

TP - FOG IMAGE

DOMONT ALEXANDRE

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1. CONTEXTE

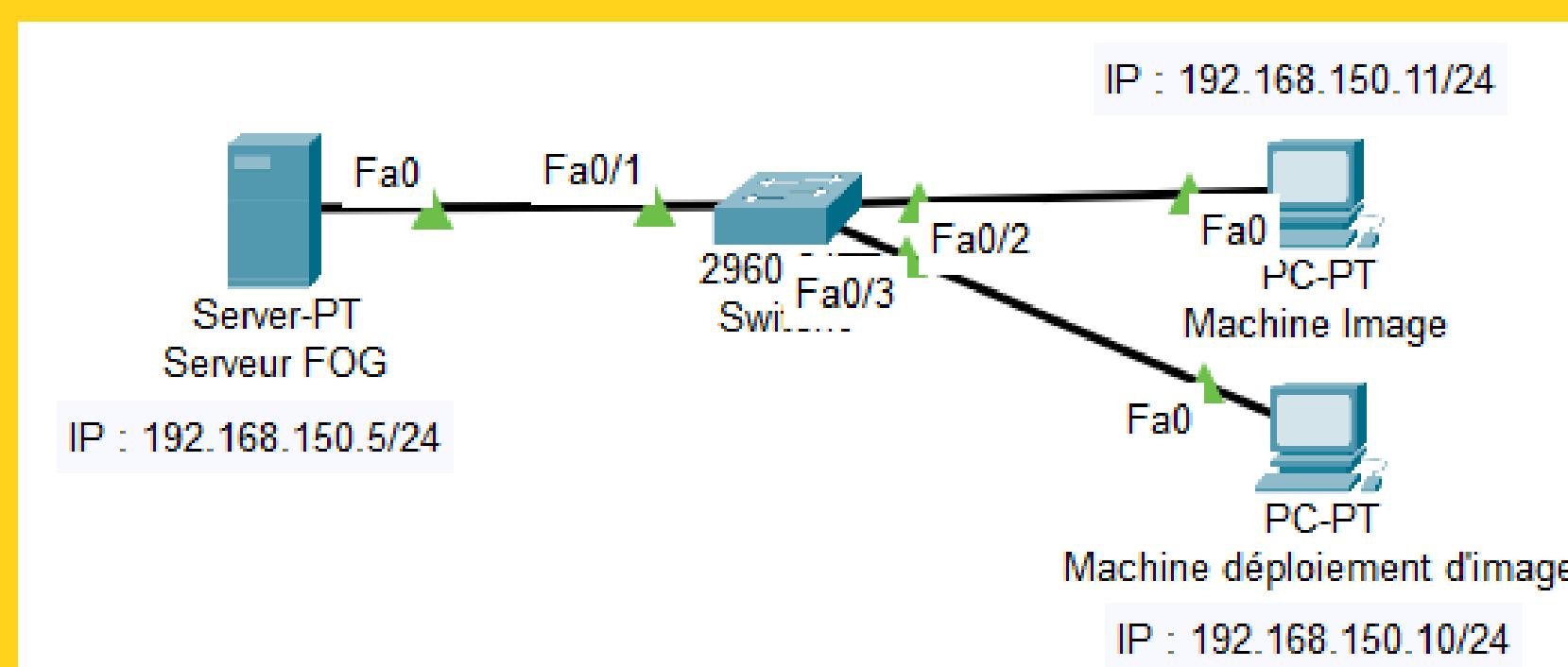
Contexte

Vous travaillez au sein du service informatique d'une entreprise de 150 salariés. La direction a décidé de renouveler une partie du parc informatique (environ 50 postes).

Le responsable SI vous confie une mission :

- Objectif éviter les installations manuelles répétitives et gagner du temps.
- Solution mettre en place un système de déploiement d'images automatisé.

Schéma réseau :



FOG

FOG Project est une solution libre et gratuite qui fonctionne sous Linux et permet de déployer facilement plusieurs systèmes d'exploitation sur des ordinateurs via le réseau (PXE). Elle sert principalement à cloner, installer et restaurer des OS sans support physique, idéale pour gérer rapidement un parc informatique.

2. INSTALLATION DE FOG

Pour installer FOG, nous téléchargeons le dépôt depuis Git, puis nous pouvons lancer l'installation qui se trouve dans le dossier fogproject/bin.

```
git clone https://github.com/FOGProject/fogproject.git  
cd fogproject/bin  
../installfog.sh
```

```
root@debian:~/fogproject/bin# ./installfog.sh  
Installing LSB_Release as needed  
* Attempting to get release information.....Done  
  
+-----+  
| ..#####:. .,,#,.. .::##:. |  
| .##### .:;###:....;#;.. |  
| ...#... .##;,##::::##... |  
| ,# .##....##::::## .:: |  
| ## .::##,,##. .##:::#.####:: |  
| ...##::##:....#. .##..#. #..##:: |  
| ...##:.. .##....##::## .. # |  
| # . .##:;##:::# .##.. |  
| .# . .##;##::::##:::#... |  
| # . .##.. |  
+-----+  
| Free Computer Imaging Solution |  
+-----+  
| Credits: http://fogproject.org/Credits |  
| http://fogproject.org/Credits |  
| Released under GPL Version 3 |  
+-----+  
  
Version: 1.5.10.1733 Installer/Updater  
  
What version of Linux would you like to run the installation for?  
  
1) Redhat Based Linux (Redhat, Alma, Rocky, CentOS, Mageia)  
2) Debian Based Linux (Debian, Ubuntu, Kubuntu, Edubuntu)  
3) Arch Linux  
  
Choice: [2] _
```

```
Starting Debian based Installation  
  
FOG Server installation modes:  
* Normal Server: (Choice N)  
This is the typical installation type and  
will install all FOG components for you on this  
machine. Pick this option if you are unsure what to pick.  
  
* Storage Node: (Choice S)  
This install mode will only install the software required  
to make this server act as a node in a storage group  
  
More information:  
http://www.fogproject.org/wiki/index.php?title=InstallationModes  
  
What type of installation would you like to do? [N/s (Normal/Storage)] N_
```

Une fois FOG installé, nous allons le configurer.
Veuillez suivre les étapes suivantes :

2. INSTALLATION DE FOG

```
Starting Debian based Installation

FOG Server installation modes:
 * Normal Server: (Choice N)
   This is the typical installation type and
   will install all FOG components for you on this
   machine. Pick this option if you are unsure what to pick.

 * Storage Node: (Choice S)
   This install mode will only install the software required
   to make this server act as a node in a storage group

More information:
  http://www.fogproject.org/wiki/index.php?title=InstallationModes

What type of installation would you like to do? [N/s (Normal/Storage)] N

We found the following interfaces on your system:
 * ens18 - 192.168.20.173/24
 * ens19 - 192.168.150.5/24

Would you like to change the default network interface from ens18?
If you are not sure, select No. [y/N] y
What network interface would you like to use? ens19

Would you like to setup a router address for the DHCP server? [Y/n] Y
What is the IP address to be used for the router on
the DHCP server? [192.168.20.254]192.168.150.1

Would you like DHCP to handle DNS? [Y/n] Y
What DNS address should DHCP allow? [185.156.80.7]

Would you like to use the FOG server for DHCP service? [y/N] y
This version of FOG has internationalization support, would
you like to install the additional language packs? [y/N] y

Using encrypted connections is state of the art on the web and we
encourage you to enable this for your FOG server. But using HTTPS
has some implications within FOG, PXE and fog-client and you want
to read https://wiki.fogproject.org/HTTPS before you decide!
Would you like to enable secure HTTPS on your FOG server? [y/N] y

Which hostname would you like to use? Currently is: debian
Note: This hostname will be in the certificate we generate for your
FOG webserver. The hostname will only be used for this but won't be
set as a local hostname on your server!
Would you like to change it? If you are not sure, select No. [y/N] y
Which hostname would you like to use? alexfog
FOG would like to collect some data:
  We would like to collect the following information:
    1. OS Name (CentOS, RedHat, Debian, etc....)
    2. OS Version (8.0.2004, 7.2.1409, 9, etc....)
    3. FOG Version (1.5.9, 1.6, etc....)

What is this information used for?
  We would like to simply track the common types of OS
  being used, along with the OS Version, and the various
  versions of FOG being used.

Are you ok with sending this information? [Y/n]
```

2. INSTALLATION DE FOG

```
Set up a local hostname on your server?
Would you like to change it? If you are not sure, select No. [y/N] y
Which hostname would you like to use? alexfog
FOG would like to collect some data:
We would like to collect the following information:
 1. OS Name (CentOS, RedHat, Debian, etc....)
 2. OS Version (8.0.2004, 7.2.1409, 9, etc....)
 3. FOG Version (1.5.9, 1.6, etc....)

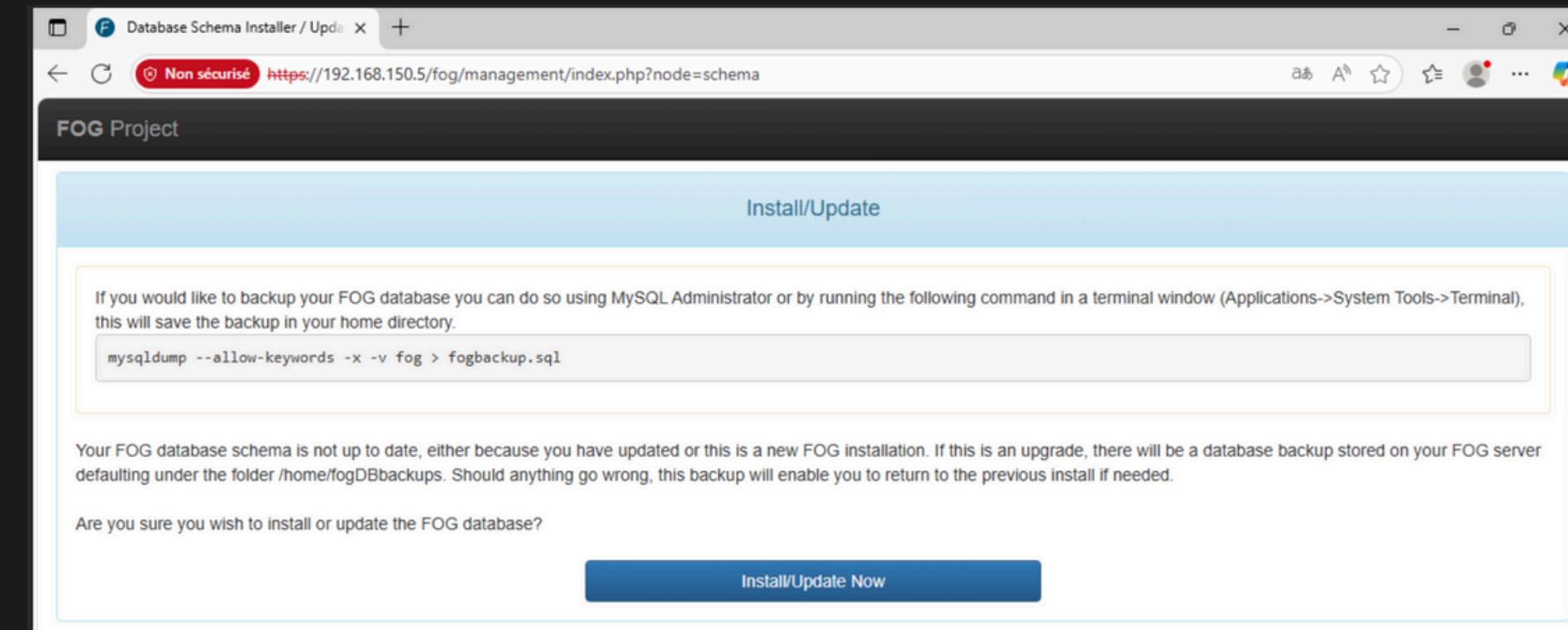
What is this information used for?
  We would like to simply track the common types of OS
  being used, along with the OS Version, and the various
  versions of FOG being used.

Are you ok with sending this information? [Y/n] Y

#####
#   FOG now has everything it needs for this setup, but please      #
# understand that this script will overwrite any setting you may    #
# have setup for services like DHCP, apache, pxe, tftp, and NFS.    #
#####
# It is not recommended that you install this on a production system #
#           as this script modifies many of your system settings.      #
#####
# This script should be run by the root user.                      #
#           It will prepend the running with sudo if root is not set  #
#####
#           Please see our wiki for more information at:             #
#           https://wiki.fogproject.org/wiki/index.php                 #
#####

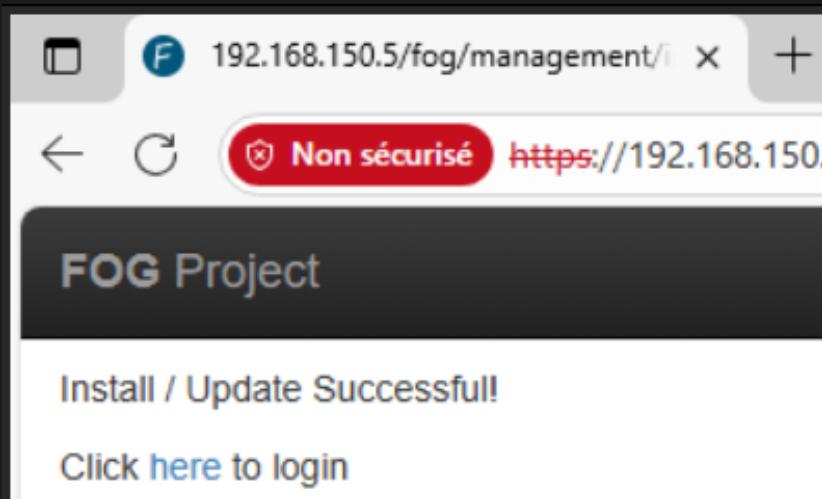
* Here are the settings FOG will use:
* Base Linux: Debian
* Detected Linux Distribution: Debian GNU/Linux
* Interface: ens19
* Server IP Address: 192.168.150.5
* Server Subnet Mask: 255.255.255.0
* Hostname: alexfog
* Installation Type: Normal Server
* Internationalization: Yes
* Image Storage Location: /images
* Using FOG DHCP: Yes
* DHCP router Address: 192.168.150.1
* Send OS Name, OS Version, and FOG Version: Yes

* Are you sure you wish to continue (Y/N) Y
```

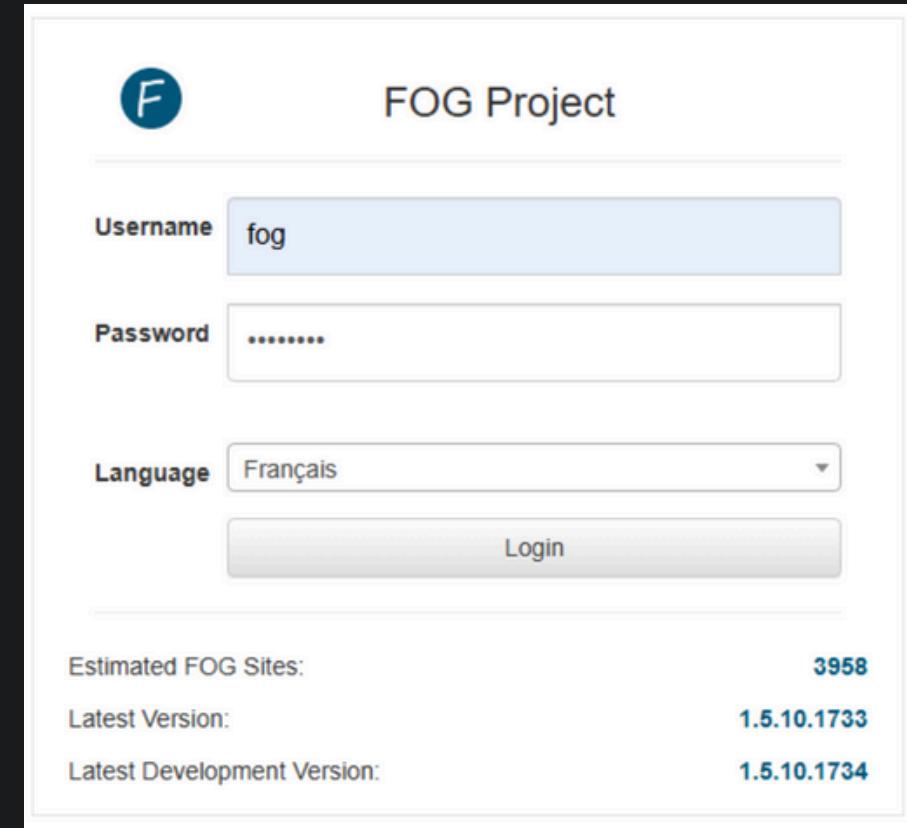


Une fois arrivé à cette étape, il faut aller sur l'interface web de FOG et installer la base de données.

2. INSTALLATION DE FOG



Une fois la base de données installée, nous pouvons cliquer sur here.



FOG Project

Username: fog

Password:

Language: Français

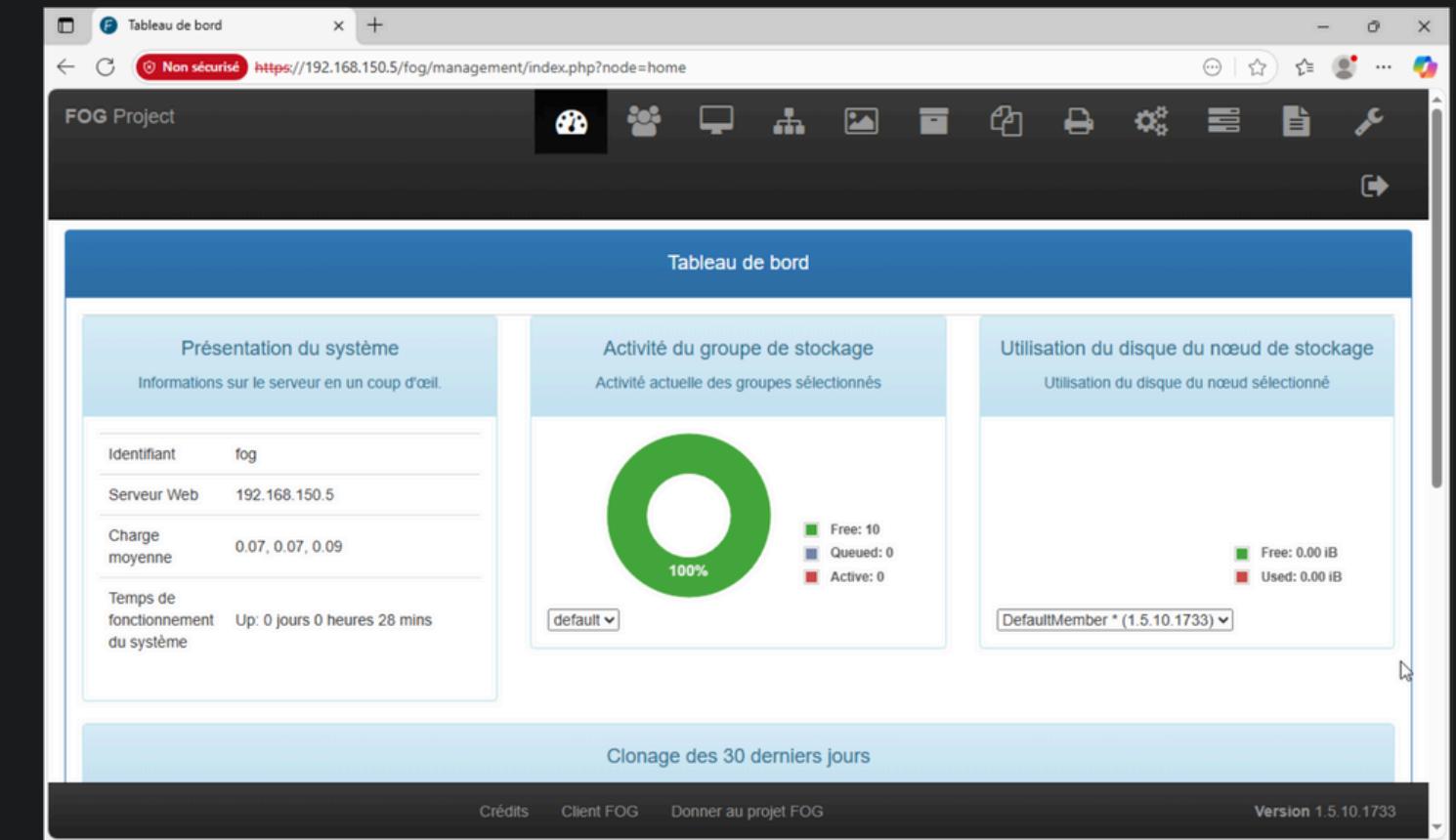
Login

Estimated FOG Sites: 3958

Latest Version: 1.5.10.1733

Latest Development Version: 1.5.10.1734

FOG va nous demander de saisir les identifiants pour se connecter.



Et nous arrivons sur le tableau de bord.

2. INSTALLATION DE FOG

```
* Testing and removing symbolic links if found.....OK
* Backing up old data.....OK
* Copying new files to web folder.....OK
* Creating the language binaries.....Done
* Creating config file.....OK
* Creating redirection index file.....OK
* Downloading kernel, init and fog-client binaries.....Done
* Copying binaries to destination paths.....OK
* Enabling apache and fpm services on boot.....OK
* Creating SSL CA.....OK
* Creating SSL Private Key.....OK
* Creating SSL Certificate.....OK
* Creating auth pub key and cert.....OK
* Resetting SSL Permissions.....OK
* Setting up Apache virtual host (SSL).....OK
* Starting and checking status of web services.....OK
* Changing permissions on apache log files.....OK
* Backing up database.....Done

* You still need to install/update your database schema.
* This can be done by opening a web browser and going to:
  https://192.168.150.5/fog/management

* Press [Enter] key when database is updated/installed..
```

```
* Setup complete

You can now login to the FOG Management Portal using
the information listed below. The login information
is only if this is the first install.

This can be done by opening a web browser and going to:
https://192.168.150.5/fog/management

Default User Information
Username: fog
Password: password

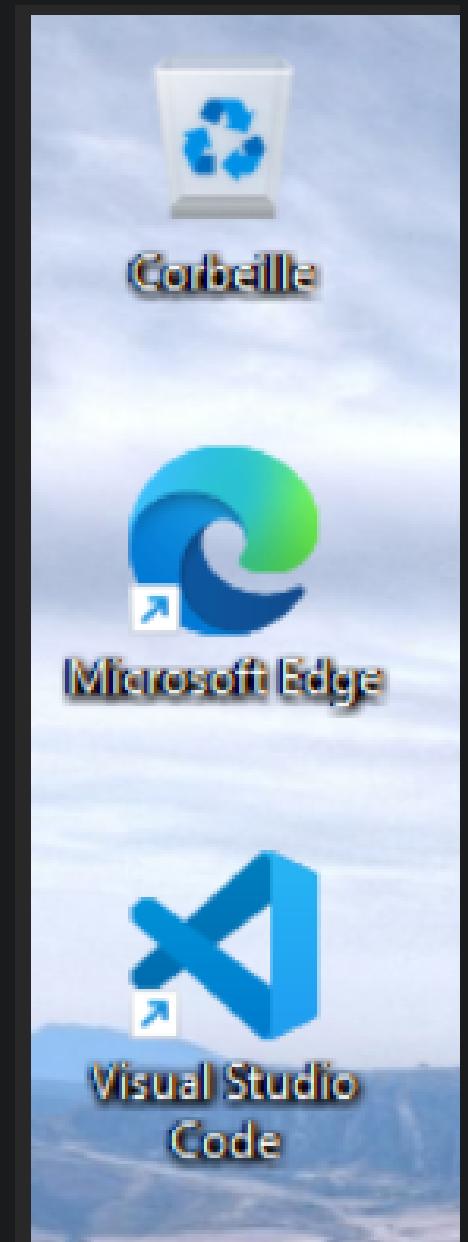
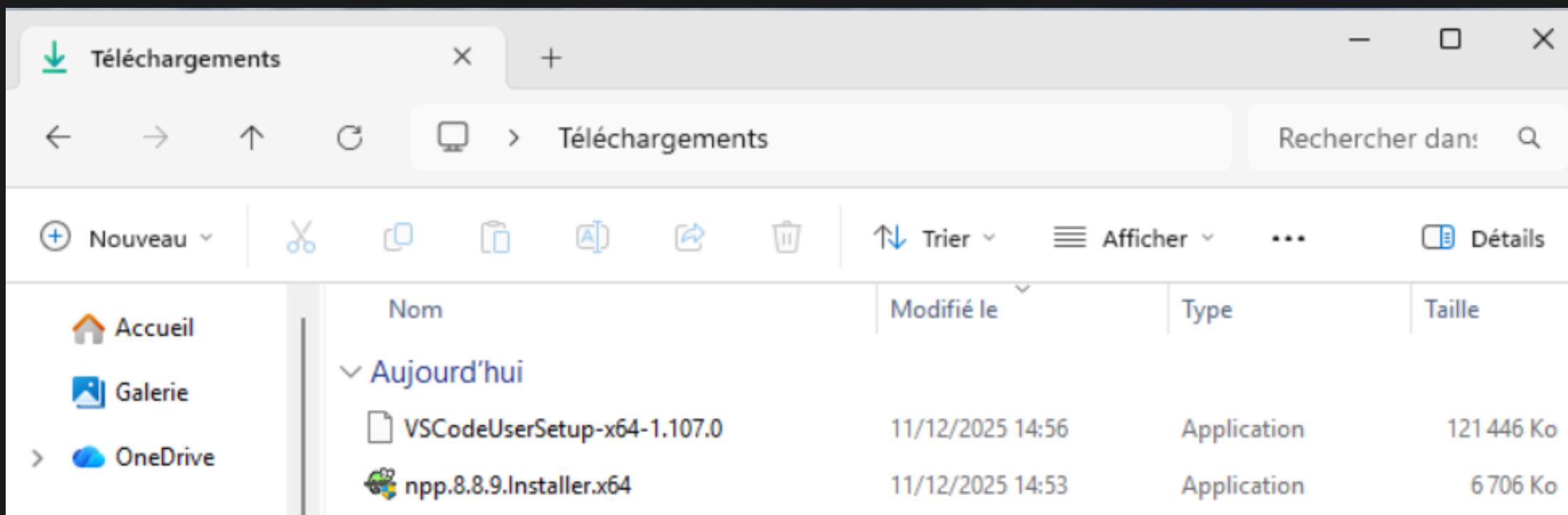
* Changed configurations:

The FOG installer changed configuration files and created the
following backup files from your original files:
* /etc/dhcp/dhcpd.conf <=> /etc/dhcp/dhcpd.conf.1765361073
* /etc/vsftpd.conf <=> /etc/vsftpd.conf.1765361073
* /etc/exports <=> /etc/exports.1765361073

root@debian:~/fogproject/bin#
root@debian:~/fogproject/bin#
```

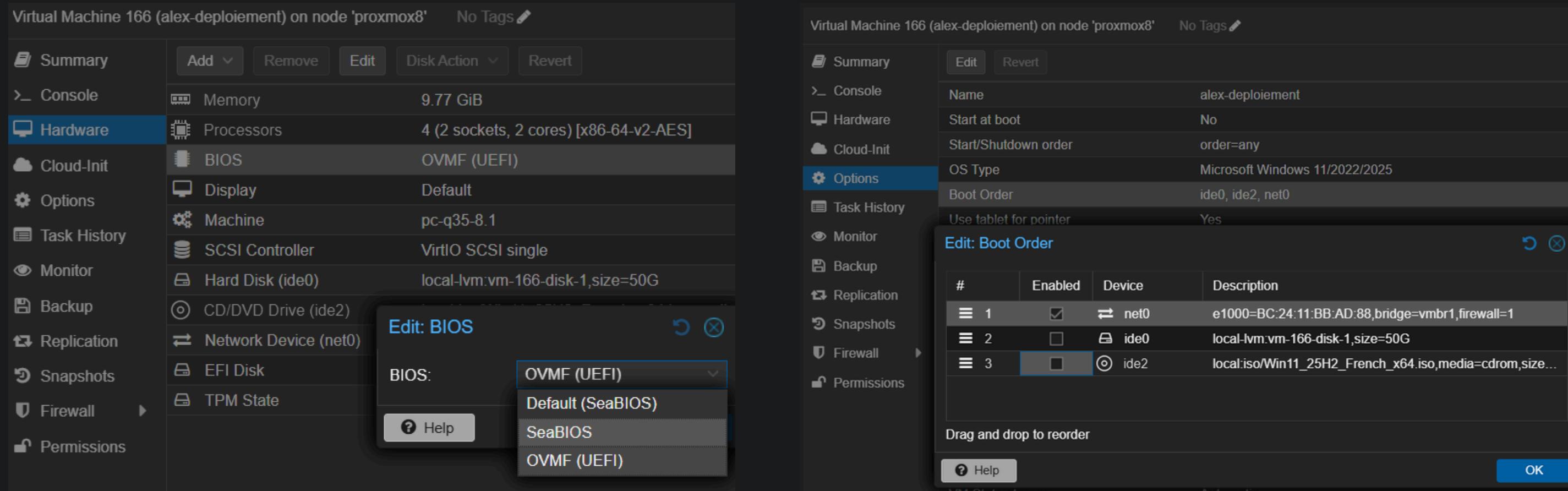
Puis, après avoir installé la base de données,
nous pouvons appuyer sur Entrée, et FOG est
désormais installé et opérationnel.

3. CONFIGURATION DE L'IMAGE



Sur la machine dont nous voulons capturer l'image, nous installons VS Code et Notepad++.

3. CONFIGURATION DE L'IMAGE



The screenshot shows two panels of the Proxmox VE web interface for a virtual machine named "alex-deploiement".

Left Panel (Hardware Configuration):

- Summary: Add, Remove, Edit, Disk Action, Revert.
- Console.
- Hardware:** Memory (9.77 GiB), Processors (4 cores), BIOS (OVMF (UEFI)), Display (Default), Machine (pc-q35-8.1), SCSI Controller (VirtIO SCSI single).
- Cloud-Init.
- Options.
- Task History.
- Monitor.
- Backup.
- Replication.
- Snapshots.
- Firewall.
- Permissions.

A modal window titled "Edit: BIOS" is open, showing the current BIOS setting as "OVMF (UEFI)" and a dropdown menu with options: OVMF (UEFI), Default (SeaBIOS), SeaBIOS, and OVMF (UEFI). The "OVMF (UEFI)" option is highlighted.

Right Panel (VM Options):

- Summary: Edit, Revert.
- Console.
- Hardware.
- Cloud-Init.
- Options:** Name (alex-deploiement), Start at boot (No), Start/Shutdown order (order=any), OS Type (Microsoft Windows 11/2022/2025), Boot Order (ide0, ide2, net0), Use tablet for pointer (Yes).
- Task History.
- Monitor.
- Backup.
- Replication.
- Snapshots.
- Firewall.
- Permissions.

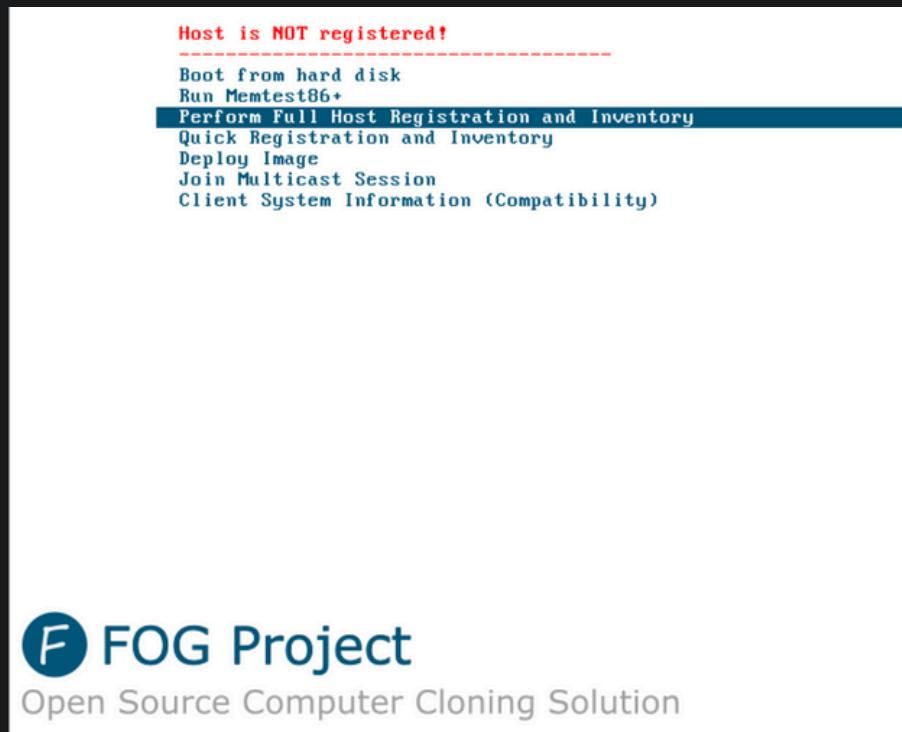
A modal window titled "Edit: Boot Order" is open, showing the current boot order:

#	Enabled	Device	Description
1	<input checked="" type="checkbox"/>	net0	e1000=BC:24:11:BB:AD:88,bridge=vmbr1,firewall=1
2	<input type="checkbox"/>	ide0	local-lvm:vm-166-disk-1,size=50G
3	<input type="checkbox"/>	ide2	local:iso/Win11_25H2_French_x64.iso,media=cdrom,size...

Instructions: Drag and drop to reorder. Buttons: Help, OK.

Ici, nous redémarrons la VM que nous voulons dupliquer en mettant le BIOS sur SeaBIOS et l'ordre de démarrage (boot order) sur la carte réseau.

3. CONFIGURATION DE L'IMAGE



**Une fois la machine démarée,
nous sélectionnons cette option**

```
Starting sshd: OK
* Running post init scripts.....Done
=====
==== Free Opensource Ghost ====
=====
===== Credits =====
= https://fogproject.org/Credits =
=====
== Released under GPL Version 3 ==
=====
Version: 1.5.10.1733
Init Version: 20251014
* Using disk device...../dev/sd
* Starting host registration
* Enter hostname for this computer: alexandreFOG
```

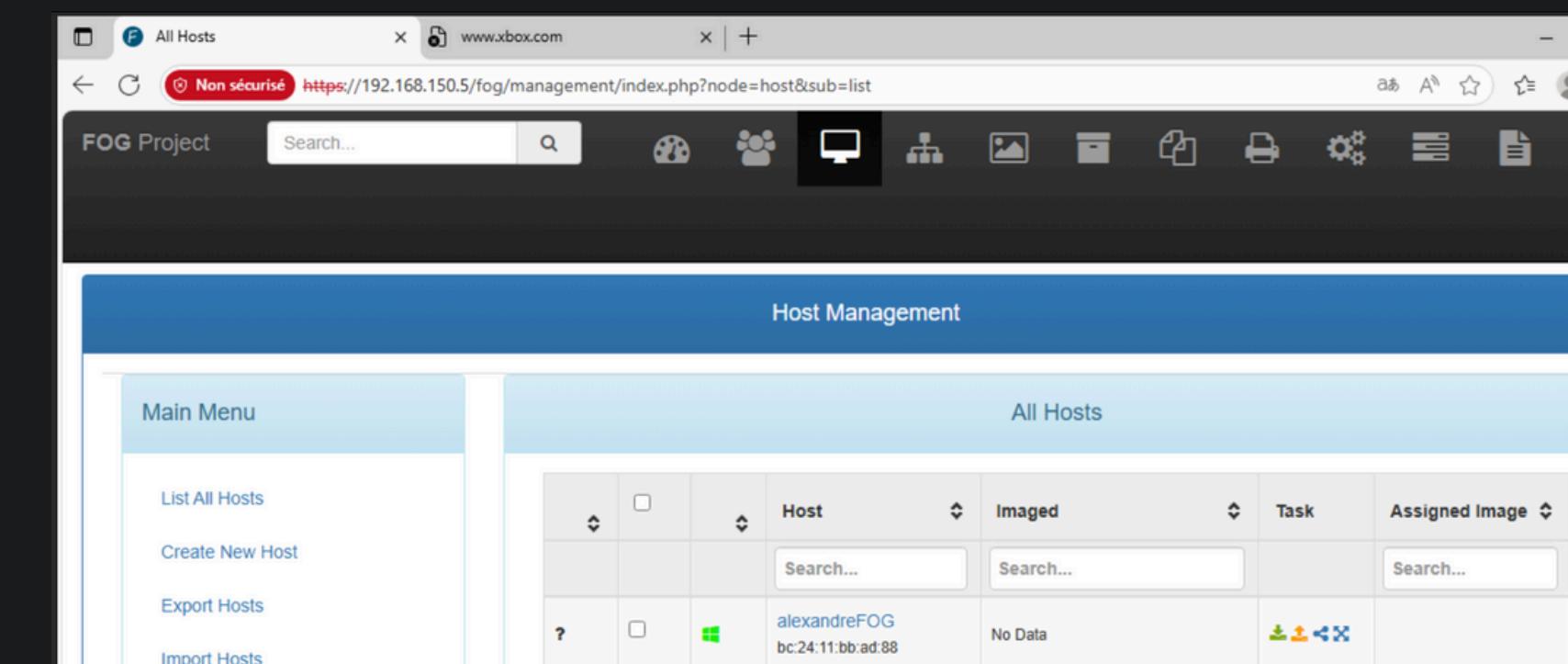
Puis nous saisissons le nom de la machine.

```
=====
== Released under GPL Version 3 ==
=====

Version: 1.5.10.1733
Init Version: 20251014
* Using disk device......./dev/sda
* Starting host registration
* Enter hostname for this computer: alexandreFOG
    Enter the image ID to associate with computer (? for listing):
    Would you like to associate this host with groups? (y/N)
    Would you like to associate this host with snapins? (y/N)
    Would you like to associate a product key to this host? (y/N)
    Would you like this host to join a domain, (using default settings)? (y/N)
* Enter the primary user for this computer:
* Enter the other tag #1 for this computer:
* Enter the other tag #2 for this computer:
* You entered all required information,
    Would you like to deploy image to this computer now? (y/N)
* Attempting to register host.....Done, without imaging!

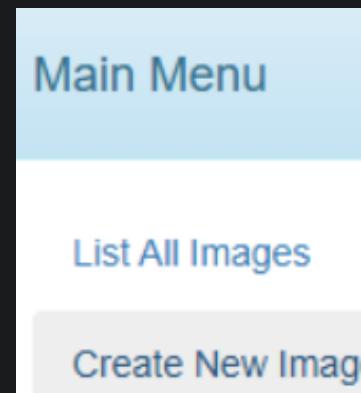
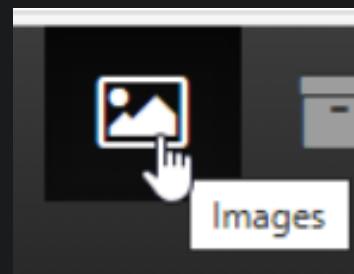
PCI (sysfs)
```

Nous répondons «Non» à tout.



Une fois de retour dans l'onglet Hôte, nous voyons l'hôte apparaître.

3. CONFIGURATION DE L'IMAGE



Nous créons ensuite une image.
Pour ce faire, nous devons aller
dans Images, puis créer une
nouvelle image.

Nous donnons un nom à notre
image et nous cliquons sur
Ajouter.

Image Management					
All Images					
	Image Name	Storage Group	Image Size:	ON CLIENT	Captured
	Search...	Search...	Search...	Search...	
	windows11 - 2	default	0.00 iB	Invalid date	
	Single Disk - Resizable ZSTD Compressed				

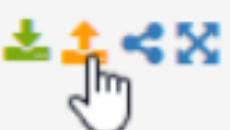
Nous voyons que l'image a bien
été ajoutée.

3. CONFIGURATION DE L'IMAGE

Host	Imaged
Search...	Search...
alexandreFOG	Edit alexandreFOG No Data

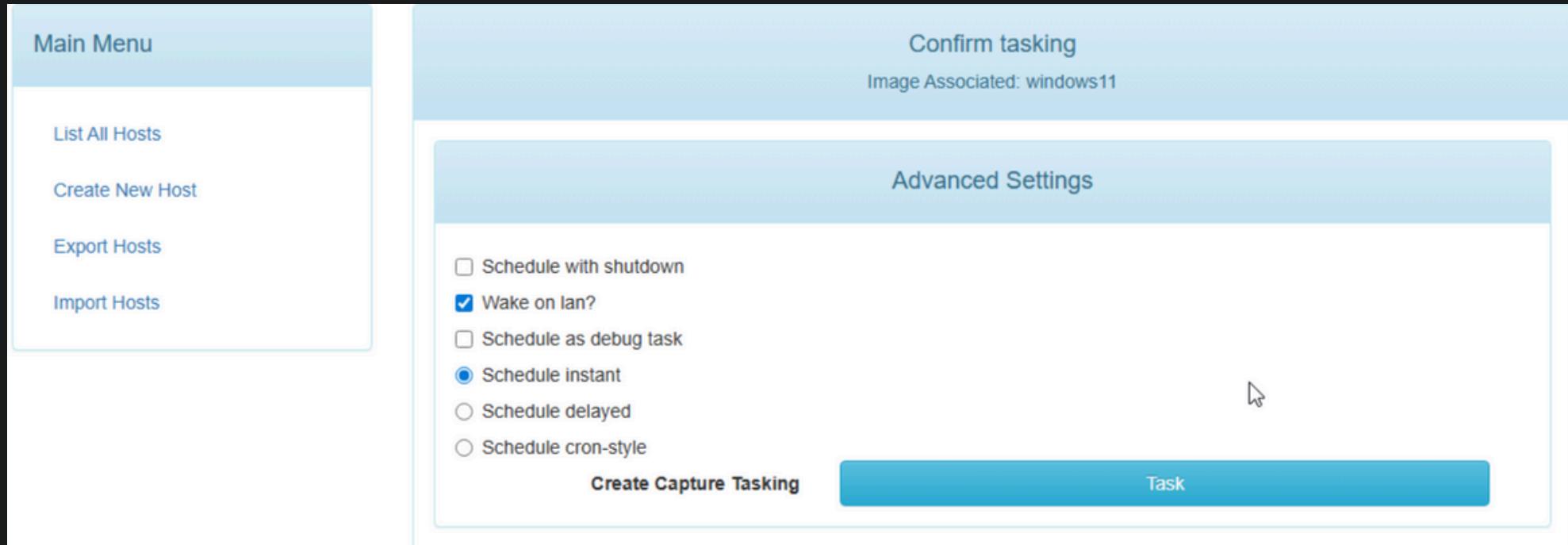
Host Product Key	<input type="text"/>
Host Image	<input type="text"/> windows11 - (2) 
Host Kernel	<input type="text"/>
Host Kernel Arguments	<input type="text"/>
Host Init	<input type="text"/>
Host Primary Disk	<input type="text"/>
Host Bios Exit Type	<input type="text"/> - Please Select an option -
Host EFI Exit Type	<input type="text"/> - Please Select an option -
Make Changes?	<input type="button" value="Update"/>

Nous allons maintenant associer l'image que nous voulons créer à la machine que nous voulons dupliquer.

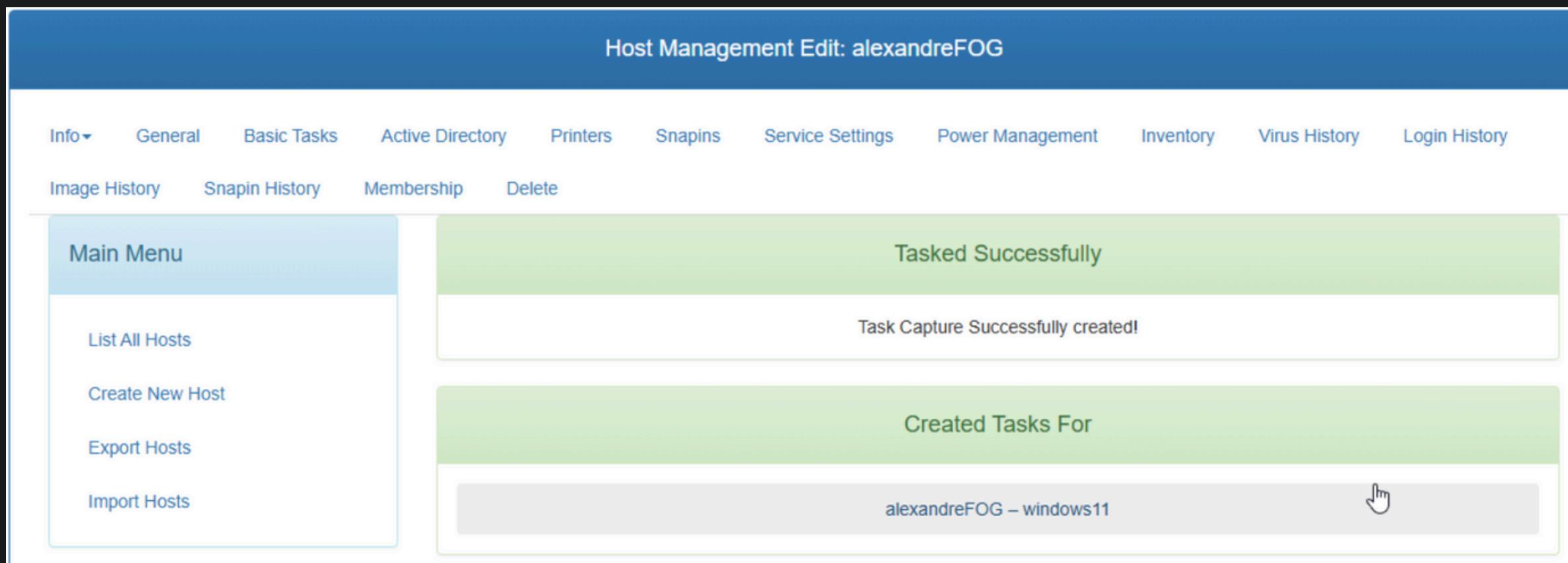
Host	Imaged	Task
Search...	Search...	
alexandreFOG bc:24:11:bb:ad:88	No Data	

Puis nous appuyons sur Capturer pour capturer l'image de la machine.

3. CONFIGURATION DE L'IMAGE



Ici, nous cliquons sur Task et redémarrons la machine.



Host Management Edit: alexandreFOG

Info General Basic Tasks Active Directory Printers Snapins Service Settings Power Management Inventory Virus History Login History

Image History Snapin History Membership Delete

Main Menu

List All Hosts Create New Host Export Hosts Import Hosts

Tasked Successfully

Task Capture Successfully created!

Created Tasks For

alexandreFOG – windows11

Nous pouvons voir que cela a réussi.

3. CONFIGURATION DE L'IMAGE

```
Partclone
Starting to clone device (/dev/sda3) to image (/tmp/pigz1)
note: Storage Location 192.168.150.5:/images/dev/, Image name windows11
Reading Super Block
Calculating bitmap... Please wait...
done!
File system: NTFS
Device size: 18.3 GB = 4463248 Blocks
Space in use: 17.5 GB = 4271116 Blocks
Free Space: 787.0 MB = 192132 Blocks
Block size: 4096 Byte
Elapsed: 00:00:31 Remaining: 00:02:57 Rate: 5.04GB/min
Current Block: 636362 Total Block: 4463248

Data Block Process:
[██████████] 14.87%
Total Block Process:
[██████████] 14.26%
```

```
File system: NTFS
Device size: 785.4 MB = 191743 Blocks
Space in use: 673.3 MB = 164371 Blocks
Free Space: 112.1 MB = 27372 Blocks
Block size: 4096 Byte
Syncing... OK!
Partclone successfully cloned the device (/dev/sda4) to the
image (/tmp/pigz1)

Total Time: 00:00:04 Remaining: 00:00:00
Ave. Rate: 10.10GB/min

Data Block Process:
[██████████] 100.00%
Total Block Process:
[██████████] 100.00%
```

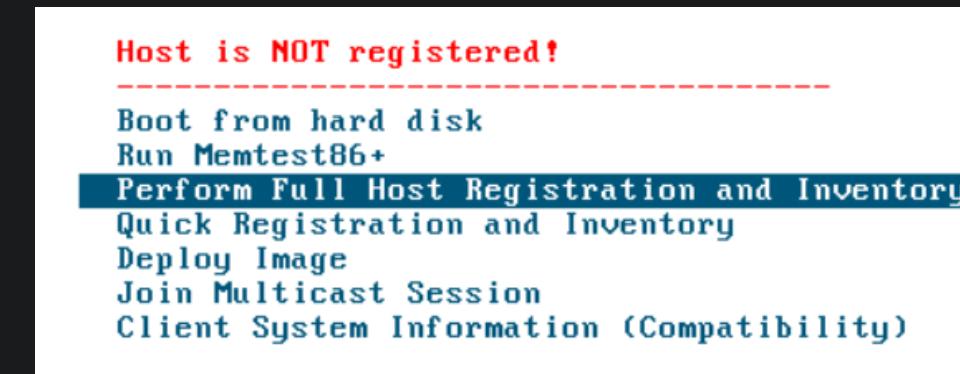
```
Cloned successfully.
* Image Captured
* Restoring Original Partition Layout.....Done
* Not expanding (/dev/sda1) fixed size
* Not expanding (/dev/sda2) fixed size
* Resizing ntfs volume (/dev/sda3).....
```

Puis nous redémarrons l'ordinateur et l'image
se capture.

4. DÉPLOIEMENT DE L'IMAGE SUR UNE MACHINE

 168 (vmtestdeploimentalex)

Pour déployer une machine,
nous créons une machine
vierge et nous la démarrons en
PXE.



Nous devons l'enregistrer dans
FOG.

```
Starting sshd: OK
* Running post init scripts.....Done
=====
==== Free Opensource Ghost ====
=====
===== Credits =====
= https://fogproject.org/Credits =
=====
== Released under GPL Version 3 ==
=====
Version: 1.5.10.1733
Init Version: 20251014
* Using disk device...../dev/sda
* Starting host registration
* Enter hostname for this computer: vmdep_
```

Et nous lui donnons un nom.

4. DÉPLOIEMENT DE L'IMAGE SUR UNE MACHINE

Gestion des machines

Menu principal

- Lister tous les Machines
- Créer un nouveau Machine
- Exporter les machines
- Importer les machines

Tout Machines

	<input type="checkbox"/>	Machine	Clonée	Tâche	Image assignée
?	<input type="checkbox"/>	alexandreFOG bc:24:11:66:86:ad	Pas de données		win11
?	<input type="checkbox"/>	vmdep bc:24:11:2a:ba:35	Pas de données		

Nous pouvons voir que la machine s'est bien enregistrée dans FOG.

?	<input type="checkbox"/>	!	vmdep bc:24:11:2a:ba:35	No Data		win11
---	--------------------------	---	----------------------------	---------	--	-------

Deploy

Puis, nous pouvons déployer.

Host Image

win11 - (4)

Nous modifions l'hôte en lui attribuant l'image que nous avons créée.

Confirm tasking
Image Associated: win11

Advanced Settings

Schedule with shutdown
 Wake on lan?
 Schedule as debug task
 Schedule instant
 Schedule delayed
 Schedule cron-style

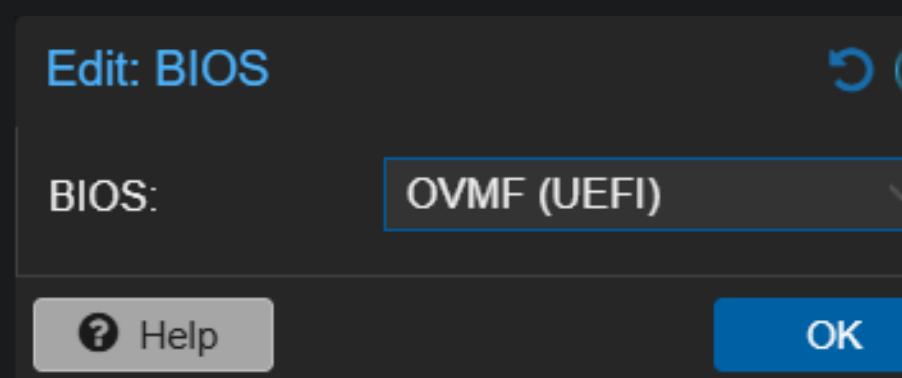
Create Deploy Tasking Task Activer Windows

Il faut cliquer sur Task.

4. DÉPLOIEMENT DE L'IMAGE SUR UNE MACHINE

```
Partclone  
n11  
Calculating bitmap... Please wait...  
done!  
File system: FAT32  
Device size: 209.7 MB = 409600 Blocks  
Space in use: 39.6 MB = 77420 Blocks  
Free Space: 170.1 MB = 332180 Blocks  
Block size: 512 Byte  
Syncing... OK!  
Partclone successfully restored the image (-) to the device  
(/dev/sda1)  
  
Total Time: 00:00:01 Remaining: 00:00:00  
Ave. Rate: 2.38GB/min  
  
Data Block Process: ██████████ 100.00%  
  
Total Block Process: ██████████ 100.00%
```

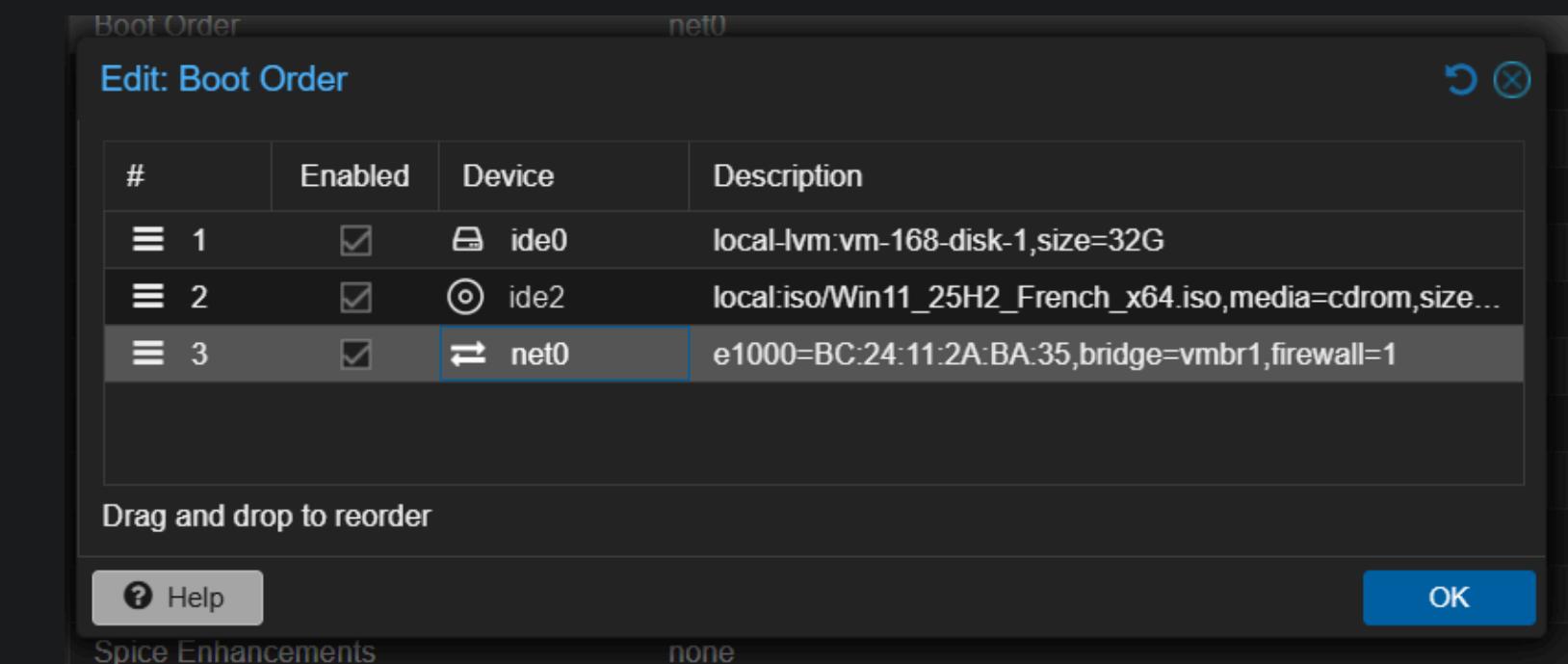
Nous redémarrons la machine après cela.



Nous redémarrons le PC normalement en UEFI.

```
Host is registered as vmdep!  
-----  
Boot from hard disk  
Run Memtest86+  
Update Product Key  
Deploy Image  
Join Multicast Session  
Quick Host Deletion  
Client System Information (Compatibility)
```

Ici, la machine nous indique qu'elle est bien enregistrée.

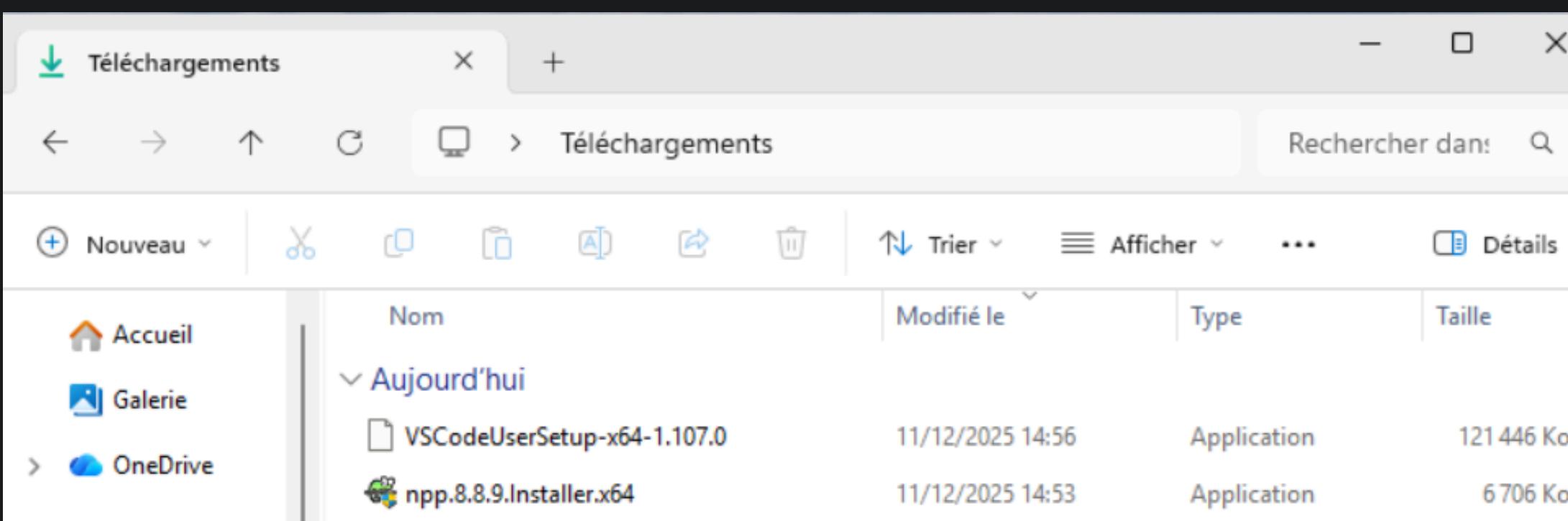


Et nous réglons l'ordre de démarrage (boot order) sur le disque de la machine.

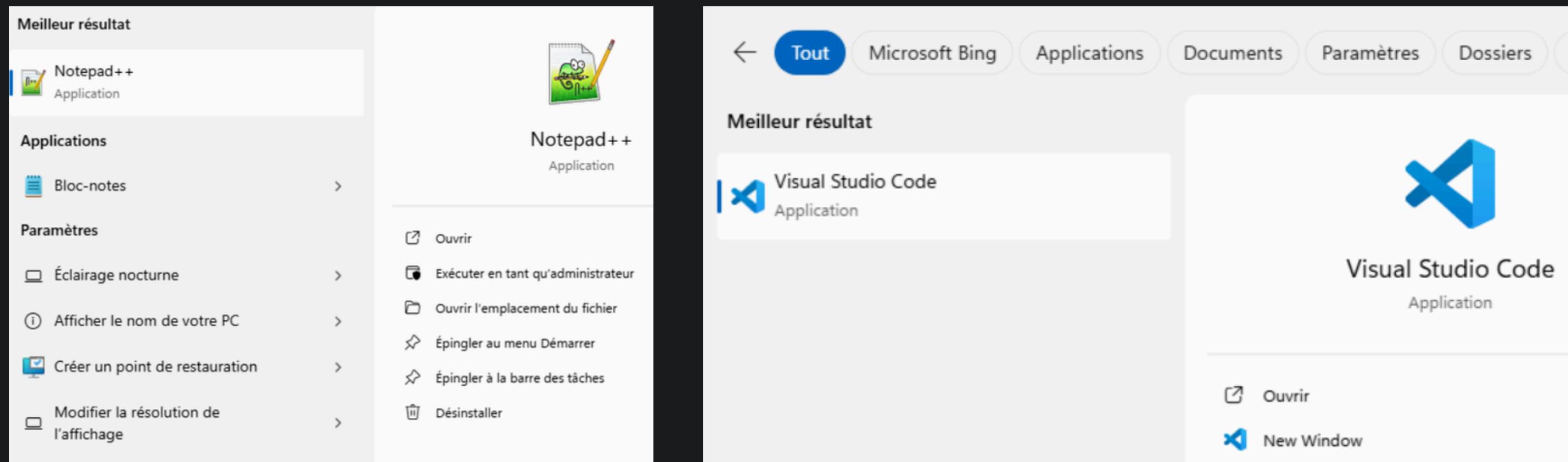
4. DÉPLOIEMENT DE L'IMAGE SUR UNE MACHINE



Une fois la machine redémarrée,
nous retrouvons bien les
applications installées sur la
machine de départ.



4. DÉPLOIEMENT DE L'IMAGE SUR UNE MACHINE



5. QUESTIONS

Quels sont les avantages et inconvénients de WDS et FOG ?

	Avantages	Inconvénients
WDS	Intégré à Windows Server Très bien avec Active Directory	Limité aux OS Windows Dépendance forte au domaine AD
FOG	Open-source et gratuit Multi-OS (Windows, Linux) Indépendant d'Active Directory	Interface et configuration un peu plus techniques Support communautaire uniquement

5. QUESTIONS

Quelle solution est la plus simple à installer ? La plus complète ?

De mon point de vue, FOG a été plus simple à installer et à mettre en place que WDS.

WDS est-il utilisable en dehors d'un domaine Active Directory ?

Oui mais les fonctionnalités seront très limitées.

Dans quel type d'organisation FOG serait préférable à WDS ?

- PME
- Établissements scolaires
- Parcs informatiques hétérogènes
- Environnements sans AD ou avec plusieurs OS

5. QUESTIONS

Comment automatiser davantage la personnalisation des postes après déploiement ?

1. Scripts automatiques

- Scripts PowerShell (Windows) ou Bash (Linux)
- Permettent de :
 - Installer des logiciels
 - Créer des utilisateurs
 - Configurer le réseau
 - Modifier des paramètres système
- Ils peuvent se lancer au premier démarrage du poste.

2. Fichiers de réponses (unattend.xml)

- Utilisés surtout avec WDS
- Automatisent :
 - Le nom du PC
 - La langue
 - Le fuseau horaire
 - L'adhésion au domaine
- Évite toute intervention pendant l'installation.

3. Stratégies de groupe (GPO)

- Spécifiques aux environnements Active Directory
- Appliquent automatiquement :
 - Paramètres de sécurité
 - Mappage de lecteurs réseau
 - Installation de logiciels
- Les postes sont configurés dès leur intégration au domaine.

4. Snapins avec FOG

- Modules qui s'exécutent après le déploiement
- Servent à :
 - Installer des applications
 - Lancer des scripts
 - Configurer les postes selon leur rôle
- Très pratique pour différencier les machines (salle info, admin, profs...).

5. Outils de gestion centralisée

- Exemples : SCCM, Intune, Ansible
- Permettent une automatisation avancée :
 - Gestion des mises à jour
 - Déploiement logiciel continu
 - Suivi et maintenance à distance