equinux

VPN Configuration Guide

LANCOM®

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Introduction

This document describes how VPN Tracker can be used to establish a connection between a Macintosh running Mac OS X and a LANCOM VPN router.

The LANCOM firewall is configured as a router connecting a company LAN to the Internet.

This paper is only a supplement to, not a replacement for, the instructions that have been included with your LANCOM device. Please be sure to read those instructions and understand them before starting.

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Prerequisites

First make sure to use a recent LANCOM firmware version. The latest release for your LANCOM firewall can be obtained from http://www.lancom-systems.com.

For this document, LCOS 6.32.0021 and 7.28.0031 were used.

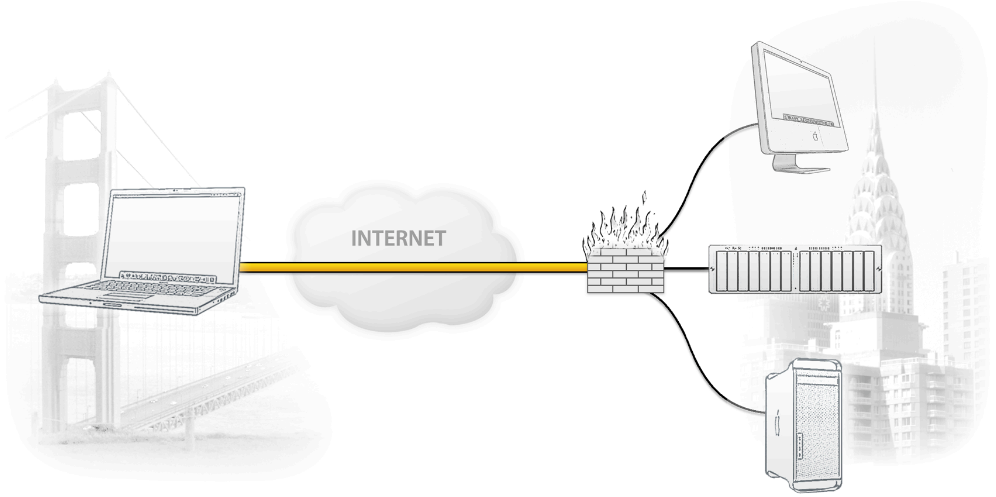
Please note: VPN Tracker has been tested with the LANCOM 1721 VPN device and the above firmware versions. The instructions should also apply to other LANCOM VPN devices with these these firmware revisions.

You will need one VPN Tracker Personal Edition license for each Mac connecting to the LANCOM device.

We recommend one VPN Tracker Professional Edition for the administrator's Mac in order to export configuration files to the clients. VPN Tracker is compatible with Mac OS X 10.4 and 10.5.

Scenario

In our example, we need to connect an employee's Mac Book in San Francisco to an office in New York. The following diagram illustrates this scenario:



The MacBook is connected directly to the Internet, and has a public IP address, assigned by an ISP.

The office's LANCOM VPN gateway is also connected to the Internet and can be accessed via an static IP address. The VPN gateway has a second interface which is connected to the internal office network. In our example, the office network has the IP range 192.168.1.0/24.

A VPN tunnel will be established between the public interfaces in San Francisco and New York. Once the VPN tunnel is up, San Francisco can access the office network behind the VPN gateway.

Please note that the connection from a MacBook at home to an office network is just one possible scenario. The instructions also apply to connections from a desktop computer or notebook in your office to a VPN gateway at home or at another office. Please adapt the term "office network", which is used throughout this manual, to your scenario.

Terminology

Each VPN connection is established between two peers. In the case of VPN Tracker, one peer is a Mac running VPN Tracker ("client"), the other is (usually) a gateway capable of handling VPN tunnels. Please note that for each peer, the settings on the other peer are considered to be "remote", while the own settings are called "local": a "local" setting from VPN Tracker's perspective, is a "remote" setting from the VPN gateway's perspective, and vice versa.

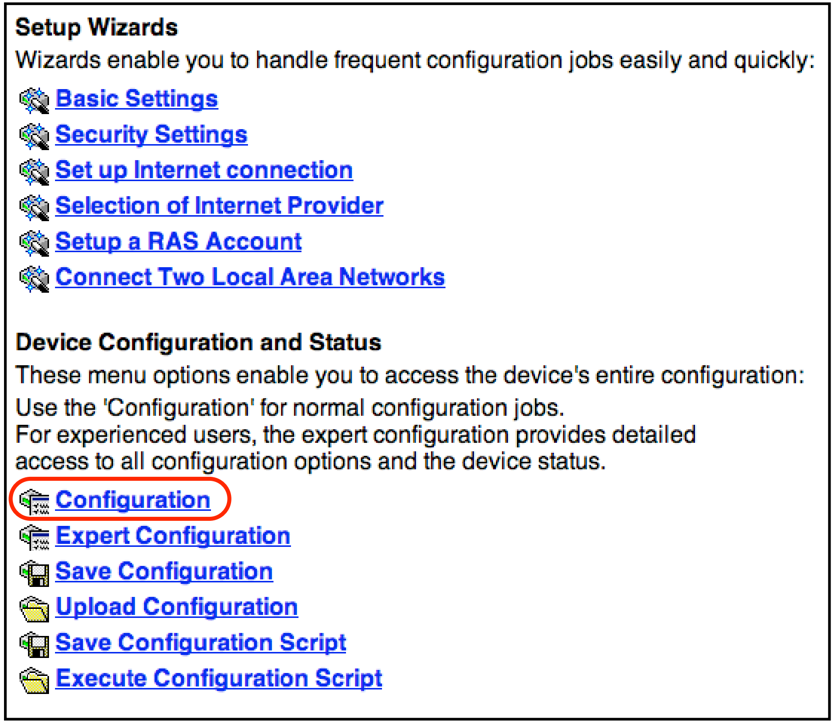
A list of terms used by LANCOM, and their corresponding terms in VPN Tracker can be found in Appendix: Terminology Matrix.

Task 1 – Configure your VPN Device

This section describes the configuration of your LANCOM VPN router.

TIP To setup your VPN connection, you'll need to keep track of certain pieces of information. Those details are indicated by red numbers. Throughout this guide we will be referencing those numbers.

Step 1 – Access the Configuration Menu



Setup Wizards

Wizards enable you to handle frequent configuration jobs easily and quickly:

- Basic Settings
- Security Settings
- Set up Internet connection
- Selection of Internet Provider
- Setup a RAS Account
- Connect Two Local Area Networks

Device Configuration and Status

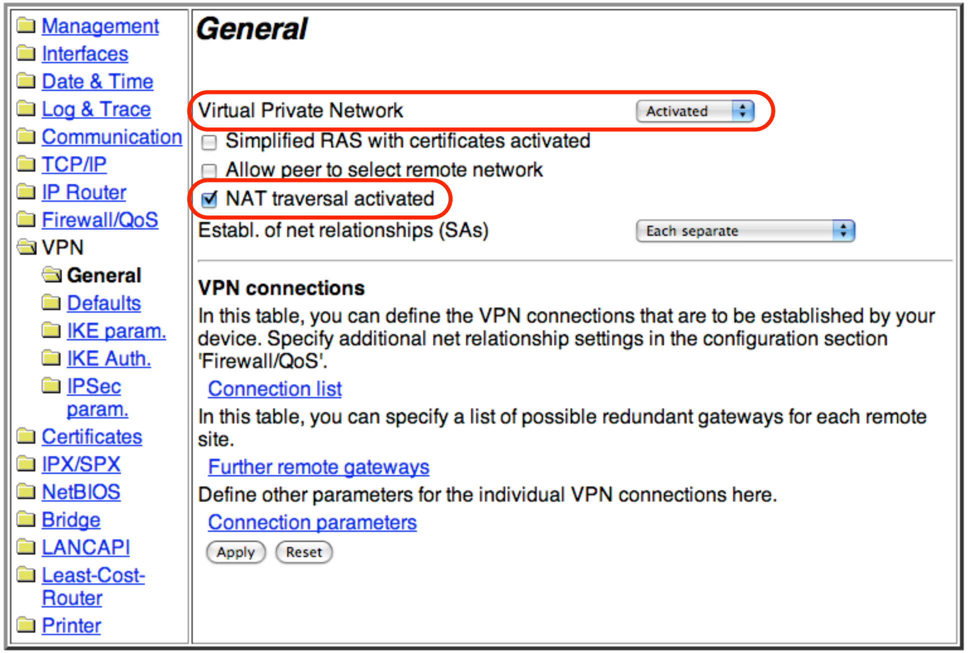
These menu options enable you to access the device's entire configuration:

Use the 'Configuration' for normal configuration jobs.
For experienced users, the expert configuration provides detailed
access to all configuration options and the device status.

- Configuration
- Expert Configuration
- Save Configuration
- Upload Configuration
- Save Configuration Script
- Execute Configuration Script

- Access your LANCOM's configuration web interface
- Click on "Configuration"

Step 2 – Activate VPN



General

Virtual Private Network: Activated

□ Simplified RAS with certificates activated

□ Allow peer to select remote network

☑ NAT traversal activated

Establ. of net relationships (SAs): Each separate

VPN connections

In this table, you can define the VPN connections that are to be established by your device. Specify additional net relationship settings in the configuration section 'Firewall/QoS'.

Connection list

In this table, you can specify a list of possible redundant gateways for each remote site.

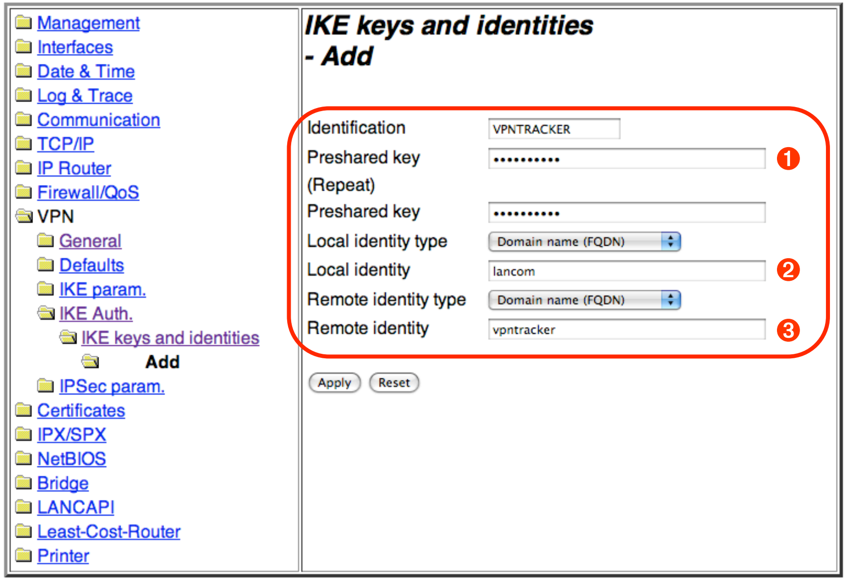
Further remote gateways

Define other parameters for the individual VPN connections here.

Connection parameters

- Select “VPN > General”
- **Virtual Private Network:** Select “Activated” from the pop-up list
- **NAT traversal activated**: Please make sure this box is checked
- Click “Apply“

Step 3 – Add an IKE Identity



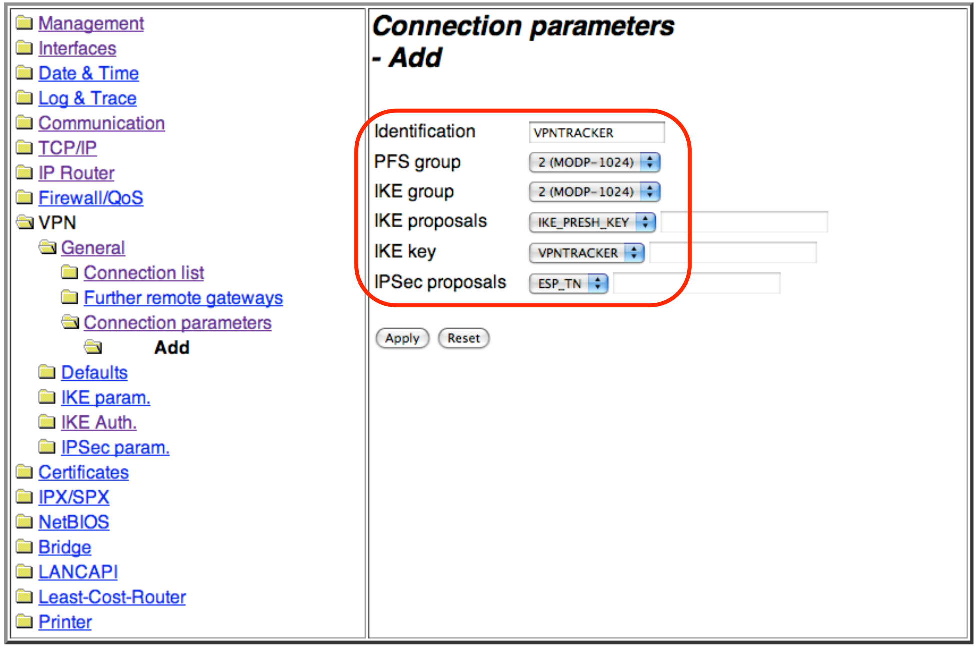
IKE keys and identities - Add

Identification	VPNTRACKER	
Preshared key	••••••••••	❶
(Repeat) Preshared key	••••••••••	
Local identity type	Domain name (FQDN)	
Local identity	lancom	❷
Remote identity type	Domain name (FQDN)	
Remote identity	vpntracker	❸

- Select “VPN > IKE Auth.“
- Click “IKE keys and identities”
- Click “Add”
- **Identification:** VPNTRACKER
- Enter a **pre-shared key.** This will be the password for connecting to the VPN ❶
- Repeat the pre-shared key
- **Local identity type:** Domain name (FQDN)
- **Local Identity:** Enter an arbitrary identifier (e.g. lancom) ❷
- **Remote identity type:** Domain name (FQDN)
- **Remote identity:** Enter an arbitrary identifier (e.g. vpntracker) ❸
- Click “Apply”

TIP Don’t forget to remember (or write down) what you entered for the pre-shared key ❶, the local identity ❷, and the remote identity ❸

Step 4 – Add Connection Parameters

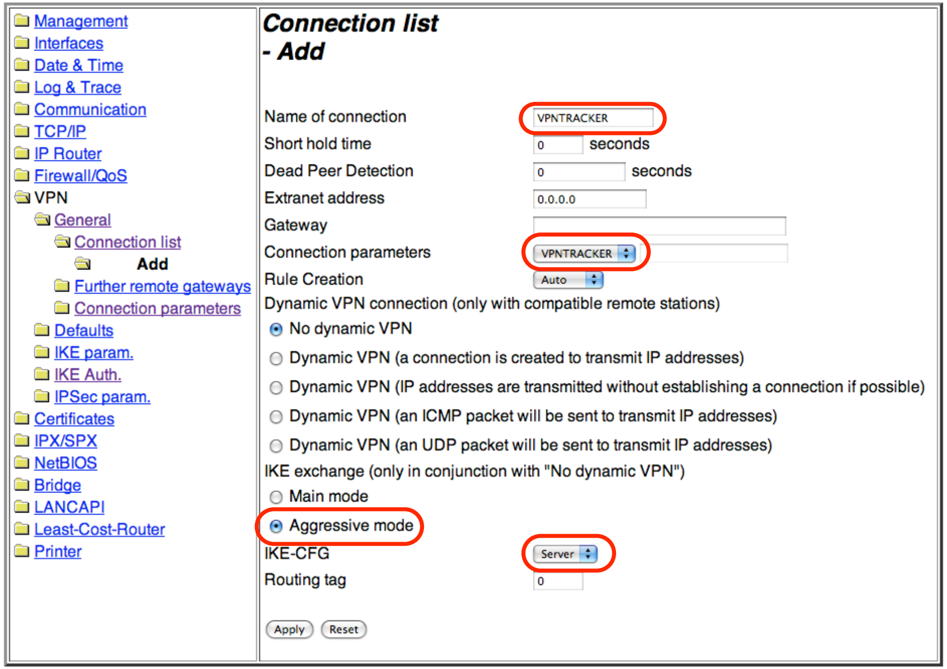


Connection parameters - Add

Identification	VPNTRACKER
PFS group	2 (MODP-1024)
IKE group	2 (MODP-1024)
IKE proposals	IKE_PRESH_KEY
IKE key	VPNTRACKER
IPSec proposals	ESP_TN

- Select “VPN > General“
- Click “Connection parameters”
- Click “Add”
- **Identification**: VPNTRACKER
- **PFS group**: Select “2 (MODP - 1024)”
- **IKE group**: Select “2 (MODP -1024)”
- **IKE proposals**: Select “IKE_PRESH_KEY”
- **IKE key**: Select “VPNTRACKER”
- **IPSec proposals**: Select “ESP_TN”

Step 5 – Add a VPN Connection



Connection list - Add

Name of connection	VPNTRACKER
Short hold time	0 seconds
Dead Peer Detection	0 seconds
Extranet address	0.0.0.0
Gateway	
Connection parameters	VPNTRACKER
Rule Creation	Auto

Dynamic VPN connection (only with compatible remote stations)

● No dynamic VPN

○ Dynamic VPN (a connection is created to transmit IP addresses)

○ Dynamic VPN (IP addresses are transmitted without establishing a connection if possible)

○ Dynamic VPN (an ICMP packet will be sent to transmit IP addresses)

○ Dynamic VPN (an UDP packet will be sent to transmit IP addresses)

IKE exchange (only in conjunction with "No dynamic VPN")

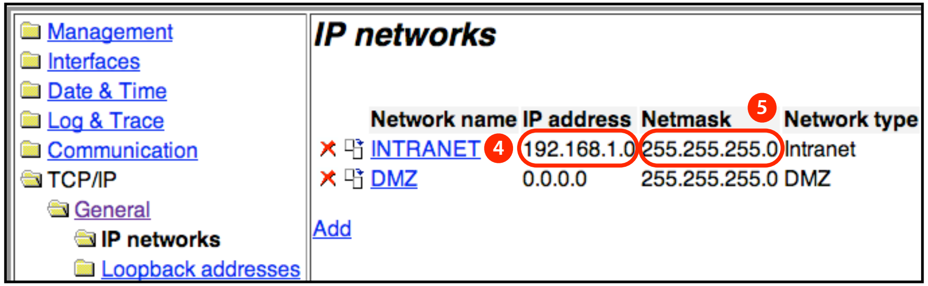
○ Main mode

● Aggressive mode

IKE-CFG	Server
Routing tag	0

- Select “VPN > General“
- Click “Connection list”
- Click “Add”
- **Name of connection**: VPNTRACKER
- **Connection parameters**: Select “VPNTRACKER” from the pop-up
- **IKE exchange:** Select “Aggressive Mode”
- **IKE-CFG**: Select “Server”
- Click “Apply”

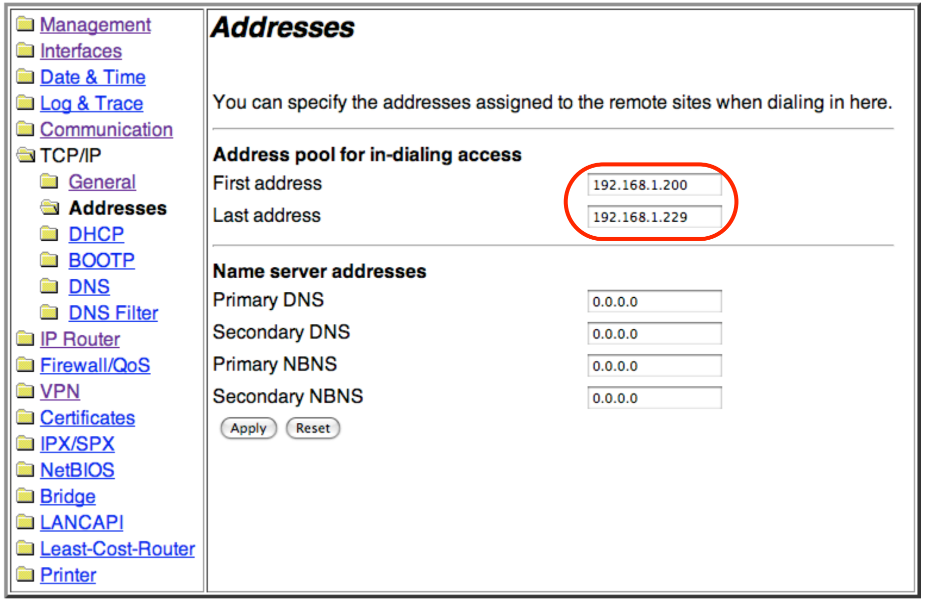
Step 6a – Retrieve your Intranet Information



IP networks

	Network name	IP address	Netmask	Network type
✕	INTRANET	192.168.1.0	255.255.255.0	Intranet
✕	DMZ	0.0.0.0	255.255.255.0	DMZ

- Select “TCP/IP > General > IP Networks“
- Find the “INTRANET” entry in the list and write down the **IP address** 4 and **netmask** 5



Addresses

You can specify the addresses assigned to the remote sites when dialing in here.

Address pool for in-dialing access

First address	192.168.1.200
Last address	192.168.1.229

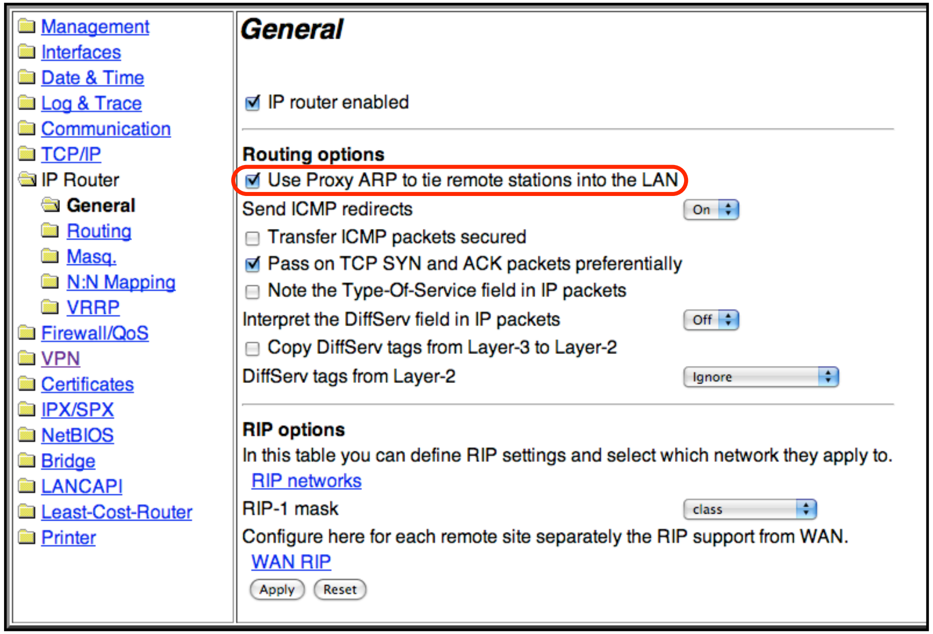
Name server addresses

Primary DNS	0.0.0.0
Secondary DNS	0.0.0.0
Primary NBNS	0.0.0.0
Secondary NBNS	0.0.0.0

- Select “TCP/IP > Addresses“
- Address pool for in-dialing access: Enter a range of IP addresses from the intranet network that is not used for other purposes (e.g. DHCP or static addresses). Make sure this pool has enough addresses for all clients that you expect to connect.
- Click “Apply”

Step 6b – Add an In-Dialing Address Pool

Step 7 – Enable Proxy ARP



General

☑ IP router enabled

Routing options

☑ Use Proxy ARP to tie remote stations into the LAN

Send ICMP redirects: On

□ Transfer ICMP packets secured

☑ Pass on TCP SYN and ACK packets preferentially

□ Note the Type-Of-Service field in IP packets

Interpret the DiffServ field in IP packets: Off

□ Copy DiffServ tags from Layer-3 to Layer-2

DiffServ tags from Layer-2: Ignore

RIP options

In this table you can define RIP settings and select which network they apply to.

RIP networks

RIP-1 mask: class

Configure here for each remote site separately the RIP support from WAN.

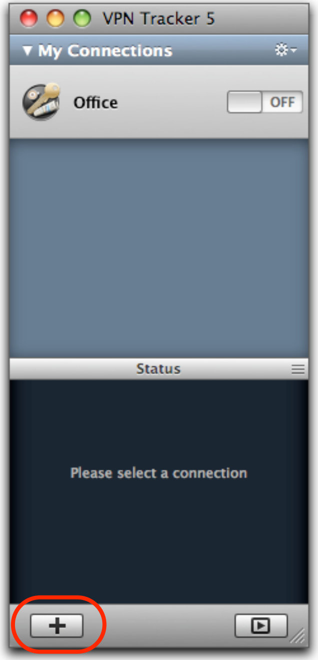
WAN RIP

- Select "IP Router > General"
- Check the box **"Use Proxy ARP to tie remote stations into the LAN"**
- Click "Apply"

Task 2 – Configure VPN Tracker

This section describes how to configure VPN Tracker.

Step 1 - Create a New Connection



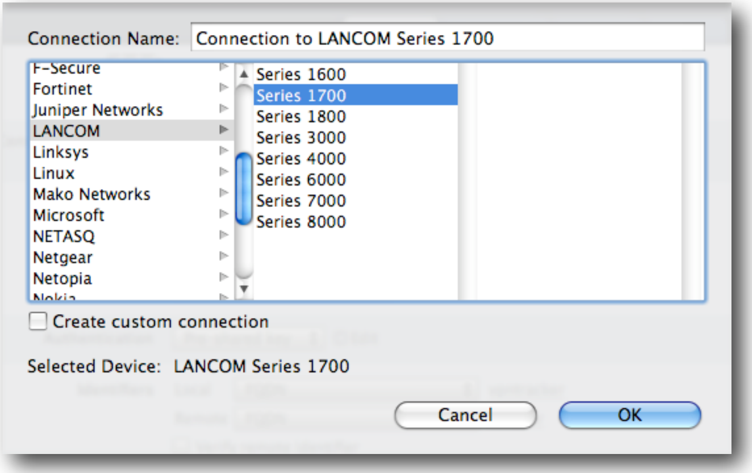
Please select a connection

- Start VPN Tracker 5
- Click the "+" button in the main window

Step 2 – Select a VPN Device

For many VPN gateways, VPN Tracker 5 provides pre-defined profiles, based on the device's default settings.

Note If you have changed any of the factory settings while configuring the device (other than as described in this document), you might have to adjust the "Advanced" settings in VPN Tracker. This is explained in detail in the VPN Tracker 5 manual. Please see the appendix of this document for a mapping of LANCOM terms to VPN Tracker terms.



Connection Name: Connection to LANCOM Series 1700

□ Create custom connection

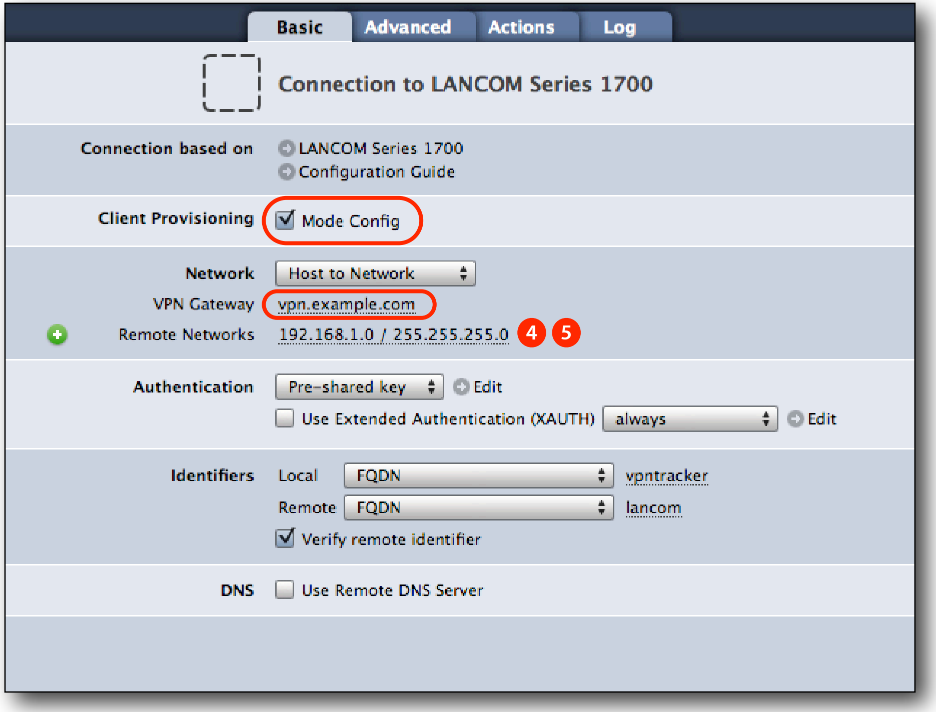
Selected Device: LANCOM Series 1700

- Select "LANCOM" from the list
- Select your device from the list of LANCOM devices
- **Connection Name**: Choose a name for your connection (e.g. "New York Office")
- Click "Ok"

Step 3 – Configure IP Addresses

There are two important addresses involved in a VPN tunnel:

- ✦ The VPN gateway's public address (aka WAN IP)
- ✦ Your office (intranet) network's IP address at the gateway's end of your VPN tunnel (i.e. the network you want to access through the VPN gateway)



Connection to LANCOM Series 1700

Connection based on: LANCOM Series 1700, Configuration Guide

Client Provisioning: ☑ Mode Config

Network: Host to Network

VPN Gateway: vpn.example.com

Remote Networks: 192.168.1.0 / 255.255.255.0 4 5

Authentication: Pre-shared key — Edit

□ Use Extended Authentication (XAUTH) always — Edit

Identifiers: Local FQDN vpntracker

Remote FQDN lancom

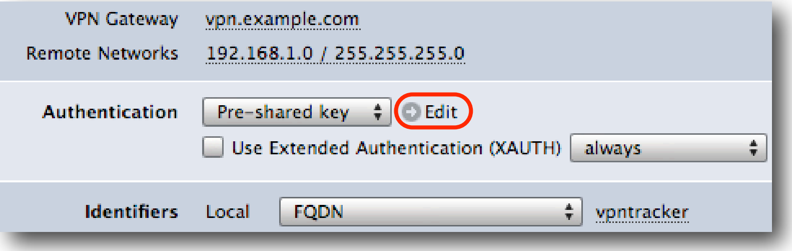
☑ Verify remote identifier

DNS: □ Use Remote DNS Server

- Make sure the **Mode Config** box is checked
- **VPN Gateway:** Enter your LANCOM's public IP address (WAN IP) or its host name
- **Remote Networks:** Enter the LANCOM's intranet network address 4 and network mask 5, separated by a slash

Step 4 – Configure Authentication

Each VPN tunnel requires mutual authentication of both the client and the gateway. This authentication can be provided by a pre-shared key.



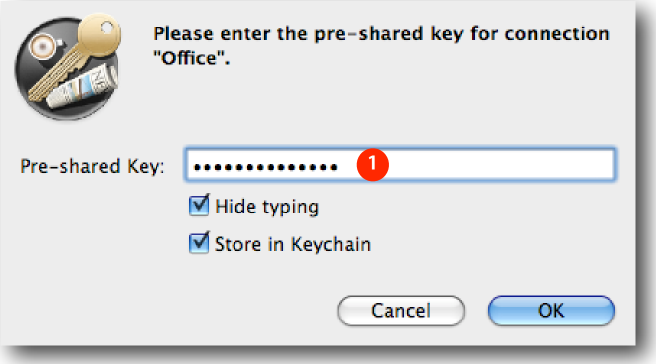
VPN Gateway vpn.example.com

Remote Networks 192.168.1.0 / 255.255.255.0

Authentication Pre-shared key Edit

□ Use Extended Authentication (XAUTH) always

Identifiers Local FQDN vpntracker



Please enter the pre-shared key for connection "Office".

Pre-shared Key: •••••••••••••• 1

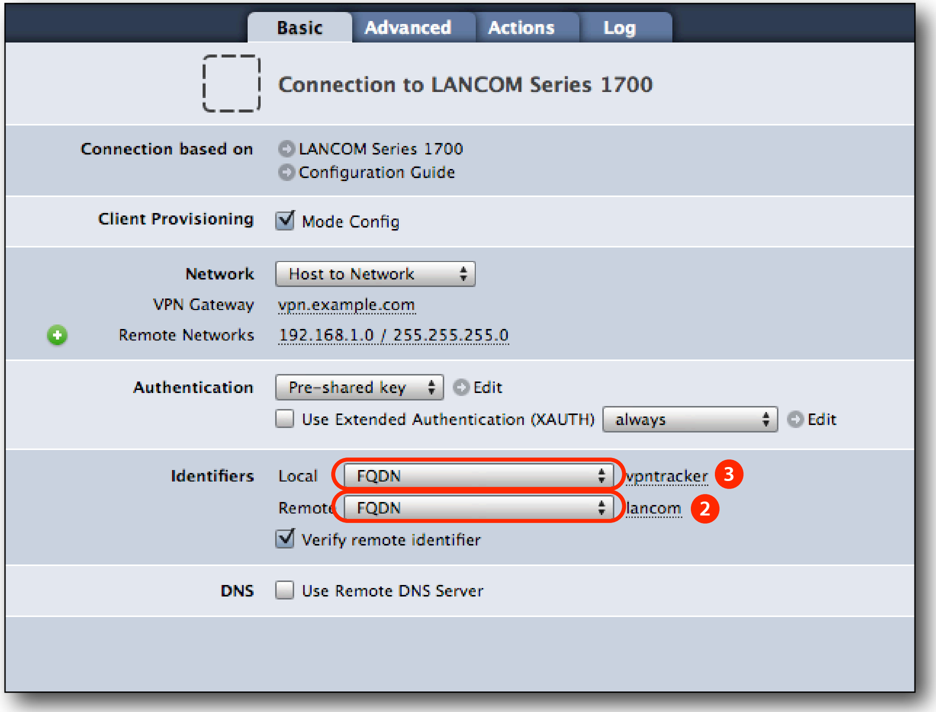
☑ Hide typing

☑ Store in Keychain

- Click the "Edit" arrow next to **Pre-shared key**
- Enter the pre-shared key 1
- Click "Ok"

Step 5 – Configure Identification

In addition to the authentication, client and gateway need to identify themselves. Each identifier has a type and a value.



Connection to LANCOM Series 1700

Connection based on: LANCOM Series 1700 / Configuration Guide

Client Provisioning: ☑ Mode Config

Network: Host to Network

VPN Gateway: vpn.example.com

Remote Networks: 192.168.1.0 / 255.255.255.0

Authentication: Pre-shared key — Edit

□ Use Extended Authentication (XAUTH) — always — Edit

Identifiers: Local — FQDN — vpntracker

Remote — FQDN — lancom

☑ Verify remote identifier

DNS: □ Use Remote DNS Server

- **Local Identifier**
  - Select "FQDN" from the pop-up
  - Enter the **remote** identity from the LANCOM 3
- **Remote Identifier**
  - Select "FQDN" from the pop-up
  - Enter the **local** identity from the LANCOM 2

You're done! The next task is to test the connection you just configured.

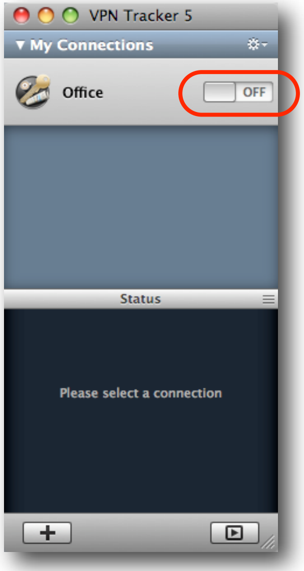
Task 3 – Test the VPN Connection

This section explains how to start and test your VPN connection.

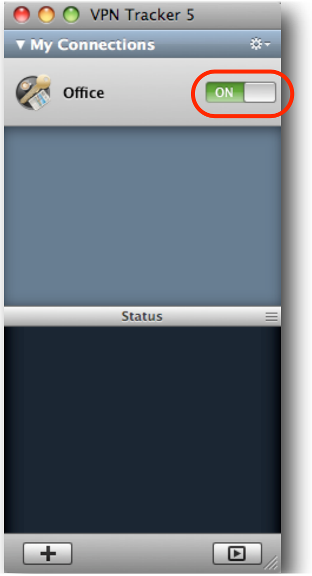
It‘s time to go out!

You will not be able to test and use your VPN connection from within the intranet that you want to connect to. In order to test your connection, you'll need to connect from a different location. For example, if you are setting up a VPN connection to your office, try it from home. If you are setting up a VPN connection to your home network, try it from an Internet cafe, or go visit a friend.

Test your connection



- Connect to the Internet
- Make sure the Internet connection is working – open your Internet browser and try to connect to http://www.equinux.com
- Start VPN Tracker if it’s not already running
- Slide the On/Off slider for the connection you have just configured to **On**



- If the slider goes back to **Off** after starting the connection, please read the **Troubleshooting** section of this document
- If the slider goes to **On** and turns green after a while, you have successfully established a connection

Congratulations!

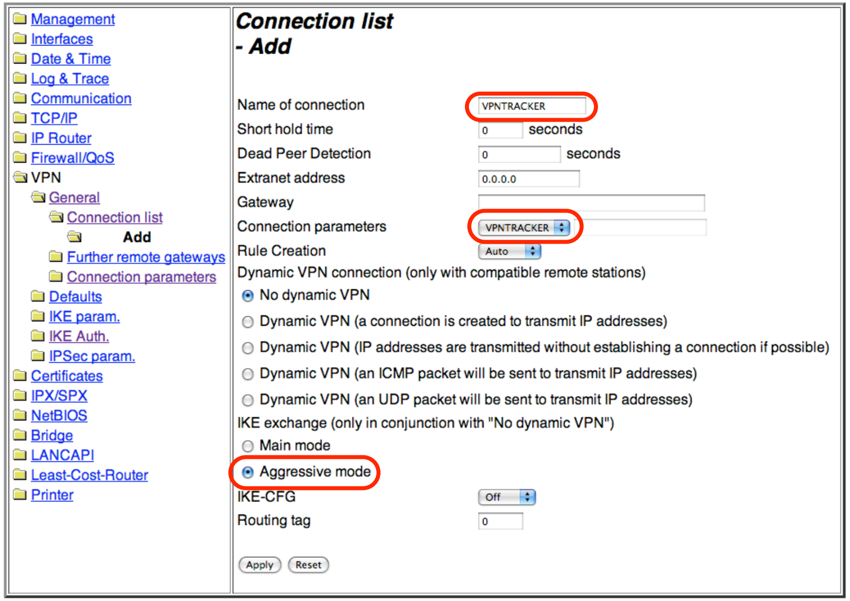
Tip You can re-use this configuration for any additional VPN Tracker clients that need to connect to this VPN . To export connections for other users, VPN Tracker Professional Edition is required.

Setting up a VPN Connection with a Static IP Address

This section explains how to set up a VPN connection that uses a static IP address for use by a single user at a time. The **recommended way** for setting up a VPN connection **is to use the dynamic IP address (Mode Config) setup** described in the previous sections of this document.

Steps 1 - 4: Follow Steps 1- 4 of "Task 1 – Configure Your VPN Device"

Step 5: Add a VPN Connection



Connection list - Add

Name of connection	VPNTRACKER
Short hold time	0 seconds
Dead Peer Detection	0 seconds
Extranet address	0.0.0.0
Gateway	
Connection parameters	VPNTRACKER
Rule Creation	Auto

Dynamic VPN connection (only with compatible remote stations)

- ● No dynamic VPN
- ○ Dynamic VPN (a connection is created to transmit IP addresses)
- ○ Dynamic VPN (IP addresses are transmitted without establishing a connection if possible)
- ○ Dynamic VPN (an ICMP packet will be sent to transmit IP addresses)
- ○ Dynamic VPN (an UDP packet will be sent to transmit IP addresses)

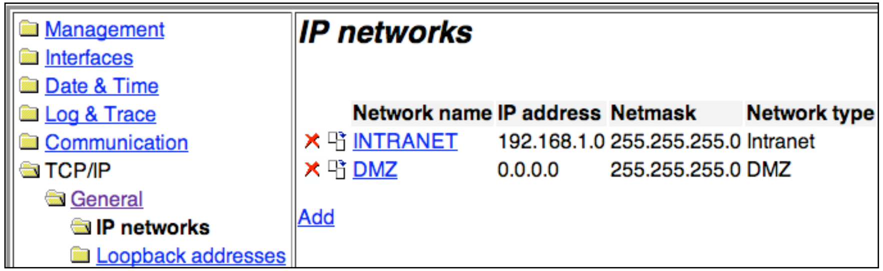
IKE exchange (only in conjunction with "No dynamic VPN")

- ○ Main mode
- ● Aggressive mode

IKE-CFG	Off
Routing tag	0

- Select "VPN > General"
- Click "Connection list"
- Click "Add"
- **Name of connection**: VPNTRACKER
- **Connection parameters**: Select "VPNTRACKER" from the pop-up
- **IKE exchange:** Select "Aggressive Mode"
- Click "Apply"

Step 6a: Retrieve your Intranet Information

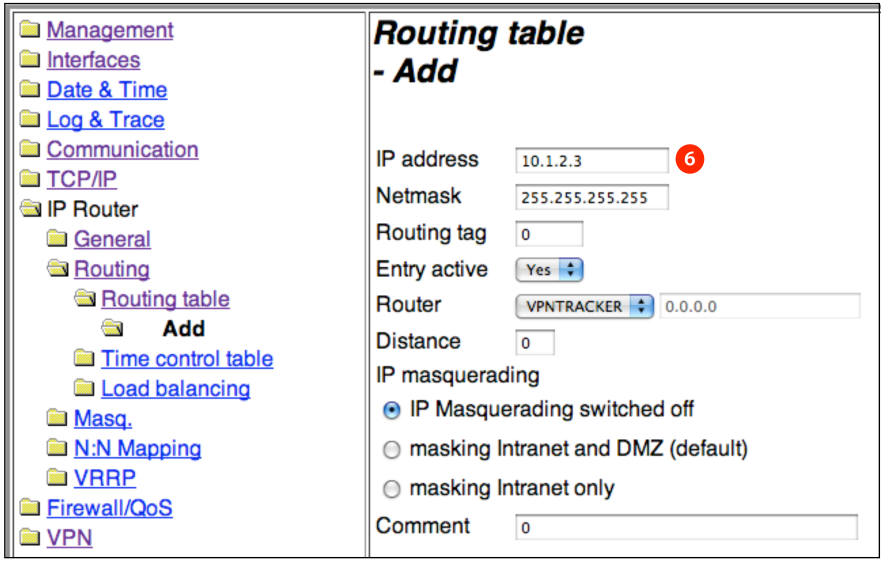


IP networks

	Network name	IP address	Netmask	Network type
✗	INTRANET	192.168.1.0	255.255.255.0	Intranet
✗	DMZ	0.0.0.0	255.255.255.0	DMZ

- Select "TCP/IP > General > IP Networks"
- Find the "INTRANET" entry in the list and write down the IP address   and netmask

Step 6b: Add a Route for the Static IP Address



Routing table - Add

IP address	10.1.2.3
Netmask	255.255.255.255
Routing tag	0
Entry active	Yes
Router	VPNTRACKER 0.0.0.0
Distance	0

IP masquerading

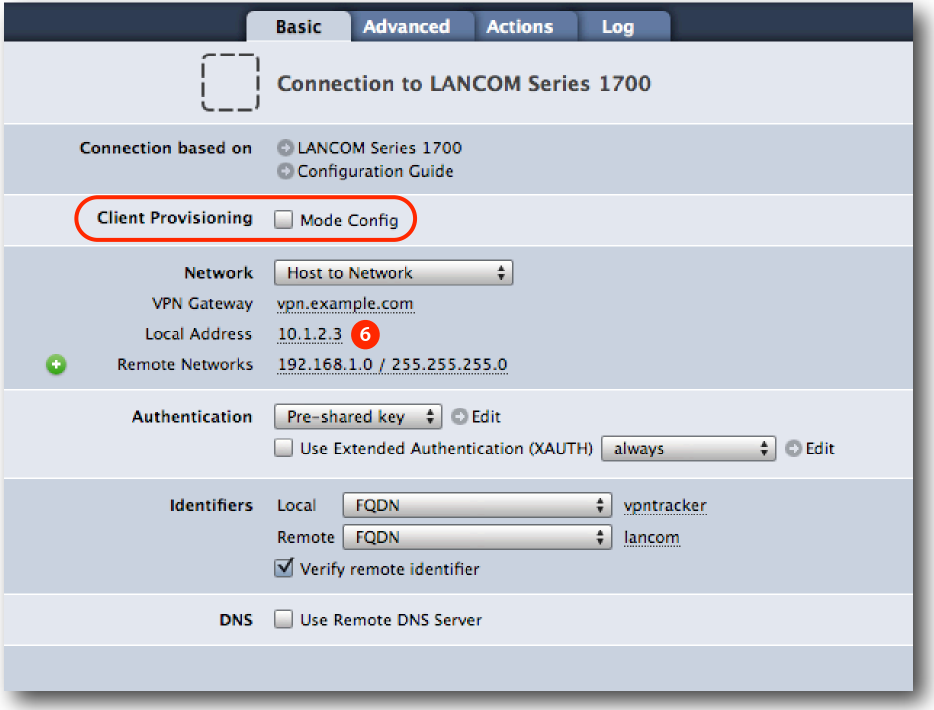
- ● IP Masquerading switched off
- ○ masking Intranet and DMZ (default)
- ○ masking Intranet only

Comment: 0

- Select "IP Router > Routing"
- Click "Routing Table"
- Click "Add"
- **IP Address**: Enter an IP address from any private subnet (i.e. 10.x.y.z, 192.168.x.y, 172.16.x.y) that is **not** in the LANCOM's intranet. Here we selected "10.1.2.3" 6
- **Netmask:** Enter 255.255.255.255
- **Router**: Select "VPNTRACKER" from the pop-up
- Click "Apply"

Required Changes in VPN Tracker

Please follow the configuration instructions in "Task 2: Configure VPN Tracker". Then make the following changes:



Connection to LANCOM Series 1700

Connection based on: LANCOM Series 1700, Configuration Guide

Client Provisioning: □ Mode Config

Network: Host to Network

VPN Gateway: vpn.example.com

Local Address: 10.1.2.3 6

Remote Networks: 192.168.1.0 / 255.255.255.0

Authentication: Pre-shared key, Edit

□ Use Extended Authentication (XAUTH): always, Edit

Identifiers: Local: FQDN, vpntracker

Remote: FQDN, lancom

☑ Verify remote identifier

DNS: □ Use Remote DNS Server

- **Client Provisioning:** Uncheck the Mode Config box
- A field "Local Address" will appear
- **Local Address**: Enter the IP address that you have configured a route for on the LANCOM 6

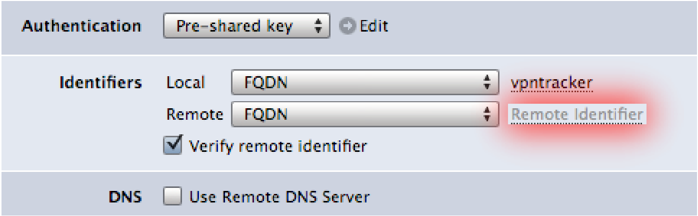
Troubleshooting

In most cases, your connection should work fine if you follow the instructions above. If you cannot connect, please read on.

VPN Connection Fails to Establish

On/Off Slider goes back to "Off" right away

If the slider goes back to "Off" right away, please make sure you have entered all the required information. VPN Tracker will highlight fields that are missing information.



Authentication: Pre-shared key

Identifiers: Local: FQDN vpntracker

Remote: FQDN Remote Identifier

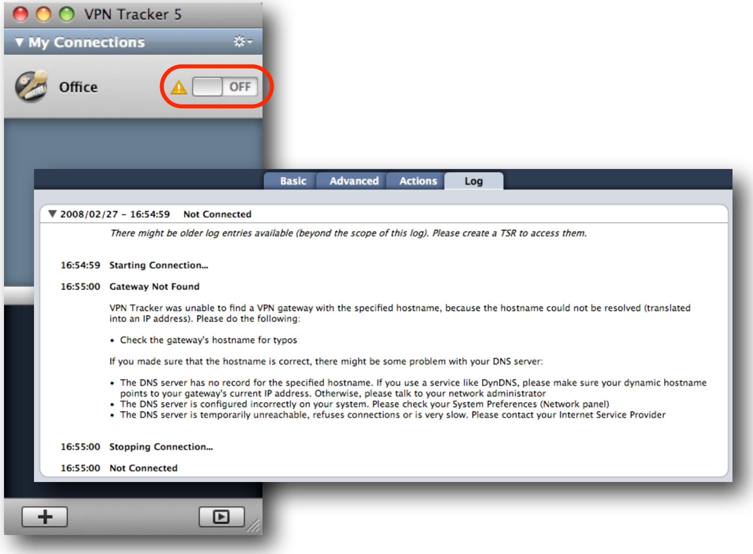
☑ Verify remote identifier

DNS: □ Use Remote DNS Server

On/Off Slider goes back to "Off" after a while

If the connection ON/OFF slider goes back to "OFF" a while after attempting to start the connection, please go to the "Log" tab to get more information about the error (or click the warning triangle to be automatically taken to the "Log" tab).

Depending on the actual problem, VPN Tracker will display detailed suggestions for a solution.



```
▼ 2008/02/27 – 16:54:59    Not Connected
          There might be older log entries available (beyond the scope of this log). Please create a TSR to access them.

16:54:59  Starting Connection...

16:55:00  Gateway Not Found

          VPN Tracker was unable to find a VPN gateway with the specified hostname, because the hostname could not be resolved (translated
          into an IP address). Please do the following:

          • Check the gateway's hostname for typos

          If you made sure that the hostname is correct, there might be some problem with your DNS server:

          • The DNS server has no record for the specified hostname. If you use a service like DynDNS, please make sure your dynamic hostname
            points to your gateway's current IP address. Otherwise, please talk to your network administrator
          • The DNS server is configured incorrectly on your system. Please check your System Preferences (Network panel)
          • The DNS server is temporarily unreachable, refuses connections or is very slow. Please contact your Internet Service Provider

16:55:00  Stopping Connection...

16:55:00  Not Connected
```

VPN Connection Seems to Be Connected, but no Resources Can Be Accessed

If the connection slider goes to ON and turns green, but you cannot access resources (servers, email, etc.) in the VPN, please check the following points.

Connect by IP address instead of host name

If you are not connecting to the resource by IP address (e.g. 192.168.1.42), but are using a host name (e.g. server.example.com), please try using the resource's IP address instead. If the connection works when using the IP address, but not when using a host name, please make sure that your Mac's DNS server or the "Remote DNS" server that you have configured in VPN Tracker is able to resolve this host name to an IP address.

Check if the IP address is part of the remote network

Please make sure that the IP address of the resource that you are connecting to is actually contained in the remote network. Also double-check the network mask that you have configured for the remote network in VPN Tracker.

Tip The network mask (e.g. 255.255.255.0) determines the size of a network. Some examples: The network 192.168.1.0/255.255.255.**0** contains **all** IP addresses starting with 192.168.1.x. The network 192.168.1.0/255.255.255.**255** contains only a single IP address, 192.168.1.0.

Run the VPN Environment Manager

In many local network your Mac will be behind a router that performs Network Address Translation (NAT). For a VPN connection to be established through such a router, VPN Tracker can use one of three different methods, but not all of them may be supported by your local router or your VPN gateway. In that case, your VPN connection may seem connected, but no connections to servers or other resources in the VPN are possible. VPN Tracker includes a tool to detect the right method for the local network:

- Stop all running VPN connections
- Select "Help > VPN Environment Manager"
- Click on "Continue"

- Wait until VPN Tracker has performed the tests
- Try to start the connection again

Tip You will only have to run the VPN Environment Manager once for each location that you are using VPN Tracker at.

Further Questions?

You can find the latest news and compatibility information on our support and FAQ website:

http://www.equinux.com/support

If you need to contact equinux technical support

If you can't resolve your issue with the information available on our website or in this guide and would like to contact Technical Support through our website, please be sure to include at least the following information:

- The manufacturer and model of the VPN gateway
- A Technical Support Report from VPN Tracker (Help > Generate Technical Support Report)
- Screenshots of what you have configured on your VPN gateway, in particular all VPN settings
- A detailed description of the problem and the troubleshooting steps you have taken

Appendix: Terminology Matrix

LANCOM	VPN Tracker
Identity	Identifier
IKE-CFG	Mode Config
IKE Exchange	Exchange Mode
IKE Group	Phase 1 Diffie-Hellman (DH) Group
IKE Proposals	Phase 1 Proposals
IPSec Proposals	Phase 2 Proposals
Local	Remote
PFS Group	Perfect Forward Secrecy (PFS) Group
Remote	Local
1 (MODP-768)	Group 1 (768 bit)
2 (MODP-1024)	Group 2 (1024 bit)
5 (MODP-1536)	Group 5 (1536 bit)