配置 IPSec 隧道 - Cisco Secure PIX 防火墙到 Checkpoint 4.1 防火墙

目录

简介

此配置示例展示如何形成有预先共享密钥的一个IPSec隧道加入两私有网络。在我们的示例中，被加入的网络是思科安全PIX防火墙(PIX)内部的192.168.1.X 专用网络和Checkpoint内部的10.32.50.X专用网络。假设，从PIX和里面里边的流量对互联网的检查点4.1防火墙(代表此处通过172.18.124.X网络)在开始此配置之前流。

先决条件

要求

本文档没有任何特定的要求。

使用的组件

本文档中的信息基于以下软件和硬件版本：

- PIX软件版本5.3.1
- 检查点 4.1 防火墙

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

有关文档规则的详细信息，请参阅 Cisco 技术提示规则。

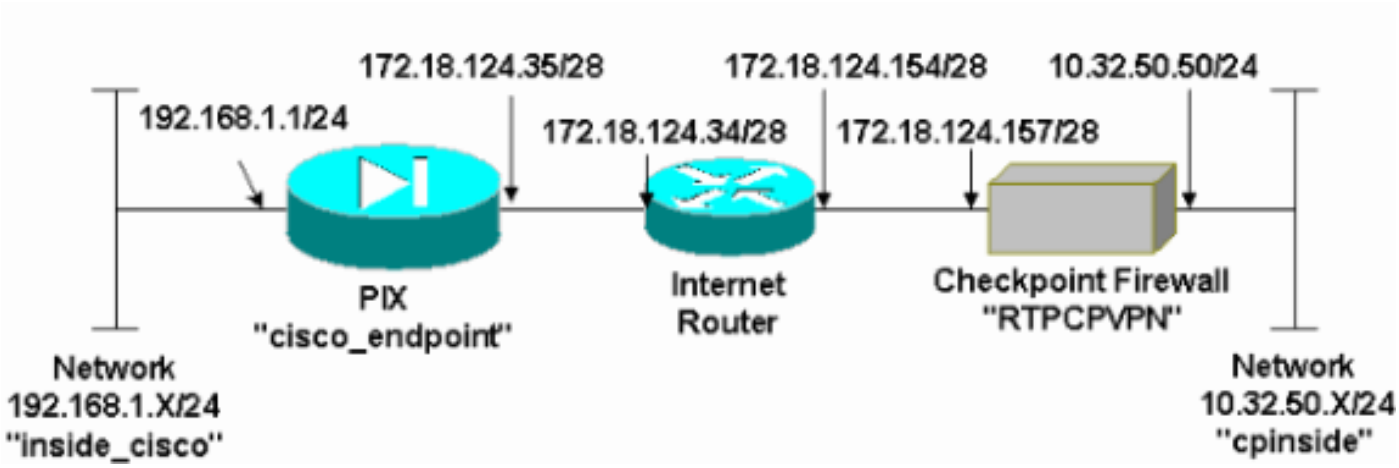
配置

本部分提供有关如何配置本文档所述功能的信息。

注意： 要查找本文档所用命令的其他信息，请使用命令查找工具（仅限注册用户）。

网络图

本文档使用此图中所示的网络设置：



配置

本文使用在此部分显示的配置。

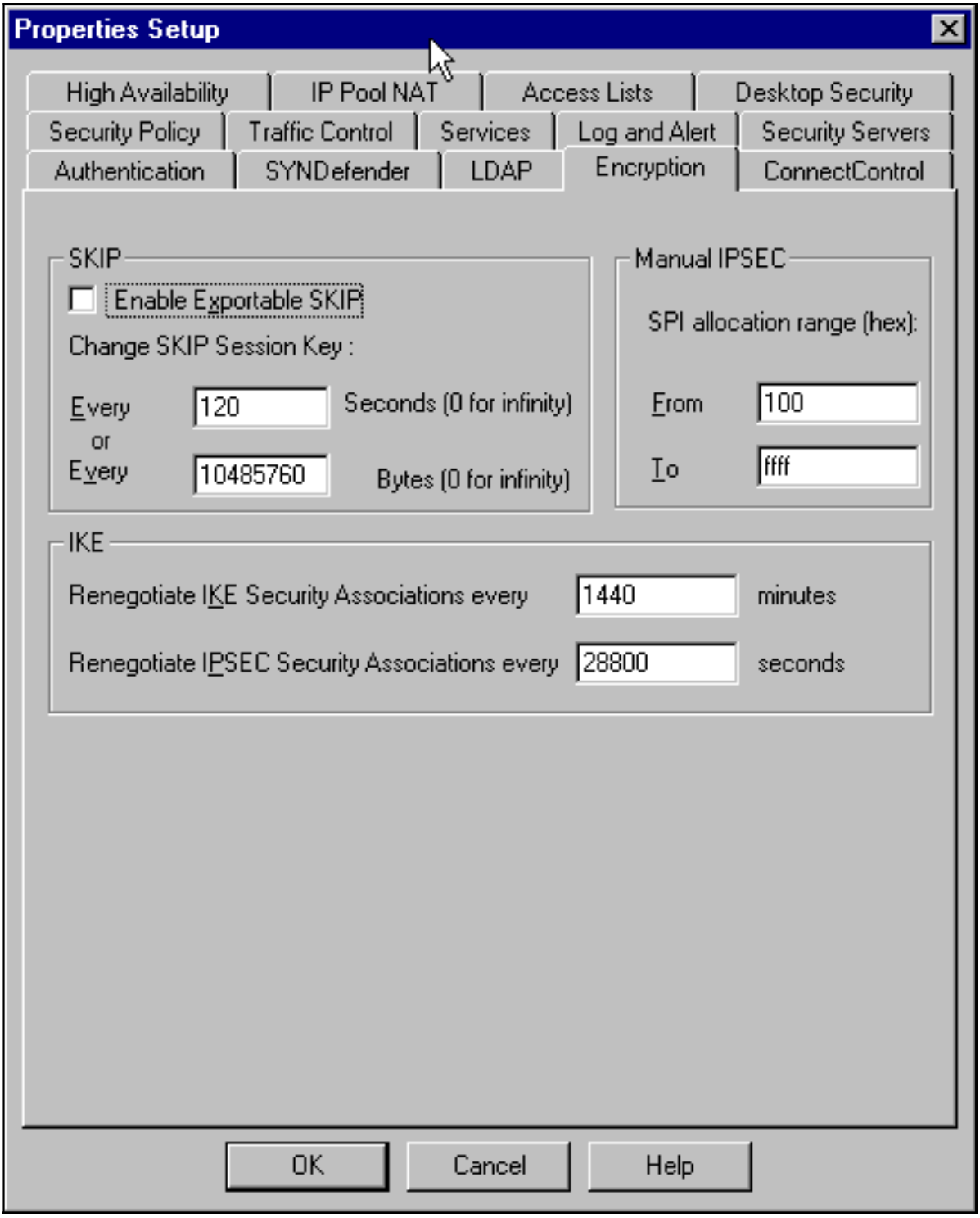
PIX 配置

```
PIX Version 5.3(1)
nameif ethernet0 outside security0
nameif ethernet1 inside security100
enable password 8Ry2YjIyt7RRXU24 encrypted
passwd 2KFQnbNIdI.2KYOU encrypted
hostname cisco_endpoint
fixup protocol ftp 21
fixup protocol http 80
fixup protocol h323 1720
fixup protocol rsh 514
fixup protocol smtp 25
fixup protocol sqlnet 1521
fixup protocol sip 5060
names
access-list 115 permit ip 192.168.1.0 255.255.255.0
10.32.50.0 255.255.255.0 access-list 115 deny ip
192.168.1.0 255.255.255.0 any pager lines 24 logging on
no logging timestamp no logging standby no logging
```

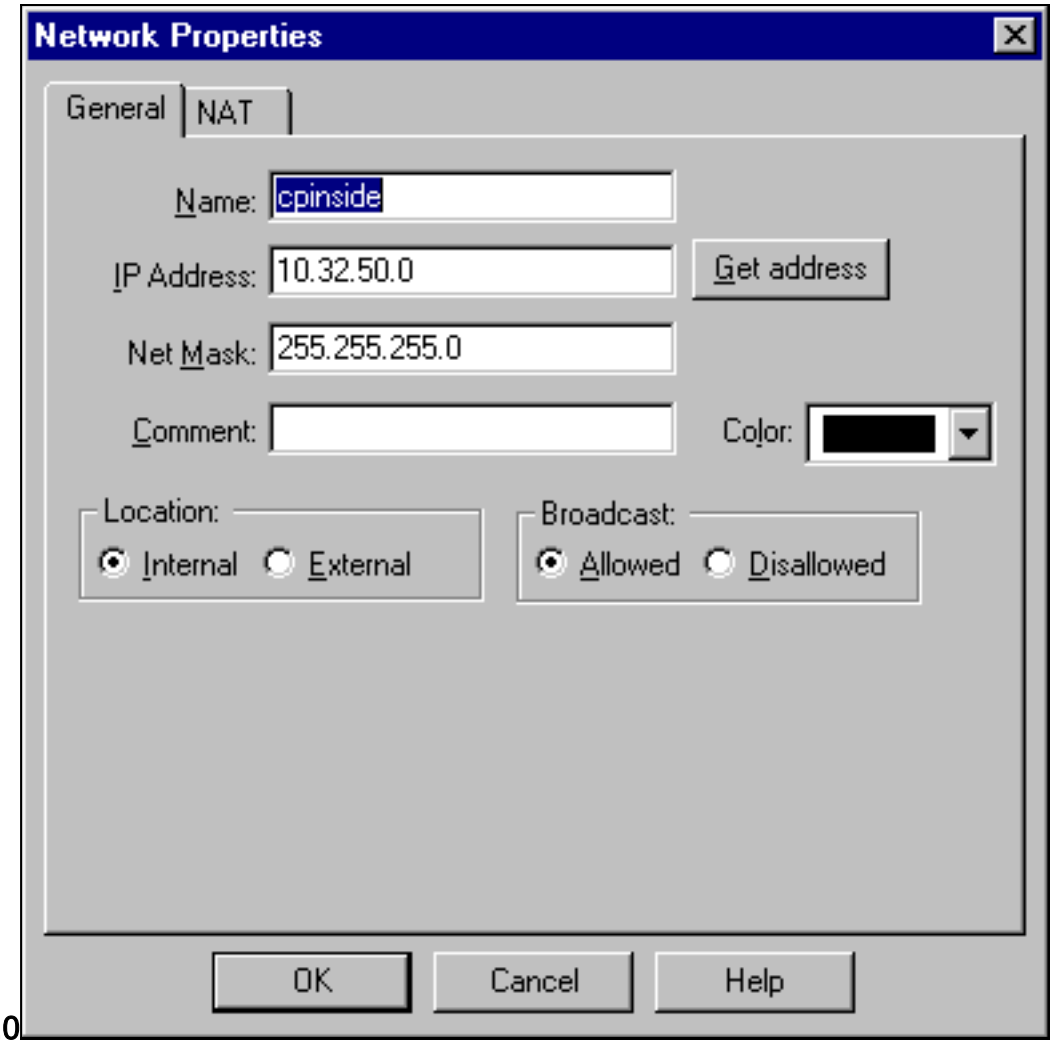
```
console logging monitor debugging no logging buffered
logging trap debugging no logging history logging
facility 20 logging queue 512 interface ethernet0 auto
interface ethernet1 auto mtu outside 1500 mtu inside
1500 ip address outside 172.18.124.35 255.255.255.240 ip
address inside 192.168.1.1 255.255.255.0 ip audit info
action alarm ip audit attack action alarm no failover
failover timeout 0:00:00 failover poll 15 failover ip
address outside 0.0.0.0 failover ip address inside
0.0.0.0 arp timeout 14400 global (outside) 1
172.18.124.36 nat (inside) 0 access-list 115 nat
(inside) 1 0.0.0.0 0.0.0.0 0 0 route outside 0.0.0.0
0.0.0.0 172.18.124.34 1 timeout xlate 3:00:00g SA
0x80bd6a10, conn_id = 0 timeout conn 1:00:00 half-closed
0:10:00 udp 0:02:00 rpc 0:10:00 h323 0:05:00 sip 0:30:00
sip_media 0:02:00 timeout uauth 0:05:00 absolute aaa-
server TACACS+ protocol tacacs+ aaa-server RADIUS
protocol radius no snmp-server location no snmp-server
contact snmp-server community public no snmp-server
enable traps floodguard enable !--- IPSec configuration
sysopt connection permit-ipsec no sysopt route dnat
crypto ipsec transform-set myset esp-des esp-sha-hmac
crypto map rtpmap 10 ipsec-isakmp crypto map rtpmap 10
match address 115 crypto map rtpmap 10 set peer
172.18.124.157 crypto map rtpmap 10 set transform-set
myset crypto map rtpmap 10 set security-association
lifetime seconds 3600 kilobytes 4608000 crypto map
rtpmap interface outside !--- IKE configuration isakmp
enable outside isakmp key ******** address
172.18.124.157 netmask 255.255.255.240 isakmp identity
address isakmp policy 10 authentication pre-share isakmp
policy 10 encryption des isakmp policy 10 hash sha
isakmp policy 10 group 1 isakmp policy 10 lifetime 86400
telnet timeout 5 ssh timeout 5 terminal width 80
Cryptochecksum:dc43c44e4513d3633a3fc7b1c3802c79 : end
[OK]
```

检查点防火墙

1. 由于供应商之间IKE和IPSec的默认寿命各不相同，选择Properties>Encryption ，设置PIX默认的Checkpoint寿命。PIX默认IKE寿命是86400秒(=1440分钟)，可修改的由此命令：**isakmp policy - lifetime 86400**PIX IKE寿命可以配置在60-86400秒之间。PIX默认IPSec寿命是28800秒，可修改的由此命令：**crypto ipsec security-association lifetime seconds -**您能配置在120-86400秒之间的PIX IPSec寿命。

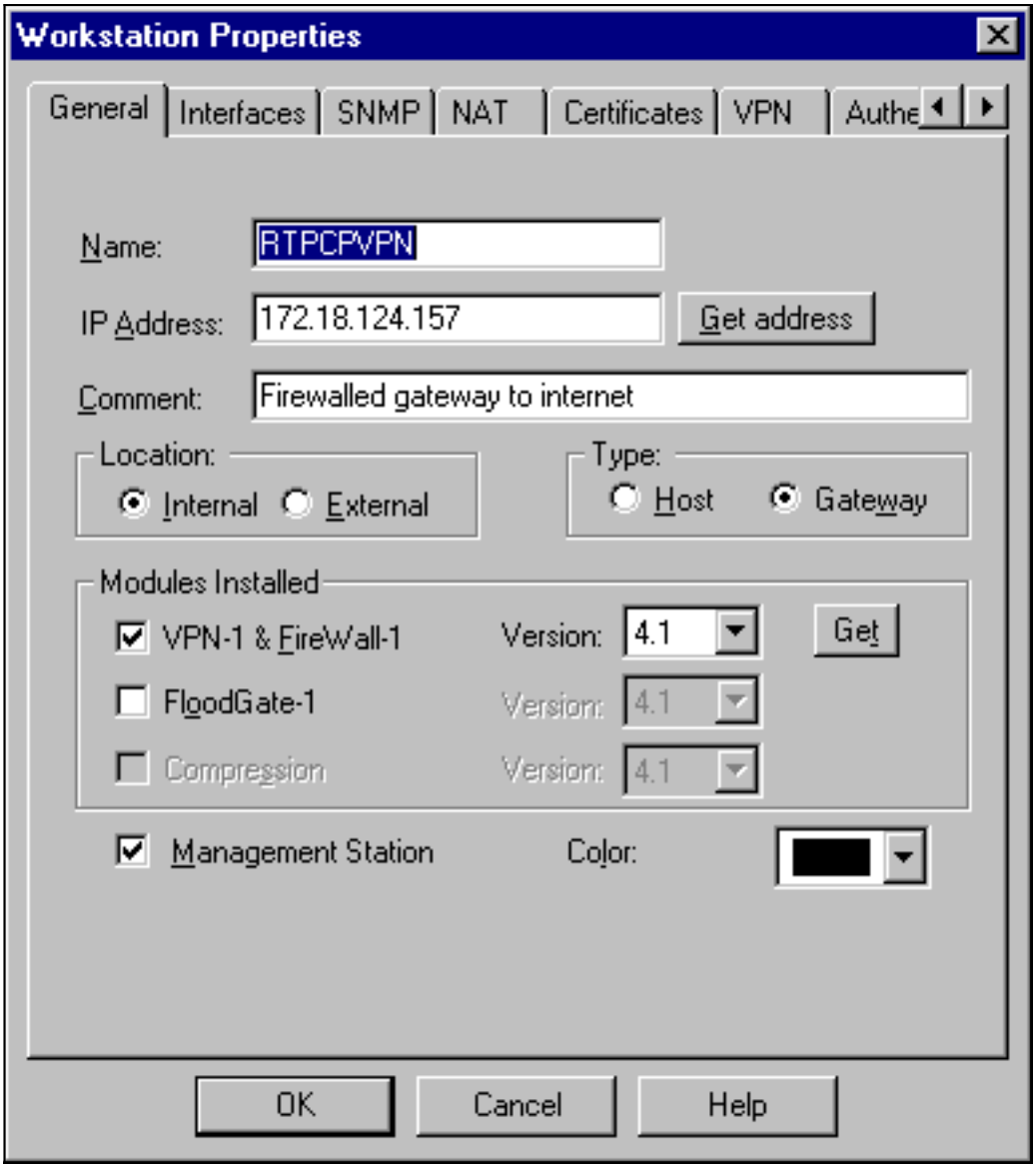


2. "选择Manage > Network objects > New (或 Edit) > Network，配置Checkpoint后的内部(""cpinside"") 网络的对象。"这必须与在此pix命令的目的地(第二)网络一致：**access-list 115 permit ip 192.168.1.0 255.255.255.0 10.32.50.0**



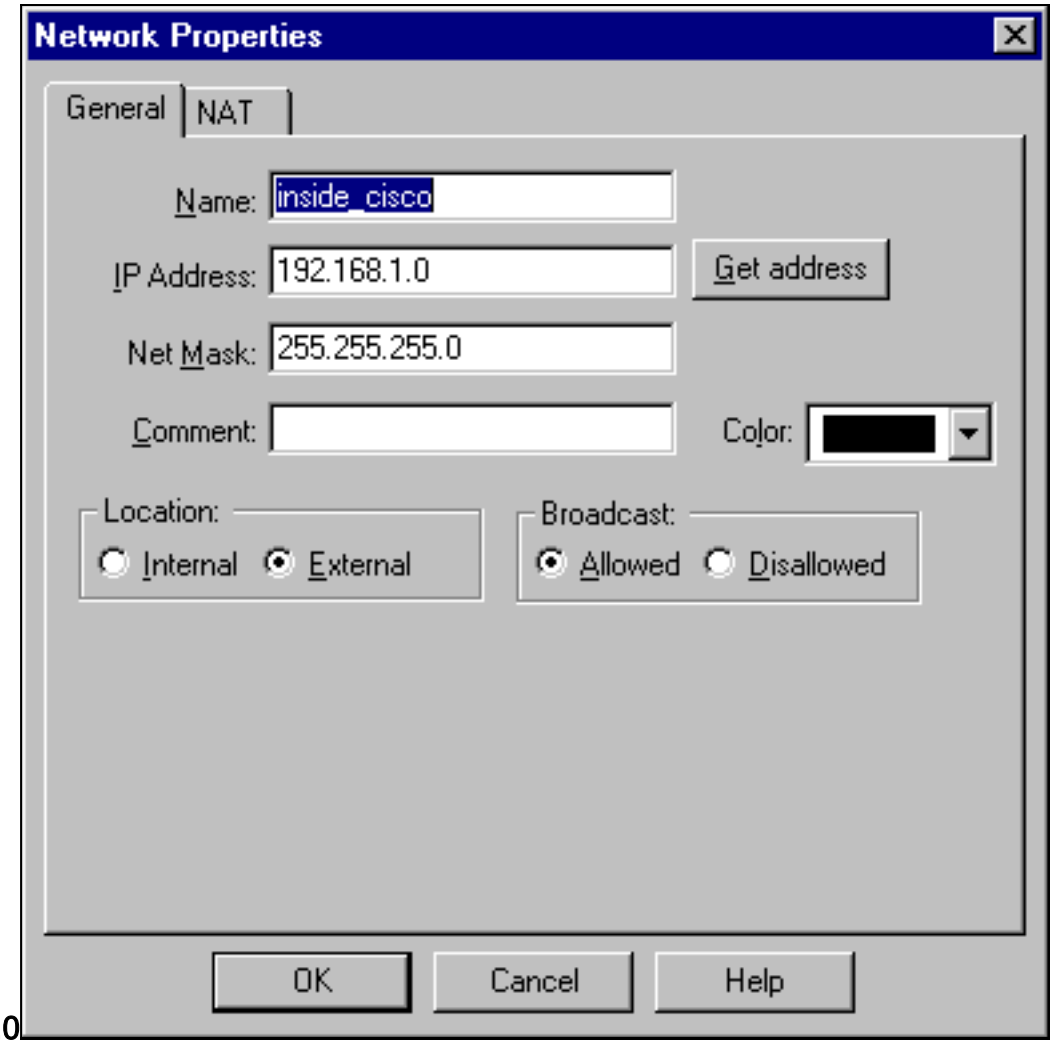
255.255.255.0

3. 选择**Manage > Network objects > Edit**编辑该网关(“RTPCPVPN” Checkpoint)的终端的对象对在此命令的PIX点：**加密映射名称#集对等体ip_address**在 Location 下，请选择 **Internal**。对于“Type”，选择 **Gateway**。在安装的模块下，请选择**VPN-1 & FireWall-1**复选框，并且选择**管理**



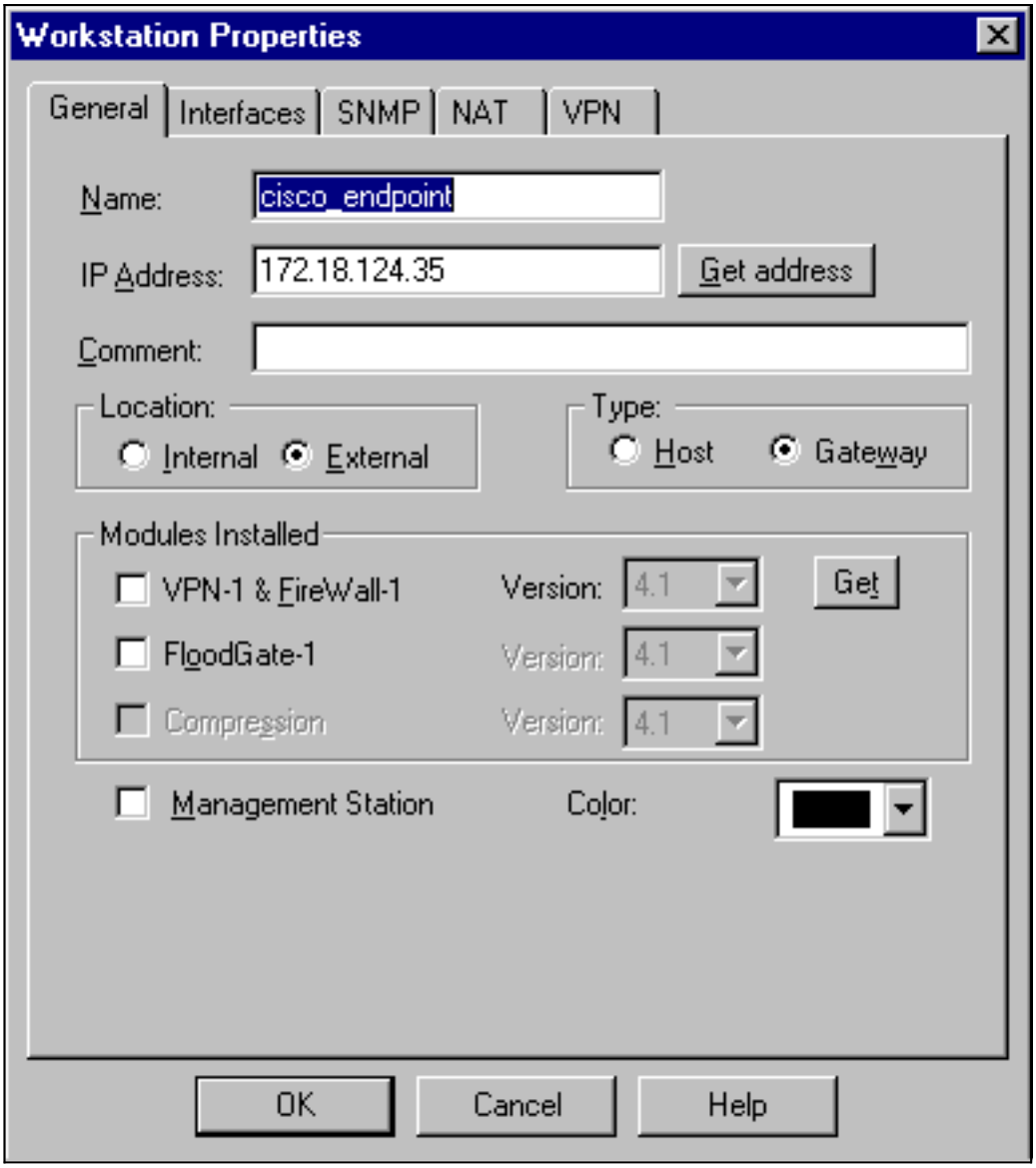
站复选框：

4. 选择Manage > Network objects > New (or Edit) > Network，配置PIX后的外部("inside_cisco") 网络的对象。这必须与在此pix命令的来源(第一)网络一致：**access-list 115 permit ip 192.168.1.0 255.255.255.0 10.32.50.0**

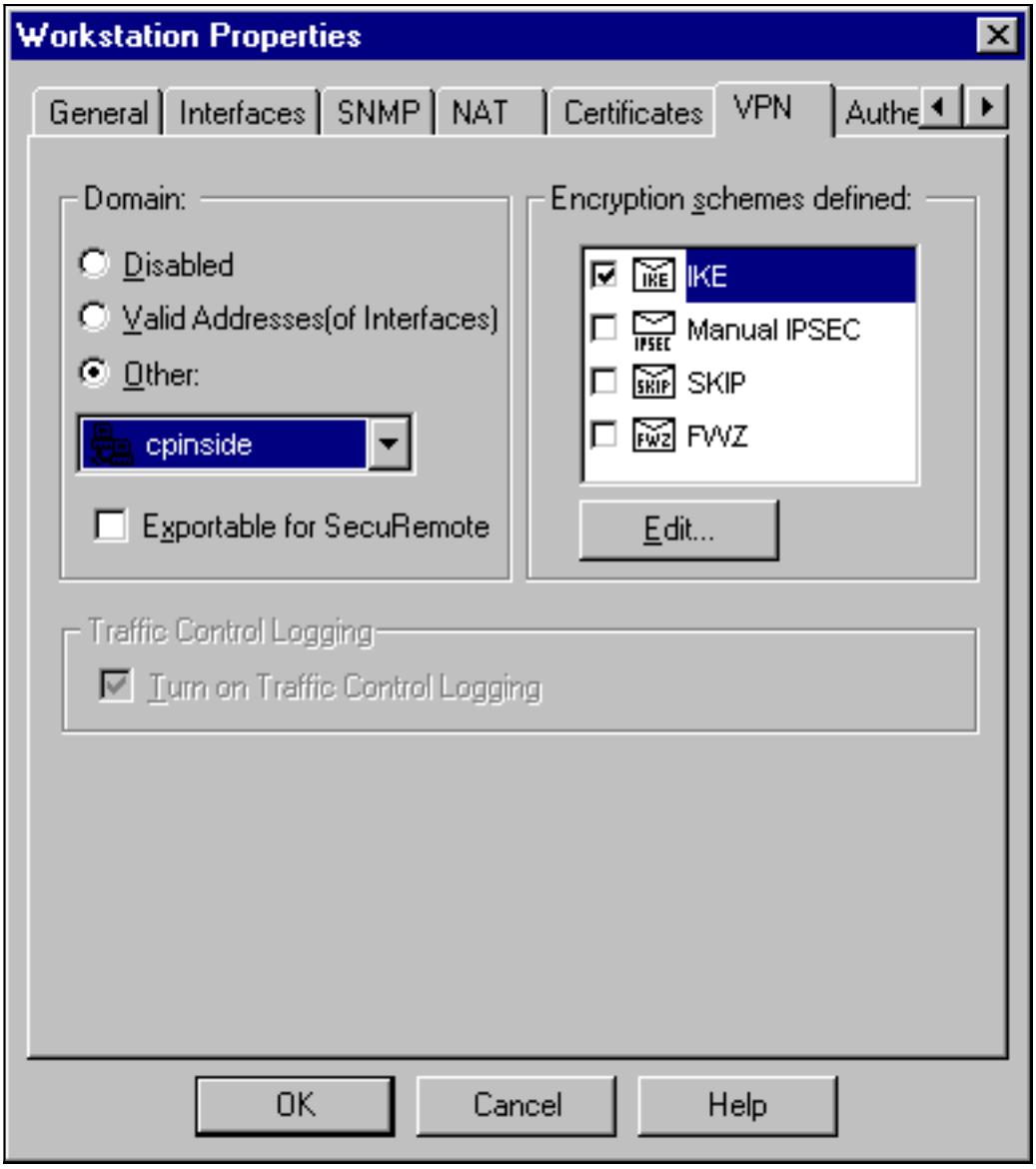


255.255.255.0

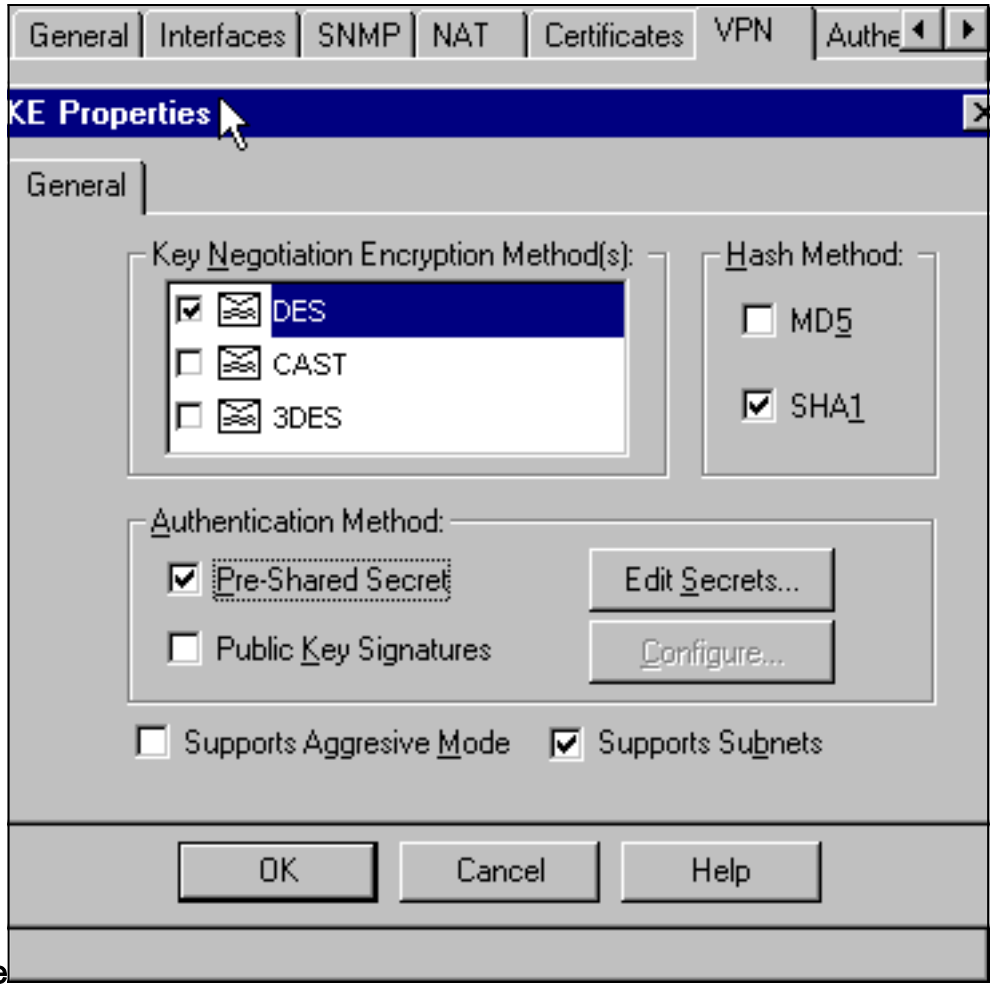
5. 选择**Manage > Network objects > New > Workstation**添加外部(“cisco_endpoint”) PIX网关的一个对象。这是此命令应用的PIX接口：**从外部加密映射名称接口**在 Location 下，选择 **External**。对于“Type”，选择 **Gateway**。**注意：** 请勿选择VPN-1/FireWall-1复选框。



6. 选择 **Manage > Network objects > Edit** 以编辑 Checkpoint 网关端点（称为 “RTPCPVPN”）VPN 选项卡。在域下，请选择**其他**然后从下拉列表中选择Checkpoint网络(称 “cpinside”)。在被定义的加密机制下，精选的**IKE**，然后点击**编辑**。

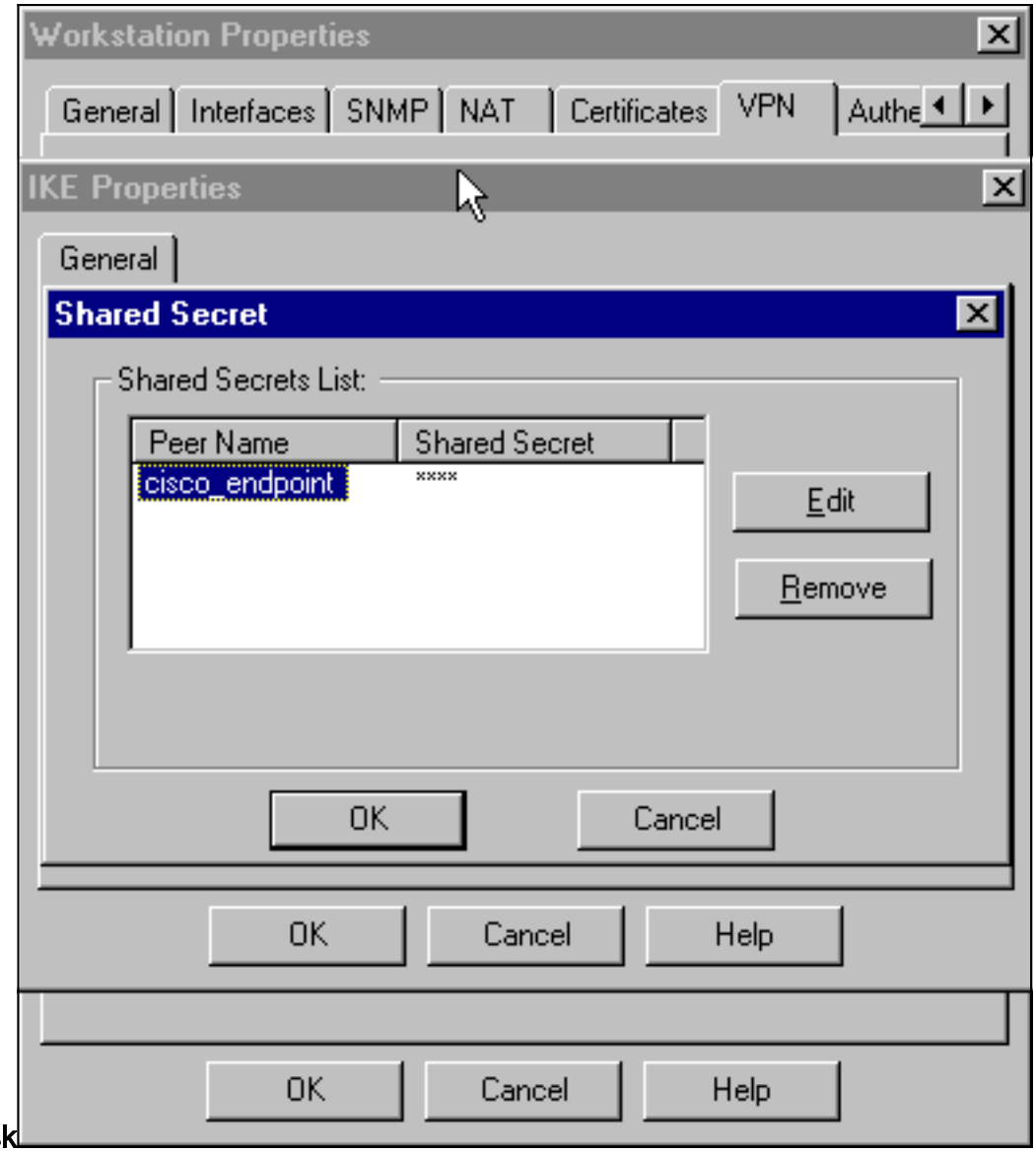


7. 更改DES加密的IKE属性同意此命令：**isakmp policy - encryption des**
8. 更改IKE属性对切细的SHA1同意此命令：**isakmp policy - hash sha**更改这些设置：取消选定积极模式。选择**支持子网**复选框。在认证方法下，请选择**预共享秘密**复选框。这与此命令一致：**isakmp policy - authentication pre-**



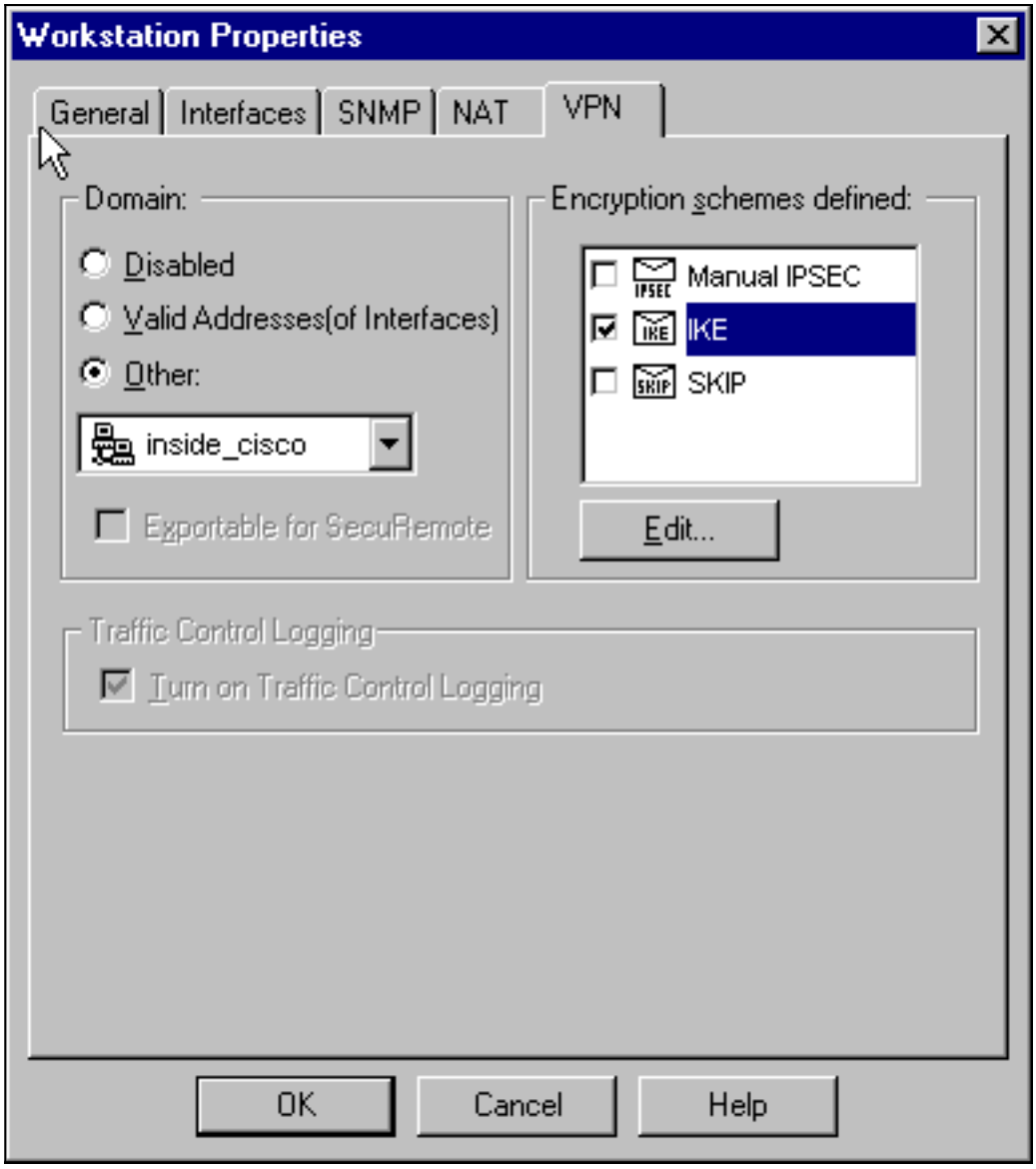
share

9. 单击**编辑秘密**设置预先共享密钥同意pix命令：**isakmp key key address address netmask**

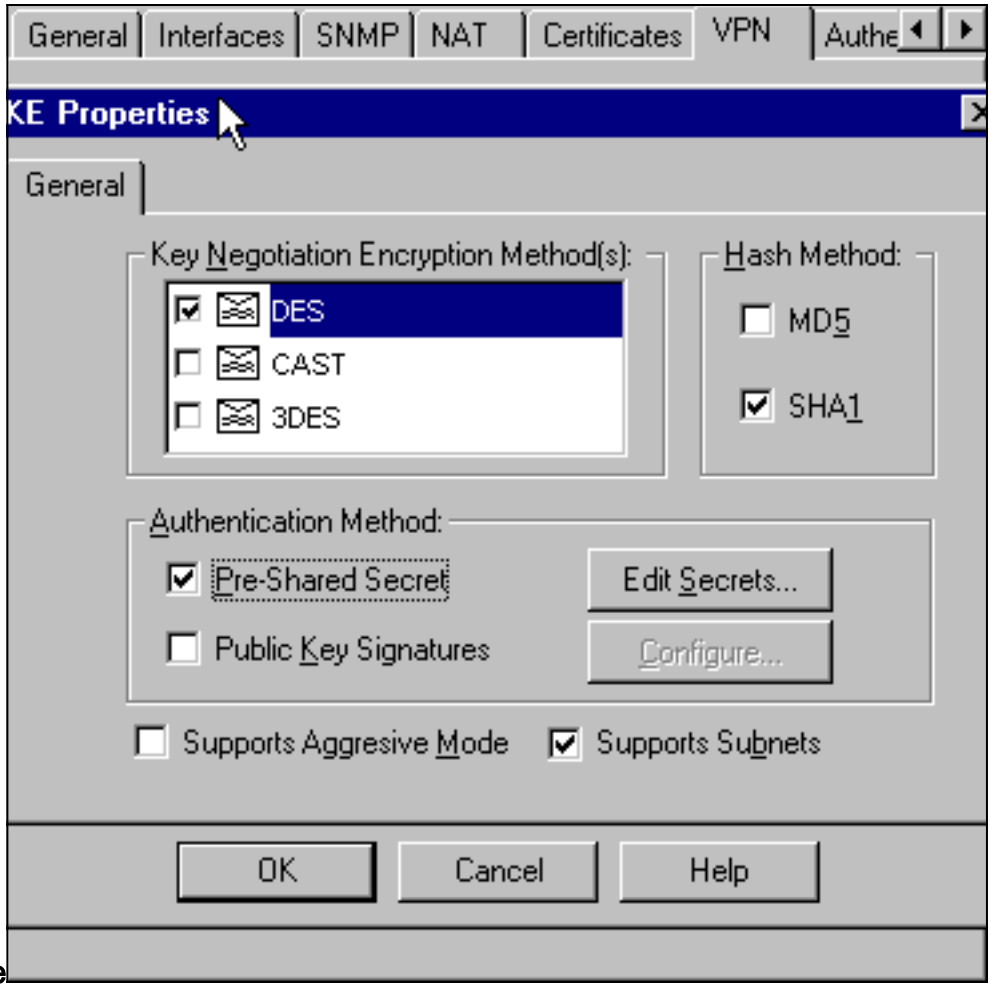


netmask

10. 选择 **Manage > Network objects > Edit** 以编辑“cisco_endpoint”VPN 选项卡。在域下，请选择**其他**，然后选择PIX网络的里面(呼叫“inside_cisco”)。在被定义的加密机制下，精选的**IKE**，然后点击**编辑**。

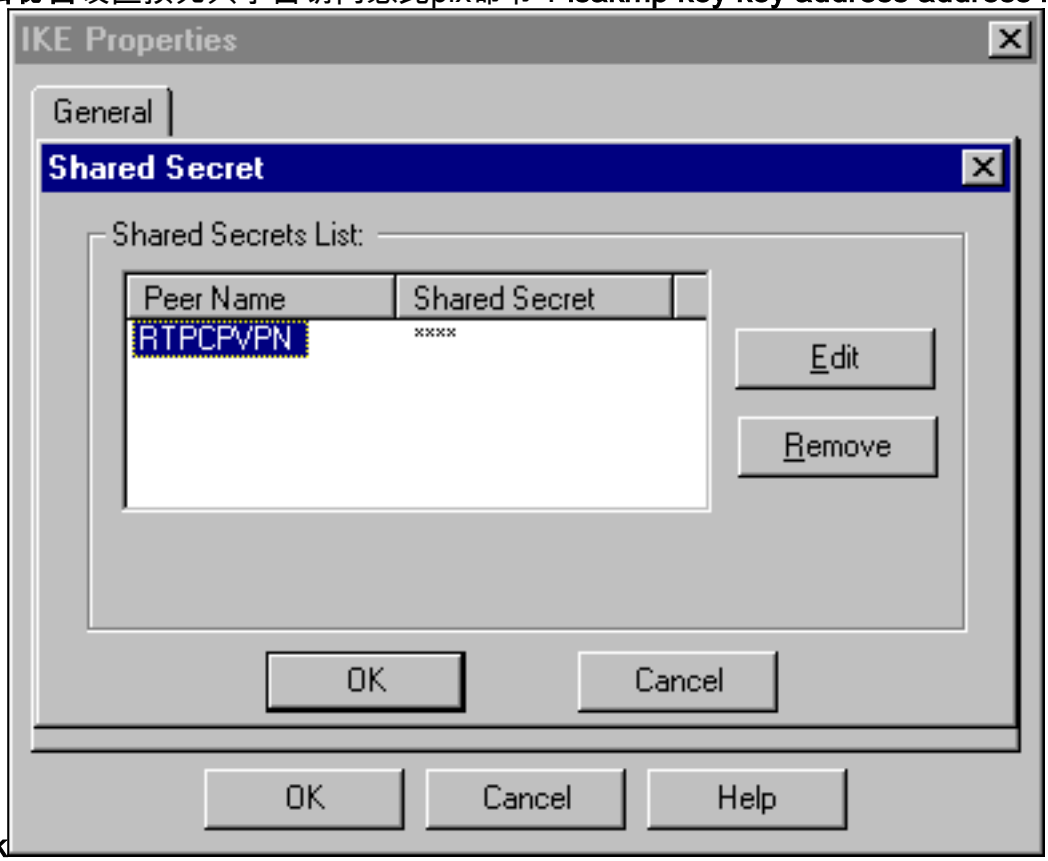


11. 更改IKE属性DES加密同意此命令：**isakmp policy - encryption des**
12. 更改IKE属性对切细的SHA1同意此命令：**crypto isakmp policy - hash sha**更改这些设置：取消选定积极模式。选择**支持子网**复选框。在认证方法下，请选择**预共享秘密**复选框。此操作与此命令一致：**isakmp policy - authentication pre-**



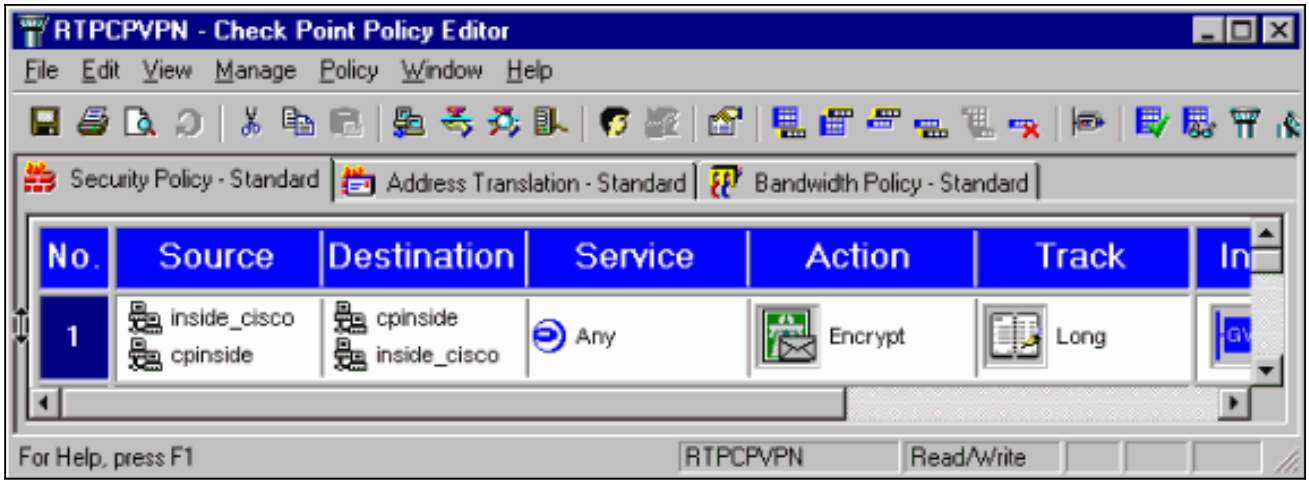
share

13. 单击**编辑秘密**设置预先共享密钥同意此pix命令：**isakmp key key address address netmask**

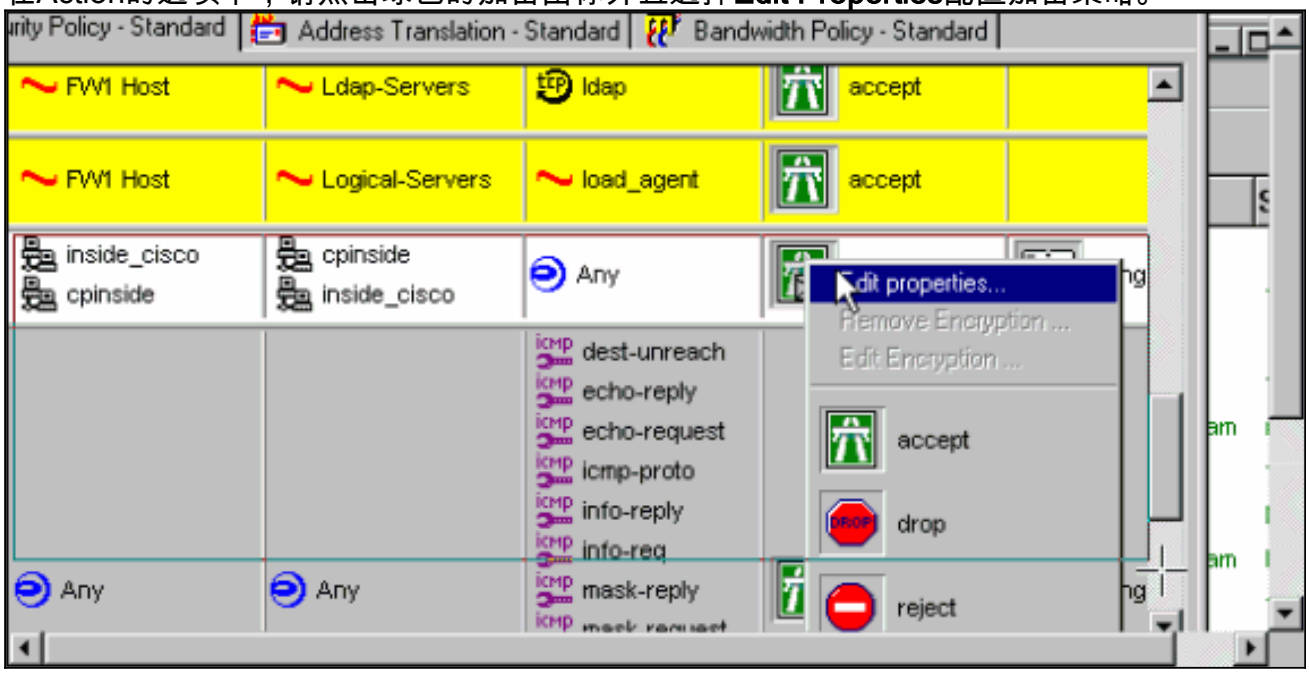


netmask

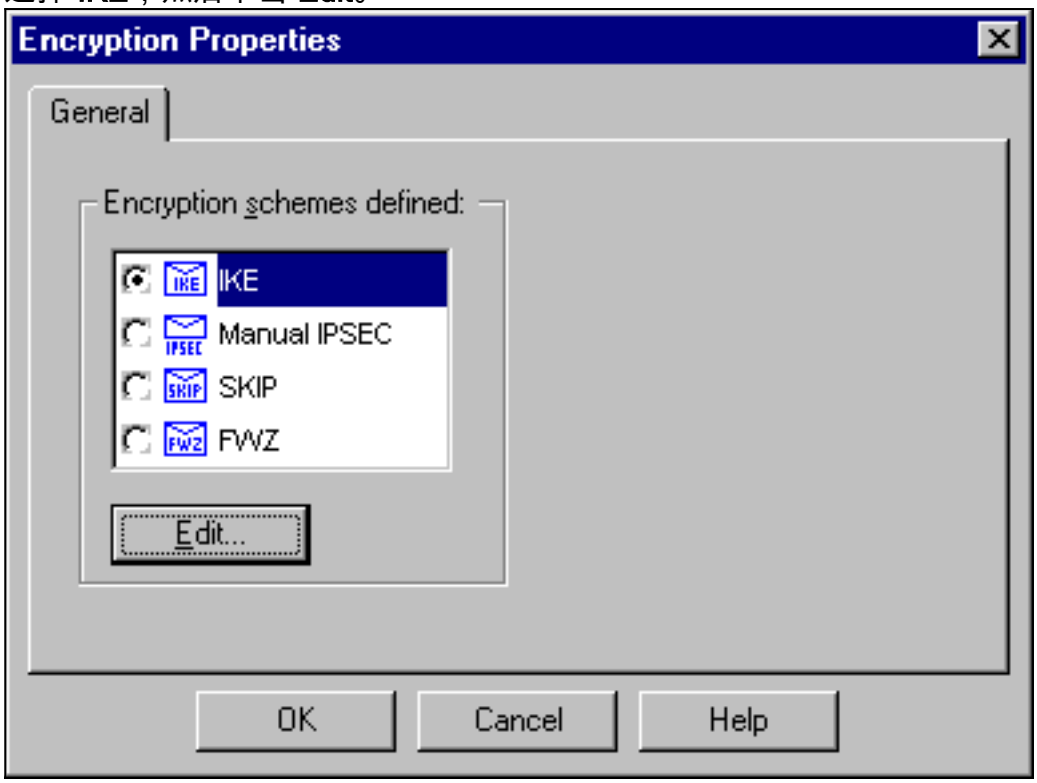
14. 在策略编辑器窗口，插入源和目的为“inside_cisco”和“cpinside”(双向)这一规则。设置 **Service=Any、Action=Encrypt 和 Track=Long。**



15. 在Action的选项下，请点击绿色的加密图标并且选择**Edit Properties**配置加密策略。

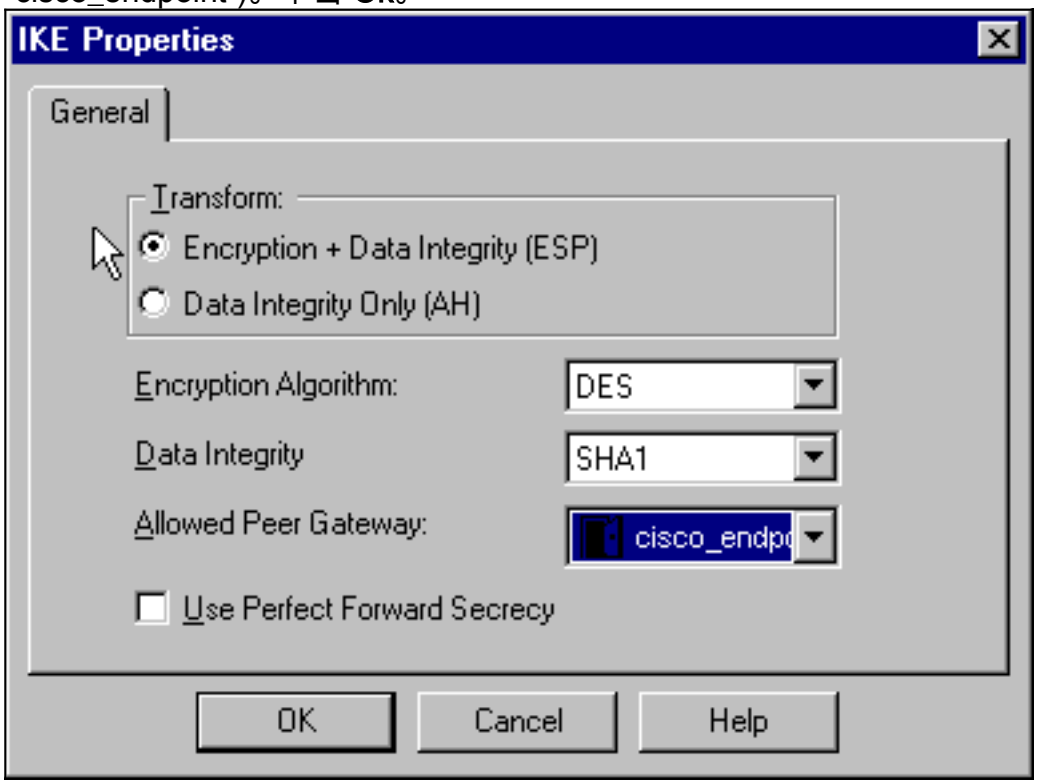


16. 选择 **IKE**，然后单击 **Edit**。



17. 在IKE Properties屏幕，请更改这些属性同意在此命令的PIX IPSec转换：**crypto ipsec**

transform-set myset esp-des esp-sha-hmac下面请变换，选择**加密+数据完整性(ESP)**。加密算法必须是**DES**，数据完整性必须是**SHA1**，并且允许对等体网关必须是外部PIX网关(呼叫“cisco_endpoint”)。单击 **Ok**。



18. 在Checkpoint配置后，请选择在Checkpoint菜单的**策略>安装**为了更改能生效。

调试，显示和清除命令

本部分所提供的信息可用于确认您的配置是否正常工作。

命令输出解释程序工具（仅限注册用户）支持某些 **show** 命令，使用此工具可以查看对 show 命令输出的分析。

在发出 **debug** 命令之前，请参阅有关 debug 命令的重要信息。

Cisco PIX 防火墙

- **debug crypto engine** —显示关于加密引擎的调试消息，进行加密和解密。
- **debug crypto isakmp** —显示关于IKE事件的消息。
- **debug crypto ipsec** —显示IPSec事件。
- **show crypto isakmp sa** - 查看对等体上的所有当前 IKE 安全连接 (SA)。
- **show crypto ipsec sa** —查看当前安全关联使用的设置。
- **clear crypto isakmp sa** — (从配置模式)请清除所有活动IKE连接。
- **clear crypto ipsec sa** — (从配置模式)请删除所有IPSec安全关联。

检查点:

由于跟踪为在步骤14显示的策略编辑器窗口的龙牌设置，拒绝的数据流在日志查看器用红色出现为红色。更多冗长的调试可以通过输入得到：

```
C:\WINNT\FW1\4.1\fwstop
```

```
C:\WINNT\FW1\4.1\fw d -d
```

并且在另一个窗口：

```
C:\WINNT\FW1\4.1\fwstart
```

注意： 这是Microsoft Windows NT安装。

您能清除在Checkpoint的SAS用这些命令：

```
fw tab -t IKE_SA_table -x fw tab -t ISAKMP_ESP_table -x fw tab -t inbound_SPI -x fw tab -t
ISAKMP_AH_table -x
```

并且回答**是**在Are you sure ？提示。

故障排除

本部分提供的信息可用于对配置进行故障排除。

网络汇总

当多个相邻网络内部在Checkpoint时的加密域配置，设备能自动地汇总他们关于关注数据流。如果在PIX的加密ACL没有配置配比，通道可能出故障。例如，如果10.0.0.0 /24和10.0.1.0 /24网络内部在通道配置包括，他们可以汇总到10.0.0.0 /23。

PIX 的调试输出示例

```
cisco_endpoint# show debug debug crypto ipsec 1 debug crypto isakmp 1 debug crypto engine debug
fover status tx Off rx Off open Off cable Off txdmp Off rxdmp Off ifc Off rxip Off txip Off get
Off put Off verify Off switch Off fail Off fmsg Off cisco_endpoint# term mon cisco_endpoint#
ISAKMP (0): beginning Quick Mode exchange, M-ID of 2112882468:7df00724IPSEC(key_engine): got a
queue event... IPSEC(spi_response): getting spi 0x9d71f29c(2641490588) for SA from
172.18.124.157 to 172.18.124.35 for prot 3 70 crypto_isakmp_process_block: src 172.18.124.157,
dest 172.18.124.35 OAK_QM exchange oakley_process_quick_mode: OAK_QM_IDLE ISAKMP (0): processing
SA payload. message ID = 2112882468 ISAKMP : Checking IPSec proposal 1 ISAKMP: transform 1,
ESP_DES ISAKMP: attributes in transform: ISAKMP: encaps is 1 ISAKMP: SA life type in seconds
ISAKMP: SA life duration (basic) of 28800 ISAKMP: SA life type in kilobytes ISAKMP: SA life
duration (VPI) of 0x0 0x46 0x50 0x0 ISAKMP: authenticator is HMAC-SHA ISAKMP (0): atts are
acceptable.IPSEC(validate_proposal_request): proposal part #1, (key eng. msg.) dest=
172.18.124.157, src= 172.18.124.35, dest_proxy= 10.32.50.0/255.255.255.0/0/0 (type=4),
src_proxy= 192.168.1.0/255.255.255.0/0/0 (type=4), protocol= ESP, transform= esp-des esp-sha-
hmac , lifedur= 0s and 0kb, spi= 0x0(0), conn_id= 0, keysize= 0, flags= 0x4 ISAKMP (0):
processing NONCE payload. message ID = 2112882468 ISAKMP (0): processing ID payload. message ID
= 2112882468 ISAKMP (0): processing ID payload. message ID = 2112882468map_alloc_entry:
allocating entry 3 map_alloc_entry: allocating entry 4 ISAKMP (0): Creating IPSec SAs inbound SA
from 172.18.124.157 to 172.18.124.35 (proxy 10.32.50.0 to 192.168.1.0) has spi 2641490588 and
conn_id 3 and flags 4 lifetime of 28800 seconds lifetime of 4608000 kilobytes outbound SA from
172.18.124.35 to 172.18.124.157 (proxy 192.168.1.0 to 10.32.50.0) has spi 3955804195 and conn_id
4 and flags 4 lifetime of 28800 seconds lifetime of 4608000 kilobytesIPSEC(key_engine): got a
queue event... IPSEC(initialize_sas): , (key eng. msg.) dest= 172.18.124.35, src=
172.18.124.157, dest_proxy= 192.168.1.0/255.255.255.0/0/0 (type=4), src_proxy=
10.32.50.0/255.255.255.0/0/0 (type=4), protocol= ESP, transform= esp-des esp-sha-hmac , lifedur=
28800s and 4608000kb, spi= 0x9d71f29c(2641490588), conn_id= 3, keysize= 0, flags= 0x4
IPSEC(initialize_sas): , (key eng. msg.) src= 172.18.124.35, dest= 172.18.124.157, src_proxy=
192.168.1.0/255.255.255.0/0/0 (type=4), dest_proxy= 10.32.50.0/255.255.255.0/0/0 (type=4),
protocol= ESP, transform= esp-des esp-sha-hmac , lifedur= 28800s and 4608000kb, spi=
0xebc8c823(3955804195), conn_id= 4, keysize= 0, flags= 0x4 return status is IKMP_NO_ERROR2303:
sa_request, (key eng. msg.) src= 172.18.124.35, dest= 172.18.124.157, src_proxy=
192.168.1.0/255.255.255.0/0/0 (type=4), dest_proxy= 10.32.50.0/255.255.255.0/0/0 (type=4),
```

```
protocol= ESP, transform= esp-des esp-sha-hmac , lifedur= 28800s and 4608000kb, spi= 0x0(0),
conn_id= 0, keysize= 0, flags= 0x4004 602301: sa created, (sa) sa_dest= 172.18.124.35, sa_prot=
50, sa_spi= 0x9d71f29c(2641490588), sa_trans= esp-des esp-sha-hmac , sa_conn_id= 3 602301: sa
created, (sa) sa_dest= 172.18.124.157, sa_prot= 50, sa_spi= 0xebc8c823(3955804195), sa_trans=
esp-des esp-sha-hmac , sa_conn_id= 4 cisco_endpoint# sho cry ips sa interface: outside Crypto
map tag: rtpmap, local addr. 172.18.124.35 local ident (addr/mask/prot/port):
(192.168.1.0/255.255.255.0/0/0) remote ident (addr/mask/prot/port): (0.0.0.0/0.0.0.0/0/0)
current_peer: 172.18.124.157 PERMIT, flags={origin_is_acl,} #pkts encaps: 0, #pkts encrypt: 0,
#pkts digest 0 #pkts decaps: 0, #pkts decrypt: 0, #pkts verify 0 #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.: 172.18.124.35, remote crypto endpt.:
172.18.124.157 path mtu 1500, ipsec overhead 0, media mtu 1500 current outbound spi: 0 inbound
esp sas: inbound ah sas: inbound pcp sas: outbound esp sas: outbound ah sas: outbound pcp sas:
local ident (addr/mask/prot/port): (192.168.1.0/255.255.255.0/0/0) remote ident
(addr/mask/prot/port): (10.32.50.0/255.255.255.0/0/0) current_peer: 172.18.124.157 PERMIT,
flags={origin_is_acl,} #pkts encaps: 4, #pkts encrypt: 4, #pkts digest 4 #pkts decaps: 4, #pkts
decrypt: 4, #pkts verify 4 #pkts compressed: 0, #pkts decompressed: 0 #pkts not compressed: 0,
#pkts compr. failed: 0, #pkts decompress failed: 0 #send errors 1, #recv errors 0 local crypto
endpt.: 172.18.124.35, remote crypto endpt.: 172.18.124.157 path mtu 1500, ipsec overhead 56,
media mtu 1500 current outbound spi: ebc8c823 inbound esp sas: spi: 0x9d71f29c(2641490588)
transform: esp-des esp-sha-hmac , in use settings ={Tunnel, } slot: 0, conn id: 3, crypto map:
rtpmap sa timing: remaining key lifetime (k/sec): (4607999/28777) IV size: 8 bytes replay
detection support: Y inbound ah sas: inbound pcp sas: outbound esp sas: spi:
0xebc8c823(3955804195) transform: esp-des esp-sha-hmac , in use settings ={Tunnel, } slot: 0,
conn id: 4, crypto map: rtpmap sa timing: remaining key lifetime (k/sec): (4607999/28777) IV
size: 8 bytes replay detection support: Y outbound ah sas: outbound pcp sas: cisco_endpoint# sho
cry is sa dst src state pending created 172.18.124.157 172.18.124.35 QM_IDLE 0 2
```

相关信息

- PIX 支持页
- PIX 命令参考
- 请求注解 (RFC)
- 配置 IPSec 网络安全
- 配置 Internet 密钥交换安全协议
- PIX 5.2 ：配置 IPSec
- PIX 5.3 ：配置 IPSec
- IPSec 支持页面
- 技术支持 - Cisco Systems