

# Site-to-Site OpenVPN with routes

## Install

<https://github.com/angristan/openvpn-install>

First, get the script and make it executable :

```
curl -O https://raw.githubusercontent.com/Angristan/openvpn-install/master/openvpn-install.sh  
chmod +x openvpn-install.sh
```

Then run it :

```
./openvpn-install.sh
```

Make 2 clients, one called **client01** and the other called **client02**

Then edit server conf and add belllow:

/etc/openvpn/server.conf

```
client-config-dir /etc/openvpn/ccd  
push "route 192.168.2.0 255.255.255.0"  
route 192.168.2.0 255.255.255.0 10.8.0.2  
client-to-client
```

/etc/openvpn/ccd/client01

```
iroute 192.168.2.0 255.255.255.0
```

/etc/openvpn/ccd/client02

```
iroute 10.1.2.0 255.255.255.0
```

# Pfsense Example

import cert

The screenshot shows the pfSense web interface for the Certificate Manager. The breadcrumb trail is "System / Certificate Manager / CAs / Edit". There are three tabs: "CAs" (selected), "Certificates", and "Certificate Revocation". The main section is titled "Create / Edit CA". It contains three form fields: "Descriptive name" (a text input with a help icon), "Method" (a dropdown menu currently showing "Import an existing Certificate Authority"), and "Existing Certificate Authority". The "Existing Certificate Authority" section has three sub-fields: "Certificate data" (a large text area with a note "Paste a certificate in X.509 PEM format here."), "Certificate Private Key (optional)" (a text area with a note "Paste the private key for the above certificate here. This is optional in most cases, but is required when generating a Certificate Revocation List (CRL)."), and "Serial for next certificate" (a text input with a note "Enter a decimal number to be used as the serial number for the next certificate to be created using this CA."). At the bottom of the form is a blue "Save" button.

pfSense  
COMMUNITY EDITION

System ▾ Interfaces ▾ Firewall ▾ Services ▾ VPN ▾ Status ▾ Diagnostics ▾ Help ▾

System / Certificate Manager / CAs / Edit

CAs Certificates Certificate Revocation

Create / Edit CA

Descriptive name

Method

Existing Certificate Authority

Certificate data

Paste a certificate in X.509 PEM format here.

Certificate Private Key (optional)

Paste the private key for the above certificate here. This is optional in most cases, but is required when generating a Certificate Revocation List (CRL).

Serial for next certificate

Enter a decimal number to be used as the serial number for the next certificate to be created using this CA.

Add Client

### General Information

**Disabled** ☐ Disable this client

Set this option to disable this client without removing it from the list.

**Server mode** Peer to Peer ( SSL/TLS ) ▾

**Protocol** UDP on IPv4 only ▾

**Device mode** tun - Layer 3 Tunnel Mode ▾

"tun" mode carries IPv4 and IPv6 (OSI layer 3) and is the most common and compatible mode across all platforms.  
"tap" mode is capable of carrying 802.3 (OSI Layer 2.)

**Interface** WAN ▾

The interface used by the firewall to originate this OpenVPN client connection

**Local port** 1194

Set this option to bind to a specific port. Leave this blank or enter 0 for a random dynamic port.

**Server host or address**  📄

The IP address or hostname of the OpenVPN server.

**Server port** 1194

The port used by the server to receive client connections.

**Proxy host or address**

The address for an HTTP Proxy this client can use to connect to a remote server.  
TCP must be used for the client and server protocol.

**Proxy port**

**Proxy Authentication** none ▾

The type of authentication used by the proxy server.

**Description**

A description may be entered here for administrative reference (not parsed).

### User Authentication Settings

**Username**

Leave empty when no user name is needed

**Password**  Password 📄

Leave empty when no password is needed

Password 📄

Confirm

**Authentication Retry** ☒ Do not retry connection when authentication fails

When enabled, the OpenVPN process will exit if it receives an authentication failure message. The default behavior is to retry.

### Cryptographic Settings

**TLS Configuration** ☒ Use a TLS Key

A TLS key enhances security of an OpenVPN connection by requiring both parties to have a common key before a peer can perform a TLS handshake.  
This layer of HMAC authentication allows control channel packets without the proper key to be dropped, protecting the peers from attack or unauthorized connections. The TLS Key does not have any effect on tunnel data.

**TLS Key**

Paste the TLS key here.

This key is used to sign control channel packets with an HMAC signature for authentication when establishing the tunnel.

**TLS Key Usage Mode** TLS Encryption and Authentication ▾

In Authentication mode the TLS key is used only as HMAC authentication for the control channel, protecting the peers from unauthorized connections.  
Encryption and Authentication mode also encrypts control channel communication, providing more privacy and traffic control channel obfuscation.

**Peer Certificate Authority** openvpn-do ▾

**Peer Certificate Revocation list** No Certificate Revocation Lists defined. One may be created here: [System > Cert. Manager > Certificate Revocation](#)

**Client Certificate**

## Revocation list

**Client Certificate**

**Encryption Algorithm**

The Encryption Algorithm used for data channel packets when Negotiable Cryptographic Parameter (NCP) support is not available.

**Enable NCP** ☒ **Enable Negotiable Cryptographic Parameters**

Check this option to allow OpenVPN clients and servers to negotiate a compatible set of acceptable cryptographic Encryption Algorithms from those selected in the NCP Algorithms list below. [i](#)

## NCP Algorithms

AES-128-CBC (128 bit key, 128 bit block)  
AES-128-CFB (128 bit key, 128 bit block)  
AES-128-CFB1 (128 bit key, 128 bit block)  
AES-128-CFB8 (128 bit key, 128 bit block)  
AES-128-GCM (128 bit key, 128 bit block)  
AES-128-OFB (128 bit key, 128 bit block)  
AES-192-CBC (192 bit key, 128 bit block)  
AES-192-CFB (192 bit key, 128 bit block)  
AES-192-CFB1 (192 bit key, 128 bit block)  
AES-192-CFB8 (192 bit key, 128 bit block)

Available NCP Encryption Algorithms  
Click to add or remove an algorithm from the list

The order of the selected NCP Encryption Algorithms is respected by OpenVPN. [i](#)

AES-128-GCM

Allowed NCP Encryption Algorithms. Click an algorithm name to remove it from the list

**Auth digest algorithm**

The algorithm used to authenticate data channel packets, and control channel packets if a TLS Key is present.  
When an AEAD Encryption Algorithm mode is used, such as AES-GCM, this digest is used for the control channel only, not the data channel.  
Set this to the same value as the server. While SHA1 is the default for OpenVPN, this algorithm is insecure.

**Hardware Crypto**

## Tunnel Settings

**IPv4 Tunnel Network**

This is the IPv4 virtual network used for private communications between this client and the server expressed using CIDR notation (e.g. 10.0.8.0/24).  
The second usable address in the network will be assigned to the client virtual interface. Leave blank if the server is capable of providing addresses to clients.

**IPv6 Tunnel Network**

This is the IPv6 virtual network used for private communications between this client and the server expressed using CIDR notation (e.g. fe80::/64).  
When set static using this field, the ::2 address in the network will be assigned to the client virtual interface. Leave blank if the server is capable of providing addresses to clients.

**IPv4 Remote network(s)**

IPv4 networks that will be routed through the tunnel, so that a site-to-site VPN can be established without manually changing the routing tables.  
Expressed as a comma-separated list of one or more CIDR ranges. If this is a site-to-site VPN, enter the remote LAN/s here. May be left blank for non site-to-site VPN.

**IPv6 Remote network(s)**

These are the IPv6 networks that will be routed through the tunnel, so that a site-to-site VPN can be established without manually changing the routing tables. Expressed as a comma-separated list of one or more IP/PREFIX. If this is a site-to-site VPN, enter the remote LAN/s here. May be left blank for non site-to-site VPN.

**Limit outgoing bandwidth**

Maximum outgoing bandwidth for this tunnel. Leave empty for no limit. The input value has to be something between 100 bytes/sec and 100 Mbytes/sec (entered as bytes per second). Not compatible with UDP Fast I/O.

**Compression**

Compress tunnel packets using the LZO algorithm.  
Compression can potentially increase throughput but may allow an attacker to extract secrets if they can control compressed plaintext traversing the VPN (e.g. HTTP). Before enabling compression, consult information about the VORACLE, CRIME, TIME, and BREACH attacks against TLS to decide if the use case for this specific VPN is vulnerable to attack.

Adaptive compression will dynamically disable compression for a period of time if OpenVPN detects that the data in the packets is not being compressed efficiently.

**Topology**

Specifies the method used to configure a virtual adapter IP address.

**Type-of-Service** ☐ **Set the TOS IP header value of tunnel packets to match the encapsulated packet value.**

**Don't pull routes** ☐ **Bars the server from adding routes to the client's routing table**  
This option still allows the server to set the TCP/IP properties of the client's TUN/TAP interface.

**Don't add/remove routes** ☐ **Don't add or remove routes automatically**  
Do not execute operating system commands to install routes. Instead, pass routes to --route-up script using environmental variables.

## Advanced Configuration

**Custom options**

Set this to the same value as the server. While SHA1 is the default for OpenVPN, this algorithm is insecure.

#### Hardware Crypto

No Hardware Crypto Acceleration

### Tunnel Settings

#### IPv4 Tunnel Network

This is the IPv4 virtual network used for private communications between this client and the server expressed using CIDR notation (e.g. 10.0.8.0/24). The second usable address in the network will be assigned to the client virtual interface. Leave blank if the server is capable of providing addresses to clients.

#### IPv6 Tunnel Network

This is the IPv6 virtual network used for private communications between this client and the server expressed using CIDR notation (e.g. fe80::/64). When set static using this field, the ::2 address in the network will be assigned to the client virtual interface. Leave blank if the server is capable of providing addresses to clients.

#### IPv4 Remote network(s)

IPv4 networks that will be routed through the tunnel, so that a site-to-site VPN can be established without manually changing the routing tables. Expressed as a comma-separated list of one or more CIDR ranges. If this is a site-to-site VPN, enter the remote LAN/s here. May be left blank for non site-to-site VPN.

#### IPv6 Remote network(s)

These are the IPv6 networks that will be routed through the tunnel, so that a site-to-site VPN can be established without manually changing the routing tables. Expressed as a comma-separated list of one or more IP/PREFIX. If this is a site-to-site VPN, enter the remote LAN/s here. May be left blank for non site-to-site VPN.

#### Limit outgoing bandwidth

Between 100 and 100,000,000 bytes/sec

Maximum outgoing bandwidth for this tunnel. Leave empty for no limit. The input value has to be something between 100 bytes/sec and 100 Mbytes/sec (entered as bytes per second). Not compatible with UDP Fast I/O.

#### Compression

Omit Preference (Use OpenVPN Default)

Compress tunnel packets using the LZO algorithm.

Compression can potentially increase throughput but may allow an attacker to extract secrets if they can control compressed plaintext traversing the VPN (e.g. HTTP). Before enabling compression, consult information about the VORACLE, CRIME, TIME, and BREACH attacks against TLS to decide if the use case for this specific VPN is vulnerable to attack.

Adaptive compression will dynamically disable compression for a period of time if OpenVPN detects that the data in the packets is not being compressed efficiently.

#### Topology

Subnet – One IP address per client in a common subnet

Specifies the method used to configure a virtual adapter IP address.

#### Type-of-Service

☐ Set the TOS IP header value of tunnel packets to match the encapsulated packet value.

#### Don't pull routes

☐ Bars the server from adding routes to the client's routing table

This option still allows the server to set the TCP/IP properties of the client's TUN/TAP interface.

#### Don't add/remove routes

☐ Don't add or remove routes automatically

Do not execute operating system commands to install routes. Instead, pass routes to --route-up script using environmental variables.

### Advanced Configuration

#### Custom options

```
persist-key;
persist-tun;
verify-x509-name server_F5vhaI0mfpNlch5d name;
remote-cert-tls server;
tls-client;
tls-cipher TLS-ECDHE-ECDSA-WITH-AES-128-GCM-SHA256;
tls-version-min 1.2;
auth-nocache;
verb 3;
```

Enter any additional options to add to the OpenVPN client configuration here, separated by semicolon.

#### UDP Fast I/O

☒ Use fast I/O operations with UDP writes to tun/tap. Experimental.

Optimizes the packet write event loop, improving CPU efficiency by 5% to 10%. Not compatible with all platforms, and not compatible with OpenVPN bandwidth limiting.

#### Send/Receive Buffer

Default

Configure a Send and Receive Buffer size for OpenVPN. The default buffer size can be too small in many cases, depending on hardware and network uplink speeds. Finding the best buffer size can take some experimentation. To test the best value for a site, start at 512KiB and test higher and lower values.

#### Gateway creation

☒ Both

☐ IPv4 only

☐ IPv6 only

If you assign a virtual interface to this OpenVPN client, this setting controls which gateway types will be created. The default setting is 'both'.

#### Verbosity level

3 (recommended)

Each level shows all info from the previous levels. Level 3 is recommended for a good summary of what's happening without being swamped by output.

None: Only fatal errors

Default through 4: Normal usage range

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Revision #5

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