



VPN Quick Configuration Guide

FortiOS

FortiGate 30-50 Series

FortiGate 60-90 Series

FortiGate 100-200 Series

FortiGate 300-500 Series

FortiGate 600-900 Series

FortiGate 1000 Series

FortiGate 3000 Series

FortiGate 5000 Series

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Introduction

This configuration guide helps you configure VPN Tracker and your Fortinet VPN gateway to establish a VPN connection between them.

Using the Configuration Guide

Part 1 – VPN Gateway Configuration

The first part of this guide will show you how to configure a VPN tunnel on your Fortinet VPN gateway device using the web configuration interface.



This guide is a supplement to the documentation included with your Fortinet VPN gateway device, it can't replace it. Please read this documentation before starting.

Part 2 – VPN Tracker Configuration

In the second part, this guide will show you how to configure VPN Tracker to easily connect to your newly created VPN tunnel.

Part 3 – Troubleshooting and Supporting Multiple Users

Troubleshooting advice and instructions on how to set up the VPN to support multiple users using either static IP address assignment or Mode Config can be found in the final part of this guide.



If you are setting up VPN on your device for the first time, we strongly recommend you keep to the tutorial-style setup in the first and second part of this document and make modifications only after you have tested the basic setup.

Conventions Used in This Document

Links to External Websites

Sometimes you will be able to find more information on external websites. Clicking links to websites will open the website in your webbrowser:

http://equinux.com

Links to Other Parts of this Guide

 $A \rightarrow Link$ will take you to another place in the configuration guide. Simply click it if you are reading this guide on your computer.

Tips and Tricks



This configuration guide contains lots of great tips. You can easily spot them by looking for the light bulb icon.

Warnings



This exclamation mark warns you when there is a setting or action where you need to take particular care.

Getting Help

VPN Tracker makes VPN simple. However, computer networking and VPNs can be complex and tricky at times, so we have also built in tools and helpful features that will assist you if you ever run into problems. Check out → *Troubleshooting* for more information.

Prerequisites

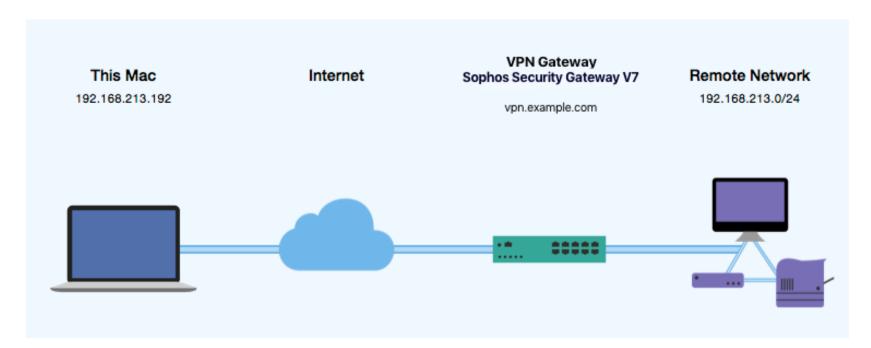
Your VPN Gateway

- ▶ This guide applies to FortiOS-based VPN gateways
- Make sure you have the newest firmware version installed that is available for your device. This guide was created based on FortiOS 4.0 MR1 Patch 3
- Older revisions of FortiOS (FortiOS 4.0 or FortiOS 3.0) should work fine for the basic setup as described in the first part of this document
- The setup using Mode Config that is described in the final part of this document requires at least FortiOS 4.0 MR1 Patch 3

Your Mac

VPN Tracker 365 runs on Mac OS X 10.9, 10.11, 10.12 and on further upgrades.

The configuration described in this guide requires VPN Tracker 365. Make sure you have all available updates installed. The latest VPN Tracker updates can always be obtained from http://www.vpntracker.-com



Scenario

In our example, we need to connect an employee's Mac to an office network. The diagram on the bottom of this page illustrates this scenario.

This guide assumes that the Mac running VPN Tracker already has internet connectivity. The office's Fortinet VPN gateway device (the "VPN gateway") is also already connected to the Internet and can be accessed through a static IP address or DNS host name. In our example setup, we will be using a static IP address: 203.0.113.1.

The VPN gateway has a second network interface which is connected to the internal office network (LAN). In our example, the office network is using the network 192.168.13.0/24 (which is the same as 192.168.13.0/255.255.255.0). This is the network that will be accessed from the employee's Mac through the VPN. It is called the "Remote Network" in VPN Tracker.

Terminology

A VPN connection is often called a "tunnel" (or "VPN tunnel"). Every VPN tunnel is established between two "endpoints". In our example one endpoint is VPN Tracker and the other endpoint is the VPN gateway. Each endpoint is called the other endpoint's "peer".

Please note that for each endpoint, the settings on the other endpoint are considered to be "remote", while its own settings are considered to be "local". That means a "local" setting from VPN Tracker's perspective, is a "remote" setting from the VPN gateway's perspective, and vice versa.

The sample configuration described in this guide is called a "Host to Network" configuration: a single computer, called a "Host" establishes a VPN tunnel to an entire "Network" behind the VPN gateway.

My VPN Gateway Configuration

Throughout this guide, there are certain pieces of information that are needed later on for configuring VPN Tracker. This information is marked with red numbers to make it easier to reference it later. You can print out this checklist to help keep track of the various settings of your Fortinet VPN gateway device.

IP A	Addresses	
0	LAN (internal) IP Address / Subnet Mask:	
2	WAN IP Address: (or hostname)	
Us	er Authentication (XAUTH)	
8	Username:	
4	Password:	
Pre	e-Shared Key	
6	Pre-Shared Key:	
Ad	ditional Settings (only for Option B – Assigning IP Addresses through Mode Conf	ıfig
6	Name of the Phase 1 Setup:	
7	Address Object for the Internal (LAN) Network:	
8	Mode Config Address Range:	

Task 1 – VPN Gateway Configuration

We will first set up VPN on the VPN gateway. If you already have VPN in place, it's helpful to follow along this tutorial to see how settings on the device fit together with VPN Tracker.

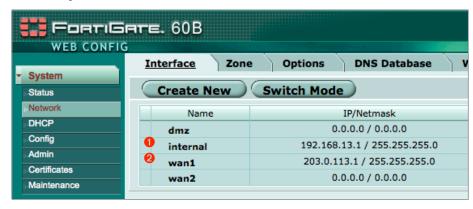
Step 1 – Retrieve Network Settings

▶ Connect to your VPN gateway through its web configuration interface



We have found **Firefox** to work best with the FortiOS Web Config interface (as of FortiOS 4.0). If you see extra options or some buttons do not work with your web browser, try using Firefox.

▶ Go to System > Network



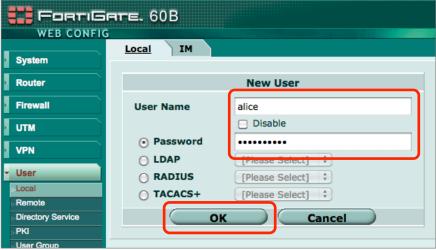
- Write down the IP address of the internal network interface, including its subnet mask as 1 on your → Configuration Checklist
- Write down the IP address of the wan1 network interface (the part before the forward slash "/") as ② on your → Configuration Checklist.

If your device has a DNS hostname (fixed or DynDNS), write it down instead.

Step 2 – Create a VPN User

Go to User > Local and click Create New





- ▶ **User Name**: Enter a username for the new user (here: **alice**). Write down the user name as €
- ▶ Password: Enter a password for this new user. Make sure to remember the password, or write it down as ④
- ▶ Click **OK** to add the user

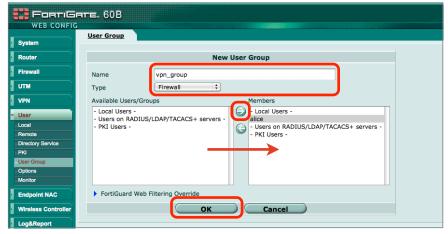


To add more users, simply repeat this step. You might want to connect the device to an existing (LDAP or RADIUS) authentication server, however, we recommend using a local user for the initial setup and testing.

Step 3 – Create a VPN User Group

▶ Go to User > User Group and click Create New





- ▶ Name: Enter a name for the user group (here: vpn_group)
- ▶ Type: Choose Firewall from the popup list
- Move the user account(s) you created in → Step 2 from the Available
 Users/Groups column into the Members column on the right
- ▶ Click **OK** to create the group

Step 4 – Set up Phase 1

Go to VPN > IPsec and click Create Phase 1

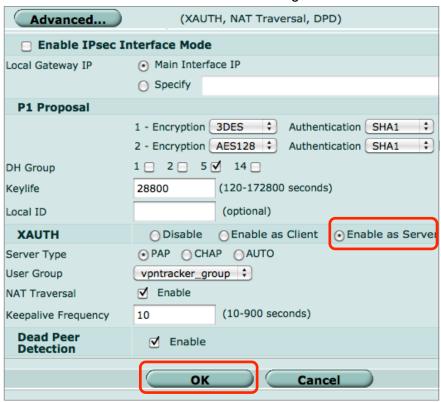




- ▶ Name: Enter a name for the phase 1 setup (here:vpn_phase1)
- ▶ Remote Gateway: Choose Dialup User from the popup list
- ▶ Local Interface: Choose wan1 from the popup list
- ▶ Mode: Choose Aggressive mode
- Authentication Method: Select Pre-Shared Key
- ► Enter a **Pre-Shared Key**. Make sure to choose a good pre-shared key and remember it, or write it down as **⑤**

Advanced Settings

Click Advanced... to reveal additional settings





If clicking **Advanced** does not work, your web browser might be incompatible with the web config interface. In our experience, Firefox works well for this task.

➤ XAUTH: Choose Enable as Server

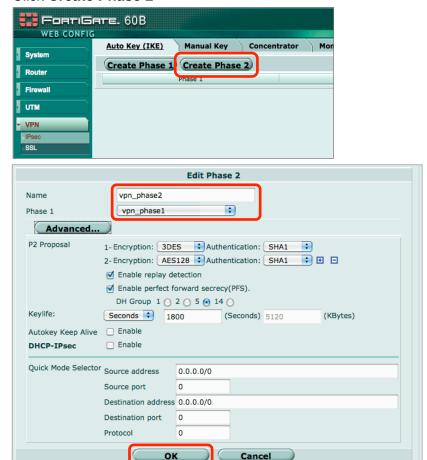


When **Enable as Server** option is not selectable, you may have skipped creating a **User Group** in \rightarrow *Step 3*. Please go back and complete this step.

▶ Click **OK** to save the phase 1 settings

Step 5 – Set up Phase 2

Click Create Phase 2



- ▶ Name: Enter a name for the phase 2 setup (here:vpn_phase2)
- Phase 1: Select the phase 1 setup you created in → Step 4 from the popup list (here:vpn_phase1)
- ▶ Click **OK**

Step 6 – Set up a Firewall Policy

▶ Go to Firewall > Policy and click Create New





- ➤ Source Interface/Zone: Choose internal from the popup list
- Source Address: Select the address object representing your Fortinet VPN gateway's internal network (here: LAN). If you do not yet have such an address object, create a new one (see the right side if you don't know how)



- ▶ **Destination Interface/Zone**: Choose wan1 from the popup list
- Destination Address: Select all
- ▶ Action: Choose IPSEC (earlier FortiOS versions: ENCRYPT) from the popup list. Additional options will become available:
 - ▶ VPN Tunnel: Select the phase 1 setup you have created in
 - → Step 4 (here: vpn_phase1) from the popup list
 - ➤ **Allow outbound**: The connection will always be initiated from VPN Tracker, never by the device, so you can deselect this option.
- ▶ Click **OK** to add the policy

Creating an address object representing the internal (LAN) network:

Click Create New...



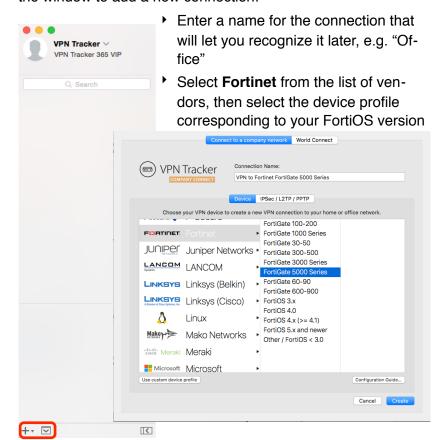
- Address Name: Enter a name for the new address object (e.g. LAN)
- ▶ Type: Select Subnet / IP Range
- ➤ Subnet / IP Range: Enter your VPN gateway's internal (LAN) network address and subnet mask. Make sure to use the network address, not the LAN IP address: With a 255.255.255.0 subnet mask this means setting the last part of LAN IP address 1 to 0 (e.g. 192.168.13.1 becomes 192.168.13.0)
- ▶ Interface: Select internal
- ▶ Click **OK** to add the new address object

Task 2 – VPN Tracker Configuration

After finishing task 1, you should now have a completed → configuration checklist containing your Fortinet VPN gateway's settings. We will now create a matching configuration in VPN Tracker.

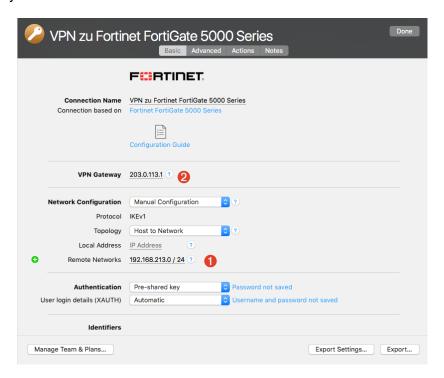
Step 1 – Add a Connection

Open VPN Tracker, and click the plus button in the bottom left corner of the window to add a new connection:



Step 2 – Configure the VPN Connection

Once you have added the new connection, there are a few settings that need to be customized to match what is configured on your VPN gateway.



- ▶ VPN Gateway: Enter the WAN IP address (or hostname) of your VPN gateway that you wrote down as ②
- Local Address: Leave empty for now. Depending on your setup, you may have to set a specific local address later. Refer to → Supporting Multiple Users on when and how to set a specific local address.
- ▶ Remote Networks: Enter the network address of the network that is being accessed through the VPN tunnel ①. Separate the subnet mask with a forward slash ("/").



VPN Tracker will automatically turn the IP address into a network address. Double-check that the result is the same as the LAN address object configured for the policy in → Step 6

Step 3 – Test the VPN Connection

It 's time to go out!

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



Click the on/off switch of your VPN to connect.

<

++ ▽

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

Start your connection

When prompted for your pre-shared key:



- Pre-shared key: Enter the pre-shared key that you configured on the Fortinet VPN gateway in the phase 1 settings 6
- Optional: Check the box Store in Keychain to save the password in your keychain so you are not asked for it again when connecting the next time
- Click OK

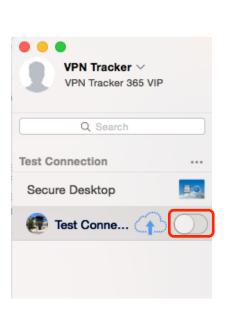
When prompted for your Extended Authentication (XAUTH) credentials:

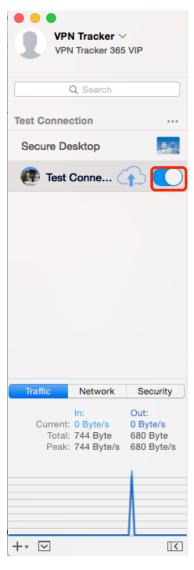


- ► **User Name**: Enter the name of the user you have added on the Fortinet VPN gateway (here: **alice**) **③**
- ▶ Password: Enter the password for the user 4

- Optional: Check the box Store in Keychain to save the password in your keychain so you are not asked for it again when connecting the next time
- Click **OK**
- If the slider goes back to Off after starting the connection, or after entering your pre-shared key or your XAUTH credentials, 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!

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 or obviously incorrect information.

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). VPN Tracker will display detailed suggestions for a solution:

No Access to the Remote Network

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 to an IP address (instead of a host name)

If you are not connecting to the resource by IP address (e.g. 192.168.13.42), 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 on your Fortinet VPN gateway is able to resolve this host name to an IP address.

Test VPN Availability again

In many networks 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 different methods, but not all of them may be supported by your local router or your VPN gateway.

VPN Tracker automatically runs a test to detect the proper method for your particular Internet connection when you first connect using this Internet connection. However, test results could become outdated by changes to the local router, so it is a good idea to test again if there are problems.

- Select "Tools > Test VPN Availability" from the menu
- Click "Test Again" and wait until the test has completed
- Try connecting again

Check that the IP address you are connecting to is part of the network(s) permitted in the split tunneling setup

Check that the IP address you are connecting to is actually part of the remote network(s) you permitted in the firewall policy in \rightarrow *Step 6*. Also double-check the network mask(s) of the address object(s).

Further Questions?

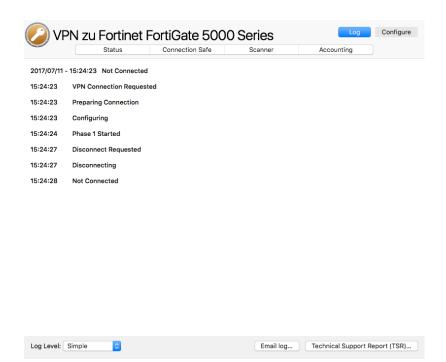
You can find the latest news and compatibility information on our support and FAQ website:

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 and firmware revision 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-related settings
- A description of the problem and the troubleshooting steps you have taken



Supporting Multiple Users

Once your VPN expands to multiple users you must ensure that IP addresses do not conflict by assigning each user their own IP address. VPN Tracker supports manually assigning IP addresses and assignment through Mode Config.

How IP Addresses are Assigned to VPN Clients

The **Local Address** in VPN Tracker is the IP address that the Mac will be using in the remote network when connected though VPN. In IPsec terms: The Local Address is the **local endpoint of the IPsec Security Association (SA)**.

- If the Local Address field contains a fixed address this address is used. The address must be unique among all users of the VPN connection
- → Option A Manually Assigning Fixed Local Addresses
- When Mode Config mode is used, the local address is assigned automatically by the VPN gateway
 - → Option B Assigning IP Addresses through Mode Config
- If the Local Address field is left empty, the Mac's actual local IP address (as shown in System Preferences > Network) is used



It is not possible to use an empty Local Address if

- → the VPN has multiple users (IPs might conflict)
- the VPN gateway is not the default gateway (router) in its network

Option A Manually Assigning Fixed Local Addresses

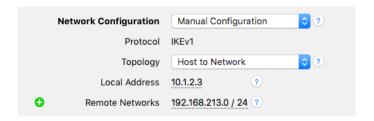
Step 0 – Check Requirements

Manually assigning fixed local address **works with any setup**, however the administrative effort may be too high if the VPN has a large number of users or users change often.

Step 1 – Choose the Local Addresses

Choose the local addresses for your VPN clients so that

- The local addresses are **not** part of the VPN's remote network (= the Fortinet VPN gateway's LAN)
- ▶ Each client has its own, unique IP address





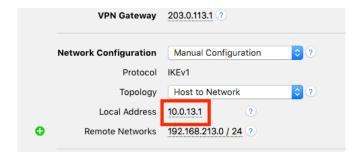
The IP addresses may **not** come from the remote network because the Fortinet VPN gateway cannot act as an <u>ARP proxy</u> for manually assigned IP addresses.

Example: The Fortinet VPN gateway 's LAN in our example is the network 192.168.13.0/24 (= 192.168.13.0/255.255.255.0). For the local addresses, choose an arbitrary <u>private network</u> that is not part of this network, such as 10.0.13.0/24. For each user, pick a different IP ad-

dress from that network to be used as the Local Address in VPN Tracker:

User	IP Address	
alice	10.0.13.1	
bob	10.0.13.2	
charlie 10.0.13.3		
	10.0.13	

Step 2 – Configure the Local Address in VPN Tracker



▶ Local Address: Enter the IP address that you have chosen for this user (here: 10.0.13.1 for the user alice)



If your VPN gateway is **not** the default gateway (router) of its network, you will have to ensure that traffic for the chosen IP addresses is routed back to the VPN gateway instead of to the usual default gateway (e.g. by adding a route on the default gateway to the VPN gateway for these IPs).

Option B Assigning IP Addresses through Mode Config

Step 0 – Check Requirements

Assigning IP addresses through Mode Config **requires FortiOS 4.0 MR 1 Patch 3** or higher. It is necessary to switch the VPN setup to an interface mode (route-based) VPN and to use the command line interface (CLI) for some parts of the setup procedure.

Mode Config is only available with IPsec Interface Mode. We will therefore set up the connection to use interface mode.



FortiOS supports both Mode Config, as well as Cisco's EasyVPN extensions. Since VPN Tracker also supports EasyVPN, we will be using EasyVPN, although a setup using only Mode Config without Cisco's extensions would also be possible.

Steps 1 to 3 – Follow Steps 1 to 3 of Task 1

The first three steps of the setup are the same as for the policy-based VPN in \rightarrow *Task 1*.

- If you have already followed → Steps 1 to 3 of Task 1, simply remove the configuration created in → Steps 4 to 6 of Task 1
- If you have not yet set up anything, please follow → Steps 1 to 3 of Task 1 now

Step 4 – Set up Phase 1

Go to VPN > IPsec and click Create Phase 1

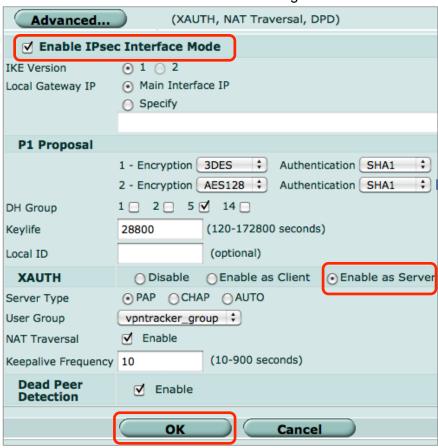




- Name: Enter a name for the phase 1 setup (here:vpn_phase1). Write it down as ^⑤
- ▶ Remote Gateway: Choose Dialup User from the popup list
- ▶ Local Interface: Choose wan1 from the popup list
- ▶ Mode: Choose Aggressive mode
- Authentication Method: Select Pre-Shared Key
- ▶ Enter a **Pre-Shared Key**. Make sure to choose a good pre-shared key and remember it, or write it down as **5**

Advanced Settings

▶ Click Advanced... to reveal additional settings



- Check the box Enable IPsec Interface Mode
- > XAUTH: Choose Enable as Server
- Click OK to save the phase 1 setup



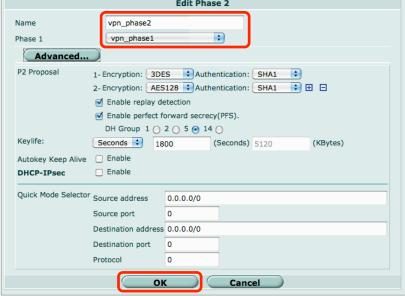
21

We will be setting up the VPN for **split tunneling**, i.e. only the traffic destined for the Fortinet VPN gateway internal network(s) will go through the VPN. A VPN Tracker user's remaining Internet traffic will continue to go out normally through their ISP.

Step 5 – Set up Phase 2

Click Create Phase 2



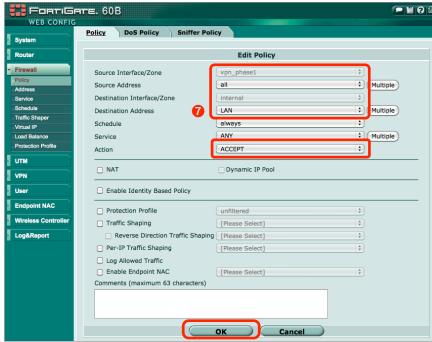


- ▶ Name: Enter a name for the phase 2 setup (here:vpn_phase2)
- Phase 1: Select the phase 1 setup you created in → Step 4 from the popup list (here:vpn_phase1)
- Click OK

Step 6 – Set up a Firewall Policy

▶ Go to Firewall > Policy and click Create New





- Source Interface/Zone: Select the phase 1 setup you created in
 → Step 4 from the popup list (here: vpn_phase1)
- ▶ Source Address: Select all
- Destination Interface/Zone: Choose internal from the popup list
- Destination Address: Select the address object representing your
 VPN gateway's internal network (here: LAN) and write its name down

- as **7**. If you do not yet have such an address object, create a new one (see below).
- ▶ Action: Select ALLOW from the popup list
- Click OK to add the policy

Creating an address object representing the internal (LAN) network:

▶ Click Create New...





- ▶ Address Name: Enter a name for the new address object (e.g. LAN). Write down the name as
- ▶ Type: Select Subnet / IP Range
- ➤ Subnet / IP Range: Enter your VPN gateway's internal (LAN) network address and subnet mask. Make sure to use the network address, not the LAN IP address: With a 255.255.255.0 subnet mask this means setting the last part of LAN IP address 1 to 0 (e.g. 192.168.13.1 becomes 192.168.13.0)
- ▶ Interface: Select internal
- ▶ Click **OK** to add the new address object

Step 7 – Choose an IP Address Range

You will need to decide which IP addresses to assign to VPN clients through Mode Config. The choice is between assigning them IP addresses from the Fortinet VPN gateway's inside (LAN) network, or using a different, unrelated network for this purpose.

IP Addresses from the Inside (LAN) Network

You can use IP addresses from the inside network if you have enough free IP addresses on the inside network for the maximum number of VPN clients you expect.

Choose a range of IP addresses and write them down as 3 and 9.



Using IP addresses from the inside network is the best solution if your VPN gateway is not the default gateway (router) of its network since it can act as an ARP proxy for those IP addresses.

IP Addresses from a Different Network

If you don't use IP addresses from the Fortinet VPN gateway's inside network, simply choose an arbitrary <u>private network</u> that is not used anywhere on your the VPN gateway's network (or the computers that need to be reachable through VPN).

In our example, the Fortinet VPN gateway's inside network is 192.168.13.0/24. We choose to take the IP addresses from the **completely unrelated**, **unused private network** 10.13.121.0/24., starting with IP 10.13.121.100 and ending with IP 10.13.121.199. The range of IP addresses must be large enough (preferably larger) than the maximum number of expected VPN clients.

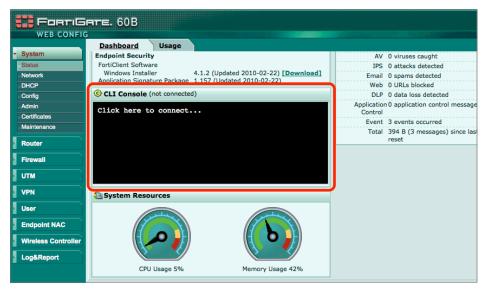
Choose a range of IP addresses and write them down as 3 and 9.



If your VPN gateway is **not** the default gateway (router) of its network, you will have to ensure that traffic for the chosen IP addresses is routed back to the VPN gateway instead of to the usual default gateway (e.g. by adding a route on the default gateway to the VPN gateway for these IPs).

Step 8 – Set up Mode Config

- Mode Config can currently only be set up on the command line
- ▶ Go to **System** > **Status** and find the **CLI Console** on the Dashboard
- Click inside the CLI Console to connect to the VPN gateway by command line interface (CLI)



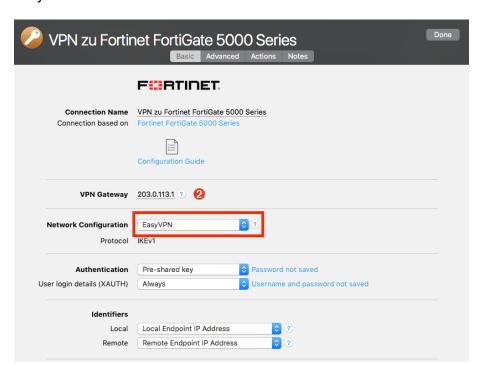
▶ Enter the following commands:

```
config vpn ipsec phase1-interface
edit "vpn_phase1"
set mode-cfg enable
set ipv4-start-ip 10.0.13.100
set ipv4-end-ip 10.0.13.199
set ipv4-split-include "LAN"
end
```

Replace the numbered settings (name of the phase 1 setup, start/end IP address of the Mode Config address range, and the address object representing the inside (LAN) network) with the settings from your own checklist.

Step 9 – Configure the VPN Connection

Once you have added the new connection, there are a few settings that need to be customized to match what is configured on your VPN gateway.



- ▶ VPN Gateway: Enter the WAN IP address (or hostname) of your VPN gateway that you wrote down as ②
- ▶ Network Configuration: Select Cisco EasyVPN from the popup list
- You can now proceed to test the connection as described in → Step 3
 Test the VPN Connection