

# PIX/ASA 7.x Enhanced Spoke-to-Client VPN with TACACS+ Authentication Configuration Example

Document ID: 64693

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## Introduction

This document describes how to configure LAN-to-LAN sessions between PIX Security Appliances, and also allows for a VPN Client to access the spoke network (PIX3) through the hub (PIX1) with Cisco Secure ACS for windows with TACACS+ authentication. In addition, this document demonstrates the configuration for a static LAN-to-LAN tunnel with VPN Client to spoke connectivity through the hub PIX Security Appliance. PIX version 7.0 improves support for spoke-to-spoke VPN communications. PIX 7.0 provides the ability for encrypted traffic to enter and leave the same interface.

The **same-security-traffic** command permits traffic to enter and exit the same interface when used with the *intra-interface* keyword, which enables spoke-to-spoke VPN support. Refer to the *Permitting Intra-Interface Traffic* section in the Cisco Security Appliance Command Line Configuration Guide for more information.

**Note:** In order to avoid the overlapping of IP addresses in the network, assign the entirely different pool of IP addresses to the VPN Client, for example, 10.x.x.x , 172.16.x.x, or 192.168.x.x. This IP addressing scheme helps to troubleshoot your network.

**Note:** In PIX version 7.2 and later, the *intra-interface* keyword allows all traffic to enter and exit the same interface and not just IPsec traffic.

**Note:** This document is for PIX/ASA 7.x configuration. Refer to Configuring IPSec Between Hub and Remote PIXes with VPN Client and Extended Authentication in order to learn more about the PIX 6.x configuration.

Refer to PIX/ASA 7.x and VPN Client for Public Internet VPN on a Stick Configuration Example in order to learn more about the scenario where the hub PIX redirects the traffic from the VPN Client to the Internet.

Refer to IPsec Tunnel Between PIX 7.x and VPN 3000 Concentrator Configuration Example in order to learn more about the scenario where the LAN-to-LAN tunnel between PIX and the Cisco VPN Concentrator.

Refer to PIX/ASA 7.x Security Appliance to an IOS Router LAN-to-LAN IPsec Tunnel Configuration Example in order to learn more about the scenario where the LAN-to-LAN tunnel between PIX/ASA and a Cisco IOS® router.

## Prerequisites

### Requirements

The hub PIX Security Appliance needs to run version 7.0 or later.

**Note:** Refer to the Guide for Cisco PIX 6.2 and 6.3 Users Upgrading to Cisco PIX Software Version 7.0 for more information on how to upgrade the PIX Security Appliance to version 7.0.

### Components Used

The information in this document is based on these software and hardware versions:

- PIX – 515 version 7.0.1 (PIX1)
- VPN Client version 4.6.02.0011
- PIX – 515 version 6.3.4 (PIX3)

The information in this document was created from the devices in a specific lab environment. All of the devices used in this document started with a cleared (default) configuration. If your network is live, make sure that you understand the potential impact of any command.

### Conventions

Refer to Cisco Technical Tips Conventions for more information on document conventions.

### Caveats

- Cisco bug ID CSCeh29328 ( registered customers only) VPN Client mode configuration attributes are not enforced when you disable XAUTH.
- Cisco bug ID CSCeh69389 ( registered customers only) Split-tunnel ACLs are not converted to standard ACLs when you upgrade to PIX 7.0.

## Configure

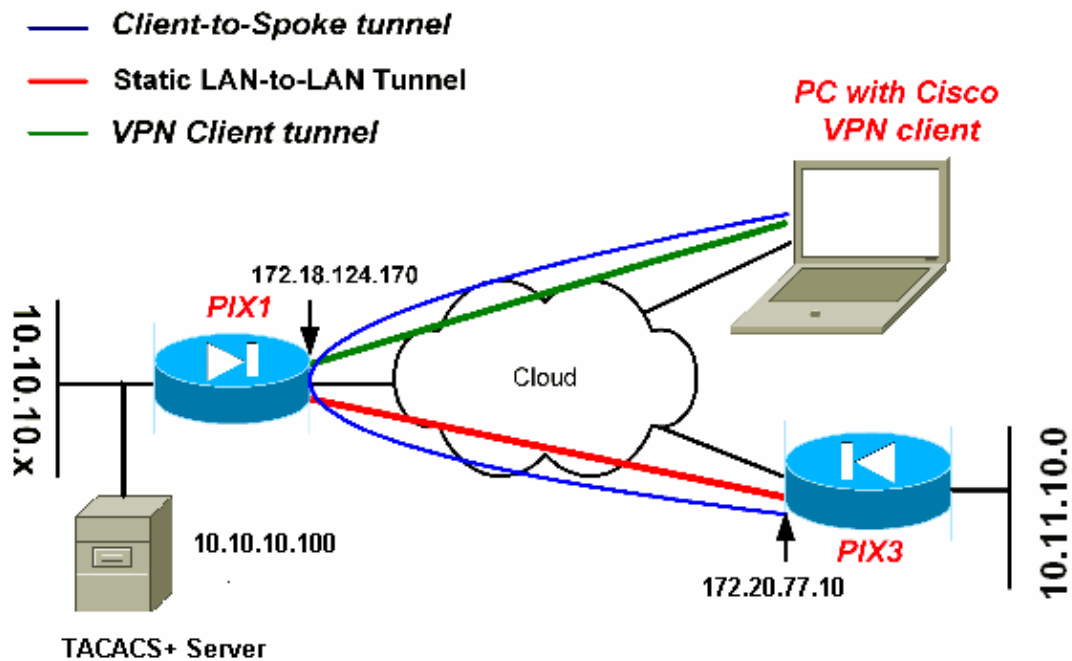
This section presents you with the information to use in order to configure the features this document describes.

**Note:** In order to find additional information on the commands this document uses, use the Command Lookup Tool ( registered customers only) .

**Note:** For a PIX Security Appliance 7.x LAN-to-LAN (L2L) VPN configuration, you must specify the <name> of the tunnel group as the **Remote peer IP Address** in the **tunnel-group <name> type ipsec-l2l** command for creating and managing the database of connection-specific records for IPsec.

## Network Diagram

This document uses this network setup:



**Note:** The IP addressing schemes used in this configuration are not legally routable on the Internet. They are RFC 1918 addresses which have been used in a lab environment.

## Configurations

This document uses these configurations:

- PIX1
- PIX3
- VPN Client

```
PIX1
PIX Version 7.0(1)
no names
!
interface Ethernet0
nameif outside
security-level 0
ip address 172.18.124.170 255.255.255.0
!
interface Ethernet1
nameif inside
security-level 100
ip address 10.10.10.1 255.255.255.0
!
interface Ethernet2
shutdown
nameif intf2
security-level 4
no ip address
!
interface Ethernet3
```

```
shutdown
nameif intf3
security-level 6
no ip address
!
interface Ethernet4
shutdown
nameif intf4
security-level 8
no ip address
!
interface Ethernet5
shutdown
nameif intf5
security-level 10
no ip address
!
enable password 9jNfZuG3TC5tCVH0 encrypted
passwd OnTrBUG1Tp0edmkr encrypted
hostname PIX1
domain-name cisco.com
boot system flash:/image.bin
ftp mode passive

!--- Command to permit IPsec traffic to enter and exit the same interface.
same-security-traffic permit intra-interface

!--- Access-list for interesting traffic to be encrypted between
!--- the hub (PIX1) and spoke (PIX3) networks.
access-list 100 extended permit ip 10.10.10.0 255.255.255.0 10.11.10.0 255.255.255.0

!--- Access-list for interesting traffic to be encrypted
!--- between the VPN Client networks and spoke (PIX3) networks.
access-list 100 extended permit ip 192.168.10.0 255.255.255.0 10.11.10.0 255.255.255.0

!--- Access-list for interesting traffic to bypass the
!--- Network Address Translation (NAT) process.
access-list nonat extended permit ip 10.10.10.0 255.255.255.0 10.11.10.0 255.255.255.0
access-list nonat extended permit ip 10.10.10.0 255.255.255.0 192.168.10.0 255.255.255.0

!--- Standard access-list to allow split-tunnel for the VPN Clients.
access-list splittunnel standard permit 10.10.10.0 255.255.255.0
access-list splittunnel standard permit 10.11.10.0 255.255.255.0
pager lines 24
mtu outside 1500
mtu inside 1500
mtu intf2 1500
mtu intf3 1500
mtu intf4 1500
mtu intf5 1500

!--- Address pool for the VPN Clients.
ip local pool vpnpool 192.168.10.1-192.168.10.254
no failover
monitor-interface outside
```

```
monitor-interface inside
monitor-interface intf2
monitor-interface intf3
monitor-interface intf4
monitor-interface intf5
asdm history enable
arp timeout 14400
nat-control
global (outside) 1 interface
```

```
!--- Bypass NAT process for IPsec traffic.
```

```
nat (inside) 0 access-list nonat
nat (inside) 1 10.10.10.0 255.255.255.0
route outside 0.0.0.0 0.0.0.0 172.18.124.1 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
timeout mgcp-pat 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
```

```
!--- Configuration of TACACS+ server on the inside interface with server
tag name as mytacacs
```

```
aaa-server mytacacs protocol tacacs+
aaa-server mytacacs (inside) host 10.10.10.100 key123 timeout 5
```

```
!--- Configuration of group-policy for VPN Clients.
```

```
group-policy clientgroup internal
group-policy clientgroup attributes
vpn-idle-timeout 20
```

```
!--- See Note 2.
```

```
!--- Enable and bind split-tunnel parameters to the group-policy.
```

```
split-tunnel-policy tunnelspecified
split-tunnel-network-list value splittunnel
no snmp-server location
no snmp-server contact
snmp-server community public
snmp-server enable traps snmp
```

```
!--- Configuration of IPsec Phase 2.
```

```
crypto ipsec transform-set myset esp-3des esp-sha-hmac
```

```
!--- Crypto map configuration for VPN Clients that connect to this PIX.
```

```
crypto dynamic-map rtpdynmap 20 set transform-set myset
```

```
!--- Crypto map configuration for a static LAN-to-LAN tunnel.
```

```
crypto map mymap 10 match address 100
```

```
crypto map mymap 10 set peer 172.20.77.10
crypto map mymap 10 set transform-set myset
```

```
!--- Binding the dynamic map to the crypto map process.
```

```
crypto map mymap 20 ipsec-isakmp dynamic rtpdynmap
```

```
!--- Crypto map applied to the outside interface.
```

```
crypto map mymap interface outside
isakmp identity address
isakmp enable outside
```

```
!--- Configuration of Internet Security Association and Key Management
!--- Protocol (ISAKMP) policy.
```

```
isakmp policy 10 authentication pre-share
isakmp policy 10 encryption 3des
isakmp policy 10 hash md5
isakmp policy 10 group 2
isakmp policy 10 lifetime 86400
isakmp policy 65535 authentication pre-share
isakmp policy 65535 encryption 3des
isakmp policy 65535 hash sha
isakmp policy 65535 group 2
isakmp policy 65535 lifetime 86400
isakmp disconnect-notify
telnet timeout 5
ssh 0.0.0.0 0.0.0.0 outside
ssh timeout 60
ssh version 1
console timeout 0
tunnel-group DefaultRAGroup type ipsec-ra
tunnel-group DefaultRAGroup general-attributes
authentication-server-group none
tunnel-group DefaultRAGroup ipsec-attributes
pre-shared-key *
```

```
!--- Configuration of tunnel-group for the static LAN-to-LAN tunnel.
!--- See the second note in the Configure section
!--- of this document in order to configure tunnel-group.
!--- The tunnel group name must be the IP address of the remote peer.
```

```
tunnel-group 172.20.77.10 type ipsec-l2l
tunnel-group 172.20.77.10 ipsec-attributes
```

```
!--- Configuraiton of a pre-shared key for the static LAN-to-LAN tunnel.
```

```
pre-shared-key *
```

```
!--- Configuration of tunnel-group with group information for VPN Clients.
```

```
tunnel-group rtptacvpn type ipsec-ra
```

```
!--- Configuration of group parameters for the VPN Clients.
```

```
tunnel-group rtptacvpn general-attributes
address-pool vpnpool
```

```

!--- Enable user authentication.

authentication-server-group mytacacs
authorization-server-group LOCAL

!--- Bind group-policy parameters to the tunnel-group for VPN Clients.

default-group-policy clientgroup
tunnel-group rtptacvpn ipsec-attributes
pre-shared-key *
!
class-map inspection_default
match default-inspection-traffic
!
!
policy-map global_policy
class inspection_default
inspect dns maximum-length 512
inspect ftp
inspect h323 h225
inspect h323 ras
inspect http
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
Cryptochecksum:646541da0da9a4c764effd2e05633018
: end

```

**Note 1:** The **sysopt connection permit-ipsec** command must be configured to permit all inbound IPsec authenticated cipher sessions. In PIX 7.0, the **sysopt** commands do not show up in the running configuration. In order to verify if the **sysopt connection permit-ipsec** command is enabled, execute the **show running-config sysopt** command.

**Note 2:** In order for VPN Clients to connect through IPsec over User Data Protocol (UDP), configure this output in the **group-policy** section of the PIX Appliance.

```

group-policy clientgroup attributes
vpn-idle-timeout 20
ipsec-udp enable
ipsec-udp-port 10000
split-tunnel-policy tunnelspecified
split-tunnel-network-list value splittunnel

```

**Note 3:** In order for VPN Clients to connect through IPsec over TCP, configure this command in the **global configuration** of the PIX Appliance.

### PIX3

```
PIX Version 6.3(4)
interface ethernet0 auto
interface ethernet1 auto
interface ethernet2 auto shutdown
interface ethernet3 auto shutdown
interface ethernet4 auto shutdown
interface ethernet5 auto shutdown
nameif ethernet0 outside security0
nameif ethernet1 inside security100
nameif ethernet2 intf2 security4
nameif ethernet3 intf3 security6
nameif ethernet4 intf4 security8
nameif ethernet5 intf5 security10
enable password 8Ry2YjIyt7RRXU24 encrypted
passwd 2KFQnbNIdI.2KYOU encrypted
hostname PIX3
domain-name cisco.com
fixup protocol dns maximum-length 512
fixup protocol ftp 21
fixup protocol h323 h225 1720
fixup protocol h323 ras 1718-1719
fixup protocol http 80
fixup protocol rsh 514
fixup protocol rtsp 554
fixup protocol sip 5060
fixup protocol sip udp 5060
fixup protocol skinny 2000
fixup protocol smtp 25
fixup protocol sqlnet 1521
fixup protocol tftp 69
names

!--- Access-list for the encryption of traffic
!--- between PIX3 and PIX1 networks.

access-list 100 permit ip 10.11.10.0 255.255.255.0 10.10.10.0 255.255.255.0

!--- Access-list for the encryption of traffic
!--- between the PIX3 network and the VPN Client address pool.

access-list 100 permit ip -10.11.10.0 255.255.255.0 192.168.10.0 255.255.255.0

!--- Access-list used to bypass the NAT process.

access-list nonat permit ip 10.11.10.0 255.255.255.0 10.10.10.0 255.255.255.0
access-list nonat permit ip 10.11.10.0 255.255.255.0 192.168.10.0 255.255.255.0
pager lines 24
mtu outside 1500
mtu inside 1500
mtu intf2 1500
mtu intf3 1500
mtu intf4 1500
mtu intf5 1500
ip address outside 172.20.77.10 255.255.0.0
ip address inside 10.11.10.1 255.255.255.0
no ip address intf2
no ip address intf3
no ip address intf4
no ip address intf5
```



```
ip audit info action alarm
ip audit attack action alarm
no failover
failover timeout 0:00:00
failover poll 15
no failover ip address outside
no failover ip address inside
no failover ip address intf2
no failover ip address intf3
no failover ip address intf4
no failover ip address intf5
pdm history enable
arp timeout 14400
global (outside) 1 interface

!--- Bind ACL nonat to the NAT statement
!--- in order to avoid NAT on the IPsec packets.

nat (inside) 0 access-list nonat
nat (inside) 1 10.11.10.0 255.255.255.0 0 0
route outside 0.0.0.0 0.0.0.0 172.20.77.1 1
timeout xlate 3:00:00
timeout conn 1:00:00 half-closed 0:10:00 udp 0:02:00 rpc 0:10:00 h225 1:00:00
timeout h323 0:05:00 mgcp 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 TACACS+ max-failed-attempts 3
aaa-server TACACS+ deadtime 10
aaa-server RADIUS protocol radius
aaa-server RADIUS max-failed-attempts 3
aaa-server RADIUS deadtime 10
aaa-server LOCAL protocol local
no snmp-server location
no snmp-server contact
snmp-server community public
no snmp-server enable traps
floodguard enable

!--- Permits all inbound IPsec authenticated cipher sessions.

sysopt connection permit-ipsec

!--- Defines IPsec encryption and authentication algorithms.

crypto ipsec transform-set myset esp-3des esp-sha-hmac

!--- Defines crypto map.

crypto map mymap 10 ipsec-isakmp
crypto map mymap 10 match address 100
crypto map mymap 10 set peer 172.18.124.170
crypto map mymap 10 set transform-set myset

!--- Apply crypto map on the outside interface.

crypto map mymap interface outside
isakmp enable outside

!--- Defines the pre-shared secret key used for Internet Key Exchange (IKE) authentication.
```

```
isakmp key ***** address 172.18.124.170 netmask 255.255.255.0 no-xauth
isakmp identity address
```

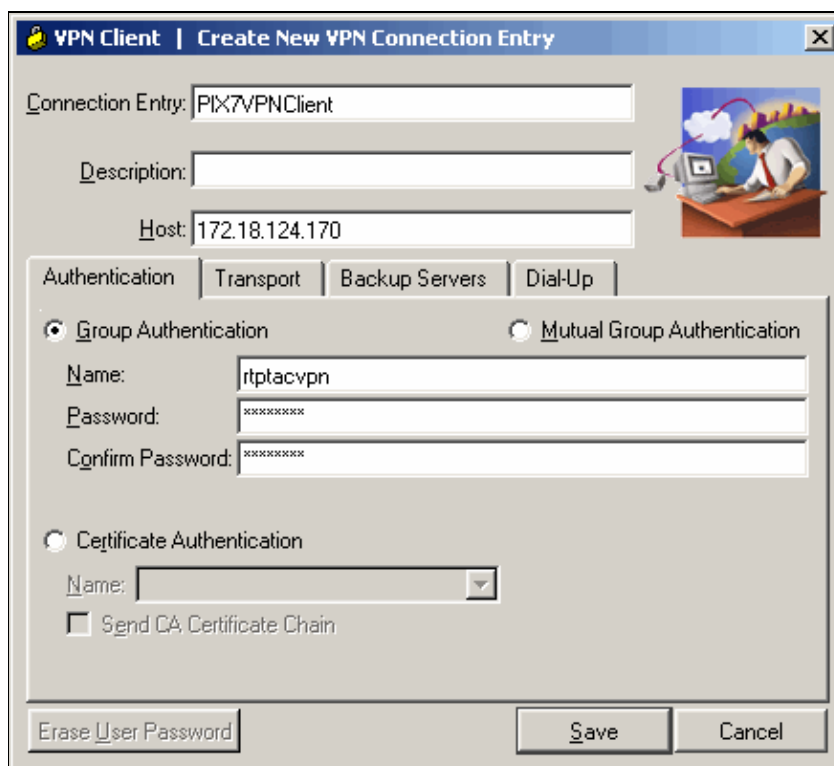
*!--- Defines the ISAKMP policy.*

```
isakmp policy 10 authentication pre-share
isakmp policy 10 encryption 3des
isakmp policy 10 hash md5
isakmp policy 10 group 2
isakmp policy 10 lifetime 86400
telnet timeout 5
ssh 0.0.0.0 0.0.0.0 outside
ssh timeout 5
console timeout 0
terminal width 80
Cryptochecksum:cb5c245112db607e3a9a85328d1295db
: end
```

## VPN Client Configuration

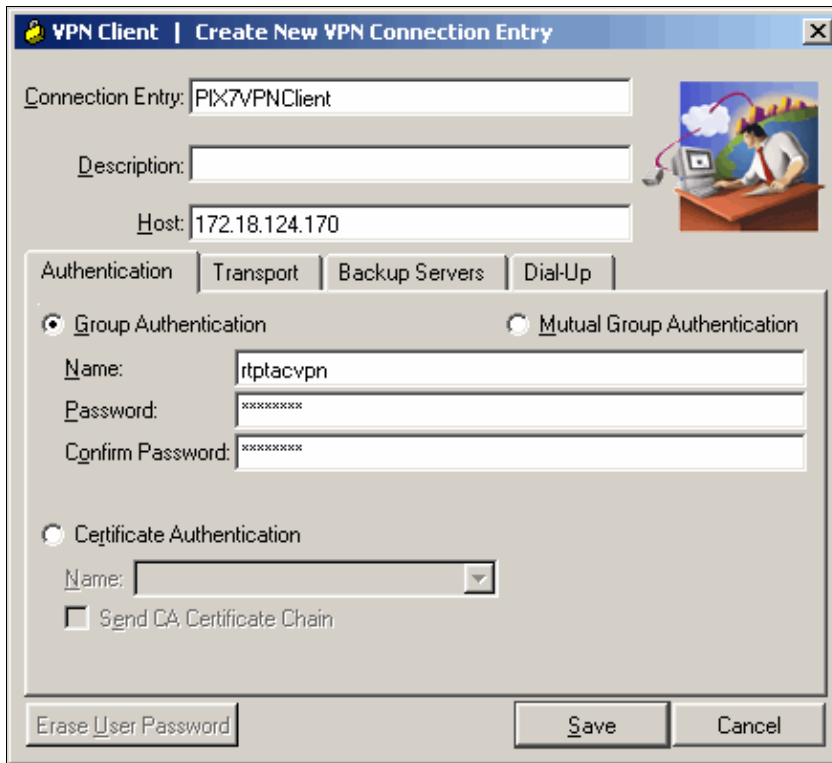
Complete these steps in order to create a new connection entry on the VPN Client.

1. Enter the host IP address (PIX1 external IP address).
2. Under the Authentication tab, enter the group attributes (group name and password as configured on the PIX Appliance).

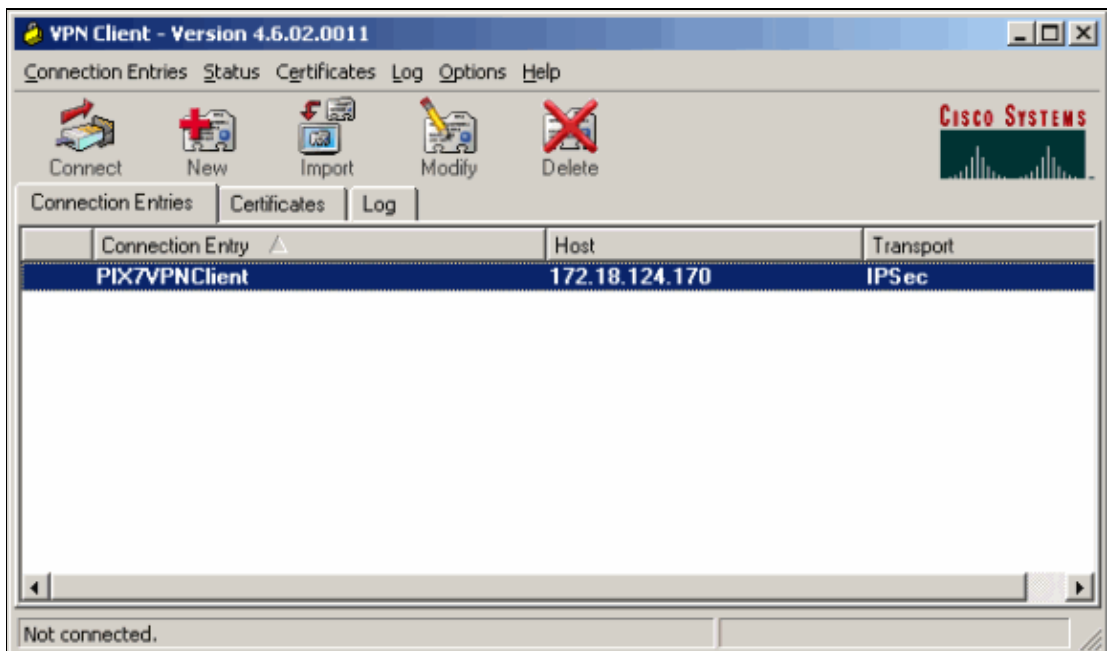


The screenshot shows a window titled "VPN Client | Create New VPN Connection Entry". The "Authentication" tab is selected. The "Connection Entry" field contains "PIX7VPNClient" and the "Host" field contains "172.18.124.170". Under "Group Authentication", the "Name" field is "rtptacvpn", and the "Password" and "Confirm Password" fields are masked with asterisks. The "Certificate Authentication" section is also visible, with a "Name" dropdown menu and a "Send CA Certificate Chain" checkbox.

3. Under the Transport tab, choose the method of tunneling which you want to use for the VPN Clients connection. In this configuration, **Enable Transport Tunneling** is disabled for straight IPsec connectivity.



4. Click **Save** in order to save the connection profile configured on the VPN Client.



## TACACS+ Server

In order to configure the TACACS+ server, complete these steps:

1. Click **Add Entry** in order to add an entry for the PIX in the TACACS+ server database.

AAA Client Hostname	AAA Client IP Address	Authenticate Using
340	172.18.124.151	RADIUS (Cisco Aironet)
Aironet-340-Lab	10.36.1.99	RADIUS (Cisco Aironet)
others	<Default>	TACACS+ (Cisco IOS)

[Add Entry](#)

2. On the Add AAA Client page, enter the PIX information as shown in this image:

**Add AAA Client**

AAA Client Hostname:

AAA Client IP Address:

Key:

Authenticate Using:

Single Connect TACACS+ AAA Client (Record stop in accounting on failure).

Log Update/Watchdog Packets from this AAA Client

Log RADIUS Tunneling Packets from this AAA Client

[Submit](#) [Submit + Restart](#) [Cancel](#)

- ◆ In the AAA Client Hostname field, enter a name for the PIX.
- ◆ In the AAA Client IP Address field, enter **10.10.10.1**.
- ◆ In the Key field, enter **key123** as the shared secret key.
- ◆ From the Authenticate Using drop-down list, choose **TACACS+ (Cisco IOS)**, and click **Submit**.

3. In the User field, enter the user name for the VPN user in the Cisco Secure database, and click **Add/Edit**.

In this example, the user name is *cisco*.

User:  [Find](#) [Add/Edit](#)

List users beginning with letter/number:

A B C D E F G H I J K L M  
 N O P Q R S T U V W X Y Z  
 0 1 2 3 4 5 6 7 8 9

[List All Users](#) [Back to Help](#)

- [User Setup and External User Databases](#)
- [Finding a Specific User in the CiscoSecure User Database](#)
- [Adding a User to the CiscoSecure User Database](#)
- [Listing Usernames that Begin with a Particular Character](#)
- [Listing All Usernames in the CiscoSecure User Database](#)
- [Changing a Username in the CiscoSecure User Database](#)

User Setup enables you to configure individual user information, add users, and delete users in the database.

4. On the next page, enter and confirm the password for the user *cisco*.

In this example, the password is also *cisco*.

**Supplementary User Info**

Real Name:   
 Description:

---

**User Setup**

Password Authentication:

CiscoSecure PAP (Also used for CHAP/MS-CHAP/ARAP, if the Separate field is not checked.)

Password:   
 Confirm Password:

Separate (CHAP/MS-CHAP/ARAP)

Password:   
 Confirm Password:

When using a Token Card server for authentication, supplying a separate CHAP password for a token card user allows CHAP authentication. This is especially useful when token caching is enabled.

Group to which the user is assigned:

- [Account Disabled](#)
- [Deleting a Username](#)
- [Supplementary User Info](#)
- [Password Authentication](#)
- [Group to which the user is assigned](#)
- [Callback](#)
- [Client IP Address Assignment](#)
- [Advanced Settings](#)
- [Network Access Restrictions](#)
- [Max Sessions](#)
- [Usage Quotas](#)
- [Account Disable](#)
- [Downloadable ACLs](#)
- [Advanced TACACS+ Settings](#)
- [TACACS+ Enable Control](#)
- [TACACS+ Enable Password](#)
- [TACACS+ Outbound Password](#)
- [TACACS+ Shell Command Authorization](#)
- [TACACS+ Unknown Services](#)
- [IETF RADIUS Attributes](#)
- [RADIUS Vendor-Specific Attributes](#)

**Account Disabled Status**

Select the Account Disabled check box to disable this account; clear the check box to enable the account.

[\[Back to Top\]](#)

5. If you want to map the user account to a group, complete that step now. When you finish, click **Submit**.

## Hairpinning or U-Turn

This feature is useful for VPN traffic that enters an interface but is then routed out of that same interface. For example, if you have a hub and spoke VPN network, where the security appliance is the hub, and the remote VPN networks are the spokes, traffic must go into the security appliance and then out again to the other spoke in order for one spoke to communicate with another spoke.

Use the **same-security-traffic** configuration to allow traffic to enter and exit the same interface.

```
securityappliance(config)# same-security-traffic permit intra-interface
```

## Verify

This section provides information you can use in order to confirm your configuration works properly.

The Output Interpreter Tool (registered customers only) (OIT) supports certain **show** commands. Use the OIT to view an analysis of **show** command output.

- **show crypto isakmp sa** Displays all current IKE security associations (SAs) at a peer.
- **show crypto ipsec sa** Displays all current SAs.

In order to test communication between the two private networks between PIX3 and PIX1, initiate a ping from one of the private networks.

In this configuration:

- For static LAN-to-LAN, a ping is sent from behind the PIX3 network (10.11.10.x) to the PIX1 network (10.10.10.x).
- In order for the VPN Clients to access the networks behind PIX3, a security association must be built from the PIX3 to PIX1 for VPN Client networks.

## PIX1 Verification

```
show crypto isakmp sa
```

```
Active SA: 2
```

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

```
Total IKE SA: 2
```

```
1 IKE Peer: 172.18.173.77
```

```
Type : user Role : responder
```

```
Rekey : no State : AM_ACTIVE
```

```
2 IKE Peer: 172.20.77.10
```

```
Type : L2L Role : responder
```

```
Rekey : no State : MM_ACTIVE
```

```
PIX1(config)#show crypto ipsec sa
```

```
interface: outside
```

```
Crypto map tag: rtpdynmap, local addr: 172.18.124.170
```

```
!-- IPsec SA for the connection between VPN Clients and the PIX1 network.
```

```
local ident (addr/mask/prot/port): (0.0.0.0/0.0.0.0/0/0)
```

```
remote ident (addr/mask/prot/port): (192.168.10.1/255.255.255.255/0/0)
```

```
current_peer: 172.18.173.77
```

```
dynamic allocated peer ip: 192.168.10.1
```

```
#pkts encaps: 12, #pkts encrypt: 12, #pkts digest: 12
```

```
#pkts decaps: 12, #pkts decrypt: 12, #pkts verify: 12
```

```
#pkts compressed: 0, #pkts decompressed: 0
```

```
#pkts not compressed: 12, #pkts comp failed: 0, #pkts decomp failed: 0
```

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

```
local crypto endpt.: 172.18.124.170, remote crypto endpt.: 172.18.173.77
```

```
path mtu 1500, ipsec overhead 60, media mtu 1500
```

```
current outbound spi: 1ECCB41D
```

```
inbound esp sas:
```

```
spi: 0x6C1615A7 (1813386663)
```

```
transform: esp-3des esp-sha-hmac
```

```
in use settings ={RA, Tunnel, }
```

```
slot: 0, conn_id: 5, crypto-map: rtpdynmap
```

```
sa timing: remaining key lifetime (sec): 28761
```

```
IV size: 8 bytes
```

```
replay detection support: Y
```

```
outbound esp sas:
```

```
spi: 0x1ECCB41D (516731933)
```

```
transform: esp-3des esp-sha-hmac
```

```
in use settings ={RA, Tunnel, }
```

```
slot: 0, conn_id: 5, crypto-map: rtpdynmap
```

```
sa timing: remaining key lifetime (sec): 28760
```

```
IV size: 8 bytes
```

```
replay detection support: Y
```

```
Crypto map tag: mymap, local addr: 172.18.124.170
```

```
!-- IPsec SA for connection between the VPN Clients network and PIX3 network.
```

```
local ident (addr/mask/prot/port): (192.168.10.0/255.255.255.0/0/0)
```

```
remote ident (addr/mask/prot/port): (10.11.10.0/255.255.255.0/0/0)
```

```
current_peer: 172.20.77.10
```

```
#pkts encaps: 8, #pkts encrypt: 8, #pkts digest: 8
#pkts decaps: 8, #pkts decrypt: 8, #pkts verify: 8
#pkts compressed: 0, #pkts decompressed: 0
#pkts not compressed: 8, #pkts comp failed: 0, #pkts decomp failed: 0
#send errors: 0, #recv errors: 0

local crypto endpt.: 172.18.124.170, remote crypto endpt.: 172.20.77.10

path mtu 1500, ipsec overhead 60, media mtu 1500
current outbound spi: 9EF2885C

inbound esp sas:
spi: 0x82E9BF07 (2196356871)
transform: esp-3des esp-sha-hmac
in use settings ={L2L, Tunnel, }
slot: 0, conn_id: 4, crypto-map: mymap
sa timing: remaining key lifetime (kB/sec): (4274999/28786)
IV size: 8 bytes
replay detection support: Y

outbound esp sas:
spi: 0x9EF2885C (2666694748)
transform: esp-3des esp-sha-hmac
in use settings ={L2L, Tunnel, }
slot: 0, conn_id: 4, crypto-map: mymap
sa timing: remaining key lifetime (kB/sec): (4274999/28786)
IV size: 8 bytes
replay detection support: Y

Crypto map tag: mymap, local addr: 172.18.124.170

/--- IPsec security association for a connection between
/--- the PIX1 and PIX3 networks.

local ident (addr/mask/prot/port): (10.10.10.0/255.255.255.0/0/0)
remote ident (addr/mask/prot/port): (10.11.10.0/255.255.255.0/0/0)
current_peer: 172.20.77.10

#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: 4, #pkts comp failed: 0, #pkts decomp failed: 0
#send errors: 0, #recv errors: 0

local crypto endpt.: 172.18.124.170, remote crypto endpt.: 172.20.77.10

path mtu 1500, ipsec overhead 60, media mtu 1500
current outbound spi: C86585AB

inbound esp sas:
spi: 0x95604966 (2506115430)
transform: esp-3des esp-sha-hmac
in use settings ={L2L, Tunnel, }
slot: 0, conn_id: 4, crypto-map: mymap
sa timing: remaining key lifetime (kB/sec): (4274999/28653)
IV size: 8 bytes
replay detection support: Y

outbound esp sas:
spi: 0xC86585AB (3362096555)
transform: esp-3des esp-sha-hmac
in use settings ={L2L, Tunnel, }
slot: 0, conn_id: 4, crypto-map: mymap
sa timing: remaining key lifetime (kB/sec): (4274999/28652)
```

IV size: 8 bytes  
replay detection support: Y

### PIX3 Verification

```
PIX3(config)#show crypto isakmp sa
Total : 1
Embryonic : 0
dst          src          state  pending  created
172.18.124.170 172.20.77.10 QM_IDLE 0         2
PIX3(config)#show crypto ipsec sa

interface: outside
Crypto map tag: mymap, local addr. 172.20.77.10

!--- IPsec security association for a connection between
!--- the PIX3 and PIX1 networks.

local ident (addr/mask/prot/port): (10.11.10.0/255.255.255.0/0/0)
remote ident (addr/mask/prot/port): (10.10.10.0/255.255.255.0/0/0)
current_peer: 172.18.124.170:500
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.: 172.20.77.10, remote crypto endpt.: 172.18.124.170
path mtu 1500, ipsec overhead 56, media mtu 1500
current outbound spi: 95604966

inbound esp sas:
spi: 0xc86585ab(3362096555)
transform: esp-3des esp-sha-hmac ,
in use settings ={Tunnel, }
slot: 0, conn id: 4, crypto map: mymap
sa timing: remaining key lifetime (k/sec): (4607999/28213)
IV size: 8 bytes
replay detection support: Y

inbound ah sas:

inbound pcp sas:

outbound esp sas:
spi: 0x95604966(2506115430)
transform: esp-3des esp-sha-hmac ,
in use settings ={Tunnel, }
slot: 0, conn id: 3, crypto map: mymap
sa timing: remaining key lifetime (k/sec): (4607999/28213)
IV size: 8 bytes
replay detection support: Y

outbound ah sas:

outbound pcp sas:
```



```
!--- IPsec security association for the connection between the VPN Client
!--- network and PIX3 networks.

local ident (addr/mask/prot/port): (10.11.10.0/255.255.255.0/0/0)
remote ident (addr/mask/prot/port): (192.168.10.0/255.255.255.0/0/0)
current_peer: 172.18.124.170:500
PERMIT, flags={origin_is_acl,}
#pkts encaps: 8, #pkts encrypt: 8, #pkts digest 8
#pkts decaps: 8, #pkts decrypt: 8, #pkts verify 8
#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.: 172.20.77.10, remote crypto endpt.: 172.18.124.170
path mtu 1500, ipsec overhead 56, media mtu 1500
current outbound spi: 82e9bf07

inbound esp sas:
spi: 0x9ef2885c(2666694748)
transform: esp-3des esp-sha-hmac ,
in use settings ={Tunnel, }
slot: 0, conn id: 2, crypto map: mymap
sa timing: remaining key lifetime (k/sec): (4607999/28295)
IV size: 8 bytes
replay detection support: Y

inbound ah sas:

inbound pcp sas:

outbound esp sas:
spi: 0x82e9bf07(2196356871)
transform: esp-3des esp-sha-hmac ,
in use settings ={Tunnel, }
slot: 0, conn id: 1, crypto map: mymap
sa timing: remaining key lifetime (k/sec): (4607999/28295)
IV size: 8 bytes
replay detection support: Y

outbound ah sas:

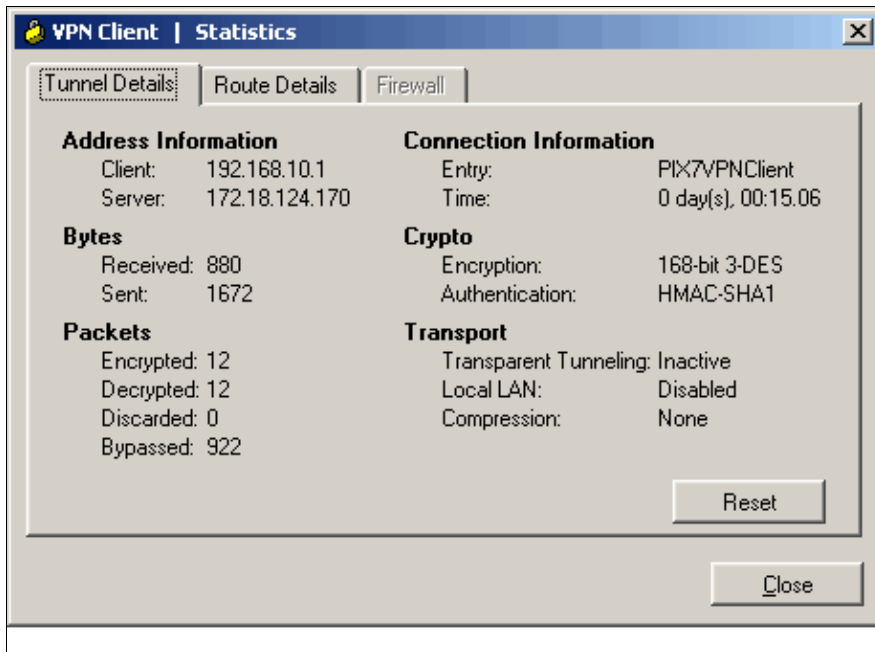
outbound pcp sas:
```

## VPN Client Verification

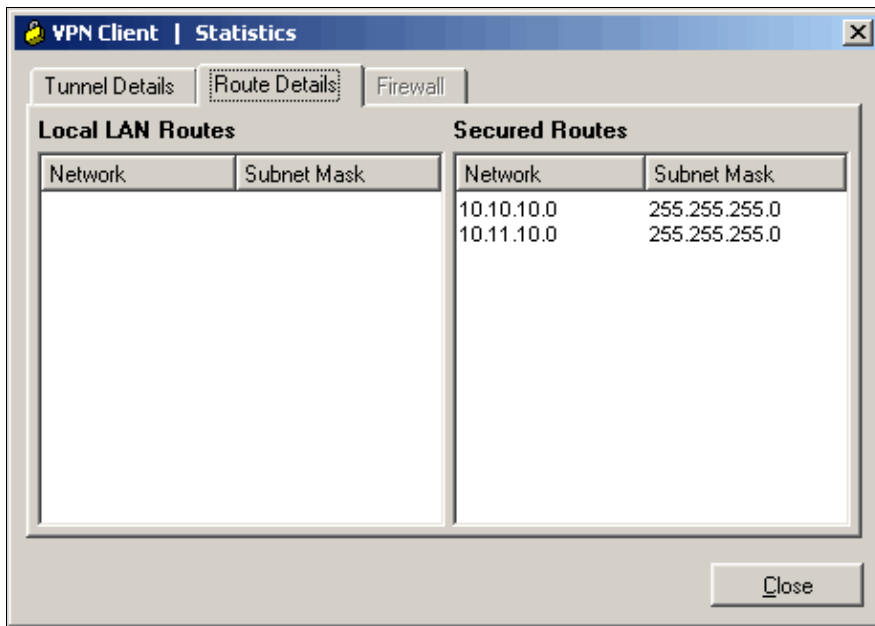
Complete these steps in order to verify the VPN Client:

1. Right-click on the VPN Client lock icon present at the system tray after successful connection and choose the option for **statistics**.

You can view details about the VPN Client connection and encryption and decryption of packet information.



2. Click on the Route Details tab in order to verify the split-tunnel list passed down from the PIX Security Appliance.



## Troubleshoot

This section provides information you can use in order to troubleshoot your configuration.

### Troubleshooting Commands

The Output Interpreter Tool (registered customers only) (OIT) supports certain **show** commands. Use the OIT to view an analysis of **show** command output.

**Note:** Refer to Important Information on Debug Commands before you use **debug** commands.

- **clear crypto isakmp sa** Clears the phase 1 security associations (SAs).
- **clear crypto ipsec sa** Clears the phase 2 SAs

- **debug crypto isakmp sa** Debugs ISAKMP SA negotiations.
  - **debug crypto ipsec sa** Debugs IPsec SA negotiations.
- 

## Related Information

- **PIX Support Page**
  - **Documentation for PIX Firewall**
  - **PIX Command References**
  - **IPsec Negotiation/IKE Protocols**
  - **Cisco VPN Client – Product support**
  - **Requests for Comments (RFCs)**
  - **Technical Support & Documentation – Cisco Systems**
- 

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Updated: Oct 14, 2009

Document ID: 64693

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