

Dans le cadre de ma formation, nous avons mis en place un serveur pfSense sur une VM via VirtualBox. pfSense est une distribution FreeBSD spécialisée dans les fonctions de pare-feu et de routeur, offrant une grande flexibilité et de nombreuses fonctionnalités avancées. Ce serveur a été utilisé pour sécuriser et gérer le trafic réseau dans un environnement simulé.

Configuration de la VM :

- Système d'exploitation : pfSense
- **Processeur** : 1 cœur
- Mémoire vive (RAM) : 2048 Mo
- **Espace disque** : 20 Go

Étape 1 : Préparation de l'environnement

Nous avons commencé par télécharger l'ISO de pfSense depuis le site officiel et créé une nouvelle VM dans VirtualBox avec les paramètres suivants :

- Type de système d'exploitation : BSD
- Version : FreeBSD (64-bit)
- Nom de la VM : pfSense

Ensuite, nous avons monté l'ISO de pfSense sur la VM et démarré l'installation.

Étape 2 : Installation de **pfSense**

L'installation de pfSense a été réalisée en suivant les étapes de l'assistant d'installation :

- Choisir l'option d'installation par défaut (Install)
- Accepter les paramètres de partitionnement automatique
- Installer pfSense sur le disque dur Redémarrage du système

INSTALLATION D'UN PAREFEU ROUTEUR (PFSENSE)

pfSense Installer



pfSense Installer

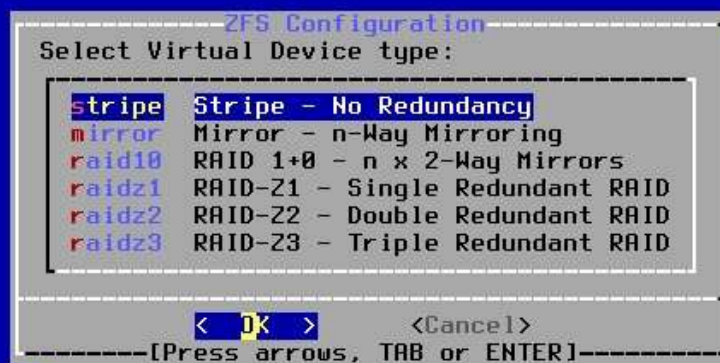


INSTALLATION D'UN PAREFEU ROUTEUR (PFSENSE)

pfSense Installer



pfSense Installer

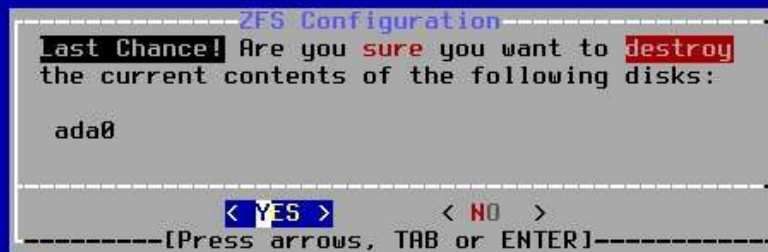


INSTALLATION D'UN PAREFEU ROUTEUR (PFSENSE)

pfSense Installer



pfSense Installer



INSTALLATION D'UN PAREFEU ROUTEUR (PFSENSE)

```
pfSense Installer
-----
Checksum Verification [ In Progress ]
base.txz
Verifying checksums of selected distributions.
Overall Progress 0%
```

```
pfSense Installer
-----
Complete
Installation of pfSense complete!
Would you like to reboot into the
installed system now?
[Reboot] [Shell]
```

Étape 3 : Configuration initiale de pfSense

Après l'installation, nous avons effectué la configuration initiale de pfSense via l'interface console :

- Définir les interfaces réseau (WAN et LAN)
- Attribuer les interfaces réseau

INSTALLATION D'UN PAREFEU ROUTEUR (PFSENSE)

```
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: c8639ced1a798e925969

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

WAN (wan)      -> em0      ->
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
8) Shell

Enter an option: 1
```

```
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: 1

Valid interfaces are:

em0      08:00:27:ae:cd:30   (up) Intel(R) Legacy PRO/1000 MT 82540EM
em1      08:00:27:1e:66:41   (up) Intel(R) Legacy PRO/1000 MT 82540EM
em2      08:00:27:d8:8e:7b (down) Intel(R) Legacy PRO/1000 MT 82540EM
em3      08:00:27:53:7f:81 (down) Intel(R) Legacy PRO/1000 MT 82540EM

Do VLANs need to be set up first?
If VLANs will not be used, or only for optional interfaces, it is typical to
say no here and use the webConfigurator to configure VLANs later, if required.

Should VLANs be set up now [y/n]? n
```

INSTALLATION D'UN PAREFEU ROUTEUR (PFSENSE)

```
7) Ping host          16) Restart PHP-FPM
8) Shell

Enter an option: 1

Valid interfaces are:

em0      08:00:27:ae:cd:30   (up) Intel(R) Legacy PRO/1000 MT 82540EM
em1      08:00:27:1e:66:41   (up) Intel(R) Legacy PRO/1000 MT 82540EM
em2      08:00:27:d8:8e:7b (down) Intel(R) Legacy PRO/1000 MT 82540EM
em3      08:00:27:53:7f:81 (down) Intel(R) Legacy PRO/1000 MT 82540EM

Do VLANs need to be set up first?
If VLANs will not be used, or only for optional interfaces, it is typical to
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 em3 or a): em0
```

```
Valid interfaces are:

em0      08:00:27:ae:cd:30   (up) Intel(R) Legacy PRO/1000 MT 82540EM
em1      08:00:27:1e:66:41   (up) Intel(R) Legacy PRO/1000 MT 82540EM
em2      08:00:27:d8:8e:7b (down) Intel(R) Legacy PRO/1000 MT 82540EM
em3      08:00:27:53:7f:81 (down) Intel(R) Legacy PRO/1000 MT 82540EM

Do VLANs need to be set up first?
If VLANs will not be used, or only for optional interfaces, it is typical to
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 em3 or a): em0

Enter the LAN interface name or 'a' for auto-detection
NOTE: this enables full Firewalling/NAT mode.
(em1 em2 em3 a or nothing if finished): em1
```

INSTALLATION D'UN PAREFEU ROUTEUR (PFSENSE)

```
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 em3 or a): em0
```

```
Enter the LAN interface name or 'a' for auto-detection
NOTE: this enables full Firewalling/NAT mode.
(em1 em2 em3 a or nothing if finished): em1
```

```
Enter the Optional 1 interface name or 'a' for auto-detection
(em2 em3 a or nothing if finished): em2
```

```
Enter the Optional 2 interface name or 'a' for auto-detection
(em3 a or nothing if finished): em3
```

```
The interfaces will be assigned as follows:
```

```
WAN   -> em0
LAN   -> em1
OPT1  -> em2
OPT2  -> em3
```

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

```
Enter an option:
```

```
FreeBSD/amd64 (pfSense.home.arp) (ttyv0)
```

```
VirtualBox Virtual Machine - Netgate Device ID: c8639ced1a798e925969
```

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

```
WAN (wan)      -> em0      ->
LAN (lan)      -> em1      -> v4: 192.168.1.1/24
OPT1 (opt1)    -> em2      ->
OPT2 (opt2)    -> em3      ->
```

- | | |
|-----------------------------------|----------------------------------|
| 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
```

INSTALLATION D'UN PAREFEU ROUTEUR (PFSENSE)

```
WAN (wan)      -> em0      ->
LAN (lan)      -> em1      -> v4: 192.168.1.1/24
OPT1 (opt1)    -> em2      ->
OPT2 (opt2)    -> em3      ->

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)
4 - OPT2 (em3)

Enter the number of the interface you wish to configure: 1
```

```
Available interfaces:

1 - WAN (em0 - dhcp, dhcp6)
2 - LAN (em1 - static)
3 - OPT1 (em2)
4 - OPT2 (em3)

Enter the number of the interface you wish to configure: 1

Configure IPv4 address WAN interface via DHCP? (y/n) n

Enter the new WAN IPv4 address. Press <ENTER> for none:
> 192.168.23.254

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 WAN IPv4 subnet bit count (1 to 32):
> 24

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

```
For a LAN, press <ENTER> for none:
> 192.168.23.200

Should this gateway be set as the default gateway? (y/n) y

Configure IPv6 address WAN interface via DHCP6? (y/n) n

Enter the new WAN IPv6 address. Press <ENTER> for none:
>

Do you want to enable the DHCP server on WAN? (y/n) n
Disabling IPv4 DHCPD...
Disabling IPv6 DHCPD...

Do you want to revert to HTTP as the webConfigurator protocol? (y/n) y

Please wait while the changes are saved to WAN...
Reloading filter...
Reloading routing configuration...
DHCPD...
Restarting webConfigurator...

The IPv4 WAN address has been set to 192.168.23.254/24
Press <ENTER> to continue. █
```

Étape 4 : Accès à l'interface web de pfSense

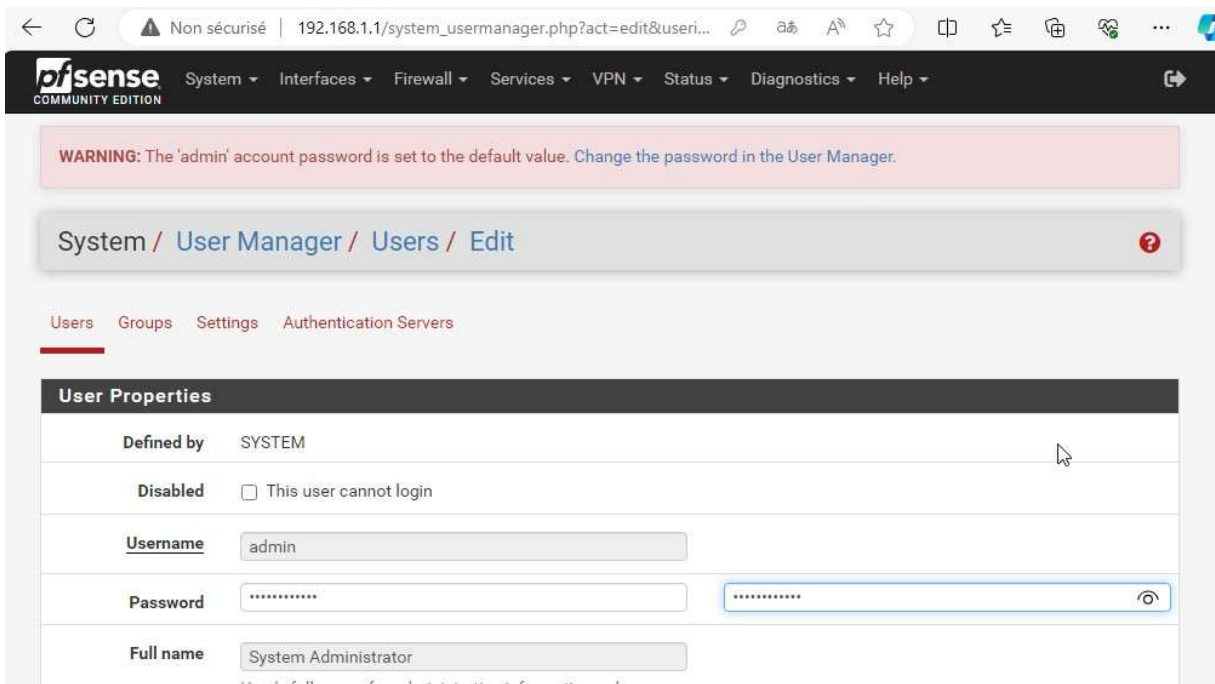
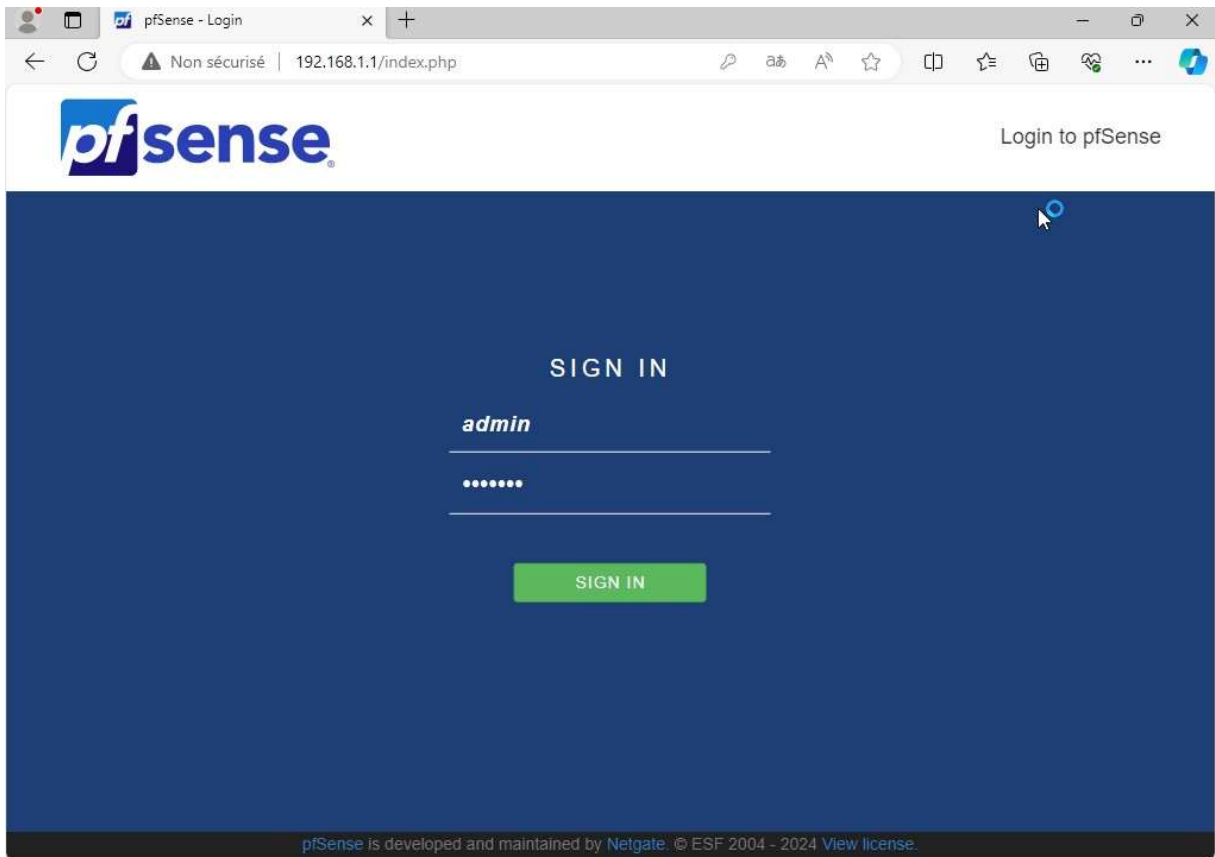
Une fois les interfaces réseau configurées, nous avons accédé à l'interface web de pfSense en utilisant l'adresse IP de l'interface LAN :

- <http://192.168.1.1>

Les étapes suivantes ont été réalisées :

- Connexion avec les identifiants par défaut (admin/pfsense) □ Changement du mot de passe par défaut

INSTALLATION D'UN PAREFEU ROUTEUR (PFSENSE)

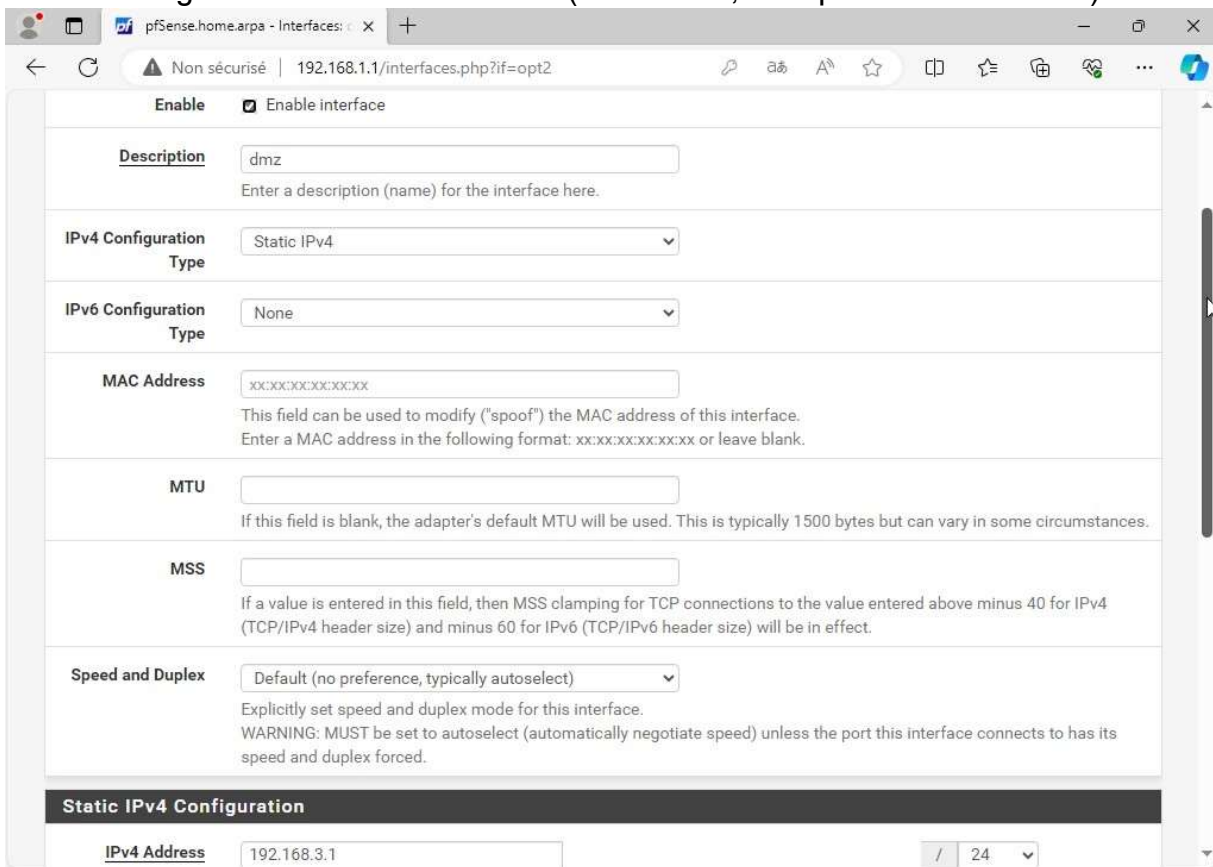


Étape 5 : Finalisation

INSTALLATION D'UN PAREFEU ROUTEUR (PFSENSE)

Nous avons maintenant accès à l'interface du Routeur pfSENSE : □ Configuration de l'interface VLAN (type de connexion, adresse IP, etc.)

- Configuration de l'interface DMZ (adresse IP, masque de sous-réseau)



The screenshot shows the pfSense web interface for configuring an interface. The browser address bar shows '192.168.1.1/interfaces.php?if=opt2'. The interface configuration page includes the following sections:

- Enable:** A checkbox labeled 'Enable interface' is checked.
- Description:** A text input field contains 'dmz'. Below it is the instruction: 'Enter a description (name) for the interface here.'
- IPv4 Configuration Type:** A dropdown menu is set to 'Static IPv4'.
- IPv6 Configuration Type:** A dropdown menu is set to 'None'.
- MAC Address:** A text input field contains 'xx:xx:xx:xx:xx:xx'. Below it is the instruction: 'This field can be used to modify ("spoof") the MAC address of this interface. Enter a MAC address in the following format: xx:xx:xx:xx:xx:xx or leave blank.'
- MTU:** An empty text input field. Below it is the instruction: 'If this field is blank, the adapter's default MTU will be used. This is typically 1500 bytes but can vary in some circumstances.'
- MSS:** An empty text input field. Below it is the instruction: 'If a value is entered in this field, then MSS clamping for TCP connections to the value entered above minus 40 for IPv4 (TCP/IPv4 header size) and minus 60 for IPv6 (TCP/IPv6 header size) will be in effect.'
- Speed and Duplex:** A dropdown menu is set to 'Default (no preference, typically autoselect)'. Below it is the instruction: 'Explicitly set speed and duplex mode for this interface. WARNING: MUST be set to autoselect (automatically negotiate speed) unless the port this interface connects to has its speed and duplex forced.'

Below these sections is a dark grey header for 'Static IPv4 Configuration'. Underneath, the 'IPv4 Address' field contains '192.168.3.1' and the 'Subnet Mask' dropdown is set to '24'.

Conclusion :

En conclusion, cette mission m'a permis de développer et de valider mes compétences en administration de systèmes et réseaux, conformément aux exigences du module [insérer le nom du module]. J'ai démontré ma capacité à installer, configurer et sécuriser un serveur de pare-feu et de routage avec pfSense. Ce projet m'a également sensibilisé aux enjeux de la sécurité réseau et de la gestion des pare-feu en entreprise.