

# pfSense + DMZ

## ESCUENARIO:

### Máquinas virtuales:

RAM ≥ 2048MB

CPU ≥ 2

PAE/NX habilitado

BIOS: Óptica

### DMZ → MV kaliA:

ISO: Live Kali amd64

Rede: Interna

IP/MS: 10.10.10.10/24

Servidor Web: apache2

### Máquina virtual pfSense:

ISO: pfSense

BIOS: Óptica, HD

HD Dinámico: 20GB

Rede1: NAT Network (em0)

IP/MS: 172.16.0.0/24

Rede2: Interna (em1)

IP/MS: 192.168.1.1/24

Rede3: Interna (em1:0)

IP/MS: 10.10.10.1/24

Firewall/Router/NAT/Proxy/VPN

### Rede Empresa → MV kaliB:

ISO: Live Kali amd64

Rede: Interna

IP/MS: 192.168.1.100/24

Cliente Web + Cliente Proxy

### Rede WAN → MV kaliC:

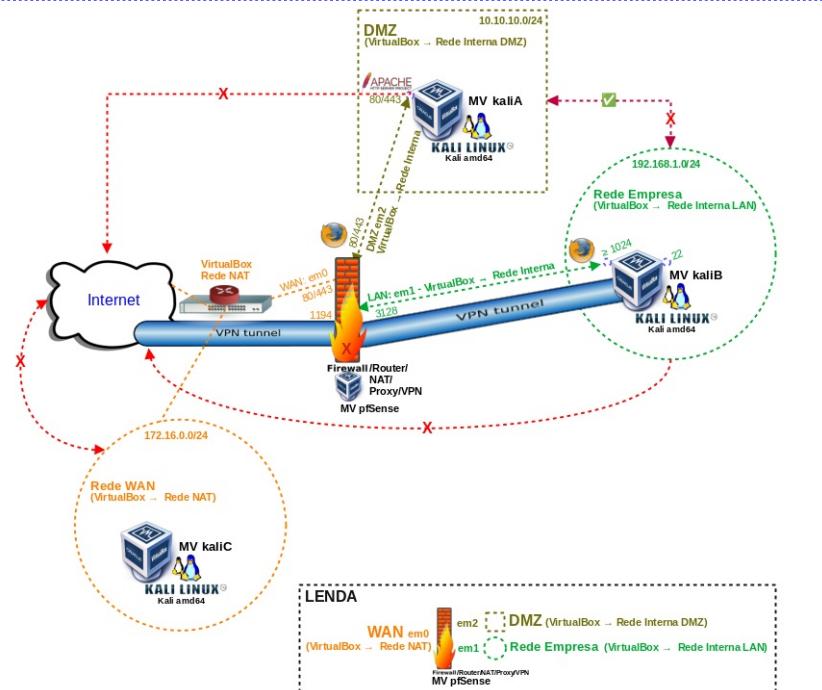
ISO: Live Kali amd64

Rede: NAT Network

IP/MS: 172.16.0.8/24

Cliente Web

Cliente VPN



**LIMITACIÓN DE RESPONSABILIDADE** O autor do presente documento declina calquera responsabilidade asociada ao uso incorrecto e/ou malicioso que puidese realizarse coa información exposta no mesmo. Por tanto, non se fa responsable en ningún caso, nin pode ser considerado legalmente responsable en ningún caso, das consecuencias que poidan derivarse da información contida nel ou que esté enlazada dende ou hacia el, incluindo os posibles errores e información incorrecta existentes, información difamatoria, así como das consecuencias que se poidan derivar sobre a súa aplicación en sistemas de información reais e/ou virtuais. Este documento foi xerado para uso didáctico e debe ser empregado en contornas privadas e virtuales controladas co permiso correspondente do administrador dasas contornas.

**NOTA:** Documentación de interese

- [Cheat Sheet Apache2 Web Server](#)
- [Practica BRS Cifrado asimetrico Conexion SSH sen contrasinal](#)
- [Mecanismos de Control](#)

## DMZ

A DMZ, ou zona desmilitarizada, utilizase habitualmente para aloxar servidores que ofrecen servizos á rede externa, xeralmente Internet. Estes servizos poden incluir servidores web, DNS, correo electrónico, etc.

En canto á conectividade, a DMZ está deseñada para permitir conexións dende a rede interna e a externa, pero restrinxir as conexións dende a DMZ unicamente á rede externa. Isto significa que:

- Os equipos da rede interna poden conectarse aos servidores da DMZ.
- Os equipos da rede externa (Internet) poden conectarse aos servidores da DMZ.
- Os equipos da DMZ non poden iniciar conexións coa rede interna.

Esta configuración ten como obxectivo protexer a rede interna no caso de que un atacante comprometa a seguridade dos equipos na DMZ. A DMZ actúa como unha especie de "amortiguador", impidiendo que un atacante que accedese á DMZ poida acceder directamente á rede interna.

## Que é pfSense?



pfSense é unha solución de *firewall* e *router* de código aberto baseada no sistema operativo **FreeBSD**. É amplamente utilizada para xestionar e protexer redes, tanto pequenas como grandes, grazas á súa flexibilidade, robustez e facilidade de uso.

### ■ Principais características de pfSense:

- **Firewall avanzado:** Controla o tráfico da rede mediante regras configurables.
- **Enrutador integrado:** Ofrece enrutamento estático e dinámico entre redes.
- **VPN (Redes Privadas Virtuales):** Establece conexións seguras usando protocolos como OpenVPN e IPsec.
- **Balanceo de carga e failover:** Mellora o rendemento e disponibilidade da conexión a Internet.
- **Filtro de contenido:** Bloquea sitios web ou categorías específicas.
- **Interfaz web fácil de usar:** Configuración sinxela a través dun navegador.

### ■ Vantaxes de usar pfSense:

- **Gratuito e de código abierto:** Sen custos de licenzas.
- **Alta seguridad e estabilidade:** Ideal para redes críticas.
- **Personalización:** Adaptable ás necesidades específicas.
- **Actualizaciones frecuentes:** Melloras continuas grazas á comunidade activa.

### ■ Interfaces e Roles en pfSense:

En pfSense, as interfaces como em0, em1 e em2 son asignadas automaticamente segundo a detección do hardware durante a instalación. A asignación de roles (WAN, LAN, OPT1) non está relacionada co nome físico (emX), senón coas decisións tomadas ao configurar o sistema.

#### A. Asignación típica das interfaces:

- **em0 (WAN):** A primeira interface detectada, normalmente asignada como **WAN**. Conecta a rede local a Internet ou a unha rede externa.
- **em1 (LAN):** A segunda interface detectada, asignada como **LAN**. Utilízase para conectar dispositivos internos na rede local.
- **em2 (OPT1):** A terceira interface detectada, configurada como **OPT1**. Pode usarse para redes adicionais, como unha DMZ ou redes de invitados.

#### B. Explicación dos roles das interfaces:

- **WAN (Wide Area Network):** Interface que conecta a rede local a Internet. Protexe a rede interna fronte a ameazas externas.
- **LAN (Local Area Network):** Interface para conectar os dispositivos internos. Proporciona acceso a Internet aos equipos locais.
- **OPT (Opcional):** Interfaces adicionais configurables para fins específicos, como VLANs ou DMZs.

En resumo:

1. pfSense é unha ferramenta versátil que permite mellorar a seguridade e o control dunha rede de forma profesional e eficiente.
2. Os nomes das interfaces (em0, em1, em2) son asignados automaticamente polo sistema en función do hardware disponible. Os roles (WAN, LAN, OPT1) son definidos polo usuario para especificar o uso de cada interface, permitindo unha configuración flexible e adaptada ás necesidades específicas.

## Descarga fpSense



## Resumo

### Firewall: Regras Port Forwarding

- No Exemplo1. Port Forwarding **kaliC(WAN)** <sup>80</sup> → **kaliA(DMZ)** imos redireccionar o porto TCP 80(HTTP) de pfSense ao porto TCP 80(HTTP) en kaliA se a petición de conectividade realizase dende a rede WAN(kaliC)
- No Exemplo2. Port Forwarding **kaliC(WAN)** <sup>443</sup> → **kaliA(DMZ)** imos redireccionar o porto TCP 443(HTTPS) de pfSense ao porto TCP 443(HTTPS) en kaliA se a petición de conectividade realizase dende a rede WAN(kaliC)

### Proxy: Squid

- No Exemplo3. Proxy en pfSense imos activar o proxy en pfSense para que as peticóns web dende LAN(kaliB) saían a través deste proxy.

### VPN: OpenVPN

- No Exemplo4. OpenVPN en pfSense. Acceso remoto **kaliC(WAN)** <sup>1194</sup> → **kaliA(DMZ)** imos configurar acceso VPN para que dende kaliC(WAN) poidamos conectarnos a kaliB(LAN).

### Firewall: Regras DMZ

- No Exemplo5. Bloqueo tráfico de rede da DMZ á LAN imos engadir a regra que impide o acceso da DMZ(kaliA) á LAN(kaliB).

## Configuración Escenario

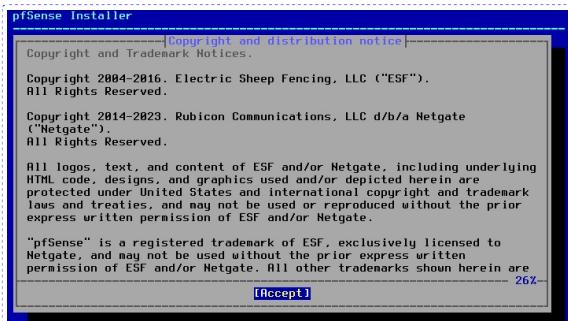
### Firewall - Máquina virtual pfSense

#### 1. Configurar según Escenario:



#### 2. Arrancar a live pfSense para a instalación no HD dinámico de 20GB:

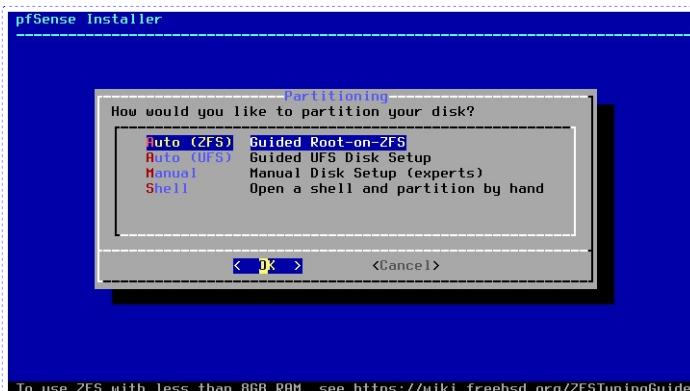
Móvese polas pantallas de instalación coas teclas frechas e tabulado. Unha vez elexido a opción desexada premer a tecla Enter.



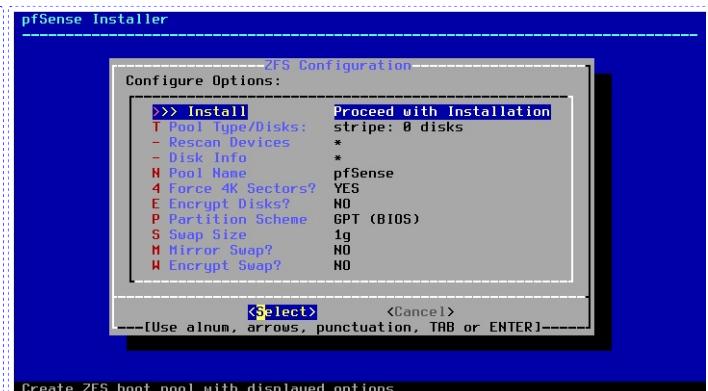
Premir a tecla Enter



Escoitar a opción Install e premer Enter



Escoitar a opción Auto (ZFS) e premer Enter



Premer a tecla Enter para proseguir coa instalación



[1] Disks1. Stripping provides maximum storage but no redundancy.

Premer a tecla Enter para proseguir coa instalación



Premer a tecla Enter para proseguir coa instalación



Apagar o equipo executando o comando: init 0

```
done.
Starting CRON... done.
pfSense 2.7.2-RELEASE amd64 20231206-2010
bootup complete

FreeBSD/amd64 (pfSense.home.arpa) (ttyv0)

VirtualBox Virtual Machine - Netgate Device ID: 49cb0c3548cad298b566

*** Welcome to pfSense 2.7.2-RELEASE (amd64) on pfSense ***

WAN (wan)      -> em0      -> v4/DHCP4: 172.16.0.7/24
LAN (lan)      -> em1      -> v4: 192.168.1.1/24

0) Logout (SSH only)          9) pfTop
1) Assign Interfaces          10) Filter Logs
2) Set interface(s) IP address 11) Restart webConfigurator
3) Reset webConfigurator password 12) PHP shell + pfSense tools
4) Reset to factory defaults   13) Update from console
5) Reboot system               14) Enable Secure Shell (sshd)
6) Halt system                 15) Restore recent configuration
7) Ping host                   16) Restart PHP-FPM

Enter an option: 1
```

Arrancar a máquina virtual. Unha vez arrancado aparece un menú.

```
say no here and use the webConfigurator to configure VLANs later, if required.
Should VLANs be set up now [y/n]? n

If the names of the interfaces are not known, auto-detection can
be used instead. To use auto-detection, please disconnect all
interfaces before pressing 'a' to begin the process.

Enter the WAN interface name or 'a' for auto-detection
(em0 em1 em2 or a): em0

Enter the LAN interface name or 'a' for auto-detection
NOTE: this enables full Firewalling/HAT mode.
(em1 em2 a or nothing if finished): em1

Enter the Optional 1 interface name or 'a' for auto-detection
(em2 a or nothing if finished): em2

The interfaces will be assigned as follows:
WAN -> em0
LAN -> em1
OPT1 -> em2

Do you want to proceed [y/n]? y
```

Elixir a opción 1 para determinar que rol posee cada interface de rede. Premer:

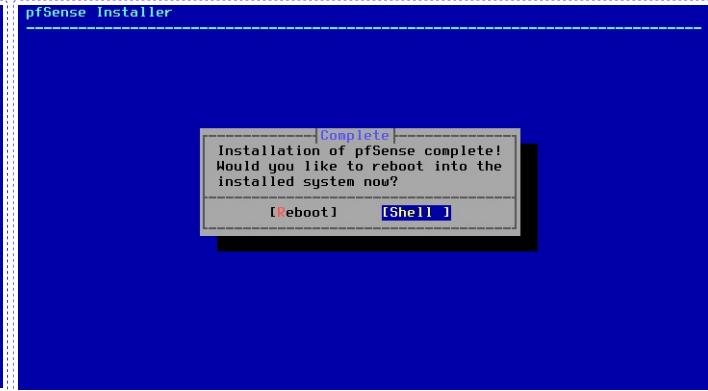
n → para non configurar VLANs

em0 → para escoller a interface em0 co rol WAN

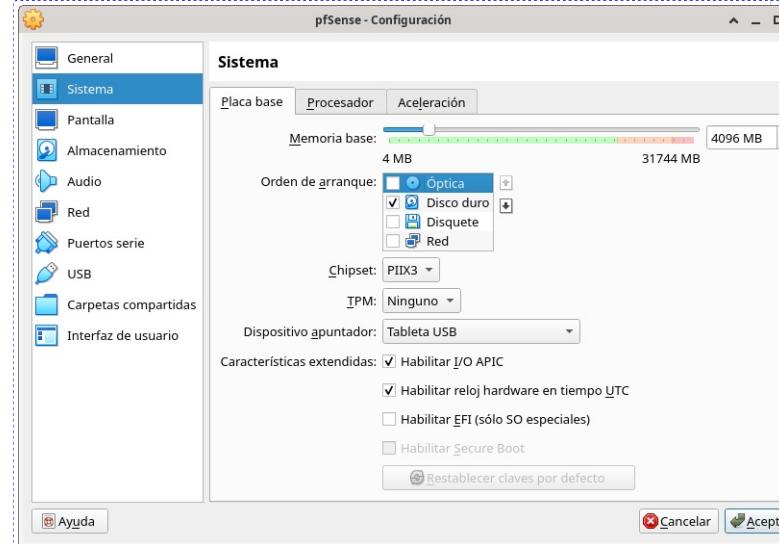
em1 → para escoller a interface em1 co rol LAN

em2 → para escoller a interface em2 co rol OPT1

y → para confirmar as anteriores opciones escollidas.



Elixir a opción Shell para proseguir coa instalación



Modificar as opciones de arranque: deixar soamente disco duro

```
done.
Starting CRON... done.
pfSense 2.7.2-RELEASE amd64 20231206-2010
bootup complete

VirtualBox Virtual Machine - Netgate Device ID: 49cb0c3548cad298b566

*** Welcome to pfSense 2.7.2-RELEASE (amd64) on pfSense ***

WAN (wan)      -> em0      -> v4/DHCP4: 172.16.0.7/24
LAN (lan)      -> em1      -> v4: 192.168.1.1/24

0) Logout (SSH only)          9) pfTop
1) Assign Interfaces          10) Filter Logs
2) Set interface(s) IP address 11) Restart webConfigurator
3) Reset webConfigurator password 12) PHP shell + pfSense tools
4) Reset to factory defaults   13) Update from console
5) Reboot system               14) Enable Secure Shell (sshd)
6) Halt system                 15) Restore recent configuration
7) Ping host                   16) Restart PHP-FPM

Enter an option: 1
```

Elixir a opción 1 para determinar que rol posee cada interface de rede. Premer:

n → para non configurar VLANs

em0 → para escoller a interface em0 co rol WAN

em1 → para escoller a interface em1 co rol LAN

em2 → para escoller a interface em2 co rol OPT1

y → para confirmar as anteriores opciones escollidas.

```

OPT1 -> em2
Do you want to proceed [y/n]? y
Writing configuration...done.
One moment while the settings are reloading... done!
VirtualBox Virtual Machine - Netgate Device ID: 49cb0c3548cad298b566

*** Welcome to pfSense 2.7.2-RELEASE (amd64) on pfSense ***

WAN (wan)      -> em0      -> v4/DHCP4: 172.16.0.7/24
LAN (lan)      -> em1      -> v4: 192.168.1.1/24
OPT1 (opt1)    -> em2      ->

8) Logout (SSH only)          9) pfTop
1) Assign Interfaces          10) Filter Logs
2) Set interface(s) IP address 11) Restart webConfigurator
3) Reset webConfigurator password 12) PHP shell + pfSense tools
4) Reset to factory defaults   13) Update from console
5) Reboot system               14) Enable Secure Shell (sshd)
6) Halt system                 15) Restore recent configuration
7) Ping host                   16) Restart PHP-FPM
8) Shell

Enter an option: 2

```

Elixer a opción 2 para configurar a rede das interfaces em0, em1, em2

```

*** Welcome to pfSense 2.7.2-RELEASE (amd64) on pfSense ***

WAN (wan)      -> em0      -> v4/DHCP4: 172.16.0.7/24
LAN (lan)      -> em1      -> v4: 192.168.1.1/24
OPT1 (opt1)    -> em2      ->

0) Logout (SSH only)          9) pfTop
1) Assign Interfaces          10) Filter Logs
2) Set interface(s) IP address 11) Restart webConfigurator
3) Reset webConfigurator password 12) PHP shell + pfSense tools
4) Reset to factory defaults   13) Update from console
5) Reboot system               14) Enable Secure Shell (sshd)
6) Halt system                 15) Restore recent configuration
7) Ping host                   16) Restart PHP-FPM
8) Shell

Enter an option: 2
Available interfaces:
1 - WAN (em0 - dhcp, dhcp6)
2 - LAN (em1 - static)
3 - OPT1 (em2)

Enter the number of the interface you wish to configure: 3

```

Escoller a opción 3 para configurar a única interface que non posúe configuración de rede: em2

```

Enter the number of the interface you wish to configure: 3
Configure IPv4 address OPT1 interface via DHCP? (y/n) n
Enter the new OPT1 IPv4 address. Press <ENTER> for none:
> 10.10.10.1

Subnet masks are entered as bit counts (as in CIDR notation) in pfSense.
e.g. 255.255.255.0 = 24
      255.255.0.0 = 16
      255.0.0.0 = 8

Enter the new OPT1 IPv4 subnet bit count (1 to 32):
> 24

For a WAN, enter the new OPT1 IPv4 upstream gateway address.
For a LAN, press <ENTER> for none:
>

Configure IPv6 address OPT1 interface via DHCP6? (y/n) n
Enter the new OPT1 IPv6 address. Press <ENTER> for none:
>

Do you want to enable the DHCP server on OPT1? (y/n) y

```

Premer:  
n → para non configurar a interface por DHCP e si de forma estática  
10.10.10.1 → para configurar esa IPv4 estática  
24 → para configurar esa máscara de subrede  
Enter → para non configurar gateway para esta interface.  
n → para non configurar IPv6 de forma dinámica  
Enter → para non configurar IPv6 de forma estática  
y → para confirmar as anteriores opcións escollidas.

```

for a WAN, enter the new OPT1 IPv4 upstream gateway address.
For a LAN, press <ENTER> for none:
>

Configure IPv6 address OPT1 interface via DHCP6? (y/n) n
Enter the new OPT1 IPv6 address. Press <ENTER> for none:
>

Do you want to enable the DHCP server on OPT1? (y/n) y
Enter the start address of the IPv4 client address range: 10.10.10.10
Enter the end address of the IPv4 client address range: 10.10.10.50
Disabling IPv6 DHCPD...

Please wait while the changes are saved to OPT1...
Reloading filter...
Reloading routing configuration...
DHCPD...

The IPv4 OPT1 address has been set to 10.10.10.1/24
You can now access the webConfigurator by opening the following URL in your web
browser:
http://10.10.10.1/
Press <ENTER> to continue.

```

Efectuados os cambios premer Enter para continuar

```

The IPv4 OPT1 address has been set to 10.10.10.1/24
You can now access the webConfigurator by opening the following URL in your web
browser:
http://10.10.10.1/
Press <ENTER> to continue.
VirtualBox Virtual Machine - Netgate Device ID: 49cb0c3548cad298b566

*** Welcome to pfSense 2.7.2-RELEASE (amd64) on pfSense ***

WAN (wan)      -> em0      -> v4/DHCP4: 172.16.0.7/24
LAN (lan)      -> em1      -> v4: 192.168.1.1/24
OPT1 (opt1)    -> em2      -> v4: 10.10.10.1/24

0) Logout (SSH only)          9) pfTop
1) Assign Interfaces          10) Filter Logs
2) Set interface(s) IP address 11) Restart webConfigurator
3) Reset webConfigurator password 12) PHP shell + pfSense tools
4) Reset to factory defaults   13) Update from console
5) Reboot system               14) Enable Secure Shell (sshd)
6) Halt system                 15) Restore recent configuration
7) Ping host                   16) Restart PHP-FPM
8) Shell

Enter an option: 

```

Para poder continuar coa práctica verificar que está realizada a configuración de rede das 3 interfaces como se amosa na imaxe.

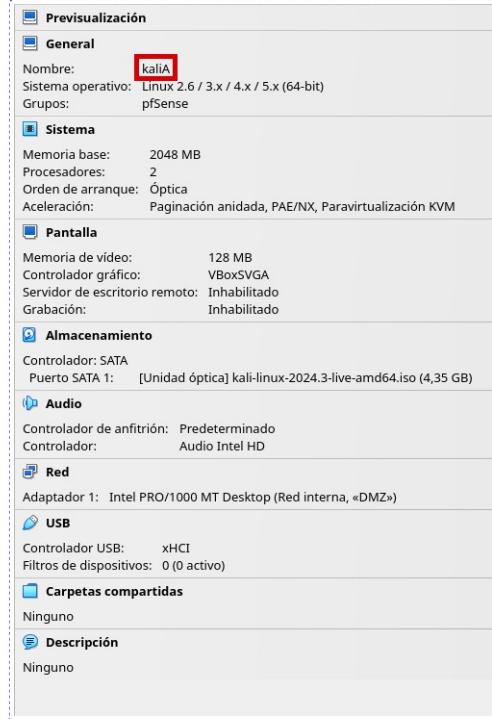
Igual as IP/MS non son as mesmas pero máis adiante na práctica resolverase esta cuestión.

Unha vez configuradas en pfSense as 3 tarxetas de rede: em0, em1, em2 imos configurar o resto de máquinas virtuais:

- kaliA para a DMZ(em2)
- kaliB para a LAN(em1)
- kaliC para a WAN(em0)

## DMZ - Máquina virtual A: Kali amd64

### 3. Configurar según Escenario:



### 4. Na contorna gráfica abrir un terminal e executar:

kali@kali:~\$ setxkbmap es #Cambiar o mapa de teclado ao idioma español.

kali@kali:~\$ passwd kali #Cambiar o contrasinal do usuario kali. Por como contrasinal DMZabc123. (Ollo que o contrasinal ten un carácter punto final).

### 5. Configuración da rede:

kaliA será cliente DHCP, polo cal recollerá a configuración de rede do servidor DHCP de pfSense a través da súa interface em2

Imaxe que amosa a configuración DHCP para em2 en pfSense (máis adiante veremos como acceder a esta aplicación de configuración de pfSense)

Nesta práctica a IP/MS concedida polo servidor DHCP DMZ de pfSense para kaliB foi: 10.10.10.24. Esta IP/MS pode variar na execución desta práctica. Se se quere proceder coa configuración 10.10.10.24 débese cambiar a IP estática a interface eth0 de kaliB e manter as táboas de rutas e o ficheiro /etc/resolv.conf como se amosa a continuación.

kali@kali:~\$ ip addr show eth0 #Amosar a configuración da tarxeta de rede interna(eth0) con IP/MS: 10.10.10.24 recollida polo DHCP (em2) de pfSense.

kali@kali:~\$ ip route show | ip route list || ip route || ip r # Listar a táboa de enrutamento otorgada polo servidor DHCP.

kali@kali:~\$ cat /etc/resolv.conf #Ver o contido do ficheiro /etc/resolv.conf, o cal contén a configuración os servidores DNS a empregar para a resolución de nomes.

```
(kali㉿kali)-[~]
$ ip addr show eth0
2: eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP group default qlen 1
    link/ether 08:00:27:de:f1:6e brd ff:ff:ff:ff:ff:ff
    inet 10.10.10.24 brd 10.10.10.255 scope global dynamic noprefixroute eth0
        valid_lft 6796sec preferred_lft 6796sec
    inet6 fe80::9811:bfc1:deac:4a01/64 scope link noprefixroute
        valid_lft forever preferred_lft forever

(kali㉿kali)-[~]
$ ip route
default via 10.10.10.1 dev eth0 proto dhcp src 10.10.10.10 metric 100
10.10.10.0/24 dev eth0 proto kernel scope link src 10.10.10.10 metric 100

(kali㉿kali)-[~]
$ cat /etc/resolv.conf
# Generated by NetworkManager
search home.arpa
nameserver 10.10.10.1
```

6. Cambiar hostname da máquina virtual A. Por kaliA como hostname:

#### OPCIÓN A:

```
kali@kali:~$ sudo su - #Acceder á consola de root(administrador) a través dos permisos configurados co comando sudo (/etc/sudoers, visudo)
root@kali:~# echo 'kaliA' > /etc/hostname #Indicar ao sistema o valor do hostname.
root@kali:~# echo 'kernel.hostname=kaliA' >> /etc/sysctl.conf #Indicar ao kernel o valor do hostname.
root@kali:~# sysctl -p #Activar o cambio de hostname sen ter que pechar sesión nin reiniciar
root@kali:~# echo -e '10.10.10.10|kaliA' >> /etc/hosts #Engadir o hostname kaliA en /etc/hosts
root@kali:~# exit #Sair da consola local sudo na que estabamos a traballar para voltar á consola local de kali.
kali@kali:~$ exit #Pesar o terminal saíndo da consola local do usuario kali.
```

#### OPCIÓN B:

```
kali@kali:~$ sudo su - #Acceder á consola de root(administrador) a través dos permisos configurados co comando sudo (/etc/sudoers, visudo)
root@kali:~# hostnamectl hostname kaliA || hostnamectl set-hostname kaliA #Modificar o hostname do sistema a kaliA.
root@kali:~# echo -e '10.10.10.10|kaliA' >> /etc/hosts #Engadir o hostname kaliA en /etc/hosts
root@kali:~# exit #Sair da consola local sudo na que estabamos a traballar para voltar á consola local de kali.
kali@kali:~$ exit #Pesar o terminal saíndo da consola local do usuario kali.
```

7. Activar Servidor Web Apache:

```
kali@kaliA:~$ sudo su - #Acceder á consola de root(administrador) a través dos permisos configurados co comando sudo (/etc/sudoers, visudo)
root@kaliA:~# /etc/init.d/apache2 status #Comprobar o estado do servidor web Apache.
root@kaliA:~# /etc/init.d/apache2 start #Iniciar o servidor web Apache.
root@kaliA:~# /etc/init.d/apache2 status #Comprobar o estado do servidor web Apache.
root@kaliA:~# nc -vz 10.10.10.10 80 #Mediante o comando nc(netcat) comprobar se o porto 80 do servidor web Apache está en estado escoita(listen), esperando conexións. A opción -v corresponde á opción verbose, o que permite amosar información más detallada na saída do comando. A opción -z permite devolver PROMPT do sistema e de igual xeito facer o escaneo ao/s porto/s solicitados. O número 80 é o porto TCP a escanear.
root@kaliA:~# a2ensite default-ssl #Habilitar o VirtualHost default-ssl, que configura o acceso a través de https (porto TCP 443)
root@kaliA:~# a2enmod ssl #Habilitar o módulo ssl que permite activar a configuración do VirtualHost default-ssl, que configura o acceso a través de https (porto TCP 443)
root@kaliA:~# /etc/init.d/apache2 restart #Reinic平ar a configuración do servidor web Apache.
root@kaliA:~# nc -vz 10.10.10.10 443 #Mediante o comando nc(netcat) comprobar se o porto 443 do servidor web Apache está en estado escoita(listen), esperando conexións. A opción -v corresponde á opción verbose, o que permite amosar información más detallada na saída do comando. A opción -z permite devolver PROMPT do sistema e de igual xeito facer o escaneo ao/s porto/s solicitados. O número 443 é o porto TCP a escanear.
```

No caso da distribución Kali xa temos instalado o servidor web Apache, pero nunha distribución baseada en Debian poderíamos instalalo do seguinte xeito:  
# apt update #Actualizar o listado de paquetes dos repositorios (/etc/apt/sources.list, /etc/apt/sources.list.d)  
# apt search apache2 #Buscar calquera paquete que coincida co patrón de búsqueda apache2  
# apt -y install apache2 #Instalar o paquete apache2, é dicir, instalar o servidor HTTP apache2. Co parámetro -y automaticamente asumimos yes a calquera pregunta que ocorra na instalación do paquete.

8. Permisos apache:

```
root@kaliA:~# chown -R www-data: /var/www/html/ #Cambiar usuario propietario www-data e grupo propietario www-data a toda a árbore de ficheiros e directorios que colgan do directorio DocumentRoot de Apache: /var/www/html
root@kaliA:~# chmod 444 /var/www/html/index.html #Cambiar a só lectura os permisos ugo do ficheiro index.html situado en /var/www/html, é dicir, establecer os permisos r-r-r- (soamente lectura para o usuario propietario, o grupo propietario e o resto do mundo)
root@kaliA:~# /etc/init.d/apache2 restart #Reinic平ar o servidor web Apache.
root@kaliA:~# /etc/init.d/apache2 status #Comprobar o estado do servidor web Apache.
```

	pfSense → kaliA	kaliA → pfSense	kaliA → Internet
ping	SI	NON	NON
nc (ports TCP 80/443)	SI		

Agora podemos comprobar que dende pfSense si é posible establecer conectividade cun ping a kaliA(10.10.10.10), pero que dende kaliA non é posible establecer conectividade cun ping a pfSense(10.10.10.1) nin a Internet.

```
[WAN (wan)] --> em0 --> v4/DHCP4: 172.16.0.7/24
[LAN (lan)] --> em1 --> v4: 192.168.1.1/24
OPT1 (opt1) --> em2 --> v4: 10.10.10.1/24

0) Logout (SSH only)          9) pfTop
1) Assign Interfaces          10) Filter Logs
2) Set interface(s) IP address 11) Restart webConfigurator
3) Reset webConfigurator password 12) PHP shell + pfSense tools
4) Reset to factory defaults 13) Update from console
5) Reboot system               14) Enable Secure Shell (sshd)
6) Halt system                 15) Restore recent configuration
7) Ping host                   16) Restart PHP-FPM
8) Shell

Enter an option: 8

[2.7.2-RELEASE][root@pfSense.home.arpal/root: ping -c2 10.10.10.10
PING 10.10.10.10 (10.10.10.10): 56 data bytes
64 bytes from 10.10.10.10: icmp_seq=0 ttl=64 time=1.311 ms
64 bytes from 10.10.10.10: icmp_seq=1 ttl=64 time=1.883 ms

--- 10.10.10.10 ping statistics ---
2 packets transmitted, 2 packets received, 0.0% packet loss
round-trip min/avg/max/stddev = 1.311/1.597/1.883/0.286 ms
[2.7.2-RELEASE][root@pfSense.home.arpal/root:
```

```
[(kali㉿kaliA)-~]
$ ping -c2 10.10.10.1
PING 10.10.10.1 (10.10.10.1) 56(84) bytes of data.

--- 10.10.10.1 ping statistics ---
2 packets transmitted, 0 received, 100% packet loss, time 1032ms
```

```
[(kali㉿kaliA)-~]
$ ping -c2 www.google.es
ping: www.google.es: Temporary failure in name resolution
```

Tamén podemos observar que dende pfSense somos quen de chegar ao portos TCP 80 e 443(servizo web apache2) de kaliA.

```
[2.7.2-RELEASE][root@pfSense.home.arpal/root: ping -c2 10.10.10.10
PING 10.10.10.10 (10.10.10.10): 56 data bytes
64 bytes from 10.10.10.10: icmp_seq=0 ttl=64 time=1.106 ms
64 bytes from 10.10.10.10: icmp_seq=1 ttl=64 time=1.298 ms

--- 10.10.10.10 ping statistics ---
2 packets transmitted, 2 packets received, 0.0% packet loss
round-trip min/avg/max/stddev = 1.106/1.242/1.298/0.056 ms
[2.7.2-RELEASE][root@pfSense.home.arpal/root: nc -46DdEfhk1NnrStUuvz1 [-e policy1] [-l length] [-i interval] [-t timeout]
usage: nc [-46DdEfhk1NnrStUuvz1] [-e policy1] [-l length] [-i interval] [-t timeout]
        [--no-tcpopt] [-sctcp]
        [-P proxy_username] [-p source_port] [-s source] [-T ToS]
        [-tun tundev] [-V rtable] [-u timeout] [-X proxy_protocol]
        [-x proxy_address[:port]] [destination] [port]
[2.7.2-RELEASE][root@pfSense.home.arpal/root: nc -vz 10.10.10.10 80
Connection to 10.10.10.10 80 port [tcp/http] succeeded!
[2.7.2-RELEASE][root@pfSense.home.arpal/root: nc -vz 10.10.10.10 443
Connection to 10.10.10.10 443 port [tcp/https] succeeded!
[2.7.2-RELEASE][root@pfSense.home.arpal/root:
```

## 9. Configurar según Escenario:

**General**

- Nombre: **kaliB**
- Sistema operativo: Linux 2.6 / 3.x / 4.x / 5.x (64-bit)
- Grupos: pfSense

**Sistema**

- Memoria base: 2048 MB
- Procesadores: 2
- Orden de arranque: Óptica
- Aceleración: Página anidada, PAE/NX, Paravirtualización KVM

**Pantalla**

- Memoria de video: 128 MB
- Controlador gráfico: VBoxSVGA
- Servidor de escritorio remoto: Inhabilitado
- Grabación: Inhabilitado

**Almacenamiento**

- Controlador: SATA
- Puerto SATA 1: [Unidad óptica] kali-linux-2024.3-live-amd64.iso (4,35 GB)

**Audio**

- Controlador de anfitrión: Predeterminado
- Controlador: Audio Intel HD

**Red**

- Adaptador 1: Intel PRO/1000 MT Desktop (Red interna, «LAN»)

**USB**

- Controlador USB: xHCI
- Filtros de dispositivos: 0 (0 activo)

**Carpetas compartidas**

- Ninguno

**Descripción**

- Ninguno

## 10. Na contorna gráfica abrir un terminal e executar:

```
kali@kali:~$ setxkbmap es #Cambiar o mapa de teclado ao idioma español.
```

```
kali@kali:~$ passwd kali #Cambiar o contrasinal do usuario kali. Por como contrasinal LANabc123. (Ollo que o contrasinal ten un caracter punto final).
```

## 11. Configuración da rede:

kaliB será cliente DHCP, polo cal recollerá a configuración de rede do servidor DHCP de pfSense a través da súa interface em1

**Services / DHCP Server / LAN**

**General DHCP Options**

**Primary Address Pool**

Subnet	192.168.1.0/24
Subnet Range	192.168.1.1 - 192.168.1.254
Address Pool Range	192.168.1.10 - 192.168.1.245
From	192.168.1.10
To	192.168.1.245

The specified range for this pool must not be within the range configured on any other address pool for this interface.

If additional pools of addresses are needed inside of this subnet outside the above range, they may be specified here.

Imaxe que amosa o rango de concesión DHCP: 192.168.1.10 - 192.168.1.245

Imaxe que amosa a configuración DHCP para em1 en pfSense (más adiante veremos como acceder a esta aplicación de configuración de pfSense)

Nesta práctica a IP/MS concedida polo servidor DHCP LAN de pfSense para kaliB foi: 192.168.1.100/24. Esta IP/MS pode variar na execución desta práctica. Se se quere proceder coa configuración 192.168.1.100/24 débese cambiar a IP estática a interface eth0 de kaliB e manter as táboas de rutas e o ficheiro /etc/resolv.conf como se amosa a continuación.

```
kali@kali:~$ ip addr show eth0 #Amosar a configuración da tarxeta de rede interna(eth0) con IP/MS: 192.168.1.100/24 recollida polo DHCP (em1) de pfSense.
```

```
kali@kali:~$ ip route show | ip route list || ip route || ip r #Listar a táboa de enrutamento otorgada polo servidor DHCP.
```

```
kali@kali:~$ cat /etc/resolv.conf #Ver o contido do ficheiro /etc/resolv.conf, o cal contén a configuración os servidores DNS a empregar para a resolución de nomes.
```

```
(kali㉿kali)-[~]
└─$ ip addr show eth0
2: eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP group default qlen 1
000
    link/ether 08:00:27:88:c0:e8 brd ff:ff:ff:ff:ff:ff
    inet 192.168.1.100/24 brd 192.168.1.255 scope global dynamic noprefixroute eth0
        valid_lft 6881sec preferred_lft 6881sec
    inet6 fe80::13af:c4:d30:f89/64 scope link noprefixroute
        valid_lft forever preferred_lft forever

(kali㉿kali)-[~]
└─$ ip route
default via 192.168.1.1 dev eth0 proto dhcp src 192.168.1.100 metric 100
192.168.1.0/24 dev eth0 proto kernel scope link src 192.168.1.100 metric 100

(kali㉿kali)-[~]
└─$ cat /etc/resolv.conf
# Generated by NetworkManager
search home.arpa
nameserver 192.168.1.1
```

12. Cambiar hostname da máquina virtual B. Por kaliB como hostname:

#### OPCIÓN A:

```
kali@kali:~$ sudo su - #Acceder á consola de root(administrador) a través dos permisos configurados co comando sudo (/etc/sudoers, visudo)
root@kali:~# echo 'kaliB' > /etc/hostname #Indicar ao sistema o valor do hostname.
root@kali:~# echo 'kernel.hostname=kaliB' >> /etc/sysctl.conf #Indicar ao kernel o valor do hostname.
root@kali:~# sysctl -p #Activar o cambio de hostname sen ter que pechar sesión nin reiniciar
root@kali:~# echo -e '192.168.1.100\tkaliB' >> /etc/hosts #Engadir o hostname kaliB en /etc/hosts
root@kali:~# exit #Sair da consola local sudo na que estábamos a traballar para voltar á consola local de kali.
kali@kali:~$ exit #Pechar o terminal saíndo da consola local do usuario kali.
```

#### OPCIÓN B:

```
kali@kali:~$ sudo su - #Acceder á consola de root(administrador) a través dos permisos configurados co comando sudo (/etc/sudoers, visudo)
root@kali:~# hostnamectl set-hostname kaliB || hostnamectl #Modificar o hostname do sistema a kaliB.
root@kali:~# echo -e '192.168.1.100\tkaliB' >> /etc/hosts #Engadir o hostname kaliB en /etc/hosts
root@kali:~# exit #Sair da consola local sudo na que estábamos a traballar para voltar á consola local de kali.
kali@kali:~$ exit #Pecchar o terminal saíndo da consola local do usuario kali.
```

	pfSense → kaliB	kaliB → pfSense	kaliB → Internet	kaliA → kaliB	kaliB → kaliA
ping	SI	SI	SI	NON	SI
nc (ports TCP 80/443)					SI

Agora podemos comprobar que dende kaliB SI é posible establecer conectividade cun ping a pfSense(192.168.1.1) e viceversa; e que tamén dende kaliB é posible a saída a Internet

```
(kali㉿kali)-[~]
└─$ ping -c2 192.168.1.1
PING 192.168.1.1 (192.168.1.1) 56(84) bytes of data.
64 bytes from 192.168.1.1: icmp_seq=1 ttl=64 time=1.10 ms
64 bytes from 192.168.1.1: icmp_seq=2 ttl=64 time=1.72 ms

--- 192.168.1.1 ping statistics ---
2 packets transmitted, 2 received, 0% packet loss, time 1002ms
rtt min/avg/max/mdev = 1.104/1.411/1.719/0.307 ms

(kali㉿kali)-[~]
└─$ ping -c2 www.google.es
PING www.google.es (142.250.200.131) 56(84) bytes of data.
64 bytes from mad4lis14-in-f3.1e100.net (142.250.200.131): icmp_seq=1 ttl=103 time=32.3 ms
64 bytes from mad4lis14-in-f3.1e100.net (142.250.200.131): icmp_seq=2 ttl=103 time=32.3 ms

--- www.google.es ping statistics ---
2 packets transmitted, 2 received, 0% packet loss, time 1003ms
rtt min/avg/max/mdev = 32.251/32.298/32.346/0.047 ms

[2.7.2-RELEASE][root@pfSense.home.arpa]/root: ping -c2 192.168.1.100
PING 192.168.1.100 (192.168.1.100) 56 data bytes
64 bytes from 192.168.1.100: icmp_seq=0 ttl=64 time=1.669 ms
64 bytes from 192.168.1.100: icmp_seq=1 ttl=64 time=2.364 ms

--- 192.168.1.100 ping statistics ---
2 packets transmitted, 2 packets received, 0.0% packet loss
round-trip min/avg/max/stddev = 1.669/2.017/2.364/0.347 ms
[2.7.2-RELEASE][root@pfSense.home.arpa]/root: ■
```

Tamén podemos observar que dende kaliB SI é posible establecer conectividade cun ping a kaliA e que somos quen de chegar aos portos TCP 80 e 443(servizo web apache2) de kaliA.

```
└─$ ping -c2 10.10.10.1
PING 10.10.10.1 (10.10.10.1) 56(84) bytes of data.
64 bytes from 10.10.10.1: icmp_seq=1 ttl=64 time=1.25 ms
64 bytes from 10.10.10.1: icmp_seq=2 ttl=64 time=1.78 ms

--- 10.10.10.1 ping statistics ---
2 packets transmitted, 2 received, 0% packet loss, time 1002ms
rtt min/avg/max/mdev = 1.253/1.516/1.780/0.263 ms

(kali㉿kali)-[~]
└─$ ping -c2 10.10.10.10
PING 10.10.10.10 (10.10.10.10) 56(84) bytes of data.
64 bytes from 10.10.10.10: icmp_seq=1 ttl=63 time=3.14 ms
64 bytes from 10.10.10.10: icmp_seq=2 ttl=63 time=3.04 ms

--- 10.10.10.10 ping statistics ---
2 packets transmitted, 2 received, 0% packet loss, time 1003ms
rtt min/avg/max/mdev = 3.036/3.087/3.139/0.051 ms

(kali㉿kali)-[~]
└─$ nc -vz 10.10.10.10 80 443
10.10.10.10: inverse host lookup failed: Unknown host
[UNKNOWN] [10.10.10.10] 80 (http) open
[UNKNOWN] [10.10.10.10] 443 (https) open
```

Tamén que dende kaliA NON é posible establecer conectividade cun ping a pfSense nin a kaliB

```
(kali㉿kali)-[~]
└─$ ping -c2 10.10.10.1
PING 10.10.10.1 (10.10.10.1) 56(84) bytes of data.

--- 10.10.10.1 ping statistics ---
2 packets transmitted, 0 received, 100% packet loss, time 1034ms

(kali㉿kali)-[~]
└─$ ping -c2 192.168.1.1
PING 192.168.1.1 (192.168.1.1) 56(84) bytes of data.

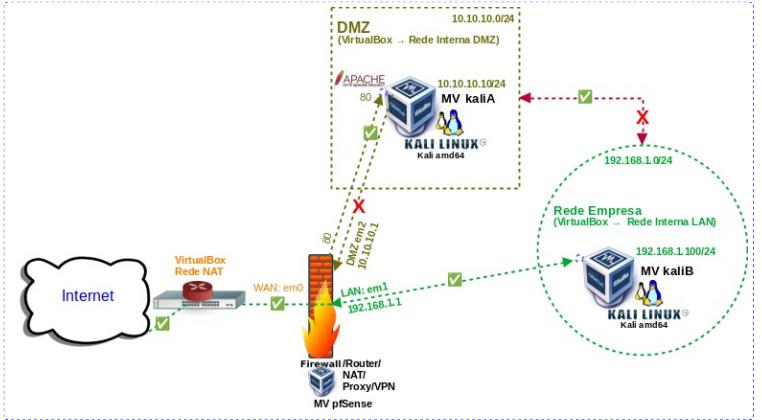
--- 192.168.1.1 ping statistics ---
2 packets transmitted, 0 received, 100% packet loss, time 1014ms

(kali㉿kali)-[~]
└─$ ping -c2 192.168.1.100
PING 192.168.1.100 (192.168.1.100) 56(84) bytes of data.

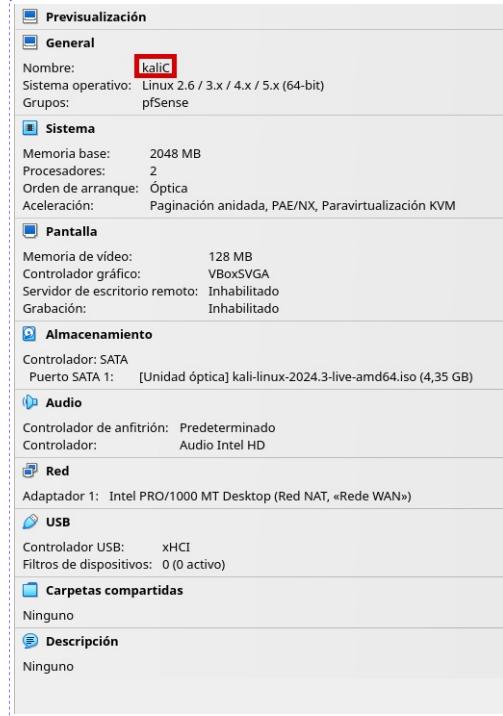
--- 192.168.1.100 ping statistics ---
2 packets transmitted, 0 received, 100% packet loss, time 1004ms
```

## Resumo Escenario Actual

	pfSense → kaliB	kaliB → pfSense	kaliB → Internet	kaliA → kaliB	kaliB → kaliA
ping	SI	SI	SI	NON	SI
nc (ports TCP 80/443)					SI



## 13. Configurar según Escenario:



## 14. Na contorna gráfica abrir un terminal e executar:

```
kali@kali:~$ setxkbmap es #Cambiar o mapa de teclado ao idioma español.
```

```
kali@kali:~$ passwd kali #Cambiar o contrasinal do usuario kali. Por como contrasinal WANabc123. (Ollo que o contrasinal ten un carácter punto final).
```

## 15. Configuración da rede:

kaliC será cliente DHCP, polo cal recollerá a configuración de rede da propia **Rede NAT de VirtualBox (Rede WAN)** a través da súa interface eth0



Nesta práctica a IP/MS concedida por VirtualBox para kaliC foi: 172.16.0.8/24. Esta IP/MS pode variar na execución desta práctica. Se se quere proceder coa configuración 172.16.0.8/24 débese cambiar a IP estática a interface eth0 de kaliC e manter as táboas de rutas e o ficheiro /etc/resolv.conf como se amosa a continuación.

```
kali@kali:~$ ip addr show eth0 #Amosar a configuración da tarxeta de rede interna(eth0) con IP/MS: 172.16.0.8/24 recollida polo DHCP (eth0) de VirtualBox.
```

```
kali@kali:~$ ip route show || ip route list || ip route || ip r #Listar a táboa de enrutamento otorgada polo servidor DHCP.
```

```
kali@kali:~$ cat /etc/resolv.conf #Ver o contido do ficheiro /etc/resolv.conf, o cal contén a configuración os servidores DNS a empregar para a resolución de nomes.
```

```
(kali㉿kali)-[~]
└─$ ip addr show eth0
2: eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP group default qlen 1000
    link/ether 08:00:27:67:b8:c7 brd ff:ff:ff:ff:ff:ff
    inet 172.16.0.8/24 brd 172.16.0.255 scope global dynamic noprefixroute eth0
        valid_lft 538sec preferred_lft 538sec
    inet6 fe80::5de9:eb0:df5:ad97/64 scope link noprefixroute
        valid_lft forever preferred_lft forever

(kali㉿kali)-[~]
└─$ ip route
default via 172.16.0.1 dev eth0 proto dhcp src 172.16.0.8 metric 100
172.16.0.0/24 dev eth0 proto kernel scope link src 172.16.0.8 metric 100

(kali㉿kali)-[~]
└─$ cat /etc/resolv.conf
# Generated by NetworkManager
nameserver 8.8.8.8
```

## 16. Cambiar hostname da máquina virtual C. Por kaliC como hostname:

**OPCIÓN A:**

```
kali@kali:~$ sudo su - #Acceder á consola de root(administrador) a través dos permisos configurados co comando sudo (/etc/sudoers, visudo)
root@kali:~# echo 'kaliC' > /etc/hostname #Indicar ao sistema o valor do hostname.
root@kali:~# echo 'kernel.hostname=kaliC' >> /etc/sysctl.conf #Indicar ao kernel o valor do hostname.
root@kali:~# sysctl -p #Activar o cambio de hostname sen ter que pechar sesión nin reiniciar
root@kali:~# echo -e '172.16.0.8|kaliC' >> /etc/hosts #Engadir o hostname kaliC en /etc/hosts
root@kali:~# exit #Sair da consola local sudo na que estabamos a traballar para voltar á consola local de kali.
kali@kali:~$ exit #Pechar o terminal saíndo da consola local do usuario kali.
```

**OPCIÓN B:**

```
kali@kali:~$ sudo su - #Acceder á consola de root(administrador) a través dos permisos configurados co comando sudo (/etc/sudoers, visudo)
root@kali:~# hostnamectl hostname kaliC || hostnamectl set-hostname kaliC #Modificar o hostname do sistema a kaliC.
root@kali:~# echo -e '172.16.0.8|kaliC' >> /etc/hosts #Engadir o hostname kaliC en /etc/hosts
root@kali:~# exit #Sair da consola local sudo na que estabamos a traballar para voltar á consola local de kali.
kali@kali:~$ exit #Pechar o terminal saíndo da consola local do usuario kali.
```

	pfSense → kaliC	kaliC → pfSense	kaliC → Internet	kaliA → kaliC	kaliC → kaliA	kaliB → kaliC	kaliC → kaliB
ping	SI	NON	SI	NON	NON	SI	NON
nc (ports TCP 80/443)					NON		

Agora podemos comprobar que dende pfSense **SI** é posible establecer conectividade cun ping a kaliC(172.16.0.8), pero que dende kaliC non é posible establecer conectividade cun ping a pfSense(en calquera das interfaces em0,em1,em2) e **SI** con Internet.

```
[2.7.2-RELEASE][root@pfSense.home.arp1]# ping -c2 172.16.0.8
PING 172.16.0.8 (172.16.0.8): 56 data bytes
64 bytes from 172.16.0.8: icmp_seq=0 ttl=64 time=1.279 ms
64 bytes from 172.16.0.8: icmp_seq=1 ttl=64 time=1.931 ms

--- 172.16.0.8 ping statistics ---
2 packets transmitted, 2 packets received, 0.0% packet loss
round-trip min/avg/max/stddev = 1.279/1.685/1.931/0.326 ms
[2.7.2-RELEASE][root@pfSense.home.arp1]# 

└─(kali㉿kaliC)-[~]
└─$ ping -c2 172.16.0.7
PING 172.16.0.7 (172.16.0.7) 56(84) bytes of data.

--- 172.16.0.7 ping statistics ---
2 packets transmitted, 0 received, 100% packet loss, time 1012ms

└─(kali㉿kaliC)-[~]
└─$ ping -c2 10.10.10.1
PING 10.10.10.1 (10.10.10.1) 56(84) bytes of data.

--- 10.10.10.1 ping statistics ---
2 packets transmitted, 0 received, 100% packet loss, time 1028ms

└─(kali㉿kaliC)-[~]
└─$ ping -c2 192.168.1.1
PING 192.168.1.1 (192.168.1.1) 56(84) bytes of data.

--- 192.168.1.1 ping statistics ---
2 packets transmitted, 0 received, 100% packet loss, time 1016ms

└─(kali㉿kaliC)-[~]
└─$ ping -c2 www.google.es
PING www.google.es (216.58.215.163) 56(84) bytes of data.
64 bytes from mad41s07-in-f3.1e100.net (216.58.215.163): icmp_seq=1 ttl=114 time=24.9
ms
64 bytes from mad41s07-in-f3.1e100.net (216.58.215.163): icmp_seq=2 ttl=114 time=22.1
ms

--- www.google.es ping statistics ---
2 packets transmitted, 2 received, 0% packet loss, time 1001ms
rtt min/avg/max/mdev = 22.129/23.508/24.888/1.379 ms
```

Tamén podemos observar que dende kaliC **NON** é posible establecer conectividade cun ping a kaliA e kaliB

```
└─(kali㉿kaliC)-[~]
└─$ ping -c2 10.10.10.10
PING 10.10.10.10 (10.10.10.10) 56(84) bytes of data.

--- 10.10.10.10 ping statistics ---
2 packets transmitted, 0 received, 100% packet loss, time 1021ms

└─(kali㉿kaliC)-[~]
└─$ ping -c2 192.168.1.100
PING 192.168.1.100 (192.168.1.100) 56(84) bytes of data.
From 192.168.1.38 icmp_seq=1 Destination Host Unreachable
From 192.168.1.38 icmp_seq=2 Destination Host Unreachable

--- 192.168.1.100 ping statistics ---
2 packets transmitted, 0 received, +2 errors, 100% packet loss, time 1015ms
pipe 2
```

E dende kaliB **SI** temos conectividade con kaliC.

```
└─(kali㉿kaliB)-[~]
└─$ ping -c2 172.16.0.8
PING 172.16.0.8 (172.16.0.8) 56(84) bytes of data.
64 bytes from 172.16.0.8: icmp_seq=1 ttl=63 time=1.69 ms
64 bytes from 172.16.0.8: icmp_seq=2 ttl=63 time=3.41 ms

--- 172.16.0.8 ping statistics ---
2 packets transmitted, 2 received, 0% packet loss, time 1005ms
rtt min/avg/max/mdev = 1.693/2.549/3.405/0.856 ms
```

E dende kaliA **NON** temos conectividade con kaliC.

```
File Actions Edit View Help
└─(kali㉿kaliA)-[~]
└─$ ping -c2 172.16.0.8
PING 172.16.0.8 (172.16.0.8) 56(84) bytes of data.

--- 172.16.0.8 ping statistics ---
2 packets transmitted, 0 received, 100% packet loss, time 1006ms
```

Tamén podemos observar que dende kaliB **SI** é posible chegar ao porto TCP 80(servizo web apache2) de kaliA; cousa que non acontece dende kaliC.

```
└─(kali㉿kaliB)-[~]
└─$ nc -vz 10.10.10.10 80 443
10.10.10.10: inverse host lookup failed: Unknown host
(UNKNOWN) [10.10.10.10] 80 (http) open
(UNKNOWN) [10.10.10.10] 443 (https) open

└─(kali㉿kaliC)-[~]
└─$ nc -vz 10.10.10.10 80 443
10.10.10.10: inverse host lookup failed: Unknown host
(UNKNOWN) [10.10.10.10] 80 (http) : Connection timed out
(UNKNOWN) [10.10.10.10] 443 (https) : Connection timed out
```

## Resumo Estado Actual

kaliA ∈ DMZ | kaliB ∈ LAN | kaliC ∈ WAN

### O que temos

	pfSense → kaliA	kaliA → pfSense	pfSense → kaliB	kaliB → pfSense	pfSense → kaliC	kaliC → pfSense
ping	SI	NON	SI	SI	SI	NON

	kaliA → Internet	kaliB → Internet	kaliC → Internet
ping	NON	SI	SI

	kaliA → kaliB	kaliB → kaliA	kaliA → kaliC	kaliC → kaliA	kaliB → kaliC	kaliC → kaliB
ping	NON	SI	NON	NON	SI	NON

	pfSense → kaliA	kaliB → kaliA	kaliC → kaliA
nc (ports TCP 80/443)	SI	SI	NON

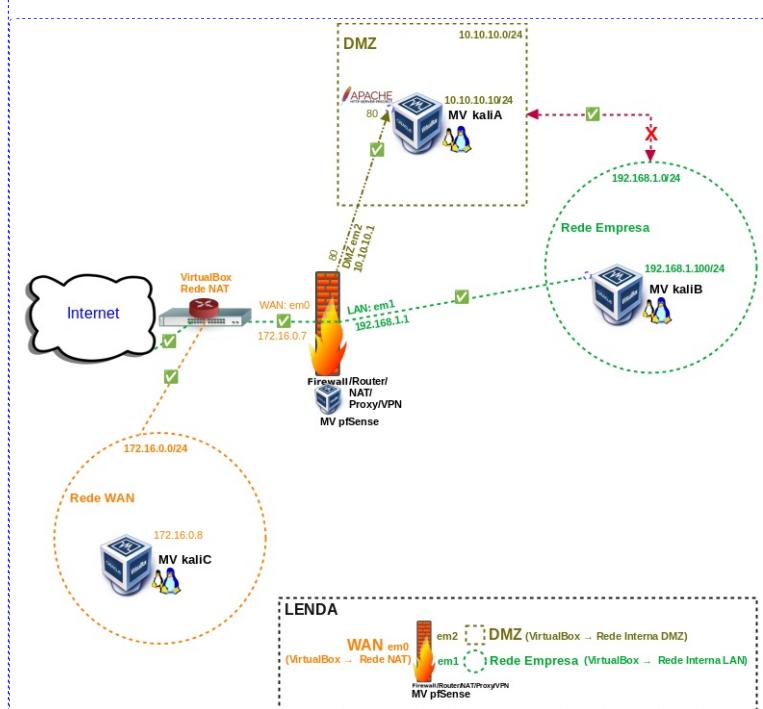
### O que desexamos

	pfSense → kaliA	kaliA → pfSense	pfSense → kaliB	kaliB → pfSense	pfSense → kaliC	kaliC → pfSense
ping	SI	NON	SI	SI	SI	NON

	kaliA → Internet	kaliB → Internet	kaliC → Internet
ping	NON	SI	SI

	kaliA → kaliB	kaliB → kaliA	kaliA → kaliC	kaliC → kaliA	kaliB → kaliC	kaliC → kaliB
ping	NON	SI	NON	NON	SI	NON

	pfSense → kaliA	kaliB → kaliA	kaliC → kaliA
nc (ports TCP 80/443)	SI	SI	SI



Entón, para conseguir o deseñado temos que configurar novas regras de firewall en pfSense.

# pfSense

## 17. Configuración Inicial

Antes de xerar as regras debemos acceder a aplicación de pfSense(<http://192.168.1.1>) e proceder coa configuración inicial de pfSense. Este procedemento farase dende kaliB.

The screenshot shows the pfSense login interface. It has a dark blue header with the pfSense logo. Below it, there's a 'SIGN IN' form with two input fields: one for 'admin' and another for 'pfSense'. A green 'SIGN IN' button is at the bottom. At the very bottom of the page, there's a small note: 'pfSense is developed and maintained by Netgate. © ESF 2004 - 2025 View license'.

Acceder coas credenciais: admin/pfSense

The screenshot shows the first step of the pfSense setup wizard. It has a pink header bar with the warning: 'WARNING: The 'admin' account password is set to the default value. Change the password in the User Manager.' Below it, the main title is 'Wizard / pfSense Setup /'. The sub-section is 'pfSense Setup' with the heading 'Welcome to pfSense® software!'. It includes a brief description of the wizard's purpose and a 'Learn more' link. A blue '» Next' button is at the bottom right.

Premer en Next

The screenshot shows the second step of the setup wizard. It has a pink header bar with the warning: 'Netgate® Global Support is available 24/7'. Below it, the main title is 'Wizard / pfSense Setup / Netgate® Global Support is available 24/7'. The sub-section is 'Step 2 of 9' with the heading 'General Information'. It asks for the host name ('Hostname') and domain ('Domain'). There are also sections for primary and secondary DNS servers and an 'Override DNS' checkbox. A blue '» Next' button is at the bottom right.

Premer en Next

The screenshot shows the fourth step of the setup wizard. It has a pink header bar with the warning: 'WARNING: The 'admin' account password is set to the default value. Change the password in the User Manager.'. Below it, the main title is 'Wizard / pfSense Setup / Time Server Information'. The sub-section is 'Step 3 of 9' with the heading 'Time Server Information'. It asks for the time server's hostname ('Time server hostname') and timezone ('Timezone'). A blue '» Next' button is at the bottom right.

The screenshot also shows the fifth step of the setup wizard, titled 'Configure WAN Interface'. It has a pink header bar with the warning: 'On this screen the Wide Area Network information will be configured.'. Below it, the main title is 'Wizard / pfSense Setup /'. The sub-section is 'Step 4 of 9' with the heading 'Configure WAN Interface'. It includes sections for 'General configuration' (MAC Address, MTU, MSS), 'Static IP Configuration' (IP Address, Subnet Mask, Upstream Gateway), and 'DHCP client configuration' (DHCP). A blue '» Next' button is at the bottom right.

Baixar para chegar ao botón Next

Premer en Next

PPTP Local Subnet: 32

PPTP Remote IP Address:

PPTP Dial on demand:  Enable Dial-On-Demand mode  
This option causes the interface to operate in dial-on-demand mode, allowing a virtual full time connection. The interface is configured, but the actual connection of the link is delayed until qualifying outgoing traffic is detected.

PPTP Idle timeout:  If no qualifying outgoing packets are transmitted for the specified number of seconds, the connection is brought down. An idle timeout of zero disables this feature.

RFC1918 Networks:

- Block private networks from entering via WAN  
When set, this option blocks traffic from IP addresses that are reserved for private networks as per RFC 1918 (10.8, 172.16/12, 192.168/16) as well as loopback addresses (127/8). This option should generally be left turned on, unless the WAN network lies in such a private address space, too.

Block bogon networks:

- Block non-Internet routed networks from entering via WAN  
When set, this option blocks traffic from IP addresses that are reserved (but not RFC 1918) or not yet assigned by IANA. Bogons are prefixes that should never appear in the Internet routing table, and obviously should not appear as the source address in any packets received.

**>> Next**

WARNING: The 'admin' account password is set to the default value. Change the password in the User Manager.

Wizard / pfSense Setup / Configure LAN Interface

Step 5 of 9

Configure LAN Interface

On this screen the Local Area Network information will be configured.

LAN IP Address: 192.168.1.1  
Type dhcp if this interface uses DHCP to obtain its IP address.

Subnet Mask: 24

**>> Next**

Antes de premer en Next asegurarse que non están activadas as 2 opcións Block

WARNING: The 'admin' account password is set to the default value. Change the password in the User Manager.

Wizard / pfSense Setup / Set Admin WebGUI Password

Step 6 of 9

Set Admin WebGUI Password

On this screen the admin password will be set, which is used to access the WebGUI and also SSH services if enabled.

Admin Password:  \*\*\*\*\*

Admin Password AGAIN:  \*\*\*\*\*

**>> Next**

WARNING: The 'admin' account password is set to the default value. Change the password in the User Manager.

Wizard / pfSense Setup / Reload configuration

Step 7 of 9

Reload configuration

Click 'Reload' to reload pfSense with new changes.

**>> Reload**

Débese modificar o contrasinal de admin -áinda que nesta práctica non se faga-, e logo premer en Next

WARNING: The 'admin' account password is set to the default value. Change the password in the User Manager.

Wizard / pfSense Setup / Reload in progress

Step 8 of 9

Reload in progress

A reload is now in progress. Please wait.  
The wizard will redirect to the next step once the reload is completed.

**>> Next**

Wizard completed!

Congratulations! pfSense is now configured.

We recommend that you check to see if there are any software updates available. Keeping your software up to date is one of the most important things you can do to maintain the security of your network.

**Check for updates**

Remember, we're here to help.

**Click here** to learn about Netgate 24/7/365 support services.

User survey  
Please help all the people involved in improving and expanding pfSense software by taking a moment to answer this short survey (all answers are anonymous).

**Anonymous User Survey**

Useful resources.

- Learn more about Netgate's product line, services, and pfSense software from our [website](#).
- To learn about Netgate appliances and other offers, visit our [store](#).
- Become part of the pfSense community. Visit our [forum](#).
- Subscribe to our [newsletter](#) for ongoing product information, software announcements and special offers.

**Finish**

Recargando...

Proceso finalizado. Premer en Finish.

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**Accept!**

Aceptar licenza. Premer en Accept.

**System Information**

- Name: pfSense.home.apa
- User: admin@192.168.1.100 (Local Database)
- System: KVM Guest  
Netgate Device ID: 103e5c089254d2bbdcfe
- BIOS: Vendor: Innotek GmbH  
Version: VirtualBox  
Release Date: Fri Dec 1 2006
- Version: 2.7.2-RELEASE (amd64)  
built on Wed Dec 6 21:10:00 CET 2023  
FreeBSD 14.0-CURRENT
- CPU Type: 13th Gen Intel(R) Core(TM) i7-1355U  
2 CPUs: 1 package(s) x 2 cache groups x 1 core(s)  
AES-NI CPU Crypto: Yes (inactive)  
QAT Crypto: No
- Hardware crypto: Inactive
- Kernel PTI: Enabled
- MDS Mitigation: Inactive
- Uptime: 00 Hour 36 Minutes 49 Seconds

Licenza aceptada. Premer en Close.

**System Information**

Name	pfSense.home.apa
User	admin@192.168.1.100 (Local Database)
System	KVM Guest Netgate Device ID: 103e5c089254d2bbdcfe
BIOS	Vendor: Innotek GmbH Version: VirtualBox Release Date: Fri Dec 1 2006
Version	2.7.2-RELEASE (amd64) built on Wed Dec 6 21:10:00 CET 2023 FreeBSD 14.0-CURRENT
CPU Type	13th Gen Intel(R) Core(TM) i7-1355U 2 CPUs: 1 package(s) x 2 cache groups x 1 core(s) AES-NI CPU Crypto: Yes (inactive) QAT Crypto: No
Hardware crypto	Inactive
Kernel PTI	Enabled
MDS Mitigation	Inactive
Uptime	00 Hour 37 Minutes 05 Seconds

Amósase información do sistema pfSense.

**NETGATE AND pfSense COMMUNITY SUPPORT RESOURCES**

If you purchased your pfSense gateway firewall appliance from Netgate and elected Community Support at the point of sale or installed pfSense on your own hardware, you have access to various community support resources. This includes the NETGATE RESOURCE LIBRARY.

You also may upgrade to a Netgate Global Technical Assistance Center (TAC) Support subscription. We're always on! Our team is staffed 24x7x365 and committed to delivering enterprise-class, worldwide support at a price point that is more competitive than compared to others in our space.

- Upgrade Your Support
- Community Support Resources
- Netgate Global Support FAQ
- Official pfSense Training by Netgate
- Netgate Professional Services
- Visit Netgate.com

If you decide to purchase a Netgate Global TAC Support subscription, you **MUST** have your Netgate Device ID (NDI) from your firewall in order to validate support for this unit. Write down your NDI and store it in a safe place. You can purchase TAC supports here.

**Interfaces**

	WAN	LAN	OPT1	Status
	1000baseT <full-duplex>	1000baseT <full-duplex>	1000baseT <full-duplex>	172.16.0.7
				192.168.1.1
				10.10.10.1

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Baixando a pantalla vemos un resumo das Interfaces.

**System Information**

Name	pfSense.home.apa
User	admin@192.168.1.100 (Local Database)
System	KVM Guest Netgate Device ID: 103e5c089254d2bbdcfe

Menú de pfSense. Dependendo das dimensións da pantalla verase en vertical(picar no botón ) ou verase en horizontal de forma predeterminada.

## Firewall: Regras Port Forwarding.

Imos engadir a seguintes regras en pfSense:

1. Permitir(pass) redirección(NAT) kaliC → kaliA ao servidor Web Apache (port tcp 80)
2. Permitir(pass) redirección(NAT) kaliC → kaliA ao servidor Web Apache (port tcp 443)

### 18. Exemplo1. Port Forwarding kaliC(WAN) → kaliA(DMZ)

The screenshot shows the pfSense web interface under the 'Firewall / NAT / Port Forward' tab. In the 'Rules' section, there are two entries:

Interface	Protocol	Source Address	Source Ports	Dest. Address	Dest. Ports	NAT IP	NAT Ports	Description
WAN	TCP	*	*	WAN address	80 (HTTP)	10.10.10.10	80 (HTTP)	Redirección do porto HTTP de WAN ao servidor DMZ
WAN	TCP	*	*	WAN address	443 (HTTPS)	10.10.10.10	443 (HTTPS)	Redirección do porto HTTPS de WAN ao servidor DMZ

The screenshot shows the pfSense web interface under the 'Firewall / NAT / Port Forward' tab. A large 'Add' button is highlighted in the center of the screen.

Para crear a primeira regra NAT escoller no menú a opción:  
Firewall → NAT

The screenshot shows the 'Edit Redirect Entry' configuration page. The 'Destination' section is filled with the following values:

Destination	Invert match	Type	Address/mask
WAN	Disabled	HTTP	HTTP
From port	Custom	To port	Custom

The 'Redirect target IP' section has the value '10.10.10.10'. The 'Description' field contains 'Redirección do porto HTTP de WAN ao servidor DMZ'.

The screenshot shows the pfSense web interface under the 'Firewall / NAT / Port Forward' tab. A large 'Apply Changes' button is highlighted in the center of the screen.

Escoller as opcións e escribir o que aparece na imaxe. Baixar a pantalla e premer en Save.

The screenshot shows the pfSense web interface under the 'Firewall / NAT / Port Forward' tab. A green message bar at the top states: 'The changes have been applied successfully. The firewall rules are now reloading in the background. Monitor the filter reload progress.'

Para aplicar os cambios premer en "Apply Changes"

Cambios aplicados e regra xerada.

Probamos agora que SI é posible acceder dende kaliC ao servidor web da DMZ:

```
(kali㉿kali)-[~]
$ nc -vz 10.10.10.80
10.10.10.10 [10.10.10.10] 80 (http) : Connection timed out
(kali㉿kali)-[~]
$ nc -vz 172.16.0.7 80
172.16.0.7 [172.16.0.7] 80 (http) open
```

Comprobamos que seguimos sen poder ter conectividade dende kaliC(WAN) a kaliB(LAN)

```
(kali㉿kali)-[~]
$ ping -c2 192.168.1.100
PING 192.168.1.100 (192.168.1.100) 56(84) bytes of data.
From 192.168.1.38 icmp_seq=1 Destination Host Unreachable
From 192.168.1.38 icmp_seq=2 Destination Host Unreachable

--- 192.168.1.100 ping statistics ---
2 packets transmitted, 0 received, +2 errors, 100% packet loss, time 1030ms
pipe 2
```

## 19. Exemplo2. Port Forwarding kaliC(WAN) → kaliA(DMZ)

Procedemos de forma análoga para xerar unha regra de Port Forwarding para o porto 443(https):

Premir en Add

Escoller as opcións e escribir o que aparece na imaxe. Baixar a pantalla e premer en Save.

Para aplicar os cambios premer en "Apply Changes"

Probamos agora que SI é posible acceder dende kaliC ao servidor web, mediante https, da DMZ:

```
(kali㉿kali)-[~]
$ nc -vz 10.10.10.10 80 443
10.10.10.10 [10.10.10.10] 80 (http) : Connection timed out
10.10.10.10 [10.10.10.10] 443 (https) : Connection timed out

(kali㉿kali)-[~]
$ nc -vz 172.16.0.7 80 443
172.16.0.7 [172.16.0.7] 80 (http) open
172.16.0.7 [172.16.0.7] 443 (https) open
```

Warning: Potential Security Risk Ahead  
Firefox detected a potential security threat and did not continue to 172.16.0.7. If you visit this site, attackers could try to steal information like your passwords, emails, or credit card details.  
[Learn more...](#)

Go Back (Recommended) Advanced...

172.16.0.7 uses an invalid security certificate.  
The certificate is not trusted because it is self-signed.  
Error code: [MOZILLA\\_PKIX\\_ERROR\\_SELF\\_SIGNED\\_CERT](#)

[View Certificate](#)

Go Back (Recommended) Accept the Risk and Continue

Apache2 Debian Default Page  
debian  
It works!  
This is the default welcome page used to test the correct operation of the Apache2 server after installation on Debian systems. If you can read this page, it means that the Apache HTTP Server installed at this site is working properly. You should [replace this file](#) (located at /var/www/html/index.html) before continuing to operate your HTTP server.  
If you are a normal user of this web site and don't know what this page is about, this probably means that the site is currently unavailable due to maintenance. If the problem persists, please contact the site's administrator.

Configuration Overview  
Debian's Apache2 default configuration is different from the upstream default configuration, and split into several files optimized for interaction with Debian tools. The configuration system is **fully documented in [/usr/share/doc/apache2/README.Debian.gz](#)**. Refer to this for the full documentation. Documentation for the web server itself can be found by accessing the [manual](#) if the apache2-doc package was installed on this server.

The configuration layout for an Apache2 web server installation on Debian systems is as follows:

```
/etc/apache2/
|-- apache2.conf
|--- ports.conf
|-- mods-enabled
|--- *.load
|--- *.conf
```

Comprobamos que seguimos sen poder ter conectividade dende kaliC(WAN) a kaliB(LAN)

```
(kali㉿kali)-[~]
$ ping -c2 192.168.1.100
PING 192.168.1.100 (192.168.1.100) 56(84) bytes of data.
From 192.168.1.38 icmp_seq=1 Destination Host Unreachable
From 192.168.1.38 icmp_seq=2 Destination Host Unreachable

--- 192.168.1.100 ping statistics ---
2 packets transmitted, 0 received, +2 errors, 100% packet loss, time 1030ms
pipe 2
```

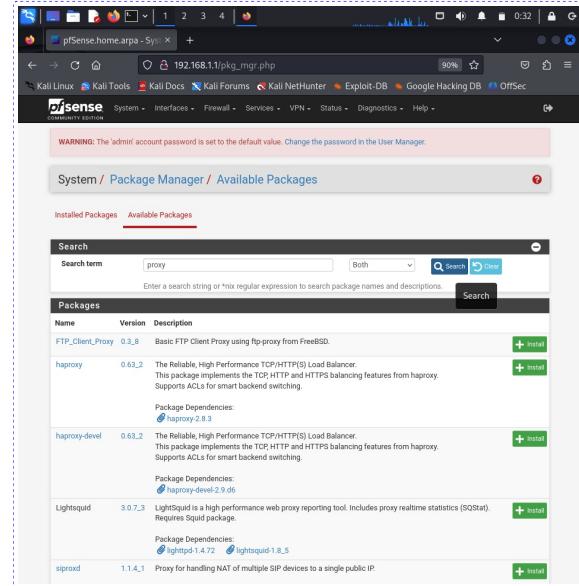
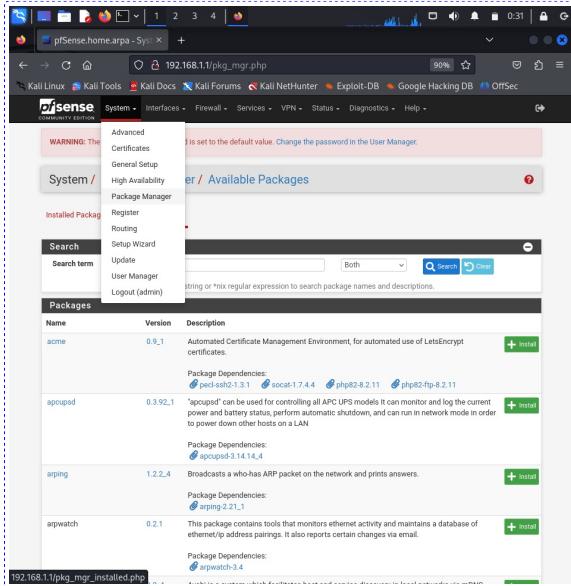
# Proxy: Squid

## 20. Exemplo3. Proxy en pfSense

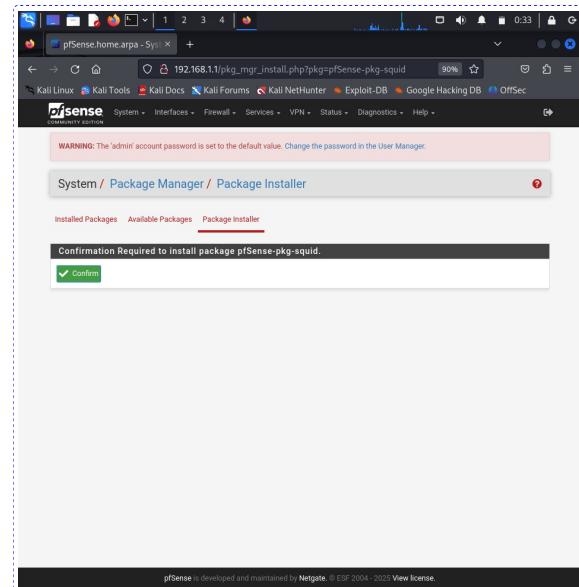
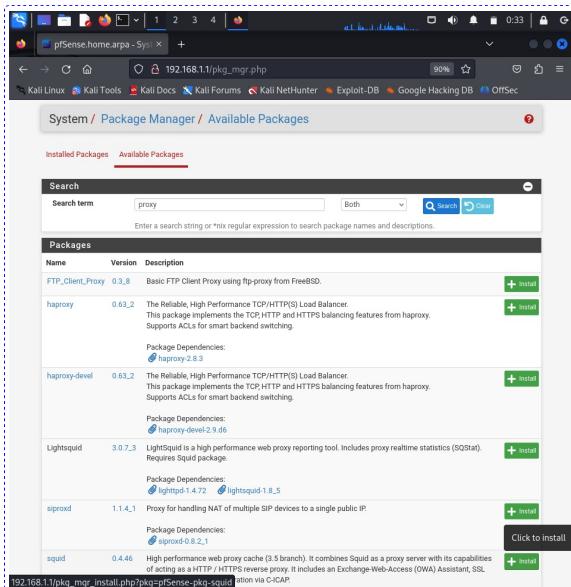
Imos activar o proxy en pfSense para que as petições web dende LAN(kaliB) saíam a través deste proxy.

### Procedemento:

1. Instalación do paquete squid en pfSense. Entón, dende kaliB acceder ao panel de configuración de pfSense e proceder como segue:

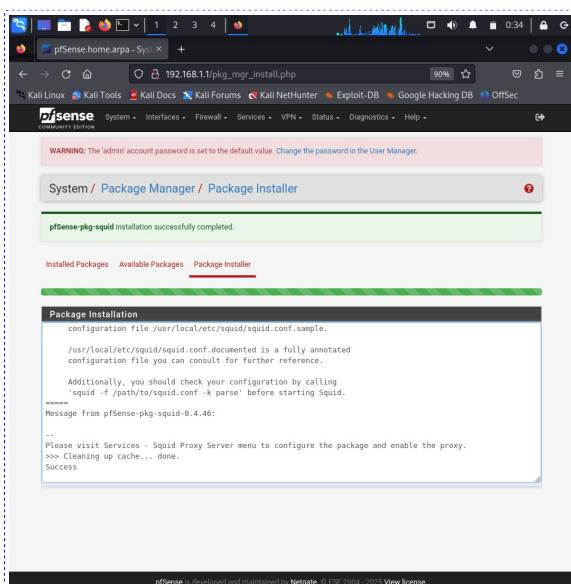


Abrir System → Package Manager



Premer no botón Install do paquete squid para proceder a instalalo.

Premer no botón Confirm para confirmar a instalación requerida.



Instalación do paquete squid realizada.

2. **Firewall: Regras LAN.** Imos xerar as regras que impiden dende a LAN(kaliB) as peticións de saída dos portos tcp 80(HTTP) e 443(HTTPS):

The screenshot shows the pfSense Firewall / Rules / WAN interface. There are two rules listed:

- Rule 1: NAT Redirección do porto HTTP de WAN ao servidor DMZ. Source: 0/0 B IPv4 TCP Port: 10.10.10.10 80 (HTTP) Destination: \* Port: none. Action: NAT.
- Rule 2: NAT Redirección do porto HTTPS de WAN ao servidor da DMZ. Source: 0/0 B IPv4 TCP Port: 10.10.10.10 443 (HTTPS) Destination: \* Port: none. Action: NAT.

Abrir Firewall → Rules

The screenshot shows the pfSense Firewall / Rules / LAN interface. There are three rules listed:

- Rule 1: Anti-Lockout Rule. Source: 3/3 0:00 MIB LAN Address Port: \* Destination: \* Port: 80. Action: Anti-Lockout Rule.
- Rule 2: Default allow LAN to any rule. Source: 0/16:09 MIB LAN subnets Port: \* Destination: \* Port: none. Action: Default allow LAN to any rule.
- Rule 3: Default allow LAN IPv6 to any rule. Source: 0/0 B IPv6 LAN subnets Port: \* Destination: \* Port: none. Action: Default allow LAN IPv6 to any rule.

Escoller a opción LAN e premer en para engadir unha nova regra de firewall.

The screenshot shows the pfSense Firewall / Rules / LAN edit page for a new rule. The configuration is as follows:

- Action: Block
- Disabled:
- Interface: LAN
- Address Family: IPv4
- Protocol: TCP
- Source:  Invert match Any Source Address /
- Destination:  Invert match Any Destination Address /
- Destination Port Range: From: Custom To: Custom
- Extra Options: Log  Log packets that are handled by this rule
- Description: Impedir acceso http sen proxy

Escoller as opcións e escribir o que aparece na imaxe. Baixar a pantalla e premer en Save.

The screenshot shows the pfSense Firewall / Rules / LAN interface after adding a new rule. There are four rules listed:

- Rule 1: Anti-Lockout Rule. Source: 3/3 0:00 MIB LAN Address Port: \* Destination: \* Port: 80. Action: Anti-Lockout Rule.
- Rule 2: Default allow LAN to any rule. Source: 0/16:09 MIB LAN subnets Port: \* Destination: \* Port: none. Action: Default allow LAN to any rule.
- Rule 3: Default allow LAN IPv6 to any rule. Source: 0/0 B IPv6 LAN subnets Port: \* Destination: \* Port: none. Action: Default allow LAN IPv6 to any rule.
- Rule 4: New rule added: Impedir acceso http sen proxy. Source: 1/3 16 MIB LAN Address Port: \* Destination: \* Port: 80. Action: Impedir acceso http sen proxy.

Premer de novo en para engadir unha nova regra de firewall.

The screenshot shows the pfSense Firewall / Rules / LAN edit page for a new rule. The configuration is as follows:

- Action: Block
- Disabled:
- Interface: LAN
- Address Family: IPv4
- Protocol: TCP
- Source:  Invert match Any Source Address /
- Destination:  Invert match Any Destination Address /
- Destination Port Range: From: Custom To: Custom
- Extra Options: Log  Log packets that are handled by this rule
- Description: Impedir acceso https sen proxy

Escoller as opcións e escribir o que aparece na imaxe. Baixar a pantalla e premer en Save.

The screenshot shows the pfSense Firewall / Rules / LAN interface after applying changes. There are five rules listed:

- Rule 1: Anti-Lockout Rule. Source: 3/3 0:00 MIB LAN Address Port: \* Destination: \* Port: 80. Action: Anti-Lockout Rule.
- Rule 2: Default allow LAN to any rule. Source: 0/16:09 MIB LAN subnets Port: \* Destination: \* Port: none. Action: Default allow LAN to any rule.
- Rule 3: Default allow LAN IPv6 to any rule. Source: 0/0 B IPv6 LAN subnets Port: \* Destination: \* Port: none. Action: Default allow LAN IPv6 to any rule.
- Rule 4: Previous new rule: Impedir acceso http sen proxy. Source: 1/3 16 MIB LAN Address Port: \* Destination: \* Port: 80. Action: Impedir acceso http sen proxy.
- Rule 5: New rule for HTTPS: Impedir acceso https sen proxy. Source: 4/16:13 MIB LAN subnets Port: \* Destination: \* Port: 443 (HTTPS). Action: Impedir acceso https sen proxy.

Para aplicar os cambios premer en "Apply Changes"

Cambios aplicados e regras xeradas.

### 3. Certificado SSL: Imos xesar un certificado SSL para permitir o acceso ás páxinas web HTTPS.

Abrir System → Certificates

Premer en Add para xesar unha CA(Autoridade de Certificación) para que poidamos asinar/expedir certificados.

Escoler as opcións e escribir o que aparece na imaxe. Baixar a pantalla e premer en Save.

Premer no botón para exportar o certificado xerado.

pfSense  
COMMUNITY EDITION

System / Certificate / Authorities

Authorities Certificates Revocation

Search

Name	Internal	Issuer	Certificates	Distinguished Name	In Use	Actions
Cert-Proxy	✓	self-signed	0	ST=Pontedera, OU=Informatica, O=IES Pl. Anton Losada Dieguez, L=A Estrada, CN=internal- ca, C=ES ⓘ		

Valid From: Thu, 09 Jan 2025  
09:10:12 +0100  
Valid Until: Sun, 07 Jan 2035  
09:10:12 +0100

+ Add

Certificado descargado (/home/kali/Downloads/Cert-Proxy.crt)

WARNING: The 'admin' account password is set to the default value. Change Manager.

System / Certificate / Authorities

Authorities Certificates Revocation

Search

Name	Internal	Issuer	Certificates	Distinguished Name
Cert-Proxy	✓	self-signed	0	ST=Pontedera, OU=Informatica, O=IES Pl. Anton Losada Dieguez, L=A Estrada, CN=internal- ca, C=ES ⓘ

Valid From: Thu, 09 Jan 2025  
09:10:12 +0100  
Valid Until: Sun, 07 Jan 2035  
09:10:12 +0100

+ Add

Ir á configuración(Settings) do navegador

Your browser is being managed by your organization

Find in Settings

General

Startup

Import Browser Data

Language and Appearance

Website appearance

Extensions & Themes

Firefox Support

Escoller Privacy & Security

Your browser is being managed by your organization

Find in Settings

Certificates

Query OCSP responder servers to confirm the current validity of certificates

View Certificates...

Security Devices...

Extensions & Themes

Firefox Support

Ir á sección Certificates

Your browser is being managed by your organization

Find in Settings

Certificates

Search Results

Certificate Name	Security Device
ACCV	Builtin Object Token
ACCVRAIZ1	Builtin Object Token
Actalis S.p.A.03358520967	Builtin Object Token
Actalis Authentication Root CA	Builtin Object Token
AffirmTrust	Builtin Object Token
AffirmTrust Commercial	Builtin Object Token

View... Edit Trust... Import... Export... Delete or Distrust... OK

Extensions & Themes

Firefox Support

Importar o Certificado descargado na sección Authorities.

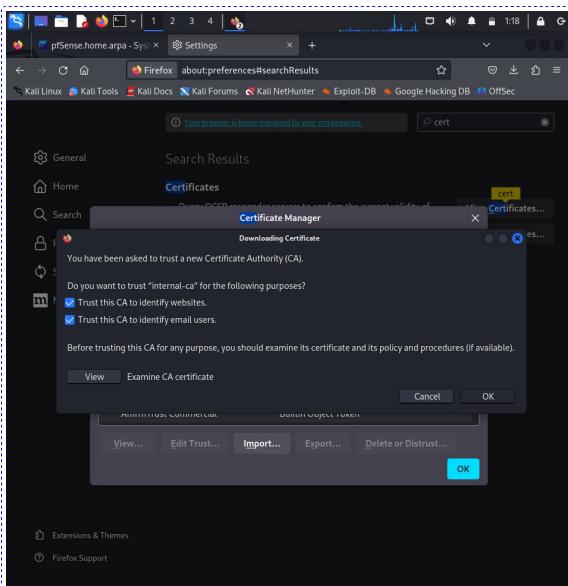
Select File containing CA certificate(s) to import

Name	Location	Size	Type	Accessed
Cert-Proxy.crt	Downloads	1.6 kB	X.509 Certificate	09:10

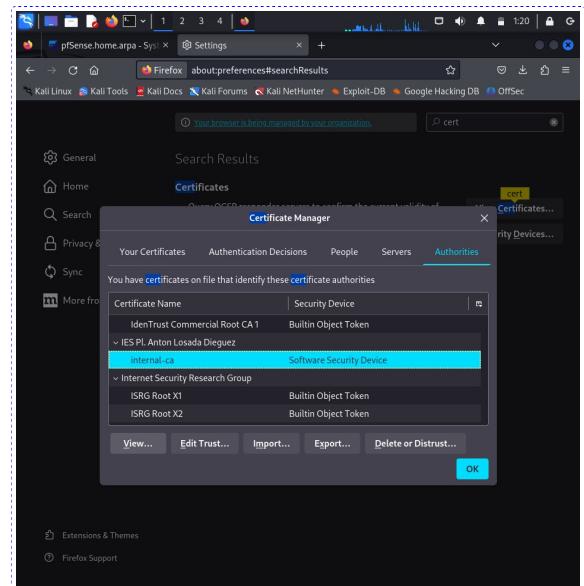
Recent Home Desktop Documents Downloads Music Pictures Videos Other Locations

Certificate Files Cancel Open

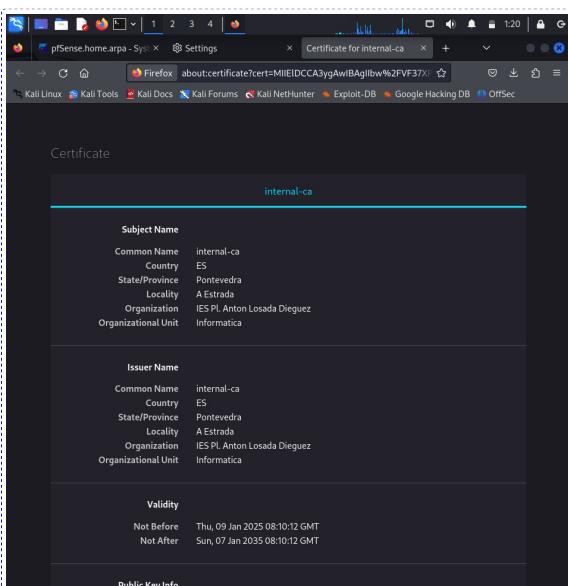
Escoller o certificado na ruta de descarga



Habilitar as opcións de confianza(Trust) e premer en OK.

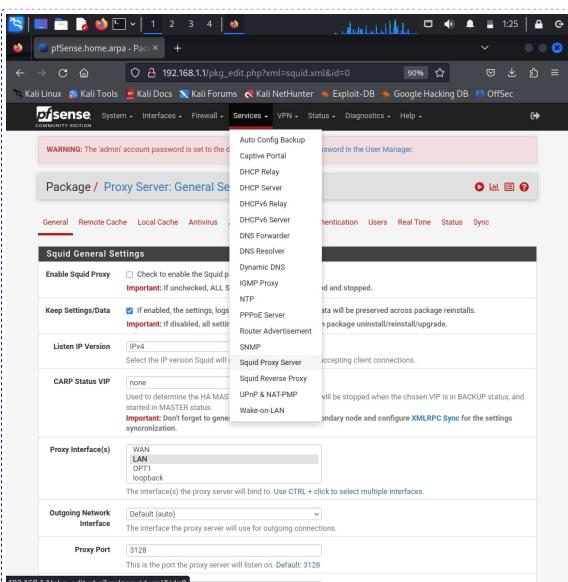


Certificado importado.

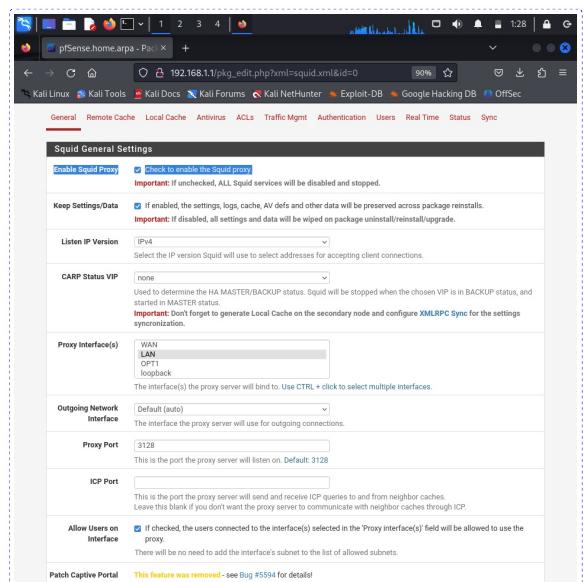


Ver as propiedades do certificado importado (premer na imaxe anterior en View co certificado seleccionado).

#### 4. Configuración SQUID



Abrir Services → Squid Proxy Server



Escolher as opcións e escribir o que aparece na imaxe. Baixar a pantalla.

**Transparent Proxy Settings**

**Transparent HTTP**  **Enable transparent mode to forward all requests from destination port 80 to the proxy server.**

Transparent proxy mode works without any additional configuration being necessary on clients.

**Important:** Transparent mode will filter SSL (port 443) if you enable HTTPS/SSL Intercept below.

**Hint:** In order to proxy both HTTP and HTTPS protocols without intercepting SSL connections, configure WPAD/PAC options on your DNS/DHCP servers.

**Transparent Proxy Interface(s)** WAN LAN OPT1

The interface(s) the proxy server will transparently intercept requests on. Use CTRL + click to select multiple interfaces.

**Bypass Proxy for Private Address Destination**  **Do not forward traffic to Private Address Space (RFC 1918 and IPv6 ULA) destinations.**

Destinations in Private Address Space (RFC 1918 and IPv6 ULA) are passed directly through the firewall, not through the proxy server.

**Bypass Proxy for These Source IPs**  **Do not forward traffic from these source IPs, CIDR nets, hostnames, or aliases through the proxy server but let it pass directly through the firewall.**

Applies only to transparent mode. Separate entries by semi-colons ( ; )

**Bypass Proxy for These Destination IPs**  **Do not proxy traffic going to these destination IPs, CIDR nets, hostnames, or aliases, but let it pass directly through the firewall.**

Applies only to transparent mode. Separate entries by semi-colons ( ; )

**SSL Man in the Middle Filtering**

**HTTPS/SSL Interception**  **Enable SSL filtering.**

**SSL/MITM Mode**  **Splice Whitelist, Bump Otherwise**

The SSL/MITM mode determines how SSL interception is treated when 'SSL Man in the Middle Filtering' is enabled. Default: Splice Whitelist, Bump Otherwise. Click Info for details.

**SSL Intercept Interface(s)** WAN LAN OPT1

Escooller as opcións segúن aparece na imaxe para habilitar o modo transparente do proxy. Baixar a pantalla.

**Logging Settings**

**Enable Access**  **This will enable the access log.**

**Warning:** Do NOT enable if available disk space is low.

**Log Store Directory** /var/squid/logs

The directory where the logs will be stored; also used for logs other than the Access Log above. Default: /var/squid/logs

**Important:** Do NOT include the trailing / when setting a custom location.

**Rotate Logs**

Defines how many days of logs will be kept. Rotation is disabled if left empty.

**Log Pages Denied by SquidGuard**

Makes it possible for SquidGuard denied log to be included on Squid logs.

**Click Info for detailed instructions.**

**Headers Handling, Language and Other Customizations**

**Visible Hostname** localhost

This is the hostname to be displayed in proxy server error messages.

**Administrator's Email** admin@localhost

This is the email address displayed in error messages to the users.

**Error Language** en

Select the language in which the proxy server will display error messages to users.

**X-Forwarded Header Mode** (on)

Choose how to handle X-Forwarded-For headers. Default: on.

**Disable VIA Header**  If not set, Squid will include a Via header in requests and replies as required by RFC2616.

**URI Whitespace Characters Handling** strip

Choose how to handle whitespace characters in URLs. Default: strip.

**Suppress Squid Version**  Suppresses Squid version string info in HTTP headers and HTML error pages if enabled.

Escooller as opcións segúن aparece na imaxe para habilitar o rexistro. Baixar a pantalla e premer no botón Save.

**Minimum Object Size** 0

Objects smaller than the size specified (in kilobytes) will not be saved on disk. Default: 0 (meaning there is no minimum).

**Maximum Object Size** 4

Objects larger than the size specified (in megabytes) will not be saved on disk. Default: 4 (MB).

**Squid Memory Cache Settings**

**Memory Cache Size** 64

Specifies the ideal amount of physical RAM (in megabytes) to be used for In-Transit objects, Hot Objects and Negative-Cached objects. Minimum value: 1 (MB). Default: 64 (MB).

**Maximum Object Size in RAM** 256

Objects greater than this size (in kilobytes) will not be attempted to be kept in the memory cache. Default: 256 (KB).

**Memory Replacement Policy**  **Heap GDSF**

The memory replacement policy determines which objects are purged from memory when space is needed. Default: heap GDSF.

**Dynamic and Update Content**

**Cache Dynamic Content**  Select to enable caching of dynamic content.

With dynamic cache enabled, you can also apply refresh\_patterns to sites like Windows Updates.

**Custom refresh\_patterns**

Enter custom refresh\_patterns for better dynamic cache usage.

Note: These refresh\_patterns will only be included if 'Cache Dynamic Content' is enabled.

Esta imaxe amosa o botón Save comentado na imaxe anterior.

**SSL Man in the Middle Filtering**

**HTTPS/SSL Interception**  **Enable SSL filtering.**

**SSL/MITM Mode**  **Splice Whitelist, Bump Otherwise**

The SSL/MITM mode determines how SSL interception is treated when 'SSL Man in the Middle Filtering' is enabled. Default: Splice Whitelist, Bump Otherwise. Click Info for details.

**SSL Intercept Interface(s)** WAN LAN OPT1

The interface(s) the proxy server will intercept SSL requests on. Use CTRL + click to select multiple interfaces.

**SSL Proxy Port** 3129

This is the port the proxy server will listen on to intercept SSL while using transparent proxy. Default: 3129

**SSL Proxy Compatibility Mode** Modern

The compatibility mode determines which cipher suites and TLS versions are supported. Default: Modern. Click Info for details.

**DHP Params Key Size** 2048 (default)

DH parameters are used for temporary/ephemeral DH key exchanges and improve security by enabling the use of DHE ciphers.

**CA** none  **Cert-Proxy**  **enabled.**

Applies only to transparent mode. Separate entries by semi-colons ( ; ).

**SSL Certificate Daemon Children** 5

This is the number of SSL certificate daemon children to start. May need to be increased in busy environments. Default: 5

**Remote Cert Checks**  **Accept remote server certificate with errors**

Do not verify remote certificate

Select remote SSL certificate checks to perform. Use CTRL + click to select multiple options.

**Certificate Adapt**  **Set the "Not After" (setValidAfter)**

Set the "Not Before" (setValidBefore)

Set CN property (setCommonName)

See [salproxy\\_cert\\_adapt](#) directive documentation and [Mimic original SSL server certificate](#) wiki article for details.

Escooller as opcións según aparece na imaxe para habilitar a incepción HTTPS/SSL. Baixar a pantalla.

**WARNING: The admin account password is set to the default value. Change the password in the User Manager.**

**Package / Proxy Server: General Settings / General**

**General** **Remote Cache** **Local Cache** **Antivirus** **ACLs** **Traffic Mgmt** **Authentication** **Users** **Real Time** **Status** **Sync**

**The following input errors were detected:**

- Please configure and save Local Cache settings first.

**Squid General Settings**

**Enable Squid Proxy**  **Check to enable the Squid proxy.**

**Important:** If unchecked, ALL Squid services will be disabled and stopped.

**Keep Settings/Data**  **If enabled, the settings, logs, cache, AV defs and other data will be preserved across package reinstalls.**

**Important:** If disabled, all settings and data will be wiped on package uninstall/reinstall/upgrade.

**Listen IP Version** IPv4

Select the IP version Squid will use to select addresses for accepting client connections.

**CARP Status VIP** none

Used to determine the HA MASTER/BACKUP status. Squid will be stopped when the chosen VIP is in BACKUP status, and started in MASTER status.

**Important:** Don't forget to generate Local Cache on the secondary node and configure XMLRPC Sync for the settings synchronization.

**Proxy Interface(s)** WAN LAN OPT1 loopback

The interface(s) the proxy server will bind to. Use CTRL + click to select multiple interfaces.

**Outgoing Network** Default (auto)

The interface the proxy server will use for outgoing connections.

Ao intentar gardar premendo no botón Save o sistema de configuración de pfSense avisa que non é posible gardar a configuración porque primeiro debemos configurar e gardar a sección "Local Cache"

**WARNING: The admin account password is set to the default value. Change the password in the User Manager.**

**Package / Proxy Server: General Settings / General**

**General** **Remote Cache** **Local Cache** **Antivirus** **ACLs** **Traffic Mgmt** **Authentication** **Users** **Real Time** **Status** **Restart Service**

**Squid General Settings**

**Enable Squid Proxy**  **Check to enable the Squid proxy.**

**Important:** If unchecked, ALL Squid services will be disabled and stopped.

**Keep Settings/Data**  **If enabled, the settings, logs, cache, AV defs and other data will be preserved across package reinstalls.**

**Important:** If disabled, all settings and data will be wiped on package uninstall/reinstall/upgrade.

**Listen IP Version** IPv4

Select the IP version Squid will use to select addresses for accepting client connections.

**CARP Status VIP** none

Used to determine the HA MASTER/BACKUP status. Squid will be stopped when the chosen VIP is in BACKUP status, and started in MASTER status.

**Important:** Don't forget to generate Local Cache on the secondary node and configure XMLRPC Sync for the settings synchronization.

**Proxy Interface(s)** WAN LAN OPT1 loopback

The interface(s) the proxy server will bind to. Use CTRL + click to select multiple interfaces.

**Outgoing Network** Default (auto)

The interface the proxy server will use for outgoing connections.

**Proxy Port** 3128

This is the port the proxy server will listen on. Default: 3128

Entón, debemos dirixirnos "Local Cache", premer no botón Save e voltar a realizar a configuración SQUID (paso 4).



Unha vez realizada a configuración do SQUID comprobamos que o acceso a Internet realizaase a través do proxy e como a comunicación establecese mediante https é verificada co certificado escollido/xerado (IES Pl. Antón Losada Diéguez)

# VPN: OpenVPN

## 21. Exemplo4. OpenVPN en pfSense. Acceso remoto kaliC(WAN) → kaliA(DMZ)

Imos configurar acceso VPN para que dende kaliC(WAN) poidamos conectarnos a través da VPN de pfSense a kaliB(LAN).

### Procedemento:

#### 1. Modificación da descripción do certificado da CA, creación do certificado do servidor VPN e de un cliente VPN.

Entón, dende kaliB acceder ao panel de configuración de pfSense e proceder como segue:

The screenshot shows the 'System / Certificate / Authorities' page. Under 'Certificate Authorities', there is one entry named 'Get-Proxy'. It is self-signed, issued by 'ST-Ponfeneda, OI-Informatica, IES PI. Anton Losada', and has a serial number of 0. The certificate is valid from Thu, 09 Jan 2025 09:13:10 +0100 to Wed, 09 Jan 2030 09:13:12 +0100. There is a red 'X' icon next to the certificate entry.

The screenshot shows the 'Create / Edit CA' form for 'Get-Proxy'. The 'Descriptive name' field is set to 'Get-Proxy'. The 'Method' dropdown is set to 'Import an existing Certificate Authority'. The 'Trust Store' checkbox is checked. The 'Randomize Serial' checkbox is checked. The 'Existing Certificate Authority' section shows the certificate data for 'Get-Proxy'. The 'Certificate Private Key (optional)' section contains a private key in PEM format. The 'Next Certificate Serial' field is set to 1. A red 'Save' button is visible at the bottom right.

En System → Certificate → Authorities premer no botón para editar o certificado anteriormente xerado.

Modificar o campo "Description Name" e premer no botón Save.

The screenshot shows the 'System / Certificates / Certificates' page. Under 'Certificates', there is one entry named 'OpenVPN-Server'. It is self-signed, issued by 'O=pfSense GUI default Self-Signed Certificate, CN=pfSense-677d9ff88be9e3'. The certificate is valid from Tue, 07 Jan 2025 23:24:03 +0100 to Wed, 09 Feb 2026 23:24:03 +0100. There is a green 'Add/Sign' button next to the certificate entry.

The screenshot shows the 'Add/Sign a New Certificate' form for 'OpenVPN-Server'. The 'Method' dropdown is set to 'Create an internal Certificate'. The 'Descriptive name' field is set to 'OpenVPN-Server'. The 'Internal Certificate' section shows 'Cert-Proxy+VPN' as the 'Certificate authority', 'RSA' as the 'Key type', and '2048' as the 'Key length'. The 'Digest Algorithm' dropdown is set to 'sha256'. The 'Lifetime (days)' dropdown is set to '3650'. The 'Common Name' field is set to 'openvpnserver'. The 'Country Code' dropdown is set to 'ES'. The 'State or Province' dropdown is set to 'Pontevedra'. The 'City' dropdown is set to 'A Estrada'. The 'Organization' dropdown is set to 'IES PI. Anton Losada Dieguez'. The 'Organizational Unit' dropdown is set to 'Informatica'. A red 'Save' button is visible at the bottom right.

Na sección Certificates premer no botón "Add/Sign" para xerar o certificado para o servidor VPN.

Escoller as opcións e escribir o que aparece na imaxe. Baixar a pantalla.

The screenshot shows the 'Add/Sign a New Certificate' form for 'OpenVPN-Server'. The 'Common Name' field is set to 'openvpnserver'. The 'Country Code' dropdown is set to 'ES'. The 'State or Province' dropdown is set to 'Pontevedra'. The 'City' dropdown is set to 'A Estrada'. The 'Organization' dropdown is set to 'IES PI. Anton Losada Dieguez'. The 'Organizational Unit' dropdown is set to 'Informatica'. The 'Attribute Notes' section is expanded, showing the following attributes:

- Attribute Name: The following attributes are added to certificates and requests when they are created or signed. These attributes behave differently depending on the selected mode.
- For Internal Certificates, these attributes are added directly to the certificate as shown.

The 'Certificate Type' dropdown is set to 'Server Certificate'. The 'Alternative Names' section shows 'FQDN or Hostname' as the type and 'Value' as the value. The 'Add SAN Row' button is visible. A red 'Save' button is visible at the bottom right.

The screenshot shows the 'System / Certificates / Certificates' page. Under 'Certificates', there is one entry named 'OpenVPN-Server'. It is self-signed, issued by 'O=pfSense GUI default Self-Signed Certificate, CN=pfSense-677d9ff88be9e3'. The certificate is valid from Tue, 07 Jan 2025 23:24:03 +0100 to Wed, 09 Feb 2026 23:24:03 +0100. There is a green 'Add/Sign' button next to the certificate entry.

Escoller as opcións e escribir o que aparece na imaxe. Baixar a pantalla e premer en Save.

Certificado OpenVPN-Server xerado.

System / Certificates / Certificates

Created internal certificate OpenVPN-Server

Authorities Certificates Certificate Revocation

Search Search term Both

Certificates

Name	Issuer	Distinguished Name	In Use	Actions
GUI default (677d6d93bc3c)	self-signed	OrgPfSense GUI default Self-Signed Certificate, CN=pfSense-677d6d93bc3c		
Server Certificate CA: No Server: Yes		Valid From: Tue, 07 Jan 2025 23:24:03 +0100 Valid Until: Mon, 09 Feb 2026 23:24:03 +0100		
OpenVPN-Server CA: No Server: Yes	Cert-Proxy+VPN	ST=Pontevedra, OU=Informatica, O=IES Pl. Anton Losada Dieguez, L=A Estrada, CN=openvpnServer, C=ES		
		Valid From: Thu, 09 Jan 2025 17:26:49 +0100 Valid Until: Sun, 07 Jan 2035 17:26:49 +0100		

+ Add/Sig

192.168.1.1/system\_certmanager.php?act=new

Na sección Certificates premer no botón "Add/Sign" para xerar un certificado para un cliente VPN.

Add/Sign a new Certificate

Method Create an internal Certificate

Descriptive name OpenVPN-Client-1

Internal Certificate

Certificate authority Cert-Proxy+VPN

Key type RSA

Length 2048

Digest Algorithm sha256

Lifetime (days) 3650

Common Name openvpnClient1

Country Code ES

State or Province Pontevedra

City A Estrada

Organization IES Pl. Anton Losada Dieguez

Organizational Unit Informatica

192.168.1.1/system\_certmanager.php?act=new

Escoller as opcións e escribir o que aparece na imaxe. Baixar a pantalla.

Common Name openvpnClient1

The following certificate subject components are optional and may be left blank.

Country Code ES

State or Province Pontevedra

City A Estrada

Organization IES Pl. Anton Losada Dieguez

Organizational Unit Informatica

Certificate Attributes

Attribute Notes The following attributes are added to certificates and requests when they are created or signed. These attributes behave differently depending on the selected mode.

For Internal Certificates, these attributes are added directly to the certificate as shown.

Certificate Type User Certificate

Alternative Names FQDN or Hostname

Type Value

Add SAN Row + Add SAN Row

Save

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Escoller as opcións e escribir o que aparece na imaxe. Baixar a pantalla e premer en Save.

System / Certificates / Certificates

Created internal certificate OpenVPN-Client-1

Authorities Certificates Certificate Revocation

Search Search term Both

Certificates

Name	Issuer	Distinguished Name	In Use	Actions
GUI default (677d6d93bc3c)	self-signed	OrgPfSense GUI default Self-Signed Certificate, CN=pfSense-677d6d93bc3c		
Server Certificate CA: No Server: Yes		Valid From: Tue, 07 Jan 2025 23:24:03 +0100 Valid Until: Mon, 09 Feb 2026 23:24:03 +0100		
OpenVPN-Server CA: No Server: Yes	Cert-Proxy+VPN	ST=Pontevedra, OU=Informatica, O=IES Pl. Anton Losada Dieguez, L=A Estrada, CN=openvpnServer, C=ES		
		Valid From: Thu, 09 Jan 2025 17:26:49 +0100 Valid Until: Sun, 07 Jan 2035 17:26:49 +0100		
OpenVPN-Client-1 CA: No Server: No	Cert-Proxy+VPN	ST=Pontevedra, OU=Informatica, O=IES Pl. Anton Losada Dieguez, L=A Estrada, CN=openvpnClient1, C=ES		
		Valid From: Thu, 09 Jan 2025 17:26:49 +0100 Valid Until: Sun, 07 Jan 2035 17:26:49 +0100		

+ Add/Sig

192.168.1.1/system\_certmanager.php?act=new

Certificado OpenVPN-Client-1 xerado.

## 2. Configuración OpenVPN:

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

VPN / OpenVPN / Servers

OpenVPN Servers

Interface	Protocol / Port	Tunnel Network	Mode / Crypto	Description	Actions
IPSec					
L2TP					
OpenVPN					

+ Add

192.168.1.1/vpn\_openvpn\_server.php

Ir a VPN → OpenVPN

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

VPN / OpenVPN / Servers

OpenVPN Servers

Interface	Protocol / Port	Tunnel Network	Mode / Crypto	Description	Actions
IPSec					
L2TP					
OpenVPN					

192.168.1.1/vpn\_openvpn\_server.php?act=new

Na sección Servers premer o botón Add

**General Information**

Description: openVPN-Server  
A description of this VPN for administrative reference.

Disabled:  Disable this server  
Set this option to disable this server without removing it from the list.

**Mode Configuration**

Server mode: Remote Access (SSL/TLS)  
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).

**Endpoint Configuration**

Protocol: UDP on IPv4 only  
Interface: WAN  
Local port: 1194  
The port used by OpenVPN to receive client connections.

**Cryptographic Settings**

TLS Configuration:  Use a TLS Key

Escoller as opcións e escribir o que aparece na imaxe. Baixar a pantalla.

**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.

Automatically generate a TLS Key

**Peer Certificate Authority**

No Certificate Revocation Lists defined. One may be created here: System > Cert. Manager

**OCSP Check**

Check client certificates with OCSP

**Server certificate**

OpenVPN-Server (Server: Yes, CA: Cert-Proxy+VPN)  
Certificates known to be incompatible with use for OpenVPN are not included in this list, such as certificates using incompatible ECDSA curves or weak digest algorithms.

**DH Parameter Length**

2048 bit  
Diffie-Hellman (DH) parameter set used for key exchange.

**ECDH Curve**

Use Default  
The Elliptic Curve to use for key exchange.  
The curve from the server certificate is used by default when the server uses an ECDSA certificate. Otherwise, secp384r1 is used as a fallback.

**Data Encryption Algorithms**

AES-128-CBC (128 bit key, 128 bit block)  
AES-128-CFB (128 bit key, 128 bit block)  
AES-128-CTR (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-CTR (192 bit key, 128 bit block)  
AES-192-GCM (192 bit key, 128 bit block)  
AES-256-CBC (256 bit key, 128 bit block)  
AES-256-CFB (256 bit key, 128 bit block)  
AES-256-CTR (256 bit key, 128 bit block)  
AES-256-GCM (256 bit key, 128 bit block)  
AES-256-OFB (256 bit key, 128 bit block)

Allowed Data Encryption Algorithms: Click to add or remove an algorithm from the list  
The order of the selected data encryption algorithms is respected by OpenVPN. This list is ignored in shared key mode.

Escoller as opcións e escribir o que aparece na imaxe. Baixar a pantalla.

**Tunnel Settings**

**IPv4 Tunnel Network**

This is the IPv4 virtual network or network type alias with a single entry used for private communications between this server and client hosts expressed using CIDR notation (e.g. 10.0.8.0/24). The first address in the network will be assigned to the server virtual interface. The remaining available addresses will be assigned to connecting clients.

A tunnel network of /30 or smaller puts OpenVPN into a special peer-to-peer mode which cannot push settings to clients. This mode is not compatible with several options, including **Box Notify** and **Inactive**.

**IPv6 Tunnel Network**

This is the IPv6 virtual network or network type alias with a single entry used for private communications between this server and client hosts expressed using CIDR notation (e.g. fe80::/64). The :1 address in the network will be assigned to the server virtual interface. The remaining addresses will be assigned to connecting clients.

**Redirect IPv4 Gateway**

Force all client-generated IPv4 traffic through the tunnel.

**Redirect IPv6 Gateway**

Force all client-generated IPv6 traffic through the tunnel.

**IPv4 Local network(s)**

IPv4 networks that will be accessible from the remote endpoint. Expressed as a comma-separated list of one or more CIDR ranges or host/network type aliases. This may be left blank if not adding a route to the local network through this tunnel on the remote machine. This is generally set to the LAN network.

**IPv6 Local network(s)**

IPv6 networks that will be accessible from the remote endpoint. Expressed as a comma-separated list of one or more IPv6/CIDR or host/network type aliases. This may be left blank if not adding a route to the local network through this tunnel on the remote machine. This is generally set to the LAN network.

**Concurrent connections**

2  
Specify the maximum number of clients allowed to concurrently connect to this server.

**Allow compression**

Refuse any non-stub compression (Max: 1000ms)  
Allow compression to be used with this VPN instance.  
Compresses data potentially increasing 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.

**Push compression**

Push the selected compression setting to connecting clients.

**Type-of-Service**

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

Escoller as opcións e escribir o que aparece na imaxe. Baixar a pantalla.

**Client Settings**

**Dynamic IP**

Allow connected clients to retain their connections if their IP address changes.

**Topology**

Subnet - One IP address per client in a common subnet  
Specifies the method used to supply a virtual adapter IP address to clients when using TUN mode on IPv4. Some clients may require this to be set to "subnet" even for IPv6, such as OpenVPN Connect (iOS/Android). Older versions of OpenVPN (before 2.0.9) or clients such as Yealink phones may require "net30".

**Ping settings**

**Inactive**

300  
Causes OpenVPN to close a client connection after n seconds of inactivity on the TUN/TAP device.  
Activity is based on the last incoming or outgoing tunnel packet.  
A value of 0 disables this feature.  
This option is ignored in Peer-to-Peer Shared Key mode and in SSL/TLS mode with a blank or /30 tunnel network as it will cause the server to exit and not restart.

**Ping method**

keepalive - Use keepalive helper to define ping config  
ping = interval ping-restart = timeout#  
push ping = interval  
push ping-restart = timeout

**Interval**

10

**Timeout**

60

**Advanced Client Settings**

**DNS Default Domain**

Provide a default domain name to clients

**DNS Server enable**

Provide a DNS server list to clients. Addresses may be IPv4 or IPv6.

**DNS Server 1**

8.8.4.4

**DNS Server 2**

8.8.8.8

**DNS Server 3**

**DNS Server 4**

**Block Outside DNS**

Make Windows 10 Clients Block access to DNS servers except those OpenVPN while connected, forcing clients to use only VPN DNS servers.  
Requires Windows 10 and OpenVPN 2.3.9 or later. Only Windows 10 is prone to DNS leakage in this way, other clients will ignore the option as they are not affected.

**Force DNS cache update**

Run "net stop dnscache", "net start dnscache", "pconfig flushdns" and "pconfig registerdns" on connection initiation.  
This is known to kick Windows into recognizing pushed DNS servers.

**NTP Server enable**

Provide an NTP server list to clients

**NetBIOS enable**

Enable NetBIOS over TCP/IP  
If this option is not set, all NetBIOS-over-TCP/IP options (including WINS) will be disabled.

**Advanced Configuration**

**Custom options**

push "route 192.168.1.4 253 253 253 0"

Enter any additional options to add to the OpenVPN server configuration here, separated by semicolon.  
EXAMPLE: push route 10.0.0.255 255.255.255.0

**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.

Escoller as opcións e escribir o que aparece na imaxe. Baixar a pantalla.

**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**

```
# 2048 bit OpenVPN static key
# -----BEGIN OpenVPN Static key V1-----
#-----BEGIN OpenVPN Static key V1-----
#-----END OpenVPN Static key V1-----
#-----END OpenVPN Static key V1-----
```

Paste the TLS key here.  
This key is used to sign control 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.

**TLS keydir direction**

Use default direction  
The TLS key direction must be set to complementary values on the client and server. For example, if the server is set to 0, the client must be set to 1. Both may be set to omit the direction, in which case the TLS Key will be used bidirectionally.

**Peer Certificate Authority**

Cert-Proxy+VPN

**Peer Certificate Revocation List**

No Certificate Revocation Lists defined. One may be created here: System > Cert. Manager

**OCSP Check**

Check client certificates with OCSP

**Server certificate**

OpenVPN-Server (Server: Yes, CA: Cert-Proxy+VPN, In Use)  
Certificates known to be incompatible with use for OpenVPN are not included in this list, such as certificates using incompatible ECDSA curves or weak digest algorithms.

**DH Parameter Length**

2048 bit  
Diffie-Hellman (DH) parameter set used for key exchange.

**ECDH Curve**

Use Default

Escoller as opcións e escribir o que aparece na imaxe. Baixar a pantalla.

**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.

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**DH Parameter Length**

2048 bit  
Diffie-Hellman (DH) parameter set used for key exchange.

**ECDH Curve**

Use Default

Voltar á sección **Cryptographic Settings** e escoller as opcións que aparecen na imaxe. Baixar a pantalla.

Enter any additional options to add to the OpenVPN server configuration here, separated by semicolon.  
EXAMPLE: push route 10.0.0.0 255.255.255.0

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 OpenVPNv2 bandwidth limiting.

**Exit Notify**  
Reconnect to this server / Retry once  
Send an explicit exit notification to connected clients/peers when restarting or shutting down, so they may immediately disconnect rather than waiting for a timeout. In SSL/TLS Server mode, clients may be directed to reconnect or use the next server. This option is ignored in Peer-to-Peer Shared Key mode and in SSL/TLS mode with a blank or /39 tunnel network as it will cause the server to exit and not restart.

**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 upload speeds. Finding the best buffer size can take some experimentation. To test the best value for a site, start at \$12KB and test higher and lower values.

**Gateway creation**  
 Both     IPv4 only     IPv6 only  
If you assign a virtual interface to this OpenVPN server, this setting controls which gateway types will be created. The default setting is 'both'.

**Verbosity level**  
default  
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  
Default (info)  
6: 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

**Save**

Escoller as opcións e escribir o que aparece na imaxe. Baixar a pantalla e premer o botón Save.

Interface	Protocol / Port	Tunnel Network	Mode / Crypto	Description	Actions
WAN	UDP4 / 1194 (TUN)	10.0.8.0/24	Mode: Remote Access (SSL/TLS) Data Ciphers: AES-256-GCM, AES-128-GCM, CHACHA20-POLY1305, AES-256-CBC Digest: SHA256 D-H Params: 2048 bits	openVPN-Server	

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Servidor OpenVPN configurado.

### 3. Configurar as regras de firewall para permitir o acceso VPN:

Actions	Source	Protocol	Port	Destination	Port	Gateway	Queue	Schedule	Description	Buttons
	0/0 B	IPV4 TCP	*	10.10.10.10	80 (HTTP)	*	none		NAT Redirección do porto HTTP de WAN ao servidor DMZ	
	0/0 B	IPV4 TCP	*	10.10.10.10	443 (HTTPS)	*	none		NAT Redirección do porto HTTPS de WAN ao servidor da DMZ	

**Add**

Ir a Firewall → Rules → WAN e premer no botón

**Action**: Pass  
What to do with packets that match the criteria specified below.  
Hint: the difference between block and reject is that with reject, a packet (TCP/RST or ICMP port unreachable for UDP) is returned to the sender whereas with block the packet is dropped silently. In either case, the original packet is discarded.

**Disabled**:  Disable this rule  
Set this option to disable this rule without removing it from the list.

**Interface**: WAN  
Choose the interface from which packets must come to match this rule.

**Address Family**: IPv4  
Select the Internet Protocol version this rule applies to.

**Protocol**: UDP  
Choose which IP protocol this rule should match.

**Source**  
**Source**:  Invert match: Any  
**Display Advanced**  
The Source Port Range for a connection is typically random and almost never equal to the destination port. In most cases this setting must remain at its default value, any.

**Destination**  
**Destination**:  Invert match: WAN address  
**Destination Address**:  
**Destination Port Range**: OpenVPN (1194) From: Custom To: Custom  
Specify the destination port or port range for this rule. The 'To' field may be left empty if only filtering a single port.

**Extra Options**  
**Log**:  Log packets that are handled by this rule  
Hint: the firewall has limited local log space. Don't turn on logging for everything. If doing a lot of logging, consider using a remote syslog server (see the Status: System Logs: Settings page).

Escoller as opcións e escribir o que aparece na imaxe. Baixar a pantalla.

**Address Family**: IPV4  
Select the Internet Protocol version this rule applies to.

**Protocol**: UDP  
Choose which IP protocol this rule should match.

**Source**  
**Source**:  Invert match: Any  
**Display Advanced**  
The Source Port Range for a connection is typically random and almost never equal to the destination port. In most cases this setting must remain at its default value, any.

**Destination**  
**Destination**:  Invert match: WAN address  
**Destination Address**:  
**Destination Port Range**: OpenVPN (1194) From: Custom To: Custom  
Specify the destination port or port range for this rule. The 'To' field may be left empty if only filtering a single port.

**Extra Options**  
**Log**:  Log packets that are handled by this rule  
Hint: the firewall has limited local log space. Don't turn on logging for everything. If doing a lot of logging, consider using a remote syslog server (see the Status: System Logs: Settings page).

**Description**: A description may be entered here for administrative reference. A maximum of 52 characters will be used in the ruleset and displayed in the firewall log.

**Advanced Options**:   
**Save**

Escoller as opcións e escribir o que aparece na imaxe. Baixar a pantalla e premer no botón Save.

Actions	Source	Protocol	Port	Destination	Port	Gateway	Queue	Schedule	Description	Buttons
	0/0 B	IPV4 UDP	*	*	WAN address (OpenVPN)	1194	*	none		
	0/0 B	IPV4 TCP	*	*	10.10.10.10	80 (HTTP)	*	none	NAT Redirección do porto HTTP de WAN ao servidor DMZ	
	0/0 B	IPV4 TCP	*	*	10.10.10.10	443 (HTTPS)	*	none	NAT Redirección do porto HTTPS de WAN ao servidor da DMZ	

**Apply Changes**

Para aplicar os cambios premer en "Apply Changes"

The screenshot shows the pfSense Firewall / Rules / WAN interface. It displays three existing rules:

- Rule 1: 0/0 B (Protocol: UDP, Port: 1194, Destination: WAN address (OpenVPN), Action: none)
- Rule 2: 0/0 B (Protocol: TCP, Port: 80 (HTTP), Destination: 10.10.10.10, Action: NAT Redirección do porto HTTP de WAN ao servidor DMZ)
- Rule 3: 0/0 B (Protocol: TCP, Port: 443 (HTTPS), Destination: 10.10.10.10, Action: NAT Redirección do porto HTTPS de WAN ao servidor da DMZ)

Below the rules table are buttons for Add, Add, Delete, Toggle, Copy, Save, and Separate.

Cambios aplicados e regra xerada.

The screenshot shows the pfSense Firewall / Rules / OpenVPN interface. It displays a message: "No rules are currently defined for this interface. All incoming connections on this interface will be blocked until pass rules are added. Click the button to add a new rule." Below this message is a "Add rule to the top of the list" button.

Ir a Firewall → Rules → OpenVPN e premer no botón

The screenshot shows the pfSense Edit Firewall Rule dialog for the OpenVPN interface. The configuration includes:

- Action: Pass
- Disabled:  Disable this rule
- Interface: OpenVPN
- Address Family: IPv4
- Protocol: Any
- Source:  Invert match Any
- Destination:  Invert match Any
- Extra Options: Log  Log packets that are handled by this rule
- Description: A description may be entered here for administrative reference. A maximum of 52 characters will be used in the ruleset and displayed in the firewall log.
- Advanced Options:

At the bottom is a "Save" button.

Escoller as opcións e escribir o que aparece na imaxe. Baixar a pantalla e premer no botón Save.

The screenshot shows the pfSense Firewall / Rules / OpenVPN interface after changes have been applied. A green message bar at the top says: "The firewall rule configuration has been changed. The changes must be applied for them to take effect." Below this is a "✓ Apply Changes" button.

The rules table now shows one rule for the OpenVPN interface:

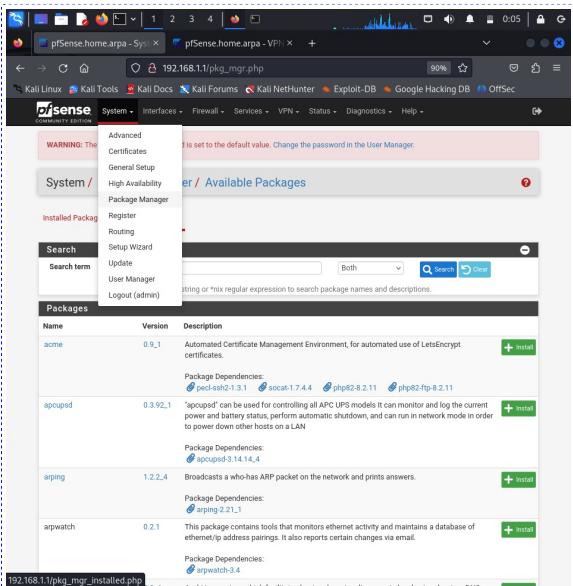
- Rule 1: 0/0 B (Protocol: IPv4\*, Action: none)

Para aplicar os cambios premer en "Apply Changes"

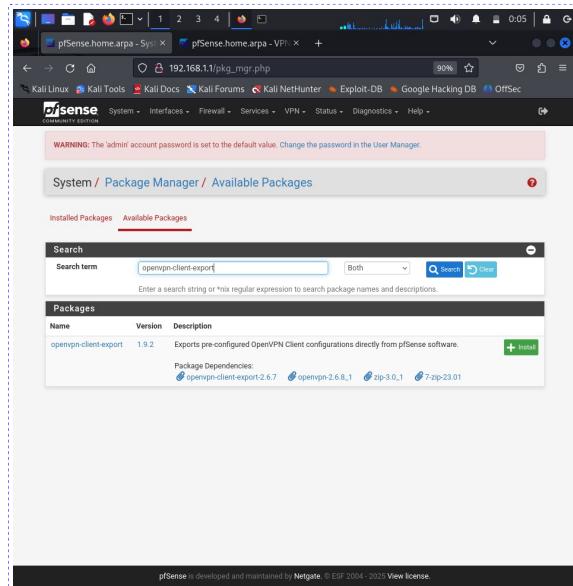
The screenshot shows the pfSense Firewall / Rules / OpenVPN interface after changes have been applied. A green message bar at the top says: "The changes have been applied successfully. The firewall rules are now reloading in the background. Monitor the filter reload progress." The rules table shows the same rule as the previous screenshot.

Cambios aplicados e regra xerada.

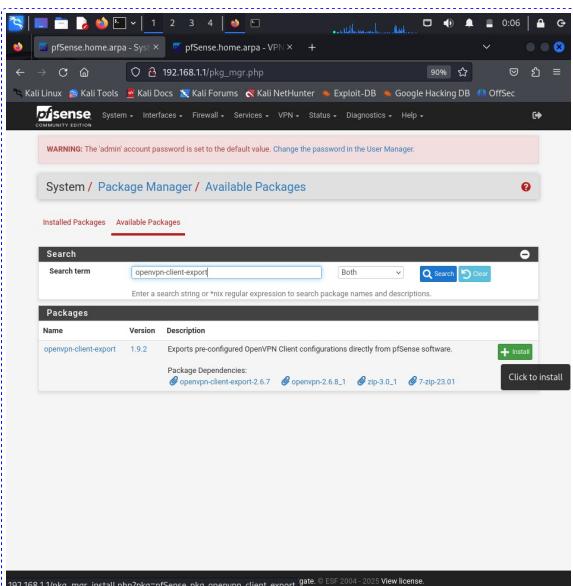
#### 4. Exportar o arquivo de configuração OpenVPN para os clientes:



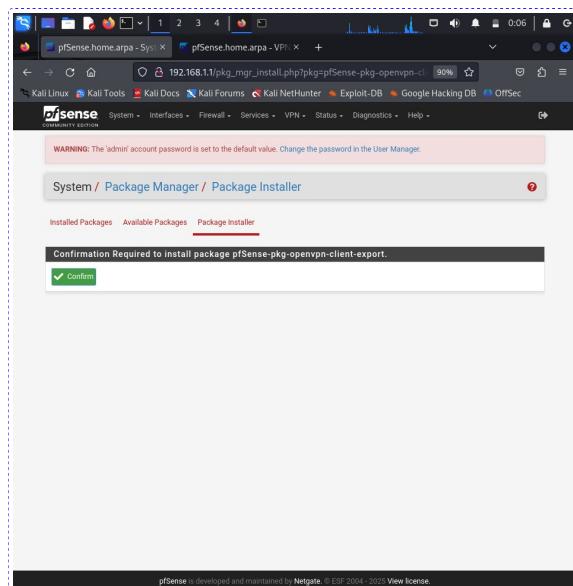
Abrir System → Package Manager



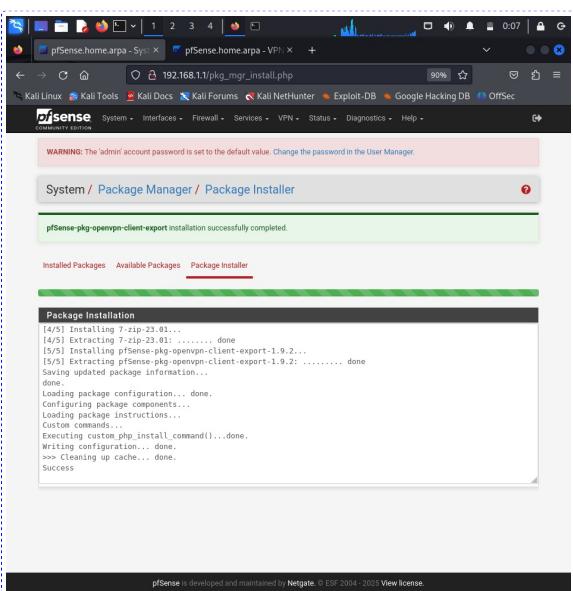
Buscar o padrão "openvpn-client-export" os paquetes possíveis a instalar.



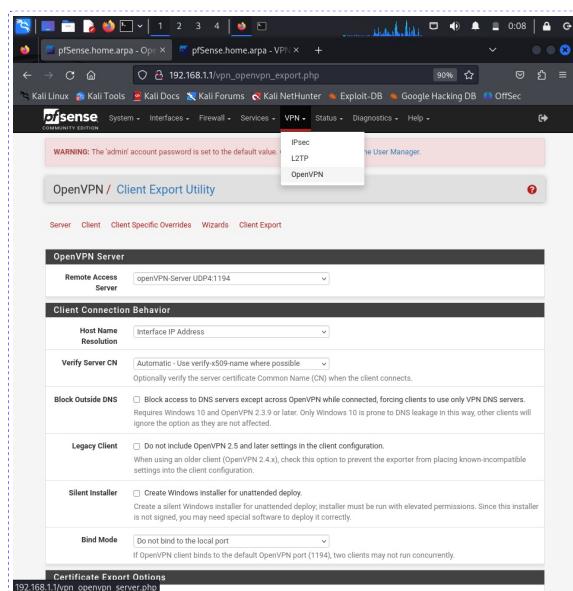
Premir no botón Install do paquete openvpn-client-export para proceder a instalalo.



Premir no botón Confirm para confirmar a instalación requerida.



Instalación do paquete openvpn-client-export realizado.



Abrir VPN → OpenVPN

OpenVPN / Client Export Utility

Server Client Client Specific Overrides Wizards Client Export

**OpenVPN Server**

Remote Access Server openVPN-Server UDP4:1194

**Client Connection Behavior**

Host Name Resolution Interface IP Address

Verify Server CN Automatic - Use verify-x509-name where possible

Block Outside DNS  Block access to DNS servers except across OpenVPN while connected, forcing clients to use only VPN DNS servers. Requires Windows 10 and OpenVPN 2.3.9 or later. Only Windows 10 is prone to DNS leakage in this way; other clients will ignore the option as they are not affected.

Legacy Client  Do not include OpenVPN 2.5 and later settings in the client configuration.  
When using a legacy client (OpenVPN 2.4.X), check this option to prevent the exporter from placing known-incompatible settings into the client configuration.

Silent Installer  Create Windows installer for unattended deploy.  
Create a silent Windows installer for unattended deploy; installer must be run with elevated permissions. Since this installer is not signed, you may need special software to deploy it correctly.

Bind Mode Use a random local source port  
If OpenVPN client binds to the default OpenVPN port (1194), two clients may not run concurrently.

**Certificate Export Options**

PKCS#11 Certificate Storage  Use PKCS#11 storage device (cryptographic token, HSM, smart card) instead of local files.

Microsoft Certificate Storage  Use Microsoft Certificate Storage instead of local files.

Only OpenVPN-compatible user certificates are shown

If a client is missing from the list it is likely due to a CA mismatch between the OpenVPN server instance and the client certificate, the client certificate does not exist on this firewall, or a user certificate is not associated with a user when local database authentication is enabled.

Using clients with OpenSSL 3.0 may not work with older or weaker ciphers and hashes, such as SHA1, including when those were used to sign CA and certificate entries.

OpenVPN 2.4.8+ requires Windows 7 or later

Links to OpenVPN clients for various platforms:

- OpenVPN Community Client - Binaries for Windows, Source for other platforms. Packaged above the Windows installers
- OpenVPN For Android - Recommended client for Android
- OpenVPN Connect (Android (Google Play) or iOS (App Store)) - Recommended client for iOS
- Mac OS X and Windows

`javascript:download_begin('configfile', '1.0')`

Elixir a opción "Client Export". Baixar a pantalla.

The screenshot shows a Kali Linux browser window with the URL `192.168.1.1/vpn_openvpn_export.php`. A file download dialog is open for `pfSense-UDP4-1194-openvpnClient1-config.ovpn`, indicating it's completed at 6.1KB. The sidebar on the right lists various certificates and configurations:

- OpenVPN Clients
- User: Certificate (SSL/TLS, no Auth)
- Certificate (SSL/TLS, no Auth)
- Show all downloads
- OpenVPN

Available certificates include:

- OpenVPN Connect (iOS/Android)
- Bundled Configurations
- Current Windows Installer (2.6.7-x601):
  - Windows 10 (64-bit)
  - Windows 10 (32-bit)
- Previous Windows Installer (2.5.9-x601):
  - Windows 7 (64-bit)
  - Windows 7 (32-bit)
- Legacy Windows Installers (2.4.12-x601):
  - Windows 7 (64-bit) 1/2013
  - Windows 7 (32-bit) 1/2013
- Viscosity (Mac OS X and Windows)
- Yeastlink SIP Handset
- Snom SIP Handsets:
  - T900 (1)
  - T900 (2) / V3
- PNOM

Certificado descargado (/home/kali/Downloads/pfSense-UDP4-1194-openvpnClient1-config.ovpn)

## 5. Conectar o cliente mediante VPN:

```
kali㉿kali:~
```

```
File Actions Edit View Help
```

```
[kali㉿kali:~]
```

```
└─[kali㉿kali:~]# ifconfig
```

```
lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group defq
    link/loopback brd 00:00:00:00:00:00
    inet 127.0.0.1/8 brd 00:00:00:00:00:00 scope host lo
        valid_lft forever preferred_lft forever
        inet6 ::1/128 brd 00:00:00:00:00:00 scope host lo
            valid_lft forever preferred_lft forever
2: eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP group bridge
    link/ether 00:0c:29:72:16:00 brd ff:ff:ff:ff:ff:ff
    inet 172.16.0.2/24 brd 172.16.0.255 scope global dynamic noprefixroute et
    br0
        valid_lft 34sec preferred_lft 34sec
    inet 172.16.0.2/24 brd 172.16.0.255 scope link noprefixroute
        valid_lft forever preferred_lft forever

[kali㉿kali:~]
```

```
└─[kali㉿kali:~]# route
```

```
default via 172.16.0.1 dev eth0 proto dhcp src 172.16.0.8 metric 100
172.16.0.0/24 dev eth0 proto kernel scope link src 172.16.0.8 metric 100

[kali㉿kali:~]
```

```
└─[kali㉿kali:~]# cat /etc/resolv.conf
```

```
# Generated by NetworkManager
nameserver 192.168.1.1
```

```
[kali㉿kali:~]
```

Revisar a configuración actual de rede en kaliC antes da conexión VPN con kaliB.

Kali Linux | Kali Tools | Kali Docs | Kali Forums | Kali NetHunter | Exploit-DB | Google Hacking DB | OffSec

pfSense COMMUNITY EDITION

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

WARNING: The 'admin' account password is set to the default value. Change the password in the User Manager.

Status / OpenVPN

openvpn1: openVPN-Server UDP:4194 / Client Connections: 0

Common Name	Real Address	Virtual Address	Last Change	Bytes Sent	Bytes Received	Cipher	Actions
kalib [kalib@kalib: ~]							

```
File Actions Edit View Help
[kalib@kalib: ~]
$ ip addr show eth0
2: eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP group default qlen 1000
    link/ether 00:0c:29:bb:0f:02 brd ff:ff:ff:ff:ff:ff
    inet 192.168.1.100/24 brd 192.168.1.255 scope global dynamic noprefixroute eth0
        valid_lft 604sec preferred_lft 604sec
        inet6 fe80::20c:29ff:fe0f:0%eth0/64 scope link noprefixroute
            valid_lft never preferred_lft forever

[kalib@kalib: ~]
$ nc -vz 192.168.1.100 22
[kalib@192.168.1.100] 22 (ssh) : Connection refused

[kalib@kalib: ~]
$ sudo systemctl start ssh
[kalib@kalib: ~]
$ nc -vz 192.168.1.100 22
[kalib@192.168.1.100] 22 (ssh) open

[kalib@kalib: ~]
$
```

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Revisar a configuración actual de rede en kaliB antes da conexión VPN e habilitar o serviço SSH em kaliB.

```
kali㉿kali: ~ (on kaliC)
```

```
File Actions Edit View Help  
└── [root@kali ~]#  
└── sudo openvpn pfSense-UDP4-1194-uservpn-config.ovpn  
2025-01-10 15:34:29 OpenVPN 2.6.12 x86_64-pc-linux-gnu [SSL (OpenSSL)] [LZO] [LZ4] [EPOLL] [PKCS11] [MH/PKTINFO] [AEAD] [DCO]  
2025-01-10 15:34:29 UDPv4 link local: (not bound)  
2025-01-10 15:34:29 UDPv4 link remote: [AF_INET]172.16.0.7:1194  
2025-01-10 15:34:29 TCP/UDP: Preserving recently used remote address: [AF_INET]172.16.0.7:1194  
2025-01-10 15:34:29 UDPv4 link local: (not bound)  
2025-01-10 15:34:29 UDPv4 link remote: [AF_INET]172.16.0.7:1194  
2025-01-10 15:34:29 [OpenVPN] Peer Connection Initiated with [AF_INET]172.16.0.7:1194  
2025-01-10 15:34:29 Option error: Unrecognized option or missing or extra parameter(s) in [ PUSH-  
OPTIONS] line: block-outside-dn (2.6.12)  
2025-01-10 15:34:29 [ifconfig-pool] tunnel opened  
2025-01-10 15:34:29 net_iface_atu_set: tun0 1580 for tun0  
2025-01-10 15:34:29 net_iface_up; set tun0 up  
2025-01-10 15:34:29 net_addr_v4_add: 10.0.8.3/24 dev tun0  
2025-01-10 15:34:29 Initialization Sequence Completed
```

Establecer a conexión VPN con kaliB desde kaliC

Revisar a configuración actual de rede en kaliC logo da conexión VPN con kaliB

Aparece unha nova NIC: tun0

Revisar a configuración actual de rede en kaliC logo da conexión VPN con kaliB

Acceder dende kaliC a kaliB mediante ssh.

Isto é posible debido á conexión VPN.

Notar que non é necesario xerar unha nova regra para chegar ao servizo SSH en kaliB.

The screenshot shows a Kali Linux desktop environment with a browser window open to [192.168.1.1/status\\_openvpn.php](http://192.168.1.1/status_openvpn.php). The page displays the status of an OpenVPN connection named 'uservpn'. The connection details are as follows:

Common Name	Real Address	Virtual Address	Last Change	Bytes Sent	Bytes Received	Cipher	Actions
uservpn	172.16.0.439986	10.0.8.3	2025-01-10 16:34:29	11 KB	10 KB	AES-256-GCM	

Below the table, there is a button labeled "Show Routing Table" which displays the internal routing table for this specific connection.

Comprobar en Status → OpenVPN que existe unha conexión VPN establecida  
Premir en "Show Routing Table"

The screenshot shows a Kali Linux browser window displaying the pfSense status page. The address bar shows '192.168.1.1/status\_openvpn.php'. The page header includes the pfSense logo and navigation links for Kali Linux, Kali Tools, Kali Docs, Kali Forums, Kali NetHunter, Exploit-DB, Google Hacking DB, OffSec, System, Interfaces, Firewall, Services, VPN, Status, Diagnostics, Help, and a user account section.

**WARNING:** The 'admin' account password is set to the default value. Change the password in the User Manager.

**Status / OpenVPN**

**openVPN1: openVPN-Server UDP4:1194 / Client Connections: 1**

Common Name	Real Address	Virtual Address	Last Change	Bytes Sent	Bytes Received	Cipher	Actions
uservpn	172.16.0.8:43998	10.0.8.3	2025-01-10 16:34:29	11 kB	10 kB	AES-256-GCM	

**openVPN-Server UDP4:1194 Routing Table**

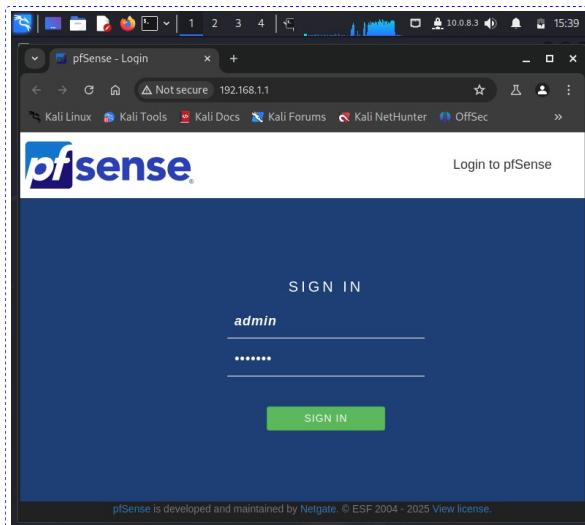
Common Name	Real Address	Target Network	Last Used
uservpn	172.16.0.8:43998	10.0.8.3	2025-01-10 16:35:29

An IP address followed by C indicates a host currently connected through the VPN.

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local

Amosar tamén a táboa de rutas na conexión VPN establecida.



Acceder dende kaliC a kaliB mediante ssh exportando o display gráfico.

Abrir o navegador chromium

Isto é posible debido á conexión VPN.

Recibir o navegador na páxina requerida en kaliC, debido a exportación do display por ssh e a conexión VPN establecida.

# Firewall: Regras DMZ

## 22. Exemplo5. Bloqueo tráfico de rede da DMZ á LAN

Ainda que tal como está configurado o Escenario a rede DMZ xa non posee conectividade hacia a LAN imos engadir a regra que impide ese acceso: o da DMZ(kaliA) á LAN(kaliB).

The screenshot shows the pfSense Firewall Rules / OPT1 interface. At the top, there is a warning about the admin password. Below it, the interface is titled 'Firewall / Rules / OPT1'. A table header 'Rules (Drag to Change Order)' is shown with columns: States, Protocol, Source, Port, Destination, Port, Gateway, Queue, Schedule, Description, and Actions. A message below the table states: 'No rules are currently defined for this interface. All incoming connections on this interface will be blocked until pass rules are added. Click the button to add a new rule.' At the bottom are several action buttons: Add, Edit, Delete, Toggle, Copy, Save, and Separator.

This screenshot shows the same pfSense Firewall Rules / OPT1 interface after a new rule has been added. The message at the bottom now says: 'The firewall rule configuration has been changed. The changes must be applied for them to take effect.' A green 'Apply Changes' button is visible. The table now contains one row: '0/0 B IPv4 \* OPT1 subnets \* LAN subnets \* \* none Bloquear comunicación da rede DMZ a LAN'. The 'Actions' column for this rule includes icons for edit, delete, toggle, copy, save, and separator.

Escoler no menú a opción: Firewall → Rules → OPT1

This screenshot shows the 'Edit Firewall Rule' dialog box. It includes sections for Action (set to Block), Disabled (unchecked), Interface (OPT1), Address Family (IPv4), Protocol (Any), Source (OPT1 subnets), Destination (LAN subnets), Extra Options (Log checkbox unchecked, Description 'Bloquear comunicación da rede DMZ a LAN'), and Advanced Options (Display Advanced, Save button). A note at the bottom says: 'The firewall has limited local log space. Don't turn on logging for everything. If doing a lot of logging, consider using a remote syslog server (see the Status System Logs Settings page).'

This screenshot shows the pfSense Firewall Rules / OPT1 interface after changes have been applied. A green 'Apply Changes' button is visible. The table now contains one row: '0/0 B IPv4 \* OPT1 subnets \* LAN subnets \* \* none Bloquear comunicación da rede DMZ a LAN'. The 'Actions' column for this rule includes icons for edit, delete, toggle, copy, save, and separator.

Para aplicar os cambios premer en "Apply Changes"

This screenshot shows the pfSense Firewall Rules / OPT1 interface after changes have been applied successfully. A green message box at the top says: 'The changes have been applied successfully. The firewall rules are now reloading in the background. Monitor the filter reload progress.' The table now contains one row: '0/0 B IPv4 \* OPT1 subnets \* LAN subnets \* \* none Bloquear comunicación da rede DMZ a LAN'. The 'Actions' column for this rule includes icons for edit, delete, toggle, copy, save, and separator.

Cambios aplicados e regra xerada.