

# Table des matières

<b>Apporter une IPv4 de datacenter sur un pfSense via un VPN</b> .....	1
Configuration du serveur OpenVPN .....	1
Configuration du client OpenVPN pfSense .....	2

# Apporter une IPv4 de datacenter sur un pfSense via un VPN

L'objectif est de faire descendre une IP de datacenter sur le pfSense avec un tunnel OpenVPN et du proxyARP.

Cette documentation existe aussi pour [Linux](#).

Il vous sera nécessaire :

- un serveur OpenVPN linux avec:
  - Une IP fixe pour initier la session VPN
  - Une IP supplémentaire (nommé "IP Fail-Over" chez OVH par exemple)

Dans notre exemple, notre IP supplémentaire sera 172.32.0.1

## Configuration du serveur OpenVPN

La configuration d'OpenVPN est classique avec quelques exception, par exemple :

[proxyarp.conf](#)

```
mode server
tls-server
proto udp
port 1194
dev tap0
cipher AES-256-CBC
keepalive 10 30
persist-key
persist-tun
verb 3
status proxyarp_status.log
log-append /var/log/openvpn-proxyarp.log

ca /etc/openvpn/easy-rsa/keys/ca.crt
cert /etc/openvpn/easy-rsa/keys/server.crt
key /etc/openvpn/easy-rsa/keys/server.key
dh /etc/openvpn/easy-rsa/keys/dh4096.pem
tls-auth /etc/openvpn/easy-rsa/keys/ta.key 0
auth sha256
keysize 256
comp-lzo no

script-security 2
client-connect /etc/openvpn/proxyarp_up.sh
```

Vous noterez l'utilisation OBLIGATOIRE d'une interface TAP, l'absence de configuration réseau et l'ajout des deux lignes suivantes :

```
script-security 2
client-connect /etc/openvpn/proxyarp_up.sh
```

et d'ajouter dans le dossier `/etc/openvpn` les deux fichiers suivant (en les adaptant) :

[proxyarp\\_up.sh](#)

```
#!/bin/bash

echo '1' > /proc/sys/net/ipv4/conf/all/proxy_arp
ip link set up tap0
ip route add 172.32.0.1 dev tap0
```

et pour finir de le rendre exécutable :

```
# chmod +x /etc/openvpn/proxyarp_up.sh
```

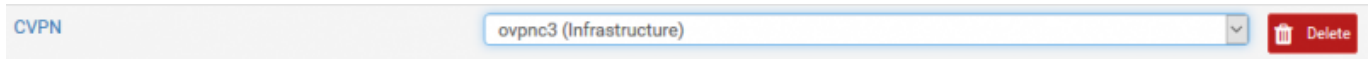
## Configuration du client OpenVPN pfSense

On va créer un client OpenVPN sur pfSense, si on suit l'exemple plus haut :

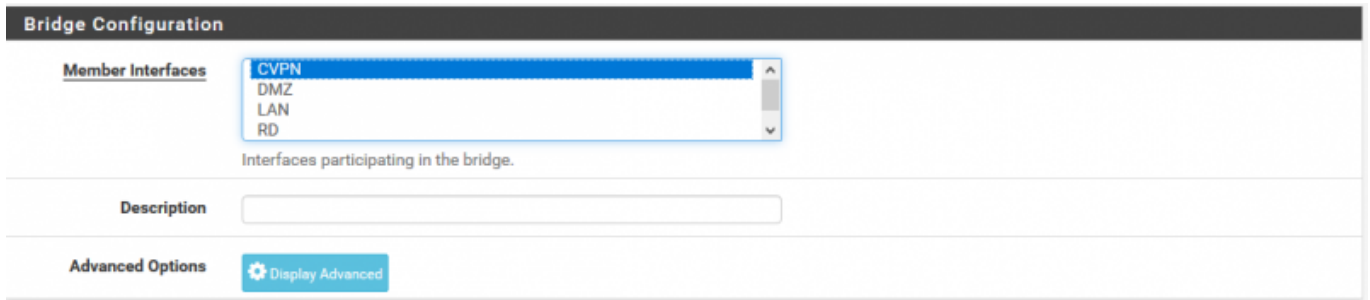
General Information	
<b>Disabled</b>	<input type="checkbox"/> Disable this client Set this option to disable this client without removing it from the list.
<b>Server mode</b>	Peer to Peer (SSL/TLS)
<b>Protocol</b>	UDP on IPv4 only
<b>Device mode</b>	tap - Layer 2 Tap Mode <small>"tap" mode carries IPv4 and IPv6 (OSI layer 2) and is the most common and compatible mode across all platforms. "tap" mode is capable of carrying 802.3 (OSI Layer 2).</small>
<b>Interface</b>	WAN <small>The interface used by the firewall to originate this OpenVPN client connection.</small>
<b>Local port</b>	<input type="text" value="0"/> <small>Set this option to bind to a specific port. Leave this blank or enter 0 for a random dynamic port.</small>
<b>Server host or address</b>	<input type="text" value="194.194.194.194"/> <small>The IP address or hostname of the OpenVPN server.</small>
<b>Server port</b>	1194 <small>The port used by the server to receive client connections.</small>
<b>Proxy host or address</b>	<input type="text"/> <small>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.</small>
<b>Proxy port</b>	<input type="text" value="0"/>
<b>Proxy Authentication</b>	none <small>The type of authentication used by the proxy server.</small>
<b>Description</b>	Infrastructure <small>A description may be entered here for administrative reference (not parsed).</small>
User Authentication Settings	
<b>Username</b>	<input type="text"/> <small>Leave empty when no user name is needed.</small>
<b>Password</b>	<input type="password" value="Password"/> <input type="password" value="Password"/> <small>Leave empty when no password is needed. Confirm</small>
<b>Authentication Retry</b>	<input type="checkbox"/> Do not retry connection when authentication fails <small>When enabled, the OpenVPN process will exit if it receives an authentication failure message. The default behavior is to retry.</small>
Cryptographic Settings	
<b>TLS Configuration</b>	<input checked="" type="checkbox"/> Use a TLS Key <small>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.</small>
<b>TLS Key</b>	<input type="text" value="-----BEGIN RSA PRIVATE KEY-----&lt;br/&gt;MIIEpAIBAAKCAQEA...&lt;br/&gt;-----END RSA PRIVATE KEY-----"/> <small>Paste the TLS key here. This key is used to sign control channel packets with an HMAC signature for authentication when establishing the tunnel.</small>
<b>TLS Key Usage Mode</b>	TLS Authentication <small>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.</small>
<b>Peer Certificate Authority</b>	<input type="text" value="openvpn.ca"/> <small>Peer Certificate Authority</small>
<b>Peer Certificate Revocation list</b>	None
<b>Client Certificate</b>	<input type="text" value="openvpn.ca:CN=vpn,ou=vpn,ou=vpn"/> <small>Client Certificate</small>
<b>Encryption Algorithm</b>	AES-256-CBC (256 bit key, 128 bit block) <small>The Encryption Algorithm used for data channel packets when Negotiable Cryptographic Parameter (NCP) support is not available.</small>
<b>Enable NCP</b>	<input checked="" type="checkbox"/> Enable Negotiable Cryptographic Parameters <small>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.</small>
<b>NCP Algorithms</b>	<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <ul style="list-style-type: none"> <li>AES-128-CBC (128 bit key, 128 bit block)</li> <li>AES-128-CFB (128 bit key, 128 bit block)</li> <li>AES-128-CFB8 (128 bit key, 128 bit block)</li> <li>AES-128-CFB128 (128 bit key, 128 bit block)</li> <li>AES-128-GCM (128 bit key, 128 bit block)</li> <li>AES-128-OFB (128 bit key, 128 bit block)</li> <li>AES-192-CBC (192 bit key, 128 bit block)</li> <li>AES-192-CFB (192 bit key, 128 bit block)</li> <li>AES-192-CFB1 (192 bit key, 128 bit block)</li> <li>AES-192-CFB128 (192 bit key, 128 bit block)</li> </ul> </div> <div style="width: 45%;"> <ul style="list-style-type: none"> <li>AES-256-GCM</li> <li>AES-128-GCM</li> </ul> </div> </div> <small>Available NCP Encryption Algorithms Click to add or remove an algorithm from the list Allowed NCP Encryption Algorithms. Click an algorithm name to remove it from the list The order of the selected NCP Encryption Algorithms is respected by OpenVPN.</small>
<b>Auth digest algorithm</b>	SHA256 (256-bit) <small>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.</small>
<b>Hardware Crypto</b>	No Hardware Crypto Acceleration
Tunnel Settings	
<b>IPv4 Tunnel Network</b>	<input type="text"/> <small>This is the IPv4 virtual network used for private communications between this client and the server expressed using CIDR notation (e.g. 10.0.0.0/24). 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.</small>
<b>IPv6 Tunnel Network</b>	<input type="text"/> <small>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.</small>
<b>IPv4 Remote network(s)</b>	<input type="text"/> <small>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.</small>
<b>IPv6 Remote network(s)</b>	<input type="text"/> <small>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.</small>
<b>Limit outgoing bandwidth</b>	<input type="text" value="0"/> <small>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.</small>
<b>Compression</b>	No LZO Compression [agency style, comp-foo no] <small>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.</small>
<b>Type-of-Service</b>	<input type="checkbox"/> Set the TOS IP header value of tunnel packets to match the encapsulated packet value.
<b>Don't pull routes</b>	<input type="checkbox"/> Bars the server from adding routes to the client's routing table <small>This option still allows the server to set the TCP/IP properties of the client's TUN/TAP interface.</small>
<b>Don't add/remove routes</b>	<input type="checkbox"/> Don't add or remove routes automatically <small>Do not execute operating system commands to install routes. Instead, pass routes to --route-up script using environmental variables.</small>
Advanced Configuration	
<b>Custom options</b>	<input type="text"/> <small>Enter any additional options to add to the OpenVPN client configuration here, separated by semicolons.</small>
<b>UDP Fast I/O</b>	<input type="checkbox"/> Use fast I/O operations with UDP writes to tun/tap. Experimental. <small>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.</small>
<b>Send/Receive Buffer</b>	Default <small>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 512KB and test higher and lower values.</small>
<b>Gateway creation</b>	<input checked="" type="radio"/> Both <input type="radio"/> IPv4 only <input type="radio"/> IPv6 only <small>If you assign a virtual interface to this OpenVPN client, this setting controls which gateway types will be created. The default setting is 'both'.</small>
<b>Verbosity level</b>	default <small>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 5: Output R and W characters to the console for each packet read and write. Uppercase is used for TCP/UDP packets and lowercase is used for TUN/TAP packets. 6-11: Debug info range</small>

Avec pour même spécificité : l'interface TAP et pas de configuration de réseau.

Il faut ensuite assigner l'interface ovncX comme interface du pfSense sans IP :



puis de créer un bridge avec UNIQUEMENT l'interface créer précédement :



puis assigner ce bridge a une interface, et lui assigner l'IP Fail-Over de votre hébergeur ainsi que sa passerelle (souvent identique a celle de votre serveur).

Si celle-ci n'est pas dans le même réseau, il vous faudra cocher la case **Use non-local gateway** dans la gateway.

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