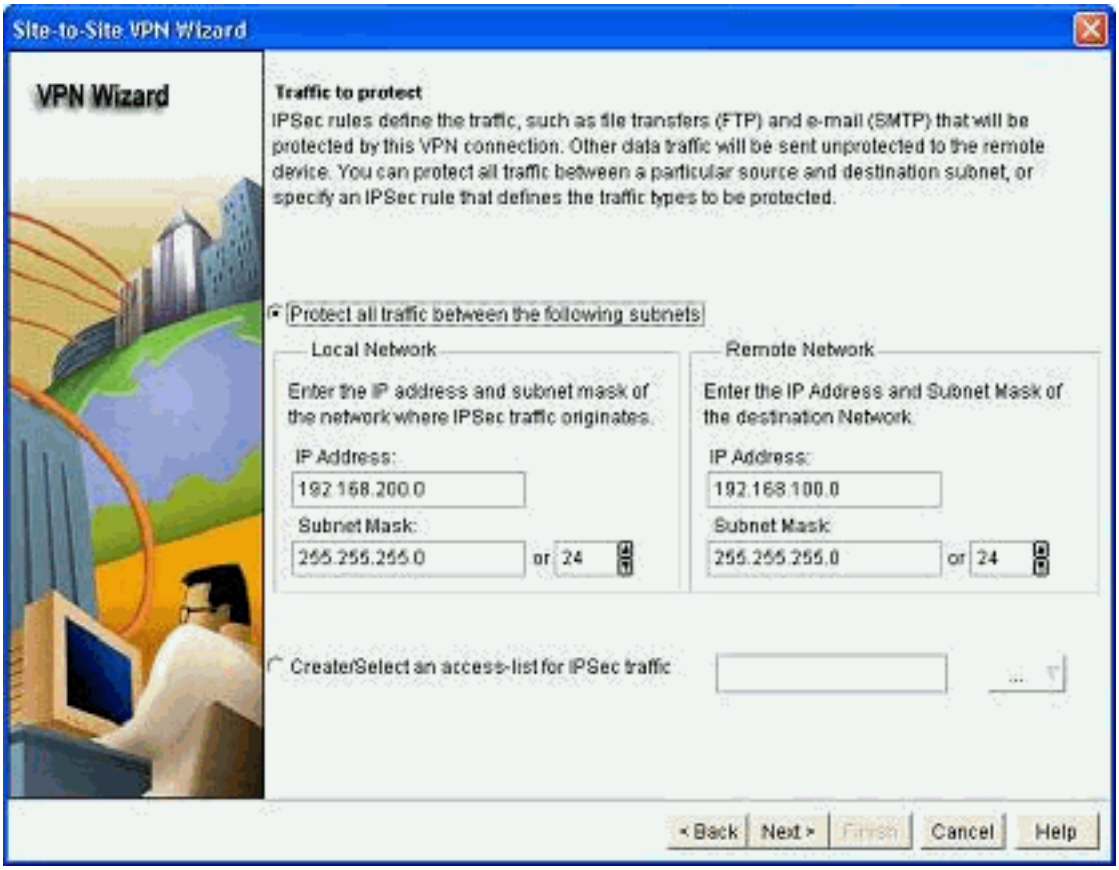
4. 选择IKE提议，然后单击**Next**。



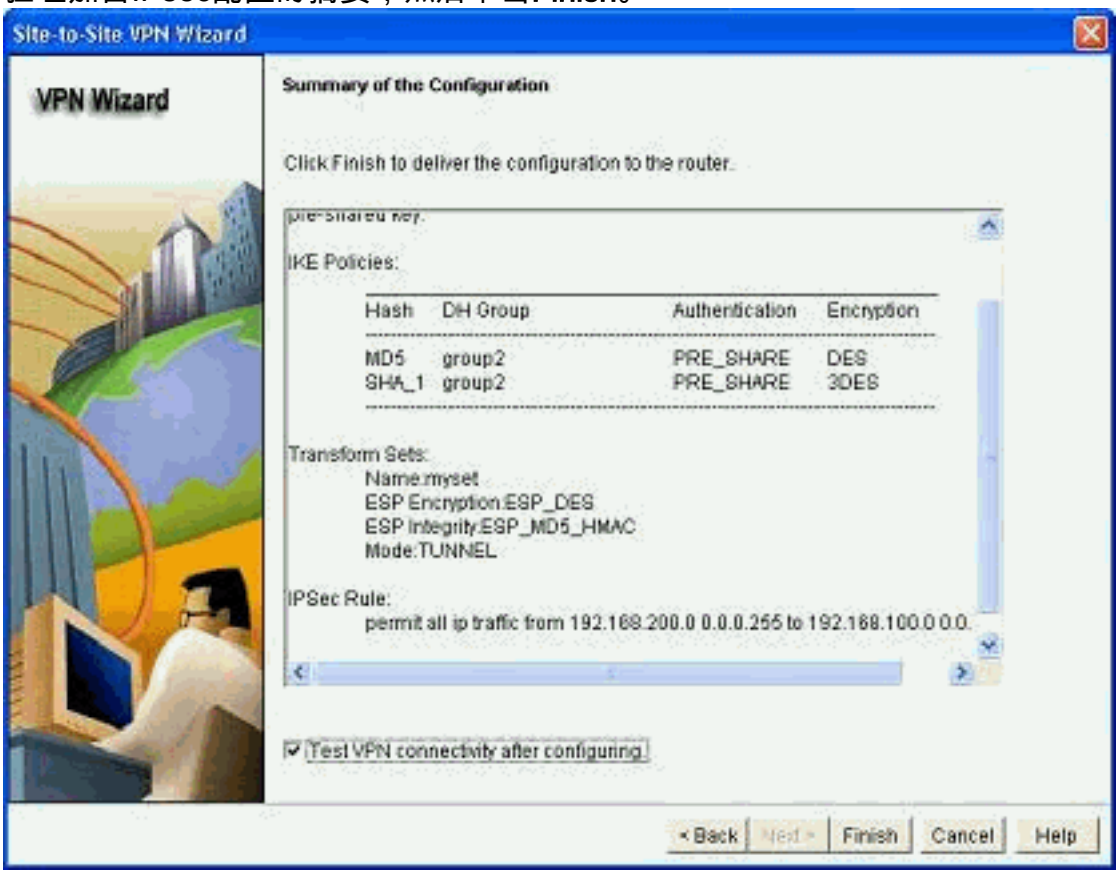
5. 定义转换集详细信息，然后单击“下一步”。



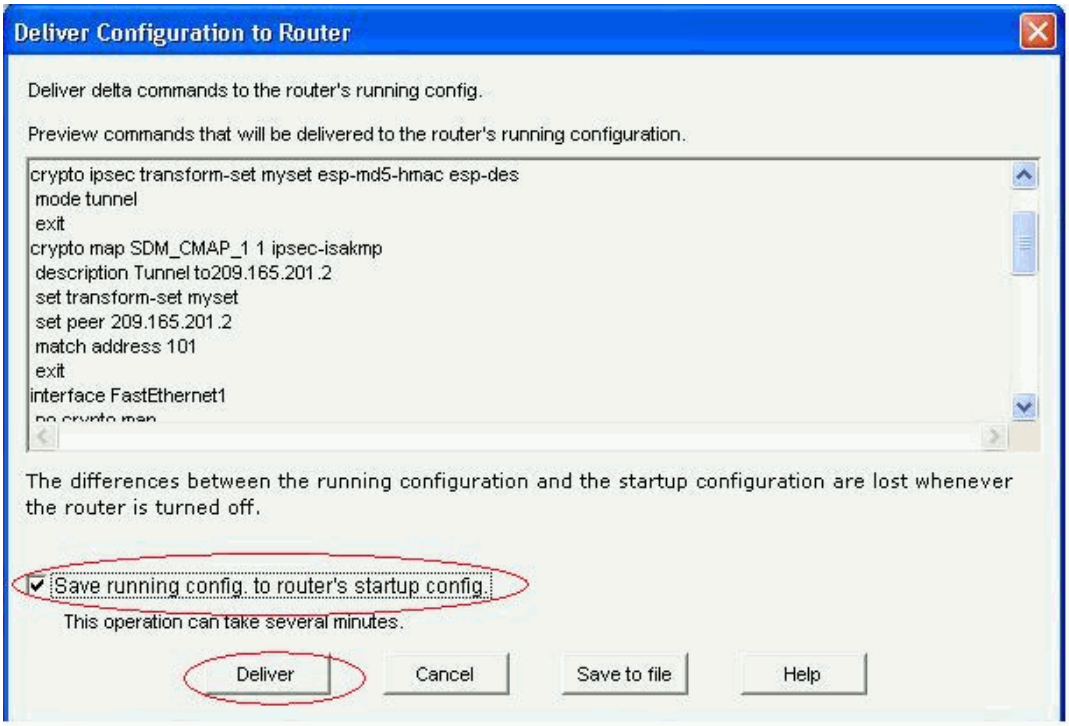
6. 定义需要加密的流量，然后单击“下一步”。



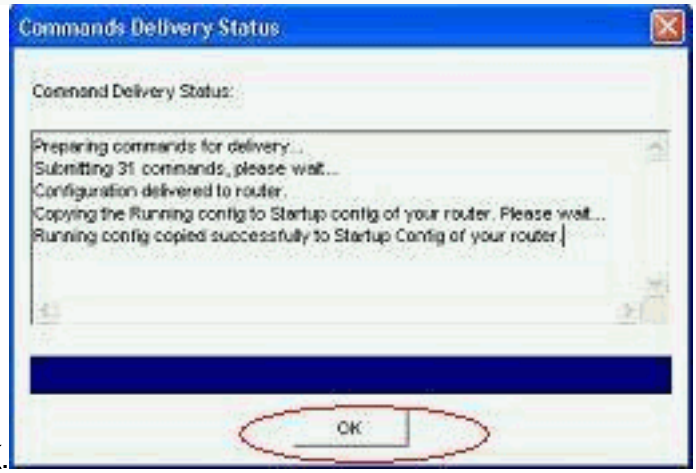
7. 验证加密IPsec配置的摘要，然后单击**Finish**。



8. 单击**Deliver**将配置发送到VPN-Router。



9. Click **OK**.



CLI 配置

- 思科阿萨
- VPN路由器

思科阿萨
ciscoasa(config)#**show run** : Saved : ASA Version 8.0(3) ! **hostname ciscoasa** enable password 8Ry2YjIyt7RRXU24 encrypted names !

```
interface Ethernet0/0
 nameif outside
 security-level 0
 ip address 209.165.201.2 255.255.255.224
!
interface Ethernet0/1
 nameif inside
 security-level 100
 ip address 192.168.100.1 255.255.255.0
!
interface Ethernet0/2
 shutdown
 no nameif
 no security-level
 no ip address
!
interface Ethernet0/3
 shutdown
 no nameif
 no security-level
 no ip address
!
interface Management0/0
 shutdown
 no nameif
 no security-level
 no ip address
!
passwd 2KFQnbNIdI.2KYOU encrypted
ftp mode passive
!--- Output suppressed access-list nonat extended permit
ip 192.168.100.0 255.255.255.0 192.168.200.0
255.255.255.0

no pager
mtu outside 1500
mtu inside 1500
icmp unreachable rate-limit 1 burst-size 1
asdm image disk0:/asdm-613.bin
no asdm history enable
arp timeout 14400
!!--- Define the nat-translation for Internet users
global (outside) 1 interface
nat (inside) 1 192.168.100.0 255.255.255.0
!
!!--- Define the nat-exemption policy for VPN traffic
nat (inside) 0 access-list nonat
!
route outside 0.0.0.0 0.0.0.0 209.165.201.1 1
!
timeout xlate 3:00:00
timeout conn 1:00:00 half-closed 0:10:00 udp 0:02:00
icmp 0:00:02
timeout sunrpc 0:10:00 h323 0:05:00 h225 1:00:00 mgcp
0:05:00 mgcp-pat 0:05:00
timeout sip 0:30:00 sip_media 0:02:00 sip-invite 0:03:00
sip-disconnect 0:02:00
timeout uauth 0:05:00 absolute
dynamic-access-policy-record DfltAccessPolicy
no snmp-server location
no snmp-server contact
snmp-server enable traps snmp authentication linkup
linkdown coldstart
!!--- Configure the IPsec transform-set crypto ipsec
```

```
transform-set myset esp-des esp-md5-hmac
!
!!--- Configure the dynamic crypto map crypto dynamic-
map mymap 1 set transform-set myset
crypto dynamic-map mymap 1 set reverse-route
crypto map dyn-map 10 IPSec-isakmp dynamic mymap
crypto map dyn-map interface outside
!!--- Configure the phase I ISAKMP policy crypto isakmp
policy 10
 authentication pre-share
 encryption des
 hash md5
 group 2
 lifetime 86400
!
!!--- Configure the default L2L tunnel group parameters
tunnel-group DefaultL2LGroup IPSec-attributes
 pre-shared-key *
!
class-map inspection_default
 match default-inspection-traffic
!
!
policy-map type inspect dns preset_dns_map
 parameters
  message-length maximum 512
policy-map global_policy
 class inspection_default
  inspect dns preset_dns_map
  inspect ftp
  inspect h323 h225
  inspect h323 ras
  inspect netbios
  inspect rsh
  inspect rtsp
  inspect skinny
  inspect esmtp
  inspect sqlnet
  inspect sunrpc
  inspect tftp
  inspect sip
  inspect xdmcp
!
service-policy global_policy global
prompt hostname context
Cryptochecksum:d41d8cd98f00b204e9800998ecf8427e
: end
ciscoasa(config)#
```

CCP在VPN-Router上创建此配置。

VPN路由器

```
VPN-Router#show run
Building configuration...
!
version 12.4
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname VPN-Router
```

```
!
!
username cisco privilege 15 secret 5
$1$UQxM$WvwDZbfDhK3wS26C9xYns/
username test12 privilege 15 secret 5
$1$LC0U$ex3tp4hM8CYD.HJSRDfQO1
!
!!--- Output suppressed no aaa new-model ip subnet-zero
! ip cef ! crypto isakmp enable outside
!
crypto isakmp policy 1
 encrypt 3des
 authentication pre-share
 group 2
!
crypto isakmp policy 2
 hash md5
 authentication pre-share
 group 2
!
!
crypto isakmp key cisco123 address 209.165.201.2
!
!
crypto ipsec transform-set myset esp-des esp-md5-hmac
!
!
crypto map SDM_CMAP_1 1 IPSec-isakmp
 description Tunnel to209.165.201.2
 set peer 209.165.201.2
 set transform-set myset
 match address 101
!
!
!
interface BRI0
 no ip address
 shutdown
!
interface Dot11Radio0
 no ip address
 shutdown
 speed basic-1.0 basic-2.0 basic-5.5 6.0 9.0 basic-11.0
12.0 18.0 24.0 36.0 48.0 54.0
 station-role root
!
interface Dot11Radio1
 no ip address
 shutdown
 speed basic-6.0 9.0 basic-12.0 18.0 basic-24.0 36.0
48.0 54.0
 station-role root
!
interface FastEthernet0
 ip address 192.168.200.1 255.255.255.0
 duplex auto
 speed auto
!
interface FastEthernet1
 ip address dhcp
 duplex auto
 speed auto
 crypto map SDM_CMAP_1
!
```

```
interface FastEthernet2
 no ip address
 shutdown
!
interface FastEthernet3
 no ip address
 shutdown
!
interface FastEthernet4
 no ip address
 shutdown
!
interface FastEthernet5
 no ip address
 shutdown
!
interface FastEthernet6
 no ip address
 shutdown
!
interface FastEthernet7
 no ip address
 shutdown
!
interface FastEthernet8
 no ip address
 shutdown
!
interface FastEthernet9
 no ip address
 shutdown
!
interface Vlan1
 no ip address
!
ip classless
ip route 0.0.0.0 0.0.0.0 209.165.200.1
!
!!--- Output suppressed ! ip http server ip http
authentication local ip http secure-server ! access-list
100 permit ip 0.0.0.0 255.255.255.0 0.0.0.0
255.255.255.0
access-list 101 remark CCP_ACL Category=4
access-list 101 remark IPSEC Rule
access-list 101 permit ip 192.168.200.0 0.0.0.255
192.168.100.0 0.0.0.255
!
!
!
!
control-plane
!
!
line con 0
line aux 0
line vty 0 4
 privilege level 15
 login local
 transport input telnet ssh
line vty 5 15
 privilege level 15
 login local
 transport input telnet ssh
!
```

```
no scheduler allocate
end
```

验证

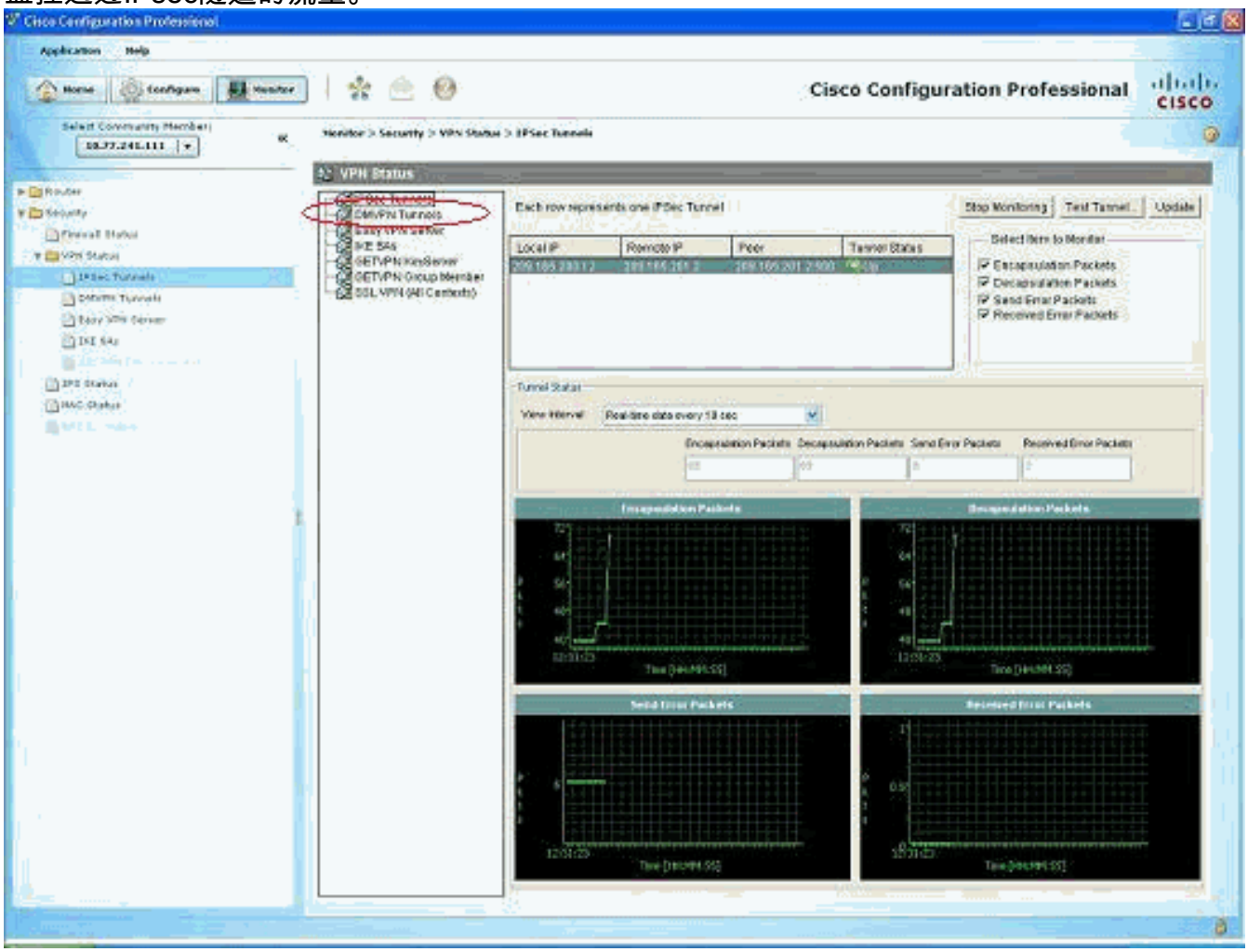
使用本部分可确认配置能否正常运行。

命令输出解释程序（仅限注册用户）(OIT) 支持某些 show 命令。使用 OIT 可查看对 show 命令输出的分析。

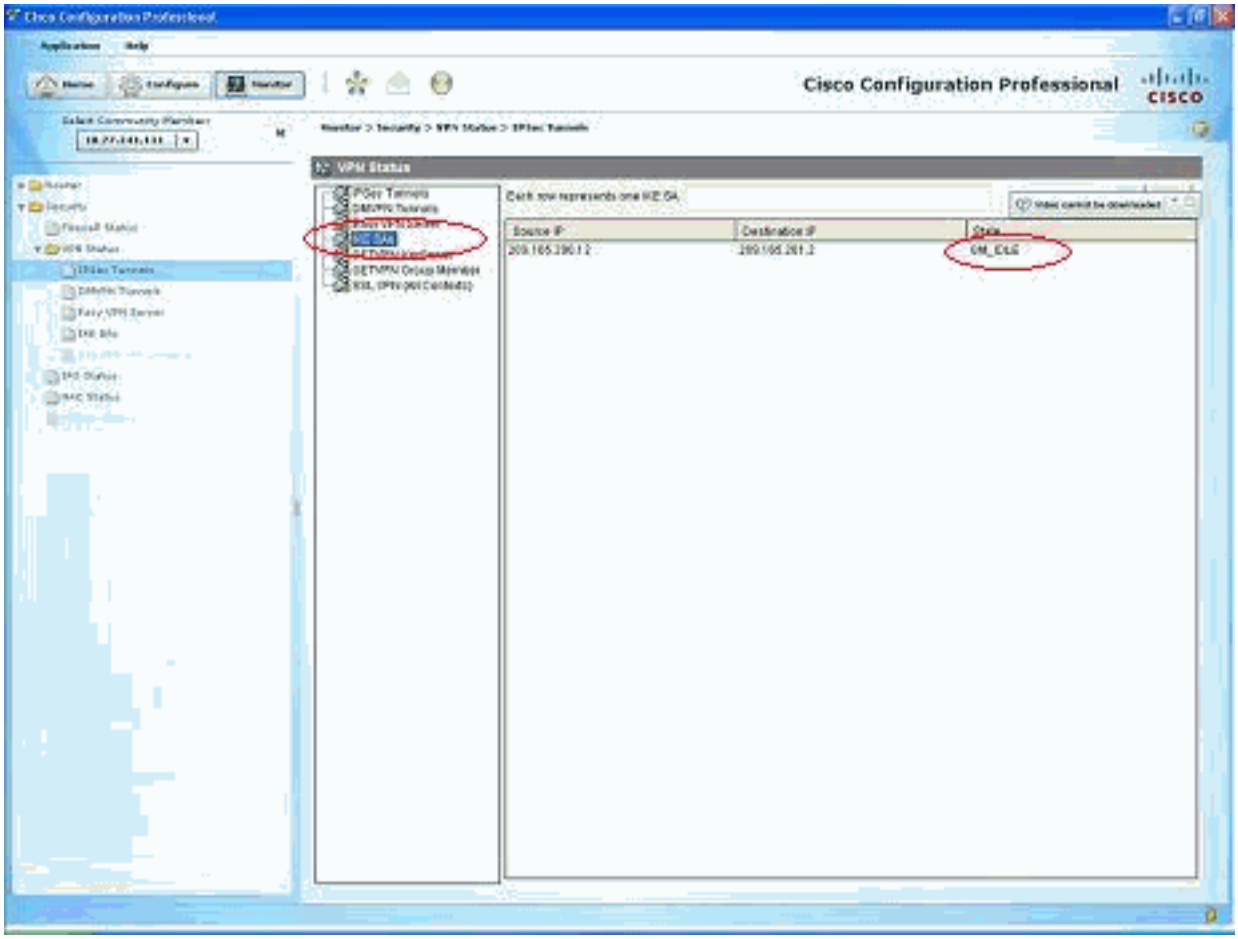
- 通过CCP验证隧道参数
- 通过ASA CLI验证隧道状态
- 通过路由器CLI检验隧道参数

通过CCP验证隧道参数

- 监控通过IPsec隧道的流量。



- 监控阶段I ISAKMP SA的状态。



通过ASA CLI验证隧道状态

- 验证第I阶段ISAKMP SA的状态。

```
ciscoasa#show crypto isakmp sa

   Active SA: 1
    Rekey SA: 0 (A tunnel will report 1 Active and 1 Rekey SA during rekey)
Total IKE SA: 1

1   IKE Peer: 209.165.200.12
    Type    : L2L             Role    : responder
    Rekey   : no              State   : MM_ACTIVE
ciscoasa#
```

注意：观察Role to be responder，它表示此隧道的发起方位于另一端，例如VPN-Router。

- 检验第II阶段IPSEC SA的参数。

```
ciscoasa#show crypto ipsec sa
interface: outside
    Crypto map tag: mymap, seq num: 1, local addr: 209.165.201.2

      local ident (addr/mask/prot/port): (192.168.100.0/255.255.255.0/0/0)
      remote ident (addr/mask/prot/port): (192.168.200.0/255.255.255.0/0/0)
      current_peer: 209.165.200.12

      #pkts encaps: 29, #pkts encrypt: 29, #pkts digest: 29
      #pkts decaps: 29, #pkts decrypt: 29, #pkts verify: 29
      #pkts compressed: 0, #pkts decompressed: 0
      #pkts not compressed: 29, #pkts comp failed: 0, #pkts decomp failed: 0
      #pre-frag successes: 0, #pre-frag failures: 0, #fragments created: 0
      #PMTUs sent: 0, #PMTUs rcvd: 0, #decapsulated frgs needing reassembly: 0
      #send errors: 0, #recv errors: 0

      local crypto endpt.: 209.165.201.2, remote crypto endpt.: 209.165.200.12
```

```
    path mtu 1500, IPSec overhead 58, media mtu 1500
    current outbound spi: E7B37960

  inbound esp sas:
    spi: 0xABB49C64 (2880740452)
       transform: esp-des esp-md5-hmac none
       in use settings ={L2L, Tunnel, }
       slot: 0, conn_id: 4096, crypto-map: mymap
       sa timing: remaining key lifetime (kB/sec): (4274997/3498)
       IV size: 8 bytes
       replay detection support: Y
  outbound esp sas:
    spi: 0xE7B37960 (3887298912)
       transform: esp-des esp-md5-hmac none
       in use settings ={L2L, Tunnel, }
       slot: 0, conn_id: 4096, crypto-map: mymap
       sa timing: remaining key lifetime (kB/sec): (4274997/3498)
       IV size: 8 bytes
       replay detection support: Y
```

通过路由器CLI检验隧道参数

- 验证第I阶段ISAKMP SA的状态。

```
VPN-Router#show crypto isakmp sa
dst             src             state          conn-id slot status
209.165.201.2   209.165.200.12  QM_IDLE              1    0 ACTIVE
```

- 检验第II阶段IPSEC SA的参数。

```
VPN-Router#show crypto ipsec sa

interface: FastEthernet1
    Crypto map tag: SDM_CMAP_1, local addr 209.165.200.12

   protected vrf: (none)
   local  ident (addr/mask/prot/port): (192.168.200.0/255.255.255.0/0/0)
   remote ident (addr/mask/prot/port): (192.168.100.0/255.255.255.0/0/0)
   current_peer 209.165.201.2 port 500
     PERMIT, flags={origin_is_acl,}
    #pkts encaps: 39, #pkts encrypt: 39, #pkts digest: 39
    #pkts decaps: 39, #pkts decrypt: 39, #pkts verify: 39
    #pkts compressed: 0, #pkts decompressed: 0
    #pkts not compressed: 0, #pkts compr. failed: 0
    #pkts not decompressed: 0, #pkts decompress failed: 0
    #send errors 6, #recv errors 0

     local crypto endpt.: 209.165.200.12, remote crypto endpt.: 209.165.201.2
     path mtu 1500, ip mtu 1500
     current outbound spi: 0xABB49C64(2880740452)

     inbound esp sas:
      spi: 0xE7B37960(3887298912)
        transform: esp-des esp-md5-hmac ,
        in use settings ={Tunnel, }
        conn id: 2001, flow_id: C18XX_MBRD:1, crypto map: SDM_CMAP_1
        sa timing: remaining key lifetime (k/sec): (4481818/3375)
        IV size: 8 bytes
        replay detection support: Y
        Status: ACTIVE

     inbound ah sas:
```

```
inbound pcp sas:

outbound esp sas:
 spi: 0xABB49C64(2880740452)
   transform: esp-des esp-md5-hmac ,
   in use settings ={Tunnel, }
   conn id: 2002, flow_id: C18XX_MBRD:2, crypto map: SDM_CMAP_1
   sa timing: remaining key lifetime (k/sec): (4481818/3371)
   IV size: 8 bytes
   replay detection support: Y
   Status: ACTIVE

outbound ah sas:

outbound pcp sas:
```

故障排除

本部分提供的信息可用于对配置进行故障排除。

- 拆除现有加密连接。

```
ciscoasa#clear crypto ipsec sa
ciscoasa#clear crypto isakmp sa

VPN-Router#clear crypto isakmp
```

- 使用debug命令排除VPN隧道问题。**注：如**果启用调试，当网际网络出现高负载情况时，这可能会中断路由器的运行。请谨**慎使用debug命令。当解决具体问题时，通常只推荐在路由器技术支持人员提供指导的情况下使用这些命令。**

```
ciscoasa#debug crypto engine
ciscoasa#debug crypto isakmp
ciscoasa#debug crypto IPSec
ciscoasa#

VPN-Router#debug crypto engine
Crypto Engine debugging is on
VPN-Router#debug crypto isakmp
Crypto ISAKMP debugging is on
VPN-Router#debug crypto ipsec
Crypto IPSEC debugging is on
VPN-Router#
```

有关debug命令的详细信息，请参阅了解和使用debug命令中的debug crypto isakmp。

相关信息

- IPsec 协商/IKE 协议支持页
- Cisco ASA安全设备操作系统软件文档
- 最常用的 IPSec VPN 故障排除解决方案
- 请求注解 (RFC)