使用预共享密钥在Windows 8 PC和ASA之间配置L2TP over IPsec

目录

简介

本文档介绍如何使用思科自适应安全设备(ASA)和Windows 8本地客户端之间的预共享密钥在IPsec上配置第2层隧道协议(L2TP)。

L2TP over Internet协议安全(IPsec)提供在单个平台中部署和管理L2TP虚拟专用网络(VPN)解决方案以及IPsec VPN和防火墙服务的功能。

先决条件

要求

Cisco 建议您了解以下主题：

- 从客户端计算机到ASA的IP连接。要测试连接，请尝试从客户端终端ping ASA的IP地址，反之亦然
- 确保UDP端口500和4500以及封装安全负载(ESP)协议在连接路径的任何位置都不会被阻止

限制

- L2TP over IPsec仅支持IKEv1。不支持IKEv2。
- ASA上带IPsec的L2TP允许LNS与集成在Windows、MAC OS X、Android和Cisco IOS等操作系统中的本地VPN客户端进行互操作。仅支持带IPsec的L2TP，ASA不支持本地L2TP本身。
- Windows客户端支持的最小IPsec安全关联生存期为300秒。如果ASA上的生存期设置为少于300秒，则Windows客户端会忽略该生命期，并将其替换为300秒的生存期。
- ASA仅在本地数据库上支持点对点协议(PPP)身份验证密码身份验证协议(PAP)和Microsoft质询握手身份验证协议(CHAP)版本1和2。可扩展身份验证协议(EAP)和CHAP由代理身份验证服务器执行。因此，如果远程用户属于使用**authentication eap-proxy**或**authentication chap**命令配置的隧道组，并且ASA配置为使用本地数据库，则该用户无法连接。

支持的PPP身份验证类型

ASA上的L2TP over IPsec连接仅支持表中所示的PPP身份验证类型

AAA服务器支持和PPP身份验证类型

AAA服务器类型	**支持的PPP身份验证类型**
本地	PAP、MSCHAPv1、MSCHAPv2
RADIUS	PAP、CHAP、MSCHAPv1、MSCHAPv2、EAP-Proxy
TACACS+	PAP、CHAP、MSCHAPv1
LDAP	PAP
NT	PAP
Kerberos	PAP
SDI	SDI

PPP身份验证类型特征

关键字	**认证类型**	**特征**
CHAP	CHAP	为响应服务器质询，客户端返回加密的[质询加密密码]，其中包含明文用户名
EAP代理	EAP	启用EAP，该EAP允许安全设备将PPP身份验证过程代理到外部RADIUS身份
ms-chap-v1	Microsoft CHAP，版本1	与CHAP类似，但更安全的是，服务器仅存储和比较加密密码，而不是像CHA
ms-chap-v2	Microsoft CHAP，版本，2	
pap	PAP	在身份验证期间传递明文用户名和密码，因此不安全。

使用的组件

本文档中的信息基于以下软件和硬件版本：

- 运行软件版本9.4(1)的Cisco 5515系列ASA
- L2TP/IPSec客户端(Windows 8)

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。如果您的网络处于活动状态，请确保您了解所有命令的潜在影响。

相关产品

此配置也可与 Cisco ASA 5500 系列安全设备 8.3(1) 一起使用。

规则

有关文档规则的详细信息，请参阅Cisco技术提示规则

背景信息

第2层隧道协议(L2TP)是一种VPN隧道协议，允许远程客户端使用公有IP网络与私有企业网络服务器安全通信。L2TP使用PPP over UDP（端口1701）来隧道化数据。

L2TP协议基于客户端/服务器模型。该功能分为L2TP网络服务器(LNS)和L2TP接入集中器(LAC)。LNS通常在网络网关（如本例中的ASA）上运行，而LAC可以是拨号网络接入服务器(NAS)或具有捆绑的L2TP客户端（如Microsoft Windows、Apple iPhone或Android）的终端设备。

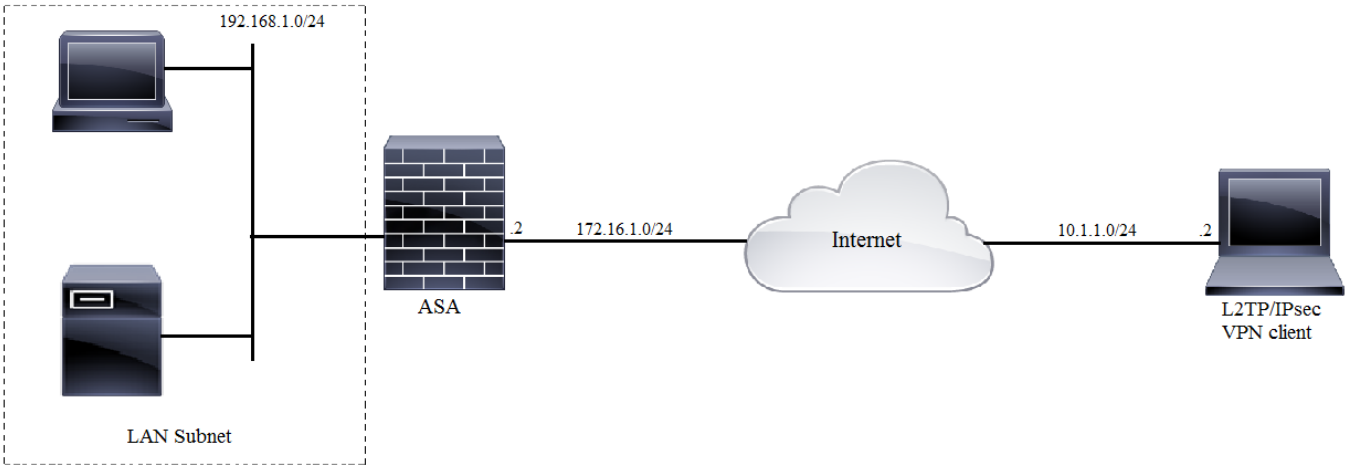
配置

本部分提供配置本文档中所述功能的信息。

> **注意**：有关本文档所用命令的详细信息，请使用命令查找工具（仅限注册用户）。

> **注意**：此配置中使用的 IP 编址方案在 Internet 上不可合法路由。这些地址是在实验室环境中使用的 RFC 1918 地址。

网络图

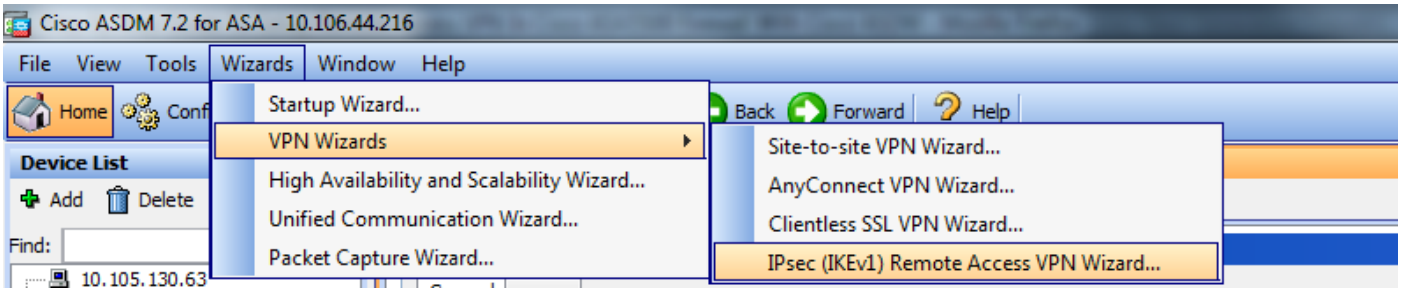


全通道配置

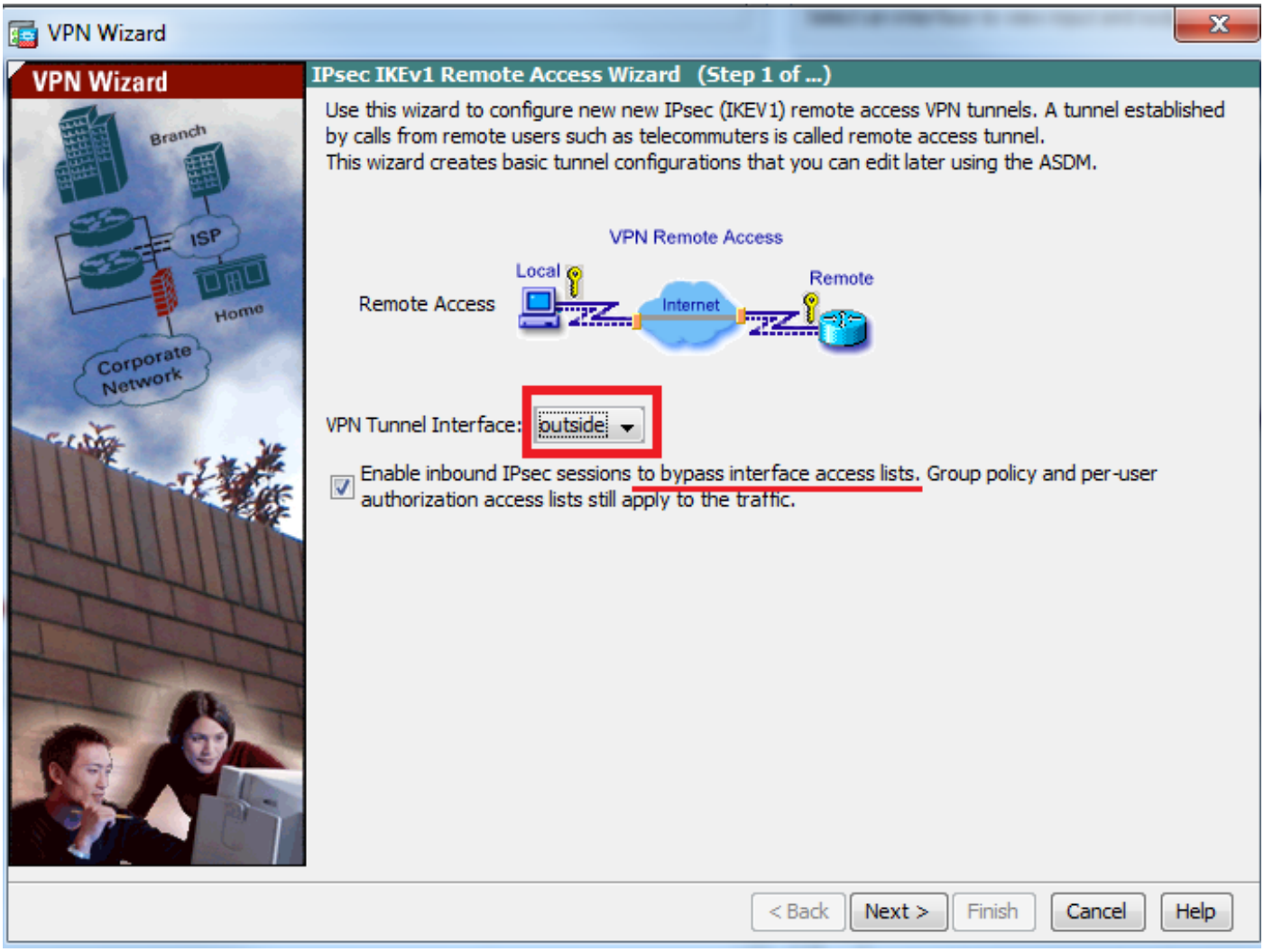
使用自适应安全设备管理器(ASDM)的ASA配置

请完成以下步骤：

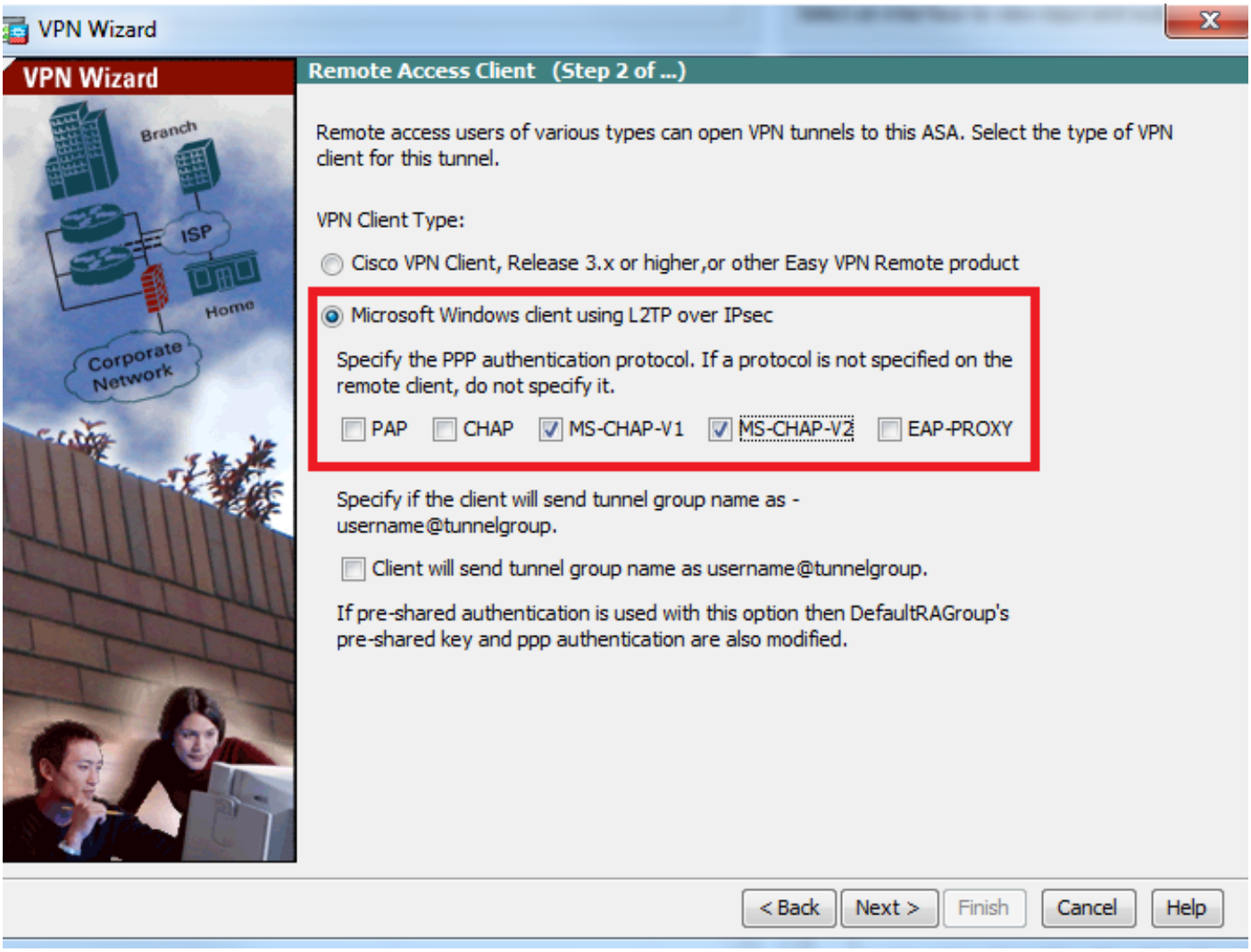
步骤1.登录到ASDM，然后导航到**Wizards > VPN Wizards > Ipsec(IKEv1)Remote Access VPN Wizard**。



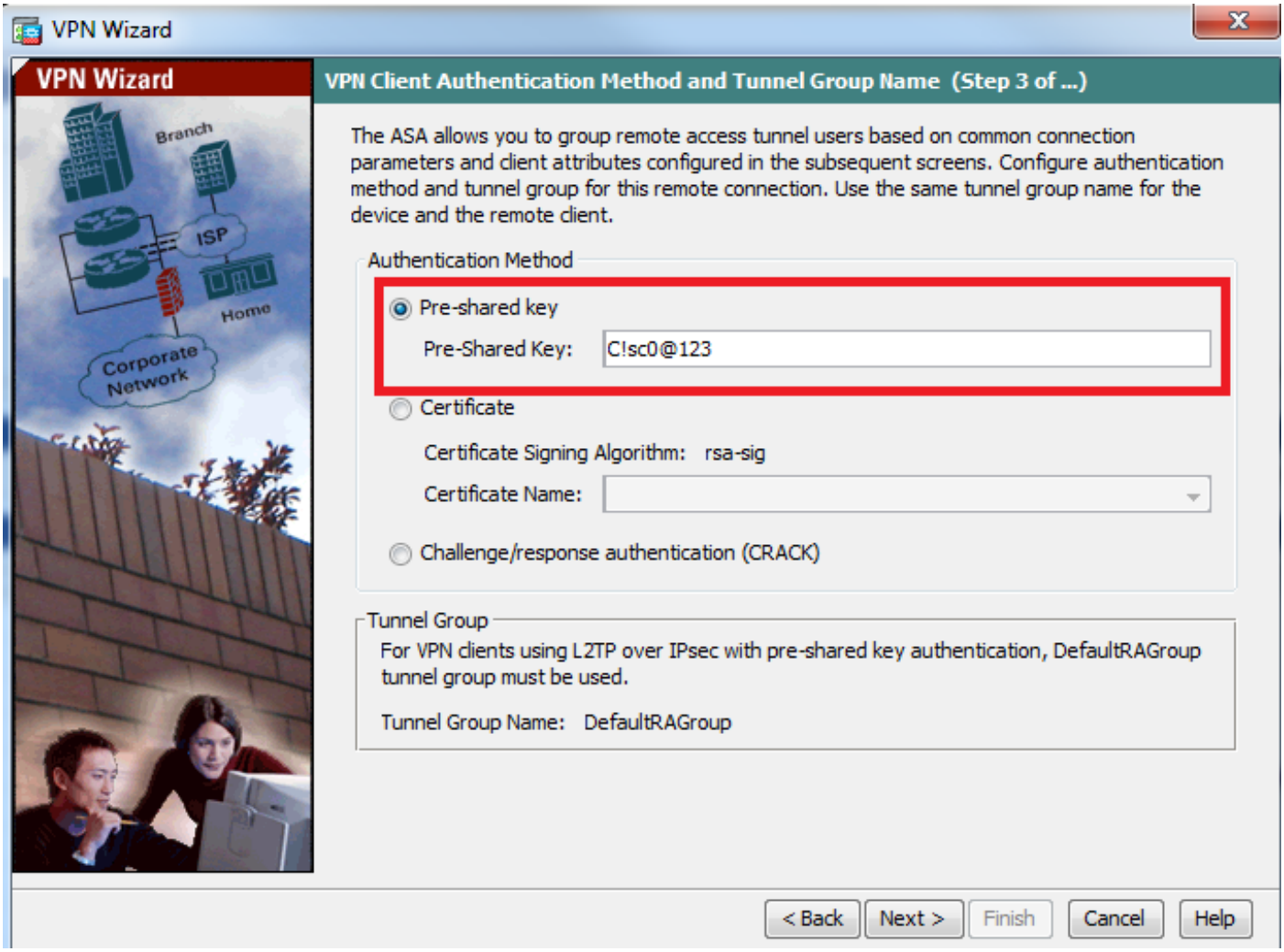
步骤2.出现Remote Access VPN设置窗口。从下拉列表中，选择必须终止VPN隧道的接口。在本示例中，外部接口连接到WAN，因此终止此接口上的VPN隧道。保留"启用入**站IPSec会话以绕过接口访问列表"框。组策略和每用户授权访问列表仍适用于**检查的流量，因此无需在外部接口上配置新访问列表，以允许客户端访问内部资源。单击 **Next**。



步骤3.如此映像所示，选择客户端类型为**Microsoft Windows客户端，使用L2TP over IPSec**和**MS-CHAP-V1**和**MS-CHAP-V2**作为PPP身份验证协议，因为PAP不安全，并且LOCAL数据库不支持其他身份验证类型作为身份验证服务器，然后单击**Next**。

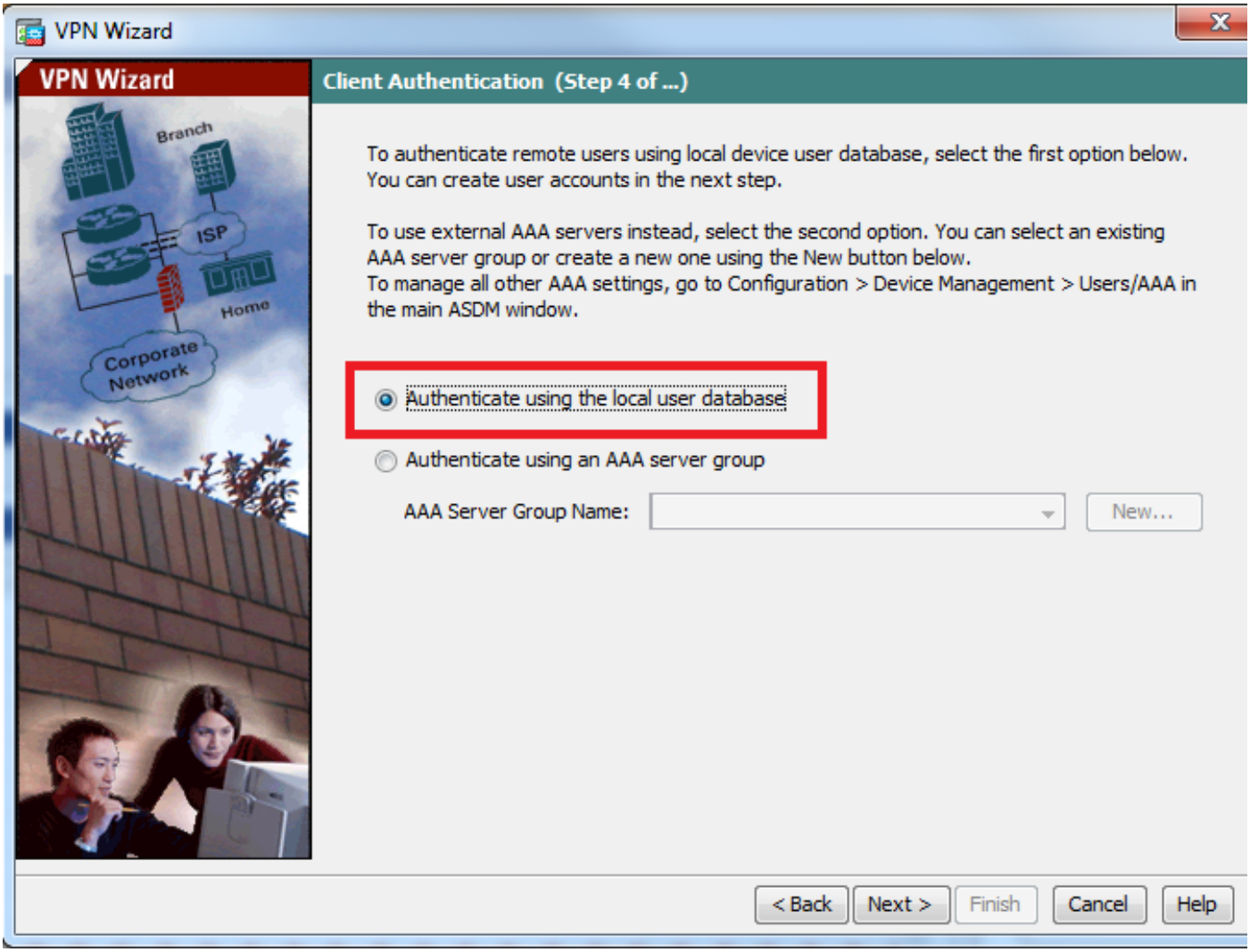


步骤4.选择**Pre-shared-key**身份验证方法，并键入在客户端必须相同的预共享密钥，然后单击**Next**，如下图所示。

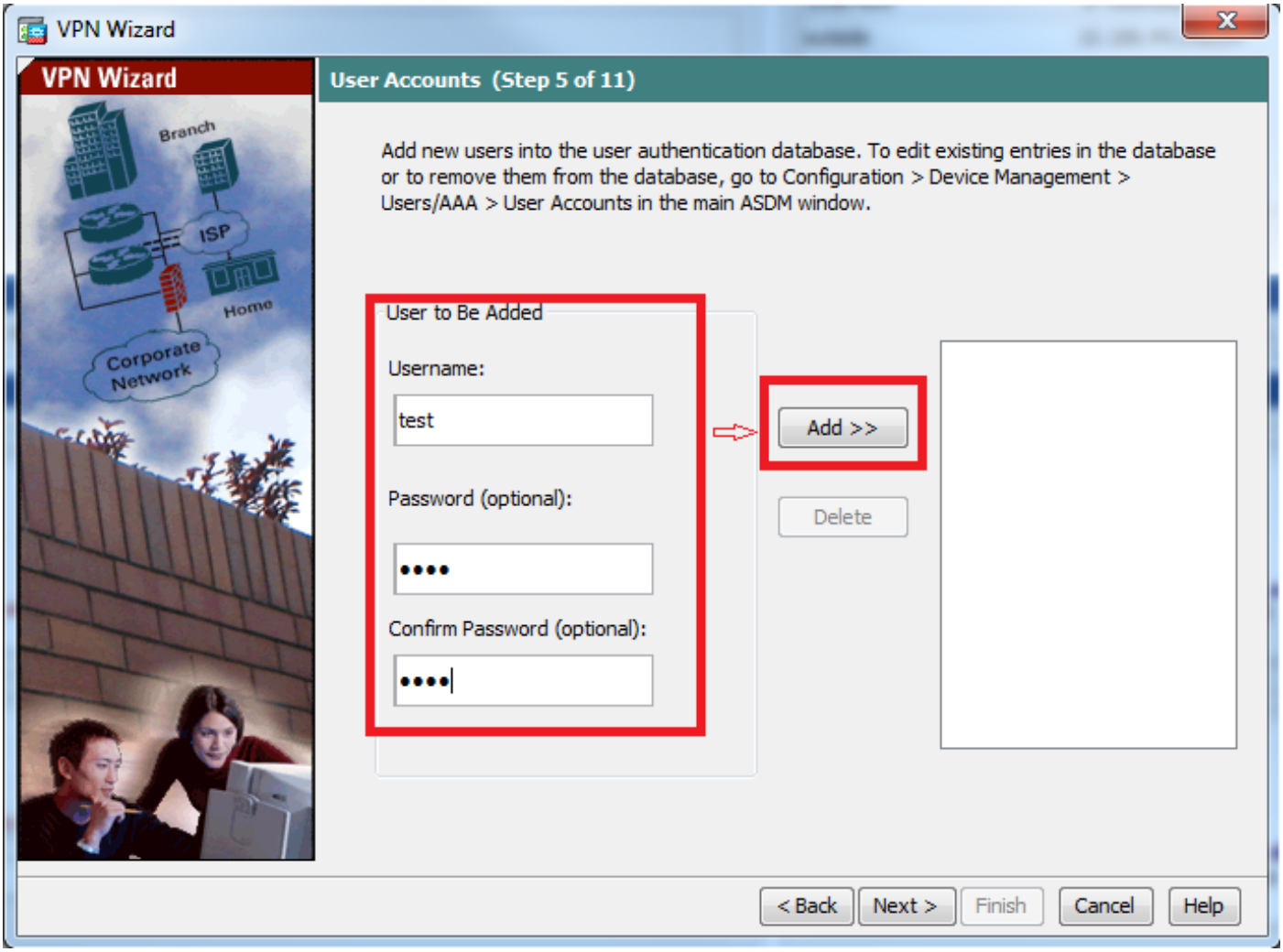


步骤5.指定对尝试L2TP over IPsec连接的用户进行身份验证的方法。可以使用外部AAA身份验证服务器或其自己的本地数据库。如果**要根据ASA的本地数据库对客**户端进行身份验证，请选择Authenticate using the local user database（使用本地用户数据库进行身份验证），然后单击**Next（下一步）。**

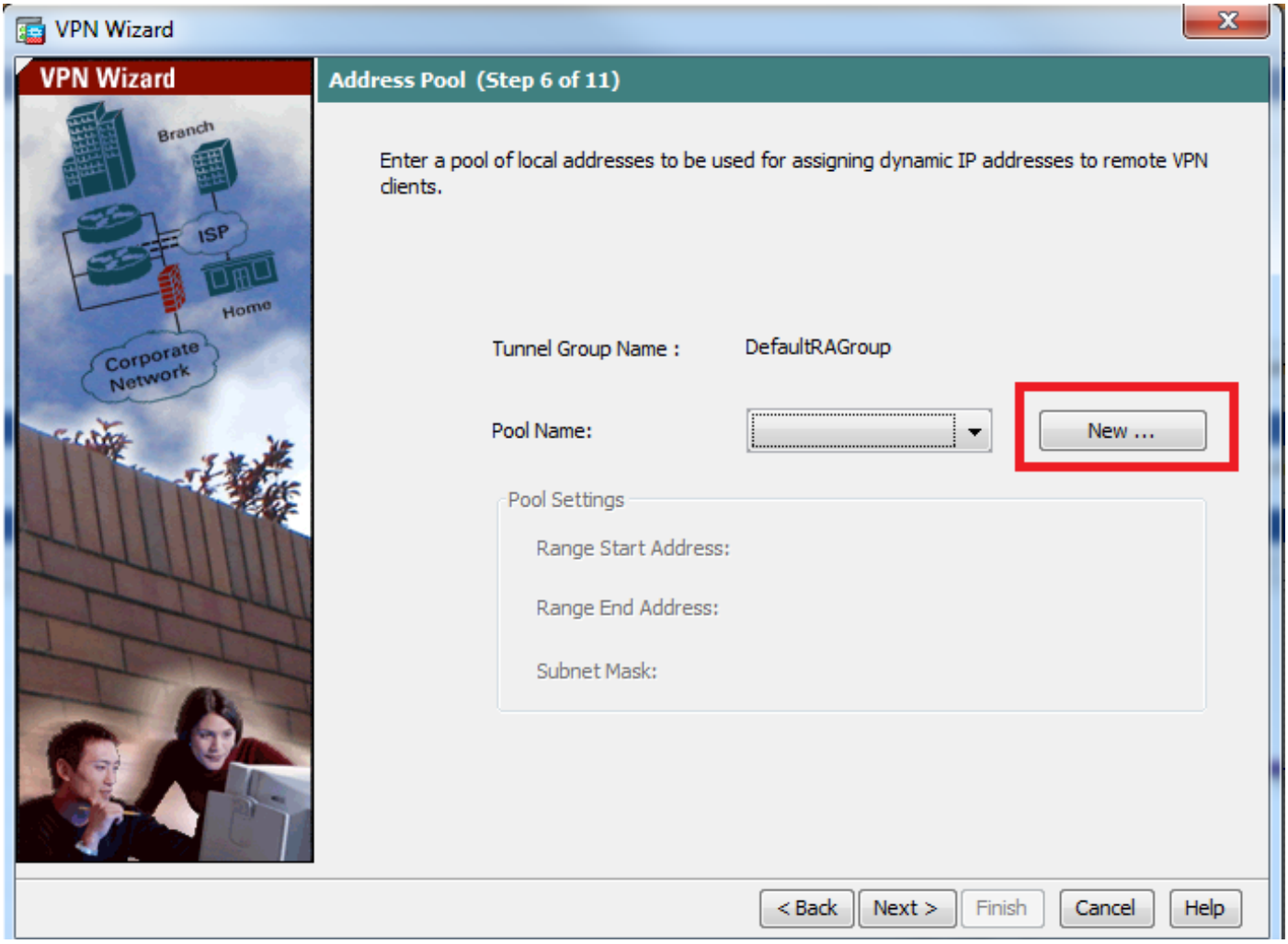
> **注意**：请参阅为VPN用户配置RADIUS身份验证，以使用外部AAA服务器对用户进行身份验证。



步骤6.要向本地数据库添加新用户以进行用户身份验证，请输入用户名和密码，然后单击ADD，否则数据库中的现有用户帐户可以使用，如下图所示。单击 **Next**。

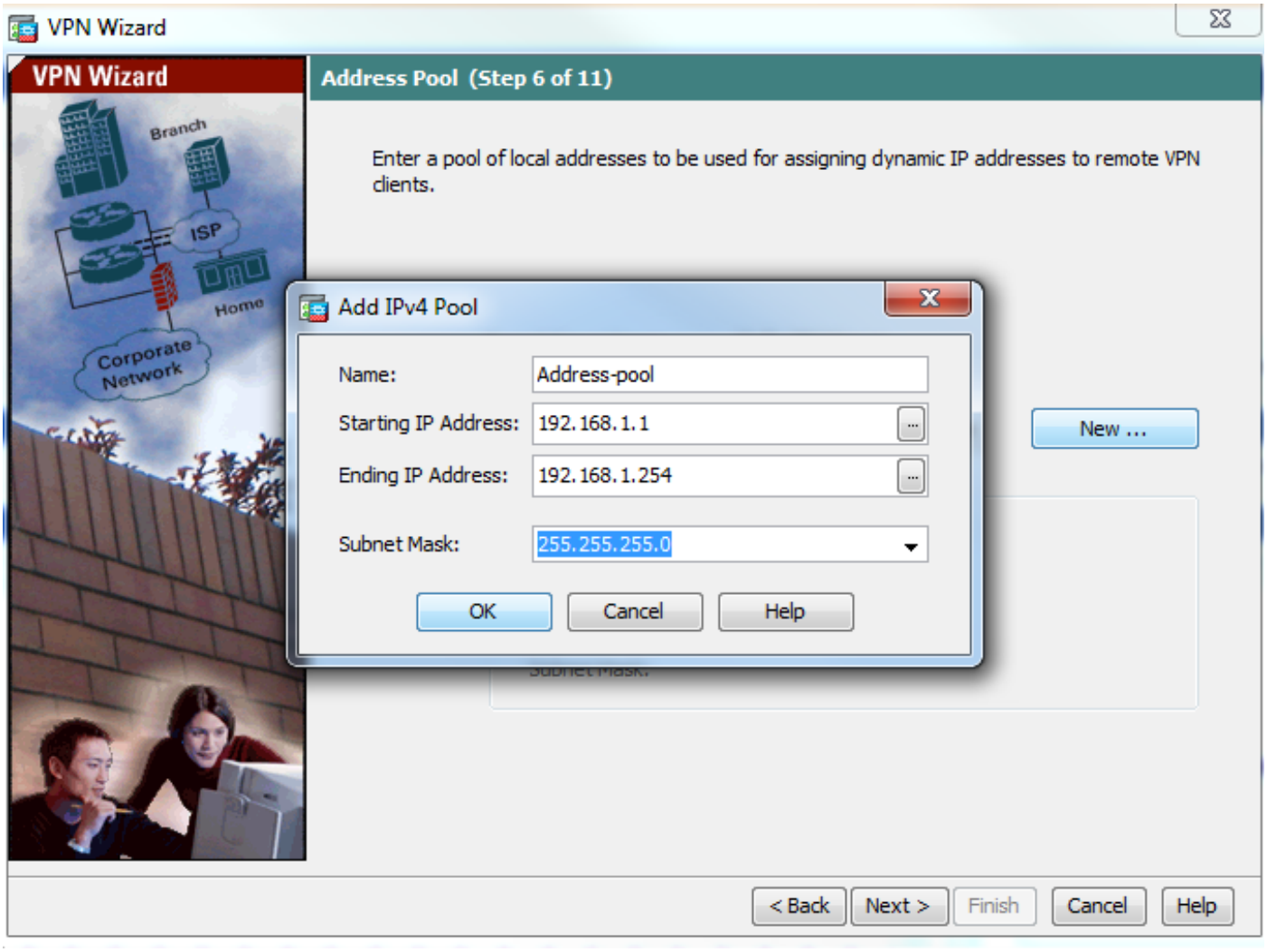


步骤7.从下拉列表中，选择要用于为客户端分配IP地址的地址池。要创建新地址池，请单击**“新建”**，如下图所示。

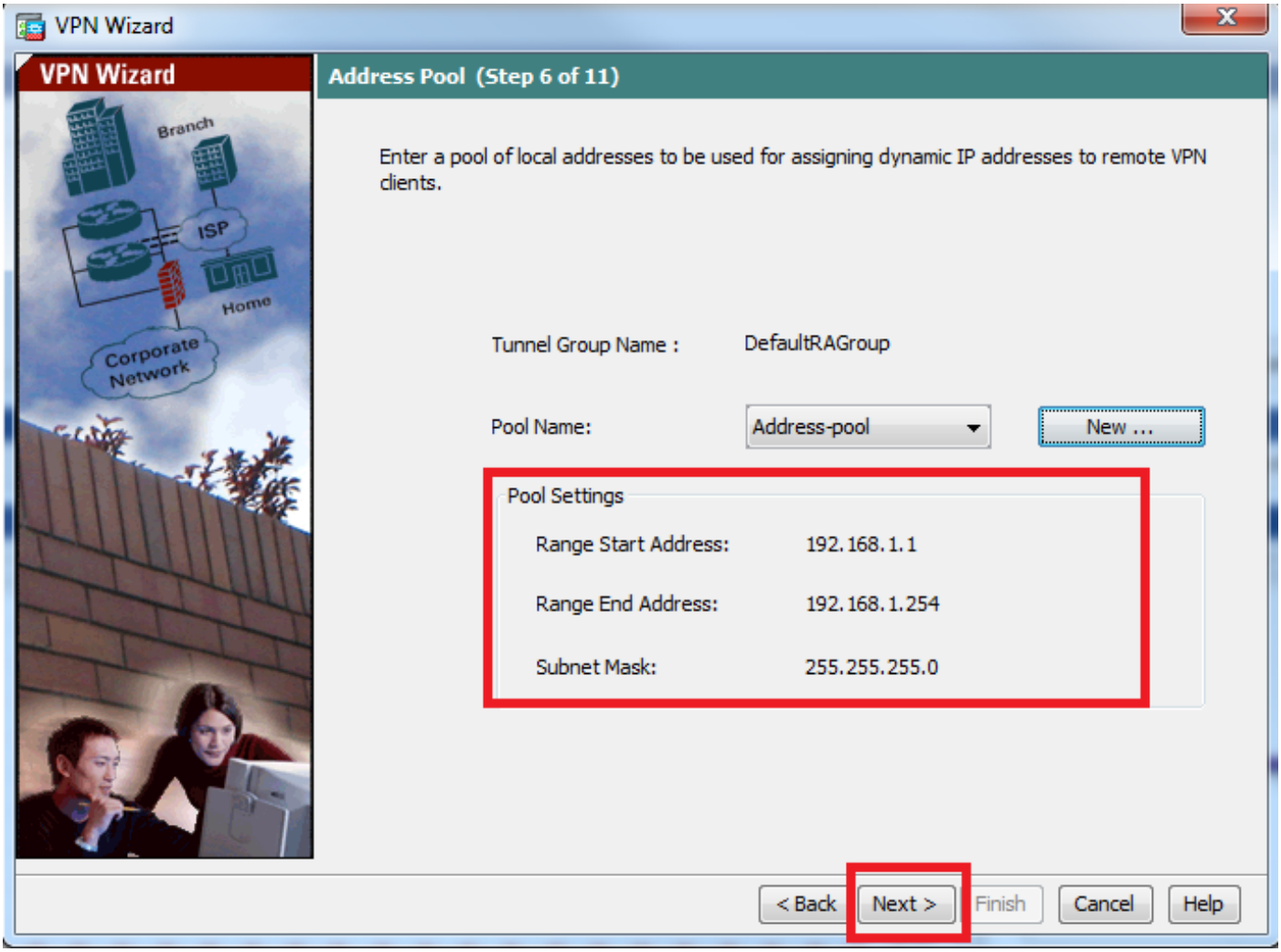


步骤8.系统将**显示Add IPv4 Pool**对话框。

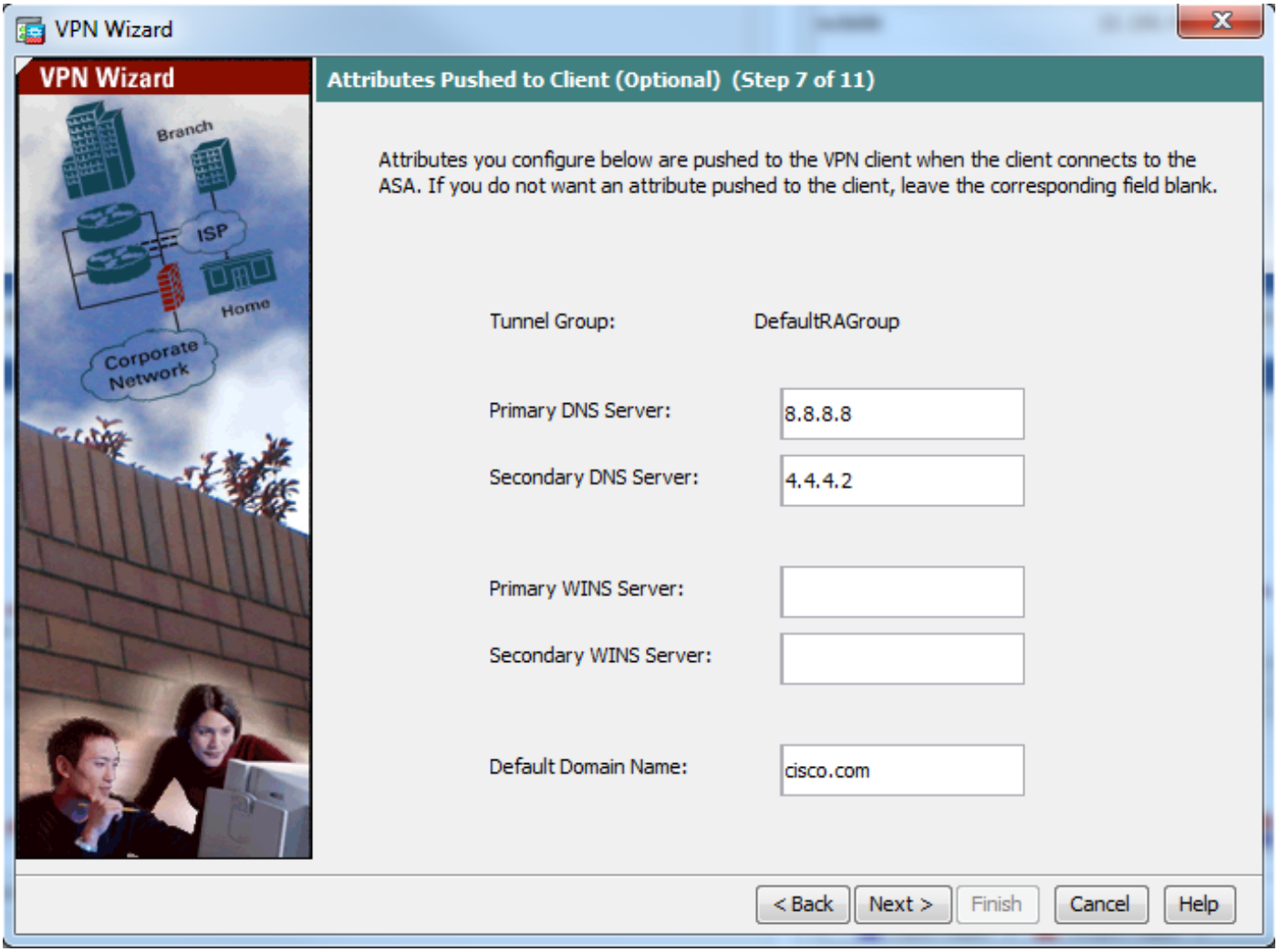
1. 输入新 IP 地址池的名称。
2. 输入起始和结束 IP 地址。
3. 输入子网掩码，然后点击 **确定**。



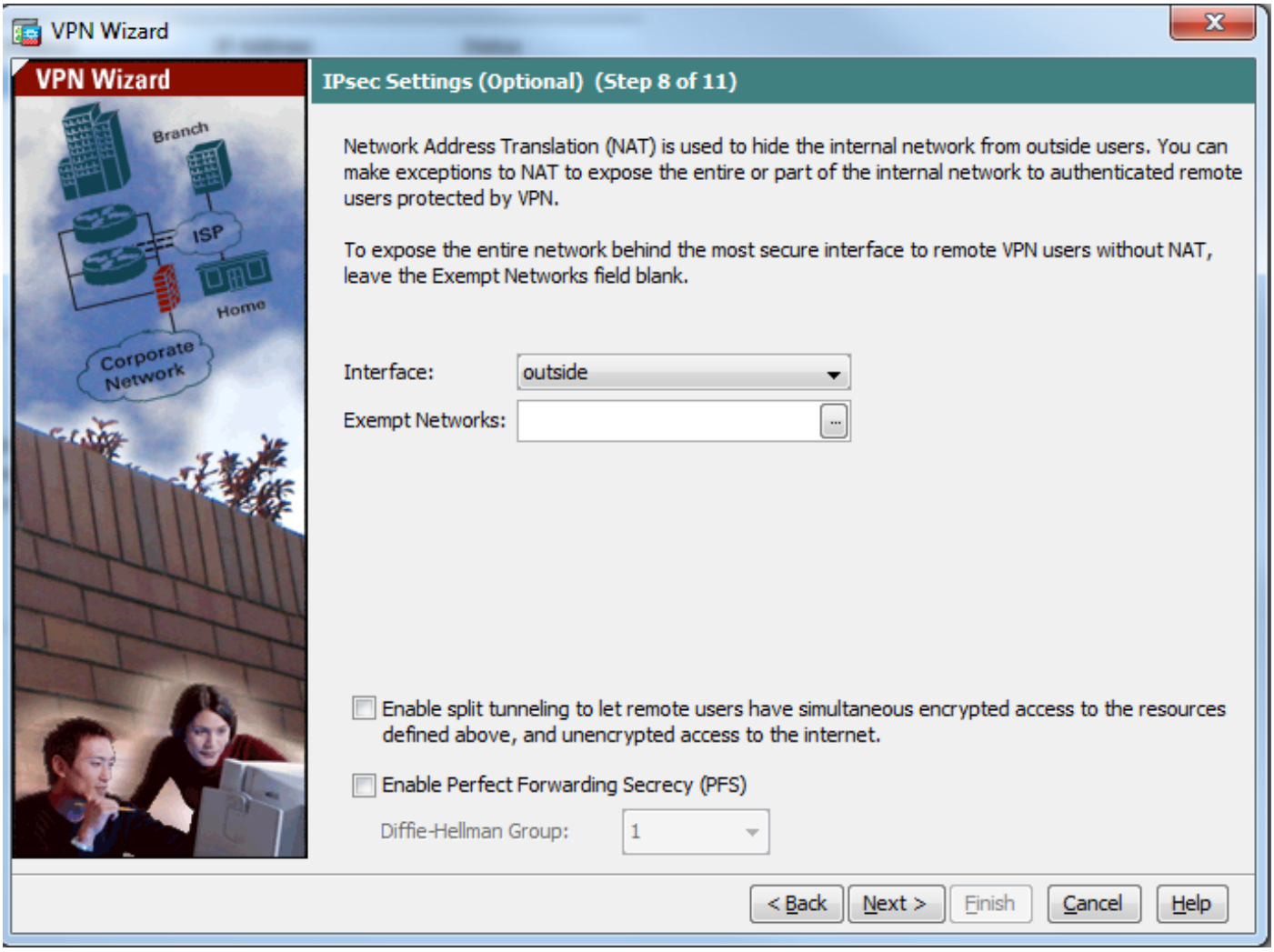
步骤9.验证池设置并单击“下一步”。



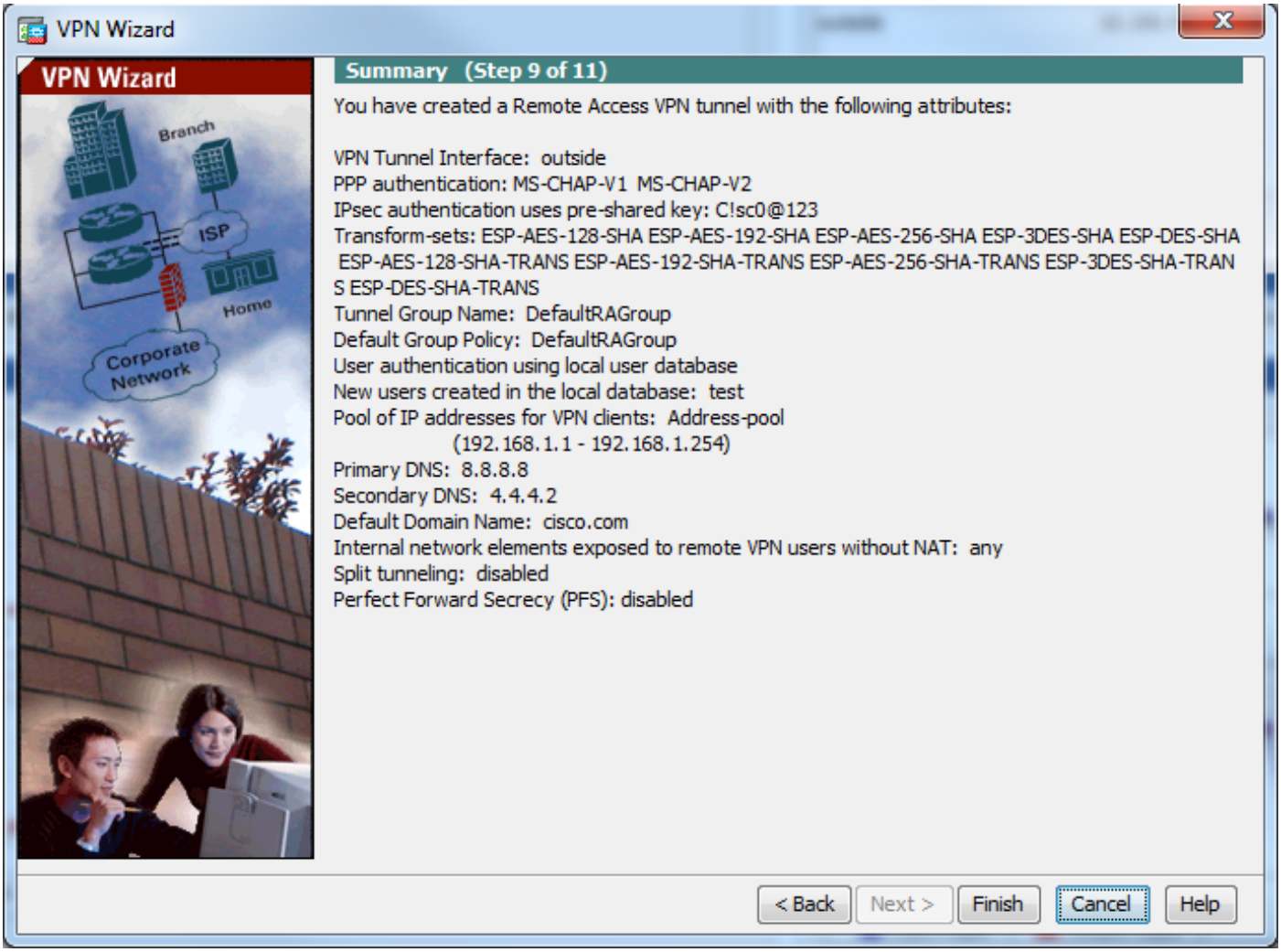
步骤10.配置要推送到客户端的属性或将其留空，然后单击“下一步”。



步骤 11：确保未选**中启用完全转发保密(PFS)**框，因为某些客户端平台不支持此功能。**启用拆分隧道以允许远程用户同时对上述定义的资源进行加密访问**，并且未选中对Internet框的未加密访问，这意味着启用全隧道，其中来自客户机的所有流量（包括互联网流量）将通过VPN隧道发送到ASA。单击 **Next。**



步骤12.查看摘要信息，然后单击“完**成”。**



使用CLI的ASA配置

步骤1.配置IKE第1阶段策略参数。

此策略用于保护对等体之间的控制流量（即保护预共享密钥和第2阶段协商）

```
ciscoasa(config)#crypto ikev1 policy 10
ciscoasa(config-ikev1-policy)#authentication pre-share
ciscoasa(config-ikev1-policy)#encryption 3des
ciscoasa(config-ikev1-policy)#hash sha
ciscoasa(config-ikev1-policy)#group 2
ciscoasa(config-ikev1-policy)#lifetime 86400
ciscoasa(config-ikev1-policy)#exit
```

步骤2.配置转换集。

它包含用于保护数据流量的IKE第2阶段策略参数。由于Windows L2TP/IPsec客户端使用IPsec传输模式，因此请将该模式设置为传输。默认为隧道模式

```
ciscoasa(config)#crypto ipsec ikev1 transform-set TRANS-ESP-3DES-SHA esp-3des esp-sha-hmac
ciscoasa(config)#crypto ipsec ikev1 transform-set TRANS-ESP-3DES-SHA mode transport
```

步骤3.配置动态映射。

当Windows客户端从ISP或本地DHCP服务器（例如调制解调器）获取动态IP地址时，ASA不知道对等体IP地址，这在ASA端的静态对等体配置中会造成问题。因此，必须进行动态加密配置，在这种配置中，所有参数不一定都定义，而缺失的参数稍后会通过客户端的IPSec协商动态获知。

```
ciscoasa(config)#crypto dynamic-map outside_dyn_map 10 set ikev1 transform-set TRANS-ESP-3DES-
SHA
```

步骤4.将动态映射绑定到静态加密映射并应用加密映射并在外部接口上启用IKEv1

无法在接口上应用动态加密映射，因此请将其绑定到静态加密映射。动态加密集应是加密映射集中优先级最低的加密映射（即，它们应具有最高的序列号），以便ASA首先评估其他加密映射。仅当其他（静态）映射条目不匹配时，才会检查动态加密映射集。

```
ciscoasa(config)#crypto map outside_map 65535 ipsec-isakmp dynamic outside_dyn_map
ciscoasa(config)#crypto map outside_map interface outside
ciscoasa(config)#crypto ikev1 enable outside
```

步骤5.创建IP地址池

创建一个地址池，从该地址池将IP地址动态分配给远程VPN客户端。忽略此步骤以使用ASA上的现有池。

```
ciscoasa(config)#ip local pool Address-pool 192.168.1.1-192.168.1.254 mask 255.255.255.0
```

步骤6.配置组策略

将组策略标识为内部，这表示从本地数据库提取属性。

```
ciscoasa(config)#group-policy L2TP-VPN internal
```

> **注意**：L2TP/IPsec连接可以配置默认组策略(DfltGrpPolicy)或用户定义的组策略。无论哪种情况，必须将组策略配置为使用L2TP/IPsec隧道协议。在默认组策略的VPN协议属性上配置l2tp-ipsec，如果未在其上配置vpn-protocol属性，则默认组策略将继承到用户定义的组策略。

配置属性，如vpn隧道协议（在本例中为l2tp-ipsec）、域名、DNS和WINS服务器IP地址以及新用户帐户

```
ciscoasa(config)#group-policy L2TP-VPN attributes
ciscoasa(config-group-policy)#dns-server value 8.8.8.8 4.4.4.2
ciscoasa(config-group-policy)#vpn-tunnel-protocol l2tp-ipsec
ciscoasa(config-group-policy)#default-domain value cisco.com
```

除使用AAA外，还在设备上配置用户名和密码。如果用户是使用Microsoft CHAP第1版或第2版的L2TP客户端，并且ASA配置为根据本地数据库进行身份验证，则必须包含mschap关键字。例如，username <username> password <password> mschap。

```
ciscoasa(config-group-policy)# username test password test mschap
```

步骤7.配置隧道组

使用tunnel-group命令创建隧道组，并指定用于为客户端分配IP地址的本地地址池名称。如果身份验证方法为预共享密钥，则隧道组名称必须为DefaultRAGroup，因为客户端上没有指定隧道组的选项，因此它只会降级到默认隧道组。使用default-group-policy命令将组策略绑定到隧道组

```
ciscoasa(config)#tunnel-group DefaultRAGroup general-attributes
ciscoasa(config-tunnel-general)#address-pool Address-pool
ciscoasa(config-tunnel-general)#default-group-policy L2TP-VPN
ciscoasa(config-tunnel-general)#exit
```

注意：如果执行基于预共享密钥的身份验证，则必须配置默认连接配置文件（隧道组）DefaultRAGroup。如果执行基于证书的身份验证，则可以根据证书标识符选择用户定义的连接配置文件

使用**tunnel-group ipsec-attributes**命令进入ipsec属性配置模式以设置预共享密钥。

```
ciscoasa(config)# tunnel-group DefaultRAGroup ipsec-attributes
ciscoasa(config-tunnel-ipsec)#  ikev1 pre-shared-key C!sc0@123
ciscoasa(config-tunnel-ipsec)#exit
```

在隧道组ppp-attributes模式下使用**authentication type命令**配置PPP身份验证协议。禁用默认启用的CHAP，因为如果AAA服务器配置为本地数据库，则不支持它。

```
ciscoasa(config)#tunnel-group DefaultRAGroup ppp-attributes
ciscoasa(config-ppp)#no authentication chap
ciscoasa(config-ppp)#authentication ms-chap-v2
ciscoasa(config-ppp)#exit
```

步骤8.配置NAT-Exemption

配置NAT-Exemption，以便客户端可以访问连接到内部接口的内部资源（在本例中，内部资源连接到内部接口）。

```
ciscoasa(config)#object network L2TP-Pool
ciscoasa(config-network-object)#subnet 192.168.1.0 255.255.255.0
ciscoasa(config-network-object)#exit
ciscoasa(config)# nat (inside,outside) source static any any destination static L2TP-Pool L2TP-
Pool no-proxy-arp route-lookup
```

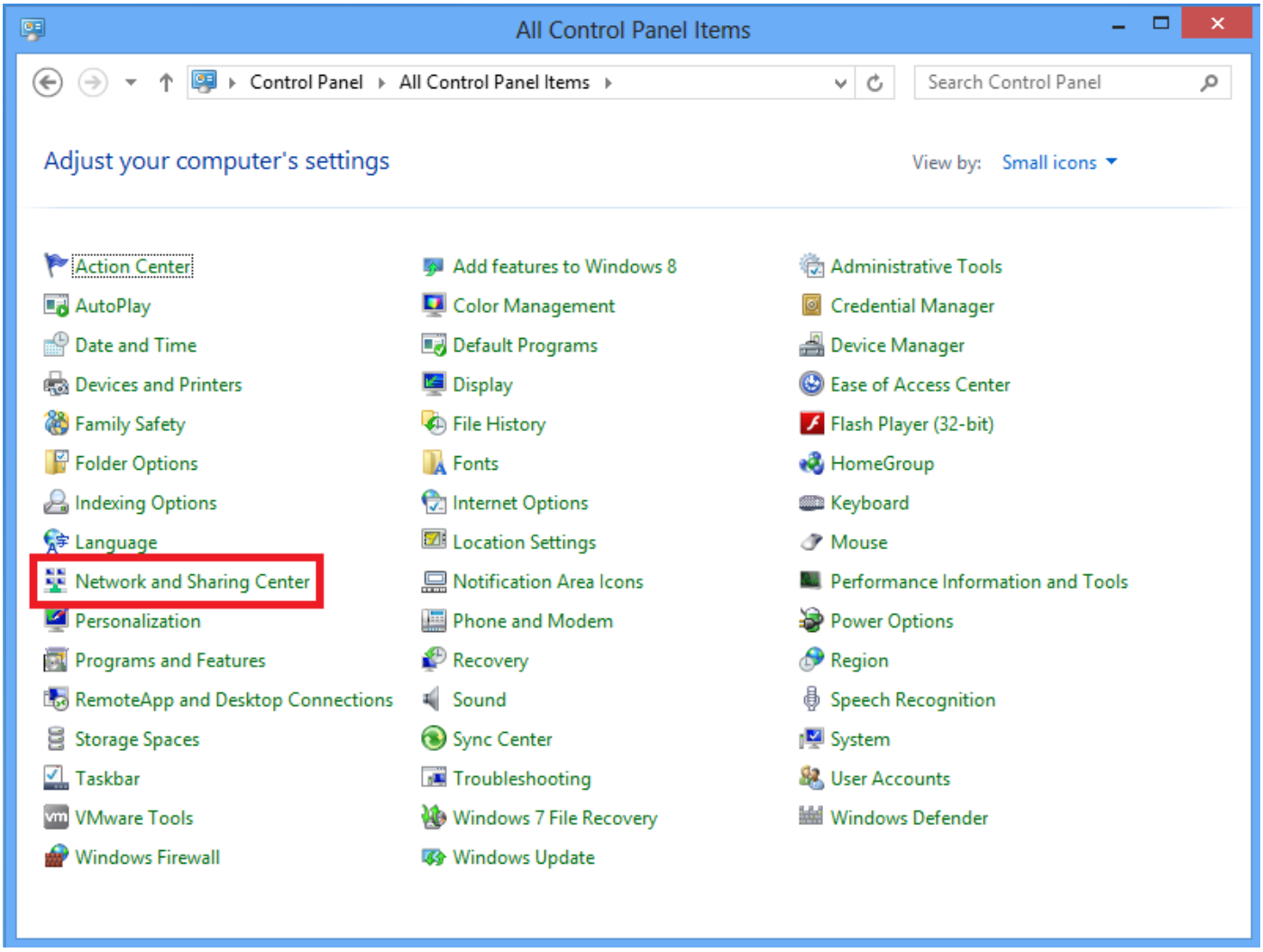
完成示例配置

```
crypto ikev1 policy 10
authentication pre-share
encryption 3des
hash sha
group 2
lifetime 86400
exit

crypto ipsec ikev1 transform-set TRANS-ESP-3DES-SHA esp-3des esp-sha-hmac
crypto ipsec ikev1 transform-set TRANS-ESP-3DES-SHA mode transport

crypto dynamic-map outside_dyn_map 10 set ikev1 transform-set TRANS-ESP-3DES-SHA

crypto map outside_map 65535 ipsec-isakmp dynamic outside_dyn_map
crypto map outside_map interface outside
crypto ikev1 enable outside

ip local pool Address-pool 192.168.1.1-192.168.1.254 mask 255.255.255.0

group-policy L2TP-VPN internal
group-policy L2TP-VPN attributes
vpn-tunnel-protocol l2tp-ipsec
default-domain value cisco.com
username test password test mschap
exit

tunnel-group DefaultRAGroup general-attributes
address-pool Address-pool
```

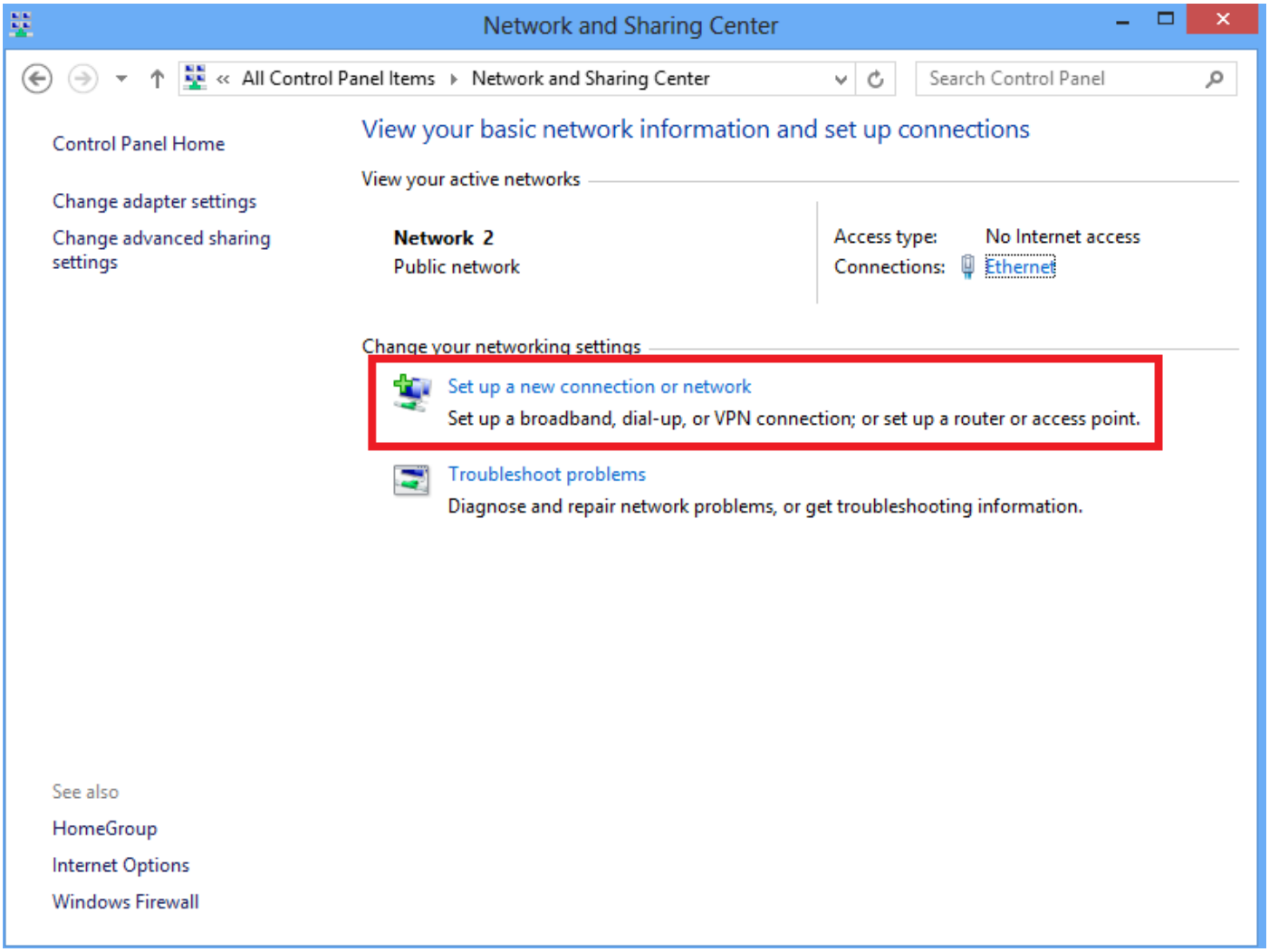
```
default-group-policy L2TP-VPN
exit

tunnel-group DefaultRAGroup ipsec-attributes
ikev1 pre-shared-key C!sc0@123
exit

tunnel-group DefaultRAGroup ppp-attributes
no authentication chap
authentication ms-chap-v2
exit

object network L2TP-Pool
subnet 192.168.1.0 255.255.255.0
exit
nat(inside,outside) source static any any destination static L2TP-Pool L2TP-Pool no-proxy-arp
route-lookup
```

Windows 8 L2TP/IPsec客户端配置

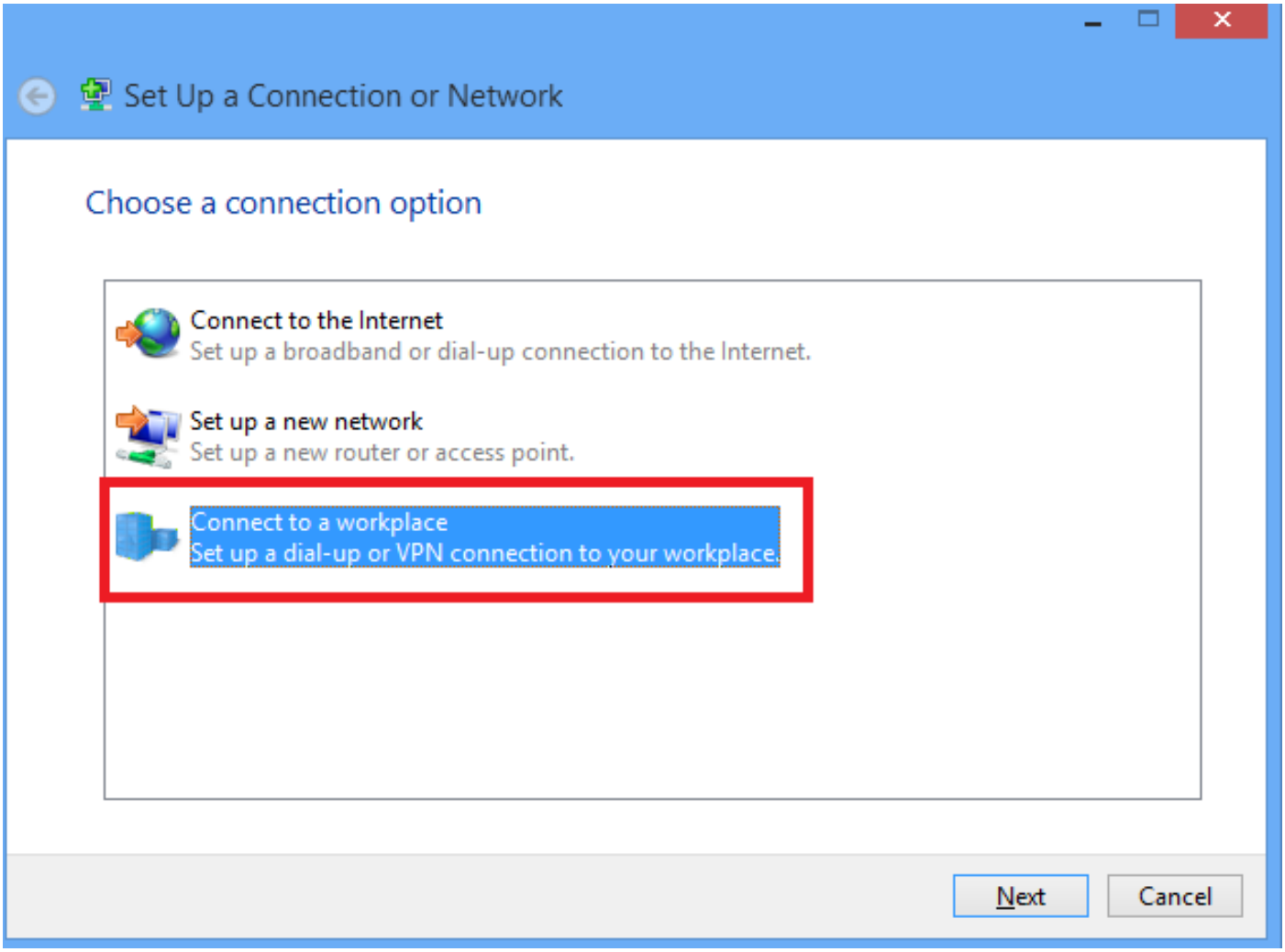
1.打开“控制面板”并选择“网络和共享中心”。



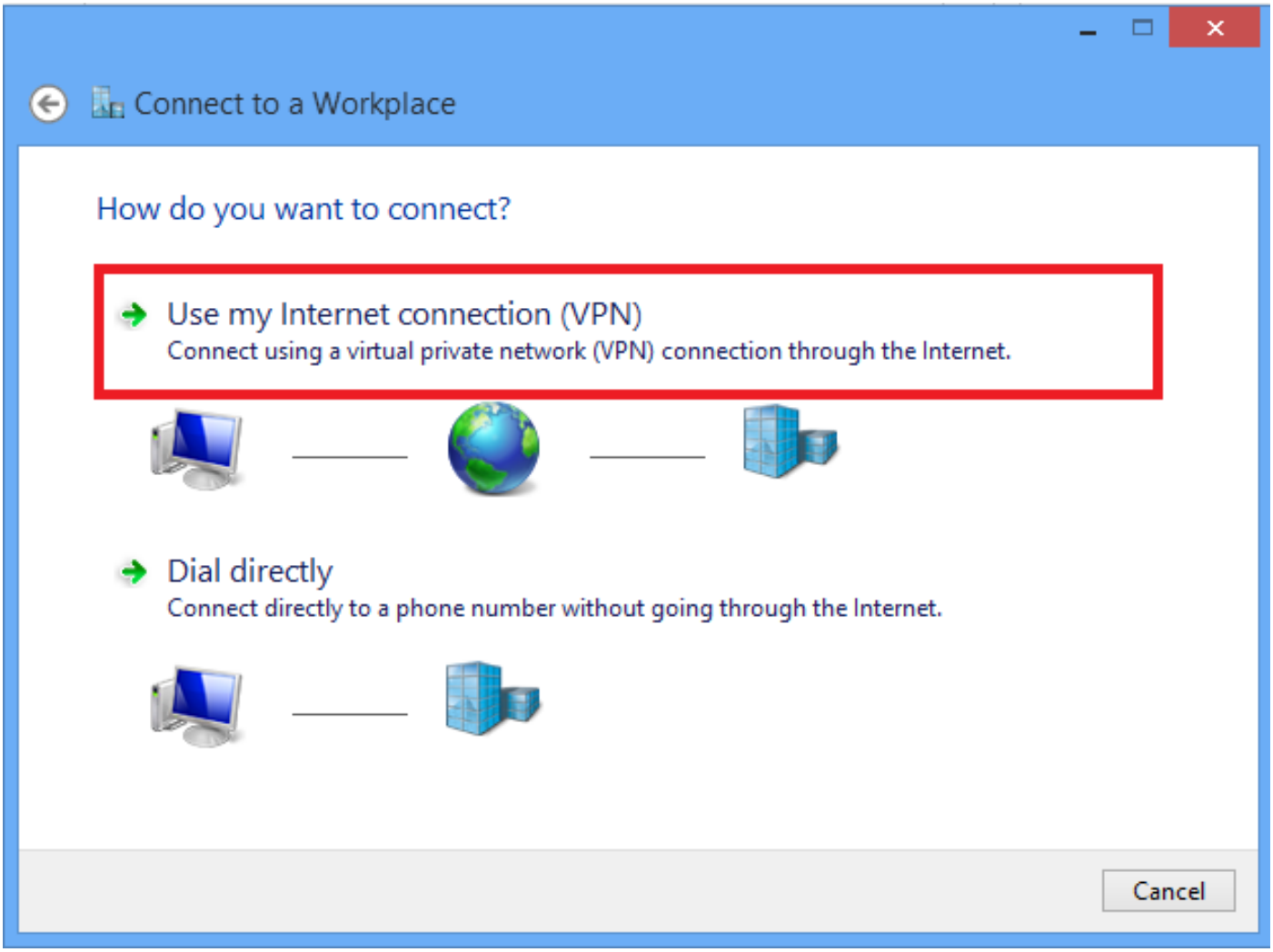
2.选择“**设置新连接或网络**”选项。



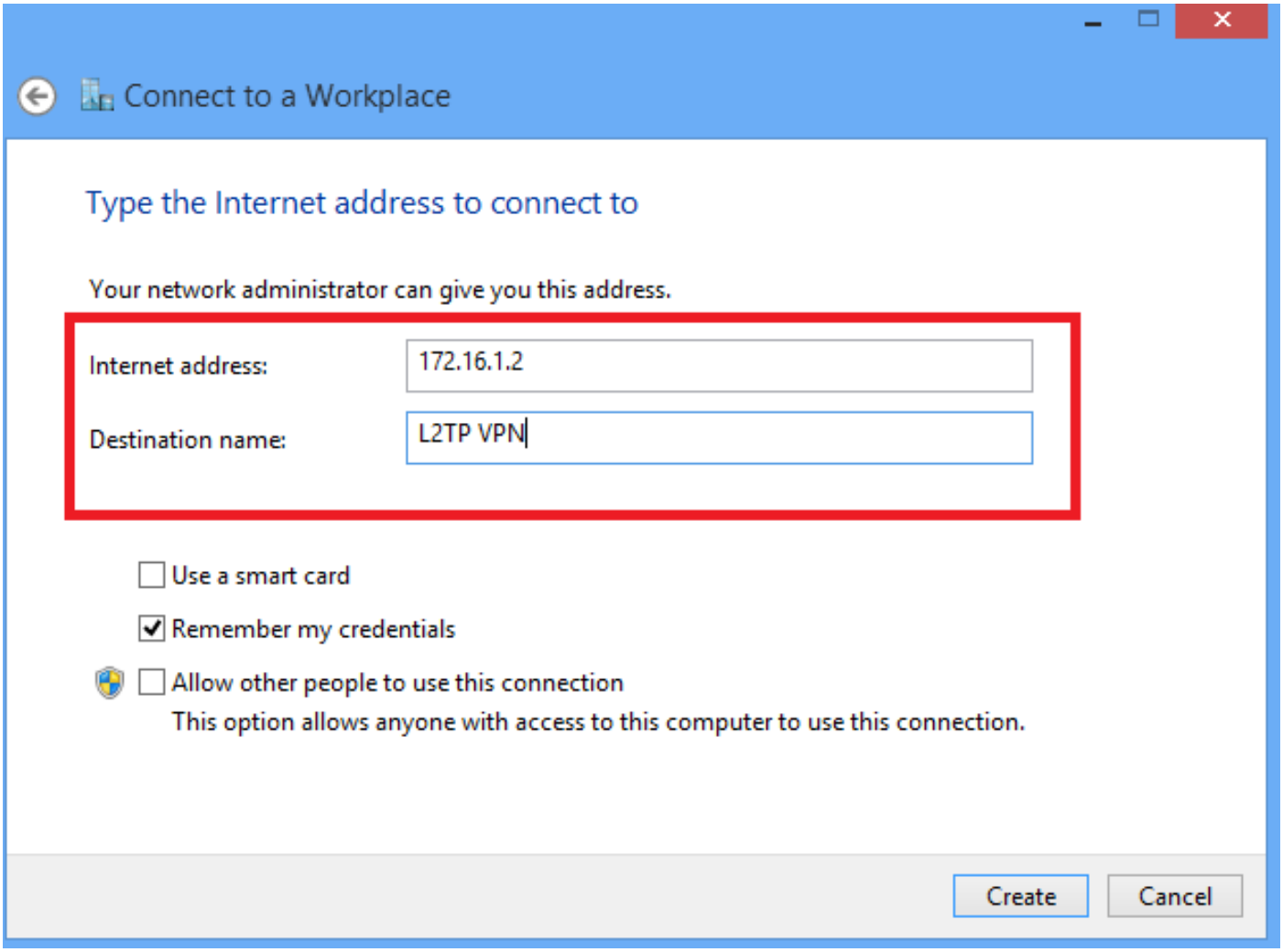
3.选择“连**接到工作区”选**项，然后单击“下**一步”。**



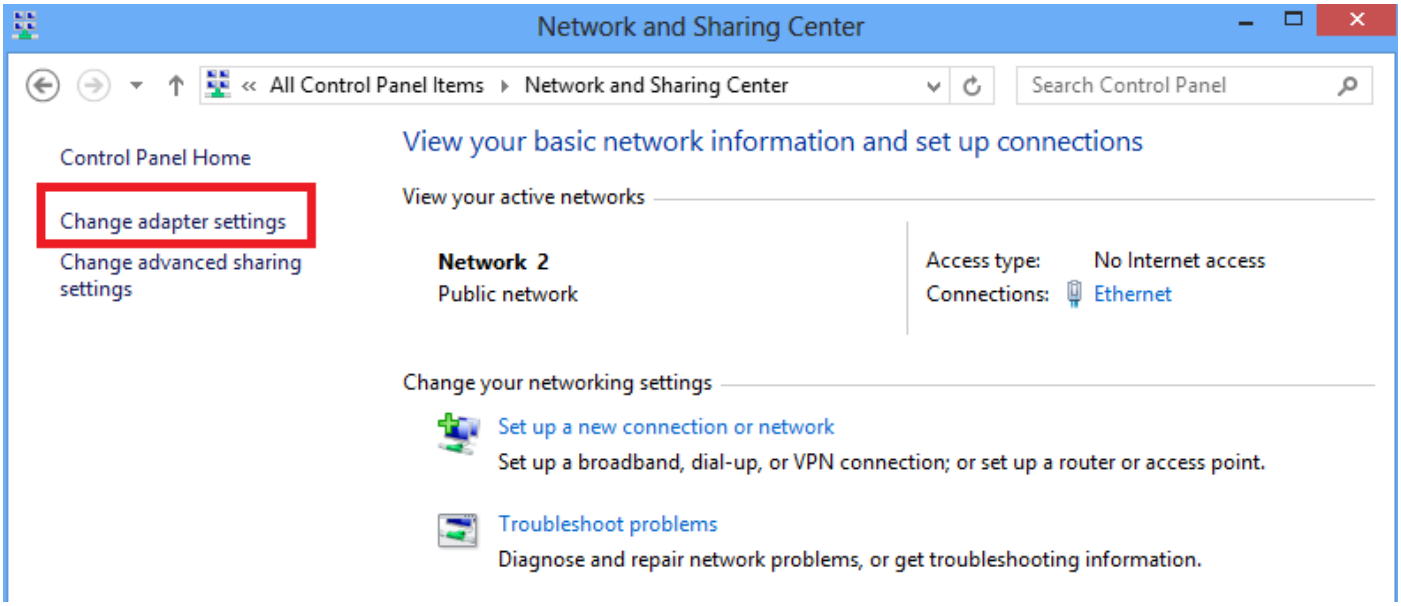
4.单击“**使用我的互联网连接(VPN)**”选项。



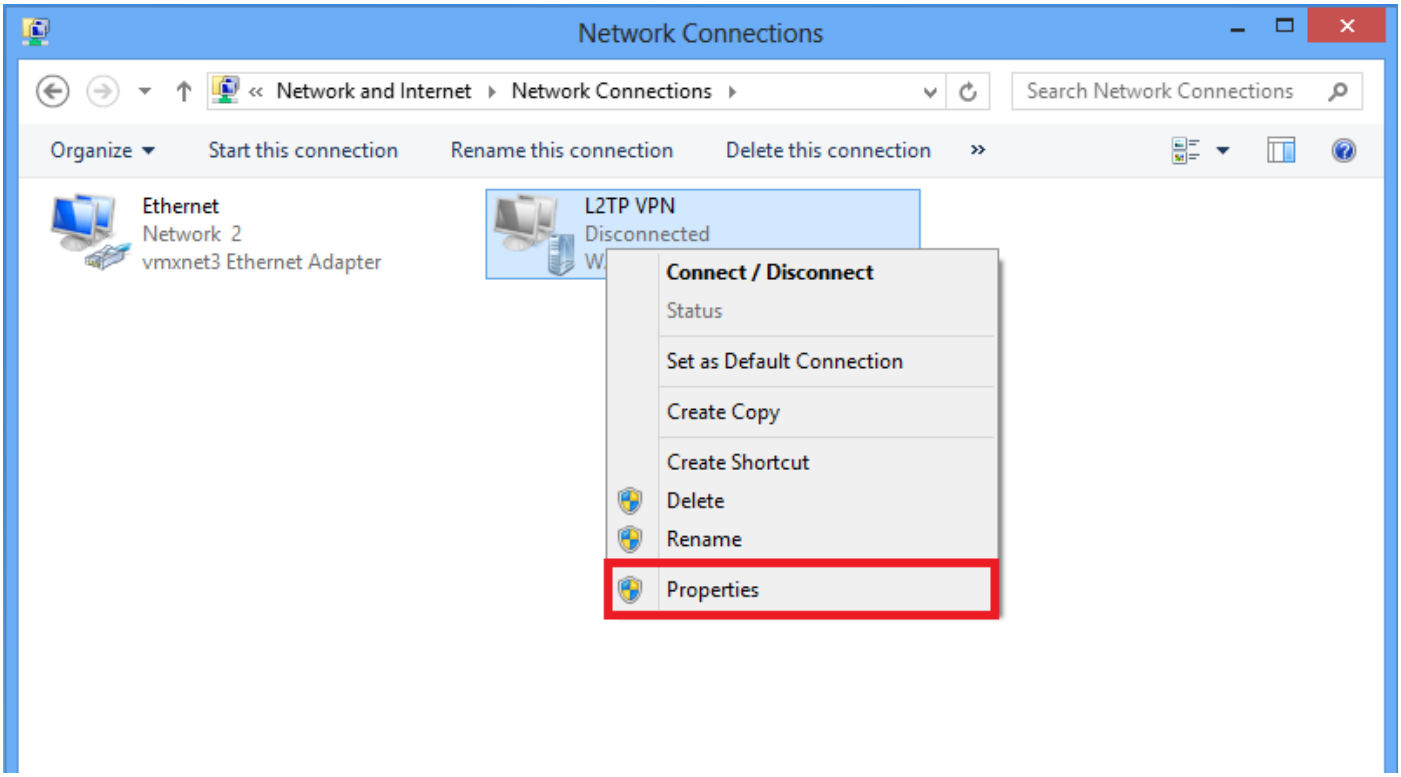
5.输入ASA的WAN接口或FQDN的IP地址以及本地有效的VPN适配器的任何名称，然后单击“创建”。



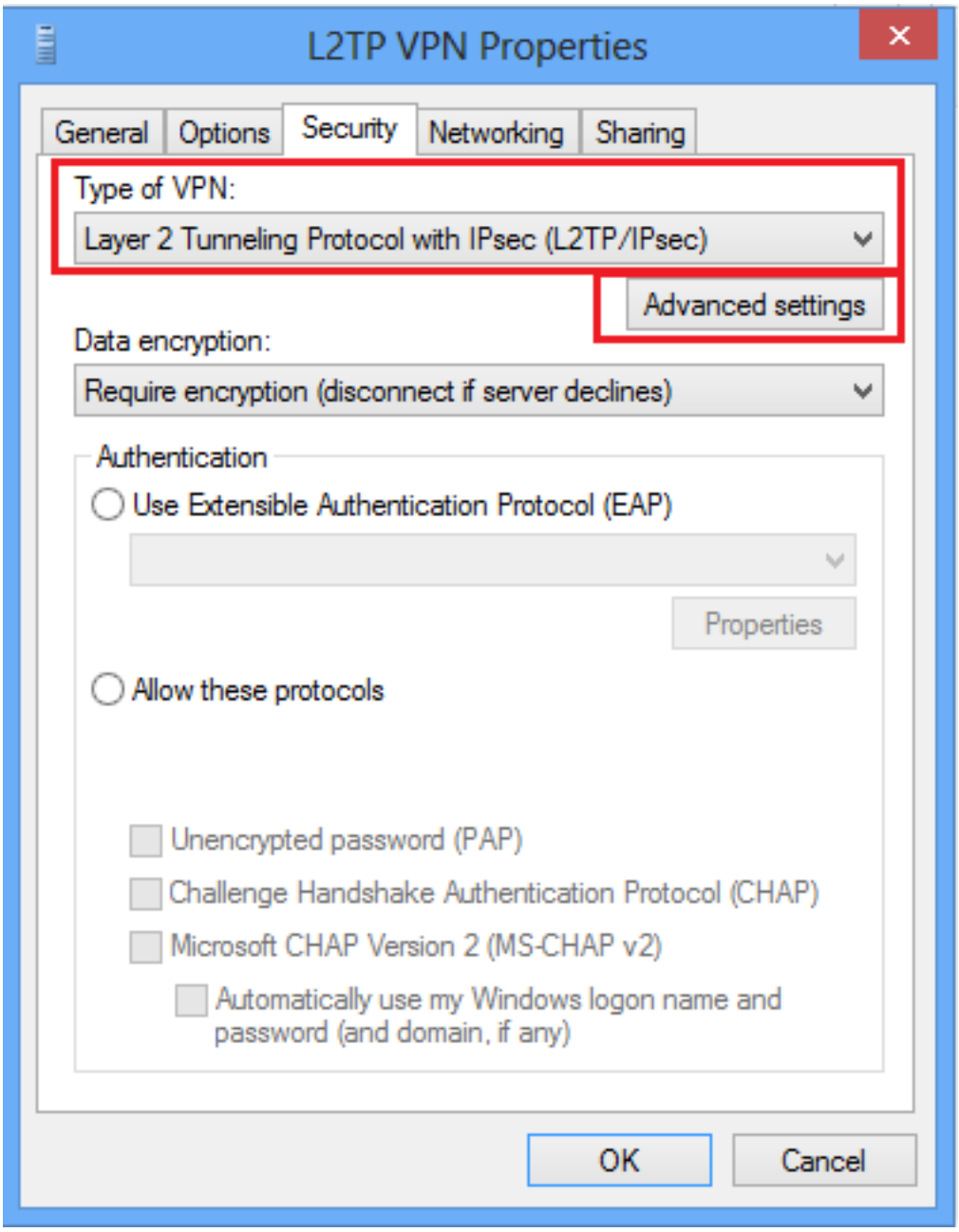
6.在“网络和共享中心”上，选择**窗口左**窗格中的“更改适配器设置”选项。



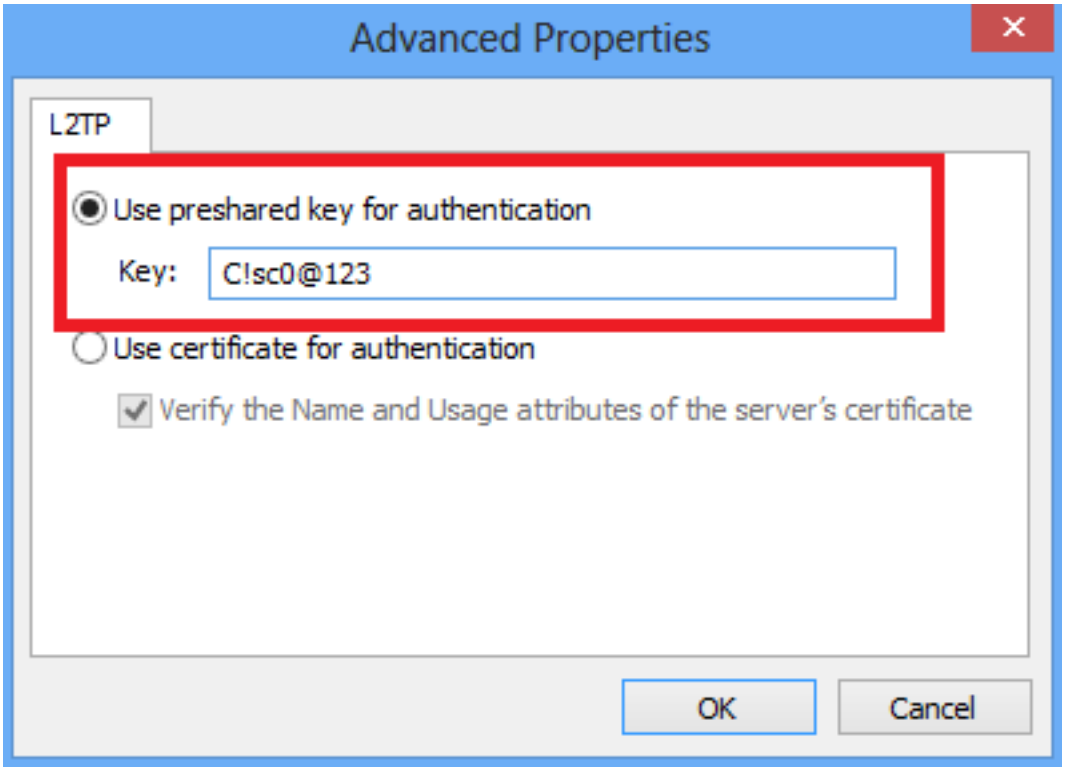
7.右键单击最近为L2TP VPN创建的适配器，然后选择“**属性**”。



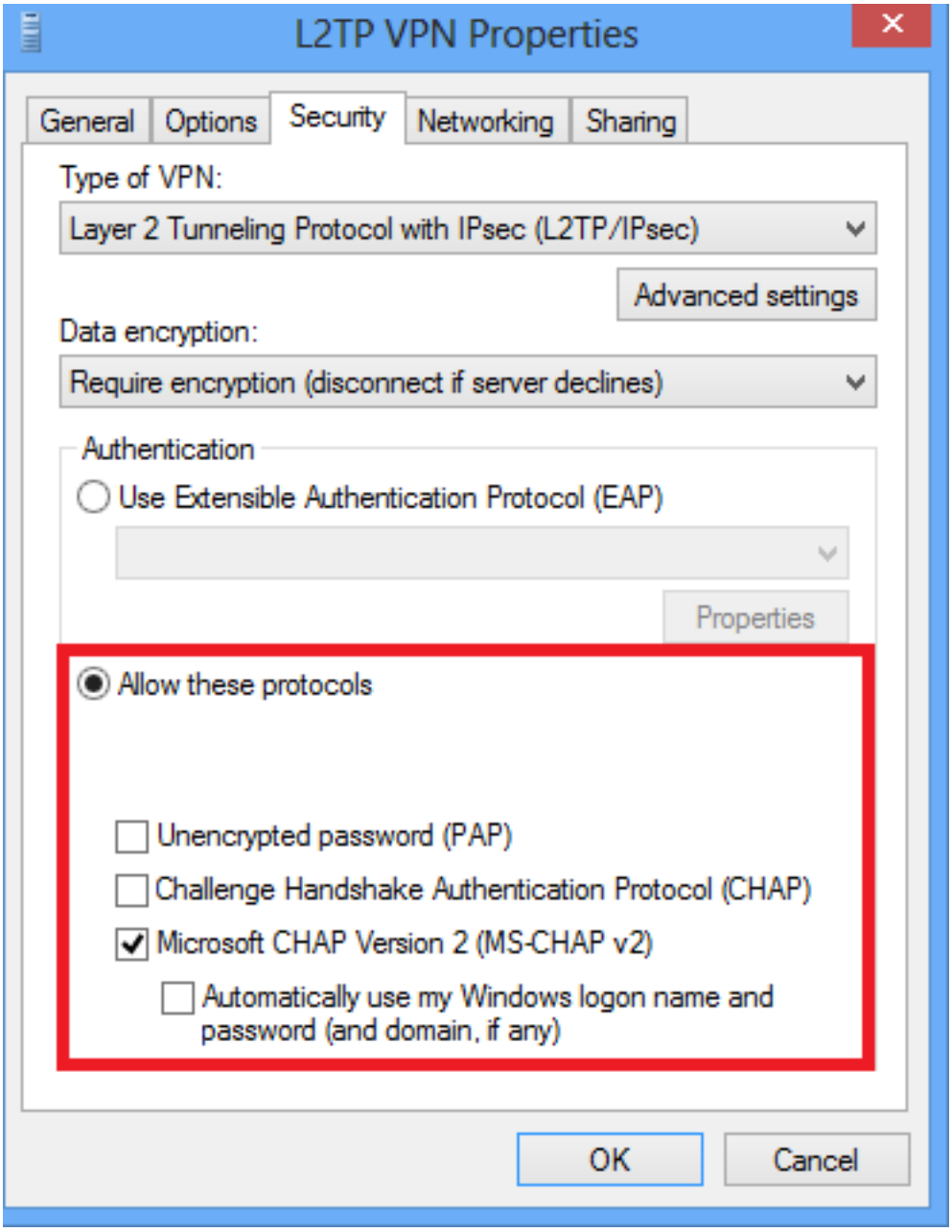
8.导航至**Security**选项卡，选择Type of VPN as Layer 2 Tunneling Protocol with IPsec(L2TP/IPsec)，然后单**击Advanced settings（高级设置）。**



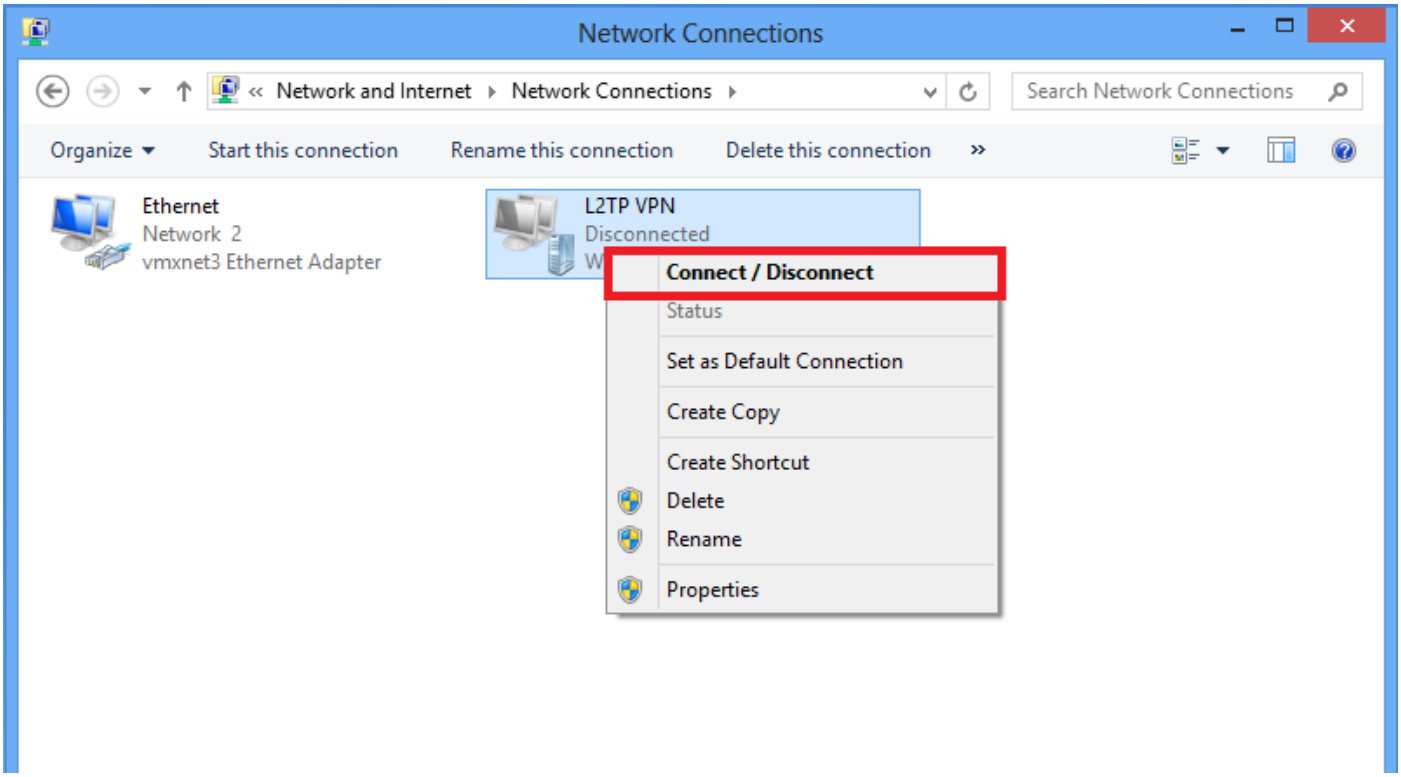
9.输入与隧道组DefaultRAGroup中所述相同的预共享密钥，**然后**单击**OK**。在本例中，C!sc0@123用作预共享密钥。



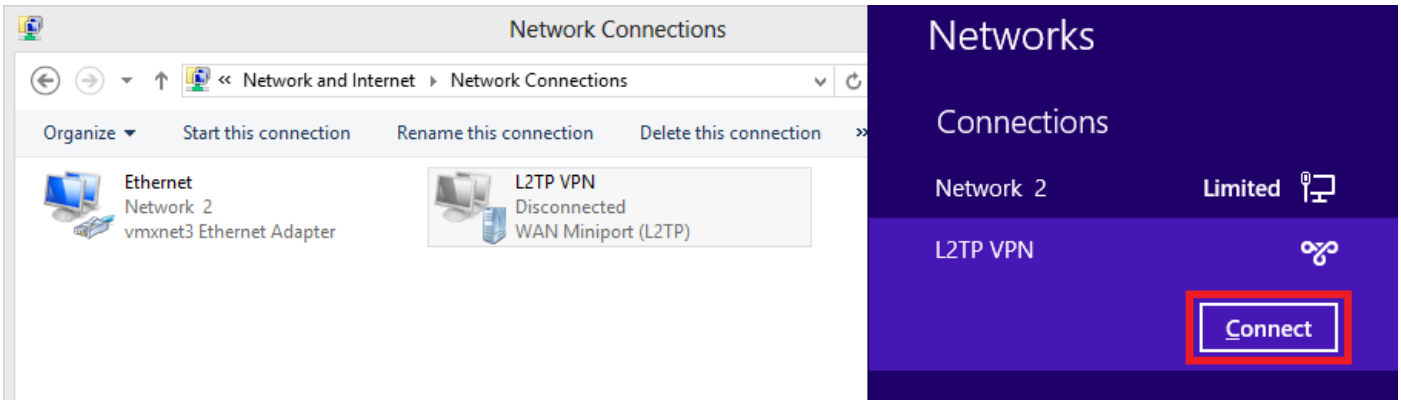
10.选择身份验证方法作为“允许这些协议”，并确保仅选中“**Microsoft CHAP版本2(MS-CHAP v2)”复选框**，然后单击“**确定”**。



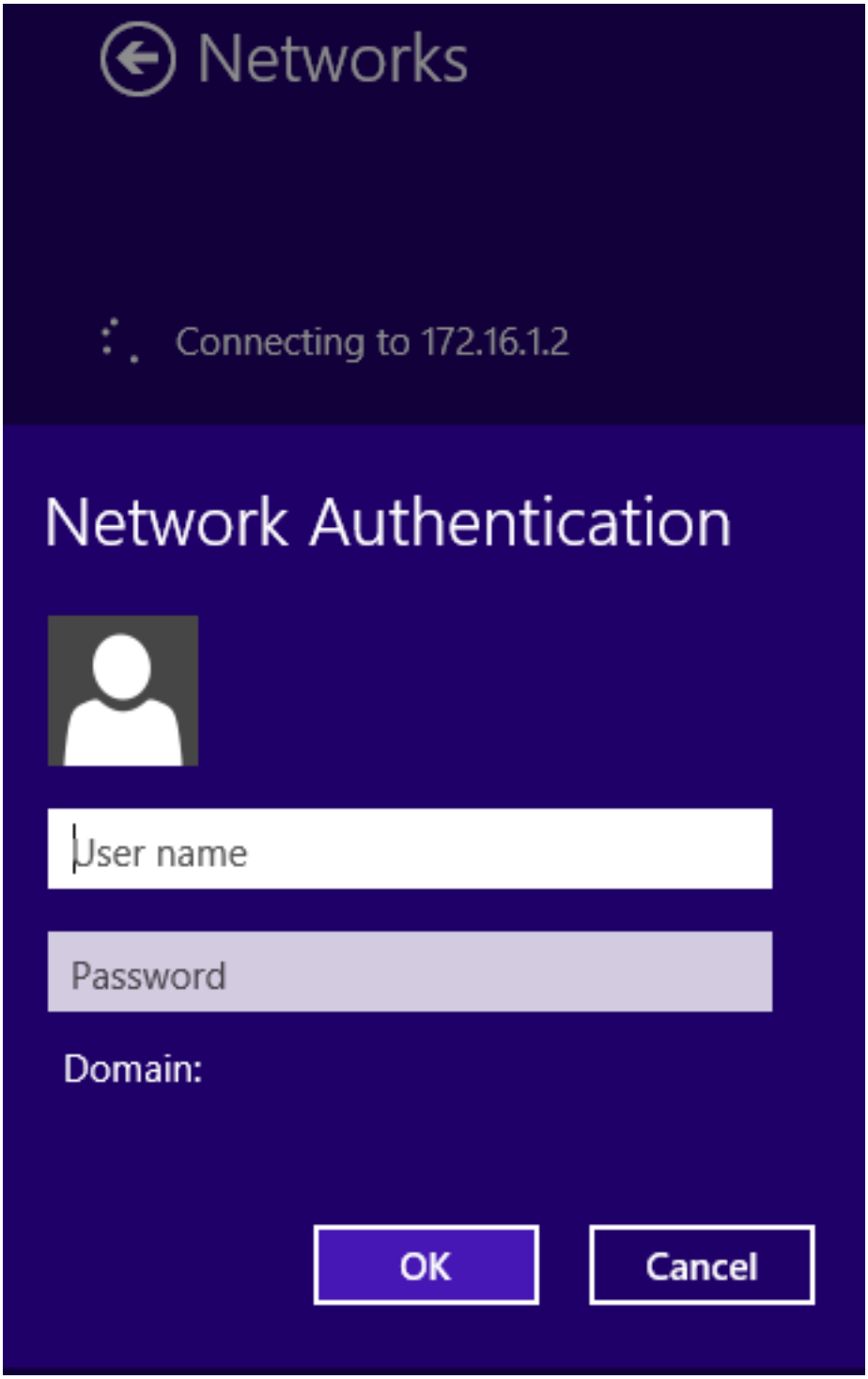
11.在网络连接下，右键单击L2TP VPN适配器，然后选择“连接/断开”。



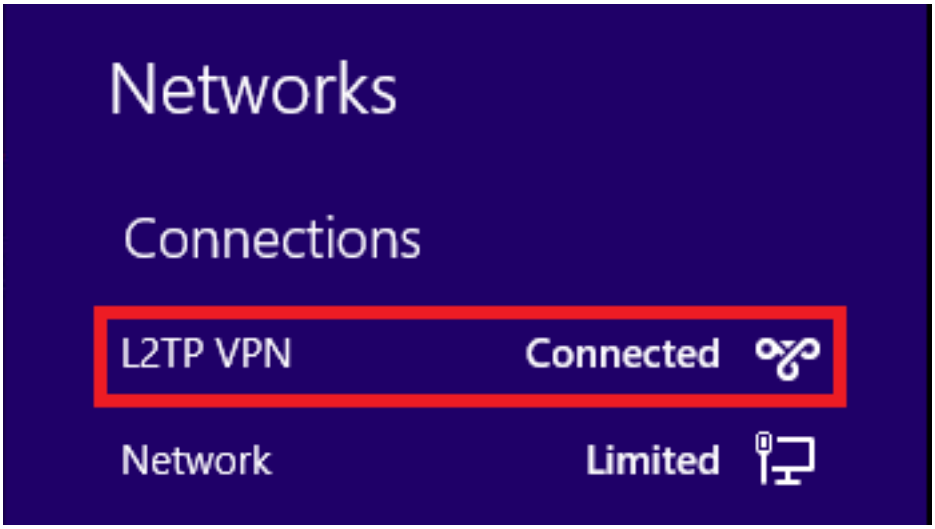
12.网络图标将弹出并单击L2TP VPN连接**上的**连接。



13.输入用户凭据，然后单击“**确定**”。



如果两端的参数匹配，将建立L2TP/IPsec连接。



拆分隧道配置

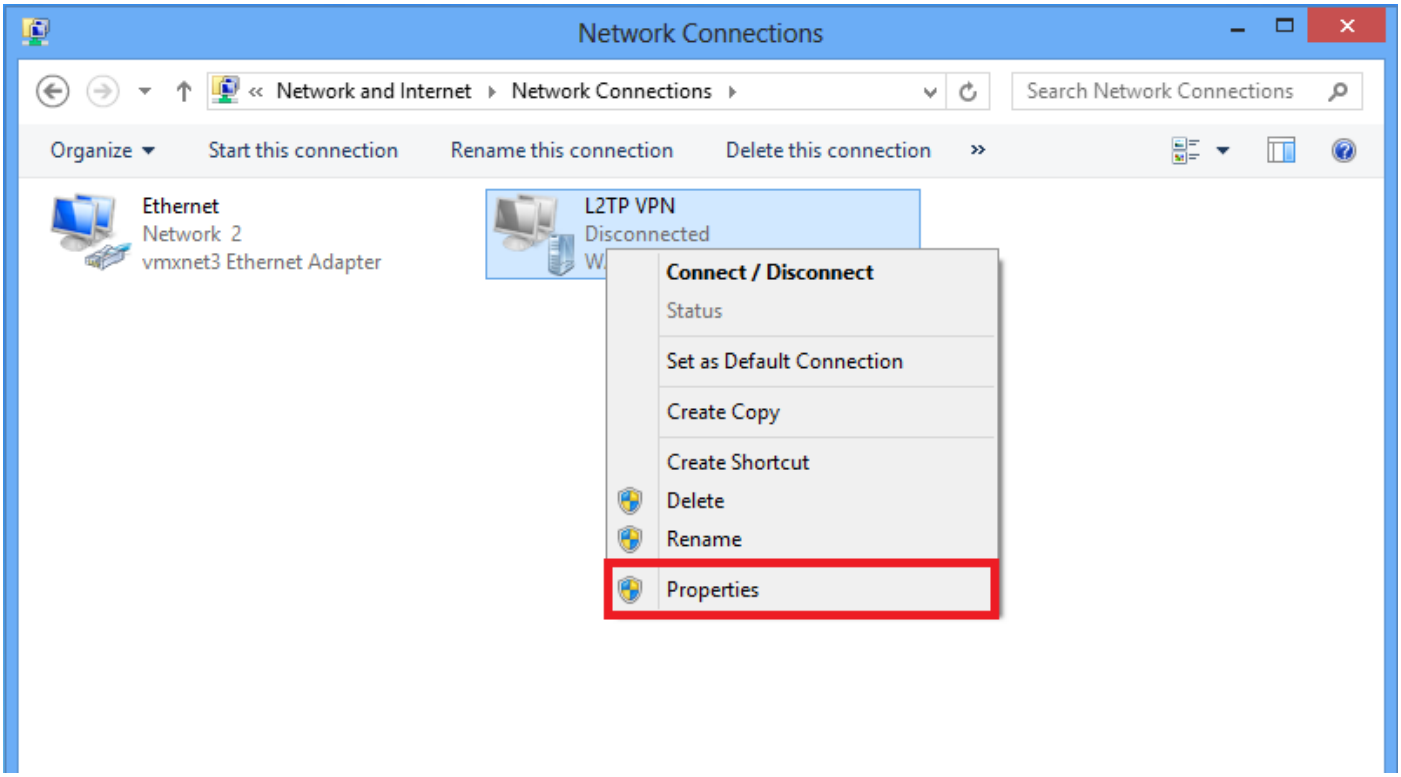
分割隧道功能可用于定义必须加密的子网或主机的流量。这包括配置与此功能关联的访问控制列表(ACL)。此ACL上定义的子网或主机的流量通过隧道从客户端加密，这些子网的路由安装在PC路由表中。ASA会拦截来自客户端的DHCPINFORM消息，并使用子网掩码、域名和无类静态路由做出响应。

ASA上的配置

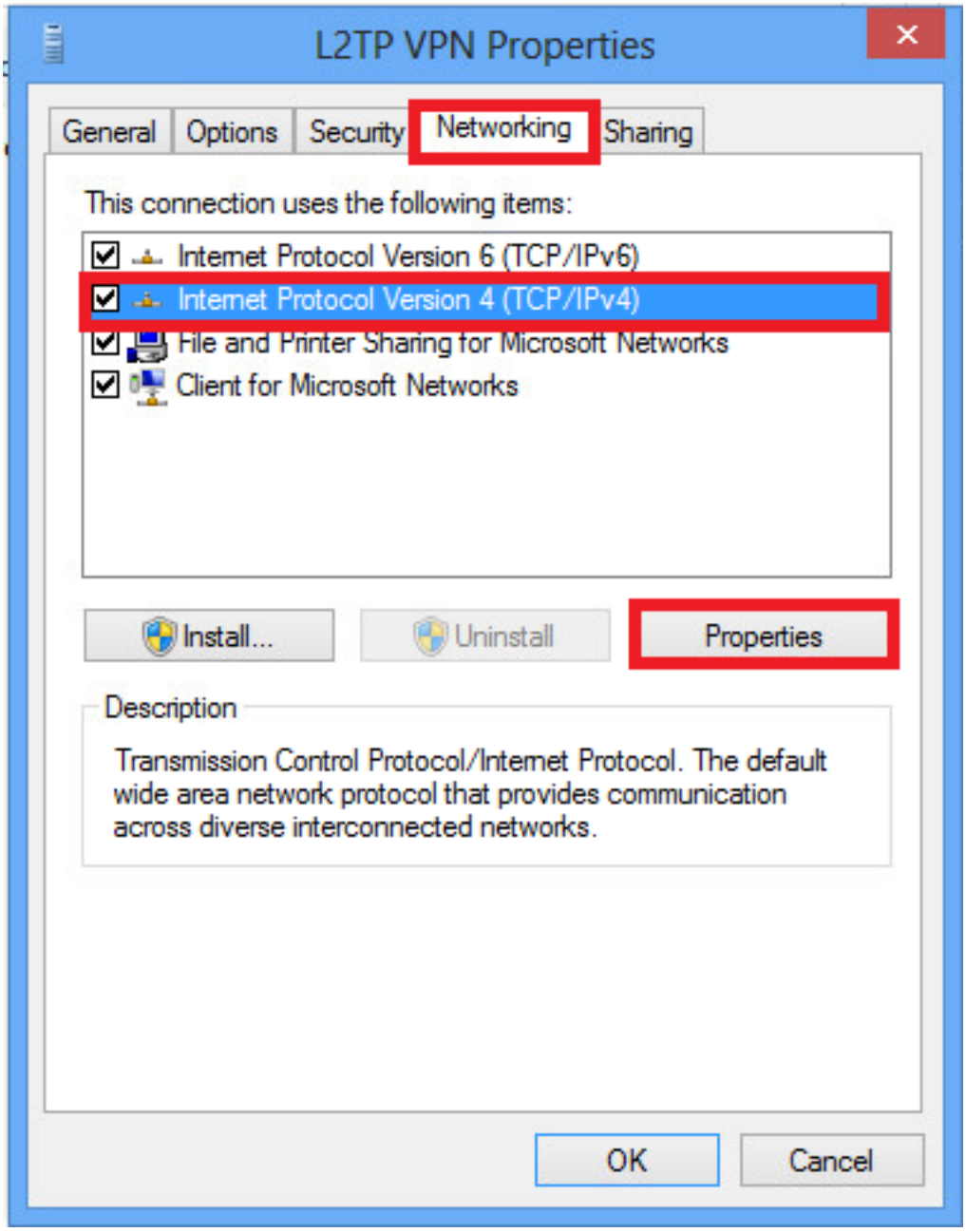
```
ciscoasa(config)# access-list SPLIT standard permit 10.1.1.0 255.255.255.0

ciscoasa(config)# group-policy DefaultRAGroup attributes
ciscoasa(config-group-policy)# split-tunnel-policy tunnelspecified
ciscoasa(config-group-policy)# split-tunnel-network-list value SPLIT
ciscoasa(config-group-policy)# intercept-dhcp 255.255.255.255 enable
```

L2TP/IPsec客户端上的配置

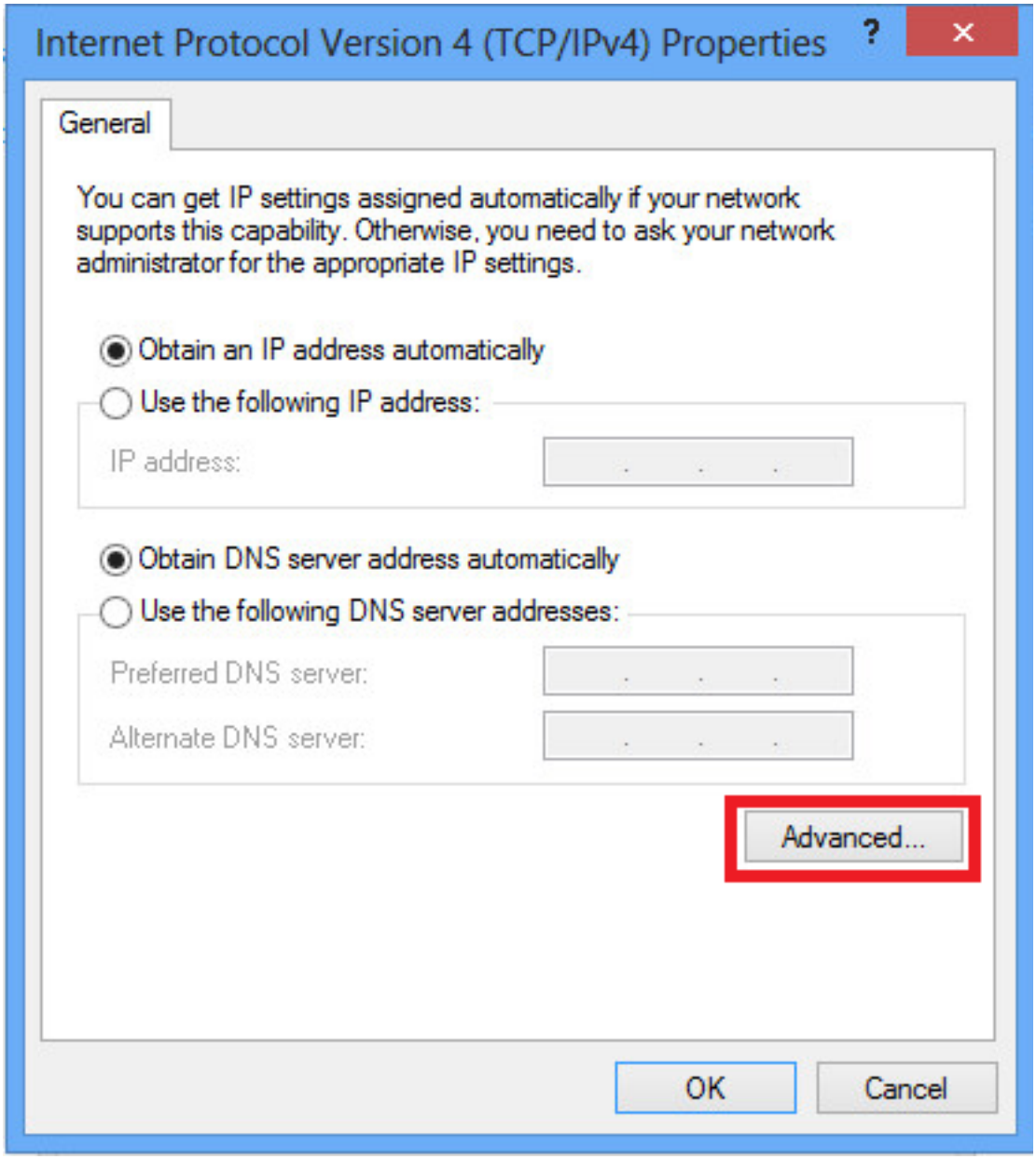
1.右键单击L2TP VPN适配器并选择“**属性**”。



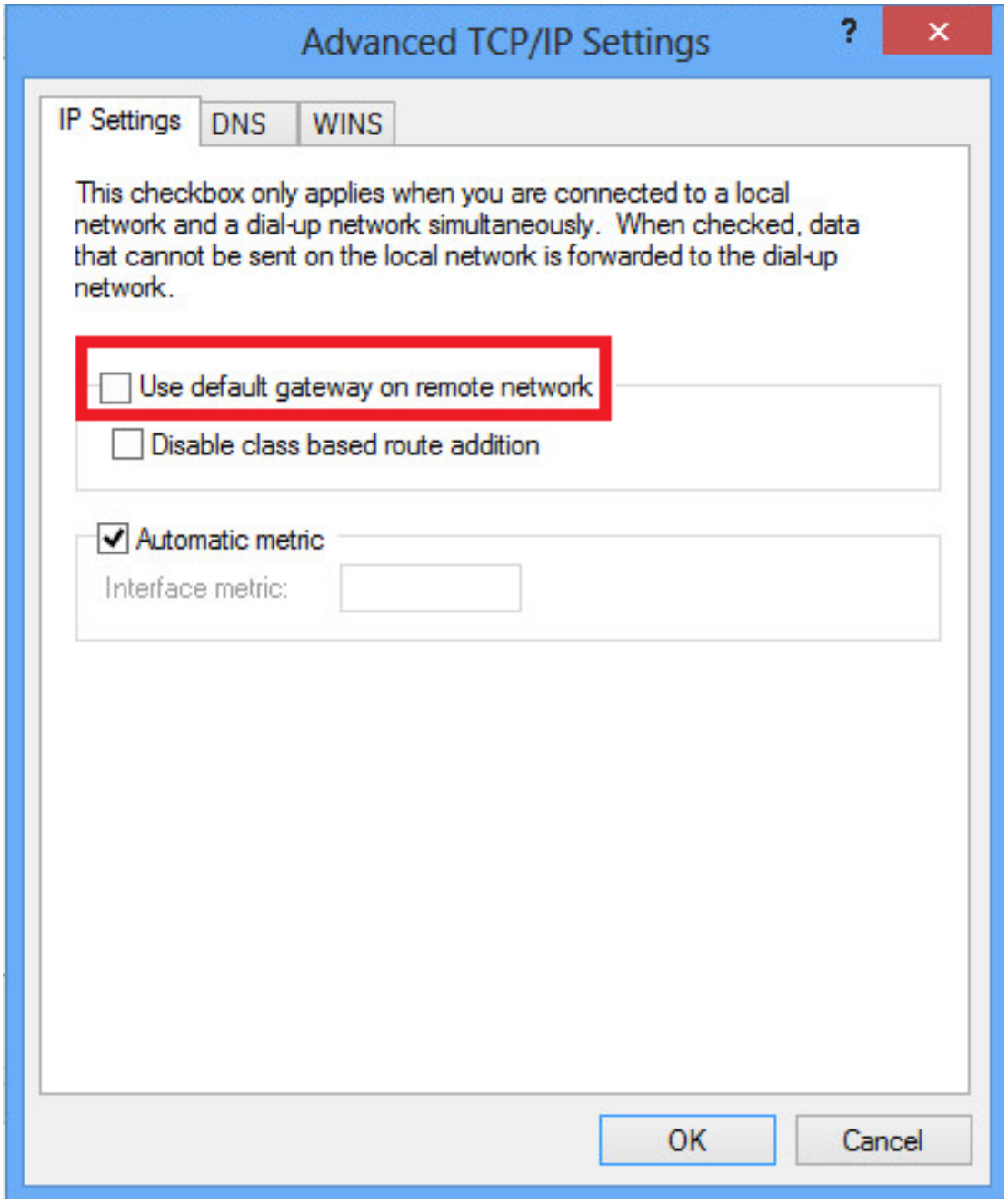
2.导航至“网络”选项卡，选择“Internet协议版本4(TCP/IPv4)”，然后单击“**属性”。**


L2TP VPN Properties
General
Options
Security
Networking
Sharing
This connection uses the following items:
Internet Protocol Version 6 (TCP/IPv6)
Internet Protocol Version 4 (TCP/IPv4)
File and Printer Sharing for Microsoft Networks
Client for Microsoft Networks
Install...
Uninstall
Properties
Description
Transmission Control Protocol/Internet Protocol. The default wide area network protocol that provides communication across diverse interconnected networks.
OK
Cancel

3.单击“高级”选项。



4.取消选中“**在远程网络上使用默认网关”选**项，然后单击“**确定”**。



验证

使用本部分可确认配置能否正常运行。

> **注意**：命令输出解释程序工具（仅限注册用户）支持某些 show 命令。使用输出解释器工具来查看 show 命令输出的分析。

- **show crypto ikev1 sa** — 显示对等体上的所有当前IKE SA。

```
ciscoasa# show crypto ikev1 sa

IKEv1 SAs:

  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:
```

10.1.1.2

```
   Type    : user            Role    : responder
   Rekey   : no
```

State   : MM_ACTIVE

- show crypto ipsec sa - 显示对等体上的所有当前 IPsec SA。

```
ciscoasa# show crypto ipsec sa
interface: outside
   Crypto map tag:
```

outside_dyn_map

```
, seq num: 10, local addr: 172.16.1.2

     local ident (addr/mask/prot/port): (172.16.1.2/255.255.255.255/
```

17/1701

```
)
     remote ident (addr/mask/prot/port): (10.1.1.2/255.255.255.255/
```

17/1701

```
)
```

current_peer: 10.1.1.2, username: test

dynamic allocated peer ip: 192.168.1.1

```
     dynamic allocated peer ip(ipv6): 0.0.0.0
```

#pkts encaps: 29, #pkts encrypt: 29, #pkts digest: 29

#pkts decaps: 118, #pkts decrypt: 118, #pkts verify: 118

```
     #pkts compressed: 0, #pkts decompressed: 0
     #pkts not compressed: 29, #pkts comp failed: 0, #pkts decomp failed: 0
     #post-frag successes: 0, #post-frag failures: 0, #fragments created: 0
     #PMTUs sent: 0, #PMTUs rcvd: 0, #decapsulated frgs needing reassembly: 0
     #TFC rcvd: 0, #TFC sent: 0
     #Valid ICMP Errors rcvd: 0, #Invalid ICMP Errors rcvd: 0
```

```
     #send errors: 0, #recv errors: 0

     local crypto endpt.: 172.16.1.2/0, remote crypto endpt.: 10.1.1.2/0
     path mtu 1500, ipsec overhead 58(36), media mtu 1500
     PMTU time remaining (sec): 0, DF policy: copy-df
     ICMP error validation: disabled, TFC packets: disabled
     current outbound spi: E8AF927A
     current inbound spi : 71F346AB

   inbound esp sas:
     spi: 0x71F346AB (1911768747)
        transform: esp-3des esp-sha-hmac no compression
        in use settings ={RA, Transport, IKEv1, }
        slot: 0, conn_id: 4096, crypto-map: outside_dyn_map
        sa timing: remaining key lifetime (kB/sec): (237303/3541)
        IV size: 8 bytes
        replay detection support: Y
        Anti replay bitmap:
         0x00000000 0x00000003
   outbound esp sas:
     spi: 0xE8AF927A (3903820410)
        transform: esp-3des esp-sha-hmac no compression
        in use settings ={RA, Transport, IKEv1, }
        slot: 0, conn_id: 4096, crypto-map: outside_dyn_map
        sa timing: remaining key lifetime (kB/sec): (237303/3541)
        IV size: 8 bytes
        replay detection support: Y
        Anti replay bitmap:
         0x00000000 0x00000001
```

- **show vpn-sessiondb detail ra-ikev1-ipsec filter protocol l2tpOverIpSec — 显示有关L2TP over IPsec连接的详细信息。**

```
ciscoasa# show vpn-sessiondb detail ra-ikev1-ipsec filter protocol l2tpOverIpSec

Session Type: IKEv1 IPsec Detailed



Username     : test

                  Index        : 1


Assigned IP  : 192.168.1.1           Public IP    : 10.1.1.2


Protocol     : IKEv1 IPsec L2TPOverIPsec
License      : Other VPN
Encryption   : IKEv1: (1)3DES  IPsec: (1)3DES  L2TPOverIPsec: (1)none
Hashing      : IKEv1: (1)SHA1  IPsec: (1)SHA1  L2TPOverIPsec: (1)none
Bytes Tx     : 1574                  Bytes Rx     : 12752
Pkts Tx      : 29                    Pkts Rx      : 118
Pkts Tx Drop : 0                     Pkts Rx Drop : 0


Group Policy : L2TP-VPN              Tunnel Group : DefaultRAGroup


Login Time   : 23:32:48 UTC Sat May 16 2015
Duration     : 0h:04m:05s
Inactivity   : 0h:00m:00s
```

```
VLAN Mapping : N/A                    VLAN         : none
Audt Sess ID : 0a6a2577000010005557d3a0
Security Grp : none

IKEv1 Tunnels: 1
IPsec Tunnels: 1
L2TPOverIPsec Tunnels: 1
```

IKEv1:

```
 Tunnel ID    : 1.1
 UDP Src Port : 500                    UDP Dst Port : 500
 IKE Neg Mode : Main                   Auth Mode    : preSharedKeys
 Encryption   : 3DES                   Hashing      : SHA1
 Rekey Int (T): 28800 Seconds          Rekey Left(T): 28555 Seconds
 D/H Group    : 2
 Filter Name  :
```

IPsec:

```
 Tunnel ID    : 1.2
 Local Addr   : 172.16.1.2/255.255.255.255/17/1701
 Remote Addr  : 10.1.1.2/255.255.255.255/17/1701
 Encryption   : 3DES                   Hashing      : SHA1
 Encapsulation: Transport
 Rekey Int (T): 3600 Seconds           Rekey Left(T): 3576 Seconds
 Rekey Int (D): 250000 K-Bytes         Rekey Left(D): 250000 K-Bytes
 Idle Time Out: 30 Minutes             Idle TO Left : 29 Minutes
 Bytes Tx     : 1574                   Bytes Rx     : 12752
 Pkts Tx      : 29                     Pkts Rx      : 118
```

L2TPOverIPsec:

```
 Tunnel ID    : 1.3
```

Username : test

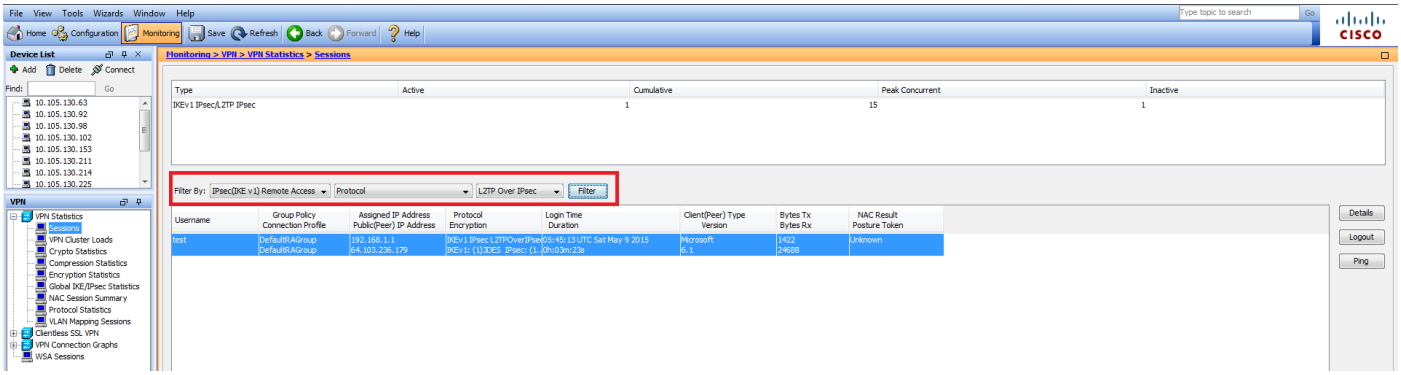
Assigned IP : 192.168.1.1

Public IP : 10.1.1.2

```
 Encryption   : none                   Hashing      : none
```

```
Auth Mode     : msCHAPV2

Idle Time Out: 30 Minutes            Idle TO Left : 27 Minutes
Client OS     : Microsoft
Client OS Ver: 6.2
Bytes Tx      : 475                  Bytes Rx     : 9093
Pkts Tx       : 18                   Pkts Rx      : 105
```

在ASDM上，在**Monitoring > VPN > VPN Statistics > Sessions**下，可以看到有关VPN会话的一般信息。L2TP over IPsec会话可以按IPsec(IKEv1)Remote Access > Protocol > L2TP Over IPsec进行过滤。



故障排除

本部分提供了可用于对配置进行故障排除的信息。

> **注意**：使用 **debug 命令之前，请参阅**有关 Debug 命令的重要信息。

> **警告**：在ASA上，可以设置各种调试级别；默认情况下，使用1级。如果更改调试级别，调试的详细程度可能会增加。请谨慎执行此操作，特别是在生产环境中！

请谨慎使**用以下debug命**令以排除VPN隧道的问题

- **debug crypto ikev1** — 显示有关IKE的调试信息
- **debug crypto ipsec** — 显示有关IPsec的调试信息

以下是成功的L2TP over IPSec连接的调试输出：

```
May 18 04:17:18 [IKEv1]IKE Receiver: Packet received on 172.16.1.2:500 from 10.1.1.2:500
May 18 04:17:18 [IKEv1]IP = 10.1.1.2, IKE_DECODE RECEIVED Message (msgid=0) with payloads : HDR
+ SA (1) + VENDOR (13) + VENDOR (13) + VENDOR (13) + VENDOR (13) + VENDOR (13) + VENDOR (13) +
VENDOR (13) + VENDOR (13) + NONE (0) total length : 408
May 18 04:17:18 [IKEv1 DEBUG]IP = 10.1.1.2, processing SA payload
May 18 04:17:18 [IKEv1]Phase 1 failure:  Mismatched attribute types for class Group
Description:  Rcv'd: Unknown  Cfg'd: Group 2
May 18 04:17:18 [IKEv1]Phase 1 failure:  Mismatched attribute types for class Group
Description:  Rcv'd: Unknown  Cfg'd: Group 2
May 18 04:17:18 [IKEv1 DEBUG]IP = 10.1.1.2, Oakley proposal is acceptable
May 18 04:17:18 [IKEv1 DEBUG]IP = 10.1.1.2, processing VID payload
May 18 04:17:18 [IKEv1 DEBUG]IP = 10.1.1.2, processing VID payload
May 18 04:17:18 [IKEv1 DEBUG]IP = 10.1.1.2, processing VID payload
May 18 04:17:18 [IKEv1 DEBUG]IP = 10.1.1.2, Received NAT-Traversal RFC VID
May 18 04:17:18 [IKEv1 DEBUG]IP = 10.1.1.2, processing VID payload
```

```
May 18 04:17:18 [IKEv1 DEBUG]IP = 10.1.1.2, Received NAT-Traversal ver 02 VID
May 18 04:17:18 [IKEv1 DEBUG]IP = 10.1.1.2, processing VID payload
May 18 04:17:18 [IKEv1 DEBUG]IP = 10.1.1.2, Received Fragmentation VID
May 18 04:17:18 [IKEv1 DEBUG]IP = 10.1.1.2, processing VID payload
May 18 04:17:18 [IKEv1 DEBUG]IP = 10.1.1.2, processing VID payload
May 18 04:17:18 [IKEv1 DEBUG]IP = 10.1.1.2, processing VID payload
May 18 04:17:18 [IKEv1 DEBUG]IP = 10.1.1.2, processing IKE SA payload
May 18 04:17:18 [IKEv1]Phase 1 failure:  Mismatched attribute types for class Group
Description:  Rcv'd: Unknown  Cfg'd: Group 2
May 18 04:17:18 [IKEv1]Phase 1 failure:  Mismatched attribute types for class Group
Description:  Rcv'd: Unknown  Cfg'd: Group 2
May 18 04:17:18 [IKEv1 DEBUG]IP = 10.1.1.2,
```

IKE SA Proposal # 1, Transform # 5 acceptable Matches global IKE entry # 2

```
May 18 04:17:18 [IKEv1 DEBUG]IP = 10.1.1.2, constructing ISAKMP SA payload
May 18 04:17:18 [IKEv1 DEBUG]IP = 10.1.1.2, constructing NAT-Traversal VID ver RFC payload
May 18 04:17:18 [IKEv1 DEBUG]IP = 10.1.1.2, constructing Fragmentation VID + extended
capabilities payload
May 18 04:17:18 [IKEv1]IP = 10.1.1.2, IKE_DECODE SENDING Message (msgid=0) with payloads : HDR +
SA (1) + VENDOR (13) + VENDOR (13) + NONE (0) total length : 124
May 18 04:17:18 [IKEv1]IKE Receiver: Packet received on 172.16.1.2:500 from 10.1.1.2:500
May 18 04:17:18 [IKEv1]IP = 10.1.1.2, IKE_DECODE RECEIVED Message (msgid=0) with payloads : HDR
+ KE (4) + NONCE (10) + NAT-D (20) + NAT-D (20) + NONE (0) total length : 260
May 18 04:17:18 [IKEv1 DEBUG]IP = 10.1.1.2, processing ke payload
May 18 04:17:18 [IKEv1 DEBUG]IP = 10.1.1.2, processing ISA_KE payload
May 18 04:17:18 [IKEv1 DEBUG]IP = 10.1.1.2, processing nonce payload
May 18 04:17:18 [IKEv1 DEBUG]IP = 10.1.1.2, processing NAT-Discovery payload
May 18 04:17:18 [IKEv1 DEBUG]IP = 10.1.1.2, computing NAT Discovery hash
May 18 04:17:18 [IKEv1 DEBUG]IP = 10.1.1.2, processing NAT-Discovery payload
May 18 04:17:18 [IKEv1 DEBUG]IP = 10.1.1.2, computing NAT Discovery hash
May 18 04:17:18 [IKEv1 DEBUG]IP = 10.1.1.2, constructing ke payload
May 18 04:17:18 [IKEv1 DEBUG]IP = 10.1.1.2, constructing nonce payload
May 18 04:17:18 [IKEv1 DEBUG]IP = 10.1.1.2, constructing Cisco Unity VID payload
May 18 04:17:18 [IKEv1 DEBUG]IP = 10.1.1.2, constructing xauth V6 VID payload
May 18 04:17:18 [IKEv1 DEBUG]IP = 10.1.1.2, Send IOS VID
May 18 04:17:18 [IKEv1 DEBUG]IP = 10.1.1.2, Constructing ASA spoofing IOS Vendor ID payload
(version: 1.0.0, capabilities: 20000001)
May 18 04:17:18 [IKEv1 DEBUG]IP = 10.1.1.2, constructing VID payload
May 18 04:17:18 [IKEv1 DEBUG]IP = 10.1.1.2, Send Altiga/Cisco VPN3000/Cisco ASA GW VID
May 18 04:17:18 [IKEv1 DEBUG]IP = 10.1.1.2, constructing NAT-Discovery payload
May 18 04:17:18 [IKEv1 DEBUG]IP = 10.1.1.2, computing NAT Discovery hash
May 18 04:17:18 [IKEv1 DEBUG]IP = 10.1.1.2, constructing NAT-Discovery payload
May 18 04:17:18 [IKEv1 DEBUG]IP = 10.1.1.2, computing NAT Discovery hash
May 18 04:17:18 [IKEv1]IP = 10.1.1.2,
```

Connection landed on tunnel_group DefaultRAGroup

```
May 18 04:17:18 [IKEv1 DEBUG]Group = DefaultRAGroup, IP = 10.1.1.2, Generating keys for
Responder...
May 18 04:17:18 [IKEv1]IP = 10.1.1.2, IKE_DECODE SENDING Message (msgid=0) with payloads : HDR +
KE (4) + NONCE (10) + VENDOR (13) + VENDOR (13) + VENDOR (13) + VENDOR (13) + NAT-D (20) + NAT-D
(20) + NONE (0) total length : 304
May 18 04:17:18 [IKEv1]IKE Receiver: Packet received on 172.16.1.2:500 from 10.1.1.2:500
May 18 04:17:18 [IKEv1]IP = 10.1.1.2, IKE_DECODE RECEIVED Message (msgid=0) with payloads : HDR
+ ID (5) + HASH (8) + NONE (0) total length : 64
May 18 04:17:18 [IKEv1 DEBUG]Group = DefaultRAGroup, IP = 10.1.1.2, processing ID payload
May 18 04:17:18 [IKEv1 DECODE]Group = DefaultRAGroup, IP = 10.1.1.2, ID_IPV4_ADDR ID received
10.1.1.2
May 18 04:17:18 [IKEv1 DEBUG]Group = DefaultRAGroup, IP = 10.1.1.2, processing hash payload
May 18 04:17:18 [IKEv1 DEBUG]Group = DefaultRAGroup, IP = 10.1.1.2, Computing hash for ISAKMP
```

May 18 04:17:18 [IKEv1]Group = DefaultRAGroup, IP = 10.1.1.2,

Automatic NAT Detection Status: Remote end is NOT behind a NAT device This end is NOT behind a NAT device

May 18 04:17:18 [IKEv1]IP = 10.1.1.2, Connection landed on tunnel_group DefaultRAGroup
May 18 04:17:18 [IKEv1 DEBUG]Group = DefaultRAGroup, IP = 10.1.1.2, constructing ID payload
May 18 04:17:18 [IKEv1 DEBUG]Group = DefaultRAGroup, IP = 10.1.1.2, constructing hash payload
May 18 04:17:18 [IKEv1 DEBUG]Group = DefaultRAGroup, IP = 10.1.1.2, Computing hash for ISAKMP
May 18 04:17:18 [IKEv1 DEBUG]Group = DefaultRAGroup, IP = 10.1.1.2, constructing dpd vid payload
May 18 04:17:18 [IKEv1]IP = 10.1.1.2, IKE_DECODE SENDING Message (msgid=0) with payloads : HDR + ID (5) + HASH (8) + VENDOR (13) + NONE (0) total length : 84
May 18 04:17:18 [IKEv1]Group = DefaultRAGroup, IP = 10.1.1.2,

PHASE 1 COMPLETED

May 18 04:17:18 [IKEv1]IP = 10.1.1.2, Keep-alive type for this connection: None
May 18 04:17:18 [IKEv1]IP = 10.1.1.2, Keep-alives configured on but peer does not support keep-alives (type = None)
May 18 04:17:18 [IKEv1 DEBUG]Group = DefaultRAGroup, IP = 10.1.1.2, Starting P1 rekey timer: 21600 seconds.
May 18 04:17:18 [IKEv1]IKE Receiver: Packet received on 172.16.1.2:500 from 10.1.1.2:500
May 18 04:17:18 [IKEv1 DECODE]IP = 10.1.1.2, IKE Responder starting QM: msg id = 00000001
May 18 04:17:18 [IKEv1]IP = 10.1.1.2, IKE_DECODE RECEIVED Message (msgid=1) with payloads : HDR + HASH (8) + SA (1) + NONCE (10) + ID (5) + ID (5) + NONE (0) total length : 300
May 18 04:17:18 [IKEv1 DEBUG]Group = DefaultRAGroup, IP = 10.1.1.2, processing hash payload
May 18 04:17:18 [IKEv1 DEBUG]Group = DefaultRAGroup, IP = 10.1.1.2, processing SA payload
May 18 04:17:18 [IKEv1 DEBUG]Group = DefaultRAGroup, IP = 10.1.1.2, processing nonce payload
May 18 04:17:18 [IKEv1 DEBUG]Group = DefaultRAGroup, IP = 10.1.1.2, processing ID payload
May 18 04:17:18 [IKEv1 DECODE]Group = DefaultRAGroup, IP = 10.1.1.2, ID_IPV4_ADDR ID received 10.1.1.2
May 18 04:17:18 [IKEv1]Group = DefaultRAGroup, IP = 10.1.1.2,

Received remote Proxy Host data in ID Payload: Address 10.1.1.2, Protocol 17, Port 1701

May 18 04:17:18 [IKEv1 DEBUG]Group = DefaultRAGroup, IP = 10.1.1.2, processing ID payload
May 18 04:17:18 [IKEv1 DECODE]Group = DefaultRAGroup, IP = 10.1.1.2, ID_IPV4_ADDR ID received 172.16.1.2
May 18 04:17:18 [IKEv1]Group = DefaultRAGroup, IP = 10.1.1.2,

Received local Proxy Host data in ID Payload: Address 172.16.1.2, Protocol 17, Port 1701

May 18 04:17:18 [IKEv1]Group = DefaultRAGroup, IP = 10.1.1.2,

L2TP/IPSec session detected.

May 18 04:17:18 [IKEv1]Group = DefaultRAGroup, IP = 10.1.1.2, QM IsRekeyed old sa not found by addr
May 18 04:17:18 [IKEv1]Group = DefaultRAGroup, IP = 10.1.1.2,

Static Crypto Map check, map outside_dyn_map, seq = 10 is a successful match

May 18 04:17:18 [IKEv1]Group = DefaultRAGroup, IP = 10.1.1.2, IKE Remote Peer configured for crypto map: outside_dyn_map
May 18 04:17:18 [IKEv1 DEBUG]Group = DefaultRAGroup, IP = 10.1.1.2, processing IPSec SA payload

May 18 04:17:18 [IKEv1 DEBUG]Group = DefaultRAGroup, IP = 10.1.1.2, I

PSec SA Proposal # 2, Transform # 1 acceptable

  Matches global IPSec SA entry # 10
May 18 04:17:18 [IKEv1]Group = DefaultRAGroup, IP = 10.1.1.2, IKE: requesting SPI!
IPSEC: New embryonic SA created @ 0x00007fffe13ab260,
   SCB: 0xE1C00540,
   Direction: inbound
   SPI   : 0x7AD72E0D
   Session ID: 0x00001000
   VPIF num : 0x00000002
   Tunnel type: ra
   Protocol   : esp
   Lifetime   : 240 seconds
May 18 04:17:18 [IKEv1 DEBUG]Group = DefaultRAGroup, IP = 10.1.1.2, IKE got SPI from key engine:
SPI = 0x7ad72e0d
May 18 04:17:18 [IKEv1 DEBUG]Group = DefaultRAGroup, IP = 10.1.1.2, oakley constucting quick
mode
May 18 04:17:18 [IKEv1 DEBUG]Group = DefaultRAGroup, IP = 10.1.1.2, constructing blank hash
payload
May 18 04:17:18 [IKEv1 DEBUG]Group = DefaultRAGroup, IP = 10.1.1.2, constructing IPSec SA
payload
May 18 04:17:18 [IKEv1 DEBUG]Group = DefaultRAGroup, IP = 10.1.1.2, constructing IPSec nonce
payload
May 18 04:17:18 [IKEv1 DEBUG]Group = DefaultRAGroup, IP = 10.1.1.2, constructing proxy ID
May 18 04:17:18 [IKEv1 DEBUG]Group = DefaultRAGroup, IP = 10.1.1.2,

Transmitting Proxy Id:

Remote host: 10.1.1.2 Protocol 17 Port 1701

Local host: 172.16.1.2 Protocol 17 Port 1701

May 18 04:17:18 [IKEv1 DEBUG]Group = DefaultRAGroup, IP = 10.1.1.2, constructing qm hash payload
May 18 04:17:18 [IKEv1 DECODE]Group = DefaultRAGroup, IP = 10.1.1.2, IKE Responder sending 2nd
QM pkt: msg id = 00000001
May 18 04:17:18 [IKEv1]IP = 10.1.1.2, IKE_DECODE SENDING Message (msgid=1) with payloads : HDR +
HASH (8) + SA (1) + NONCE (10) + ID (5) + ID (5) + NONE (0) total length : 160
May 18 04:17:18 [IKEv1]IKE Receiver: Packet received on 172.16.1.2:500 from 10.1.1.2:500
May 18 04:17:18 [IKEv1]IP = 10.1.1.2, IKE_DECODE RECEIVED Message (msgid=1) with payloads : HDR
+ HASH (8) + NONE (0) total length : 52
May 18 04:17:18 [IKEv1 DEBUG]Group = DefaultRAGroup, IP = 10.1.1.2, processing hash payload
May 18 04:17:18 [IKEv1 DEBUG]Group = DefaultRAGroup, IP = 10.1.1.2, loading all IPSEC SAs
May 18 04:17:18 [IKEv1 DEBUG]Group = DefaultRAGroup, IP = 10.1.1.2, Generating Quick Mode Key!
May 18 04:17:18 [IKEv1 DEBUG]Group = DefaultRAGroup, IP = 10.1.1.2, NP encrypt rule look up for
crypto map outside_dyn_map 10 matching ACL Unknown: returned cs_id=e148a8b0;
encrypt_rule=00000000; tunnelFlow_rule=00000000
May 18 04:17:18 [IKEv1 DEBUG]Group = DefaultRAGroup, IP = 10.1.1.2, Generating Quick Mode Key!
IPSEC: New embryonic SA created @ 0x00007fffe1c75c00,
   SCB: 0xE13ABD20,
   Direction: outbound
   SPI   : 0x8C14FD70
   Session ID: 0x00001000
   VPIF num : 0x00000002

```
   Tunnel type: ra
   Protocol   : esp
   Lifetime   : 240 seconds
IPSEC: Completed host OBSA update, SPI 0x8C14FD70
IPSEC: Creating outbound VPN context, SPI 0x8C14FD70
   Flags: 0x00000205
   SA   : 0x00007fffe1c75c00
   SPI  : 0x8C14FD70
   MTU  : 1500 bytes
   VCID : 0x00000000
   Peer : 0x00000000
   SCB  : 0x0AC609F9
   Channel: 0x00007fffed817200
IPSEC: Completed outbound VPN context, SPI 0x8C14FD70
   VPN handle: 0x00000000000028d4
IPSEC: New outbound encrypt rule, SPI 0x8C14FD70
   Src addr: 172.16.1.2
   Src mask: 255.255.255.255
   Dst addr: 10.1.1.2
   Dst mask: 255.255.255.255
```

Src ports

Upper: 1701

Lower: 1701

```
     Op   : equal
```

Dst ports

Upper: 1701

Lower: 1701

```
     Op   : equal
```

Protocol: 17

```
   Use protocol: true
   SPI: 0x00000000
   Use SPI: false
```

```
IPSEC: Completed outbound encrypt rule, SPI 0x8C14FD70
   Rule ID: 0x00007fffe1c763d0
IPSEC: New outbound permit rule, SPI 0x8C14FD70
   Src addr: 172.16.1.2
   Src mask: 255.255.255.255
   Dst addr: 10.1.1.2
   Dst mask: 255.255.255.255
   Src ports
     Upper: 0
     Lower: 0
     Op   : ignore
   Dst ports
     Upper: 0
     Lower: 0
     Op   : ignore
   Protocol: 50
   Use protocol: true
   SPI: 0x8C14FD70
   Use SPI: true
IPSEC: Completed outbound permit rule, SPI 0x8C14FD70
   Rule ID: 0x00007fffe1c76a00
May 18 04:17:18 [IKEv1 DEBUG]Group = DefaultRAGroup, IP = 10.1.1.2, NP encrypt rule look up for
crypto map outside_dyn_map 10 matching ACL Unknown: returned cs_id=e148a8b0;
encrypt_rule=00000000; tunnelFlow_rule=00000000
May 18 04:17:18 [IKEv1]Group = DefaultRAGroup, IP = 10.1.1.2, Security negotiation complete for
User ()  Responder, Inbound SPI = 0x7ad72e0d, Outbound SPI = 0x8c14fd70
May 18 04:17:18 [IKEv1 DEBUG]Group = DefaultRAGroup, IP = 10.1.1.2, IKE got a KEY_ADD msg for
SA: SPI = 0x8c14fd70
IPSEC: New embryonic SA created @ 0x00007fffe13ab260,
   SCB: 0xE1C00540,
   Direction: inbound
   SPI      : 0x7AD72E0D
   Session ID: 0x00001000
   VPIF num  : 0x00000002
   Tunnel type: ra
   Protocol   : esp
   Lifetime   : 240 seconds
IPSEC: Completed host IBSA update, SPI 0x7AD72E0D
IPSEC: Creating inbound VPN context, SPI 0x7AD72E0D
   Flags: 0x00000206
   SA   : 0x00007fffe13ab260
   SPI  : 0x7AD72E0D
   MTU  : 0 bytes
   VCID : 0x00000000
   Peer : 0x000028D4
   SCB  : 0x0AC5BD5B
   Channel: 0x00007fffed817200
IPSEC: Completed inbound VPN context, SPI 0x7AD72E0D
   VPN handle: 0x0000000000004174
IPSEC: Updating outbound VPN context 0x000028D4, SPI 0x8C14FD70
   Flags: 0x00000205
   SA   : 0x00007fffe1c75c00
   SPI  : 0x8C14FD70
   MTU  : 1500 bytes
   VCID : 0x00000000
   Peer : 0x00004174
   SCB  : 0x0AC609F9
   Channel: 0x00007fffed817200
IPSEC: Completed outbound VPN context, SPI 0x8C14FD70
   VPN handle: 0x00000000000028d4
IPSEC: Completed outbound inner rule, SPI 0x8C14FD70
   Rule ID: 0x00007fffe1c763d0
IPSEC: Completed outbound outer SPD rule, SPI 0x8C14FD70
   Rule ID: 0x00007fffe1c76a00
```

```
IPSEC: New inbound tunnel flow rule, SPI 0x7AD72E0D
   Src addr: 10.1.1.2
   Src mask: 255.255.255.255
   Dst addr: 172.16.1.2
   Dst mask: 255.255.255.255
   Src ports
     Upper: 1701
     Lower: 1701
     Op   : equal
   Dst ports
     Upper: 1701
     Lower: 1701
     Op   : equal
   Protocol: 17
   Use protocol: true
   SPI: 0x00000000
   Use SPI: false
IPSEC: Completed inbound tunnel flow rule, SPI 0x7AD72E0D
   Rule ID: 0x00007fffe13aba90
IPSEC: New inbound decrypt rule, SPI 0x7AD72E0D
   Src addr: 10.1.1.2
   Src mask: 255.255.255.255
   Dst addr: 172.16.1.2
   Dst mask: 255.255.255.255
   Src ports
     Upper: 0
     Lower: 0
     Op   : ignore
   Dst ports
     Upper: 0
     Lower: 0
     Op   : ignore
   Protocol: 50
   Use protocol: true
   SPI: 0x7AD72E0D
   Use SPI: true
IPSEC: Completed inbound decrypt rule, SPI 0x7AD72E0D
   Rule ID: 0x00007fffe1c77420
IPSEC: New inbound permit rule, SPI 0x7AD72E0D
   Src addr: 10.1.1.2
   Src mask: 255.255.255.255
   Dst addr: 172.16.1.2
   Dst mask: 255.255.255.255
   Src ports
     Upper: 0
     Lower: 0
     Op   : ignore
   Dst ports
     Upper: 0
     Lower: 0
     Op   : ignore
   Protocol: 50
   Use protocol: true
   SPI: 0x7AD72E0D
   Use SPI: true
IPSEC: Completed inbound permit rule, SPI 0x7AD72E0D
   Rule ID: 0x00007fffe13abb80
May 18 04:17:18 [IKEv1 DEBUG]Group = DefaultRAGroup, IP = 10.1.1.2, Pitcher: received
KEY_UPDATE, spi 0x7ad72e0d
May 18 04:17:18 [IKEv1 DEBUG]Group = DefaultRAGroup, IP = 10.1.1.2, Starting P2 rekey timer:
3420 seconds.
May 18 04:17:18 [IKEv1]Group = DefaultRAGroup, IP = 10.1.1.2,
```

PHASE 2 COMPLETED

```
 (msgid=00000001)
May 18 04:17:18 [IKEv1]IKEQM_Active() Add L2TP classification rules: ip <10.1.1.2> mask
<0xFFFFFFFF> port <1701>
May 18 04:17:21 [IKEv1]Group = DefaultRAGroup,
```

Username = test, IP = 10.1.1.2, Adding static route for client address: 192.168.1.1

下表显示了Windows客户端上常见的一些VPN相关错误

错误代码	可能的解决方案
691	确保输入的用户名和密码正确
789,835	确保在客户端上配置的预共享密钥与在ASA上配置相同
800	1.确保VPN类型设置为“第2层隧道协议(L2TP)” 2.确保已正确配置预共享密钥
809	确保UDP端口500、4500（在客户端或服务器位于NAT设备后面的情况下）和ESP流量未被阻止

相关信息

- Cisco ASA 5500 系列自适应安全设备
- 最常用的 L2L 和远程访问 IPSec VPN 故障排除解决方案
- 技术支持和文档 - Cisco Systems