

# Router Allows VPN Clients to Connect IPsec and Internet Using Split Tunneling Configuration Example

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## Contents

### Introduction

#### Prerequisites

- Requirements
- Components Used
- Conventions

#### Background Information

#### Configure

- Network Diagram
- Configurations
- VPN Client 4.8 Configuration

#### Verify

#### Troubleshoot

- Troubleshooting Commands

#### Related Information

## Introduction

This document provides step-by-step instructions on how to allow VPN Clients access to the Internet while they are tunneled into a Cisco IOS® Router. This configuration is required to allow the VPN Clients secure access to corporate resources via IPsec and at the same time allow unsecured access to the Internet. This configuration is called split tunneling.

**Note:** Split tunneling can pose a security risk when configured. Since VPN Clients have unsecured access to the Internet, they can be compromised by an attacker. That attacker is then able to access the corporate LAN via the IPsec tunnel. A compromise between full tunneling and split tunneling can be to allow VPN Clients local LAN access only. Refer to PIX/ASA 7.x: Allow Local LAN Access for VPN Clients Configuration Example for more information.

## Prerequisites

### Requirements

There are no specific requirements for this document.

### Components Used

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

- Cisco Router 3640 with Cisco IOS Software Release 12.4
- Cisco VPN Client 4.8

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 the Cisco Technical Tips Conventions for more information on document conventions.

## Background Information

Remote access VPNs address the requirement of the mobile workforce to securely connect to the organization's network. Mobile users are able to set up a secure connection using the VPN Client software installed on their PCs. The VPN Client initiates a connection to a central site device configured to accept these requests. In this example, the central site device is a Cisco IOS Router that uses dynamic crypto maps.

When you enable split tunneling for VPN connections, it requires the configuration of an access control list (ACL) on the router. In this example, the **access-list 101** command is associated with the group for split tunneling purposes, and the tunnel is formed to the 10.10.10.x/24 network. Unencrypted traffic flows (for example, the Internet) to devices are excluded from the networks configured in ACL 101.

```
access-list 101 permit ip 10.10.10.0 0.0.0.255 192.168.1.0 0.0.0.255
```

Apply the ACL on the group properties.

```
crypto isakmp client configuration group vpngroup
key cisco123
dns 10.10.10.10
wins 10.10.10.20
domain cisco.com
pool ippool
acl 101
```

In this configuration example, an IPsec tunnel is configured with these elements:

- Crypto maps applied to the outside interfaces on the PIX
- Extended authentication (Xauth) of the VPN Clients against a local authentication
- Dynamic assignment of a private IP address from a pool to VPN Clients
- The **nat 0 access-list** command functionality, which allows hosts on a LAN to use private IP addresses with a remote user and still get a Network Address Translation (NAT) address from the PIX to visit an untrusted network.

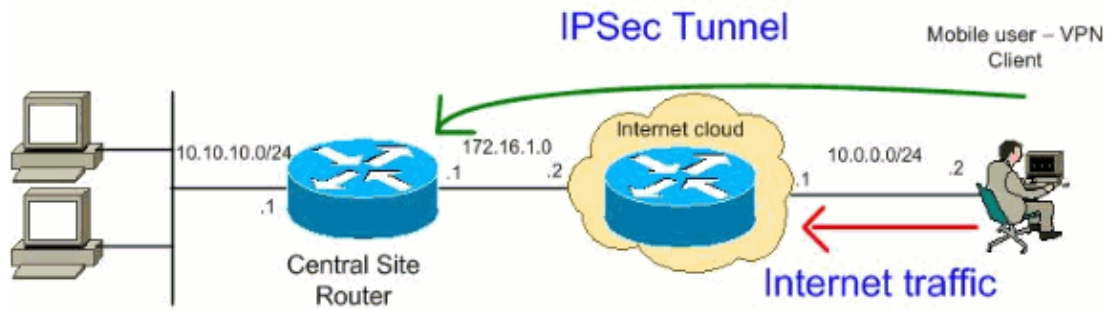
## Configure

In this section, you are presented with the information to configure the features described in this document.

**Note:** Use the Command Lookup Tool (registered customers only) to obtain more information on the commands used in this section.

## 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:

- Router
- Cisco VPN Client

Router
<pre> VPN#show run Building configuration...  Current configuration : 2170 bytes ! version 12.4 service timestamps debug datetime msec service timestamps log datetime msec no service password-encryption ! hostname VPN ! boot-start-marker boot-end-marker ! !  !--- Enable authentication, authorization and accounting (AAA) !--- for user authentication and group authorization.  aaa new-model !  !--- In order to enable Xauth for user authentication, !--- enable the <b>aaa authentication</b> commands.  aaa authentication login userauthen local  !--- In order to enable group authorization, enable !--- the <b>aaa authorization</b> commands.  aaa authorization network groupauthen local ! aaa session-id common ! resource policy </pre>

```
!  
!  
  
!--- For local authentication of the IPsec user,  
!--- create the user with a password.  
  
username user password 0 cisco  
!  
!  
!  
  
!--- Create an Internet Security Association and  
!--- Key Management Protocol (ISAKMP) policy for Phase 1 negotiations.  
  
crypto isakmp policy 3  
  encr 3des  
  authentication pre-share  
  group 2  
  
!--- Create a group that is used to specify the  
!--- WINS and DNS server addresses to the VPN Client,  
!--- along with the pre-shared key for authentication. Use ACL 101 used for  
!--- the Split tunneling in the VPN Client end.  
  
crypto isakmp client configuration group vpnclient  
  key cisco123  
  dns 10.10.10.10  
  wins 10.10.10.20  
  domain cisco.com  
  pool ippool  
  acl 101  
!  
  
!--- Create the Phase 2 Policy for actual data encryption.  
  
crypto ipsec transform-set myset esp-3des esp-md5-hmac  
!  
  
!--- Create a dynamic map and apply  
!--- the transform set that was created earlier.  
  
crypto dynamic-map dynmap 10  
  set transform-set myset  
  reverse-route  
!  
  
!--- Create the actual crypto map,  
!--- and apply the AAA lists that were created earlier.  
  
crypto map clientmap client authentication list userauthen  
crypto map clientmap isakmp authorization list groupauthor  
crypto map clientmap client configuration address respond  
crypto map clientmap 10 ipsec-isakmp dynamic dynmap  
!  
!
```

```

!
!
interface Ethernet0/0
 ip address 10.10.10.1 255.255.255.0
 half-duplex
 ip nat inside

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

interface FastEthernet1/0
 ip address 172.16.1.1 255.255.255.0
 ip nat outside
 ip virtual-reassembly
 duplex auto
 speed auto
 crypto map clientmap
!
interface Serial2/0
 no ip address
!
interface Serial2/1
 no ip address
 shutdown
!
interface Serial2/2
 no ip address
 shutdown
!
interface Serial2/3
 no ip address
 shutdown

!--- Create a pool of addresses to be
!--- assigned to the VPN Clients.

!
ip local pool ippool 192.168.1.1 192.168.1.2
ip http server
no ip http secure-server
!
ip route 0.0.0.0 0.0.0.0 172.16.1.2

!--- Enables Network Address Translation (NAT)
!--- of the inside source address that matches access list 111
!--- and gets PATed with the FastEthernet IP address.

ip nat inside source list 111 interface FastEthernet1/0 overload
!

!--- The access list is used to specify which traffic
!--- is to be translated for the outside Internet.

access-list 111 deny ip 10.10.10.0 0.0.0.255 192.168.1.0 0.0.0.255
access-list 111 permit ip any any

!--- Configure the interesting traffic to be encrypted from the VPN Client
!--- to the central site router (access list 101).
!--- Apply this ACL in the ISAKMP configuration.

```

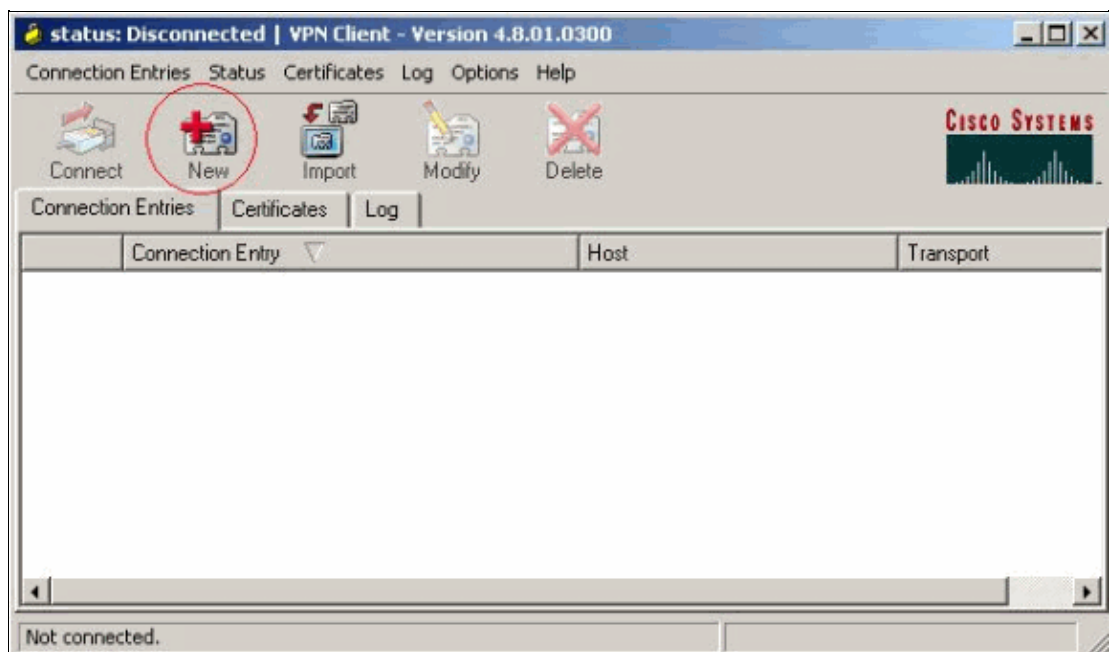
```
access-list 101 permit ip 10.10.10.0 0.0.0.255 192.168.1.0 0.0.0.255

control-plane
!
line con 0
line aux 0
line vty 0 4
!
end
```

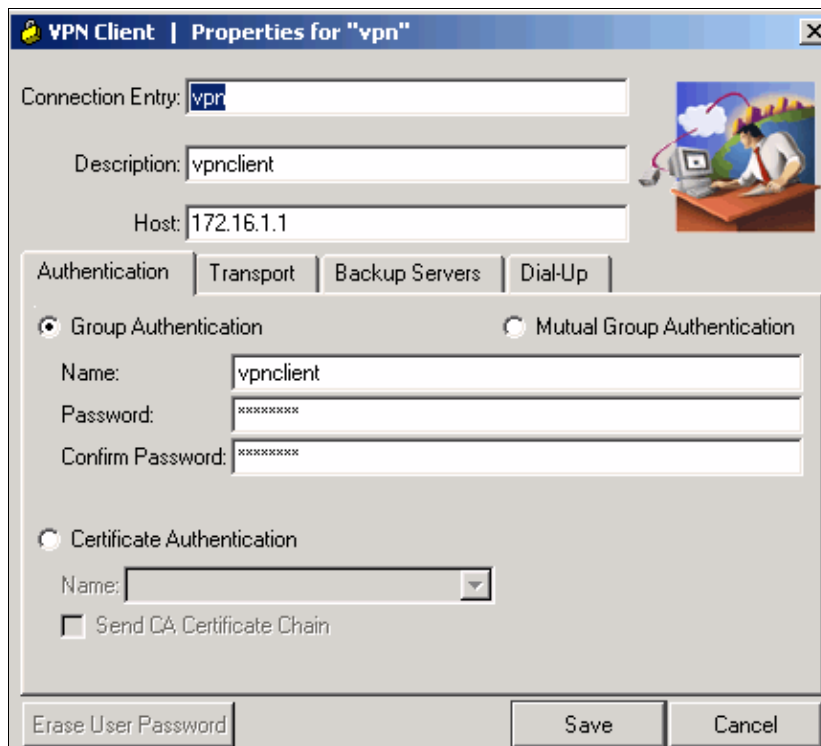
## VPN Client 4.8 Configuration

Complete these steps in order to configure the VPN Client 4.8.

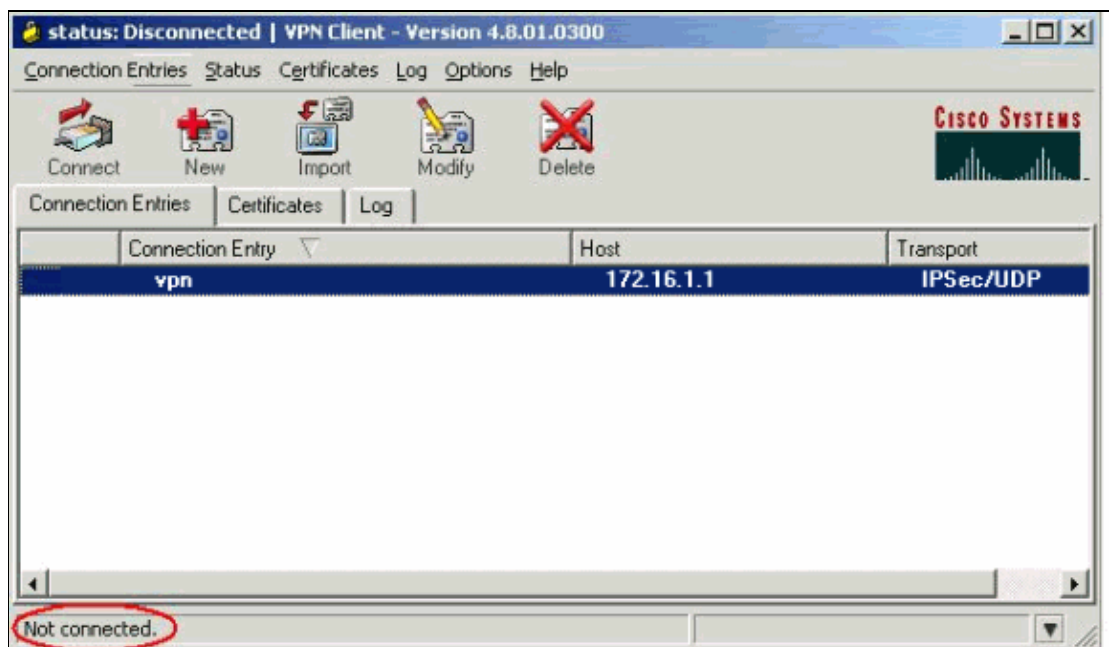
1. Choose **Start > Programs > Cisco Systems VPN Client > VPN Client**.
2. Click **New** in order to launch the Create New VPN Connection Entry window.



3. Enter the name of the Connection Entry along with a description, enter the outside IP address of the router in the Host box, and enter the VPN Group name and password. Click **Save**.



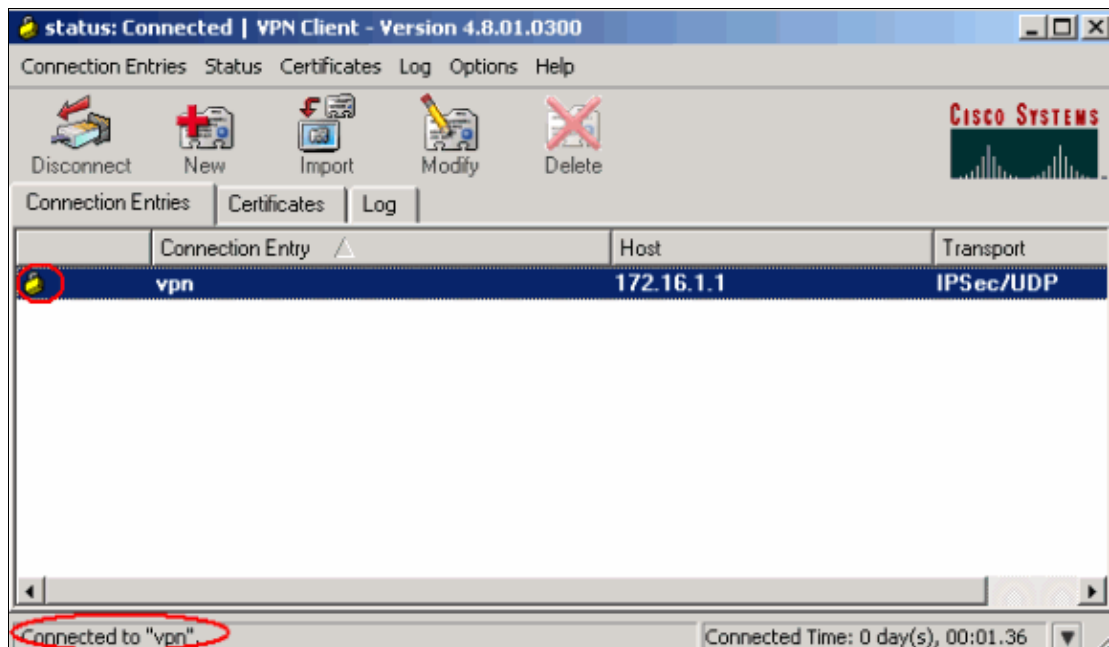
- Click on the connection you would like to use and click **Connect** from the VPN Client main window.



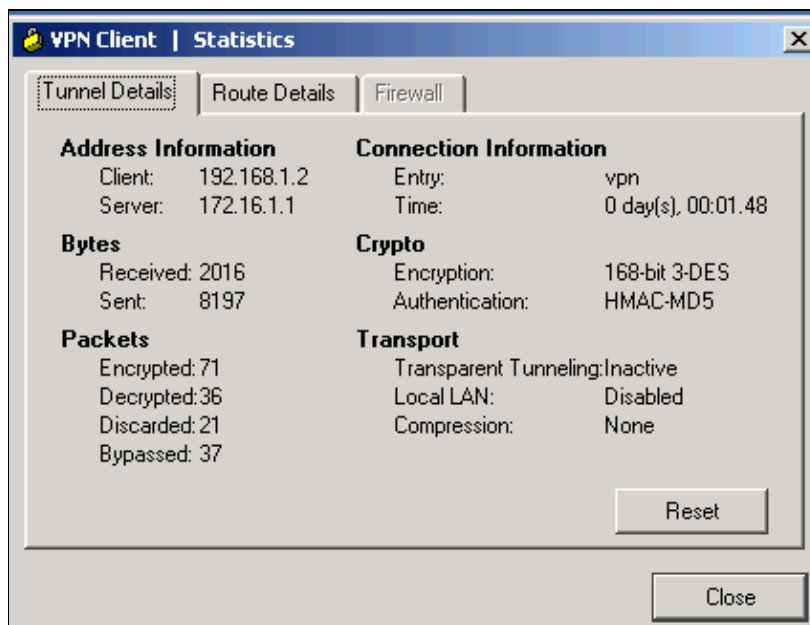
- When prompted, enter the Username and Password information for Xauth and click **OK** in order to connect to the remote network.



- The VPN Client gets connected with the router at the central site.



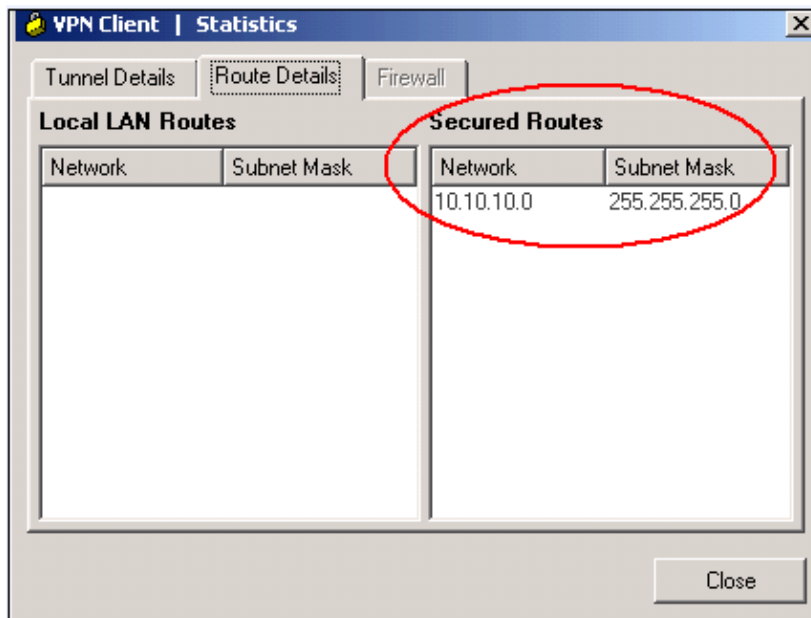
7. Choose **Status > Statistics** in order to check the tunnel statistics of the VPN Client.



8. Go to the Route Details tab in order to see the routes that the VPN Client secures to the router.

In this example, the VPN Client secures access to 10.10.10.0/24 while all other traffic is not encrypted and not sent across the tunnel. The secured network is downloaded from ACL 101 which is configured in the central site router.





## Verify

This section provides information you can use 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** Shows all current IKE Security Associations (SAs) at a peer.

```
VPN#show crypto ipsec sa
```

```
interface: FastEthernet1/0
  Crypto map tag: clientmap, local addr 172.16.1.1

protected vrf: (none)
local  ident (addr/mask/prot/port): (0.0.0.0/0.0.0.0/0/0)
remote ident (addr/mask/prot/port): (192.168.1.1/255.255.255.255/0/0)
current_peer 10.0.0.2 port 500
  PERMIT, flags={}
  #pkts encaps: 270, #pkts encrypt: 270, #pkts digest: 270
  #pkts decaps: 270, #pkts decrypt: 270, #pkts verify: 270
  #pkts compressed: 0, #pkts decompressed: 0
  #pkts not compressed: 0, #pkts compr. failed: 0
  #pkts not decompressed: 0, #pkts decompress failed: 0
  #send errors 0, #recv errors 0

local crypto endpt.: 172.16.1.1, remote crypto endpt.: 10.0.0.2
path mtu 1500, ip mtu 1500, ip mtu idb FastEthernet1/0
current outbound spi: 0xEF7C20EA(4017889514)

inbound esp sas:
  spi: 0x17E0CBEC(400608236)
    transform: esp-3des esp-md5-hmac ,
    in use settings = {Tunnel, }
    conn id: 2001, flow_id: SW:1, crypto map: clientmap
    sa timing: remaining key lifetime (k/sec): (4530341/3288)
    IV size: 8 bytes
    replay detection support: Y
    Status: ACTIVE

inbound ah sas:
```

```

inbound pcp sas:

outbound esp sas:
spi: 0xEF7C20EA(4017889514)
transform: esp-3des esp-md5-hmac ,
in use settings ={Tunnel, }
conn id: 2002, flow_id: SW:2, crypto map: clientmap
sa timing: remaining key lifetime (k/sec): (4530354/3287)
IV size: 8 bytes
replay detection support: Y
Status: ACTIVE

outbound ah sas:

outbound pcp sas:

```

- **show crypto ipsec sa** Shows the settings used by current SAs.

```

VPN#show crypto isakmp sa
dst          src          state          conn-id slot status
172.16.1.1   10.0.0.2   QM_IDLE        15      0  ACTIVE

```

## Troubleshoot

### 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.

- **debug crypto ipsec** Displays the IPsec negotiations of Phase 2.
- **debug crypto isakmp** Displays the ISAKMP negotiations of Phase 1.

## Related Information

- [IPsec Negotiation/IKE Protocols](#)
- [Cisco VPN Client – Product support](#)
- [Cisco Router – Product Support](#)
- [Technical Support & Documentation – Cisco Systems](#)

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