

Exercise 1 – Installing packages using rpm

Tasks to Perform on AlmaLinux:

Using the **rpm** command:

1. Verify that the **net-tools** package is installed.
2. Uninstall the **net-tools** package.
3. Verify that the package is uninstalled.

```
gkeymole@server07 ~ $ rpm -q net-tools
net-tools-2.0-0.64.20160912git.el9.x86_64
gkeymole@server07 ~ $ sudo rpm -evh net-tools
[sudo] password for gkeymole:
Preparing... ##### [100%]
Cleaning up / removing...
 1:net-tools-2.0-0.64.20160912git.el9.x86_64 ##### [100%]
gkeymole@server07 ~ $ rpm -q net-tools
package net-tools is not installed
gkeymole@server07 ~ $
```

4. Using the following link and the **wget** command, download the latest version of the **net-tools** package: <https://rpmfind.net/linux/rpm2html/search.php>
You need to find the right package (CentOS distribution and x86_64 architectures).
5. Install the new **net-tools** package.

```
gkeymole@server07 ~ $ wget https://rpmfind.net/linux/almalinux/9.5/BaseOS/x86_64/os/Packages/net-tools-2.0-0.64.20160912git.el9.x86_64.rpm
--2025-03-25 19:30:37-- https://rpmfind.net/linux/almalinux/9.5/BaseOS/x86_64/os/Packages/net-tools-2.0-0.64.20160912git.el9.x86_64.rpm
Resolving rpmfind.net (rpmfind.net)... 195.220.108.108
Connecting to rpmfind.net (rpmfind.net)|195.220.108.108|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 301148 (294K) [application/x-rpm]
Saving to: 'net-tools-2.0-0.64.20160912git.el9.x86_64.rpm'

net-tools-2.0-0.64.20160912git.el9 100%[=====] 294.09K 700KB/s in 0.4s

2025-03-25 19:30:38 (700 KB/s) - 'net-tools-2.0-0.64.20160912git.el9.x86_64.rpm' saved [301148/301148]

gkeymole@server07 ~ $ sudo rpm -ivh net-tools-2.0-0.64.20160912git.el9.x86_64.rpm
[sudo] password for gkeymole:
Verifying... ##### [100%]
Preparing... ##### [100%]
Updating / installing...
 1:net-tools-2.0-0.64.20160912git.el9.x86_64 ##### [100%]
gkeymole@server07 ~ $
```

6. Verify that the package is installed correctly.
7. List all information about this package.

Lab 2 – Software Installation

```
gkeymole@server07 ~ $ rpm -q net-tools
net-tools-2.0-0.64.20160912git.el9.x86_64
gkeymole@server07 ~ $ rpm -qi net-tools
Name       : net-tools
Version    : 2.0
Release    : 0.64.20160912git.el9
Architecture: x86_64
Install Date: Tue 25 Mar 2025 07:32:06 PM
Group      : Unspecified
Size       : 927468
License    : GPLv2+
Signature  : RSA/SHA256, Thu 03 Oct 2024 06:08:12 AM, Key ID d36cb86cb86b3716
Source RPM : net-tools-2.0-0.64.20160912git.el9.src.rpm
Build Date : Wed 02 Oct 2024 03:02:32 PM
Build Host : x64-builder01.almalinux.org
Packager   : AlmaLinux Packaging Team <packager@almalinux.org>
Vendor     : AlmaLinux
URL        : http://sourceforge.net/projects/net-tools/
Summary    : Basic networking tools
Description:
The net-tools package contains basic networking tools,
including ifconfig, netstat, route, and others.
Most of them are obsolete. For replacement check iproute package.
gkeymole@server07 ~ $
```

8. List the manual (documentation) files for this package.

```
gkeymole@server07 ~ $ rpm -qd net-tools
/usr/share/man/de/man5/ethers.5.gz
/usr/share/man/de/man8/arp.8.gz
/usr/share/man/de/man8/ifconfig.8.gz
/usr/share/man/de/man8/netstat.8.gz
/usr/share/man/de/man8/plipconfig.8.gz
/usr/share/man/de/man8/route.8.gz
/usr/share/man/de/man8/slattach.8.gz
/usr/share/man/fr/man5/ethers.5.gz
/usr/share/man/fr/man8/arp.8.gz
/usr/share/man/fr/man8/ifconfig.8.gz
/usr/share/man/fr/man8/netstat.8.gz
/usr/share/man/fr/man8/plipconfig.8.gz
/usr/share/man/fr/man8/route.8.gz
/usr/share/man/fr/man8/slattach.8.gz
/usr/share/man/man5/ethers.5.gz
/usr/share/man/man8/arp.8.gz
/usr/share/man/man8/ether-wake.8.gz
/usr/share/man/man8/ifconfig.8.gz
/usr/share/man/man8/ipmaddr.8.gz
/usr/share/man/man8/iptunnel.8.gz
/usr/share/man/man8/mii-diag.8.gz
/usr/share/man/man8/mii-tool.8.gz
/usr/share/man/man8/nameif.8.gz
/usr/share/man/man8/netstat.8.gz
/usr/share/man/man8/plipconfig.8.gz
/usr/share/man/man8/route.8.gz
/usr/share/man/man8/slattach.8.gz
/usr/share/man/pt/man8/arp.8.gz
/usr/share/man/pt/man8/ifconfig.8.gz
/usr/share/man/pt/man8/netstat.8.gz
/usr/share/man/pt/man8/route.8.gz
gkeymole@server07 ~ $
```

9. List the configuration files for this package.

```
gkeymole@server07 ~ $ rpm -qc net-tools
gkeymole@server07 ~ $
```

Lab 2 – Software Installation

Exercise 2 – Installing packages using **dpkg**

Tasks to Perform on Ubuntu:

Using the **dpkg** command:

1. Verify that the **net-tools** package is not installed.

```
gkeymole@client07:~$ dpkg -s net-tools
dpkg-query: package 'net-tools' is not installed and no information is available
Use dpkg --info (= dpkg-deb --info) to examine archive files.
```

2. Using the following link and the **wget** command, download the latest version of the **net-tools** package: http://http.us.debian.org/debian/pool/main/n/net-tools/net-tools_2.10-1.1_amd64.deb
You need to find the right package (amd64 Architecture).

```
gkeymole@client07:~$ wget https://deb.debian.org/debian/pool/main/n/net-tools/net-tools_2.10-1.1_amd64.deb
--2025-03-26 12:42:01-- https://deb.debian.org/debian/pool/main/n/net-tools/net-tools_2.10-1.1_amd64.d
eb
Resolving deb.debian.org (deb.debian.org)... 140.211.166.134, 64.50.236.52, 64.50.233.100, ...
Connecting to deb.debian.org (deb.debian.org)|140.211.166.134|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 242936 (237K) [application/vnd.debian.binary-package]
Saving to: 'net-tools_2.10-1.1_amd64.deb'

net-tools_2.10-1.1_amd64.d 100%[=====>] 237.24K  524KB/s  in 0.5s
2025-03-26 12:42:01 (524 KB/s) - 'net-tools_2.10-1.1_amd64.deb' saved [242936/242936]
```

3. Install the new **net-tools** package.

```
gkeymole@client07:~$ dpkg-deb -I net-tools_2.10-1.1_amd64.deb
new Debian package, version 2.0.
size 242936 bytes: control archive=2080 bytes.
  838 bytes, 19 lines   control
  3476 bytes, 53 lines  md5sums
Package: net-tools
Version: 2.10-1.1
Architecture: amd64
Maintainer: net-tools Team <team+net-tools@tracker.debian.org>
Installed-Size: 976
Depends: libc6 (>= 2.34), libselinux1 (>= 3.1~)
Section: net
Priority: important
Multi-Arch: foreign
Homepage: http://sourceforge.net/projects/net-tools/
Description: NET-3 networking toolkit
 This package includes the important tools for controlling the network
 subsystem of the Linux kernel. This includes arp, ifconfig, netstat,
 rarp, nameif and route. Additionally, this package contains utilities
 relating to particular network hardware types (plipconfig, slattach,
 mil-tool) and advanced aspects of IP configuration (iptunnel, ipnaddr).
.
In the upstream package 'hostname' and friends are included. Those are
not installed by this package, since there is a special "hostname*.deb".

gkeymole@client07:~$ dpkg -s libc6
Package: libc6
Status: install ok installed
Priority: required
Section: libs
Installed-Size: 13597
Maintainer: Ubuntu Developers <ubuntu-devel-discuss@lists.ubuntu.com>
Architecture: amd64
Multi-Arch: same
Source: glibc
Version: 2.35-0ubuntu3.9
Replaces: libc6-amd64
Depends: libgcc-s1, libcrypt1 (>= 1:4.4.10-10ubuntu4)
Recommends: libidn2-0 (>= 2.0.5-), libnss-nis, libnss-nisplus
Suggests: glibc-doc, debconf | debconf-2.0, locales
Breaks: busybox (< 1.30.1-6), fakeroot (< 1.25.3-1ubuntu2~), hurd (< 1:0.9.git20170910-1), ioquake3 (< 1.36u20200211.f2c61ci-dfsg-2), iraf-fitsutil (< 2018.07.06-4), libgegl-0.4-0 (< 0.4.18), libtirpc1 (< 0.2.3), locales (< 2.35), locales-all (< 2.35), maccs (< 2.2.7.1-3~), ncache (< 1.1.1-), nscd (< 2.35), openarena (< 0.8.8+dfsg-4~), openssl-server (< 1:8.2p1-4), r-cran-later (< 0.7.5+dfsg-2), wcc (< 0.0.2+dfsg-3)
Conflicts:
/etc/ld.so.conf.d/x86_64-linux-gnu.conf d4e7a7b88a71b5ffd9e2644e71a0cfab
Description: GNU C Library: Shared libraries
Contains the standard libraries that are used by nearly all programs on
the system. This package includes shared versions of the standard C library
```


Lab 2 – Software Installation

```
gkeymole@client07:~$ sudo dpkg -i net-tools_2.10-1.1_amd64.deb
[sudo] password for gkeymole:
Selecting previously unselected package net-tools.
(Reading database ... 200776 files and directories currently installed.)
Preparing to unpack net-tools_2.10-1.1_amd64.deb ...
Unpacking net-tools (2.10-1.1) ...
Setting up net-tools (2.10-1.1) ...
Processing triggers for man-db (2.10.2-1) ...
gkeymole@client07:~$
```

4. Verify that the **net-tools** package is installed correctly and display all the information of this package.

```
gkeymole@client07:~$ dpkg -s net-tools
Package: net-tools
Status: install ok installed
Priority: important
Section: net
Installed-Size: 976
Maintainer: net-tools Team <team+net-tools@tracker.debian.org>
Architecture: amd64
Multi-Arch: foreign
Version: 2.10-1.1
Depends: libc6 (>= 2.34), libselinux1 (>= 3.1~)
Description: NET-3 networking toolkit
 This package includes the important tools for controlling the network
 subsystem of the Linux kernel. This includes arp, ifconfig, netstat,
 rarp, nameif and route. Additionally, this package contains utilities
 relating to particular network hardware types (plipconfig, slattach,
 mii-tool) and advanced aspects of IP configuration (iptunnel, ipmaddr).
 .
 In the upstream package 'hostname' and friends are included. Those are
 not installed by this package, since there is a special "hostname*.deb".
 Homepage: http://sourceforge.net/projects/net-tools/
```

5. View all files in this package.

```
gkeymole@client07:~$ dpkg -L net-tools
/.
/usr
/usr/bin
/usr/bin/netstat
/usr/sbin
/usr/sbin/arp
/usr/sbin/ifconfig
/usr/sbin/ipmaddr
/usr/sbin/iptunnel
/usr/sbin/mii-tool
/usr/sbin/nameif
/usr/sbin/plipconfig
/usr/sbin/rarp
/usr/sbin/route
/usr/sbin/slattach
/usr/share
/usr/share/doc
/usr/share/doc/net-tools
/usr/share/doc/net-tools/README
/usr/share/doc/net-tools/TODD
/usr/share/doc/net-tools/changelog.Debian.gz
/usr/share/doc/net-tools/copyright
/usr/share/locale
/usr/share/locale/cs
```

Exercise 3 – Installing packages using **dnf**

Tasks to Perform on AlmaLinux:

Exercise 3.1

1. List the package repositories installed on the server.
2. In which directory is the configuration of these repositories saved?

```
gkeymole@server07 ~$ dnf repolist
repo id                                repo name
appstream                              AlmaLinux 9 - AppStream
baseos                                 AlmaLinux 9 - BaseOS
epel                                   Extra Packages for Enterprise Linux 9 - x86_64
epel-cisco-openh264                   Extra Packages for Enterprise Linux 9 openh264 (From Cisco) - x86_64
extras                                AlmaLinux 9 - Extras
gkeymole@server07 ~$ ls -la /etc/yum.repos.d/
total 72
drwxr-xr-x. 2 root root 4096 Feb  6 06:28 .
drwxr-xr-x. 131 root root 8192 Mar 25 20:27 ..
-rw-r--r--. 1 root root 1023 Feb  6 06:06 almalinux-appstream.repo
-rw-r--r--. 1 root root 987 Feb  6 06:06 almalinux-baseos.repo
-rw-r--r--. 1 root root 951 Feb  6 06:06 almalinux-crb.repo
-rw-r--r--. 1 root root 987 Feb  6 06:06 almalinux-extras.repo
-rw-r--r--. 1 root root 1107 Feb  6 06:06 almalinux-highavailability.repo
-rw-r--r--. 1 root root 951 Feb  6 06:06 almalinux-nfv.repo
-rw-r--r--. 1 root root 963 Feb  6 06:06 almalinux-plus.repo
-rw-r--r--. 1 root root 1107 Feb  6 06:06 almalinux-resilientstorage.repo
-rw-r--r--. 1 root root 939 Feb  6 06:06 almalinux-rt.repo
-rw-r--r--. 1 root root 999 Feb  6 06:06 almalinux-saphana.repo
-rw-r--r--. 1 root root 951 Feb  6 06:06 almalinux-sap.repo
-rw-r--r--. 1 root root 1052 Dec  2 18:57 epel-cisco-openh264.repo
-rw-r--r--. 1 root root 1333 Dec  2 18:57 epel.repo
-rw-r--r--. 1 root root 1432 Dec  2 18:57 epel-testing.repo
gkeymole@server07 ~$
```

3. View repository configuration: **AlmaLinux-AppStream**.

```
gkeymole@server07 ~$ cat /etc/yum.repos.d/almalinux-appstream.repo
[appstream]
name=AlmaLinux $releasever - AppStream
mirrorlist=https://mirrors.almalinux.org/mirrorlist/$releasever/appstream
# baseurl=https://repo.almalinux.org/almalinux/$releasever/AppStream/$basearch/os/
enabled=1
gpgcheck=1
countme=1
gpgkey=file:///etc/pki/rpm-gpg/RPM-GPG-KEY-AlmaLinux-9
metadata_expire=86400
enabled_metadata=1

[appstream-debuginfo]
name=AlmaLinux $releasever - AppStream - Debug
mirrorlist=https://mirrors.almalinux.org/mirrorlist/$releasever/appstream-debug
# baseurl=https://repo.almalinux.org/vault/$releasever/AppStream/debug/$basearch/
enabled=0
gpgcheck=1
gpgkey=file:///etc/pki/rpm-gpg/RPM-GPG-KEY-AlmaLinux-9
metadata_expire=86400
enabled_metadata=0

[appstream-source]
name=AlmaLinux $releasever - AppStream - Source
mirrorlist=https://mirrors.almalinux.org/mirrorlist/$releasever/appstream-source
# baseurl=https://repo.almalinux.org/vault/$releasever/AppStream/Source/
enabled=0
gpgcheck=1
gpgkey=file:///etc/pki/rpm-gpg/RPM-GPG-KEY-AlmaLinux-9
metadata_expire=86400
enabled_metadata=0
gkeymole@server07 ~$
```

Exercise 3.2

1. Verify that the **nmap** application is not installed.
2. Get all the information about this **nmap** app.

Lab 2 – Software Installation

```
gkeymole@server07 ~ $ dnf list installed nmap
Error: No matching Packages to list
gkeymole@server07 ~ $ dnf list nmap
Last metadata expiration check: 0:02:30 ago on Tue 25 Mar 2025 10:05:54 PM.
Available Packages
nmap.x86_64                                     3:7.92-3.el9
gkeymole@server07 ~ $ dnf info nmap
Last metadata expiration check: 0:02:39 ago on Tue 25 Mar 2025 10:05:54 PM.
Available Packages
Name      : nmap
Epoch    : 3
Version   : 7.92
Release   : 3.el9
Architecture : x86_64
Size      : 5.4 M
Source    : nmap-7.92-3.el9.src.rpm
Repository : appstream
Summary   : Network exploration tool and security scanner
URL       : http://nmap.org/
License   : Nmap
Description : Nmap is a utility for network exploration or security auditing. It supports
           : ping scanning (determine which hosts are up), many port scanning techniques
           : (determine what services the hosts are offering), and TCP/IP fingerprinting
           : (remote host operating system identification). Nmap also offers flexible target
           : and port specification, decoy scanning, determination of TCP sequence
           : predictability characteristics, reverse-identd scanning, and more. In addition
           : to the classic command-line nmap executable, the Nmap suite includes a flexible
           : data transfer, redirection, and debugging tool (netcat utility ncat), a utility
           : for comparing scan results (ndiff), and a packet generation and response
           : analysis tool (nping).
```

3. Install the latest version of the **nmap** application.

```
gkeymole@server07 ~ $ sudo dnf install nmap
[sudo] password for gkeymole:
Last metadata expiration check: 0:57:06 ago on Tue 25 Mar 2025 09:12:17 PM.
Dependencies resolved.
=====
Package                Architecture      Version           Repository        Size
=====
Installing:
nmap                   x86_64            3:7.92-3.el9      appstream          5.4 M
Transaction Summary
=====
Install 1 Package

Total download size: 5.4 M
Installed size: 24 M
Is this ok [y/N]: y
Downloading Packages:
nmap-7.92-3.el9.x86_64.rpm                                37 MB/s | 5.4 MB    00:00
-----
Total                                                    2.4 MB/s | 5.4 MB    00:02
Running transaction check
Transaction check succeeded.
Running transaction test
Transaction test succeeded.
Running transaction
  Preparing      :
  Installing     : nmap-3:7.92-3.el9.x86_64                1/1
  Running scriptlet: nmap-3:7.92-3.el9.x86_64                1/1
  Verifying      : nmap-3:7.92-3.el9.x86_64                1/1
Installed:
nmap-3:7.92-3.el9.x86_64
```

4. Verify that **nmap** is installed correctly.

Lab 2 – Software Installation

```
gkeymole@server07 ~$ dnf list installed nmap
Installed Packages
nmap.x86_64                               3:7.92-3.el9                                @appstream
gkeymole@server07 ~$
```

5. Search for packages that contain the keyword: **named**.

```
gkeymole@server07 ~$ dnf search named
Last metadata expiration check: 0:04:46 ago on Tue 25 Mar 2025 10:05:54 PM.
===== Name & Summary Matched: named =====
pcp-pmda-named.x86_64 : Performance Co-Pilot (PCP) metrics for Named
===== Name Matched: named =====
rust-palette+named-devel.noarch : Convert and manage colors with a focus on correctness, flexibility and ease of use
rust-palette+named_from_str-devel.noarch : Convert and manage colors with a focus on correctness, flexibility and ease of use
rust-palette0.6+named-devel.noarch : Convert and manage colors with a focus on correctness, flexibility and ease of use
rust-palette0.6+named_from_str-devel.noarch : Convert and manage colors with a focus on correctness, flexibility and ease of use
rust-palette0.6+named_gradients-devel.noarch : Convert and manage colors with a focus on correctness, flexibility and ease of use
===== Summary Matched: named =====
bind-chroot.x86_64 : A chroot runtime environment for the ISC BIND DNS server, named(8)
bind9.18-chroot.x86_64 : A chroot runtime environment for the ISC BIND DNS server, named(8)
perl-Opcode.x86_64 : Disable named opcodes when compiling a perl code
perl-URI-FromHash.noarch : Build a URI from a set of named parameters
```

6. Install the first package found.

```
gkeymole@server07 ~$ sudo dnf install pcp-pmda-named.x86_64
Last metadata expiration check: 0:59:45 ago on Tue 25 Mar 2025 09:12:17 PM.
Dependencies resolved.
=====
Package                                Architecture      Version           Repository        Size
=====
Installing:
pcp-pmda-named                         x86_64            6.2.2-7.el9_5.alma.1  appstream         15 k
Installing dependencies:
pcp                                    x86_64            6.2.2-7.el9_5.alma.1  appstream         1.4 M
pcp-conf                              x86_64            6.2.2-7.el9_5.alma.1  appstream          29 k
pcp-libs                              x86_64            6.2.2-7.el9_5.alma.1  appstream        637 k
pcp-selinux                           x86_64            6.2.2-7.el9_5.alma.1  appstream          31 k
perl-PCP-PMDA                         x86_64            6.2.2-7.el9_5.alma.1  appstream          50 k
Transaction Summary
=====
Install 6 Packages

Total download size: 2.1 M
Installed size: 7.1 M
Is this ok [y/N]: y
Downloading Packages:
(1/6): pcp-conf-6.2.2-7.el9_5.alma.1.x86_64.rpm                2.9 MB/s | 29 kB    00:00
(2/6): pcp-pmda-named-6.2.2-7.el9_5.alma.1.x86_64.rpm          1.9 MB/s | 15 kB    00:00
(3/6): pcp-selinux-6.2.2-7.el9_5.alma.1.x86_64.rpm             6.5 MB/s | 31 kB    00:00
(4/6): perl-PCP-PMDA-6.2.2-7.el9_5.alma.1.x86_64.rpm           8.1 MB/s | 50 kB    00:00
(5/6): pcp-libs-6.2.2-7.el9_5.alma.1.x86_64.rpm               19 MB/s | 637 kB    00:00
(6/6): pcp-6.2.2-7.el9_5.alma.1.x86_64.rpm                   26 MB/s | 1.4 MB    00:00
-----
Total                                                                12 MB/s | 2.1 MB    00:00
Running transaction check
Transaction check succeeded.
Running transaction test
```

7. Verify that this package is installed correctly.

```
gkeymole@server07 ~$ dnf list installed pcp-pmda-named
Installed Packages
pcp-pmda-named.x86_64                               6.2.2-7.el9_5.alma.1                                @appstream
gkeymole@server07 ~$
```

8. View all information about this package.

Lab 2 – Software Installation

```
gkeymole@server07 ~ $ dnf info pcp-pmda-named
Last metadata expiration check: 0:08:06 ago on Tue 25 Mar 2025 10:05:54 PM.
Installed Packages
Name       : pcp-pmda-named
Version    : 6.2.2
Release    : 7.el9_5.alma.1
Architecture: x86_64
Size       : 8.3 k
Source     : pcp-6.2.2-7.el9_5.alma.1.src.rpm
Repository : @System
From repo  : appstream
Summary    : Performance Co-Pilot (PCP) metrics for Named
URL        : https://pcp.io
License    : GPL-2.0-or-later
Description: This package contains the PCP Performance Metrics Domain Agent (PMDA) for
           : collecting metrics about the Named nameserver.

gkeymole@server07 ~ $
```

9. Uninstall this package.

```
gkeymole@server07 ~ $ sudo dnf remove pcp-pmda-named
Dependencies resolved.
=====
Package                        Architecture      Version           Repository        Size
=====
Removing:
pcp-pmda-named                 x86_64           6.2.2-7.el9_5.alma.1 @appstream        8.3 k
Removing unused dependencies:
pcp                            x86_64           6.2.2-7.el9_5.alma.1 @appstream        5.3 M
pcp-conf                      x86_64           6.2.2-7.el9_5.alma.1 @appstream         76 k
pcp-libs                      x86_64           6.2.2-7.el9_5.alma.1 @appstream        1.5 M
pcp-selinux                   x86_64           6.2.2-7.el9_5.alma.1 @appstream         18 k
perl-PCP-PMDA                 x86_64           6.2.2-7.el9_5.alma.1 @appstream        110 k

Transaction Summary
=====
Remove 6 Packages

Freed space: 7.1 M
Is this ok [y/N]: y
Running transaction check
Transaction check succeeded.
Running transaction test
Transaction test succeeded.
Running transaction
  Preparing                :                               1/1
  Running scriptlet: pcp-pmda-named-6.2.2-7.el9_5.alma.1.x86_64 1/6
  Erasing            : pcp-pmda-named-6.2.2-7.el9_5.alma.1.x86_64 1/6
  Running scriptlet: pcp-6.2.2-7.el9_5.alma.1.x86_64             2/6
  Erasing            : pcp-6.2.2-7.el9_5.alma.1.x86_64           2/6
  Erasing            : perl-PCP-PMDA-6.2.2-7.el9_5.alma.1.x86_64 3/6
  Erasing            : pcp-selinux-6.2.2-7.el9_5.alma.1.x86_64  4/6
  Running scriptlet: pcp-selinux-6.2.2-7.el9_5.alma.1.x86_64    4/6
```

Exercise 3.3

1. List all the package groups.

```
gkeymole@server07 ~ $ dnf group list
Last metadata expiration check: 0:10:03 ago on Tue 25 Mar 2025 10:05:54 PM.
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:
  Console Internet Tools
  .NET Development
  RPM Development Tools
  Development Tools
  Graphical Administration Tools
  Legacy UNIX Compatibility
  Network Servers
  Scientific Support
  Security Tools
  Smart Card Support
  System Tools
  Fedora Packager
  VideoLAN Client
  Xfce
gkeymole@server07 ~ $
```


Lab 2 – Software Installation

2. View all information about the group: "Development Tools".

```
gkeymole@server07 ~ $ dnf group info "Development Tools"
Last metadata expiration check: 0:11:45 ago on Tue 25 Mar 2025 10:05:54 PM.
Group: Development Tools
Description: A basic development environment.
Mandatory Packages:
  autoconf
  automake
  binutils
  bison
  flex
  gcc
  gcc-c++
  gdb
  glibc-devel
  libtool
  make
  pkgconf
  pkgconf-m4
  pkgconf-pkg-config
  redhat-rpm-config
  rpm-build
  rpm-sign
  strace
Default Packages:
  asciidoc
  byacc
  diffstat
  git
  intltool
  jna
  ltrace
  patchutils
  perl-Fedora-VSP
```

3. Install the group: "Development Tools".

```
gkeymole@server07 ~ $ sudo dnf group install "Development Tools"
Last metadata expiration check: 1:06:19 ago on Tue 25 Mar 2025 09:12:17 PM.
Dependencies resolved.
=====
Package                                Architecture      Version           Repository        Size
=====
Installing group/module packages:
asciidoc                               noarch            9.1.0-3.el9      appstream         237 k
autoconf                               noarch            2.69-39.el9      appstream         665 k
automake                               noarch            1.16.2-8.el9     appstream         662 k
bison                                  x86_64            3.7.4-5.el9      appstream         920 k
byacc                                  x86_64            2.0.20210109-4.el9 appstream         88 k
diffstat                              x86_64            1.64-6.el9       appstream         43 k
flex                                   x86_64            2.6.4-9.el9      appstream         307 k
gcc                                     x86_64            11.5.0-5.el9_5.alma.1 appstream         32 M
gcc-c++                               x86_64            11.5.0-5.el9_5.alma.1 appstream         13 M
gdb                                    x86_64            14.2-3.el9       appstream         146 k
git                                    x86_64            2.43.5-2.el9_5   appstream         50 k
glibc-devel                           x86_64            2.34-125.el9_5.3.alma.1 appstream         25 k
intltool                              noarch            0.51.0-20.el9    appstream         55 k
jna                                    x86_64            5.6.0-8.el9      appstream         268 k
libtool                               x86_64            2.4.6-46.el9     appstream         577 k
ltrace                                x86_64            0.7.91-43.el9    appstream         137 k
make                                   x86_64            1:4.3-8.el9      baseos            530 k
patchutils                            x86_64            0.4.2-7.el9      appstream         99 k
perl-Fedora-VSP                       noarch            0.001-23.el9     appstream         23 k
perl-generators                       noarch            1.11-12.el9      appstream         15 k
pesign                                 x86_64            115-6.el9_1      appstream         167 k
redhat-rpm-config                     noarch            208-1.el9.alma.1 appstream         66 k
rpm-build                             x86_64            4.16.1.3-34.el9  appstream         59 k
rpm-sign                              x86_64            4.16.1.3-34.el9  baseos            17 k
=====
```

4. Verify if the group: "Development Tools" is installed correctly.

```
gkeymole@server07 ~ $ dnf group list installed
Last metadata expiration check: 0:15:54 ago on Tue 25 Mar 2025 10:05:54 PM.
Installed Environment Groups:
  Server with GUI
Installed Groups:
  Container Management
  Development Tools
  Headless Management
gkeymole@server07 ~ $
```

Lab 2 – Software Installation

5. Uninstall the "Development Tools" group.

```
gkeymole@server07 ~ $ sudo dnf group remove "Development Tools"
Dependencies resolved.
=====
Package                                Architecture      Version           Repository        Size
=====
Removing:
asciidoc                               noarch            9.1.0-3.el9      @appstream        949 k
autoconf                               noarch            2.69-39.el9      @appstream        2.2 M
automake                               noarch            1.16.2-8.el9     @appstream        1.7 M
bison                                  x86_64            3.7.4-5.el9      @appstream        3.1 M
byacc                                  x86_64            2.0.20210109-4.el9 @appstream        271 k
diffstat                              x86_64            1.64-6.el9       @appstream        76 k
flex                                   x86_64            2.6.4-9.el9      @appstream        902 k
gcc                                    x86_64            11.5.0-5.el9_5.alma.1 @appstream        86 M
gcc-c++                               x86_64            11.5.0-5.el9_5.alma.1 @appstream        32 M
gdb                                    x86_64            14.2-3.el9       @appstream        445 k
git                                    x86_64            2.43.5-2.el9_5   @appstream        86 k
glibc-devel                           x86_64            2.34-125.el9_5.3.alma.1 @appstream        38 k
intltool                              noarch            0.51.0-20.el9    @appstream        169 k
jna                                    x86_64            5.6.0-8.el9      @appstream        459 k
libtool                               x86_64            2.4.6-46.el9     @appstream        2.6 M
ltrace                                x86_64            0.7.91-43.el9    @appstream        309 k
make                                   x86_64            1:4.3-8.el9      @baseos           1.6 M
patchutils                            x86_64            0.4.2-7.el9      @appstream        210 k
perl-Fedora-VSP                       noarch            0.001-23.el9     @appstream        40 k
perl-generators                       noarch            1.11-12.el9      @appstream        21 k
pesign                                x86_64            115-6.el9_1      @appstream        744 k
redhat-rpm-config                    noarch            208-1.el9.alma.1 @appstream        187 k
rpm-build                             x86_64            4.16.1.3-34.el9  @appstream        146 k
rpm-sign                              x86_64            4.16.1.3-34.el9  @baseos           22 k
source-highlight                     x86_64            3.1.9-12.el9     @appstream        2.8 M
=====
```

Exercise 3.4

1. List the history of **dnf** commands.

```
gkeymole@server07 ~ $ dnf history
ID      | Command line                                     | Date and time | Action(s) | Altered
-----|-----
8 | group remove Development Tools                  | 2025-03-25 22:23 | Removed | 106 EE
7 | group install Development Tools                 | 2025-03-25 22:18 | Install | 110 EE
6 | remove pcp-pmda-named                          | 2025-03-25 22:15 | Removed | 6
5 | install pcp-pmda-named.x86_64                  | 2025-03-25 22:12 | Install | 6 EE
4 | install nmap                                    | 2025-03-25 22:09 | Install | 1 <
3 | -y update                                       | 2025-03-24 14:48 | I, U | 153 >
2 | install -y epel-release                        | 2025-03-24 14:25 | Install | 1 E<
1 |                                                  | 2025-03-24 14:13 | Install | 1190 >E
gkeymole@server07 ~ $
```

2. View information about one of these commands.

```
gkeymole@server07 ~ $ dnf history info 5
Transaction ID : 5
Begin time     : Tue 25 Mar 2025 10:12:04 PM
Begin rpmdb    : c7e07f8db924a30abd4d754393cff965cd756594968261f05a6f48c9121a0f16
End time       : Tue 25 Mar 2025 10:12:10 PM (6 seconds)
End rpmdb      : c92dedffa96ca6999578dedde325cb7e805baf75b252be532f47afe6024ab1cd
User           : Guillermo Padilla Keymole <gkeymole>
Return-Code    : Success
Releasever     : 9
Command Line    : install pcp-pmda-named.x86_64
Comment        :
Packages Altered:
  Install pcp-6.2.2-7.el9_5.alma.1.x86_64 @appstream
  Install pcp-conf-6.2.2-7.el9_5.alma.1.x86_64 @appstream
  Install pcp-libs-6.2.2-7.el9_5.alma.1.x86_64 @appstream
  Install pcp-pmda-named-6.2.2-7.el9_5.alma.1.x86_64 @appstream
  Install pcp-selinux-6.2.2-7.el9_5.alma.1.x86_64 @appstream
  Install perl-PCP-PMDA-6.2.2-7.el9_5.alma.1.x86_64 @appstream
Scriptlet output:
  1 libsemanage.semanage_direct_install_info: Overriding pcp module at lower priority 100 with module at priority 200.
  2 Creating group 'pcp' with GID 980.
  3 Creating user 'pcp' (Performance Co-Pilot) with UID 980 and GID 980.
gkeymole@server07 ~ $
```

Lab 2 – Software Installation

3. Using **dnf history**, reverse the last command.

```
gkeymole@server07 ~$ dnf history
ID      | Command line                                     | Date and time   | Action(s)      | Altered
-----|-----
8       | group remove Development Tools                 | 2025-03-25 22:23 | Removed        | 106 EE
7       | group install Development Tools                | 2025-03-25 22:18 | Install        | 110 EE
6       | remove pcp-pmda-named                         | 2025-03-25 22:15 | Removed        | 6
5       | install pcp-pmda-named.x86_64                 | 2025-03-25 22:12 | Install        | 6 EE
4       | install nmap                                   | 2025-03-25 22:09 | Install        | 1 <
3       | -y update                                     | 2025-03-24 14:48 | I, U           | 153 >
2       | install -y epel-release                       | 2025-03-24 14:25 | Install        | 1 E<
1       |                                                | 2025-03-24 14:13 | Install        | 1190 >E

gkeymole@server07 ~$ sudo dnf history undo 8
Last metadata expiration check: 1:15:06 ago on Tue 25 Mar 2025 09:12:17 PM.
Dependencies resolved.
=====
Package                                Architecture      Version           Repository        Size
=====
Installing group/module packages:
asciidoc                               noarch            9.1.0-3.el9      appstream         237 k
autoconf                               noarch            2.69-39.el9      appstream         665 k
automake                               noarch            1.16.2-8.el9     appstream         662 k
bison                                  x86_64            3.7.4-5.el9      appstream         920 k
byacc                                  x86_64            2.0.20210109-4.el9 appstream         88 k
diffstat                              x86_64            1.64-6.el9       appstream         43 k
flex                                   x86_64            2.6.4-9.el9      appstream         307 k
gcc                                    x86_64            11.5.0-5.el9_5.alma.1 appstream         32 M
gcc-c++                               x86_64            11.5.0-5.el9_5.alma.1 appstream         13 M
gdb                                    x86_64            14.2-3.el9       appstream         146 k
git                                    x86_64            2.43.5-2.el9_5   appstream         50 k
glibc-devel                            x86_64            2.34-125.el9_5.3.alma.1 appstream         25 k
```


Exercise 4 – Installing packages with **apt**

Tasks to Perform on Ubuntu:

1. Verify that **bind9-dnsutils** package is installed.

```
gkeymole@client07:~$ apt list bind9-dnsutils
Listing... Done
bind9-dnsutils/jammy-updates,jammy-security,now 1:9.18.30-0ubuntu0.22.04.2 amd64 [installed,automatic]
bind9-dnsutils/jammy-updates,jammy-security 1:9.18.30-0ubuntu0.22.04.2 i386
gkeymole@client07:~$
```

2. If it is installed, uninstall it.

```
gkeymole@client07:~$ sudo apt remove bind9-dnsutils
[sudo] password for gkeymole:
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following packages will be REMOVED:
  bind9-dnsutils ubuntu-standard
0 upgraded, 0 newly installed, 2 to remove and 0 not upgraded.
After this operation, 599 kB disk space will be freed.
Do you want to continue? [Y/n] y
(Reading database ... 200830 files and directories currently installed.)
Removing ubuntu-standard (1.481.4) ...
Removing bind9-dnsutils (1:9.18.30-0ubuntu0.22.04.2) ...
Processing triggers for man-db (2.10.2-1) ...
gkeymole@client07:~$
```

3. Install the **bind9-dnsutils** application again.

```
gkeymole@client07:~$ sudo apt install bind9-dnsutils
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following NEW packages will be installed:
  bind9-dnsutils
0 upgraded, 1 newly installed, 0 to remove and 0 not upgraded.
Need to get 0 B/158 kB of archives.
After this operation, 545 kB of additional disk space will be used.
Selecting previously unselected package bind9-dnsutils.
(Reading database ... 200813 files and directories currently installed.)
Preparing to unpack .../bind9-dnsutils_1%3a9.18.30-0ubuntu0.22.04.2_amd64.deb ...
Unpacking bind9-dnsutils (1:9.18.30-0ubuntu0.22.04.2) ...
Setting up bind9-dnsutils (1:9.18.30-0ubuntu0.22.04.2) ...
Processing triggers for man-db (2.10.2-1) ...
gkeymole@client07:~$
```

4. Verify that **bind9-dnsutils** is installed correctly.

```
gkeymole@client07:~$ apt list bind9-dnsutils
Listing... Done
bind9-dnsutils/jammy-updates,jammy-security,now 1:9.18.30-0ubuntu0.22.04.2 amd64 [installed]
bind9-dnsutils/jammy-updates,jammy-security 1:9.18.30-0ubuntu0.22.04.2 i386
```

5. Get all the information about this app.

```
gkeymole@client07:~$ apt info bind9-dnsutils
Package: bind9-dnsutils
Version: 1:9.18.30-0ubuntu0.22.04.2
Priority: standard
Section: net
Source: bind9
Origin: Ubuntu
Maintainer: Ubuntu Developers <ubuntu-devel-discuss@lists.ubuntu.com>
Original-Maintainer: Debian DNS Team <team+dns@tracker.debian.org>
Bugs: https://bugs.launchpad.net/ubuntu/+filebug
Installed-Size: 545 kB
Provides: dnsutils
Depends: bind9-host | host, bind9-libs (= 1:9.18.30-0ubuntu0.22.04.2), libc6 (= 2.34), libedit2 (= 2.11-20080614-0), libidn2-0 (>= 2.0.0), libkrb5-3 (= 1.6.dfsg-2)
Conflicts: bind-dnsutils (< 1:9.13.6-), dnsutils (< 1:9.13.6-)
Breaks: bind-dnsutils (< 1:9.13.6-), dnsutils (< 1:9.13.6-)
Homepage: https://www.isc.org/downloads/bind/
Task: standard
Download-Size: 158 kB
APT-Manual-Installed: yes
APT-Sources: http://ca.archive.ubuntu.com/ubuntu jammy-updates/main amd64 Packages
Description: Clients provided with BIND 9
 The Berkeley Internet Name Domain (BIND 9) implements an Internet domain
 name server. BIND 9 is the most widely-used name server software on the
 Internet, and is supported by the Internet Software Consortium, www.isc.org.
```

Lab 2 – Software Installation

6. Uninstall this package with all configuration files.

```
gkeymole@client07:~$ sudo apt purge bind9-dnsutils
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following packages will be REMOVED:
  bind9-dnsutils*
0 upgraded, 0 newly installed, 1 to remove and 0 not upgraded.
After this operation, 545 kB disk space will be freed.
Do you want to continue? [Y/n] y
(Reading database ... 200827 files and directories currently installed.)
Removing bind9-dnsutils (1:9.18.30-0ubuntu0.22.04.2) ...
Processing triggers for man-db (2.10.2-1) ...
```