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# web-01

## Machine virtuelle

- Partie matérielle (virtuelle) KVM/QEMU
  - 8 cœurs virtuels
  - 16 Go de mémoire RAM
  - 1 disque virtuel de 50 Go
  - Accès au 1 Gbit/s
- Partie logicielle
  - Système d'exploitation : [Debian](#) stable
  - Technologies de virtualisation : KVM, QEMU, libvirt
  - Stockage des données : [ZFS](#)
  - 1 IPv4 : 159.69.59.13/32, via des NAT sur hypervisor-01 vers les services exposés (web, mail, ports spéciaux, etc.)
  - 1 IPv6 : 2a01:4f8:231:aa6::5/64

## Topologie

Cette VM héberge tous les frontaux et applications web de Liberta. Historiquement, des services imposants comme Peertube ou Funkwhale disposaient de leur propre VM dédiée mais à l'usage cela s'est avéré être un gaspillage de ressources.

Ce serveur héberge donc les services :

- Castopod
- CryptPad
- Etherpad-Lite
- Funkwhale
- Nextcloud
- Peertube
- WriteFreely

## Configuration

### Système d'exploitation

- Debian stable (Debian 12 « Bookworm »)

### Adressage IP

La route vers 10.10.10.0/24 via l'hyperviseur permet l'accès (par VPN) au réseau d'administration des VM.

```
# cat /etc/network/interfaces
# This file describes the network interfaces available on your system
# and how to activate them. For more information, see interfaces(5).

source /etc/network/interfaces.d/*

# The loopback network interface
auto lo
iface lo inet loopback

# The primary network interface
allow-hotplug enp1s0
iface enp1s0 inet static
    address 192.168.10.5/24
    gateway 192.168.10.1
    dns-nameservers 213.133.99.99 213.133.100.100 213.133.98.98
    dns-search liberta.vip
    up ip route add 10.10.10.0/24 via 192.168.10.1 dev enp1s0

iface enp1s0 inet6 static
    address 2a01:4f8:231:aa6::5
    netmask 120
    gateway 2a01:4f8:231:aa6::1
```

## Paramètres réseau et swap dans sysctl

Dans `/etc/sysctl.d/99-sysctl.conf` nous avons passé la « swappiness » à 0. La mémoire doit être donc complètement saturée avant de commencer à « swapper » sur le disque dur (pratique d'ailleurs sujet à débats dont nous avons conscience). Nous avons également activé le paramètre `d'overcommit` à 1 pour éviter que Nextcloud ne se prenne les foudres du « Out of Memory Killer » de Linux:

```
# Cloud :
vm.overcommit_memory = 1
# swap à 0% de ram libre :
vm.swappiness=0
```

## Routage et filtrage avec iptables

Le paquet `iptables-persistent` doit avoir été installé pour conserver les modifications du pare-feu entre chaque redémarrage.

Il est bien sûr extrêmement important de sécuriser SSH : interdire le login root avec mot de passe, utiliser de bons algorithmes de chiffrement, changer le port, n'autoriser qu'une IP distante (ou mieux, ne rien autoriser depuis internet et utiliser un VPN) et mettre en place un faux serveur SSH pour que les attaquants perdent leur temps à essayer de se connecter, sans vous faire perdre le vôtre (et

ajouter un Fail2Ban évidemment). La recette reste secrète, désolé !



Cela dit, pour information une configuration similaire à la suivante est en place :

```
# /etc/ssh/sshd_config.d/liberta.conf

# Common parameters:
Port <un_port>
Port <un_autre_port>
AcceptEnv LANG LC_*
ChallengeResponseAuthentication no
KbdInteractiveAuthentication no
PrintMotd no
PasswordAuthentication no
Subsystem sftp /usr/lib/openssh/sftp-server
UsePAM yes
X11Forwarding no

# Port <un_port> configuration for IPv4/IPv6:
Match
Address="<adresse_ipv4_de_confiance>,127.0.0.0/8,<adresse_ipv6_de_confiance>
,fd00::/8" LocalPort=<un_port>
    AllowUsers root <utilisateurice_de_confiance>

# Port <un_autre_port> configuration for IPv4/IPv6:
Match LocalPort=<un_autre_port>
    AllowUsers <utilisateurice_de_confiance>
```

Pour IPv4, l'hyperviseur s'occupe déjà de tout router et rediriger, nous n'avons besoin d'aucune règle.

En revanche, nous disposons d'une IPv6 routable et exposée sur internet ! Nous devons donc avoir des règles de pare-feu actives. Dans /etc/iptables-persistent/rules.v6 :

```
*filter
:INPUT ACCEPT [0:0]
:FORWARD ACCEPT [0:0]
:OUTPUT ACCEPT [0:0]
-A INPUT -m conntrack --ctstate RELATED,ESTABLISHED -m comment --comment
"Accepter le trafic basique : ICMP, boucle locale et connexions établies, en
entrée" -j ACCEPT
-A INPUT -i lo -m comment --comment "Accepter le trafic basique : ICMP,
boucle locale et connexions établies, en entrée" -j ACCEPT
-A INPUT -d ::1/128 ! -i lo -m comment --comment "Accepter le trafic basique
: ICMP, boucle locale et connexions établies, en entrée" -j REJECT --reject-
with icmp6-port-unreachable
-A INPUT -s 2a01:4f8:231:aa6::/120 -p tcp -m tcp --dport 22 --tcp-flags
FIN,SYN,RST,ACK SYN -m conntrack --ctstate NEW -m comment --comment
"Accepter le SSH depuis les autres VM" -j ACCEPT
-A INPUT -p tcp -m tcp --dport 1984 --tcp-flags FIN,SYN,RST,ACK SYN -m
conntrack --ctstate NEW -m comment --comment "Accepter le SSH" -j ACCEPT
-A INPUT -s 2a01:4f8:231:aa6::/120 -p udp -m udp -m multiport --dports 53 -m
comment --comment "Accepter les requêtes DNS (port 53) depuis les VM" -j
ACCEPT
```

```
-A INPUT -s 2a01:4f8:231:aa6::/120 -p udp -m udp -m multiport --dports 53 -m comment --comment "Accepter les requêtes DNS (port 53) depuis les VM" -j ACCEPT
-A INPUT -s 2a01:4f8:231:aa6::/120 -p tcp -m tcp -m multiport --dports 53 -m comment --comment "Accepter les requêtes DNS (port 53) depuis les VM" -j ACCEPT
-A INPUT -s 2a01:4f8:231:aa6::/120 -p tcp -m multiport --dports 2049 -m comment --comment "Bloquer les requêtes rpcbind/portmap en entrée depuis l\'extérieur" -j ACCEPT
-A INPUT -s 2a01:4f8:231:aa6::/120 -p tcp -m multiport --dports 111 -m comment --comment "Bloquer les requêtes rpcbind/portmap en entrée depuis l\'extérieur" -j ACCEPT
-A INPUT -s ::1/128 -p tcp -m tcp --dport 111 -m comment --comment "Bloquer les requêtes rpcbind/portmap en entrée depuis l\'extérieur" -j ACCEPT
-A INPUT -s ::1/128 -p tcp -m tcp --dport 111 -m comment --comment "Bloquer les requêtes rpcbind/portmap en entrée depuis l\'extérieur" -j DROP
-A INPUT -s 2a01:4f8:231:aa6::/120 -p tcp -m tcp -m multiport --dports 10050 -m comment --comment "Accepter les requêtes Zabbix passives (port 10050) depuis les VM" -j ACCEPT
-A INPUT -p ipv6-icmp -m icmp6 --icmpv6-type 4 -m comment --comment "On accepte l\'ICMPv6 indispensable au fonctionnement d\'IPv6" -j ACCEPT
-A INPUT -p ipv6-icmp -m icmp6 --icmpv6-type 128 -m comment --comment "On accepte l\'ICMPv6 indispensable au fonctionnement d\'IPv6" -j ACCEPT
-A INPUT -p ipv6-icmp -m icmp6 --icmpv6-type 129 -m comment --comment "On accepte l\'ICMPv6 indispensable au fonctionnement d\'IPv6" -j ACCEPT
-A INPUT -p ipv6-icmp -m icmp6 --icmpv6-type 134 -m hl --hl-eq 255 -m comment --comment "On accepte l\'ICMPv6 indispensable au fonctionnement d\'IPv6" -j ACCEPT
-A INPUT -p ipv6-icmp -m icmp6 --icmpv6-type 133 -m hl --hl-eq 255 -m comment --comment "On accepte l\'ICMPv6 indispensable au fonctionnement d\'IPv6" -j ACCEPT
-A INPUT -p ipv6-icmp -m icmp6 --icmpv6-type 136 -m hl --hl-eq 255 -m comment --comment "On accepte l\'ICMPv6 indispensable au fonctionnement d\'IPv6" -j ACCEPT
-A INPUT -p ipv6-icmp -m icmp6 --icmpv6-type 135 -m hl --hl-eq 255 -m comment --comment "On accepte l\'ICMPv6 indispensable au fonctionnement d\'IPv6" -j ACCEPT
-A INPUT -p ipv6-icmp -m icmp6 --icmpv6-type 128 -m conntrack --ctstate NEW -m limit --limit 1/sec --limit-burst 1 -m comment --comment "On refuse les trop nombreux ping" -j ACCEPT
-A INPUT -p tcp -m tcp --tcp-flags FIN,SYN,RST,ACK SYN -m conntrack --ctstate NEW -m multiport --dports 80,443 -m comment --comment "Accepter le Web" -j ACCEPT
-A INPUT -p tcp -m tcp --tcp-flags FIN,SYN,RST,ACK SYN -m conntrack --ctstate NEW -m multiport --dports 1935 -m comment --comment "Accepter les ports pour Peertube" -j ACCEPT
-A INPUT -p ipv6-icmp -m icmp6 --icmpv6-type 128 -m comment --comment "On refuse les trop nombreux ping" -j DROP
-A INPUT -m conntrack --ctstate INVALID -m comment --comment "On refuse tout le reste en entrée" -j DROP
-A INPUT -m comment --comment "On refuse tout le reste en entrée" -j REJECT
```

```
--reject-with icmp6-port-unreachable
-A INPUT -s 2620:0:1c00::/40 -m comment --comment
"Meta/Facebook/Instagram/Threads Adios!" -j DROP
-A INPUT -s 2620:10d:c090::/44 -m comment --comment
"Meta/Facebook/Instagram/Threads Adios!" -j DROP
-A INPUT -s 2a03:2880::/32 -m comment --comment
"Meta/Facebook/Instagram/Threads Adios!" -j DROP
-A INPUT -s 2a03:2887:ff02::/47 -m comment --comment
"Meta/Facebook/Instagram/Threads Adios!" -j DROP
-A INPUT -s 2a03:2887:ff19::/48 -m comment --comment
"Meta/Facebook/Instagram/Threads Adios!" -j DROP
-A INPUT -s 2a03:2887:ff1b::/48 -m comment --comment
"Meta/Facebook/Instagram/Threads Adios!" -j DROP
-A INPUT -s 2a03:2887:ff1c::/46 -m comment --comment
"Meta/Facebook/Instagram/Threads Adios!" -j DROP
-A INPUT -s 2a03:2887:ff23::/48 -m comment --comment
"Meta/Facebook/Instagram/Threads Adios!" -j DROP
-A INPUT -s 2a03:2887:ff25::/48 -m comment --comment
"Meta/Facebook/Instagram/Threads Adios!" -j DROP
-A INPUT -s 2a03:2887:ff27::/48 -m comment --comment
"Meta/Facebook/Instagram/Threads Adios!" -j DROP
-A INPUT -s 2a03:2887:ff28::/46 -m comment --comment
"Meta/Facebook/Instagram/Threads Adios!" -j DROP
-A INPUT -s 2a03:2887:ff2f::/48 -m comment --comment
"Meta/Facebook/Instagram/Threads Adios!" -j DROP
-A INPUT -s 2a03:2887:ff30::/48 -m comment --comment
"Meta/Facebook/Instagram/Threads Adios!" -j DROP
-A INPUT -s 2a03:2887:ff35::/48 -m comment --comment
"Meta/Facebook/Instagram/Threads Adios!" -j DROP
-A INPUT -s 2a03:2887:ff37::/48 -m comment --comment
"Meta/Facebook/Instagram/Threads Adios!" -j DROP
-A INPUT -s 2a03:2887:ff38::/46 -m comment --comment
"Meta/Facebook/Instagram/Threads Adios!" -j DROP
-A INPUT -s 2a03:2887:ff3f::/48 -m comment --comment
"Meta/Facebook/Instagram/Threads Adios!" -j DROP
-A INPUT -s 2a03:2887:ff40::/48 -m comment --comment
"Meta/Facebook/Instagram/Threads Adios!" -j DROP
-A INPUT -s 2a03:2887:ff43::/48 -m comment --comment
"Meta/Facebook/Instagram/Threads Adios!" -j DROP
-A INPUT -s 2a03:2887:ff44::/47 -m comment --comment
"Meta/Facebook/Instagram/Threads Adios!" -j DROP
-A INPUT -s 2a03:2887:ff48::/46 -m comment --comment
"Meta/Facebook/Instagram/Threads Adios!" -j DROP
-A INPUT -s 2a03:2887:ff4d::/48 -m comment --comment
"Meta/Facebook/Instagram/Threads Adios!" -j DROP
-A INPUT -s 2a03:2887:ff4e::/47 -m comment --comment
"Meta/Facebook/Instagram/Threads Adios!" -j DROP
-A INPUT -s 2a03:2887:ff50::/47 -m comment --comment
"Meta/Facebook/Instagram/Threads Adios!" -j DROP
-A INPUT -s 2a03:2887:ff52::/48 -m comment --comment
"Meta/Facebook/Instagram/Threads Adios!" -j DROP
```

```
-A INPUT -s 2a03:2887:ff58::/47 -m comment --comment
"Meta/Facebook/Instagram/Threads Adios!" -j DROP
-A INPUT -s 2c0f:ef78:3::/48 -m comment --comment
"Meta/Facebook/Instagram/Threads Adios!" -j DROP
-A INPUT -s 2c0f:ef78:5::/48 -m comment --comment
"Meta/Facebook/Instagram/Threads Adios!" -j DROP
-A INPUT -s 2c0f:ef78:6::/48 -m comment --comment
"Meta/Facebook/Instagram/Threads Adios!" -j DROP
-A INPUT -s 2c0f:ef78:9::/48 -m comment --comment
"Meta/Facebook/Instagram/Threads Adios!" -j DROP
-A INPUT -s 2c0f:ef78:d::/48 -m comment --comment
"Meta/Facebook/Instagram/Threads Adios!" -j DROP
-A INPUT -s 2c0f:ef78:e::/47 -m comment --comment
"Meta/Facebook/Instagram/Threads Adios!" -j DROP
-A INPUT -s 2c0f:ef78:11::/48 -m comment --comment
"Meta/Facebook/Instagram/Threads Adios!" -j DROP
-A INPUT -s 2c0f:ef78:12::/48 -m comment --comment
"Meta/Facebook/Instagram/Threads Adios!" -j DROP
COMMIT
```

## Paquets installés

Nous utilisons certains dépôts tiers : Node.js, Yarn, PHP (afin d'utiliser les plus récentes, actuellement la version 8.4) et les paquets de PostgreSQL :

```
deb [arch=amd64 signed-by=/usr/share/keyrings/nodesource.gpg]
https://deb.nodesource.com/node_22.x nodistro main
```

```
deb http://apt.postgresql.org/pub/repos/apt bookworm-pgdg main
```

```
deb [signed-by=/usr/share/keyrings/yarn-archive-keyring.gpg]
https://dl.yarnpkg.com/debian/ stable main
```

```
deb [signed-by=/usr/share/keyrings/debsuryorg-archive-keyring.gpg]
https://packages.sury.org/php/ bookworm main
```

La liste des paquets :

```
# dpkg -l | grep '^i' |awk '{ print $2 }' | sed '/^$/d'| sort
acl
adduser
alsa-topology-conf
alsa-ucm-conf
apparmor
appstream
apt
apt-listchanges
apt-transport-https
apt-utils
```

aspell  
aspell-fr  
base-files  
base-passwd  
bash  
bash-completion  
bind9-dnsutils  
bind9-host  
bind9-libs:amd64  
binutils  
binutils-common:amd64  
binutils-x86-64-linux-gnu  
bsdextrautils  
bsdutils  
build-essential  
busybox  
bzip2  
ca-certificates  
certbot  
cloud-guest-utils  
composer  
console-setup  
console-setup-linux  
coreutils  
cpio  
cpp  
cpp-12  
cron  
cron-daemon-common  
curl  
dash  
dbus  
dbus-bin  
dbus-daemon  
dbus-session-bus-common  
dbus-system-bus-common  
dbus-user-session  
debconf  
debconf-i18n  
debian-archive-keyring  
debian-faq  
debianutils  
debsuryorg-archive-keyring  
dictionaries-common  
diffutils  
dirmngr  
discover  
discover-data  
distro-info-data  
dmidecode  
dmsetup

dnsutils  
doc-debian  
dpkg  
dpkg-dev  
e2fsprogs  
eject  
emacsen-common  
ethtool  
exiftags  
exiftran  
exuberant-ctags  
fail2ban  
fakeroot  
fdisk  
ffmpeg  
file  
findutils  
firmware-linux-free  
fontconfig  
fontconfig-config  
fonts-dejavu-core  
fonts-droid-fallback  
fonts-noto-mono  
fonts-urw-base35  
fuse  
g++  
g++-12  
gcc  
gcc-12  
gcc-12-base:amd64  
gdbm-l10n  
gdisk  
geoip-database  
gettext  
gettext-base  
ghostscript  
gifsicle  
gir1.2-glib-2.0:amd64  
gir1.2-packagekitglib-1.0  
git  
git-man  
gnupg  
gnupg-l10n  
gnupg-utils  
gnupg2  
gpg  
gpg-agent  
gpg-wks-client  
gpg-wks-server  
gpgconf  
pgpasm

```
gpgv
grep
groff-base
grub-common
grub-pc
grub-pc-bin
grub2-common
gsfonts
gzip
hdparm
hicolor-icon-theme
hostname
htop
i965-va-driver:amd64
icu-devtools
ifrench-gut
iftop
ifupdown
imagemagick
imagemagick-6-common
imagemagick-6.q16
inetutils-telnet
init
init-system-helpers
initramfs-tools
initramfs-tools-core
installation-report
intel-media-va-driver:amd64
iotop
iproute2
iptables
iptables-persistent
iputils-ping
isc-dhcp-client
isc-dhcp-common
iso-codes
ispell
javascript-common
jpegoptim
jq
jsonlint
kbd
keyboard-configuration
keyutils
klibc-utils
kmod
krb5-locales
laptop-detect
less
lib32gcc-s1
lib32stdc++6
```

libaacs0:amd64  
libabsl20220623:amd64  
libacl1:amd64  
libalgorithm-diff-perl  
libalgorithm-diff-xs-perl:amd64  
libalgorithm-merge-perl  
libaom3:amd64  
libapparmor1:amd64  
libappstream4:amd64  
libapt-inst2.0:amd64  
libapt-pkg5.0:amd64  
libapt-pkg6.0:amd64  
libarchive-zip-perl  
libarchive13:amd64  
libargon2-1:amd64  
libasan8:amd64  
libasound2-data  
libasound2:amd64  
libaspell15:amd64  
libass9:amd64  
libassuan0:amd64  
libasyncns0:amd64  
libatomic1:amd64  
libattr1:amd64  
libaudit-common  
libaudit1:amd64  
libavahi-client3:amd64  
libavahi-common-data:amd64  
libavahi-common3:amd64  
libavc1394-0:amd64  
libavcodec59:amd64  
libavdevice59:amd64  
libavfilter8:amd64  
libavformat59:amd64  
libavif15:amd64  
libavutil57:amd64  
libbdplus0:amd64  
libbinutils:amd64  
libblas3:amd64  
libblkid1:amd64  
libbluray2:amd64  
libbpf1:amd64  
libbrotli1:amd64  
libbs2b0:amd64  
libbsd0:amd64  
libbz2-1.0:amd64  
libc-bin  
libc-dev-bin  
libc-devtools  
libc-l10n  
libc6-dev:amd64

libc6-i386  
libc6:amd64  
libcaca0:amd64  
libcairo-gobject2:amd64  
libcairo2:amd64  
libcap-ng0:amd64  
libcap2-bin  
libcap2:amd64  
libcbor0.8:amd64  
libcc1-0:amd64  
libcdio-cdda2:amd64  
libcdio-paranoia2:amd64  
libcdio19:amd64  
libchromaprint1:amd64  
libcjson1:amd64  
libclang-14-dev  
libclang-common-14-dev  
libclang-dev  
libclang-rt-14-dev:amd64  
libclang1-14  
libcodec2-1.0:amd64  
libcom-err2:amd64  
libconfig-inifiles-perl  
libcrypt-dev:amd64  
libcrypt1:amd64  
libcryptsetup12:amd64  
libctf-nobfd0:amd64  
libctf0:amd64  
libcups2:amd64  
libcurl3-gnutls:amd64  
libcurl4:amd64  
libdatriel:amd64  
libdav1d6:amd64  
libdb5.3:amd64  
libdbd-mariadb-perl  
libdbi-perl:amd64  
libdbus-1-3:amd64  
libdc1394-25:amd64  
libde265-0:amd64  
libdebconfclient0:amd64  
libdecor-0-0:amd64  
libdecor-0-plugin-1-cairo:amd64  
libdeflate0:amd64  
libdevmapper1.02.1:amd64  
libdiscover2  
libdjvulibre-text  
libdjvulibre21:amd64  
libdns-export1104  
libdpkg-perl  
libdrm-amdgpu1:amd64  
libdrm-common

libdrm-intel1:amd64  
libdrm-nouveau2:amd64  
libdrm-radeon1:amd64  
libdrm2:amd64  
libduktape207:amd64  
libdw1:amd64  
libedit2:amd64  
libefiboot1:amd64  
libefivar1:amd64  
libelf1:amd64  
libepoxy0:amd64  
liberror-perl  
libestr0:amd64  
libevent-core-2.1-7:amd64  
libexif12:amd64  
libexpat1-dev:amd64  
libexpat1:amd64  
libext2fs2:amd64  
libfakeroot:amd64  
libfastjson4:amd64  
libfdisk1:amd64  
libffi-dev:amd64  
libffi6:amd64  
libffi7:amd64  
libffi8:amd64  
libfftw3-double3:amd64  
libfido2-1:amd64  
libfile-fcntllock-perl  
libfile-find-rule-perl  
libflac12:amd64  
libflite1:amd64  
libfontconfig1:amd64  
libfontenc1:amd64  
libfreetype6:amd64  
libfribidi0:amd64  
libfstrm0:amd64  
libfuse2:amd64  
libgavl-1:amd64  
libgbm1:amd64  
libgcl:amd64  
libgcc-12-dev:amd64  
libgcc-s1:amd64  
libgcrypt20:amd64  
libgd3:amd64  
libgdbm-compat4:amd64  
libgdbm6:amd64  
libgdk-pixbuf-2.0-0:amd64  
libgdk-pixbuf2.0-bin  
libgdk-pixbuf2.0-common  
libgeoip1:amd64  
libgfortran5:amd64

```
libgirepository-1.0-1:amd64
libgl1-mesa-dri:amd64
libgl1:amd64
libglapi-mesa:amd64
libglib2.0-0:amd64
libglib2.0-bin
libglib2.0-data
libglvnd0:amd64
libglx-mesa0:amd64
libglx0:amd64
libgme0:amd64
libgmp10:amd64
libgnutls30:amd64
libgomp1:amd64
libgpg-error0:amd64
libgpgme11:amd64
libgpm2:amd64
libgprofng0:amd64
libgraphite2-3:amd64
libgs-common
libgs10-common
libgs10:amd64
libgsml:amd64
libgssapi-krb5-2:amd64
libgstreamer1.0-0:amd64
libharfbuzz0b:amd64
libheif1:amd64
libhogweed4:amd64
libhogweed6:amd64
libhwy1:amd64
libice6:amd64
libicu-dev:amd64
libicu72:amd64
libidn11:amd64
libidn12:amd64
libidn2-0:amd64
libiec61883-0:amd64
libigdgmm12:amd64
libijs-0.35:amd64
libimage-exiftool-perl
libimagequant0:amd64
libimath-3-1-29:amd64
libip4tc0:amd64
libip4tc2:amd64
libip6tc0:amd64
libip6tc2:amd64
libiptc0:amd64
libisc-export1100:amd64
libisl23:amd64
libitm1:amd64
libjack-jackd2-0:amd64
```

libjansson4:amd64  
libjbig0:amd64  
libjbig2dec0:amd64  
libjemalloc2:amd64  
libjpeg-dev:amd64  
libjpeg62-turbo-dev:amd64  
libjpeg62-turbo:amd64  
libjq1:amd64  
libjs-jquery  
libjs-sphinxdoc  
libjs-underscore  
libjson-c3:amd64  
libjson-c5:amd64  
libjxl0.7:amd64  
libjxr-tools  
libjxr0:amd64  
libk5crypto3:amd64  
libkeyutils1:amd64  
libklibc:amd64  
libkmod2:amd64  
libkrb5-3:amd64  
libkrb5support0:amd64  
libksba8:amd64  
liblapack3:amd64  
liblcms2-2:amd64  
libldap-2.5-0:amd64  
libldap-common  
libldap-dev:amd64  
libldap2-dev  
libldb2:amd64  
liblerc4:amd64  
liblilv-0-0:amd64  
liblinear4:amd64  
libllvm14:amd64  
libllvm15:amd64  
liblmb0:amd64  
liblocale-gettext-perl  
liblockfile-bin  
liblognorm5:amd64  
liblqr-1-0:amd64  
liblsan0:amd64  
libltdl7:amd64  
liblua5.3-0:amd64  
liblz4-1:amd64  
liblzma5:amd64  
libmagic-dev:amd64  
libmagic-mgc  
libmagic1:amd64  
libmagickcore-6.q16-6-extra:amd64  
libmagickcore-6.q16-6:amd64  
libmagickwand-6.q16-6:amd64

```
libmariadb3:amd64
libmaxminddb0:amd64
libmbedcrypto7:amd64
libmd0:amd64
libmfx1:amd64
libmime-charset-perl
libmnl0:amd64
libmount1:amd64
libmp3lame0:amd64
libmpc3:amd64
libmpfr6:amd64
libmpg123-0:amd64
libmysofa1:amd64
libncurses5:amd64
libncurses6:amd64
libncursesw6:amd64
libnetfilter-conntrack3:amd64
libnetpbm11:amd64
libnettle6:amd64
libnettle8:amd64
libnewt0.52:amd64
libnfnetwork0:amd64
libnfsidmap1:amd64
libnftnl11:amd64
libnghttp2-14:amd64
libnginx-mod-http-auth-pam
libnginx-mod-http-dav-ext
libnginx-mod-http-echo
libnginx-mod-http-geoip
libnginx-mod-http-image-filter
libnginx-mod-http-substitutions-filter
libnginx-mod-http-upstream-fair
libnginx-mod-http-xslt-filter
libnginx-mod-stream
libnginx-mod-stream-geoip
libnl-3-200:amd64
libnl-genl-3-200:amd64
libnorm1:amd64
libnpth0:amd64
libnsl-dev:amd64
libnsl2:amd64
libnss-nis:amd64
libnss-nisplus:amd64
libnss-systemd:amd64
libnuma1:amd64
libnumber-compare-perl
libobjc-12-dev:amd64
libobjc4:amd64
libogg0:amd64
libonig5:amd64
libopenal-data
```

libopenall:amd64  
libopenexr-3-1-30:amd64  
libopenjp2-7:amd64  
libopenmpt0:amd64  
libopus0:amd64  
libp11-kit0:amd64  
libpackagekit-glib2-18:amd64  
libpam-modules-bin  
libpam-modules:amd64  
libpam-runtime  
libpam-systemd:amd64  
libpam0g:amd64  
libpango-1.0-0:amd64  
libpangocairo-1.0-0:amd64  
libpangoft2-1.0-0:amd64  
libpaper-utils  
libpaper1:amd64  
libpcap0.8:amd64  
libpci3:amd64  
libpciaccess0:amd64  
libpcre2-8-0:amd64  
libpcre3:amd64  
libperl5.36:amd64  
libpgm-5.3-0:amd64  
libpipeline1:amd64  
libpixman-1-0:amd64  
libpkgconf3:amd64  
libplacebo208:amd64  
libpng16-16:amd64  
libpocketsphinx3:amd64  
libpolkit-agent-1-0:amd64  
libpolkit-gobject-1-0:amd64  
libpopt0:amd64  
libposix-strptime-perl  
libpostproc56:amd64  
libpq-dev  
libpq5:amd64  
libproc2-0:amd64  
libprocps7:amd64  
libprotobuf-c1:amd64  
libpsl5:amd64  
libpulse0:amd64  
libpython2.7-minimal:amd64  
libpython2.7-stdlib:amd64  
libpython3-dev:amd64  
libpython3-stdlib:amd64  
libpython3.11-dev:amd64  
libpython3.11-minimal:amd64  
libpython3.11-stdlib:amd64  
libpython3.11:amd64  
libquadmath0:amd64

```
librabbitmq4:amd64
librav1e0:amd64
libraw1394-11:amd64
libreadline8:amd64
librist4:amd64
librsvg2-2:amd64
librsvg2-common:amd64
librtmp1:amd64
librubberband2:amd64
libsamplerate0:amd64
libsasl2-2:amd64
libsasl2-dev
libsasl2-modules-db:amd64
libsasl2-modules:amd64
libsdl2-2.0-0:amd64
libseccomp2:amd64
libselinux1:amd64
libsemanage-common
libsemanage2:amd64
libsensors-config
libsensors5:amd64
libsepol1:amd64
libsepol2:amd64
libserd-0-0:amd64
libshine3:amd64
libslang2:amd64
libsm6:amd64
libsmartcols1:amd64
libsmbclient:amd64
libsnappy1v5:amd64
libsndfile1:amd64
libsndio7.0:amd64
libsodium23:amd64
libsombok3:amd64
libsord-0-0:amd64
libsoxr0:amd64
libspeex1:amd64
libspinxbase3:amd64
libsqlite3-0:amd64
libsratom-0-0:amd64
libstr1.5-gnutls:amd64
libss2:amd64
libssh-gcrypt-4:amd64
libssh2-1:amd64
libssl-dev:amd64
libssl1.1:amd64
libssl3:amd64
libstdc++-12-dev:amd64
libstdc++6:amd64
libstemmer0d:amd64
libsvtav1enc1:amd64
```

libswresample4:amd64  
libswscale6:amd64  
libsystemd-shared:amd64  
libsystemd0:amd64  
libtalloc2:amd64  
libtasn1-6:amd64  
libtdb1:amd64  
libterm-readkey-perl  
libtevent0:amd64  
libtext-charwidth-perl:amd64  
libtext-glob-perl  
libtext-iconv-perl:amd64  
libtext-wrap18n-perl  
libthai-data  
libthai0:amd64  
libtheora0:amd64  
libtiff6:amd64  
libtinfo5:amd64  
libtinfo6:amd64  
libtirpc-common  
libtirpc-dev:amd64  
libtirpc3:amd64  
libtsan2:amd64  
libtwolame0:amd64  
libubsan1:amd64  
libuchardet0:amd64  
libudev1:amd64  
libudfread0:amd64  
libunicode-linebreak-perl  
libunistring2:amd64  
libunwind8:amd64  
liburing2:amd64  
libusb-1.0-0:amd64  
libutempter0:amd64  
libuuid1:amd64  
libuv1:amd64  
libva-drm2:amd64  
libva-x11-2:amd64  
libva2:amd64  
libvdpau-va-gll:amd64  
libvdpau1:amd64  
libvidstab1.1:amd64  
libvorbis0a:amd64  
libvorbisenc2:amd64  
libvorbisfile3:amd64  
libvpx7:amd64  
libvulkan1:amd64  
libwayland-client0:amd64  
libwayland-cursor0:amd64  
libwayland-egl1:amd64  
libwayland-server0:amd64

```
libwbclient0:amd64
libwebp7:amd64
libwebpdemux2:amd64
libwebpmux3:amd64
libwmflite-0.2-7:amd64
libwrap0:amd64
libx11-6:amd64
libx11-data
libx11-xcb1:amd64
libx264-164:amd64
libx265-199:amd64
libxau6:amd64
libxcb-dri2-0:amd64
libxcb-dri3-0:amd64
libxcb-glx0:amd64
libxcb-present0:amd64
libxcb-randr0:amd64
libxcb-render0:amd64
libxcb-shape0:amd64
libxcb-shm0:amd64
libxcb-sync1:amd64
libxcb-xfixes0:amd64
libxcb1:amd64
libxcursor1:amd64
libxdmcp6:amd64
libxext6:amd64
libxfixes3:amd64
libxi6:amd64
libxkbcommon0:amd64
libxml2-dev:amd64
libxml2:amd64
libxmlb2:amd64
libxmlrpc-epi0:amd64
libxmuu1:amd64
libxpm4:amd64
libxrandr2:amd64
libxrender1:amd64
libxshmfence1:amd64
libxslt1-dev:amd64
libxslt1.1:amd64
libxss1:amd64
libxt6:amd64
libxtables12:amd64
libxv1:amd64
libxvidcore4:amd64
libxxf86vm1:amd64
libxxhash0:amd64
libyam1-0-2:amd64
libyuv0:amd64
libz3-4:amd64
libzimg2:amd64
```

libzip4:amd64  
libzmq5:amd64  
libzstd1:amd64  
libzvbi-common  
libzvbi0:amd64  
linux-base  
linux-image-6.1.0-37-amd64  
linux-image-6.1.0-39-amd64  
linux-image-amd64  
linux-libc-dev:amd64  
locales  
locate  
login  
logrotate  
logsave  
lsb-base  
lsb-release  
lsof  
lua-lpeg:amd64  
mailcap  
make  
man-db  
manpages  
manpages-dev  
manpages-fr  
mariadb-client  
mariadb-client-core  
mariadb-common  
mawk  
media-types  
mesa-va-drivers:amd64  
mesa-va-drivers:amd64  
mesa-vulkan-drivers:amd64  
mime-support  
mount  
mysql-common  
nano  
ncal  
ncdu  
ncurses-base  
ncurses-bin  
ncurses-term  
net-tools  
netbase  
netcat-traditional  
netfilter-persistent  
netpbm  
nfs-common  
nfs-kernel-server  
nginx  
nginx-common

```
nmap
nmap-common
nodejs
ocl-icd-libopencl1:amd64
openssh-client
openssh-server
openssh-sftp-server
openssl
optipng
os-prober
packagekit
packagekit-tools
passwd
patch
pci.ids
pciutils
perl
perl-base
perl-modules-5.28
perl-modules-5.36
php-common
php-composer-ca-bundle
php-composer-class-map-generator
php-composer-metadata-minifier
php-composer-pcre
php-composer-semantic
php-composer-spdx-licenses
php-composer-xdebug-handler
php-json-schema
php-psr-container
php-psr-log
php-react-promise
php-seld-signal-handler
php-symfony-console
php-symfony-deprecation-contracts
php-symfony-filesystem
php-symfony-finder
php-symfony-process
php-symfony-service-contracts
php-symfony-string
php8.4-apcu
php8.4-apcu-dbgsym
php8.4-bcmath
php8.4-bz2
php8.4-cli
php8.4-common
php8.4-curl
php8.4-fpm
php8.4-gd
php8.4-gmp
php8.4-igbinary
```

php8.4-imagick  
php8.4-intl  
php8.4-mbstring  
php8.4-mysql  
php8.4-opcache  
php8.4-pgsql  
php8.4-phpdbg  
php8.4-readline  
php8.4-redis  
php8.4-xml  
php8.4-xmlrpc  
php8.4-zip  
pinentry-curses  
pkexec  
pkg-config:amd64  
pkgconf-bin  
pkgconf:amd64  
pngquant  
pocketsphinx-en-us  
policykit-1  
polkitd  
polkitd-pkla  
poppler-data  
powermgmt-base  
procps  
psmisc  
publicsuffix  
python-apt-common  
python-certbot-nginx  
python-is-python3  
python2.7  
python2.7-minimal  
python3  
python3-acme  
python3-apt  
python3-blinker  
python3-brotli  
python3-certbot  
python3-certbot-dns-gandi  
python3-certbot-nginx  
python3-certifi  
python3-ctypes-backend:amd64  
python3-chardet  
python3-charset-normalizer  
python3-click  
python3-colorama  
python3-configargparse  
python3-configobj  
python3-cryptography  
python3-dbus  
python3-debconf

```
python3-debian
python3-debianbts
python3-dev
python3-distro
python3-distutils
python3-gi
python3-gpg
python3-httplib2
python3-icu
python3-idna
python3-josepy
python3-jwt
python3-lazr.restfulclient
python3-lazr.uri
python3-ldb
python3-lib2to3
python3-minimal
python3-mutagen
python3-oauthlib
python3-openssl
python3-parsedatetime
python3-pip
python3-pip-whl
python3-pkg-resources
python3-pycryptodome
python3-pycurl
python3-pyinotify
python3-pyparsing
python3-pysimplesoap
python3-pyattr:amd64
python3-reportbug
python3-requests
python3-rfc3339
python3-samba
python3-setuptools
python3-setuptools-whl
python3-six
python3-software-properties
python3-systemd
python3-talloc:amd64
python3-tdb
python3-tz
python3-urllib3
python3-venv
python3-wadllib
python3-websockets
python3-wheel
python3-yaml
python3.11
python3.11-dev
python3.11-minimal
```

```
python3.11-venv
qemu-guest-agent
readline-common
reportbug
rpcbind
rpcsvc-proto
rsync
rsyslog
rtmpdump
runit-helper
samba-common
samba-common-bin
samba-dsdb-modules:amd64
samba-libs:amd64
screen
sed
sensible-utils
sgml-base
shared-mime-info
smbclient
socat
software-properties-common
ssl-cert
sudo
sysstat
systemd
systemd-sysv
systemd-timesyncd
sysvinit-utils
tar
task-french
task-ssh-server
tasksel
tasksel-data
tcpdump
traceroute
tree
tzdata
ucf
udev
unzip
usbutils
usrmerge
util-linux
util-linux-extra
util-linux-locales
va-driver-all:amd64
vdpau-driver-all:amd64
vim
vim-common
vim-runtime
```

```
vim-tiny
wamerican
wfrench
wget
whiptail
whois
wkhtmltox
x11-common
xauth
xdg-user-dirs
xfonts-75dpi
xfonts-base
xfonts-encodings
xfonts-utils
xkb-data
xml-core
xxd
xz-utils
yarn
yt-dlp
zabbix-agent2
zip
zlib1g-dev:amd64
zlib1g:amd64
zstd
```

## Stockage

Nous montons les partages ZFS de notre hyperviseur en NFS pour chaque application :

Dans `/etc/fstab` :

```
# cloud_data ZFS NFS share:
192.168.10.1:/zdata/cloud_data      /cloud_data      nfs  auto
0 0
# cryptpad_data ZFS NFS share:
192.168.10.1:/zdata/cryptpad_data  /home/cryptpad/cryptpad_data  nfs  auto
0 0
# castpod_data ZFS NFS share:
192.168.10.1:/zdata/castopod_data  /var/www/castopod/public/media  nfs  auto
0 0
# video_data ZFS NFS share:
192.168.10.1:/zdata/video_data     /var/www/peertube/storage      nfs  auto
0 0
# audio_data ZFS NFS share:
192.168.10.1:/zdata/audio_data     /var/www/funkwhale/data        nfs  auto
0 0
```

## Partie logicielle

Toutes les applications web des services sont servies par le serveur / reverse-proxy Nginx dont voici les configurations pour chaque application ainsi que les configurations communes.

Nous avons décidé de bannir dans la configuration générale un certain nombre de pays nous noyant de spam et d'attaques en tout genre :

```
# cat /etc/nginx/nginx.conf
user www-data;
worker_processes auto;
pid /run/nginx.pid;
include /etc/nginx/modules-enabled/*.conf;

events {
    worker_connections 1024;
    multi_accept on;
    use epoll;
}

http {
    server_names_hash_bucket_size 64;

    # Liberta : no more reverse proxy:
    #set_real_ip_from 127.0.0.1;
    #set_real_ip_from 192.168.10.0/24;
    #real_ip_header X-Forwarded-For;
    #real_ip_recursive on;

    include /etc/nginx/mime.types;
    default_type application/octet-stream;
    access_log /var/log/nginx/access.log;
    error_log /var/log/nginx/error.log warn;
    sendfile on;
    send_timeout 3600;
    tcp_nopush on;
    tcp_nodelay on;
    open_file_cache max=500 inactive=10m;
    open_file_cache_errors on;
    keepalive_timeout 65;
    reset_timedout_connection on;
    server_tokens off;
    resolver_timeout 5s;
    proxy_buffers 16 16k;
    proxy_buffer_size 16k;
    fastcgi_buffers 64 4K;
    client_max_body_size 8G;

    ##
    # Logging Settings
```

```
##

rewrite_log on;
access_log /var/log/nginx/access.log;
error_log /var/log/nginx/error.log notice;

# Liberta : ban all countries except those:
geoip_country /usr/share/GeoIP/GeoIP.dat;
map $geoip_country_code $allowed_country {
    default no;
    AL yes;
    AD yes;
    AM yes;
    AT yes;
    BA yes;
    BE yes;
    BG yes;
    BY yes;
    CH yes;
    CY yes;
    CZ yes;
    DK yes;
    EE yes;
    FI yes;
    FR yes;
    FO yes;
    DE yes;
    GB yes;
    GE yes;
    GI yes;
    GR yes;
    HR yes;
    HU yes;
    IE yes;
    IM yes;
    IS yes;
    IT yes;
    LI yes;
    LV yes;
    LT yes;
    LU yes;
    MC yes;
    MD yes;
    ME yes;
    MK yes;
    MT yes;
    NL yes;
    NO yes;
    PL yes;
    PT yes;
    RO yes;
```

```
SK yes;
SI yes;
ES yes;
RS yes;
RU yes;
SE yes;
SM yes;
TR yes;
UA yes;
VA yes;
XK yes;
# Allowed countries list:
#
AL,AD,AM,AT,BA,BE,BG,BY,CH,CY,CZ,DK,EE,FI,FR,FO,DE,GB,GE,GI,GR,HR,HU,IE,IM,I
S,IT,LI,LV,LT,LU,MC,MD,ME,MK,MT,NL,NO,PL,PT,RO,SK,SI,ES,RS,RU,SE,SM,TR,UA,VA
,XK
}

##
# Virtual Host Configs
##

include /etc/nginx/conf.d/*.conf;
include /etc/nginx/sites-enabled/*;
}
```

## CryptPad

## Etherpad-Lite

## Funkwhale

## Nextcloud

## Peertube

## Castopod

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