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RH12407 - Gestion des Paquets

Contenu du Module

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LAB #1 - La commande rpm

Afin de faciliter l'installation, la désinstallation et la gestion des logiciels (appelés paquets), CentOS et Red Hat utilisent un format de fichier de logiciels installables spécifique. Celui-ci s'appelle **RPM** pour Red Hat Package Manager. La commande utilisée pour manipuler ses paquets s'appelle aussi **rpm**.

Les options de la commande rpm sont :

```
[root@redhat9 ~]# rpm --help
Usage: rpm [OPTION...]
```

Query/Verify package selection options:

```
-a, --all                query/verify all packages
-f, --file               query/verify package(s) owning installed file
  --path                 query/verify package(s) owning path, installed or not
-g, --group              query/verify package(s) in group
-p, --package            query/verify a package file
  --pkgid                query/verify package(s) with package identifier
  --hdrid                query/verify package(s) with header identifier
  --triggeredby          query the package(s) triggered by the package
  --whatconflicts        query/verify the package(s) which conflict with a dependency
  --whatrequires         query/verify the package(s) which require a dependency
  --whatobsoletes        query/verify the package(s) which obsolete a dependency
  --whatprovides         query/verify the package(s) which provide a dependency
  --whatrecommends       query/verify the package(s) which recommends a dependency
  --whatsuggests         query/verify the package(s) which suggests a dependency
  --whatsupplements      query/verify the package(s) which supplements a dependency
  --whatenhances         query/verify the package(s) which enhances a dependency
  --nomanifest           do not process non-package files as manifests
```

Query/Verify file selection options:

```
-c, --configfiles    only include configuration files
-d, --docfiles       only include documentation files
-L, --licensefiles  only include license files
-A, --artifactfiles only include artifact files
--noghost           exclude %%ghost files
--noconfig          exclude %%config files
--noartifact        exclude %%artifact files
```

Query options (with -q or --query):

```
--dump              dump basic file information
-l, --list          list files in package
--queryformat=QUERYFORMAT use the following query format
-s, --state         display the states of the listed files
```

Verify options (with -V or --verify):

```
--nofiledigest     don't verify digest of files
--nofiles          don't verify files in package
--nodeps          don't verify package dependencies
--noscript         don't execute verify script(s)
```

Install/Upgrade/Erase options:

```
--allfiles         install all files, even configurations which might otherwise be skipped
--allmatches       remove all packages which match <package> (normally an error is generated if
<package> specified multiple packages)
--badreloc         relocate files in non-relocatable package
-e, --erase=<package>+ erase (uninstall) package
--excludedocs      do not install documentation
--excludepath=<path> skip files with leading component <path>
--force           short hand for --replacepkgs --replacefiles
-F, --freshen=<packagefile>+ upgrade package(s) if already installed
-h, --hash         print hash marks as package installs (good with -v)
--ignorearch      don't verify package architecture
--ignoreos        don't verify package operating system
--ignoresize      don't check disk space before installing
```

```
--noverify          short hand for --ignorepayload --ignoresignature
-i, --install       install package(s)
--justdb            update the database, but do not modify the filesystem
--nodeps            do not verify package dependencies
--nofiledigest      don't verify digest of files
--nocontexts        don't install file security contexts
--nocaps            don't install file capabilities
--noorder           do not reorder package installation to satisfy dependencies
--noscripts         do not execute package scriptlet(s)
--notriggers        do not execute any scriptlet(s) triggered by this package
--oldpackage        upgrade to an old version of the package (--force on upgrades does this
automatically)
--percent           print percentages as package installs
--prefix=<dir>      relocate the package to <dir>, if relocatable
--relocate=<old>=<new> relocate files from path <old> to <new>
--replacefiles      ignore file conflicts between packages
--replacepkgs       reinstall if the package is already present
--test             don't install, but tell if it would work or not
-U, --upgrade=<packagefile>+ upgrade package(s)
--reinstall=<packagefile>+ reinstall package(s)
```

Common options for all rpm modes and executables:

```
-D, --define='MACRO EXPR'  define MACRO with value EXPR
--undefine=MACRO           undefine MACRO
-E, --eval='EXPR'          print macro expansion of EXPR
--target=CPU-VENDOR-OS     Specify target platform
--macros=<FILE:...>        read <FILE:...> instead of default file(s)
--load=<FILE>              load a single macro file
--noplugins               don't enable any plugins
--nodigest                don't verify package digest(s)
--nosignature              don't verify package signature(s)
--rcfile=<FILE:...>        read <FILE:...> instead of default file(s)
-r, --root=ROOT            use ROOT as top level directory (default: "/")
--dbpath=DIRECTORY         use database in DIRECTORY
```

```
--querytags      display known query tags
--showrc         display final rpmrc and macro configuration
--quiet          provide less detailed output
-v, --verbose    provide more detailed output
--version        print the version of rpm being used
```

Options implemented via popt alias/exec:

```
--scripts        list install/erase scriptlets from package(s)
--setperms        set permissions of files in a package
--setugids        set user/group ownership of files in a package
--setcaps         set capabilities of files in a package
--restore         restore file/directory permissions
--conflicts       list capabilities this package conflicts with
--obsoletes       list other packages removed by installing this package
--provides        list capabilities that this package provides
--requires        list capabilities required by package(s)
--recommends      list capabilities recommended by package(s)
--suggests        list capabilities suggested by package(s)
--supplements     list capabilities supplemented by package(s)
--enhances        list capabilities enhanced by package(s)
--info           list descriptive information from package(s)
--changelog       list change logs for this package
--changes         list changes for this package with full time stamps
--xml            list metadata in xml
--triggers        list trigger scriptlets from package(s)
--filetriggers    list filetrigger scriptlets from package(s)
--last           list package(s) by install time, most recent first
--dupes          list duplicated packages
--filesbypkg     list all files from each package
--fileclass       list file names with their classes
--filecolor       list file names with their colors
--fileprovide     list file names with their provides
--filerequire     list file names with requires
--filecaps       list file names with their POSIX1.e capabilities
```

Help options:

-?, --help	Show this help message
--usage	Display brief usage message

1.1 - Configuration

Le fichier de configuration principal de la commande rpm est **/usr/lib/rpm/rpmrc** :

```
[root@redhat9 ~]# more /usr/lib/rpm/rpmrc
#/*! \page config_rpmrc Default configuration: /usr/lib/rpm/rpmrc
# \verbatim
#
# This is a global RPM configuration file. All changes made here will
# be lost when the rpm package is upgraded. Any per-system configuration
# should be added to /etc/rpmrc, while per-user configuration should
# be added to ~/.rpmrc.
#
#####
# Values for RPM_OPT_FLAGS for various platforms

# "fat" binary with both archs, for Darwin
optflags: fat -O2 -g -arch i386 -arch ppc

optflags: i386 -O2 -g -march=i386 -mtune=i686
optflags: i486 -O2 -g -march=i486
optflags: i586 -O2 -g -march=i586
optflags: i686 -O2 -g -march=i686
optflags: pentium3 -O2 -g -march=pentium3
optflags: pentium4 -O2 -g -march=pentium4
optflags: athlon -O2 -g -march=athlon
optflags: geode -Os -g -m32 -march=geode
optflags: ia64 -O2 -g
optflags: x86_64 -O2 -g
```

```
optflags: amd64 -02 -g
optflags: ia32e -02 -g

optflags: alpha -02 -g -mieee
optflags: alphaev5 -02 -g -mieee -mtune=ev5
optflags: alphaev56 -02 -g -mieee -mtune=ev56
optflags: alphapca56 -02 -g -mieee -mtune=pca56
optflags: alphaev6 -02 -g -mieee -mtune=ev6
optflags: alphaev67 -02 -g -mieee -mtune=ev67

optflags: sparc -02 -g -m32 -mtune=ultrasparc
optflags: sparcv8 -02 -g -m32 -mtune=ultrasparc -mv8
optflags: sparcv9 -02 -g -m32 -mtune=ultrasparc
optflags: sparcv9v -02 -g -m32 -mtune=niagara
optflags: sparc64 -02 -g -m64 -mtune=ultrasparc
optflags: sparc64v -02 -g -m64 -mtune=niagara

optflags: m68k -02 -g -fomit-frame-pointer

optflags: ppc -02 -g
optflags: ppc8260 -02 -g
optflags: ppc8560 -02 -g
optflags: ppc32dy4 -02 -g
optflags: ppciseries -02 -g
optflags: ppcpseries -02 -g
optflags: ppc64 -02 -g
optflags: ppc64le -02 -g
optflags: ppc64p7 -03 -mtune=power7 -mcpu=power7 -g

optflags: parisc -02 -g -mpa-risc-1-0
optflags: hppa1.0 -02 -g -mpa-risc-1-0
--More-- (10%)
[q]
```

Ces directives indiquent comment optimiser la construction d'un rpm en fonction du type de processeur retourné par la commande **uname -p**. Par exemple, la directive **buildarchtranslate: athlon: i386** indique que le processus doit utiliser les optimisations **i386** lors de la construction d'un src.rpm sur une architecture **athlon**. Si au contraire il est souhaité que les optimisations **athlon** soient utilisées, il convient d'inclure la ligne **buildarchtranslate: athlon: athlon** dans le fichier **/etc/rpmsrc**. En effet lors de la mise à jour du paquet rpm, le fichier **/usr/lib/rpm/rpmsrc** est écrasé. Toute modification des directives de ce fichier doivent être inscrites dans **/etc/rpmsrc** ou dans un fichier **~/rpmsrc** spécifique à un utilisateur.

1.2 - Utilisation

Afin de connaître la liste des paquets installés sur la machine, il convient de saisir la commande suivante dans une console en tant que root :

```
[root@redhat9 ~]# rpm -qa | more
fonts-filesystem-2.0.5-7.el9.1.noarch
xkeyboard-config-2.33-2.el9.noarch
abattis-cantarell-fonts-0.301-4.el9.noarch
yelp-xsl-40.2-1.el9.noarch
mozilla-filesystem-1.9-30.el9.x86_64
google-noto-fonts-common-20201206-4.el9.noarch
foomatic-db-filesystem-4.0-72.20210209.el9.noarch
adobe-mappings-cmap-20171205-12.el9.noarch
subscription-manager-rhsm-certificates-20220623-1.el9.noarch
libreport-filesystem-2.15.2-6.el9.noarch
adobe-mappings-cmap-deprecated-20171205-12.el9.noarch
adobe-source-code-pro-fonts-2.030.1.050-12.el9.1.noarch
dejavu-sans-mono-fonts-2.37-18.el9.noarch
dejavu-sans-fonts-2.37-18.el9.noarch
langpacks-core-font-en-3.0-16.el9.noarch
google-droid-sans-fonts-20200215-11.el9.2.noarch
thai-scalable-fonts-common-0.7.2-5.el9.noarch
redhat-indexhtml-9-4.el9_2.noarch
poppler-data-0.4.9-9.el9.noarch
mobile-broadband-provider-info-20210805-2.el9.noarch
man-pages-overrides-9.0.0.0-1.el9.noarch
hunspell-filesystem-1.7.0-11.el9.x86_64
```

```
hplip-common-3.21.2-6.el9.x86_64
gawk-all-langpacks-5.1.0-6.el9.x86_64
adwaita-cursor-theme-40.1.1-3.el9.noarch
adobe-mappings-pdf-20180407-10.el9.noarch
vim-filesystem-8.2.2637-20.el9_1.noarch
rhsm-icons-6-1.el9.noarch
filesystem-3.16-2.el9.x86_64
urw-base35-fonts-common-20200910-6.el9.noarch
basesystem-11-13.el9.noarch
quota-nls-4.06-6.el9.noarch
publicsuffix-list-dafsa-20210518-3.el9.noarch
pkgconf-m4-1.7.3-10.el9.noarch
popt-1.18-8.el9.x86_64
xz-libs-5.2.5-8.el9_0.x86_64
libxcrypt-4.4.18-3.el9.x86_64
bzip2-libs-1.0.8-8.el9.x86_64
libzstd-1.5.1-2.el9.x86_64
libpng-1.6.37-12.el9.x86_64
libcap-ng-0.8.2-7.el9.x86_64
libicu-67.1-9.el9.x86_64
libunistring-0.9.10-15.el9.x86_64
libgpg-error-1.42-5.el9.x86_64
libseccomp-2.5.2-2.el9.x86_64
lcms2-2.12-3.el9.x86_64
readline-8.1-4.el9.x86_64
libwayland-client-1.21.0-1.el9.x86_64
libwayland-server-1.21.0-1.el9.x86_64
jansson-2.14-1.el9.x86_64
libxkbcommon-1.0.3-4.el9.x86_64
libwayland-egl-1.21.0-1.el9.x86_64
keyutils-libs-1.6.3-1.el9.x86_64
libdhash-0.5.0-53.el9.x86_64
libXau-1.0.9-8.el9.x86_64
--More--
```

```
[q]
```

Afin de connaître le nombre total de paquets installés sur la machine, utilisez la commande suivante :

```
[root@redhat9 ~]# rpm -qa | wc -l  
1218
```

Imaginons maintenant que vous souhaitez vérifier si un paquet contenant la chaîne de caractères **setup** soit déjà installé sur la machine. Dans ce cas, il convient d'utiliser une commande telle la suivante :

```
[root@redhat9 ~]# rpm -qa | grep setup  
gnome-initial-setup-40.4-3.el9.x86_64  
setup-2.13.7-10.el9.noarch  
python3-setuptools-wheel-53.0.0-12.el9_4.1.noarch  
python3-setuptools-53.0.0-12.el9_4.1.noarch  
cryptsetup-libs-2.6.0-3.el9.x86_64  
cryptsetup-2.6.0-3.el9.x86_64  
ibus-setup-1.5.25-5.el9.noarch
```

Afin de connaître les détails du paquet **setup-2.13.7-10.el9.noarch**, il convient de saisir la commande suivante :

```
[root@redhat9 ~]# rpm -qi setup  
Name       : setup  
Version    : 2.13.7  
Release    : 10.el9  
Architecture: noarch  
Install Date: Wed 25 Sep 2024 11:52:00 AM CEST  
Group      : System Environment/Base  
Size       : 725932  
License    : Public Domain  
Signature  : RSA/SHA256, Wed 14 Feb 2024 11:15:37 AM CET, Key ID 199e2f91fd431d51  
Source RPM : setup-2.13.7-10.el9.src.rpm  
Build Date : Wed 07 Feb 2024 09:44:23 AM CET  
Build Host : x86-64-01.build.eng.rdu2.redhat.com
```

```
Packager   : Red Hat, Inc. <http://bugzilla.redhat.com/bugzilla>
Vendor     : Red Hat, Inc.
URL        : https://pagure.io/setup/
Summary    : A set of system configuration and setup files
Description:
The setup package contains a set of important system configuration and
setup files, such as passwd, group, and profile.
```

Afin de lister tous les fichiers installés par le paquet concerné, utilisez la commande suivante :

```
[root@redhat9 ~]# rpm -ql setup
/etc/aliases
/etc/bashrc
/etc/csh.cshrc
/etc/csh.login
/etc/dnf/protected.d/setup.conf
/etc/environment
/etc/ethertypes
/etc/exports
/etc/filesystems
/etc/fstab
/etc/group
/etc/gshadow
/etc/host.conf
/etc/hosts
/etc/inputrc
/etc/motd
/etc/motd.d
/etc/networks
/etc/passwd
/etc/printcap
/etc/profile
/etc/profile.d
/etc/profile.d/csh.local
```

```
/etc/profile.d/lang.csh
/etc/profile.d/lang.sh
/etc/profile.d/sh.local
/etc/protocols
/etc/services
/etc/shadow
/etc/shells
/etc/subgid
/etc/subuid
/run/motd
/run/motd.d
/usr/lib/motd
/usr/lib/motd.d
/usr/lib/tmpfiles.d/setup.conf
/usr/share/doc/setup
/usr/share/doc/setup/uidgid
/usr/share/licenses/setup
/usr/share/licenses/setup/COPYING
```

A l'inverse, si vous connaissez le nom d'un fichier et vous souhaitez savoir quel paquet l'a installé, utilisez la commande suivante :

```
[root@redhat9 ~]# rpm -qf /etc/exports
setup-2.13.7-10.el9.noarch
```

Pour n'afficher que les fichiers de configuration installés par le paquet, utilisez les options **-qc** :

```
[root@redhat9 ~]# rpm -qc setup
/etc/aliases
/etc/bashrc
/etc/csh.cshrc
/etc/csh.login
/etc/environment
/etc/ethertypes
/etc/exports
```

```
/etc/filesystems
/etc/fstab
/etc/group
/etc/gshadow
/etc/host.conf
/etc/hosts
/etc/inputrc
/etc/motd
/etc/networks
/etc/passwd
/etc/printcap
/etc/profile
/etc/profile.d/csh.local
/etc/profile.d/sh.local
/etc/protocols
/etc/services
/etc/shadow
/etc/shells
/etc/subgid
/etc/subuid
/run/motd
/usr/lib/motd
```

Pour n'afficher que les fichiers de documentation installés par le paquet, utilisez les options **-qd** :

```
[root@redhat9 ~]# rpm -qd setup
/usr/share/doc/setup/uidgid
```

Pour n'afficher que les scripts installés qui s'exécutent avant ou après l'installation du paquet, utilisez les options **-q** et **-scripts** :

```
[root@redhat9 ~]# rpm -q --scripts setup
postinstall scriptlet (using <lua>):
for i, name in ipairs({"passwd", "shadow", "group", "gshadow"}) do
  os.remove("/etc/"..name..".rpmnew")
```

```
end
if posix.access("/usr/bin/newaliases", "x") then
    os.execute("/usr/bin/newaliases >/dev/null")
end
```

Pour visualiser le journal des modifications du paquet, utilisez les options **-q** et **-changelog** :

```
[root@redhat9 ~]# rpm -q --changelog setup
* Wed Feb 07 2024 Martin Osvald <mosvald@redhat.com> - 2.13.7-10
- csh.login: Add csh.local into foreach loop (RHEL-17226)

* Wed Dec 21 2022 Martin Osvald <mosvald@redhat.com> - 2.13.7-9
- make setup protected package (#2155529)

* Thu Nov 24 2022 Martin Osvald <mosvald@redhat.com> - 2.13.7-8
- Set default umask for non-login shell only if it is set to 0 (#2062601)

* Mon May 09 2022 Martin Osvald <mosvald@redhat.com> - 2.13.7-7
- Move /var/log/lastlog ownership to systemd (#2066753)
- tcsh sets variable p to /usr/sbin from /etc/csh.login (#2066767)
- bashrc: Don't set up VTE-specific PROMPT_COMMAND (#2026892)
```

Pour connaître les fichiers modifiés depuis l'installation d'un paquet, utilisez les options **-qV**, par exemple :

```
# rpm -qV setup
.M....G.. g /var/log/lastlog
```

Dans le cas où aucun fichier n'a été modifié, la console n'affiche rien. Dans le cas où les fichiers ont été modifiés, le système vous indique, fichier par fichier, les modifications apportées selon le tableau ci-dessous. Pour plus d'informations utilisez les commandes `man` et `info` :

Lettre ou mot Clé	Description
5	Contrôle MD5
S	Taille du fichier

Lettre ou mot Clé	Description
L	Lien symbolique
T	Date de modification
D	Périphérique
U	Utilisateur propriétaire
G	Groupe propriétaire
M	Droits d'accès
?	Fichier illisible
Manquant	Fichier manquant



Important : Un paquet rpm est un fichier cpio modifié. Pour pouvoir extraire le contenu d'un src.rpm et explorer l'arborescence utilisé pour construire le paquet, utilisez la commande **rpm2cpio paquet.src.rpm | cpio -i -make-directories**

LAB #2 - La commande dnf

2.1 - Présentation

dnf est une abréviation de **Dandified YUM**. Historiquement, RHEL a utilisé **Yellow dog Updater, Modified (Yum)** en tant qu'utilitaire de gestion de paquets. Sous RHEL 9, la commande yum a été remplacée par la commande **dnf-3** :

```
[root@redhat9 ~]# ls -l /usr/bin/yum
lrwxrwxrwx. 1 root root 5 Oct 26 2023 /usr/bin/yum -> dnf-3
[root@redhat9 ~]# ls -l /usr/bin/dnf
lrwxrwxrwx. 1 root root 5 Oct 26 2023 /usr/bin/dnf -> dnf-3
[root@redhat9 ~]# ls -l /usr/bin/dnf-3
-rwxr-xr-x. 1 root root 2094 Oct 26 2023 /usr/bin/dnf-3
```

La commande `dnf` apporte des améliorations suivantes par rapport à la commande **yum** :

- une résolution des dépendances plus rapide en utilisant moins de mémoire,
- le fonctionnement dans les environnements Python 2 et Python 3.

Il est à noter que :

- l'utilisation de la commande `dnf` est similaire à l'utilisation de la commande **yum**,
- les commandes `dnf` et `yum` peuvent coexister sur le même système.

L'utilisation de l'alias **dnf** de la commande `dnf-3` prend la forme suivante :

```
# dnf <options> <commande> <paquet(s)> [Entrée]
```

Les options et commandes de `dnf` sont :

```
[root@redhat9 ~]# dnf --help
Updating Subscription Management repositories.
usage: dnf [options] COMMAND

List of Main Commands:

alias                List or create command aliases
autoremove           remove all unneeded packages that were originally installed as dependencies
check                check for problems in the packagedb
check-update         check for available package upgrades
clean                remove cached data
deplist              [deprecated, use repoquery --deplist] List package's dependencies and what packages
provide them
distro-sync          synchronize installed packages to the latest available versions
downgrade            Downgrade a package
group                display, or use, the groups information
help                 display a helpful usage message
history              display, or use, the transaction history
```

info	display details about a package or group of packages
install	install a package or packages on your system
list	list a package or groups of packages
makecache	generate the metadata cache
mark	mark or unmark installed packages as installed by user.
module	Interact with Modules.
provides	find what package provides the given value
reinstall	reinstall a package
remove	remove a package or packages from your system
repolist	display the configured software repositories
repoquery	search for packages matching keyword
repository-packages	run commands on top of all packages in given repository
search	search package details for the given string
shell	run an interactive DNF shell
swap	run an interactive DNF mod for remove and install one spec
updateinfo	display advisories about packages
upgrade	upgrade a package or packages on your system
upgrade-minimal	upgrade, but only 'newest' package match which fixes a problem that affects your system

List of Plugin Commands:

builddep	Install build dependencies for package or spec file
changelog	Show changelog data of packages
config-manager	manage dnf configuration options and repositories
copr	Interact with Copr repositories.
debug-dump	dump information about installed rpm packages to file
debug-restore	restore packages recorded in debug-dump file
debuginfo-install	install debuginfo packages
download	Download package to current directory
groups-manager	create and edit groups metadata file
kpatch	Toggles automatic installation of kpatch-patch packages
needs-restarting	determine updated binaries that need restarting
offline-distrosync	Prepare offline distrosync of the system
offline-upgrade	Prepare offline upgrade of the system

```
playground          Interact with Playground repository.
repclosure           Display a list of unresolved dependencies for repositories
repodiff             List differences between two sets of repositories
repograph           Output a full package dependency graph in dot format
repomanage           Manage a directory of rpm packages
reposync            download all packages from remote repo
system-upgrade       Prepare system for upgrade to a new release
uploadprofile        Upload combined profile to Satellite server (list of installed RPMs, enabled
repositories and modules)
```

General DNF options:

```
-c [config file], --config [config file]
                        config file location
-q, --quiet            quiet operation
-v, --verbose          verbose operation
--version             show DNF version and exit
--installroot [path] set install root
--nodocs              do not install documentations
--noplugins           disable all plugins
--enableplugin [plugin]
                        enable plugins by name
--disableplugin [plugin]
                        disable plugins by name
--releasever RELEASEVER
                        override the value of $releasever in config and repo files
--setopt SETOPTS      set arbitrary config and repo options
--skip-broken         resolve depsolve problems by skipping packages
-h, --help, --help-cmd
                        show command help
--allowerasing        allow erasing of installed packages to resolve dependencies
-b, --best            try the best available package versions in transactions.
--nobest             do not limit the transaction to the best candidate
-C, --cacheonly       run entirely from system cache, don't update cache
-R [minutes], --randomwait [minutes]
```

```
                maximum command wait time
-d [debug level], --debuglevel [debug level]
                debugging output level
--debugsolver   dumps detailed solving results into files
--showduplicates show duplicates, in repos, in list/search commands
-e ERRORLEVEL, --errorlevel ERRORLEVEL
                error output level
--obsoletes     enables dnf's obsoletes processing logic for upgrade or display capabilities that the
package obsoletes for info, list and repoquery
--rpmverbosity [debug level name]
                debugging output level for rpm
-y, --assumeyes automatically answer yes for all questions
--assumeno     automatically answer no for all questions
--enablerepo [repo]  Temporarily enable repositories for the purpose of the current dnf command. Accepts an
id, a comma-separated list of ids, or a glob of ids. This option can be specified multiple times.
--disablerepo [repo] Temporarily disable active repositories for the purpose of the current dnf command.
Accepts an id, a comma-separated list of ids, or a glob of ids. This option can be specified
multiple times, but is mutually exclusive with `--repo`.
--repo [repo], --repoid [repo]
                enable just specific repositories by an id or a glob, can be specified multiple times
--enable       enable repos with config-manager command (automatically saves)
--disable     disable repos with config-manager command (automatically saves)
-x [package], --exclude [package], --excludepkgs [package]
                exclude packages by name or glob
--disableexcludes [repo], --disableexcludepkgs [repo]
                disable excludepkgs
--repofrompath [repo,path]
                label and path to an additional repository to use (same path as in a baseurl), can be
specified multiple times.
--noautoremove  disable removal of dependencies that are no longer used
--nogpgcheck   disable gpg signature checking (if RPM policy allows)
--color COLOR  control whether color is used
--refresh     set metadata as expired before running the command
-4            resolve to IPv4 addresses only
```

```
-6                resolve to IPv6 addresses only
--destdir DESTDIR, --downloadaddir DESTDIR
                  set directory to copy packages to
--downloadonly    only download packages
--comment COMMENT add a comment to transaction
--bugfix          Include bugfix relevant packages, in updates
--enhancement     Include enhancement relevant packages, in updates
--newpackage      Include newpackage relevant packages, in updates
--security        Include security relevant packages, in updates
--advisory ADVISORY, --advisories ADVISORY
                  Include packages needed to fix the given advisory, in updates
--bz BUGZILLA, --bzs BUGZILLA
                  Include packages needed to fix the given BZ, in updates
--cve CVES, --cves CVES
                  Include packages needed to fix the given CVE, in updates
--sec-severity {Critical,Important,Moderate,Low}, --secseverity {Critical,Important,Moderate,Low}
                  Include security relevant packages matching the severity, in updates
--forcearch ARCH Force the use of an architecture
```

2.2 - Configuration

La configuration principale de dnf est effectuée en éditant le fichier **/etc/dnf/dnf.conf** :

```
[root@redhat9 ~]# cat /etc/dnf/dnf.conf
[main]
gpgcheck=1
installonly_limit=3
clean_requirements_on_remove=True
best=True
skip_if_unavailable=False
```

Le répertoire **/etc/dnf** contient lui-même des répertoires :

```
[root@redhat9 ~]# ls -l /etc/dnf
total 4
drwxr-xr-x. 2 root root  6 Oct 26  2023 aliases.d
-rw-r--r--. 1 root root 108 Sep  9  2022 dnf.conf
drwxr-xr-x. 2 root root  6 Oct 26  2023 modules.d
drwxr-xr-x. 2 root root  6 Oct 26  2023 modules.defaults.d
drwxr-xr-x. 3 root root 142 Sep 25 12:00 plugins
drwxr-xr-x. 2 root root 173 Sep 25 12:05 protected.d
drwxr-xr-x. 2 root root  6 Oct 26  2023 vars
```

2.3 - Dépôts



Important : Un dépôt est un lieu de stockage de paquets binaires prêts à installer. Un dépôt peut être le DVD d'installation de la distribution, un dossier sur disque dur ou bien des serveurs distants accessibles par Internet.

Les dépôts de paquets sont spécifiés dans un fichier *par dépôt* stocké dans le répertoire **/etc/yum.repos.d** :

```
[root@redhat9 ~]# ls /etc/yum.repos.d/
epel-cisco-openh264.repo  epel-next.repo  epel-next-testing.repo  epel.repo  epel-testing.repo  redhat.repo
```

Par exemple :

```
[root@redhat9 ~]# more /etc/yum.repos.d/redhat.repo
#
# Certificate-Based Repositories
# Managed by (rhsm) subscription-manager
#
# *** This file is auto-generated.  Changes made here will be over-written. ***
# *** Use "subscription-manager repo-override --help" if you wish to make changes. ***
```

```
#
# If this file is empty and this system is subscribed consider
# a "yum repolist" to refresh available repos
#

[rhel-9-for-x86_64-highavailability-eus-rpms]
name = Red Hat Enterprise Linux 9 for x86_64 - High Availability - Extended Update Support (RPMs)
baseurl = https://cdn.redhat.com/content/eus/rhel9/$releasever/x86_64/highavailability/os
enabled = 0
gpgcheck = 1
gpgkey = file:///etc/pki/rpm-gpg/RPM-GPG-KEY-redhat-release
sslverify = 1
sslcacert = /etc/rhsm/ca/redhat-uep.pem
sslclientkey = /etc/pki/entitlement/9005910890346536267-key.pem
sslclientcert = /etc/pki/entitlement/9005910890346536267.pem
sslverifystatus = 1
metadata_expire = 86400
enabled_metadata = 0

[rhel-9-for-x86_64-resilientstorage-eus-rpms]
name = Red Hat Enterprise Linux 9 for x86_64 - Resilient Storage - Extended Update Support (RPMs)
baseurl = https://cdn.redhat.com/content/eus/rhel9/$releasever/x86_64/resilientstorage/os
enabled = 0
gpgcheck = 1
gpgkey = file:///etc/pki/rpm-gpg/RPM-GPG-KEY-redhat-release
sslverify = 1
sslcacert = /etc/rhsm/ca/redhat-uep.pem
sslclientkey = /etc/pki/entitlement/9005910890346536267-key.pem
sslclientcert = /etc/pki/entitlement/9005910890346536267.pem
sslverifystatus = 1
metadata_expire = 86400
enabled_metadata = 0

[rhel-atomic-7-cdk-3.6-source-rpms]
```

```

name = Red Hat Container Development Kit 3.6 /(Source RPMs)
baseurl = https://cdn.redhat.com/content/dist/rhel/atomic/7/7Server/$basearch/cdk/3.6/source/SRPMS
enabled = 0
gpgcheck = 1
gpgkey = file:///etc/pki/rpm-gpg/RPM-GPG-KEY-redhat-release
sslverify = 1
sslcacert = /etc/rhsm/ca/redhat-uep.pem
sslclientkey = /etc/pki/entitlement/9005910890346536267-key.pem
sslclientcert = /etc/pki/entitlement/9005910890346536267.pem
sslverifystatus = 1
metadata_expire = 86400
enabled_metadata = 0

[gitops-1.12-for-rhel-9-x86_64-rpms]
name = Red Hat OpenShift GitOps 1.12 for RHEL 9 x86_64 (RPMs)
--More-- (1%)

```

Pour consulter tous les dépôts, activés ou non, en utilisant dnf, il convient d'utiliser la commande **repolist all** :

```

[root@redhat9 ~]# dnf repolist all
Updating Subscription Management repositories.
repo id                                     repo name
status
amq-clients-3-for-rhel-9-x86_64-debug-rpms  Red Hat AMQ Clients 3 for RHEL 9
x86_64 (Debug RPMs)                        disabled
amq-clients-3-for-rhel-9-x86_64-rpms       Red Hat AMQ Clients 3 for RHEL 9
x86_64 (RPMs)                              disabled
amq-clients-3-for-rhel-9-x86_64-source-rpms Red Hat AMQ Clients 3 for RHEL 9
x86_64 (Source RPMs)                       disabled
amq-interconnect-textonly-1-for-middleware-rpms Red Hat AMQ Interconnect Text-Only
Advisories                                 disabled
amq-textonly-1-for-middleware-rpms         Red Hat JBoss AMQ Text-Only
Advisories                                 disabled
ansible-automation-platform-2.2-for-rhel-9-x86_64-debug-rpms Red Hat Ansible Automation Platform

```

2.2 for RHEL 9 x86_64 (Debug RPMs)	disabled
ansible-automation-platform-2.2-for-rhel-9-x86_64-rpms	Red Hat Ansible Automation Platform
2.2 for RHEL 9 x86_64 (RPMs)	disabled
ansible-automation-platform-2.2-for-rhel-9-x86_64-source-rpms	Red Hat Ansible Automation Platform
2.2 for RHEL 9 x86_64 (Source RPMs)	disabled
ansible-automation-platform-2.3-for-rhel-9-x86_64-debug-rpms	Red Hat Ansible Automation Platform
2.3 for RHEL 9 x86_64 (Debug RPMs)	disabled
ansible-automation-platform-2.3-for-rhel-9-x86_64-rpms	Red Hat Ansible Automation Platform
2.3 for RHEL 9 x86_64 (RPMs)	disabled
ansible-automation-platform-2.3-for-rhel-9-x86_64-source-rpms	Red Hat Ansible Automation Platform
2.3 for RHEL 9 x86_64 (Source RPMs)	disabled
ansible-automation-platform-2.4-for-rhel-9-x86_64-debug-rpms	Red Hat Ansible Automation Platform
2.4 for RHEL 9 x86_64 (Debug RPMs)	disabled
ansible-automation-platform-2.4-for-rhel-9-x86_64-rpms	Red Hat Ansible Automation Platform
2.4 for RHEL 9 x86_64 (RPMs)	disabled
ansible-automation-platform-2.4-for-rhel-9-x86_64-source-rpms	Red Hat Ansible Automation Platform
2.4 for RHEL 9 x86_64 (Source RPMs)	disabled
ansible-automation-platform-2.5-for-rhel-9-x86_64-debug-rpms	Red Hat Ansible Automation Platform
2.5 for RHEL 9 x86_64 (Debug RPMs)	disabled
ansible-automation-platform-2.5-for-rhel-9-x86_64-rpms	Red Hat Ansible Automation Platform
2.5 for RHEL 9 x86_64 (RPMs)	disabled
ansible-automation-platform-2.5-for-rhel-9-x86_64-source-rpms	Red Hat Ansible Automation Platform
2.5 for RHEL 9 x86_64 (Source RPMs)	disabled
application-interconnect-1-for-rhel-9-x86_64-debug-rpms	Red Hat Application Interconnect
for RHEL 9 x86_64 (Debug RPMs)	disabled
application-interconnect-1-for-rhel-9-x86_64-rpms	Red Hat Application Interconnect
for RHEL 9 x86_64 (RPMs)	disabled
application-interconnect-1-for-rhel-9-x86_64-source-rpms	Red Hat Application Interconnect
for RHEL 9 x86_64 (Source RPMs)	disabled
cert-manager-1.10-for-rhel-9-x86_64-debug-rpms	Cert Manager support for Red Hat
OpenShift 1.10 for RHEL 9 x86_64 (Debug RPMs)	disabled
cert-manager-1.10-for-rhel-9-x86_64-rpms	Cert Manager support for Red Hat
OpenShift 1.10 for RHEL 9 x86_64 (RPMs)	disabled
cert-manager-1.10-for-rhel-9-x86_64-source-rpms	Cert Manager support for Red Hat

OpenShift 1.10 for RHEL 9 x86_64 (Source RPMs)	disabled
cert-manager-1.11-for-rhel-9-x86_64-debug-rpms	Cert Manager support for Red Hat
OpenShift 1.11 for RHEL 9 x86_64 (Debug RPMs)	disabled
cert-manager-1.11-for-rhel-9-x86_64-rpms	Cert Manager support for Red Hat
OpenShift 1.11 for RHEL 9 x86_64 (RPMs)	disabled
cert-manager-1.11-for-rhel-9-x86_64-source-rpms	Cert Manager support for Red Hat
OpenShift 1.11 for RHEL 9 x86_64 (Source RPMs)	disabled
cert-manager-1.12-for-rhel-9-x86_64-debug-rpms	Cert Manager support for Red Hat
OpenShift 1.12 for RHEL 9 x86_64 (Debug RPMs)	disabled
cert-manager-1.12-for-rhel-9-x86_64-rpms	Cert Manager support for Red Hat
OpenShift 1.12 for RHEL 9 x86_64 (RPMs)	disabled
cert-manager-1.12-for-rhel-9-x86_64-source-rpms	Cert Manager support for Red Hat
OpenShift 1.12 for RHEL 9 x86_64 (Source RPMs)	disabled
cert-manager-1.13-for-rhel-9-x86_64-debug-rpms	Cert Manager support for Red Hat
OpenShift 1.13 for RHEL 9 x86_64 (Debug RPMs)	disabled
cert-manager-1.13-for-rhel-9-x86_64-rpms	Cert Manager support for Red Hat
OpenShift 1.13 for RHEL 9 x86_64 (RPMs)	disabled
cert-manager-1.13-for-rhel-9-x86_64-source-rpms	Cert Manager support for Red Hat
OpenShift 1.13 for RHEL 9 x86_64 (Source RPMs)	disabled
cert-manager-1.14-for-rhel-9-x86_64-debug-rpms	Cert Manager support for Red Hat
OpenShift 1.14 for RHEL 9 x86_64 (Debug RPMs)	disabled
cert-manager-1.14-for-rhel-9-x86_64-rpms	Cert Manager support for Red Hat
OpenShift 1.14 for RHEL 9 x86_64 (RPMs)	disabled
cert-manager-1.14-for-rhel-9-x86_64-source-rpms	Cert Manager support for Red Hat
OpenShift 1.14 for RHEL 9 x86_64 (Source RPMs)	disabled
cnv-4.13-for-rhel-9-x86_64-debug-rpms	Red Hat Container Native
Virtualization 4.13 for RHEL 9 x86_64 (Debug RPMs)	disabled
cnv-4.13-for-rhel-9-x86_64-rpms	Red Hat Container Native
Virtualization 4.13 for RHEL 9 x86_64 (RPMs)	disabled
cnv-4.13-for-rhel-9-x86_64-source-rpms	Red Hat Container Native
Virtualization 4.13 for RHEL 9 x86_64 (Source RPMs)	disabled
cnv-4.14-for-rhel-9-x86_64-debug-rpms	Red Hat Container Native
Virtualization 4.14 for RHEL 9 x86_64 (Debug RPMs)	disabled
cnv-4.14-for-rhel-9-x86_64-rpms	Red Hat Container Native

Virtualization 4.14 for RHEL 9 x86_64 (RPMs)	disabled
cnv-4.14-for-rhel-9-x86_64-source-rpms	Red Hat Container Native
Virtualization 4.14 for RHEL 9 x86_64 (Source RPMs)	disabled
cnv-4.15-for-rhel-9-x86_64-debug-rpms	Red Hat Container Native
Virtualization 4.15 for RHEL 9 x86_64 (Debug RPMs)	disabled
cnv-4.15-for-rhel-9-x86_64-rpms	Red Hat Container Native
Virtualization 4.15 for RHEL 9 x86_64 (RPMs)	disabled
cnv-4.15-for-rhel-9-x86_64-source-rpms	Red Hat Container Native
Virtualization 4.15 for RHEL 9 x86_64 (Source RPMs)	disabled
cnv-4.16-for-rhel-9-x86_64-debug-rpms	Red Hat Container Native
Virtualization 4.16 for RHEL 9 x86_64 (Debug RPMs)	disabled
cnv-4.16-for-rhel-9-x86_64-rpms	Red Hat Container Native
Virtualization 4.16 for RHEL 9 x86_64 (RPMs)	disabled
cnv-4.16-for-rhel-9-x86_64-source-rpms	Red Hat Container Native
Virtualization 4.16 for RHEL 9 x86_64 (Source RPMs)	disabled
cnv-4.17-for-rhel-9-x86_64-debug-rpms	Red Hat Container Native
Virtualization 4.17 for RHEL 9 x86_64 (Debug RPMs)	disabled
cnv-4.17-for-rhel-9-x86_64-rpms	Red Hat Container Native
Virtualization 4.17 for RHEL 9 x86_64 (RPMs)	disabled
cnv-4.17-for-rhel-9-x86_64-source-rpms	Red Hat Container Native
Virtualization 4.17 for RHEL 9 x86_64 (Source RPMs)	disabled
codeready-builder-for-rhel-9-x86_64-debug-rpms	Red Hat CodeReady Linux Builder for disabled
RHEL 9 x86_64 (Debug RPMs)	
codeready-builder-for-rhel-9-x86_64-eus-debug-rpms	Red Hat CodeReady Linux Builder for disabled
RHEL 9 x86_64 - Extended Update Support (Debug RPMs)	
codeready-builder-for-rhel-9-x86_64-eus-rpms	Red Hat CodeReady Linux Builder for disabled
RHEL 9 x86_64 - Extended Update Support (RPMs)	
codeready-builder-for-rhel-9-x86_64-eus-source-rpms	Red Hat CodeReady Linux Builder for disabled
RHEL 9 x86_64 - Extended Update Support (Source RPMs)	
codeready-builder-for-rhel-9-x86_64-rpms	Red Hat CodeReady Linux Builder for enabled
RHEL 9 x86_64 (RPMs)	
codeready-builder-for-rhel-9-x86_64-source-rpms	Red Hat CodeReady Linux Builder for disabled
RHEL 9 x86_64 (Source RPMs)	
discovery-1-for-rhel-9-x86_64-debug-rpms	Red Hat Discovery 1 for RHEL 9

x86_64 (Debug RPMs)	disabled
discovery-1-for-rhel-9-x86_64-rpms	Red Hat Discovery 1 for RHEL 9
x86_64 (RPMs)	disabled
discovery-1-for-rhel-9-x86_64-source-rpms	Red Hat Discovery 1 for RHEL 9
x86_64 (Source RPMs)	disabled
epel	Extra Packages for Enterprise Linux
9 - x86_64	enabled
epel-cisco-openh264	Extra Packages for Enterprise Linux
9 openh264 (From Cisco) - x86_64	enabled
epel-cisco-openh264-debuginfo	Extra Packages for Enterprise Linux
9 openh264 (From Cisco) - x86_64 - Debug	disabled
epel-cisco-openh264-source	Extra Packages for Enterprise Linux
9 openh264 (From Cisco) - x86_64 - Source	disabled
epel-debuginfo	Extra Packages for Enterprise Linux
9 - x86_64 - Debug	disabled
epel-next	Extra Packages for Enterprise Linux
9 - Next - x86_64	enabled
epel-next-debuginfo	Extra Packages for Enterprise Linux
9 - Next - x86_64 - Debug	disabled
epel-next-source	Extra Packages for Enterprise Linux
9 - Next - x86_64 - Source	disabled
epel-next-testing	Extra Packages for Enterprise Linux
9 - Next - Testing - x86_64	disabled
epel-next-testing-debuginfo	Extra Packages for Enterprise Linux
9 - Next - Testing - x86_64 - Debug	disabled
epel-next-testing-source	Extra Packages for Enterprise Linux
9 - Next - Testing - x86_64 - Source	disabled
epel-source	Extra Packages for Enterprise Linux
9 - x86_64 - Source	disabled
epel-testing	Extra Packages for Enterprise Linux
9 - Testing - x86_64	disabled
epel-testing-debuginfo	Extra Packages for Enterprise Linux
9 - Testing - x86_64 - Debug	disabled
epel-testing-source	Extra Packages for Enterprise Linux

9 - Testing - x86_64 - Source	disabled
fast-datapath-for-rhel-9-x86_64-debug-rpms (Debug RPMs)	Fast Datapath for RHEL 9 x86_64 disabled
fast-datapath-for-rhel-9-x86_64-rpms (RPMs)	Fast Datapath for RHEL 9 x86_64 disabled
fast-datapath-for-rhel-9-x86_64-source-rpms (Source RPMs)	Fast Datapath for RHEL 9 x86_64 disabled
fsw-textonly-1-for-middleware-rpms Text-Only Advisories	Red Hat JBoss Fuse Service Works disabled
gitops-1.12-for-rhel-9-x86_64-debug-rpms RHEL 9 x86_64 (Debug RPMs)	Red Hat OpenShift GitOps 1.12 for disabled
gitops-1.12-for-rhel-9-x86_64-rpms RHEL 9 x86_64 (RPMs)	Red Hat OpenShift GitOps 1.12 for disabled
gitops-1.12-for-rhel-9-x86_64-source-rpms RHEL 9 x86_64 (Source RPMs)	Red Hat OpenShift GitOps 1.12 for disabled
gitops-1.13-for-rhel-9-x86_64-debug-rpms RHEL 9 x86_64 (Debug RPMs)	Red Hat OpenShift GitOps 1.13 for disabled
gitops-1.13-for-rhel-9-x86_64-rpms RHEL 9 x86_64 (RPMs)	Red Hat OpenShift GitOps 1.13 for disabled
gitops-1.13-for-rhel-9-x86_64-source-rpms RHEL 9 x86_64 (Source RPMs)	Red Hat OpenShift GitOps 1.13 for disabled
gitops-1.14-for-rhel-9-x86_64-debug-rpms RHEL 9 x86_64 (Debug RPMs)	Red Hat OpenShift GitOps 1.14 for disabled
gitops-1.14-for-rhel-9-x86_64-rpms RHEL 9 x86_64 (RPMs)	Red Hat OpenShift GitOps 1.14 for disabled
gitops-1.14-for-rhel-9-x86_64-source-rpms RHEL 9 x86_64 (Source RPMs)	Red Hat OpenShift GitOps 1.14 for disabled
jb-coreservices-textonly-1-for-middleware-rhui-rpms Only Advisories from RHUI	Red Hat JBoss Core Services Text- disabled
jb-coreservices-textonly-1-for-middleware-rpms Only Advisories	Red Hat JBoss Core Services Text- disabled
jb-datagrid-8.4-for-rhel-9-x86_64-debug-rpms 9) (Debug RPMs)	Red Hat JBoss Data Grid 8.4 (RHEL disabled
jb-datagrid-8.4-for-rhel-9-x86_64-rpms	Red Hat JBoss Data Grid 8.4 (RHEL

9) (RPMs)	disabled
jb-datagrid-8.4-for-rhel-9-x86_64-source-rpms	Red Hat JBoss Data Grid 8.4 (RHEL
9) (Source RPMs)	disabled
jb-datagrid-textonly-1-for-middleware-rpms	Red Hat JBoss Data Grid Text-Only
Advisories	disabled
jb-eap-7.4-for-rhel-9-x86_64-debug-rpms	JBoss Enterprise Application
Platform 7.4 (RHEL 9) (Debug RPMs)	disabled
jb-eap-7.4-for-rhel-9-x86_64-rpms	JBoss Enterprise Application
Platform 7.4 (RHEL 9) (RPMs)	disabled
jb-eap-7.4-for-rhel-9-x86_64-source-rpms	JBoss Enterprise Application
Platform 7.4 (RHEL 9) (Source RPMs)	disabled
jb-eap-8.0-for-rhel-9-x86_64-debug-rpms	JBoss Enterprise Application
Platform 8.0 (RHEL 9 x86_64) (Debug RPMs)	disabled
jb-eap-8.0-for-rhel-9-x86_64-rhui-debug-rpms	JBoss Enterprise Application
Platform 8.0 (RHEL 9) (Debug RPMs) from RHUI	disabled
jb-eap-8.0-for-rhel-9-x86_64-rhui-rpms	JBoss Enterprise Application
Platform 8.0 (RHEL 9) (RPMs) from RHUI	disabled
jb-eap-8.0-for-rhel-9-x86_64-rhui-source-rpms	JBoss Enterprise Application
Platform 8.0 (RHEL 9) (Source RPMs) from RHUI	disabled
jb-eap-8.0-for-rhel-9-x86_64-rpms	JBoss Enterprise Application
Platform 8.0 (RHEL 9 x86_64) (RPMs)	disabled
jb-eap-8.0-for-rhel-9-x86_64-source-rpms	JBoss Enterprise Application
Platform 8.0 (RHEL 9 x86_64) (Source RPMs)	disabled
jb-eap-textonly-1-for-middleware-rpms	Red Hat JBoss Enterprise
Application Platform Text-Only Advisories	disabled
jdv-textonly-1-for-middleware-rpms	Red Hat JBoss Data Virtualization
Text-Only Advisories	disabled
jon-textonly-1-for-middleware-rpms	Red Hat JBoss Operations Network
Text-Only Advisories	disabled
jpp-textonly-1-for-middleware-rpms	Red Hat JBoss Portal Text-Only
Advisories	disabled
kmm-1-for-rhel-9-x86_64-debug-rpms	Kernel Module Management 1 for RHEL
9 x86_64 (Debug RPMs)	disabled
kmm-1-for-rhel-9-x86_64-rpms	Kernel Module Management 1 for RHEL

9 x86_64 (RPMs)	disabled
kmm-1-for-rhel-9-x86_64-source-rpms	Kernel Module Management 1 for RHEL
9 x86_64 (Source RPMs)	disabled
kmm-2-for-rhel-9-x86_64-debug-rpms	Kernel Module Management 2 for RHEL
9 x86_64 (Debug RPMs)	disabled
kmm-2-for-rhel-9-x86_64-rpms	Kernel Module Management 2 for RHEL
9 x86_64 (RPMs)	disabled
kmm-2-for-rhel-9-x86_64-source-rpms	Kernel Module Management 2 for RHEL
9 x86_64 (Source RPMs)	disabled
lvms-4.14-for-rhel-9-x86_64-debug-rpms	Logical Volume Manager Storage 4.14
for RHEL 9 x86_64 (Debug RPMs)	disabled
lvms-4.14-for-rhel-9-x86_64-rpms	Logical Volume Manager Storage 4.14
for RHEL 9 x86_64 (RPMs)	disabled
lvms-4.14-for-rhel-9-x86_64-source-rpms	Logical Volume Manager Storage 4.14
for RHEL 9 x86_64 (Source RPMs)	disabled
lvms-4.15-for-rhel-9-x86_64-debug-rpms	Logical Volume Manager Storage 4.15
for RHEL 9 x86_64 (Debug RPMs)	disabled
lvms-4.15-for-rhel-9-x86_64-rpms	Logical Volume Manager Storage 4.15
for RHEL 9 x86_64 (RPMs)	disabled
lvms-4.15-for-rhel-9-x86_64-source-rpms	Logical Volume Manager Storage 4.15
for RHEL 9 x86_64 (Source RPMs)	disabled
lvms-4.16-for-rhel-9-x86_64-debug-rpms	Logical Volume Manager Storage 4.16
for RHEL 9 x86_64 (Debug RPMs)	disabled
lvms-4.16-for-rhel-9-x86_64-rpms	Logical Volume Manager Storage 4.16
for RHEL 9 x86_64 (RPMs)	disabled
lvms-4.16-for-rhel-9-x86_64-source-rpms	Logical Volume Manager Storage 4.16
for RHEL 9 x86_64 (Source RPMs)	disabled
lvms-4.17-for-rhel-9-x86_64-debug-rpms	Logical Volume Manager Storage 4.17
for RHEL 9 x86_64 (Debug RPMs)	disabled
lvms-4.17-for-rhel-9-x86_64-rpms	Logical Volume Manager Storage 4.17
for RHEL 9 x86_64 (RPMs)	disabled
lvms-4.17-for-rhel-9-x86_64-source-rpms	Logical Volume Manager Storage 4.17
for RHEL 9 x86_64 (Source RPMs)	disabled
network-observability-1-for-rhel-9-x86_64-debug-rpms	Network Observability (NETOBSERV) 1

for RHEL 9 x86_64 (Debug RPMs)	disabled
network-observability-1-for-rhel-9-x86_64-rpms	Network Observability (NETOBSERV) 1
for RHEL 9 x86_64 (RPMs)	disabled
network-observability-1-for-rhel-9-x86_64-source-rpms	Network Observability (NETOBSERV) 1
for RHEL 9 x86_64 (Source RPMs)	disabled
ocp-tools-4.15-for-rhel-9-x86_64-debug-rpms	OpenShift Developer Tools and
Services 4.15 (RHEL 9) (x86_64 Debug RPMs)	disabled
ocp-tools-4.15-for-rhel-9-x86_64-rpms	OpenShift Developer Tools and
Services 4.15 (RHEL 9) (x86_64 RPMs)	disabled
ocp-tools-4.15-for-rhel-9-x86_64-source-rpms	OpenShift Developer Tools and
Services 4.15 (RHEL 9) (x86_64 Source RPMs)	disabled
ocp-tools-4.16-for-rhel-9-x86_64-debug-rpms	OpenShift Developer Tools and
Services 4.16 (RHEL 9) (x86_64 Debug RPMs)	disabled
ocp-tools-4.16-for-rhel-9-x86_64-rpms	OpenShift Developer Tools and
Services 4.16 (RHEL 9) (x86_64 RPMs)	disabled
ocp-tools-4.16-for-rhel-9-x86_64-source-rpms	OpenShift Developer Tools and
Services 4.16 (RHEL 9) (x86_64 Source RPMs)	disabled
openjdk-textonly-1-for-middleware-rpms	OpenJDK Text-Only Advisories
disabled	
openliberty-textonly-1-for-middleware-rpms	Open Liberty Text-Only Advisories
disabled	
openstack-17-tools-for-rhel-9-x86_64-debug-rpms	Red Hat OpenStack Platform 17 Tools
for RHEL 9 x86_64 (Debug RPMs)	disabled
openstack-17-tools-for-rhel-9-x86_64-rpms	Red Hat OpenStack Platform 17 Tools
for RHEL 9 x86_64 (RPMs)	disabled
openstack-17-tools-for-rhel-9-x86_64-source-rpms	Red Hat OpenStack Platform 17 Tools
for RHEL 9 x86_64 (Source RPMs)	disabled
openstack-17.1-tools-for-rhel-9-x86_64-debug-rpms	Red Hat OpenStack Platform 17.1
Tools for RHEL 9 x86_64 (Debug RPMs)	disabled
openstack-17.1-tools-for-rhel-9-x86_64-rpms	Red Hat OpenStack Platform 17.1
Tools for RHEL 9 x86_64 (RPMs)	disabled
openstack-17.1-tools-for-rhel-9-x86_64-source-rpms	Red Hat OpenStack Platform 17.1
Tools for RHEL 9 x86_64 (Source RPMs)	disabled
osso-1-for-rhel-9-x86_64-debug-rpms	Secondary Scheduler Operator 1 for

RHEL 9 for Red Hat OpenShift (Debug RPMs)	disabled
osso-1-for-rhel-9-x86_64-files	Secondary Scheduler Operator 1 for disabled
RHEL 9 for Red Hat OpenShift (Files)	disabled
osso-1-for-rhel-9-x86_64-rpms	Secondary Scheduler Operator 1 for disabled
RHEL 9 for Red Hat OpenShift (RPMs)	disabled
osso-1-for-rhel-9-x86_64-source-rpms	Secondary Scheduler Operator 1 for disabled
RHEL 9 for Red Hat OpenShift (Source RPMs)	disabled
quarkus-textonly-1-for-middleware-rpms	Red Hat build of Quarkus Text-Only disabled
Advisories	disabled
rhbop-textonly-1-for-middleware-rpms	Red Hat Build of OptaPlanner Text-disabled
Only Advisories	disabled
rhceph-5-tools-for-rhel-9-x86_64-debug-rpms	Red Hat Ceph Storage Tools 5 for disabled
RHEL 9 x86_64 (Debug RPMs)	disabled
rhceph-5-tools-for-rhel-9-x86_64-rpms	Red Hat Ceph Storage Tools 5 for disabled
RHEL 9 x86_64 (RPMs)	disabled
rhceph-5-tools-for-rhel-9-x86_64-source-rpms	Red Hat Ceph Storage Tools 5 for disabled
RHEL 9 x86_64 (Source RPMs)	disabled
rhceph-6-tools-for-rhel-9-x86_64-debug-rpms	Red Hat Ceph Storage Tools 6 for disabled
RHEL 9 x86_64 (Debug RPMs)	disabled
rhceph-6-tools-for-rhel-9-x86_64-rpms	Red Hat Ceph Storage Tools 6 for disabled
RHEL 9 x86_64 (RPMs)	disabled
rhceph-6-tools-for-rhel-9-x86_64-source-rpms	Red Hat Ceph Storage Tools 6 for disabled
RHEL 9 x86_64 (Source RPMs)	disabled
rhceph-7-tools-for-rhel-9-x86_64-debug-rpms	Red Hat Ceph Storage Tools 7 for disabled
RHEL 9 x86_64 (Debug RPMs)	disabled
rhceph-7-tools-for-rhel-9-x86_64-rpms	Red Hat Ceph Storage Tools 7 for disabled
RHEL 9 x86_64 (RPMs)	disabled
rhceph-7-tools-for-rhel-9-x86_64-source-rpms	Red Hat Ceph Storage Tools 7 for disabled
RHEL 9 x86_64 (Source RPMs)	disabled
rhceph-8-tools-for-rhel-9-x86_64-debug-rpms	Red Hat Ceph Storage Tools 8 for disabled
RHEL 9 x86_64 (Debug RPMs)	disabled
rhceph-8-tools-for-rhel-9-x86_64-rpms	Red Hat Ceph Storage Tools 8 for disabled
RHEL 9 x86_64 (RPMs)	disabled
rhceph-8-tools-for-rhel-9-x86_64-source-rpms	Red Hat Ceph Storage Tools 8 for

RHEL 9 x86_64 (Source RPMs)	disabled
rhdh-1-for-rhel-9-x86_64-debug-rpms (Debug RPMs)	Red Hat Developer Hub 1 (RHEL 9) disabled
rhdh-1-for-rhel-9-x86_64-rpms (RPMs)	Red Hat Developer Hub 1 (RHEL 9) disabled
rhdh-1-for-rhel-9-x86_64-source-rpms (Source RPMs)	Red Hat Developer Hub 1 (RHEL 9) disabled
rhel-9-for-x86_64-appstream-debug-rpms x86_64 - AppStream (Debug RPMs)	Red Hat Enterprise Linux 9 for disabled
rhel-9-for-x86_64-appstream-e4s-debug-rpms x86_64 - AppStream - Update Services for SAP Solutions (Debug RPMs)	Red Hat Enterprise Linux 9 for disabled
rhel-9-for-x86_64-appstream-e4s-rpms x86_64 - AppStream - Update Services for SAP Solutions (RPMs)	Red Hat Enterprise Linux 9 for disabled
rhel-9-for-x86_64-appstream-e4s-source-rpms x86_64 - AppStream - Update Services for SAP Solutions (Source RPMs)	Red Hat Enterprise Linux 9 for disabled
rhel-9-for-x86_64-appstream-eus-debug-rpms x86_64 - AppStream - Extended Update Support (Debug RPMs)	Red Hat Enterprise Linux 9 for disabled
rhel-9-for-x86_64-appstream-eus-rpms x86_64 - AppStream - Extended Update Support (RPMs)	Red Hat Enterprise Linux 9 for disabled
rhel-9-for-x86_64-appstream-eus-source-rpms x86_64 - AppStream - Extended Update Support (Source RPMs)	Red Hat Enterprise Linux 9 for disabled
rhel-9-for-x86_64-appstream-rpms x86_64 - AppStream (RPMs)	Red Hat Enterprise Linux 9 for enabled
rhel-9-for-x86_64-appstream-source-rpms x86_64 - AppStream (Source RPMs)	Red Hat Enterprise Linux 9 for disabled
rhel-9-for-x86_64-baseos-debug-rpms x86_64 - BaseOS (Debug RPMs)	Red Hat Enterprise Linux 9 for disabled
rhel-9-for-x86_64-baseos-e4s-debug-rpms x86_64 - BaseOS - Update Services for SAP Solutions (Debug RPMs)	Red Hat Enterprise Linux 9 for disabled
rhel-9-for-x86_64-baseos-e4s-rpms x86_64 - BaseOS - Update Services for SAP Solutions (RPMs)	Red Hat Enterprise Linux 9 for disabled
rhel-9-for-x86_64-baseos-e4s-source-rpms x86_64 - BaseOS - Update Services for SAP Solutions (Source RPMs)	Red Hat Enterprise Linux 9 for disabled
rhel-9-for-x86_64-baseos-eus-debug-rpms	Red Hat Enterprise Linux 9 for

x86_64 - BaseOS - Extended Update Support (Debug RPMs)	disabled
rhel-9-for-x86_64-baseos-eus-rpms	Red Hat Enterprise Linux 9 for
x86_64 - BaseOS - Extended Update Support (RPMs)	disabled
rhel-9-for-x86_64-baseos-eus-source-rpms	Red Hat Enterprise Linux 9 for
x86_64 - BaseOS - Extended Update Support (Source RPMs)	disabled
rhel-9-for-x86_64-baseos-rpms	Red Hat Enterprise Linux 9 for
x86_64 - BaseOS (RPMs)	enabled
rhel-9-for-x86_64-baseos-source-rpms	Red Hat Enterprise Linux 9 for
x86_64 - BaseOS (Source RPMs)	disabled
rhel-9-for-x86_64-highavailability-debug-rpms	Red Hat Enterprise Linux 9 for
x86_64 - High Availability (Debug RPMs)	disabled
rhel-9-for-x86_64-highavailability-e4s-debug-rpms	Red Hat Enterprise Linux 9 for
x86_64 - High Availability - Update Services for SAP Solutions (Debug RPMs)	disabled
rhel-9-for-x86_64-highavailability-e4s-rpms	Red Hat Enterprise Linux 9 for
x86_64 - High Availability - Update Services for SAP Solutions (RPMs)	disabled
rhel-9-for-x86_64-highavailability-e4s-source-rpms	Red Hat Enterprise Linux 9 for
x86_64 - High Availability - Update Services for SAP Solutions (Source RPMs)	disabled
rhel-9-for-x86_64-highavailability-eus-debug-rpms	Red Hat Enterprise Linux 9 for
x86_64 - High Availability - Extended Update Support (Debug RPMs)	disabled
rhel-9-for-x86_64-highavailability-eus-rpms	Red Hat Enterprise Linux 9 for
x86_64 - High Availability - Extended Update Support (RPMs)	disabled
rhel-9-for-x86_64-highavailability-eus-source-rpms	Red Hat Enterprise Linux 9 for
x86_64 - High Availability - Extended Update Support (Source RPMs)	disabled
rhel-9-for-x86_64-highavailability-rpms	Red Hat Enterprise Linux 9 for
x86_64 - High Availability (RPMs)	disabled
rhel-9-for-x86_64-highavailability-source-rpms	Red Hat Enterprise Linux 9 for
x86_64 - High Availability (Source RPMs)	disabled
rhel-9-for-x86_64-resilientstorage-debug-rpms	Red Hat Enterprise Linux 9 for
x86_64 - Resilient Storage (Debug RPMs)	disabled
rhel-9-for-x86_64-resilientstorage-eus-debug-rpms	Red Hat Enterprise Linux 9 for
x86_64 - Resilient Storage - Extended Update Support (Debug RPMs)	disabled
rhel-9-for-x86_64-resilientstorage-eus-rpms	Red Hat Enterprise Linux 9 for
x86_64 - Resilient Storage - Extended Update Support (RPMs)	disabled
rhel-9-for-x86_64-resilientstorage-eus-source-rpms	Red Hat Enterprise Linux 9 for

x86_64 - Resilient Storage - Extended Update Support (Source RPMs)	disabled
rhel-9-for-x86_64-resilientstorage-rpms	Red Hat Enterprise Linux 9 for
x86_64 - Resilient Storage (RPMs)	disabled
rhel-9-for-x86_64-resilientstorage-source-rpms	Red Hat Enterprise Linux 9 for
x86_64 - Resilient Storage (Source RPMs)	disabled
rhel-9-for-x86_64-rt-debug-rpms	Red Hat Enterprise Linux 9 for
x86_64 - Real Time (Debug RPMs)	disabled
rhel-9-for-x86_64-rt-rpms	Red Hat Enterprise Linux 9 for
x86_64 - Real Time (RPMs)	disabled
rhel-9-for-x86_64-rt-source-rpms	Red Hat Enterprise Linux 9 for
x86_64 - Real Time (Source RPMs)	disabled
rhel-9-for-x86_64-sap-netweaver-debug-rpms	Red Hat Enterprise Linux 9 for
x86_64 - SAP NetWeaver (Debug RPMs)	disabled
rhel-9-for-x86_64-sap-netweaver-e4s-debug-rpms	Red Hat Enterprise Linux 9 for
x86_64 - SAP NetWeaver - Update Services for SAP Solutions (Debug RPMs)	disabled
rhel-9-for-x86_64-sap-netweaver-e4s-rpms	Red Hat Enterprise Linux 9 for
x86_64 - SAP NetWeaver - Update Services for SAP Solutions (RPMs)	disabled
rhel-9-for-x86_64-sap-netweaver-e4s-source-rpms	Red Hat Enterprise Linux 9 for
x86_64 - SAP NetWeaver - Update Services for SAP Solutions (Source RPMs)	disabled
rhel-9-for-x86_64-sap-netweaver-eus-debug-rpms	Red Hat Enterprise Linux 9 for
x86_64 - SAP NetWeaver - Extended Update Support (Debug RPMs)	disabled
rhel-9-for-x86_64-sap-netweaver-eus-rpms	Red Hat Enterprise Linux 9 for
x86_64 - SAP NetWeaver - Extended Update Support (RPMs)	disabled
rhel-9-for-x86_64-sap-netweaver-eus-source-rpms	Red Hat Enterprise Linux 9 for
x86_64 - SAP NetWeaver - Extended Update Support (Source RPMs)	disabled
rhel-9-for-x86_64-sap-netweaver-rpms	Red Hat Enterprise Linux 9 for
x86_64 - SAP NetWeaver (RPMs)	disabled
rhel-9-for-x86_64-sap-netweaver-source-rpms	Red Hat Enterprise Linux 9 for
x86_64 - SAP NetWeaver (Source RPMs)	disabled
rhel-9-for-x86_64-sap-solutions-debug-rpms	Red Hat Enterprise Linux 9 for
x86_64 - SAP Solutions (Debug RPMs)	disabled
rhel-9-for-x86_64-sap-solutions-e4s-debug-rpms	Red Hat Enterprise Linux 9 for
x86_64 - SAP Solutions - Update Services for SAP Solutions (Debug RPMs)	disabled
rhel-9-for-x86_64-sap-solutions-e4s-rpms	Red Hat Enterprise Linux 9 for

x86_64 - SAP Solutions - Update Services for SAP Solutions (RPMs)	disabled
rhel-9-for-x86_64-sap-solutions-e4s-source-rpms	Red Hat Enterprise Linux 9 for
x86_64 - SAP Solutions - Update Services for SAP Solutions (Source RPMs)	disabled
rhel-9-for-x86_64-sap-solutions-eus-debug-rpms	Red Hat Enterprise Linux 9 for
x86_64 - SAP Solutions - Extended Update Support (Debug RPMs)	disabled
rhel-9-for-x86_64-sap-solutions-eus-rpms	Red Hat Enterprise Linux 9 for
x86_64 - SAP Solutions - Extended Update Support (RPMs)	disabled
rhel-9-for-x86_64-sap-solutions-eus-source-rpms	Red Hat Enterprise Linux 9 for
x86_64 - SAP Solutions - Extended Update Support (Source RPMs)	disabled
rhel-9-for-x86_64-sap-solutions-rpms	Red Hat Enterprise Linux 9 for
x86_64 - SAP Solutions (RPMs)	disabled
rhel-9-for-x86_64-sap-solutions-source-rpms	Red Hat Enterprise Linux 9 for
x86_64 - SAP Solutions (Source RPMs)	disabled
rhel-9-for-x86_64-supplementary-debug-rpms	Red Hat Enterprise Linux 9 for
x86_64 - Supplementary (Debug RPMs)	disabled
rhel-9-for-x86_64-supplementary-eus-debug-rpms	Red Hat Enterprise Linux 9 for
x86_64 - Supplementary - Extended Update Support (Debug RPMs)	disabled
rhel-9-for-x86_64-supplementary-eus-rpms	Red Hat Enterprise Linux 9 for
x86_64 - Supplementary - Extended Update Support (RPMs)	disabled
rhel-9-for-x86_64-supplementary-eus-source-rpms	Red Hat Enterprise Linux 9 for
x86_64 - Supplementary - Extended Update Support (Source RPMs)	disabled
rhel-9-for-x86_64-supplementary-rpms	Red Hat Enterprise Linux 9 for
x86_64 - Supplementary (RPMs)	disabled
rhel-9-for-x86_64-supplementary-source-rpms	Red Hat Enterprise Linux 9 for
x86_64 - Supplementary (Source RPMs)	disabled
rhel-atomic-7-cdk-2.3-debug-rpms	Red Hat Container Development Kit
2.3 /(Debug RPMs)	disabled
rhel-atomic-7-cdk-2.3-rpms	Red Hat Container Development Kit
2.3 /(RPMs)	disabled
rhel-atomic-7-cdk-2.3-source-rpms	Red Hat Container Development Kit
2.3 /(Source RPMs)	disabled
rhel-atomic-7-cdk-3.10-rpms	Red Hat Container Development Kit
3.10 /(RPMs)	disabled
rhel-atomic-7-cdk-3.11-rpms	Red Hat Container Development Kit

3.11 /(RPMs)	disabled
rhel-atomic-7-cdk-3.12-rpms	Red Hat Container Development Kit
3.12 /(RPMs)	disabled
rhel-atomic-7-cdk-3.13-rpms	Red Hat Container Development Kit
3.13 /(RPMs)	disabled
rhel-atomic-7-cdk-3.14-rpms	Red Hat Container Development Kit
3.14 /(RPMs)	disabled
rhel-atomic-7-cdk-3.15-rpms	Red Hat Container Development Kit
3.15 /(RPMs)	disabled
rhel-atomic-7-cdk-3.16-rpms	Red Hat Container Development Kit
3.16 /(RPMs)	disabled
rhel-atomic-7-cdk-3.17-rpms	Red Hat Container Development Kit
3.17 /(RPMs)	disabled
rhel-atomic-7-cdk-3.3-debug-rpms	Red Hat Container Development Kit
3.3 /(Debug RPMs)	disabled
rhel-atomic-7-cdk-3.3-rpms	Red Hat Container Development Kit
3.3 /(RPMs)	disabled
rhel-atomic-7-cdk-3.3-source-rpms	Red Hat Container Development Kit
3.3 /(Source RPMs)	disabled
rhel-atomic-7-cdk-3.4-debug-rpms	Red Hat Container Development Kit
3.4 /(Debug RPMs)	disabled
rhel-atomic-7-cdk-3.4-rpms	Red Hat Container Development Kit
3.4 /(RPMs)	disabled
rhel-atomic-7-cdk-3.4-source-rpms	Red Hat Container Development Kit
3.4 /(Source RPMs)	disabled
rhel-atomic-7-cdk-3.5-debug-rpms	Red Hat Container Development Kit
3.5 /(Debug RPMs)	disabled
rhel-atomic-7-cdk-3.5-rpms	Red Hat Container Development Kit
3.5 /(RPMs)	disabled
rhel-atomic-7-cdk-3.5-source-rpms	Red Hat Container Development Kit
3.5 /(Source RPMs)	disabled
rhel-atomic-7-cdk-3.6-debug-rpms	Red Hat Container Development Kit
3.6 /(Debug RPMs)	disabled
rhel-atomic-7-cdk-3.6-rpms	Red Hat Container Development Kit

3.6 /(RPMs)	disabled
rhel-atomic-7-cdk-3.6-source-rpms	Red Hat Container Development Kit
3.6 /(Source RPMs)	disabled
rhel-atomic-7-cdk-3.7-rpms	Red Hat Container Development Kit
3.7 /(RPMs)	disabled
rhel-atomic-7-cdk-3.8-rpms	Red Hat Container Development Kit
3.8 /(RPMs)	disabled
rhel-atomic-7-cdk-3.9-rpms	Red Hat Container Development Kit
3.9 /(RPMs)	disabled
rhelai-1.1-for-rhel-9-x86_64-debug-rpms	Red Hat Enterprise Linux AI (1.1)
for RHEL 9 x86_64 (Debug RPMs)	disabled
rhelai-1.1-for-rhel-9-x86_64-rpms	Red Hat Enterprise Linux AI (1.1)
for RHEL 9 x86_64 (RPMs)	disabled
rhelai-1.1-for-rhel-9-x86_64-source-rpms	Red Hat Enterprise Linux AI (1.1)
for RHEL 9 x86_64 (Source RPMs)	disabled
rhelai-1.2-for-rhel-9-x86_64-debug-rpms	Red Hat Enterprise Linux AI (1.2)
for RHEL 9 x86_64 (Debug RPMs)	disabled
rhelai-1.2-for-rhel-9-x86_64-rpms	Red Hat Enterprise Linux AI (1.2)
for RHEL 9 x86_64 (RPMs)	disabled
rhelai-1.2-for-rhel-9-x86_64-source-rpms	Red Hat Enterprise Linux AI (1.2)
for RHEL 9 x86_64 (Source RPMs)	disabled
rhelai-1.2-gaudi-for-rhel-9-x86_64-debug-rpms	Red Hat Enterprise Linux AI (1.2)
for RHEL 9 x86_64 - Gaudi (Debug RPMs)	disabled
rhelai-1.2-gaudi-for-rhel-9-x86_64-rpms	Red Hat Enterprise Linux AI (1.2)
for RHEL 9 x86_64 - Gaudi (RPMs)	disabled
rhelai-1.2-gaudi-for-rhel-9-x86_64-source-rpms	Red Hat Enterprise Linux AI (1.2)
for RHEL 9 x86_64 - Gaudi (Source RPMs)	disabled
rhocp-4.12-for-rhel-9-x86_64-debug-rpms	Red Hat OpenShift Container
Platform 4.12 for RHEL 9 x86_64 (Debug RPMs)	disabled
rhocp-4.12-for-rhel-9-x86_64-rpms	Red Hat OpenShift Container
Platform 4.12 for RHEL 9 x86_64 (RPMs)	disabled
rhocp-4.12-for-rhel-9-x86_64-source-rpms	Red Hat OpenShift Container
Platform 4.12 for RHEL 9 x86_64 (Source RPMs)	disabled
rhocp-4.13-for-rhel-9-x86_64-debug-rpms	Red Hat OpenShift Container

Platform 4.13 for RHEL 9 x86_64 (Debug RPMs)		disabled
rhocp-4.13-for-rhel-9-x86_64-rpms	Red Hat OpenShift Container	disabled
Platform 4.13 for RHEL 9 x86_64 (RPMs)		disabled
rhocp-4.13-for-rhel-9-x86_64-source-rpms	Red Hat OpenShift Container	disabled
Platform 4.13 for RHEL 9 x86_64 (Source RPMs)		disabled
rhocp-4.14-for-rhel-9-x86_64-debug-rpms	Red Hat OpenShift Container	disabled
Platform 4.14 for RHEL 9 x86_64 (Debug RPMs)		disabled
rhocp-4.14-for-rhel-9-x86_64-rpms	Red Hat OpenShift Container	disabled
Platform 4.14 for RHEL 9 x86_64 (RPMs)		disabled
rhocp-4.14-for-rhel-9-x86_64-source-rpms	Red Hat OpenShift Container	disabled
Platform 4.14 for RHEL 9 x86_64 (Source RPMs)		disabled
rhocp-4.15-for-rhel-9-x86_64-debug-rpms	Red Hat OpenShift Container	disabled
Platform 4.15 for RHEL 9 x86_64 (Debug RPMs)		disabled
rhocp-4.15-for-rhel-9-x86_64-rpms	Red Hat OpenShift Container	disabled
Platform 4.15 for RHEL 9 x86_64 (RPMs)		disabled
rhocp-4.15-for-rhel-9-x86_64-source-rpms	Red Hat OpenShift Container	disabled
Platform 4.15 for RHEL 9 x86_64 (Source RPMs)		disabled
rhocp-4.16-for-rhel-9-x86_64-debug-rpms	Red Hat OpenShift Container	disabled
Platform 4.16 for RHEL 9 x86_64 (Debug RPMs)		disabled
rhocp-4.16-for-rhel-9-x86_64-rpms	Red Hat OpenShift Container	disabled
Platform 4.16 for RHEL 9 x86_64 (RPMs)		disabled
rhocp-4.16-for-rhel-9-x86_64-source-rpms	Red Hat OpenShift Container	disabled
Platform 4.16 for RHEL 9 x86_64 (Source RPMs)		disabled
rhocp-4.17-for-rhel-9-x86_64-debug-rpms	Red Hat OpenShift Container	disabled
Platform 4.17 for RHEL 9 x86_64 (Debug RPMs)		disabled
rhocp-4.17-for-rhel-9-x86_64-rpms	Red Hat OpenShift Container	disabled
Platform 4.17 for RHEL 9 x86_64 (RPMs)		disabled
rhocp-4.17-for-rhel-9-x86_64-source-rpms	Red Hat OpenShift Container	disabled
Platform 4.17 for RHEL 9 x86_64 (Source RPMs)		disabled
rhocp-ironic-4.12-for-rhel-9-x86_64-debug-rpms	Ironic content for Red Hat	disabled
OpenShift Container Platform 4.12 for RHEL 9 x86_64 (Debug RPMs)		disabled
rhocp-ironic-4.12-for-rhel-9-x86_64-rpms	Ironic content for Red Hat	disabled
OpenShift Container Platform 4.12 for RHEL 9 x86_64 (RPMs)		disabled
rhocp-ironic-4.12-for-rhel-9-x86_64-source-rpms	Ironic content for Red Hat	

OpenShift Container Platform 4.12 for RHEL 9 x86_64 (Source RPMs)	disabled
rhocp-ironic-4.13-for-rhel-9-x86_64-debug-rpms	Ironic content for Red Hat
OpenShift Container Platform 4.13 for RHEL 9 x86_64 (Debug RPMs)	disabled
rhocp-ironic-4.13-for-rhel-9-x86_64-rpms	Ironic content for Red Hat
OpenShift Container Platform 4.13 for RHEL 9 x86_64 (RPMs)	disabled
rhocp-ironic-4.13-for-rhel-9-x86_64-source-rpms	Ironic content for Red Hat
OpenShift Container Platform 4.13 for RHEL 9 x86_64 (Source RPMs)	disabled
rhocp-ironic-4.14-for-rhel-9-x86_64-debug-rpms	Ironic content for Red Hat
OpenShift Container Platform 4.14 for RHEL 9 x86_64 (Debug RPMs)	disabled
rhocp-ironic-4.14-for-rhel-9-x86_64-rpms	Ironic content for Red Hat
OpenShift Container Platform 4.14 for RHEL 9 x86_64 (RPMs)	disabled
rhocp-ironic-4.14-for-rhel-9-x86_64-source-rpms	Ironic content for Red Hat
OpenShift Container Platform 4.14 for RHEL 9 x86_64 (Source RPMs)	disabled
rhocp-ironic-4.15-for-rhel-9-x86_64-debug-rpms	Ironic content for Red Hat
OpenShift Container Platform 4.15 for RHEL 9 x86_64 (Debug RPMs)	disabled
rhocp-ironic-4.15-for-rhel-9-x86_64-rpms	Ironic content for Red Hat
OpenShift Container Platform 4.15 for RHEL 9 x86_64 (RPMs)	disabled
rhocp-ironic-4.15-for-rhel-9-x86_64-source-rpms	Ironic content for Red Hat
OpenShift Container Platform 4.15 for RHEL 9 x86_64 (Source RPMs)	disabled
rhocp-ironic-4.16-for-rhel-9-x86_64-debug-rpms	Ironic content for Red Hat
OpenShift Container Platform 4.16 for RHEL 9 x86_64 (Debug RPMs)	disabled
rhocp-ironic-4.16-for-rhel-9-x86_64-rpms	Ironic content for Red Hat
OpenShift Container Platform 4.16 for RHEL 9 x86_64 (RPMs)	disabled
rhocp-ironic-4.16-for-rhel-9-x86_64-source-rpms	Ironic content for Red Hat
OpenShift Container Platform 4.16 for RHEL 9 x86_64 (Source RPMs)	disabled
rhocp-ironic-4.17-for-rhel-9-x86_64-debug-rpms	Ironic content for Red Hat
OpenShift Container Platform 4.17 for RHEL 9 x86_64 (Debug RPMs)	disabled
rhocp-ironic-4.17-for-rhel-9-x86_64-rpms	Ironic content for Red Hat
OpenShift Container Platform 4.17 for RHEL 9 x86_64 (RPMs)	disabled
rhocp-ironic-4.17-for-rhel-9-x86_64-source-rpms	Ironic content for Red Hat
OpenShift Container Platform 4.17 for RHEL 9 x86_64 (Source RPMs)	disabled
rhosds-textonly-3-for-middleware-rpms	Red Hat OpenShift Dev Spaces 3
Container Advisories	disabled
rhose-textonly-1-for-middleware-rpms	Red Hat Middleware Container

Advisories	disabled
rhoso-tools-18-beta-for-rhel-9-x86_64-debug-rpms OpenShift 18 Tools Beta for RHEL 9 x86_64 (Debug RPMs)	Red Hat OpenStack Services on disabled
rhoso-tools-18-beta-for-rhel-9-x86_64-rpms OpenShift 18 Tools Beta for RHEL 9 x86_64 (RPMs)	Red Hat OpenStack Services on disabled
rhoso-tools-18-beta-for-rhel-9-x86_64-source-rpms OpenShift 18 Tools Beta for RHEL 9 x86_64 (Source RPMs)	Red Hat OpenStack Services on disabled
rhoso-tools-18-for-rhel-9-x86_64-debug-rpms OpenShift 18 Tools for RHEL 9 x86_64 (Debug RPMs)	Red Hat OpenStack Services on disabled
rhoso-tools-18-for-rhel-9-x86_64-rpms OpenShift 18 Tools for RHEL 9 x86_64 (RPMs)	Red Hat OpenStack Services on disabled
rhoso-tools-18-for-rhel-9-x86_64-source-rpms OpenShift 18 Tools for RHEL 9 x86_64 (Source RPMs)	Red Hat OpenStack Services on disabled
rhpm-1-for-rhel-9-x86_64-textonly-debug-rpms OpenShift (for RHEL 9 x86_64) (Debug RPMs)	Power monitoring for Red Hat disabled
rhpm-1-for-rhel-9-x86_64-textonly-rpms OpenShift (for RHEL 9 x86_64) (RPMs)	Power monitoring for Red Hat disabled
rhpm-1-for-rhel-9-x86_64-textonly-source-rpms OpenShift (for RHEL 9 x86_64) (Source RPMs)	Power monitoring for Red Hat disabled
rhsi-textonly-1-for-middleware-rpms	Red Hat Service Interconnect Text-disabled
Only Advisories	
rhv-4-tools-for-rhel-9-x86_64-debug-rpms RHEL 9 x86_64 (Debug RPMs)	Red Hat Virtualization 4 Tools for disabled
rhv-4-tools-for-rhel-9-x86_64-rpms RHEL 9 x86_64 (RPMs)	Red Hat Virtualization 4 Tools for disabled
rhv-4-tools-for-rhel-9-x86_64-source-rpms RHEL 9 x86_64 (Source RPMs)	Red Hat Virtualization 4 Tools for disabled
rodo-1-for-rhel-9-x86_64-debug-rpms (RODO0) 1 for RHEL 9 x86_64 (Debug RPMs)	Run Once Duration Override Operator disabled
rodo-1-for-rhel-9-x86_64-rpms (RODO0) 1 for RHEL 9 x86_64 (RPMs)	Run Once Duration Override Operator disabled
rodo-1-for-rhel-9-x86_64-source-rpms (RODO0) 1 for RHEL 9 x86_64 (Source RPMs)	Run Once Duration Override Operator disabled
satellite-client-6-for-rhel-9-x86_64-debug-rpms	Red Hat Satellite Client 6 for RHEL

9 x86_64 (Debug RPMs)	disabled
satellite-client-6-for-rhel-9-x86_64-e4s-debug-rpms	Red Hat Satellite Client 6 for RHEL
9 x86_64 - Update Services for SAP Solutions (Debug RPMs)	disabled
satellite-client-6-for-rhel-9-x86_64-e4s-rpms	Red Hat Satellite Client 6 for RHEL
9 x86_64 - Update Services for SAP Solutions (RPMs)	disabled
satellite-client-6-for-rhel-9-x86_64-e4s-source-rpms	Red Hat Satellite Client 6 for RHEL
9 x86_64 - Update Services for SAP Solutions (Source RPMs)	disabled
satellite-client-6-for-rhel-9-x86_64-eus-debug-rpms	Red Hat Satellite Client 6 for RHEL
9 x86_64 - Extended Update Support (Debug RPMs)	disabled
satellite-client-6-for-rhel-9-x86_64-eus-rpms	Red Hat Satellite Client 6 for RHEL
9 x86_64 - Extended Update Support (RPMs)	disabled
satellite-client-6-for-rhel-9-x86_64-eus-source-rpms	Red Hat Satellite Client 6 for RHEL
9 x86_64 - Extended Update Support (Source RPMs)	disabled
satellite-client-6-for-rhel-9-x86_64-rpms	Red Hat Satellite Client 6 for RHEL
9 x86_64 (RPMs)	disabled
satellite-client-6-for-rhel-9-x86_64-source-rpms	Red Hat Satellite Client 6 for RHEL
9 x86_64 (Source RPMs)	disabled
satellite-maintenance-6.16-for-rhel-9-x86_64-debug-rpms	Red Hat Satellite Maintenance 6.16
for RHEL 9 x86_64 (Debug RPMs)	disabled
satellite-maintenance-6.16-for-rhel-9-x86_64-rpms	Red Hat Satellite Maintenance 6.16
for RHEL 9 x86_64 (RPMs)	disabled
satellite-maintenance-6.16-for-rhel-9-x86_64-source-rpms	Red Hat Satellite Maintenance 6.16
for RHEL 9 x86_64 (Source RPMs)	disabled
satellite-utils-6.16-for-rhel-9-x86_64-debug-rpms	Red Hat Satellite Utils 6.16 for
RHEL 9 x86_64 (Debug RPMs)	disabled
satellite-utils-6.16-for-rhel-9-x86_64-rpms	Red Hat Satellite Utils 6.16 for
RHEL 9 x86_64 (RPMs)	disabled
satellite-utils-6.16-for-rhel-9-x86_64-source-rpms	Red Hat Satellite Utils 6.16 for
RHEL 9 x86_64 (Source RPMs)	disabled
service-interconnect-1-for-rhel-9-x86_64-debug-rpms	Red Hat Service Interconnect for
RHEL 9 x86_64 (Debug RPMs)	disabled
service-interconnect-1-for-rhel-9-x86_64-rpms	Red Hat Service Interconnect for
RHEL 9 x86_64 (RPMs)	disabled
service-interconnect-1-for-rhel-9-x86_64-source-rpms	Red Hat Service Interconnect for

RHEL 9 x86_64 (Source RPMs)	disabled
service-interconnect-1.4-for-rhel-9-x86_64-debug-rpms for RHEL 9 x86_64 (Debug RPMs)	Red Hat Service Interconnect 1.4 disabled
service-interconnect-1.4-for-rhel-9-x86_64-rpms for RHEL 9 x86_64 (RPMs)	Red Hat Service Interconnect 1.4 disabled
service-interconnect-1.4-for-rhel-9-x86_64-source-rpms for RHEL 9 x86_64 (Source RPMs)	Red Hat Service Interconnect 1.4 disabled
service-interconnect-1.8-for-rhel-9-x86_64-debug-rpms for RHEL 9 x86_64 (Debug RPMs)	Red Hat Service Interconnect 1.8 disabled
service-interconnect-1.8-for-rhel-9-x86_64-rpms for RHEL 9 x86_64 (RPMs)	Red Hat Service Interconnect 1.8 disabled
service-interconnect-1.8-for-rhel-9-x86_64-source-rpms for RHEL 9 x86_64 (Source RPMs)	Red Hat Service Interconnect 1.8 disabled
soa-textonly-1-for-middleware-rpms Advisories	Red Hat JBoss SOA Text-Only disabled
wfk-textonly-1-for-middleware-rpms Text-Only Advisories	Red Hat JBoss Web Framework Kit disabled

Pour ne consulter que la liste des dépôts actifs, utilisez la commande **repolist** seule :

```
[root@redhat9 ~]# dnf repolist
Updating Subscription Management repositories.
repo id                                repo name
codeready-builder-for-rhel-9-x86_64-rpms  Red Hat CodeReady
Linux Builder for RHEL 9 x86_64 (RPMs)
epel                                     Extra Packages for
Enterprise Linux 9 - x86_64
epel-cisco-openh264                    Extra Packages for
Enterprise Linux 9 openh264 (From Cisco) - x86_64
epel-next                               Extra Packages for
Enterprise Linux 9 - Next - x86_64
rhel-9-for-x86_64-appstream-rpms        Red Hat Enterprise
Linux 9 for x86_64 - AppStream (RPMs)
rhel-9-for-x86_64-baseos-rpms          Red Hat Enterprise
```

Linux 9 for x86_64 - BaseOS (RPMs)

Pour désactiver un dépôt, il convient d'utiliser la commande **yum-config-manager** :

```
[root@redhat9 ~]# yum-config-manager --disable epel
bash: yum-config-manager: command not found...
Install package 'yum-utils' to provide command 'yum-config-manager'? [N/y] y
```

```
* Waiting in queue...
* Loading list of packages....
The following packages have to be installed:
yum-utils-4.3.0-13.el9.noarch Yum-utils CLI compatibility layer
Proceed with changes? [N/y] y
```

```
* Waiting in queue...
* Waiting for authentication...
* Waiting in queue...
* Downloading packages...
* Requesting data...
* Testing changes...
* Installing packages...
Updating Subscription Management repositories.
```

```
[root@redhat9 ~]# dnf repolist
Updating Subscription Management repositories.
repo id                                repo name
codeready-builder-for-rhel-9-x86_64-rpms Red Hat CodeReady
Linux Builder for RHEL 9 x86_64 (RPMs)
epel-cisco-openh264                    Extra Packages for
Enterprise Linux 9 openh264 (From Cisco) - x86_64
epel-next                                Extra Packages for
Enterprise Linux 9 - Next - x86_64
```

```
rhel-9-for-x86_64-appstream-rpms          Red Hat Enterprise
Linux 9 for x86_64 - AppStream (RPMs)
rhel-9-for-x86_64-baseos-rpms            Red Hat Enterprise
Linux 9 for x86_64 - BaseOS (RPMs)
```

Pour activer un dépôt, il convient d'utiliser la commande **yum-config-manager** de nouveau :

```
[root@redhat9 ~]# yum-config-manager --enable epel
Updating Subscription Management repositories.

[root@redhat9 ~]# dnf repolist
Updating Subscription Management repositories.
repo id                                repo name
codeready-builder-for-rhel-9-x86_64-rpms  Red Hat CodeReady
Linux Builder for RHEL 9 x86_64 (RPMs)
epel                                     Extra Packages for
Enterprise Linux 9 - x86_64
epel-cisco-openh264                     Extra Packages for
Enterprise Linux 9 openh264 (From Cisco) - x86_64
epel-next                                Extra Packages for
Enterprise Linux 9 - Next - x86_64
rhel-9-for-x86_64-appstream-rpms         Red Hat Enterprise
Linux 9 for x86_64 - AppStream (RPMs)
rhel-9-for-x86_64-baseos-rpms            Red Hat Enterprise
Linux 9 for x86_64 - BaseOS (RPMs)
```

2.4 - Rechercher des Paquets

Pour lister tous les paquets installés **et** disponibles il convient d'utiliser la commande **list** :

```
[root@redhat9 ~]# dnf list | more
Updating Subscription Management repositories.
Last metadata expiration check: 3:33:08 ago on Mon 30 Sep 2024 07:52:55 AM CEST.
```

Installed Packages

ModemManager.x86_64	1.20.2-1.el9
@anaconda	
ModemManager-glib.x86_64	1.20.2-1.el9
@anaconda	
NetworkManager.x86_64	1:1.46.0-19.el9_4
@rhel-9-for-x86_64-baseos-rpms	
NetworkManager-ads1.x86_64	1:1.46.0-19.el9_4
@rhel-9-for-x86_64-baseos-rpms	
NetworkManager-bluetooth.x86_64	1:1.46.0-19.el9_4
@rhel-9-for-x86_64-baseos-rpms	
NetworkManager-config-server.noarch	1:1.46.0-19.el9_4
@rhel-9-for-x86_64-baseos-rpms	
NetworkManager-libnm.x86_64	1:1.46.0-19.el9_4
@rhel-9-for-x86_64-baseos-rpms	
NetworkManager-team.x86_64	1:1.46.0-19.el9_4
@rhel-9-for-x86_64-baseos-rpms	
NetworkManager-tui.x86_64	1:1.46.0-19.el9_4
@rhel-9-for-x86_64-baseos-rpms	
NetworkManager-wifi.x86_64	1:1.46.0-19.el9_4
@rhel-9-for-x86_64-baseos-rpms	
NetworkManager-wwan.x86_64	1:1.46.0-19.el9_4
@rhel-9-for-x86_64-baseos-rpms	
PackageKit.x86_64	1.2.6-1.el9
@rhel-9-for-x86_64-appstream-rpms	
PackageKit-command-not-found.x86_64	1.2.6-1.el9
@rhel-9-for-x86_64-appstream-rpms	
PackageKit-glib.x86_64	1.2.6-1.el9
@rhel-9-for-x86_64-appstream-rpms	
PackageKit-gstreamer-plugin.x86_64	1.2.6-1.el9
@rhel-9-for-x86_64-appstream-rpms	
PackageKit-gtk3-module.x86_64	1.2.6-1.el9
@rhel-9-for-x86_64-appstream-rpms	
aardvark-dns.x86_64	2:1.10.0-3.el9_4

@rhel-9-for-x86_64-appstream-rpms abattis-cantarell-fonts.noarch	0.301-4.el9
@AppStream accountsservice.x86_64	0.6.55-10.el9
@AppStream accountsservice-libs.x86_64	0.6.55-10.el9
@AppStream acl.x86_64	2.3.1-4.el9
@rhel-9-for-x86_64-baseos-rpms adcli.x86_64	0.9.2-1.el9
@anaconda adobe-mappings-cmap.noarch	20171205-12.el9
@AppStream adobe-mappings-cmap-deprecated.noarch	20171205-12.el9
@AppStream adobe-mappings-pdf.noarch	20180407-10.el9
@AppStream adobe-source-code-pro-fonts.noarch	2.030.1.050-12.el9.1
@anaconda adwaita-cursor-theme.noarch	40.1.1-3.el9
@AppStream adwaita-icon-theme.noarch	40.1.1-3.el9
@AppStream alsa-lib.x86_64	1.2.10-2.el9
@rhel-9-for-x86_64-appstream-rpms alsa-ucm.noarch	1.2.10-2.el9
@rhel-9-for-x86_64-appstream-rpms alsa-utils.x86_64	1.2.10-1.el9
@rhel-9-for-x86_64-appstream-rpms alternatives.x86_64	1.24-1.el9
@rhel-9-for-x86_64-baseos-rpms appstream.x86_64	0.16.1-1.el9
@rhel-9-for-x86_64-appstream-rpms appstream-data.noarch	1:9-20230504.el9

@rhel-9-for-x86_64-appstream-rpms apr.x86_64	1.7.0-12.el9_3
@rhel-9-for-x86_64-appstream-rpms apr-util.x86_64	1.6.1-23.el9
@rhel-9-for-x86_64-appstream-rpms apr-util-bdb.x86_64	1.6.1-23.el9
@rhel-9-for-x86_64-appstream-rpms apr-util-openssl.x86_64	1.6.1-23.el9
@rhel-9-for-x86_64-appstream-rpms at.x86_64	3.1.23-11.el9
@anaconda at-spi2-atk.x86_64	2.38.0-4.el9
@AppStream at-spi2-core.x86_64	2.40.3-1.el9
@AppStream atk.x86_64	2.36.0-5.el9
@AppStream atkmm.x86_64	2.28.2-2.el9
@AppStream attr.x86_64	2.5.1-3.el9
@anaconda audit.x86_64	3.1.2-2.el9
@rhel-9-for-x86_64-baseos-rpms audit-libs.x86_64	3.1.2-2.el9
@rhel-9-for-x86_64-baseos-rpms authselect.x86_64	1.2.6-2.el9
@rhel-9-for-x86_64-baseos-rpms authselect-libs.x86_64	1.2.6-2.el9
@rhel-9-for-x86_64-baseos-rpms avahi.x86_64	0.8-20.el9
@rhel-9-for-x86_64-baseos-rpms avahi-glib.x86_64	0.8-20.el9
@rhel-9-for-x86_64-appstream-rpms avahi-libs.x86_64	0.8-20.el9

```
@rhel-9-for-x86_64-baseos-rpms
baobab.x86_64
@AppStream
--More--
[q]
```

40.0-3.el9

Pour ne lister que les paquets installés, la commande list prend l'option **installed** :

```
[root@redhat9 ~]# dnf list installed | more
Updating Subscription Management repositories.
Installed Packages
ModemManager.x86_64                1.20.2-1.el9                @anaconda
ModemManager-glib.x86_64           1.20.2-1.el9                @anaconda
NetworkManager.x86_64              1:1.46.0-19.el9_4          @rhel-9-for-x86_64-baseos-rpms
NetworkManager-adsl.x86_64         1:1.46.0-19.el9_4          @rhel-9-for-x86_64-baseos-rpms
NetworkManager-bluetooth.x86_64   1:1.46.0-19.el9_4          @rhel-9-for-x86_64-baseos-rpms
NetworkManager-config-server.noarch 1:1.46.0-19.el9_4          @rhel-9-for-x86_64-baseos-rpms
NetworkManager-libnm.x86_64        1:1.46.0-19.el9_4          @rhel-9-for-x86_64-baseos-rpms
NetworkManager-team.x86_64         1:1.46.0-19.el9_4          @rhel-9-for-x86_64-baseos-rpms
NetworkManager-tui.x86_64          1:1.46.0-19.el9_4          @rhel-9-for-x86_64-baseos-rpms
NetworkManager-wifi.x86_64         1:1.46.0-19.el9_4          @rhel-9-for-x86_64-baseos-rpms
NetworkManager-wwan.x86_64         1:1.46.0-19.el9_4          @rhel-9-for-x86_64-baseos-rpms
PackageKit.x86_64                  1.2.6-1.el9                 @rhel-9-for-x86_64-appstream-
rpms
PackageKit-command-not-found.x86_64 1.2.6-1.el9                 @rhel-9-for-x86_64-appstream-
rpms
PackageKit-glib.x86_64              1.2.6-1.el9                 @rhel-9-for-x86_64-appstream-
rpms
PackageKit-gstreamer-plugin.x86_64  1.2.6-1.el9                 @rhel-9-for-x86_64-appstream-
rpms
PackageKit-gtk3-module.x86_64       1.2.6-1.el9                 @rhel-9-for-x86_64-appstream-
rpms
aardvark-dns.x86_64                 2:1.10.0-3.el9_4           @rhel-9-for-x86_64-appstream-
```

abattis-cantarell-fonts.noarch	0.301-4.el9	@AppStream
accountsservice.x86_64	0.6.55-10.el9	@AppStream
accountsservice-libs.x86_64	0.6.55-10.el9	@AppStream
acl.x86_64	2.3.1-4.el9	@rhel-9-for-x86_64-baseos-rpms
adcli.x86_64	0.9.2-1.el9	@anaconda
adobe-mappings-cmap.noarch	20171205-12.el9	@AppStream
adobe-mappings-cmap-deprecated.noarch	20171205-12.el9	@AppStream
adobe-mappings-pdf.noarch	20180407-10.el9	@AppStream
adobe-source-code-pro-fonts.noarch	2.030.1.050-12.el9.1	@anaconda
adwaita-cursor-theme.noarch	40.1.1-3.el9	@AppStream
adwaita-icon-theme.noarch	40.1.1-3.el9	@AppStream
alsa-lib.x86_64 rpms	1.2.10-2.el9	@rhel-9-for-x86_64-appstream-
alsa-ucm.noarch rpms	1.2.10-2.el9	@rhel-9-for-x86_64-appstream-
alsa-utils.x86_64 rpms	1.2.10-1.el9	@rhel-9-for-x86_64-appstream-
alternatives.x86_64	1.24-1.el9	@rhel-9-for-x86_64-baseos-rpms
appstream.x86_64 rpms	0.16.1-1.el9	@rhel-9-for-x86_64-appstream-
appstream-data.noarch rpms	1:9-20230504.el9	@rhel-9-for-x86_64-appstream-
apr.x86_64 rpms	1.7.0-12.el9_3	@rhel-9-for-x86_64-appstream-
apr-util.x86_64 rpms	1.6.1-23.el9	@rhel-9-for-x86_64-appstream-
apr-util-bdb.x86_64 rpms	1.6.1-23.el9	@rhel-9-for-x86_64-appstream-
apr-util-openssl.x86_64 rpms	1.6.1-23.el9	@rhel-9-for-x86_64-appstream-
at.x86_64	3.1.23-11.el9	@anaconda
at-spi2-atk.x86_64	2.38.0-4.el9	@AppStream
at-spi2-core.x86_64	2.40.3-1.el9	@AppStream
atk.x86_64	2.36.0-5.el9	@AppStream

```

atkmm.x86_64                2.28.2-2.el9                @AppStream
attr.x86_64                 2.5.1-3.el9                 @anaconda
audit.x86_64                3.1.2-2.el9                 @rhel-9-for-x86_64-baseos-rpms
audit-libs.x86_64          3.1.2-2.el9                 @rhel-9-for-x86_64-baseos-rpms
authselect.x86_64          1.2.6-2.el9                 @rhel-9-for-x86_64-baseos-rpms
authselect-libs.x86_64     1.2.6-2.el9                 @rhel-9-for-x86_64-baseos-rpms
avahi.x86_64                0.8-20.el9                  @rhel-9-for-x86_64-baseos-rpms
avahi-glib.x86_64          0.8-20.el9                  @rhel-9-for-x86_64-appstream-
rpms
avahi-libs.x86_64          0.8-20.el9                  @rhel-9-for-x86_64-baseos-rpms
baobab.x86_64              40.0-3.el9                  @AppStream
basesystem.noarch          11-13.el9                   @anaconda
--More--
[q]

```

Pour ne lister que les paquets disponibles, la commande list prend l'option **available** :

```

[root@redhat9 ~]# dnf list available | more
Updating Subscription Management repositories.
Last metadata expiration check: 0:00:11 ago on Mon 30 Sep 2024 11:27:31 AM CEST.
Available Packages
389-ds-base.x86_64                2.4.5-9.el9_4
rhel-9-for-x86_64-appstream-rpms
389-ds-base-devel.x86_64          2.4.5-9.el9_4
codeready-builder-for-rhel-9-x86_64-rpms
389-ds-base-libs.x86_64          2.4.5-9.el9_4
rhel-9-for-x86_64-appstream-rpms
3proxy.x86_64                    0.9.4-4.el9
epel
6tunnel.x86_64                   0.13-1.el9
epel
AMF-devel.noarch                  1.4.34-1.el9
epel
AMF-samples.noarch                1.4.34-1.el9

```

epel	
Agda.x86_64	2.6.2.2-36.el9
epel	
Agda-common.noarch	2.6.2.2-36.el9
epel	
BackupPC.x86_64	4.4.0-9.el9
epel	
BackupPC-XS.x86_64	0.62-11.el9
epel	
BibTool.x86_64	2.68-5.el9
epel	
Box2D.i686	2.4.1-7.el9
rhel-9-for-x86_64-appstream-rpms	
Box2D.x86_64	2.4.1-7.el9
rhel-9-for-x86_64-appstream-rpms	
CCfits.x86_64	2.6-6.el9
epel	
CCfits-devel.x86_64	2.6-6.el9
epel	
CCfits-doc.noarch	2.6-6.el9
epel	
CFR.noarch	0.151-9.el9
epel	
CFR-javadoc.noarch	0.151-9.el9
epel	
CGAL-demos-source.noarch	5.6.1-1.el9
epel	
CGAL-devel.x86_64	5.6.1-1.el9
epel	
CGAL-qt5-devel.x86_64	5.6.1-1.el9
epel	
CGSI-gSOAP.x86_64	1.3.12-1.el9
epel	
CGSI-gSOAP-devel.x86_64	1.3.12-1.el9

epel		
CUnit.i686		2.1.3-25.el9
rhel-9-for-x86_64-appstream-rpms		
CUnit.x86_64		2.1.3-25.el9
rhel-9-for-x86_64-appstream-rpms		
CUnit-devel.i686		2.1.3-25.el9
codeready-builder-for-rhel-9-x86_64-rpms		
CUnit-devel.x86_64		2.1.3-25.el9
codeready-builder-for-rhel-9-x86_64-rpms		
CharLS.x86_64		2.0.0-7.el9
epel		
CharLS-devel.x86_64		2.0.0-7.el9
epel		
Coin4.x86_64		4.0.0-11.el9
epel		
Coin4-devel.x86_64		4.0.0-11.el9
epel		
Coin4-doc.x86_64		4.0.0-11.el9
epel		
DNS-Compliance-Testing.x86_64		
0^20230708git4aea40b-2.el9	epel	
FoXlibf.x86_64		4.1.2-19.el9
epel		
FoXlibf-devel.x86_64		4.1.2-19.el9
epel		
FoXlibf-static.x86_64		4.1.2-19.el9
epel		
GConf2.x86_64		3.2.6-34.el9
epel		
GConf2-devel.x86_64		3.2.6-34.el9
epel		
GMT.x86_64		6.4.0-4.el9
epel		
GMT-common.noarch		6.4.0-4.el9

```
epel
GMT-devel.x86_64 6.4.0-4.el9
epel
GMT-doc.noarch 6.4.0-4.el9
epel
GeographicLib.x86_64 2.3-2.el9
epel
GeographicLib-devel.x86_64 2.3-2.el9
epel
GeographicLib-doc.noarch 2.3-2.el9
epel
GraphicsMagick.x86_64 1.3.38-1.el9
epel
GraphicsMagick-c++.x86_64 1.3.38-1.el9
epel
GraphicsMagick-c++-devel.x86_64 1.3.38-1.el9
epel
GraphicsMagick-devel.x86_64 1.3.38-1.el9
epel
GraphicsMagick-doc.noarch 1.3.38-1.el9
epel
GraphicsMagick-perl.x86_64 1.3.38-1.el9
epel
--More--
[q]
```

Pour rechercher une chaîne dans le nom ou dans la description courte du paquet, il convient d'utiliser la commande **search** :

```
[root@redhat9 ~]# dnf search httpd
Updating Subscription Management repositories.
Last metadata expiration check: 0:01:15 ago on Mon 30 Sep 2024 11:27:31 AM CEST.
===== Name Exactly Matched:
httpd =====
httpd.x86_64 : Apache HTTP Server
```

```
===== Name & Summary Matched:
httpd =====
httpd-core.x86_64 : httpd minimal core
keycloak-httpd-client-install.noarch : Tools to configure Apache HTTPD as Keycloak client
libmicrohttpd-devel.x86_64 : Development files for libmicrohttpd
libmicrohttpd-devel.i686 : Development files for libmicrohttpd
libmicrohttpd-doc.noarch : Documentation for libmicrohttpd
lighttpd-fastcgi.x86_64 : FastCGI module and spawning helper for lighttpd and PHP configuration
lighttpd-filesystem.noarch : The basic directory layout for lighttpd
lighttpd-mod_authn_gssapi.x86_64 : Authentication module for lighttpd that uses GSSAPI
lighttpd-mod_authn_ldap.x86_64 : Authentication module for lighttpd that uses LDAP
lighttpd-mod_authn_pam.x86_64 : Authentication module for lighttpd that uses PAM
lighttpd-mod_authn_sasl.x86_64 : Authentication module for lighttpd that uses SASL
lighttpd-mod_deflate.x86_64 : Compression module for lighttpd
lighttpd-mod_gnutls.x86_64 : TLS module for lighttpd that uses GnuTLS
lighttpd-mod_magnet.x86_64 : Lua module for lighttpd
lighttpd-mod_maxminddb.x86_64 : GeoIP2 module for lighttpd to use for location lookups
lighttpd-mod_mbedtls.x86_64 : TLS module for lighttpd that uses mbedtls
lighttpd-mod_nss.x86_64 : TLS module for lighttpd that uses NSS
lighttpd-mod_openssl.x86_64 : TLS module for lighttpd that uses OpenSSL
lighttpd-mod_vhostdb_ldap.x86_64 : Virtual host module for lighttpd that uses LDAP
lighttpd-mod_vhostdb_mysql.x86_64 : Virtual host module for lighttpd that uses MySQL
lighttpd-mod_vhostdb_pgsqll.x86_64 : Virtual host module for lighttpd that uses PostgreSQL
lighttpd-mod_webdav.x86_64 : WebDAV module for lighttpd
nextcloud-httpd.noarch : Httpd integration for NextCloud
python3-keycloak-httpd-client-install.noarch : Tools to configure Apache HTTPD as Keycloak client
radicale3-httpd.noarch : httpd config for Radicale
redhat-logos-httpd.noarch : Red Hat-related icons and pictures used by httpd
sympa-lighttpd.x86_64 : Sympa with lighttpd
===== Name Matched:
httpd =====
httpd-devel.x86_64 : Development interfaces for the Apache HTTP Server
httpd-filesystem.noarch : The basic directory layout for the Apache HTTP Server
httpd-manual.noarch : Documentation for the Apache HTTP Server
```

```
httpd-tools.x86_64 : Tools for use with the Apache HTTP Server
libmicrohttpd.i686 : Lightweight library for embedding a webserver in applications
libmicrohttpd.x86_64 : Lightweight library for embedding a webserver in applications
lighttpd.x86_64 : Lightning fast webserver with light system requirements
mirmon-httpd.noarch : Apache configuration for mirmon
perl-Test-Fake-HTTPD.noarch : Fake HTTP server module for testing
python3-sphinxcontrib-httpdomain.noarch : Sphinx domain for documenting HTTP APIs
rust-httpdate+default-devel.noarch : HTTP date parsing and formatting
rust-httpdate-devel.noarch : HTTP date parsing and formatting
rust-tower-http+httpdate-devel.noarch : Tower middleware and utilities for HTTP clients and servers
sympa-httpd.x86_64 : Sympa with Apache HTTP Server
sysusage-httpd.noarch : Apache configuration for sysusage
web-assets-httpd.noarch : Web Assets aliases for the Apache HTTP daemon
===== Summary Matched:
httpd =====
mod_auth_mellon.x86_64 : A SAML 2.0 authentication module for the Apache Httpd Server
mod_dav_svn.x86_64 : Apache httpd module for Subversion server
mod_proxy_cluster.x86_64 : JBoss mod_proxy_cluster for Apache httpd
```

Pour ne rechercher que la chaîne dans le nom du paquet, utilisez la commande **list** :

```
[root@redhat9 ~]# dnf list httpd
Updating Subscription Management repositories.
Last metadata expiration check: 0:01:50 ago on Mon 30 Sep 2024 11:27:31 AM CEST.
Installed Packages
httpd.x86_64                                     2.4.57-11.el9_4.1
@rhel-9-for-x86_64-appstream-rpms
```

Pour rechercher le paquet qui contient l'exécutable httpd, il convient d'utiliser la commande **provides** :

```
[root@redhat9 ~]# dnf provides httpd
Updating Subscription Management repositories.
Last metadata expiration check: 0:02:56 ago on Mon 30 Sep 2024 11:27:31 AM CEST.
httpd-2.4.51-7.el9_0.x86_64 : Apache HTTP Server
```

```
Repo      : rhel-9-for-x86_64-appstream-rpms
Matched from:
Provide   : httpd = 2.4.51-7.el9_0
```

```
httpd-2.4.53-7.el9.x86_64 : Apache HTTP Server
Repo      : rhel-9-for-x86_64-appstream-rpms
Matched from:
Provide   : httpd = 2.4.53-7.el9
```

```
httpd-2.4.53-7.el9_1.1.x86_64 : Apache HTTP Server
Repo      : rhel-9-for-x86_64-appstream-rpms
Matched from:
Provide   : httpd = 2.4.53-7.el9_1.1
```

```
httpd-2.4.53-7.el9_1.5.x86_64 : Apache HTTP Server
Repo      : rhel-9-for-x86_64-appstream-rpms
Matched from:
Provide   : httpd = 2.4.53-7.el9_1.5
```

```
httpd-2.4.53-11.el9_2.4.x86_64 : Apache HTTP Server
Repo      : rhel-9-for-x86_64-appstream-rpms
Matched from:
Provide   : httpd = 2.4.53-11.el9_2.4
```

```
httpd-2.4.53-11.el9_2.5.x86_64 : Apache HTTP Server
Repo      : rhel-9-for-x86_64-appstream-rpms
Matched from:
Provide   : httpd = 2.4.53-11.el9_2.5
```

```
httpd-2.4.57-5.el9.x86_64 : Apache HTTP Server
Repo      : rhel-9-for-x86_64-appstream-rpms
Matched from:
Provide   : httpd = 2.4.57-5.el9
```

```
httpd-2.4.57-8.el9.x86_64 : Apache HTTP Server
Repo      : rhel-9-for-x86_64-appstream-rpms
Matched from:
Provide   : httpd = 2.4.57-8.el9

httpd-2.4.57-11.el9_4.x86_64 : Apache HTTP Server
Repo      : rhel-9-for-x86_64-appstream-rpms
Matched from:
Provide   : httpd = 2.4.57-11.el9_4

httpd-2.4.57-11.el9_4.1.x86_64 : Apache HTTP Server
Repo      : @System
Matched from:
Provide   : httpd = 2.4.57-11.el9_4.1

httpd-2.4.57-11.el9_4.1.x86_64 : Apache HTTP Server
Repo      : rhel-9-for-x86_64-appstream-rpms
Matched from:
Provide   : httpd = 2.4.57-11.el9_4.1
```

Pour rechercher tout paquet commençant par **kerne**, utilisez la commande suivante :

```
[root@redhat9 ~]# dnf list kerne\*
Updating Subscription Management repositories.
Last metadata expiration check: 0:03:38 ago on Mon 30 Sep 2024 11:27:31 AM CEST.
Installed Packages
kernel.x86_64                               5.14.0-284.11.1.el9_2
@anaconda
kernel.x86_64                               5.14.0-427.37.1.el9_4
@rhel-9-for-x86_64-baseos-rpms
kernel-core.x86_64                         5.14.0-284.11.1.el9_2
@anaconda
kernel-core.x86_64                         5.14.0-427.37.1.el9_4
@rhel-9-for-x86_64-baseos-rpms
```

kernel-modules.x86_64	5.14.0-284.11.1.el9_2
@anaconda	
kernel-modules.x86_64	5.14.0-427.37.1.el9_4
@rhel-9-for-x86_64-baseos-rpms	
kernel-modules-core.x86_64	5.14.0-284.11.1.el9_2
@anaconda	
kernel-modules-core.x86_64	5.14.0-427.37.1.el9_4
@rhel-9-for-x86_64-baseos-rpms	
kernel-tools.x86_64	5.14.0-427.37.1.el9_4
@rhel-9-for-x86_64-baseos-rpms	
kernel-tools-libs.x86_64	5.14.0-427.37.1.el9_4
@rhel-9-for-x86_64-baseos-rpms	
Available Packages	
kernel-abi-stablelists.noarch	5.14.0-427.37.1.el9_4
rhel-9-for-x86_64-baseos-rpms	
kernel-cross-headers.x86_64	5.14.0-427.37.1.el9_4
codeready-builder-for-rhel-9-x86_64-rpms	
kernel-debug.x86_64	5.14.0-427.37.1.el9_4
rhel-9-for-x86_64-baseos-rpms	
kernel-debug-core.x86_64	5.14.0-427.37.1.el9_4
rhel-9-for-x86_64-baseos-rpms	
kernel-debug-devel.x86_64	5.14.0-427.37.1.el9_4
rhel-9-for-x86_64-appstream-rpms	
kernel-debug-devel-matched.x86_64	5.14.0-427.37.1.el9_4
rhel-9-for-x86_64-appstream-rpms	
kernel-debug-modules.x86_64	5.14.0-427.37.1.el9_4
rhel-9-for-x86_64-baseos-rpms	
kernel-debug-modules-core.x86_64	5.14.0-427.37.1.el9_4
rhel-9-for-x86_64-baseos-rpms	
kernel-debug-modules-extra.x86_64	5.14.0-427.37.1.el9_4
rhel-9-for-x86_64-baseos-rpms	
kernel-debug-uki-virt.x86_64	5.14.0-427.37.1.el9_4
rhel-9-for-x86_64-baseos-rpms	
kernel-devel.x86_64	5.14.0-427.37.1.el9_4

```
rhel-9-for-x86_64-appstream-rpms
kernel-devel-matched.x86_64          5.14.0-427.37.1.el9_4
rhel-9-for-x86_64-appstream-rpms
kernel-doc.noarch                    5.14.0-427.37.1.el9_4
rhel-9-for-x86_64-appstream-rpms
kernel-headers.x86_64               5.14.0-427.37.1.el9_4
rhel-9-for-x86_64-appstream-rpms
kernel-modules-extra.x86_64        5.14.0-427.37.1.el9_4
rhel-9-for-x86_64-baseos-rpms
kernel-rpm-macros.noarch            185-13.el9
rhel-9-for-x86_64-appstream-rpms
kernel-srpm-macros.noarch           1.0-13.el9
rhel-9-for-x86_64-appstream-rpms
kernel-tools-libs-devel.x86_64    5.14.0-427.37.1.el9_4
codeready-builder-for-rhel-9-x86_64-rpms
kernel-uki-virt.x86_64             5.14.0-427.37.1.el9_4
rhel-9-for-x86_64-baseos-rpms
kernelshark.x86_64                 1:1.2-10.el9
rhel-9-for-x86_64-appstream-rpms
```

Pour lister les groupes de paquets, il convient d'utiliser la commande **grouplist** :

```
[root@redhat9 ~]# dnf grouplist
Updating Subscription Management repositories.
Last metadata expiration check: 0:04:11 ago on Mon 30 Sep 2024 11:27:31 AM CEST.
Available Environment Groups:
  Server
  Minimal Install
  Workstation
  KDE Plasma Workspaces
  Virtualization Host
  Custom Operating System
Installed Environment Groups:
  Server with GUI
```

```
Installed Groups:
  Container Management
  Headless Management
Available Groups:
  RPM Development Tools
  .NET Development
  Console Internet Tools
  Scientific Support
  Legacy UNIX Compatibility
  Smart Card Support
  Security Tools
  Graphical Administration Tools
  System Tools
  Network Servers
  Development Tools
  Fedora Packager
  VideoLAN Client
  Xfce
```

Pour obtenir de l'information sur un groupe de paquets, il convient d'utiliser la commande **group info** :

```
[root@redhat9 ~]# dnf groupinfo Server
Updating Subscription Management repositories.
Environment Group: Server
Description: An integrated, easy-to-manage server.
Mandatory Groups:
  Container Management
  Core
  Hardware Support
  Headless Management
  Server product core
  Standard
Optional Groups:
  Basic Web Server
```

```
DNS Name Server
Debugging Tools
FTP Server
File and Storage Server
GNOME
Guest Agents
Hardware Monitoring Utilities
Infiniband Support
Mail Server
Network File System Client
Network Servers
Performance Tools
Remote Management for Linux
Virtualization Hypervisor
Windows File Server
```

2.5 - Obtenir de l'Information sur un Paquet et le Télécharger

Pour obtenir de l'information sur un paquet, il convient d'utiliser la commande **info** :

```
[root@redhat9 ~]# dnf info httpd
Updating Subscription Management repositories.
Last metadata expiration check: 0:04:53 ago on Mon 30 Sep 2024 11:27:31 AM CEST.
Installed Packages
Name           : httpd
Version        : 2.4.57
Release        : 11.el9_4.1
Architecture   : x86_64
Size           : 59 k
Source         : httpd-2.4.57-11.el9_4.1.src.rpm
Repository     : @System
From repo      : rhel-9-for-x86_64-appstream-rpms
Summary        : Apache HTTP Server
```

```
URL      : https://httpd.apache.org/
License  : ASL 2.0
Description : The Apache HTTP Server is a powerful, efficient, and extensible
           : web server.
```

Pour télécharger sans installer un paquet, l'ancienne commande **yumdownloader** a été remplacée par la commande **download** de dnf :

```
[root@redhat9 ~]# dnf download httpd
Updating Subscription Management repositories.
Last metadata expiration check: 0:05:25 ago on Mon 30 Sep 2024 11:27:31 AM CEST.
httpd-2.4.57-11.el9_4.1.x86_64.rpm
163 kB/s | 51 kB      00:00
```

Ce paquet est téléchargé vers le répertoire courant :

```
[root@redhat9 ~]# updatedb

[root@redhat9 ~]# locate httpd-2.4.57
/root/httpd-2.4.57-11.el9_4.1.x86_64.rpm
```

2.6 - Installer un Paquet

Pour installer un paquet, dnf possède la commande **install** :

```
[root@redhat9 ~]# dnf install httpd
Updating Subscription Management repositories.
Last metadata expiration check: 0:09:28 ago on Mon 30 Sep 2024 11:27:31 AM CEST.
Dependencies resolved.
```

```
=====
=====
Package                                Architecture                               Size                               Version
Repository
```

Installing:

```
httpd                                x86_64                2.4.57-11.el9_4.1
rhel-9-for-x86_64-appstream-rpms    51 k
```

Installing dependencies:

```
apr                                x86_64                1.7.0-12.el9_3
rhel-9-for-x86_64-appstream-rpms    126 k
apr-util                           x86_64                1.6.1-23.el9
rhel-9-for-x86_64-appstream-rpms    97 k
apr-util-bdb                       x86_64                1.6.1-23.el9
rhel-9-for-x86_64-appstream-rpms    14 k
httpd-core                          x86_64                2.4.57-11.el9_4.1
rhel-9-for-x86_64-appstream-rpms    1.5 M
httpd-filesystem                   noarch                2.4.57-11.el9_4.1
rhel-9-for-x86_64-appstream-rpms    14 k
httpd-tools                         x86_64                2.4.57-11.el9_4.1
rhel-9-for-x86_64-appstream-rpms    86 k
redhat-logos-httpd                 noarch                90.4-2.el9
rhel-9-for-x86_64-appstream-rpms    18 k
```

Installing weak dependencies:

```
apr-util-openssl                   x86_64                1.6.1-23.el9
rhel-9-for-x86_64-appstream-rpms    17 k
mod_http2                           x86_64                2.0.26-2.el9_4
rhel-9-for-x86_64-appstream-rpms    167 k
mod_lua                             x86_64                2.4.57-11.el9_4.1
rhel-9-for-x86_64-appstream-rpms    60 k
```

Transaction Summary

```
Install 11 Packages
```

```
Total download size: 2.2 M
```

```
Installed size: 6.0 M
Is this ok [y/N]: n
Operation aborted.
```

Pour répondre automatiquement oui à chaque question posée par dnf, utilisez l'option **-y** :

```
[root@redhat9 ~]# dnf install httpd -y
Updating Subscription Management repositories.
Last metadata expiration check: 0:10:12 ago on Mon 30 Sep 2024 11:27:31 AM CEST.
Dependencies resolved.
```

```
=====
=====
Package                               Architecture  Size  Version
Repository
=====
=====
Installing:
  httpd                                x86_64      51 k  2.4.57-11.el9_4.1
rhel-9-for-x86_64-appstream-rpms
Installing dependencies:
  apr                                  x86_64     126 k  1.7.0-12.el9_3
rhel-9-for-x86_64-appstream-rpms
  apr-util                             x86_64      97 k  1.6.1-23.el9
rhel-9-for-x86_64-appstream-rpms
  apr-util-bdb                         x86_64     14 k  1.6.1-23.el9
rhel-9-for-x86_64-appstream-rpms
  httpd-core                            x86_64     1.5 M  2.4.57-11.el9_4.1
rhel-9-for-x86_64-appstream-rpms
  httpd-filesystem                     noarch     14 k  2.4.57-11.el9_4.1
rhel-9-for-x86_64-appstream-rpms
  httpd-tools                           x86_64     86 k  2.4.57-11.el9_4.1
rhel-9-for-x86_64-appstream-rpms
  redhat-logos-httpd                   noarch     18 k  90.4-2.el9
rhel-9-for-x86_64-appstream-rpms
```

Installing weak dependencies:

apr-util-openssl	x86_64		1.6.1-23.el9
rhel-9-for-x86_64-appstream-rpms		17 k	
mod_http2	x86_64		2.0.26-2.el9_4
rhel-9-for-x86_64-appstream-rpms		167 k	
mod_lua	x86_64		2.4.57-11.el9_4.1
rhel-9-for-x86_64-appstream-rpms		60 k	

Transaction Summary

=====
=====
Install 11 Packages

Total download size: 2.2 M

Installed size: 6.0 M

Downloading Packages:

(1/11): apr-util-1.6.1-23.el9.x86_64.rpm
350 kB/s | 97 kB 00:00
(2/11): apr-util-bdb-1.6.1-23.el9.x86_64.rpm
47 kB/s | 14 kB 00:00
(3/11): apr-util-openssl-1.6.1-23.el9.x86_64.rpm
53 kB/s | 17 kB 00:00
(4/11): redhat-logos-httpd-90.4-2.el9.noarch.rpm
97 kB/s | 18 kB 00:00
(5/11): apr-1.7.0-12.el9_3.x86_64.rpm
654 kB/s | 126 kB 00:00
(6/11): httpd-2.4.57-11.el9_4.1.x86_64.rpm
677 kB/s | 51 kB 00:00
(7/11): mod_http2-2.0.26-2.el9_4.x86_64.rpm
677 kB/s | 167 kB 00:00
(8/11): httpd-core-2.4.57-11.el9_4.1.x86_64.rpm
11 MB/s | 1.5 MB 00:00
(9/11): httpd-filesystem-2.4.57-11.el9_4.1.noarch.rpm
104 kB/s | 14 kB 00:00

```
(10/11): httpd-tools-2.4.57-11.el9_4.1.x86_64.rpm
```

```
261 kB/s | 86 kB      00:00
```

```
(11/11): mod_lua-2.4.57-11.el9_4.1.x86_64.rpm
```

```
219 kB/s | 60 kB      00:00
```

```
-----  
-----  
Total
```

```
2.4 MB/s | 2.2 MB      00:00
```

```
Running transaction check
```

```
Transaction check succeeded.
```

```
Running transaction test
```

```
Transaction test succeeded.
```

```
Running transaction
```

```
  Preparing          :
```

```
1/1
```

```
  Installing         : apr-1.7.0-12.el9_3.x86_64
```

```
1/11
```

```
  Installing         : apr-util-bdb-1.6.1-23.el9.x86_64
```

```
2/11
```

```
  Installing         : apr-util-openssl-1.6.1-23.el9.x86_64
```

```
3/11
```

```
  Installing         : apr-util-1.6.1-23.el9.x86_64
```

```
4/11
```

```
  Installing         : httpd-tools-2.4.57-11.el9_4.1.x86_64
```

```
5/11
```

```
  Running scriptlet: httpd-filesystem-2.4.57-11.el9_4.1.noarch
```

```
6/11
```

```
  Installing         : httpd-filesystem-2.4.57-11.el9_4.1.noarch
```

```
6/11
```

```
  Installing         : httpd-core-2.4.57-11.el9_4.1.x86_64
```

```
7/11
```

```
  Installing         : mod_lua-2.4.57-11.el9_4.1.x86_64
```

```
8/11
```

```
  Installing         : redhat-logos-httpd-90.4-2.el9.noarch
```

```
9/11
  Installing      : mod_http2-2.0.26-2.el9_4.x86_64
10/11
  Installing      : httpd-2.4.57-11.el9_4.1.x86_64
11/11
  Running scriptlet: httpd-2.4.57-11.el9_4.1.x86_64
11/11
  Verifying       : apr-util-1.6.1-23.el9.x86_64
1/11
  Verifying       : apr-util-bdb-1.6.1-23.el9.x86_64
2/11
  Verifying       : apr-util-openssl-1.6.1-23.el9.x86_64
3/11
  Verifying       : redhat-logos-httpd-90.4-2.el9.noarch
4/11
  Verifying       : apr-1.7.0-12.el9_3.x86_64
5/11
  Verifying       : mod_http2-2.0.26-2.el9_4.x86_64
6/11
  Verifying       : httpd-2.4.57-11.el9_4.1.x86_64
7/11
  Verifying       : httpd-core-2.4.57-11.el9_4.1.x86_64
8/11
  Verifying       : httpd-filesystem-2.4.57-11.el9_4.1.noarch
9/11
  Verifying       : httpd-tools-2.4.57-11.el9_4.1.x86_64
10/11
  Verifying       : mod_lua-2.4.57-11.el9_4.1.x86_64
11/11
Installed products updated.
```

Installed:

```
  apr-1.7.0-12.el9_3.x86_64          apr-util-1.6.1-23.el9.x86_64          apr-util-
bdb-1.6.1-23.el9.x86_64          apr-util-openssl-1.6.1-23.el9.x86_64  httpd-2.4.57-11.el9_4.1.x86_64
```

```
httpd-core-2.4.57-11.el9_4.1.x86_64      httpd-filesystem-2.4.57-11.el9_4.1.noarch      httpd-  
tools-2.4.57-11.el9_4.1.x86_64      mod_http2-2.0.26-2.el9_4.x86_64      mod_lua-2.4.57-11.el9_4.1.x86_64  
redhat-logos-httpd-90.4-2.el9.noarch
```

Complete!

Il est possible de ré-installer un paquet avec la commande **reinstall** :

```
[root@redhat9 ~]# dnf reinstall httpd  
Updating Subscription Management repositories.  
Last metadata expiration check: 0:11:00 ago on Mon 30 Sep 2024 11:27:31 AM CEST.  
Dependencies resolved.  
=====
```

Package	Architecture	Size	Version
Reinstalling:			
httpd	x86_64		2.4.57-11.el9_4.1
rhel-9-for-x86_64-appstream-rpms		51 k	

```
Transaction Summary  
=====
```

Total download size: 51 k
Installed size: 59 k
Is this ok [y/N]: y

Pour installer un groupe de paquets, dnf possède la commande **groupinstall** :

```
[root@redhat9 ~]# dnf groupinstall 'System Tools'  
Updating Subscription Management repositories.
```

Last metadata expiration check: 0:12:43 ago on Mon 30 Sep 2024 11:27:31 AM CEST.
 Dependencies resolved.

```

=====
Package                               Architecture                               Version
Repository                             Size
=====
Installing group/module packages:
  NetworkManager-libreswan             x86_64                                     1.2.18-3.el9_4
rhel-9-for-x86_64-appstream-rpms
  cifs-utils                            x86_64                                     7.0-1.el9
rhel-9-for-x86_64-baseos-rpms
  libreswan                             x86_64                                     4.12-2.el9_4.1
rhel-9-for-x86_64-appstream-rpms
  nmap                                  x86_64                                     3:7.92-1.el9
rhel-9-for-x86_64-appstream-rpms
  openldap-clients                     x86_64                                     2.6.6-3.el9
rhel-9-for-x86_64-baseos-rpms
  samba-client                          x86_64                                     4.19.4-105.el9_4
rhel-9-for-x86_64-appstream-rpms
  setserial                             x86_64                                     2.17-54.el9
rhel-9-for-x86_64-baseos-rpms
  tigervnc                              x86_64                                     1.13.1-8.el9_4.3
rhel-9-for-x86_64-appstream-rpms
  tmux                                  x86_64                                     3.2a-5.el9
rhel-9-for-x86_64-baseos-rpms
  zsh                                    x86_64                                     5.8-9.el9
rhel-9-for-x86_64-baseos-rpms
Installing dependencies:
  fltk                                  x86_64                                     1.3.8-1.el9
rhel-9-for-x86_64-appstream-rpms
  keyutils                              x86_64                                     1.6.3-1.el9
rhel-9-for-x86_64-baseos-rpms
  
```

```
ldns                                x86_64                                1.7.1-11.el9
rhel-9-for-x86_64-appstream-rpms    163 k
nss-tools                            x86_64                                3.101.0-7.el9_2
rhel-9-for-x86_64-appstream-rpms    449 k
tigervnc-icons                       noarch                                1.13.1-8.el9_4.3
rhel-9-for-x86_64-appstream-rpms    40 k
tigervnc-license                     noarch                                1.13.1-8.el9_4.3
rhel-9-for-x86_64-appstream-rpms    18 k
unbound-libs                         x86_64                                1.16.2-3.el9_3.5
rhel-9-for-x86_64-appstream-rpms    553 k
Installing Groups:
  System Tools
```

Transaction Summary

```
=====
Install 17 Packages
```

```
Total download size: 14 M
Installed size: 47 M
Is this ok [y/N]: y
```

2.7 - Mettre à jour des Paquets

Pour vérifier la disponibilité des mises-à-jour, dnf possède la commande **check-update** :

```
[root@redhat9 ~]# dnf check-update
Updating Subscription Management repositories.
Last metadata expiration check: 0:13:55 ago on Mon 30 Sep 2024 11:27:31 AM CEST.

cups-filters.x86_64                                1.28.7-17.el9_4
rhel-9-for-x86_64-appstream-rpms
cups-filters-libs.x86_64                          1.28.7-17.el9_4
```

```
rhel-9-for-x86_64-appstream-rpms
net-snmp-libs.x86_64
rhel-9-for-x86_64-appstream-rpms
```

1:5.9.1-13.el9_4.3

Pour procéder à la mise à jour de tous les paquets, dnf possède les commandes **update** et **upgrade**. Il est aussi possible de spécifier un paquet spécifique :

```
[root@redhat9 ~]# dnf update net-snmp-libs.x86_64
Updating Subscription Management repositories.
Last metadata expiration check: 0:14:57 ago on Mon 30 Sep 2024 11:27:31 AM CEST.
Dependencies resolved.

=====
Package Architecture Size Version
Repository
=====
Upgrading:
 net-snmp-libs x86_64 1:5.9.1-13.el9_4.3
rhel-9-for-x86_64-appstream-rpms 763 k

Transaction Summary
=====
Upgrade 1 Package

Total download size: 763 k
Is this ok [y/N]: y
```

La gestion des mises à jour des groupes de paquets se fait en utilisant la commande **groupupdate** :

```
[root@redhat9 ~]# dnf groupupdate 'System Tools'
Updating Subscription Management repositories.
Last metadata expiration check: 0:15:46 ago on Mon 30 Sep 2024 11:27:31 AM CEST.
```

```
Dependencies resolved.
```

```
=====
=====
Package                               Architecture                               Version
Repository                             Size
=====
=====
```

```
Installing Groups:
  System Tools
```

```
Transaction Summary
```

```
=====
=====
Is this ok [y/N]: y
Complete!
```

2.8 - Supprimer des Paquets

Pour supprimer un paquet, il convient d'utiliser la commande **remove** :

```
[root@redhat9 ~]# dnf remove httpd
Updating Subscription Management repositories.
Dependencies resolved.
```

```
=====
=====
Package                               Architecture                               Version
Repository                             Size
=====
=====
Removing:
  httpd                               x86_64                               2.4.57-11.el9_4.1
@rhel-9-for-x86_64-appstream-rpms      59 k
```

Removing unused dependencies:

apr	x86_64		1.7.0-12.el9_3
@rhel-9-for-x86_64-appstream-rpms		288 k	
apr-util	x86_64		1.6.1-23.el9
@rhel-9-for-x86_64-appstream-rpms		211 k	
apr-util-bdb	x86_64		1.6.1-23.el9
@rhel-9-for-x86_64-appstream-rpms		15 k	
apr-util-openssl	x86_64		1.6.1-23.el9
@rhel-9-for-x86_64-appstream-rpms		23 k	
httpd-core	x86_64		2.4.57-11.el9_4.1
@rhel-9-for-x86_64-appstream-rpms		4.7 M	
httpd-filesystem	noarch		2.4.57-11.el9_4.1
@rhel-9-for-x86_64-appstream-rpms		400	
httpd-tools	x86_64		2.4.57-11.el9_4.1
@rhel-9-for-x86_64-appstream-rpms		199 k	
mod_http2	x86_64		2.0.26-2.el9_4
@rhel-9-for-x86_64-appstream-rpms		442 k	
mod_lua	x86_64		2.4.57-11.el9_4.1
@rhel-9-for-x86_64-appstream-rpms		142 k	
redhat-logos-httpd	noarch		90.4-2.el9
@rhel-9-for-x86_64-appstream-rpms		12 k	

Transaction Summary

```
=====
=====
Remove 11 Packages
```

```
Freed space: 6.0 M
Is this ok [y/N]: n
Operation aborted.
```

Pour supprimer un groupe de paquets, il convient d'utiliser la commande **groupremove** :

```
[root@redhat9 ~]# dnf groupremove 'System Tools'
```

Updating Subscription Management repositories.
 Dependencies resolved.

```

=====
Package                               Architecture      Version
Repository                             Size
=====
Removing:
  NetworkManager-libreswan             x86_64            1.2.18-3.el9_4
@rhel-9-for-x86_64-appstream-rpms
  cifs-utils                            x86_64            7.0-1.el9
@rhel-9-for-x86_64-baseos-rpms
  libreswan                             x86_64            4.12-2.el9_4.1
@rhel-9-for-x86_64-appstream-rpms
  nmap                                  x86_64            3:7.92-1.el9
@rhel-9-for-x86_64-appstream-rpms
  openldap-clients                     x86_64            2.6.6-3.el9
@rhel-9-for-x86_64-baseos-rpms
  samba-client                          x86_64            4.19.4-105.el9_4
@rhel-9-for-x86_64-appstream-rpms
  setserial                             x86_64            2.17-54.el9
@rhel-9-for-x86_64-baseos-rpms
  tigervnc                              x86_64            1.13.1-8.el9_4.3
@rhel-9-for-x86_64-appstream-rpms
  tmux                                  x86_64            3.2a-5.el9
@rhel-9-for-x86_64-baseos-rpms
  zsh                                    x86_64            5.8-9.el9
@rhel-9-for-x86_64-baseos-rpms
Removing unused dependencies:
  fltk                                  x86_64            1.3.8-1.el9
@rhel-9-for-x86_64-appstream-rpms
  keyutils                              x86_64            1.6.3-1.el9
@rhel-9-for-x86_64-baseos-rpms
  
```

```

ldns                                x86_64                                1.7.1-11.el9
@rhel-9-for-x86_64-appstream-rpms   426 k
nss-tools                            x86_64                                3.101.0-7.el9_2
@rhel-9-for-x86_64-appstream-rpms   1.3 M
tigervnc-icons                       noarch                                1.13.1-8.el9_4.3
@rhel-9-for-x86_64-appstream-rpms   36 k
tigervnc-license                     noarch                                1.13.1-8.el9_4.3
@rhel-9-for-x86_64-appstream-rpms   18 k
unbound-libs                         x86_64                                1.16.2-3.el9_3.5
@rhel-9-for-x86_64-appstream-rpms   1.5 M
Removing Groups:
  System Tools

```

Transaction Summary

```
=====  
=====  
Remove 17 Packages
```

```
Freed space: 47 M
```

```
Is this ok [y/N]: y
```

Pour supprimer les dépendances inutilisées, utilisez la commande **autoremove** :

```
[root@redhat9 ~]# dnf autoremove
Updating Subscription Management repositories.
Last metadata expiration check: 0:18:14 ago on Mon 30 Sep 2024 11:27:31 AM CEST.
Dependencies resolved.
```

```
=====  
=====  
Package                                Architecture                                Version  
Repository                                Size
```

```
=====  
=====  
Removing:
```

efivar-libs	x86_64		38-3.el9
@anaconda		367 k	
grub2-tools-efi	x86_64		1:2.06-82.el9_4
@rhel-9-for-x86_64-baseos-rpms		2.7 M	
grub2-tools-extra	x86_64		1:2.06-82.el9_4
@rhel-9-for-x86_64-baseos-rpms		5.3 M	
libgcab1	x86_64		1.4-6.el9
@anaconda		207 k	
libglvnd-opengl	x86_64		1:1.3.4-1.el9
@AppStream		173 k	
libsmbios	x86_64		2.4.3-4.el9
@anaconda		388 k	
openldap-compat	x86_64		2.6.6-3.el9
@rhel-9-for-x86_64-baseos-rpms		59 k	
pulseaudio-utils	x86_64		15.0-2.el9
@AppStream		199 k	
python3-ethtool	x86_64		0.15-2.el9
@anaconda		94 k	

Transaction Summary

=====
=====
Remove 9 Packages

Freed space: 9.5 M
Is this ok [y/N]: y

Pour nettoyer le cache des paquets téléchargés, utilisez la commande **clean all** :

```
[root@redhat9 ~]# dnf clean all
Updating Subscription Management repositories.
61 files removed
```

2.9 - L'historique dnf

Les transactions de dnf sont journalisées dans le fichier `/var/log/dnf.rpm.log` :

```
[root@redhat9 ~]# tail /var/log/dnf.rpm.log
2024-09-30T11:46:10+0200 SUBDEBUG Erase: pulseaudio-utils-15.0-2.el9.x86_64
2024-09-30T11:46:10+0200 SUBDEBUG Erase: openldap-compat-2.6.6-3.el9.x86_64
2024-09-30T11:46:10+0200 SUBDEBUG Erase: libsmbios-2.4.3-4.el9.x86_64
2024-09-30T11:46:10+0200 SUBDEBUG Erase: libglvnd-opengl-1:1.3.4-1.el9.x86_64
2024-09-30T11:46:10+0200 SUBDEBUG Erase: libgcab1-1.4-6.el9.x86_64
2024-09-30T11:46:10+0200 SUBDEBUG Erase: grub2-tools-extra-1:2.06-82.el9_4.x86_64
2024-09-30T11:46:10+0200 SUBDEBUG Erase: grub2-tools-efi-1:2.06-82.el9_4.x86_64
2024-09-30T11:46:10+0200 SUBDEBUG Erase: efivar-libs-38-3.el9.x86_64
2024-09-30T11:46:30+0200 INFO --- logging initialized ---
2024-09-30T11:49:36+0200 INFO --- logging initialized ---
```

Ces transactions sont aussi visibles en utilisant la commande dnf **history** :

```
[root@redhat9 ~]# dnf history
Updating Subscription Management repositories.
Extra Packages for Enterprise Linux 9 - x86_64
8.7 MB/s | 23 MB      00:02
Extra Packages for Enterprise Linux 9 openh264 (From Cisco) - x86_64
3.0 kB/s | 2.5 kB    00:00
Extra Packages for Enterprise Linux 9 - Next - x86_64
585 kB/s | 277 kB    00:00
Red Hat Enterprise Linux 9 for x86_64 - AppStream (RPMs)
26 MB/s | 41 MB      00:01
Red Hat Enterprise Linux 9 for x86_64 - BaseOS (RPMs)
13 MB/s | 32 MB      00:02
Red Hat CodeReady Linux Builder for RHEL 9 x86_64 (RPMs)
8.5 MB/s | 9.2 MB    00:01
```

ID	Command line	Date and time	Action(s)	Altered
17	autoremove	2024-09-30 11:46	Removed	9
16	groupremove System Tools	2024-09-30 11:45	Removed	18 EE
15	groupupdate System Tools	2024-09-30 11:43	Install	1
14	update net-snmp-libs.x86_64	2024-09-30 11:42	Upgrade	1
13	groupinstall System Tools	2024-09-30 11:40	Install	18 EE
12	reinstall httpd	2024-09-30 11:39	R	2
11	install httpd -y	2024-09-30 11:37	Install	11
10	install telnet-server	2024-09-29 14:19	Install	1
9		2024-09-29 13:58	Install	1
8		2024-09-29 13:44	Install	1
7		2024-09-29 13:21	Install	1
6	install patch -y	2024-09-25 16:20	Install	1
5	install screen	2024-09-25 15:43	Install	1
4	install epel-release epel-next-release	2024-09-25 15:42	Install	1 <
3	install https://dl.fedoraproject.org/pub/epel/epel-release-latest-9.noarch.rpm	2024-09-25 15:39	Install	1 >E

```
  2 | update
| 2024-09-25 11:50 | I, U          | 584 E<
  1 |
| 2023-10-19 18:08 | Install        | 1198 >E
```

Cette commande possède une option **undo** :

```
[root@redhat9 ~]# dnf history undo 14
Updating Subscription Management repositories.
Last metadata expiration check: 0:22:38 ago on Mon 30 Sep 2024 11:50:09 AM CEST.
Dependencies resolved.

=====
=====
Package                               Architecture      Size              Version
Repository                             Size
=====
=====
Downgrading:
 net-snmp-libs                         x86_64           760 k            1:5.9.1-13.el9_4.2
 rhel-9-for-x86_64-appstream-rpms
Transaction Summary
=====
=====
Downgrade 1 Package

Total download size: 760 k
Is this ok [y/N]: y
Downloading Packages:
net-snmp-libs-5.9.1-13.el9_4.2.x86_64.rpm
1.2 MB/s | 760 kB      00:00
-----
-----
Total
```

```
1.2 MB/s | 760 kB    00:00
Running transaction check
Transaction check succeeded.
Running transaction test
Transaction test succeeded.
Running transaction
  Preparing          :
1/1
  Downgrading        : net-snmp-libs-1:5.9.1-13.el9_4.2.x86_64
1/2
  Cleanup            : net-snmp-libs-1:5.9.1-13.el9_4.3.x86_64
2/2
  Running scriptlet: net-snmp-libs-1:5.9.1-13.el9_4.3.x86_64
2/2
  Verifying          : net-snmp-libs-1:5.9.1-13.el9_4.2.x86_64
1/2
  Verifying          : net-snmp-libs-1:5.9.1-13.el9_4.3.x86_64
2/2
Installed products updated.

Downgraded:
  net-snmp-libs-1:5.9.1-13.el9_4.2.x86_64

Complete!
```

2.10 - Le Dépôt Application Stream

Le contenu de RHEL 9 est distribué via deux dépôts principaux de logiciels : BaseOS et Application Stream (AppStream).

En utilisant le dépôt Application Stream, plusieurs versions des composants de l'espace utilisateur livrés avec la distribution sont livrés en même temps. Ils peuvent être mis à jour plus fréquemment que les paquets principaux du système d'exploitation. Cela fournit une plus grande flexibilité pour personnaliser RHEL sans affecter la stabilité sous-jacente de la plateforme ou des déploiements spécifiques.

Le dépôt Application Stream contient deux types de contenu, des Modules et des paquets RPM traditionnels. Un module décrit un ensemble de paquets RPM qui vont ensemble.

Les Modules peuvent contenir plusieurs flux pour rendre plusieurs versions d'applications disponibles à l'installation. L'activation d'un flux de Module donne au système l'accès aux packages RPM contenus dans ce flux de Module.

Un Module est un ensemble de paquets RPM qui constituent un ensemble cohérent qui vont ensemble. Généralement, ceci est organisé autour d'une version spécifique d'une application logicielle ou d'un langage de programmation. Un Module typique peut contenir des paquets avec une application, des paquets avec des bibliothèques partagés, des paquets de documentation pour l'application et des paquets contenant des utilitaires.

Chaque Module peut avoir un ou plusieurs flux de Modules qui contiennent différentes versions du contenu. Chacun des flux reçoit les mises à jour indépendamment. Un flux de modules est un dépôt virtuel dans le dépôt physique **Application Stream**. Pour chaque Module, un seul de ses flux peut être activé et fournir ses packages à la fois.

Chaque Module peut avoir un ou plusieurs **profils**. Un profil est une liste de certains paquets à installer ensemble pour un cas d'utilisation particulier tel que pour un serveur, un client ou autre. L'installation d'un profil de module particulier installe simplement un ensemble particulier de paquets à partir du flux de Modules. Il est ensuite possible d'installer ou de désinstaller les paquets normalement. Si le profil à utiliser n'est pas spécifié, le Module installera son profil par défaut.

Pour consulter la liste de Modules disponibles, utilisez la commande dnf **module list** :

```
[root@redhat9 ~]# dnf module list
Updating Subscription Management repositories.
Last metadata expiration check: 0:22:40 ago on Mon 30 Sep 2024 12:48:56 PM CEST.
Red Hat CodeReady Linux Builder for RHEL 9 x86_64 (RPMs)
Name                               Stream                               Profiles
Summary
swig                                4.1                                  common [d], complete
Connects C/C++/Objective C to some high-level programming languages

Red Hat Enterprise Linux 9 for x86_64 - AppStream (RPMs)
Name                               Stream                               Profiles
Summary
mariadb                             10.11                               client, galera, server [d]
MariaDB Module
```

```

maven                3.8                common [d]
Java project management and project comprehension tool
nginx                1.22                common [d]
nginx webserver
nginx                1.24                common [d]
nginx webserver
nodejs               18                  common [d], development, minimal, s2i
Javascript runtime
nodejs               20                  common [d], development, minimal, s2i
Javascript runtime
php                  8.1                 common [d], devel, minimal
PHP scripting language
php                  8.2                 common [d], devel, minimal
PHP scripting language
postgresql           15                  client, server [d]
PostgreSQL server and client module
postgresql           16                  client, server [d]
PostgreSQL server and client module
redis                7                   common [d]
Redis persistent key-value database
ruby                 3.1                 common [d]
An interpreter of object-oriented scripting language
ruby                 3.3                 common [d]
An interpreter of object-oriented scripting language

Hint: [d]efault, [e]nabled, [x]disabled, [i]nstalled

```

Pour lister les flux de Modules disponibles ainsi que leurs statuts pour un Module particulier, utilisez la commande suivante :

```

[root@redhat9 ~]# dnf module list php
Updating Subscription Management repositories.
Last metadata expiration check: 0:38:17 ago on Mon 30 Sep 2024 12:48:56 PM CEST.
Red Hat Enterprise Linux 9 for x86_64 - AppStream (RPMs)
Name                                Stream                                Profiles

```

Summary

php	8.1	common [d], devel, minimal
PHP scripting language		
php	8.2	common [d], devel, minimal
PHP scripting language		

Hint: [d]efault, [e]nabled, [x]disabled, [i]nstalled

Pour obtenir l'information sur les flux de Modules d'un Module particulier, utilisez la commande suivante :

```
[root@redhat9 ~]# dnf module info php | more
Updating Subscription Management repositories.
Last metadata expiration check: 0:42:18 ago on Mon 30 Sep 2024 12:48:56 PM CEST.
Name           : php
Stream          : 8.1
Version        : 9010020220706080036
Context        : 9
Architecture   : x86_64
Profiles       : common [d], devel, minimal
Default profiles : common
Repo           : rhel-9-for-x86_64-appstream-rpms
Summary        : PHP scripting language
Description    : php 8.1 module
Requires      : platform:[el9]
Artifacts      : apcu-panel-0:5.1.21-1.module+el9.1.0+15477+1fc469b9.noarch
               : php-0:8.1.8-1.module+el9.1.0+15877+c3862210.src
               : php-0:8.1.8-1.module+el9.1.0+15877+c3862210.x86_64
               : php-bcmath-0:8.1.8-1.module+el9.1.0+15877+c3862210.x86_64
               : php-bcmath-debuginfo-0:8.1.8-1.module+el9.1.0+15877+c3862210.x86_64
               : php-cli-0:8.1.8-1.module+el9.1.0+15877+c3862210.x86_64
               : php-cli-debuginfo-0:8.1.8-1.module+el9.1.0+15877+c3862210.x86_64
               : php-common-0:8.1.8-1.module+el9.1.0+15877+c3862210.x86_64
               : php-common-debuginfo-0:8.1.8-1.module+el9.1.0+15877+c3862210.x86_64
               : php-dba-0:8.1.8-1.module+el9.1.0+15877+c3862210.x86_64
```

```
: php-dba-debuginfo-0:8.1.8-1.module+el9.1.0+15877+c3862210.x86_64
: php-dbg-0:8.1.8-1.module+el9.1.0+15877+c3862210.x86_64
: php-dbg-debuginfo-0:8.1.8-1.module+el9.1.0+15877+c3862210.x86_64
: php-debuginfo-0:8.1.8-1.module+el9.1.0+15877+c3862210.x86_64
: php-debugsource-0:8.1.8-1.module+el9.1.0+15877+c3862210.x86_64
: php-devel-0:8.1.8-1.module+el9.1.0+15877+c3862210.x86_64
: php-embedded-0:8.1.8-1.module+el9.1.0+15877+c3862210.x86_64
: php-embedded-debuginfo-0:8.1.8-1.module+el9.1.0+15877+c3862210.x86_64
: php-enchant-0:8.1.8-1.module+el9.1.0+15877+c3862210.x86_64
: php-enchant-debuginfo-0:8.1.8-1.module+el9.1.0+15877+c3862210.x86_64
: php-ffi-0:8.1.8-1.module+el9.1.0+15877+c3862210.x86_64
: php-ffi-debuginfo-0:8.1.8-1.module+el9.1.0+15877+c3862210.x86_64
: php-fpm-0:8.1.8-1.module+el9.1.0+15877+c3862210.x86_64
: php-fpm-debuginfo-0:8.1.8-1.module+el9.1.0+15877+c3862210.x86_64
: php-gd-0:8.1.8-1.module+el9.1.0+15877+c3862210.x86_64
: php-gd-debuginfo-0:8.1.8-1.module+el9.1.0+15877+c3862210.x86_64
: php-gmp-0:8.1.8-1.module+el9.1.0+15877+c3862210.x86_64
: php-gmp-debuginfo-0:8.1.8-1.module+el9.1.0+15877+c3862210.x86_64
: php-intl-0:8.1.8-1.module+el9.1.0+15877+c3862210.x86_64
: php-intl-debuginfo-0:8.1.8-1.module+el9.1.0+15877+c3862210.x86_64
: php-ldap-0:8.1.8-1.module+el9.1.0+15877+c3862210.x86_64
: php-ldap-debuginfo-0:8.1.8-1.module+el9.1.0+15877+c3862210.x86_64
: php-mbstring-0:8.1.8-1.module+el9.1.0+15877+c3862210.x86_64
: php-mbstring-debuginfo-0:8.1.8-1.module+el9.1.0+15877+c3862210.x86_64
: php-mysqldb-0:8.1.8-1.module+el9.1.0+15877+c3862210.x86_64
: php-mysqldb-debuginfo-0:8.1.8-1.module+el9.1.0+15877+c3862210.x86_64
: php-odbc-0:8.1.8-1.module+el9.1.0+15877+c3862210.x86_64
: php-odbc-debuginfo-0:8.1.8-1.module+el9.1.0+15877+c3862210.x86_64
: php-opcache-0:8.1.8-1.module+el9.1.0+15877+c3862210.x86_64
: php-opcache-debuginfo-0:8.1.8-1.module+el9.1.0+15877+c3862210.x86_64
: php-pdo-0:8.1.8-1.module+el9.1.0+15877+c3862210.x86_64
: php-pdo-debuginfo-0:8.1.8-1.module+el9.1.0+15877+c3862210.x86_64
```

--More--

[q]

Pour installer **et** activer un flux de Module particulier, il est nécessaire de stipuler le flux concerné :

```
[root@redhat9 ~]# dnf module install php:8.2 -y
Updating Subscription Management repositories.
Last metadata expiration check: 0:54:10 ago on Mon 30 Sep 2024 12:48:56 PM CEST.
Dependencies resolved.
=====
=====
Package                Architecture          Size          Version
Repository
=====
=====
Installing group/module packages:
  php-cli                x86_64
  8.2.13-1.module+el9.4.0+20748+b46899d2
  3.6 M                  rhel-9-for-x86_64-appstream-rpms
  php-common             x86_64
  8.2.13-1.module+el9.4.0+20748+b46899d2
  703 k                  rhel-9-for-x86_64-appstream-rpms
  php-fpm                x86_64
  8.2.13-1.module+el9.4.0+20748+b46899d2
  1.8 M                  rhel-9-for-x86_64-appstream-rpms
  php-mbstring           x86_64
  8.2.13-1.module+el9.4.0+20748+b46899d2
  524 k                  rhel-9-for-x86_64-appstream-rpms
  php-xml                x86_64
  8.2.13-1.module+el9.4.0+20748+b46899d2
  150 k                  rhel-9-for-x86_64-appstream-rpms
Installing dependencies:
  nginx-filesystem       noarch
  rhel-9-for-x86_64-appstream-rpms
  11 k                   1:1.20.1-16.el9_4.1
Installing module profiles:
  php/common
Enabling module streams:
```

php

8.2

Transaction Summary

=====
=====
Install 6 Packages

Total download size: 6.8 M

Installed size: 34 M

Downloading Packages:

(1/6): php-common-8.2.13-1.module+el9.4.0+20748+b46899d2.x86_64.rpm

1.4 MB/s | 703 kB 00:00

(2/6): php-fpm-8.2.13-1.module+el9.4.0+20748+b46899d2.x86_64.rpm

2.2 MB/s | 1.8 MB 00:00

(3/6): php-mbstring-8.2.13-1.module+el9.4.0+20748+b46899d2.x86_64.rpm

899 kB/s | 524 kB 00:00

(4/6): php-xml-8.2.13-1.module+el9.4.0+20748+b46899d2.x86_64.rpm

566 kB/s | 150 kB 00:00

(5/6): php-cli-8.2.13-1.module+el9.4.0+20748+b46899d2.x86_64.rpm

2.4 MB/s | 3.6 MB 00:01

(6/6): nginx-filesystem-1.20.1-16.el9_4.1.noarch.rpm

23 kB/s | 11 kB 00:00

Total

4.4 MB/s | 6.8 MB 00:01

Running transaction check

Transaction check succeeded.

Running transaction test

Transaction test succeeded.

Running transaction

Preparing :

1/1

Installing : php-common-8.2.13-1.module+el9.4.0+20748+b46899d2.x86_64

```
1/6
  Running scriptlet: nginx-filesystem-1:1.20.1-16.el9_4.1.noarch
2/6
  Installing      : nginx-filesystem-1:1.20.1-16.el9_4.1.noarch
2/6
  Installing      : php-fpm-8.2.13-1.module+el9.4.0+20748+b46899d2.x86_64
3/6
  Running scriptlet: php-fpm-8.2.13-1.module+el9.4.0+20748+b46899d2.x86_64
3/6
  Installing      : php-cli-8.2.13-1.module+el9.4.0+20748+b46899d2.x86_64
4/6
  Installing      : php-mbstring-8.2.13-1.module+el9.4.0+20748+b46899d2.x86_64
5/6
  Installing      : php-xml-8.2.13-1.module+el9.4.0+20748+b46899d2.x86_64
6/6
  Running scriptlet: php-xml-8.2.13-1.module+el9.4.0+20748+b46899d2.x86_64
6/6
  Verifying      : php-cli-8.2.13-1.module+el9.4.0+20748+b46899d2.x86_64
1/6
  Verifying      : php-common-8.2.13-1.module+el9.4.0+20748+b46899d2.x86_64
2/6
  Verifying      : php-fpm-8.2.13-1.module+el9.4.0+20748+b46899d2.x86_64
3/6
  Verifying      : php-mbstring-8.2.13-1.module+el9.4.0+20748+b46899d2.x86_64
4/6
  Verifying      : php-xml-8.2.13-1.module+el9.4.0+20748+b46899d2.x86_64
5/6
  Verifying      : nginx-filesystem-1:1.20.1-16.el9_4.1.noarch
6/6
Installed products updated.

Installed:
  nginx-filesystem-1:1.20.1-16.el9_4.1.noarch          php-
cli-8.2.13-1.module+el9.4.0+20748+b46899d2.x86_64  php-
```

```
common-8.2.13-1.module+el9.4.0+20748+b46899d2.x86_64
php-fpm-8.2.13-1.module+el9.4.0+20748+b46899d2.x86_64      php-
mbstring-8.2.13-1.module+el9.4.0+20748+b46899d2.x86_64    php-
xml-8.2.13-1.module+el9.4.0+20748+b46899d2.x86_64
```

Complete!

Constatez le statut du flux de Module **php** :

```
[root@redhat9 ~]# dnf module list --enabled
Updating Subscription Management repositories.
Last metadata expiration check: 0:54:59 ago on Mon 30 Sep 2024 12:48:56 PM CEST.
Red Hat Enterprise Linux 9 for x86_64 - AppStream (RPMs)
Name                               Stream                               Profiles
Summary
php                                 8.2 [e]                               common [d] [i], devel,
minimal                             PHP scripting language
```

Hint: [d]efault, [e]nabled, [x]disabled, [i]nstalled



Important : Notez la présence des caractères **[e]**, **[d]** et **[i]**.

Pour supprimer le flux de Module, utilisez la commande **dnf module remove** :

```
[root@redhat9 ~]# dnf module remove php:8.2 -y
Updating Subscription Management repositories.
Last metadata expiration check: 0:56:35 ago on Mon 30 Sep 2024 12:48:56 PM CEST.
Dependencies resolved.
```

```
=====
Package                               Architecture                          Version
```

```

Repository                                                    Size
=====
Removing:
  php-cli                x86_64                @rhel-9-for-x86_64-appstream-rpms
8.2.13-1.module+el9.4.0+20748+b46899d2
16 M
  php-common             x86_64                @rhel-9-for-x86_64-appstream-rpms
8.2.13-1.module+el9.4.0+20748+b46899d2
8.1 M
  php-fpm                x86_64                @rhel-9-for-x86_64-appstream-rpms
8.2.13-1.module+el9.4.0+20748+b46899d2
8.2 M
  php-mbstring           x86_64                @rhel-9-for-x86_64-appstream-rpms
8.2.13-1.module+el9.4.0+20748+b46899d2
1.2 M
  php-xml                x86_64                @rhel-9-for-x86_64-appstream-rpms
8.2.13-1.module+el9.4.0+20748+b46899d2
465 k
Removing unused dependencies:
  nginx-filesystem      noarch                1:1.20.1-16.el9_4.1
@rhel-9-for-x86_64-appstream-rpms
Disabling module profiles:
  php/common

Transaction Summary
=====
Remove 6 Packages

Freed space: 34 M
Running transaction check
Transaction check succeeded.
Running transaction test

```

```
Transaction test succeeded.
Running transaction
  Preparing      :
1/1
  Running scriptlet: php-fpm-8.2.13-1.module+el9.4.0+20748+b46899d2.x86_64
1/6
  Erasing        : php-fpm-8.2.13-1.module+el9.4.0+20748+b46899d2.x86_64
1/6
  Erasing        : php-xml-8.2.13-1.module+el9.4.0+20748+b46899d2.x86_64
2/6
  Erasing        : php-mbstring-8.2.13-1.module+el9.4.0+20748+b46899d2.x86_64
3/6
  Erasing        : php-cli-8.2.13-1.module+el9.4.0+20748+b46899d2.x86_64
4/6
  Erasing        : nginxfilesystem-1:1.20.1-16.el9_4.1.noarch
5/6
  Erasing        : php-common-8.2.13-1.module+el9.4.0+20748+b46899d2.x86_64
6/6
  Running scriptlet: php-common-8.2.13-1.module+el9.4.0+20748+b46899d2.x86_64
6/6
  Verifying      : nginxfilesystem-1:1.20.1-16.el9_4.1.noarch
1/6
  Verifying      : php-cli-8.2.13-1.module+el9.4.0+20748+b46899d2.x86_64
2/6
  Verifying      : php-common-8.2.13-1.module+el9.4.0+20748+b46899d2.x86_64
3/6
  Verifying      : php-fpm-8.2.13-1.module+el9.4.0+20748+b46899d2.x86_64
4/6
  Verifying      : php-mbstring-8.2.13-1.module+el9.4.0+20748+b46899d2.x86_64
5/6
  Verifying      : php-xml-8.2.13-1.module+el9.4.0+20748+b46899d2.x86_64
6/6
Installed products updated.
```

Removed:

```
nginx-filesystem-1:1.20.1-16.el9_4.1.noarch      php-
cli-8.2.13-1.module+el9.4.0+20748+b46899d2.x86_64  php-
common-8.2.13-1.module+el9.4.0+20748+b46899d2.x86_64
php-fpm-8.2.13-1.module+el9.4.0+20748+b46899d2.x86_64  php-
mbstring-8.2.13-1.module+el9.4.0+20748+b46899d2.x86_64  php-
xml-8.2.13-1.module+el9.4.0+20748+b46899d2.x86_64
```

Complete!

Constatez de nouveau le statut du flux de Module **php** :

```
[root@redhat9 ~]# dnf module list --enabled
Updating Subscription Management repositories.
Last metadata expiration check: 0:57:06 ago on Mon 30 Sep 2024 12:48:56 PM CEST.
Red Hat Enterprise Linux 9 for x86_64 - AppStream (RPMs)
Name                               Stream                               Profiles
Summary
php                                 8.2 [e]                             common [d], devel, minimal
PHP scripting language

Hint: [d]efault, [e]nabled, [x]disabled, [i]nstalled
```



Important : Notez que le flux de Module a été désinstallé (absence de **[i]**) mais que celui-ci est toujours activé (présence de **[e]**).

Pour désactiver le flux de Module, utilisez la commande **dnf module disable** :

```
[root@redhat9 ~]# dnf module disable php:8.2 -y
Updating Subscription Management repositories.
Last metadata expiration check: 0:58:47 ago on Mon 30 Sep 2024 12:48:56 PM CEST.
```

```
Only module name is required. Ignoring unneeded information in argument: 'php:8.2'
Dependencies resolved.
```

```
=====
Package                                Architecture                               Version
Repository                              Size
=====
```

```
Disabling modules:
 php
```

```
Transaction Summary
```

```
Complete!
```

```
[root@redhat9 ~]# dnf module list --enabled
Updating Subscription Management repositories.
Last metadata expiration check: 0:59:14 ago on Mon 30 Sep 2024 12:48:56 PM CEST.
```

LAB #3 - Les Bibliothèques Partagées

3.1 - Présentation

Introduction

Les bibliothèques partagées sont des fonctions communes à plusieurs programmes différents d'un même **domaine** (son, base de données, vidéo etc.). Les fonctions proposées par une ou plusieurs bibliothèques forment un **API** (*Application Programming Interface*). Sous Linux les bibliothèques se nomment **Shared Objects** et portent le suffixe **.so**.

Stockage

Les bibliothèques partagées sont stockées par convention dans des répertoires **lib**, par exemple :

Répertoire	Contenu
/lib	Bibliothèques du système de base
/usr/lib	Bibliothèques utilisateurs
/usr/local/lib	Bibliothèques locales
/usr/X11R6/lib	Bibliothèques de l'environnement X
/opt/kde4/lib	Bibliothèques de KDE



Important : La bibliothèque la plus importante est **libc**. Sans elle, le système Linux ne peut pas fonctionner.

ld-linux.so.2

La bibliothèque **ld-linux.so.2** est utilisée par le système pour créer un lien avec une bibliothèque partagée au moment de l'exécution d'un programme et s'appelle le **chargeur de liens**. Ce dernier recherche des bibliothèques partagées dans un ordre précis :

- dans les chemins précisés par la variable système **LD_LIBRARY_PATH**,
- dans les chemins précisés dans le contenu compilé du fichier **/etc/ld.so.cache**,
- dans **/lib** et **/usr/lib**.

Il est à noter que le contenu du cache **ld.so.cache** est construit à partir des informations contenus dans le fichier de configuration **/etc/ld.so.conf**.

Afin d'étudier les bibliothèques liées à une application, nous allons d'abord installer l'application **mc** :

```
[root@redhat9 ~]# dnf install mc -y
```

3.2 - La Commande ldd

Pour déterminer quelles sont les bibliothèques liées à une application, il convient d'utiliser la commande **ldd** :

```
[root@redhat9 ~]# ldd /usr/bin/mc
linux-vdso.so.1 (0x00007ffe40b83000)
libslang.so.2 => /lib64/libslang.so.2 (0x00007f0579a00000)
libgpm.so.2 => /lib64/libgpm.so.2 (0x00007f0579e2d000)
libe2p.so.2 => /lib64/libe2p.so.2 (0x00007f0579e21000)
libglib-2.0.so.0 => /lib64/libglib-2.0.so.0 (0x00007f0579ce6000)
libc.so.6 => /lib64/libc.so.6 (0x00007f0579600000)
libm.so.6 => /lib64/libm.so.6 (0x00007f0579925000)
libpcre.so.1 => /lib64/libpcre.so.1 (0x00007f05798ad000)
/lib64/ld-linux-x86-64.so.2 (0x00007f0579f99000)
```

Afin de comprendre ce qui se passe dans le cas où une bibliothèque est manquante, renommez la bibliothèque **/usr/lib/libslang.so.2** en **/usr/lib/libslang.so.2.old** :

```
[root@redhat9 ~]# mv /lib64/libslang.so.2 /lib64/libslang.so.2.old
```

Exécutez de nouveau la commande ldd. Vous obtiendrez un résultat similaire à celui-ci :

```
[root@redhat9 ~]# ldd /usr/bin/mc
linux-vdso.so.1 (0x00007ffe893a6000)
libslang.so.2 => not found
libgpm.so.2 => /lib64/libgpm.so.2 (0x00007fdff3ea8000)
libe2p.so.2 => /lib64/libe2p.so.2 (0x00007fdff3e9c000)
libglib-2.0.so.0 => /lib64/libglib-2.0.so.0 (0x00007fdff3d61000)
libc.so.6 => /lib64/libc.so.6 (0x00007fdff3a00000)
libpcre.so.1 => /lib64/libpcre.so.1 (0x00007fdff3ce9000)
/lib64/ld-linux-x86-64.so.2 (0x00007fdff4014000)
```

Notez la présence de la ligne **libslang.so.2 ⇒ not found**. Compte tenu de la bibliothèque partagée manquante, le programme **mc** ne peut plus être

lancé :

```
[root@redhat9 ~]# mc
/usr/bin/mc: error while loading shared libraries: libslang.so.2: cannot open shared object file: No such file or directory
```

Renommez la bibliothèque correctement et vérifiez la résolution de l'erreur précédente avec la commande ldd :

```
[root@redhat9 ~]# mv /lib64/libslang.so.2.old /lib64/libslang.so.2

[root@redhat9 ~]# ldd /usr/bin/mc
linux-vdso.so.1 (0x00007ffff85f9000)
libslang.so.2 => /lib64/libslang.so.2 (0x00007effc9e00000)
libgpm.so.2 => /lib64/libgpm.so.2 (0x00007effca1d4000)
libe2p.so.2 => /lib64/libe2p.so.2 (0x00007effca1c8000)
libglib-2.0.so.0 => /lib64/libglib-2.0.so.0 (0x00007effc9cc5000)
libc.so.6 => /lib64/libc.so.6 (0x00007effc9a00000)
libm.so.6 => /lib64/libm.so.6 (0x00007effca0ed000)
libpcre.so.1 => /lib64/libpcre.so.1 (0x00007effc9c4d000)
/lib64/ld-linux-x86-64.so.2 (0x00007effca340000)
```

3.3 - Le fichier `/etc/ld.so.conf`

Le fichier `/etc/ld.so.conf` est utilisé pour configurer le cache `/etc/ld.so.cache` :

```
[root@redhat9 ~]# cat /etc/ld.so.conf
include ld.so.conf.d/*.conf
```

Dans ce cas, le fichier ne contient qu'une directive **include** qui renvoie vers le contenu du répertoire `/etc/ld.so.conf.d/` :

```
[root@redhat9 ~]# ls -l /etc/ld.so.conf.d/
total 4
```

```
-rw-r--r--. 1 root root 30 Jan 19 2024 pipewire-jack-x86_64.conf
```

Par exemple, le contenu du fichier **pipewire-jack-x86_64.conf** est :

```
[root@redhat9 ~]# cat /etc/ld.so.conf.d/pipewire-jack-x86_64.conf
/usr/lib64/pipewire-0.3/jack/
```

3.4 - La Commande ldconfig

La commande **ldconfig** est utilisée pour :

- mettre à jour le cache pour les chemins inclus dans le fichier **/etc/ld.so.conf** ainsi que pour les répertoires **/lib** et **/usr/lib**. L'option **-N** de la commande ldconfig empêche la mise à jour des chemins dans le fichier,
- mettre à jour les liens symboliques sur les bibliothèques. L'option **-X** de la commande ldconfig empêche la mise à jour des liens symboliques.

Les liens symboliques sont utilisés pour gérer les versions de bibliothèques.

La commande ldconfig peut être utilisée avec l'option **-p** pour visualiser le contenu du cache :

```
[root@redhat9 ~]# ldconfig -p | more
827 libs found in cache `/etc/ld.so.cache'
  libzstd.so.1 (libc6,x86-64) => /lib64/libzstd.so.1
  libz.so.1 (libc6,x86-64) => /lib64/libz.so.1
  libyelp.so.0 (libc6,x86-64) => /lib64/libyelp.so.0
  libyaml-0.so.2 (libc6,x86-64) => /lib64/libyaml-0.so.2
  libyajl.so.2 (libc6,x86-64) => /lib64/libyajl.so.2
  libxtables.so.12 (libc6,x86-64) => /lib64/libxtables.so.12
  libxslt.so.1 (libc6,x86-64) => /lib64/libxslt.so.1
  libxshmfence.so.1 (libc6,x86-64) => /lib64/libxshmfence.so.1
  libxml2.so.2 (libc6,x86-64) => /lib64/libxml2.so.2
  libxmlsec1.so.1 (libc6,x86-64) => /lib64/libxmlsec1.so.1
  libxmlsec1-openssl.so.1 (libc6,x86-64) => /lib64/libxmlsec1-openssl.so.1
  libxmlsec1-openssl.so (libc6,x86-64) => /lib64/libxmlsec1-openssl.so
```

```
libxmlb.so.2 (libc6,x86-64) => /lib64/libxmlb.so.2
libxklavier.so.16 (libc6,x86-64) => /lib64/libxklavier.so.16
libxkbregistry.so.0 (libc6,x86-64) => /lib64/libxkbregistry.so.0
libxkbfile.so.1 (libc6,x86-64) => /lib64/libxkbfile.so.1
libxkbcommon.so.0 (libc6,x86-64) => /lib64/libxkbcommon.so.0
libxkbcommon-x11.so.0 (libc6,x86-64) => /lib64/libxkbcommon-x11.so.0
libxcvt.so.0 (libc6,x86-64) => /lib64/libxcvt.so.0
libxcb.so.1 (libc6,x86-64) => /lib64/libxcb.so.1
libxcb-xvmc.so.0 (libc6,x86-64) => /lib64/libxcb-xvmc.so.0
libxcb-xv.so.0 (libc6,x86-64) => /lib64/libxcb-xv.so.0
libxcb-xtest.so.0 (libc6,x86-64) => /lib64/libxcb-xtest.so.0
libxcb-xselinux.so.0 (libc6,x86-64) => /lib64/libxcb-xselinux.so.0
libxcb-xkb.so.1 (libc6,x86-64) => /lib64/libxcb-xkb.so.1
libxcb-xinput.so.0 (libc6,x86-64) => /lib64/libxcb-xinput.so.0
libxcb-xinerama.so.0 (libc6,x86-64) => /lib64/libxcb-xinerama.so.0
libxcb-xf86dri.so.0 (libc6,x86-64) => /lib64/libxcb-xf86dri.so.0
libxcb-xfixes.so.0 (libc6,x86-64) => /lib64/libxcb-xfixes.so.0
libxcb-util.so.1 (libc6,x86-64) => /lib64/libxcb-util.so.1
libxcb-sync.so.1 (libc6,x86-64) => /lib64/libxcb-sync.so.1
libxcb-shm.so.0 (libc6,x86-64) => /lib64/libxcb-shm.so.0
libxcb-shape.so.0 (libc6,x86-64) => /lib64/libxcb-shape.so.0
libxcb-screensaver.so.0 (libc6,x86-64) => /lib64/libxcb-screensaver.so.0
libxcb-res.so.0 (libc6,x86-64) => /lib64/libxcb-res.so.0
libxcb-render.so.0 (libc6,x86-64) => /lib64/libxcb-render.so.0
libxcb-record.so.0 (libc6,x86-64) => /lib64/libxcb-record.so.0
libxcb-randr.so.0 (libc6,x86-64) => /lib64/libxcb-randr.so.0
libxcb-present.so.0 (libc6,x86-64) => /lib64/libxcb-present.so.0
libxcb-glx.so.0 (libc6,x86-64) => /lib64/libxcb-glx.so.0
libxcb-dri3.so.0 (libc6,x86-64) => /lib64/libxcb-dri3.so.0
libxcb-dri2.so.0 (libc6,x86-64) => /lib64/libxcb-dri2.so.0
libxcb-dpms.so.0 (libc6,x86-64) => /lib64/libxcb-dpms.so.0
libxcb-damage.so.0 (libc6,x86-64) => /lib64/libxcb-damage.so.0
libxcb-composite.so.0 (libc6,x86-64) => /lib64/libxcb-composite.so.0
libxatracker.so.2 (libc6,x86-64) => /lib64/libxatracker.so.2
```

```
libwpe-1.0.so.1 (libc6,x86-64) => /lib64/libwpe-1.0.so.1
libwoff2enc.so.1.0.2 (libc6,x86-64) => /lib64/libwoff2enc.so.1.0.2
libwoff2dec.so.1.0.2 (libc6,x86-64) => /lib64/libwoff2dec.so.1.0.2
libwoff2common.so.1.0.2 (libc6,x86-64) => /lib64/libwoff2common.so.1.0.2
libwnck-3.so.0 (libc6,x86-64) => /lib64/libwnck-3.so.0
libwireplumber-0.4.so.0 (libc6,x86-64) => /lib64/libwireplumber-0.4.so.0
libwebrtc_audio_processing.so.1 (libc6,x86-64) => /lib64/libwebrtc_audio_processing.so.1
libwebpmux.so.3 (libc6,x86-64) => /lib64/libwebpmux.so.3
```

--More--

Pour ajouter des bibliothèques partagées, il convient de :

- créer un fichier dans le répertoire **/etc/ld.so.conf.d/** et d'y inscrire le ou les chemins vers le lieu de stockage des bibliothèques partagées à ajouter,
- exécuter la commande **ldconfig -v**, où v implique verbose, afin de reconstruire le cache.

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