

Exercise 1 – Installing packages using rpm

Tasks to Perform on AlmaLinux:

Using the **rpm** command:

1. Verify that the **net-tools** package is installed.

```
[lmohammed@server12 ~]$ rpm -q net-tools
net-tools-2.0-0.64.20160912git.el9.x86_64
[lmohammed@server12 ~]$
```

2. Uninstall the **net-tools** package.

```
[root@server12 ~]# rpm -evh net-tools
Preparing...                               ##### [100%]
Cleaning up / removing...
 1:net-tools-2.0-0.64.20160912git.el##### [100%]
[root@server12 ~]#
```

3. Verify that the package is uninstalled.

```
[root@server12 ~]# rpm -qi net-tools
package net-tools is not installed
[root@server12 ~]#
```

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).

```
[root@server12 ~]# 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 13:58:58-- 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 100%[=====>] 294.09K 693KB/s in 0.4s

2025-03-25 13:58:59 (693 KB/s) - 'net-tools-2.0-0.64.20160912git.el9.x86_64.rpm' saved [301148/301148]
```

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

Lab 2 – Software Installation

```
[root@server12 ~]# rpm -ivh net-tools-2.0-0.64.20160912git.el9.x86_64.rpm
Verifying... ##### [100%]
Preparing... ##### [100%]
Updating / installing...
 1:net-tools-2.0-0.64.20160912git.el9##### [100%]
[root@server12 ~]#
```

6. Verify that the package is installed correctly.

```
[root@server12 ~]# rpm -q net-tools
net-tools-2.0-0.64.20160912git.el9.x86_64
[root@server12 ~]#
```

7. List all information about this package.

```
[root@server12 ~]# rpm -q net-tools
net-tools-2.0-0.64.20160912git.el9.x86_64
[root@server12 ~]# rpm -qi net-tools
Name       : net-tools
Version    : 2.0
Release    : 0.64.20160912git.el9
Architecture: x86_64
Install Date: Tue 25 Mar 2025 01:59:42 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.
[root@server12 ~]#
```

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

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```
[root@server12 ~]# 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
[root@server12 ~]#
```

9. List the configuration files for this package.

```
[root@server12 ~]# rpm -qc net-tools
[root@server12 ~]#
```

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.

```
root@client12:~# 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.
root@client12:~#
```

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/>
You need to find the right package (amd64 Architecture).

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```
root@client12:~# wget http://http.us.debian.org/debian/pool/main/n/net-tools/net-tools_2.10-1.1_amd64.deb
--2025-03-25 14:47:12-- http://http.us.debian.org/debian/pool/main/n/net-tools/net-tools_2.10-1.1_amd64.deb
Resolving http.us.debian.org (http.us.debian.org)... 208.80.154.139, 64.50.236.52, 64.50.233.100, ...
Connecting to http.us.debian.org (http.us.debian.org)|208.80.154.139|:80... 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.deb  100%[=====] 237.24K  --.-KB/s   in 0.06s

2025-03-25 14:47:12 (3.83 MB/s) - 'net-tools_2.10-1.1_amd64.deb' saved [242936/242936]

root@client12:~#
```

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

```
root@client12:~# dpkg -i net-tools_2.10-1.1_amd64.deb
Selecting previously unselected package net-tools.
(Reading database ... 200601 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) ...
root@client12:~#
```

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

```
root@client12:~# 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,
 mil-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/
root@client12:~#
```

5. View all files in this package.

Lab 2 – Software Installation

```
root@client12:~# dpkg -L net-tools
./
/usr
/usr/bin
/usr/bin/netstat
/usr/sbin
/usr/sbin/arp
/usr/sbin/ifconfig
/usr/sbin/ipnaddr
/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/TODO
/usr/share/doc/net-tools/changelog.Debian.gz
/usr/share/doc/net-tools/copyright
/usr/share/locale
/usr/share/locale/cs
/usr/share/locale/cs/LC_MESSAGES
/usr/share/locale/cs/LC_MESSAGES/net-tools.mo
/usr/share/locale/de
/usr/share/locale/de/LC_MESSAGES
/usr/share/locale/de/LC_MESSAGES/net-tools.mo
/usr/share/locale/et
/usr/share/locale/et/LC_MESSAGES
/usr/share/locale/et/LC_MESSAGES/net-tools.mo
/usr/share/locale/fr
/usr/share/locale/fr/LC_MESSAGES
/usr/share/locale/fr/LC_MESSAGES/net-tools.mo
/usr/share/locale/ja
/usr/share/locale/ja/LC_MESSAGES
/usr/share/locale/ja/LC_MESSAGES/net-tools.mo
```


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```
/usr/share/locale/fr/LC_MESSAGES/net-tools.mo
/usr/share/locale/ja
/usr/share/locale/ja/LC_MESSAGES
/usr/share/locale/ja/LC_MESSAGES/net-tools.mo
/usr/share/locale/pt_BR
/usr/share/locale/pt_BR/LC_MESSAGES
/usr/share/locale/pt_BR/LC_MESSAGES/net-tools.mo
/usr/share/man
/usr/share/man/de
/usr/share/man/de/man5
/usr/share/man/de/man5/ethers.5.gz
/usr/share/man/de/man8
/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/rarp.8.gz
/usr/share/man/de/man8/route.8.gz
/usr/share/man/de/man8/slattach.8.gz
/usr/share/man/fr
/usr/share/man/fr/man5
/usr/share/man/fr/man5/ethers.5.gz
/usr/share/man/fr/man8
/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/rarp.8.gz
/usr/share/man/fr/man8/route.8.gz
/usr/share/man/fr/man8/slattach.8.gz
/usr/share/man/man5
/usr/share/man/man5/ethers.5.gz
/usr/share/man/man8
/usr/share/man/man8/arp.8.gz
/usr/share/man/man8/ifconfig.8.gz
/usr/share/man/man8/iptunnel.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/rarp.8.gz
/usr/share/man/man8/route.8.gz
/usr/share/man/man8/slattach.8.gz
/usr/share/man/pt_BR
/usr/share/man/pt_BR/man8
/usr/share/man/pt_BR/man8/arp.8.gz
/usr/share/man/pt_BR/man8/ifconfig.8.gz
/usr/share/man/pt_BR/man8/netstat.8.gz
/usr/share/man/pt_BR/man8/rarp.8.gz
/usr/share/man/pt_BR/man8/route.8.gz
root@client12:~#
```

Exercise 3 – Installing packages using dnf

Tasks to Perform on AlmaLinux:

Exercise 3.1

1. List the package repositories installed on the server.

```
[root@server12 ~]# dnf repolist all
```

repo id	repo name	status
appstream	AlmaLinux 9 - AppStream	enabled
appstream-debuginfo	AlmaLinux 9 - AppStream - Debug	disabled
appstream-source	AlmaLinux 9 - AppStream - Source	disabled
baseos	AlmaLinux 9 - BaseOS	enabled
baseos-debuginfo	AlmaLinux 9 - BaseOS - Debug	disabled
baseos-source	AlmaLinux 9 - BaseOS - Source	disabled
crb	AlmaLinux 9 - CRB	disabled
crb-debuginfo	AlmaLinux 9 - CRB - Debug	disabled
crb-source	AlmaLinux 9 - CRB - Source	disabled
epel	Extra Packages for Enterprise Linux 9 - x	enabled
epel-cisco-openh264	Extra Packages for Enterprise Linux 9 ope	enabled
epel-cisco-openh264-debuginfo	Extra Packages for Enterprise Linux 9 ope	disabled
epel-cisco-openh264-source	Extra Packages for Enterprise Linux 9 ope	disabled
epel-debuginfo	Extra Packages for Enterprise Linux 9 - x	disabled
epel-source	Extra Packages for Enterprise Linux 9 - x	disabled
epel-testing	Extra Packages for Enterprise Linux 9 - T	disabled
epel-testing-debuginfo	Extra Packages for Enterprise Linux 9 - T	disabled
epel-testing-source	Extra Packages for Enterprise Linux 9 - T	disabled
extras	AlmaLinux 9 - Extras	enabled
extras-debuginfo	AlmaLinux 9 - Extras - Debug	disabled
extras-source	AlmaLinux 9 - Extras - Source	disabled
highavailability	AlmaLinux 9 - HighAvailability	disabled
highavailability-debuginfo	AlmaLinux 9 - HighAvailability - Debug	disabled
highavailability-source	AlmaLinux 9 - HighAvailability - Source	disabled
nfv	AlmaLinux 9 - NFV	disabled
nfv-debuginfo	AlmaLinux 9 - NFV - Debug	disabled
nfv-source	AlmaLinux 9 - NFV - Source	disabled
plus	AlmaLinux 9 - Plus	disabled
plus-debuginfo	AlmaLinux 9 - Plus - Debug	disabled
plus-source	AlmaLinux 9 - Plus - Source	disabled
resilientstorage	AlmaLinux 9 - ResilientStorage	disabled
resilientstorage-debuginfo	AlmaLinux 9 - ResilientStorage - Debug	disabled
resilientstorage-source	AlmaLinux 9 - ResilientStorage - Source	disabled
rt	AlmaLinux 9 - RT	disabled
rt-debuginfo	AlmaLinux 9 - RT - Debug	disabled
rt-source	AlmaLinux 9 - RT - Source	disabled
sap	AlmaLinux 9 - SAP	disabled
sap-debuginfo	AlmaLinux 9 - SAP - Debug	disabled
sap-source	AlmaLinux 9 - SAP - Source	disabled
saphana	AlmaLinux 9 - SAPHANA	disabled
saphana-debuginfo	AlmaLinux 9 - SAPHANA - Debug	disabled
saphana-source	AlmaLinux 9 - SAPHANA - Source	disabled

```
[root@server12 ~]#
```

2. In which directory is the configuration of these repositories saved?

/etc/yum.repos.d/

Lab 2 – Software Installation

```
[root@server12 ~]# 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 14:53 ..
-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
[root@server12 ~]#
```

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

```
[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
```

Exercise 3.2

1. Verify that the **nmap** application is not installed.

```
[root@server12 ~]# dnf list nmap
Last metadata expiration check: 1:20:34 ago on Tue 25 Mar 2025 01:41:11 PM.
Available Packages
nmap.x86_64
[root@server12 ~]#
```


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2. Get all the information about this **nmap** app.

```
[root@server12 ~]# dnf info nmap
Last metadata expiration check: 1:21:44 ago on Tue 25 Mar 2025 01:41:11 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.

```
[root@server12 ~]# dnf install nmap
Last metadata expiration check: 1:22:42 ago on Tue 25 Mar 2025 01:41:11 PM.
Dependencies resolved.
=====
Package                                Architecture      Version           Repository
=====
Installing:                             x86_64            3:7.92-3.el9      appstream
nmap
=====
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
=====
Total
Running transaction check
Transaction check succeeded.
Running transaction test
Transaction test succeeded.
Running transaction
  Preparing      : 
  Installing     : nmap-3:7.92-3.el9.x86_64
  Running scriptlet: nmap-3:7.92-3.el9.x86_64
  Verifying      : nmap-3:7.92-3.el9.x86_64

Installed:
nmap-3:7.92-3.el9.x86_64

Complete!
[root@server12 ~]#
```

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

```
[root@server12 ~]# dnf list nmap
Last metadata expiration check: 1:32:21 ago on Tue 25 Mar 2025 01:41:11 PM.
Installed Packages
nmap.x86_64                3:7.92-3.el9      @appstream
[root@server12 ~]#
```

Lab 2 – Software Installation

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

```
[root@server12 ~]# dnf search named
Last metadata expiration check: 1:33:00 ago on Tue 25 Mar 2025 01:41:11 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
[root@server12 ~]#
```

6. Install the first package found.

```
[root@server12 ~]# dnf install pcp-pmda-named.x86_64
Last metadata expiration check: 1:35:30 ago on Tue 25 Mar 2025 01:41:11 PM.
Dependencies resolved.
=====
Package                Arch      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-6.2.2-7.el9_5.alma.1.x86_64.rpm 12 MB/s | 1.4 MB 00:00
```

Lab 2 – Software Installation

```
Is this ok [y/N]: y
Downloading Packages:
(1/6): pcp-6.2.2-7.el9_5.alma.1.x86_64.rpm      12 MB/s | 1.4 MB    00:00
(2/6): pcp-conf-6.2.2-7.el9_5.alma.1.x86_64.rpm 163 kB/s | 29 kB    00:00
(3/6): pcp-libs-6.2.2-7.el9_5.alma.1.x86_64.rpm 3.1 MB/s | 637 kB   00:00
(4/6): pcp-pmda-named-6.2.2-7.el9_5.alma.1.x86_64 138 kB/s | 15 kB    00:00
(5/6): perl-PCP-PMDA-6.2.2-7.el9_5.alma.1.x86_64 1.5 MB/s | 50 kB    00:00
(6/6): pcp-selinux-6.2.2-7.el9_5.alma.1.x86_64 251 kB/s | 31 kB    00:00
-----
Total                                         4.8 MB/s | 2.1 MB    00:00
Running transaction check
Transaction check succeeded.
Running transaction test
Transaction test succeeded.
Running transaction
  Preparing      :                                1/1
  Running scriptlet: pcp-selinux-6.2.2-7.el9_5.alma.1.x86_64 1/6
  Installing      : pcp-selinux-6.2.2-7.el9_5.alma.1.x86_64 1/6
  Running scriptlet: pcp-selinux-6.2.2-7.el9_5.alma.1.x86_64 1/6
libsemanage.semanage_direct_install_info: Overriding pcp module at lower priority 100 with module at priority 200.

  Installing      : pcp-conf-6.2.2-7.el9_5.alma.1.x86_64    2/6
  Installing      : pcp-libs-6.2.2-7.el9_5.alma.1.x86_64    3/6

Creating user 'pcp' (Performance Co-Pilot) with UID 980 and GID 980.

  Installing      : pcp-6.2.2-7.el9_5.alma.1.x86_64          4/6
  Running scriptlet: pcp-6.2.2-7.el9_5.alma.1.x86_64          4/6
  Installing      : perl-PCP-PMDA-6.2.2-7.el9_5.alma.1.x86_64 5/6
  Installing      : pcp-pmda-named-6.2.2-7.el9_5.alma.1.x86_64 6/6
  Running scriptlet: pcp-pmda-named-6.2.2-7.el9_5.alma.1.x86_64 6/6
  Verifying       : pcp-6.2.2-7.el9_5.alma.1.x86_64          1/6
  Verifying       : pcp-conf-6.2.2-7.el9_5.alma.1.x86_64      2/6
  Verifying       : pcp-libs-6.2.2-7.el9_5.alma.1.x86_64      3/6
  Verifying       : pcp-pmda-named-6.2.2-7.el9_5.alma.1.x86_64 4/6
  Verifying       : pcp-selinux-6.2.2-7.el9_5.alma.1.x86_64    5/6
  Verifying       : perl-PCP-PMDA-6.2.2-7.el9_5.alma.1.x86_64 6/6

Installed:
pcp-6.2.2-7.el9_5.alma.1.x86_64
pcp-conf-6.2.2-7.el9_5.alma.1.x86_64
pcp-libs-6.2.2-7.el9_5.alma.1.x86_64
pcp-pmda-named-6.2.2-7.el9_5.alma.1.x86_64
pcp-selinux-6.2.2-7.el9_5.alma.1.x86_64
perl-PCP-PMDA-6.2.2-7.el9_5.alma.1.x86_64

Complete!
[root@server12 ~]#
```

7. Verify that this package is installed correctly.

```
[root@server12 ~]# dnf list pcp-pmda-named
Last metadata expiration check: 1:37:55 ago on Tue 25 Mar 2025 01:41:11 PM.
Installed Packages
pcp-pmda-named.x86_64                6.2.2-7.el9_5.alma.1                @appstream
[root@server12 ~]#
```

8. View all information about this package.

Lab 2 – Software Installation

```
[root@server12 ~]# dnf info pcp-pmda-named
Last metadata expiration check: 1:38:35 ago on Tue 25 Mar 2025 01:41:11 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.
```

9. Uninstall this package.

```
[root@server12 ~]# dnf remove pcp-pmda-named
Dependencies resolved.
=====
Package      Arch      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      : 
  Running scriptlet: pcp-pmda-named-6.2.2-7.el9_5.alma.1.x86_64
  Erasing        : pcp-pmda-named-6.2.2-7.el9_5.alma.1.x86_64
  Running scriptlet: pcp-6.2.2-7.el9_5.alma.1.x86_64
  Erasing        : pcp-6.2.2-7.el9_5.alma.1.x86_64
  Erasing        : perl-PCP-PMDA-6.2.2-7.el9_5.alma.1.x86_64
  Erasing        : pcp-selinux-6.2.2-7.el9_5.alma.1.x86_64
  Running scriptlet: pcp-selinux-6.2.2-7.el9_5.alma.1.x86_64
  Erasing        : pcp-libs-6.2.2-7.el9_5.alma.1.x86_64
  Erasing        : pcp-conf-6.2.2-7.el9_5.alma.1.x86_64
  Running scriptlet: pcp-conf-6.2.2-7.el9_5.alma.1.x86_64
  Verifying      : pcp-6.2.2-7.el9_5.alma.1.x86_64
  Verifying      : pcp-conf-6.2.2-7.el9_5.alma.1.x86_64
  Verifying      : pcp-libs-6.2.2-7.el9_5.alma.1.x86_64
  Verifying      : pcp-pmda-named-6.2.2-7.el9_5.alma.1.x86_64
  Verifying      : pcp-selinux-6.2.2-7.el9_5.alma.1.x86_64
  Verifying      : perl-PCP-PMDA-6.2.2-7.el9_5.alma.1.x86_64

Removed:
  pcp-6.2.2-7.el9_5.alma.1.x86_64 pcp-conf-6.2.2-7.el9_5.alma.1.x86_64 pcp-libs-6.2.2-7.el9_5.alma.1.x86_64 pcp-pmda-named-6.2.2-7.el9_5.alma.1.x86_64 pcp-selinux-6.2.2-7.el9_5.alma.1.x86_64
Complete!
[root@server12 ~]#
```

```
[root@server12 ~]# dnf list pcp-pmda-named
Last metadata expiration check: 1:40:16 ago on Tue 25 Mar 2025 01:41:11 PM.
Available Packages
pcp-pmda-named.x86_64                                6.2.2-7.el9_5.alma.1
[root@server12 ~]#
```

Exercise 3.3

1. List all the package groups.

Lab 2 – Software Installation

```
[root@server12 ~]# dnf group list
Last metadata expiration check: 1:41:30 ago on Tue 25 Mar 2025 01:41:11 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
[root@server12 ~]#
```

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

Lab 2 – Software Installation

```
[root@server12 ~]# dnf group info development tools
Last metadata expiration check: 1:42:55 ago on Tue 25 Mar 2025 01:41:11 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
  perl-generators
  pesign
  source-highlight
  systemtap
  valgrind
  valgrind-devel
Optional Packages:
  cmake
  expect
  rpmdevtools
  rpmlint
Warning: Group tools does not exist.
[root@server12 ~]#
```

3. Install the group: "**Development Tools**".

Lab 2 – Software Installation

```
[root@server12 ~]# dnf group install "development tools"
Last metadata expiration check: 1:44:45 ago on Tue 25 Mar 2025 01:41:11 PM.
Dependencies resolved.
=====
Package                                     Architecture                               Version
=====
Installing group/module packages:
asciidoc                                   noarch                                    9.1.0-3.el9
autoconf                                   noarch                                    2.69-39.el9
automake                                   noarch                                    1.16.2-8.el9
bison                                     x86_64                                    3.7.4-5.el9
byacc                                     x86_64                                    2.0.20210109-4.el9
diffstat                                  x86_64                                    1.64-6.el9
flex                                       x86_64                                    2.6.4-0.el9
gcc                                         x86_64                                    11.5.0-5.el9_5.alma.1
gcc-c++                                   x86_64                                    11.5.0-5.el9_5.alma.1
gdb                                        x86_64                                    14.2-3.el9
git                                         x86_64                                    2.43.5-2.el9_5
intltool                                  noarch                                    0.51.0-20.el9
jna                                         x86_64                                    5.6.0-8.el9
libtool                                   x86_64                                    2.4.6-46.el9
ltrace                                    x86_64                                    0.7.91-43.el9
make                                       x86_64                                    1:4.3-8.el9
patchutils                               x86_64                                    0.4.2-7.el9
perl-Fedora-VSP                           noarch                                    0.001-23.el9
perl-generators                           noarch                                    1.11-12.el9
pesign                                     x86_64                                    1:5-6.el9_1
redhat-rpm-config                         noarch                                    208-1.el9.alma.1
rpm-build                                 x86_64                                    4.16.1.3-34.el9
rpm-sign                                  x86_64                                    4.16.1.3-34.el9
source-highlight                           x86_64                                    3.1.9-12.el9
systemtap                                 x86_64                                    5.1-4.el9_5
valgrind                                  x86_64                                    1:3.23.0-4.el9
valgrind-devel                            x86_64                                    1:3.23.0-4.el9

Installing dependencies:
annobin                                   x86_64                                    12.65-1.el9
boost-filesystem                          x86_64                                    1.75.0-8.el9
boost-regex                               x86_64                                    1.75.0-8.el9
boost-system                              x86_64                                    1.75.0-8.el9
boost-thread                              x86_64                                    1.75.0-8.el9
copy-jdk-configs                          noarch                                    4.0-3.el9
debugedit                                 x86_64                                    5.0-5.el9
docbook-dtds                             noarch                                    1.0-79.el9
docbook-style-xsl                         noarch                                    1.79.2-16.el9
dwz                                        x86_64                                    0.14-3.el9
dyninst                                   x86_64                                    12.1.0-1.el9
efi-srpm-macros                           noarch                                    6-2.el9_0.0.1
efivar-libs                               x86_64                                    38-3.el9
elfutils                                  x86_64                                    0.191-4.el9.alma.1
elfutils-devel                            x86_64                                    0.191-4.el9.alma.1
```

```
=====
Installing weak dependencies:
adwaita-gtk2-theme                        x86_64
kernel-devel                              x86_64
libcanberra-gtk2                          x86_64
perl-version                              x86_64

Installing Groups:
Development Tools

Transaction Summary
=====
Install 105 Packages

Total download size: 150 M
Installed size: 526 M
Is this ok [y/N]: y
```

```
Installed:
adwaita-gtk2-theme-3.28-14.el9.x86_64    annobin-12.65-1.el9.x86_64    asciidoc-9.1.0-3.el9.noarch    autoconf-2.69-39.el9.noarch    automake-1.16.2-8.el9.noarch
bison-3.7.4-5.el9.x86_64                  boost-filesystem-1.75.0-8.el9.x86_64    boost-regex-1.75.0-8.el9.x86_64    boost-system-1.75.0-8.el9.x86_64    boost-thread-1.75.0-8.el9.x86_64
byacc-2.0.20210109-4.el9.x86_64           copy-jdk-configs-4.0-3.el9.noarch    debugedit-5.0-5.el9.x86_64    diffstat-1.64-6.el9.x86_64    docbook-dtds-1.0-79.el9.noarch
docbook-style-xsl-1.79.2-16.el9.noarch     dwz-0.14-3.el9.x86_64             dyninst-12.1.0-1.el9.x86_64    efi-srpm-macros-6-2.el9_0.0.1.noarch    efivar-libs-38-3.el9.x86_64
elfutils-0.191-4.el9.alma.1.x86_64        gcc-c++-11.5.0-5.el9_5.alma.1.x86_64    gcc-plugin-annobin-11.5.0-5.el9_5.alma.1.x86_64    flex-2.6.4-9.el9.x86_64    fonts-srpm-macros-1:2.0.5-7.el9.1.noarch
gcc-11.5.0-5.el9_5.alma.1.x86_64          gettext-devel-0.21-8.el9.x86_64      ghc-srpm-macros-1.5.0-6.el9.noarch    gdb-14.2-3.el9.x86_64    gdb-headless-14.2-3.el9.x86_64
gettext-common-devel-0.21-8.el9.noarch      go-srpm-macros-3.6.0-3.el9.noarch    graphviz-2.44.0-26.el9.x86_64    git-2.43.5-2.el9_5.x86_64    git-core-2.43.5-2.el9_5.x86_64
git-core-doc-2.43.5-2.el9_5.noarch          java-1.8.0-openjdk-headless-1:1.8.0_442.b06-2.el9.x86_64    javapackages-filestream-6.0-7.el9_5.noarch    gtk2-2.24.33-8.el9.x86_64    dbus-gtk2-1.5.25-6.el9.x86_64
intltool-0.51.0-20.el9.noarch              libbwa-1.0.13-19.el9.x86_64          libbibtex-1.5.8-10.el9.x86_64    libcanberra-gtk2-0.30-27.el9.x86_64    kernel-devel-5.14.0-503.33.1.el9_5.x86_64
kernel-srpm-macros-1.0-13.el9.noarch        libtool-2.4.6-46.el9.x86_64          libstdc++-devel-11.5.0-5.el9_5.alma.1.x86_64    ltrace-0.7.91-43.el9.x86_64    libtpt-2.0.4-5.el9.x86_64
libstdc++-devel-11.5.0-5.el9_5.alma.1.x86_64    lua-5.4.4-4.el9.x86_64             lua-posix-35.0-8.el9.x86_64    m4-1.4.19-1.el9.x86_64    make-1:4.3-8.el9.x86_64
lua-5.4.4-4.el9.x86_64                     mokutil-2:0.6.0-4.el9.x86_64        nss-tools-3.101.0-10.el9_2.x86_64    ocaml-srpm-macros-6-6.el9.noarch    openblas-srpm-macros-2-11.el9.noarch
mkfontscale-1.2.1-3.el9.x86_64             patch-2.7.6-16.el9.x86_64           perl-File-Copy-2.34-481.el9.noarch    perl-Error-1:0.17029-7.el9.noarch    perl-Fedora-VSP-0.001-23.el9.noarch
openssl-devel-1:3.2.2-6.el9_5.1.x86_64     perl-File-Copy-2.34-481.el9.noarch    perl-generators-1.11-12.el9.noarch    perl-File-ReadKey-2.30-11.el9.x86_64    perl-Thread-Queue-3.14-460.el9.noarch
perl-File-Compare-1.100.600-481.el9.noarch    perl-ML-Parser-2.46-9.el9.x86_64     perl-threads-1:2.25-460.el9.x86_64    perl-macros-4:5.32-1.481.el9.noarch    perl-srpm-macros-1-41.el9.noarch
perl-threads-1:2.25-460.el9.x86_64          perl-threads-shared-1.61-460.el9.x86_64    perl-version-7:0.99.28-4.el9.x86_64    pesign-1:5-6.el9_1.x86_64    pyproject-srpm-macros-1.12.0-1.el9.noarch
python-srpm-macros-3.9-54.el9.noarch         qt5-srpm-macros-5.15.9-1.el9.noarch    redhat-rpm-config-208-1.el9.alma.1.noarch    rpm-build-4.16.1.3-34.el9.x86_64    rpm-sign-4.16.1.3-34.el9.x86_64
rust-srpm-macros-1.7-4.el9.noarch           sgml-common-0.6.3-58.el9.noarch        source-highlight-3.1.9-12.el9.x86_64    rpm-build-4.16.1.3-34.el9.x86_64    systemtap-client-5.1-4.el9_5.x86_64
systemtap-devel-5.1-4.el9_5.x86_64          systemtap-runtime-5.1-4.el9_5.x86_64    tbb-2020.3-8.el9_5.1.x86_64    tzdata-java-2025a-1.el9.noarch    valgrind-1:3.23.0-4.el9.x86_64
systemtap-runtime-5.1-4.el9_5.x86_64        xorg-x11-fonts-ISO8859-1-100dpi-7.5-33.el9.noarch    xz-devel-5.2.5-8.el9_0.x86_64    zlib-devel-1.2.11-40.el9.x86_64    zstd-1.5.1-2.el9.x86_64

Complete!
```

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

Lab 2 – Software Installation

```
[root@server12 ~]# dnf group list
Last metadata expiration check: 1:48:35 ago on Tue 25 Mar 2025 01:41:11 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
  Development Tools
  Headless Management
Available Groups:
  Console Internet Tools
  .NET Development
  RPM Development Tools
  Graphical Administration Tools
  Legacy UNIX Compatibility
  Network Servers
  Scientific Support
  Security Tools
  Smart Card Support
  System Tools
  Fedora Packager
  VideoLAN Client
  Xfce
[root@server12 ~]#
```

5. Uninstall the " **Development Tools**" group.

Lab 2 – Software Installation

```
[root@server12 ~]# dnf group remove "Development Tools"
Dependencies resolved.
```

Package	Architecture
Removing:	
asciidoc	noarch
autoconf	noarch
automake	noarch
bison	x86_64
byacc	x86_64
diffstat	x86_64
flex	x86_64
gcc	x86_64
gcc-c++	x86_64
gdb	x86_64
git	x86_64
intltool	noarch
jna	x86_64
libtool	x86_64
ltrace	x86_64
make	x86_64
patchutils	x86_64
perl-Fedora-VSP	noarch
perl-generators	noarch
design	x86_64
redhat-rpm-config	noarch
rpm-build	x86_64
rpm-sign	x86_64
source-highlight	x86_64
systemtap	x86_64
valgrind	x86_64
valgrind-devel	x86_64
Removing unused dependencies:	
annobin	x86_64
boostfilesystem	x86_64
boost-regex	x86_64
boost-system	x86_64
boost-thread	x86_64
copy-jdk-configs	noarch
debugedit	x86_64
dotbook-dtts	noarch
dotbook-style-xsl	noarch
dwt	x86_64
dyninst	x86_64
efi-srpm-macros	noarch
elfvar-libs	x86_64
elfutils	x86_64
elfutils-devel	x86_64
elfutils-libelf-devel	x86_64
fonts-srpm-macros	noarch
gcc-plugin-annobin	x86_64
gdh-bookkeeper	x86_64

```

removed:
annobin-12.65-1.el9.x86_64
bison-3.7.4-5.el9.x86_64
bzip2-1.0.8-1.el9.x86_64
diffstat-1.64-6.el9.x86_64
dymint-1.1-0.el9.x86_64
elfutils-devel-0.191-4.el9.almalinux.x86_64
gcc-11.3.0-5.el9.x86_64
gdb-headless-14.2-3.el9.x86_64
git-2.43.5-2.el9.x86_64
graphviz-2.44-0-26.el9.x86_64
junit-5.10.2-1.el9.x86_64
libbalttrace-1.5-10.el9.x86_64
libbsd-2.0.4-1.el9.x86_64
lksctp-tools-1.0.19-3.el9.x86_64
lua-srpm-macros-1.6-0.el9.x86_64
mkfontscale-1.2.1-0.el9.x86_64
openssl-srpm-macros-2.11-0.el9.x86_64
perl-Error-1.0.17029-7.el9.x86_64
perl-Git-2.43.5-2.el9.x86_64
perl-generators-1.11-0.el9.x86_64
perl-threads-1.12.2-400.el9.x86_64
pyproject-srpm-macros-1.12.0-1.el9.x86_64
rpm-build-4.16.1.3-34.el9.x86_64
source-highlight-3.1.0-12.el9.x86_64
systemtap-runtime-5.1-4.el9.x86_64
valgrind-devel-1.13.23.0-4.el9.x86_64
zstd-1.5-1.el9.x86_64

asciidoc-9.1.0-3.el9.noarch
boost-filesystem-1.75.0-8.el9.x86_64
bzip2-1.0.8-1.el9.x86_64
doctest-1.0.79.el9.noarch
elfi-srpm-macros-6-2.el9.0-1.noarch
elfutils-libelf-devel-0.191-4.el9.almalinux.x86_64
gcc-11.3.0-5.el9.x86_64
gettext-compat-devel-0.21-8.el9.noarch
git-core-2.43.5-2.el9.x86_64
intltool-0.51.0-20.el9.noarch
kernel-devel-5.14.0-303.el9.x86_64
libipset-2.0.4-1.el9.x86_64
lksctp-tools-1.0.19-3.el9.x86_64
lua-srpm-macros-1.6-0.el9.x86_64
mkfontscale-1.2.1-0.el9.x86_64
openssl-devel-1.13.2.2-6.el9_5.x86_64
perl-Fedora-VSP-0.001-23.el9.noarch
perl-TermReadKey-2.38-11.el9.x86_64
perl-threads-1.12.2-400.el9.x86_64
perl-threads-shared-1.1-6400.el9.x86_64
python-srpm-macros-3.9.5-4.el9.x86_64
rpm-sign-4.16.1.3-34.el9.x86_64
systemtap-5.1-4.el9.x86_64
tbl-2020-3-8.el9_5.x86_64
xorg-x11-fonts-10588991-1000p1-7.5-33.el9.noarch

autoconf-2.69-39.el9.noarch
boost-regex-1.75.0-8.el9.x86_64
copy-jdk-configs-6-0-3.el9.noarch
doctest-style-xml-1.79.2-16.el9.noarch
efivar-libis-38-3.el9.x86_64
flex-2.6.4-9.el9.x86_64
gcc-11.3.0-5.el9.x86_64
gettext-devel-0.21-8.el9.x86_64
git-core-doc-2.43.5-2.el9_5.noarch
libc-gconv-devel-headless-11.8.0.442.b06-2.el9.x86_64
kernel-srpm-macros-1-0-13.el9.noarch
libstdc++-devel-11.5.0-5.el9_5.almalinux.x86_64
lr-0.79.1-43.el9.x86_64
ml-1.4.19-1.el9.x86_64
ocaml-4.13.0-3.el9.x86_64
patch-2.7.6-16.el9.x86_64
perl-File-Compare-1.100.600-481.el9.noarch
perl-Thread-Queue-1.34-460.el9.noarch
perl-lmarc-4.5-32-1-el9.noarch
perl-version-7.09.99-28-el9.x86_64
qt5-srpm-macros-5.15.9-1.el9.noarch
rust-srpm-macros-1.74.el9.noarch
systemtap-devel-5.1-4.el9.x86_64
tzdata-jan-2023a-1.el9.noarch
xz-devel-5.2.5-8.el9.x86_64

automake-1.16-2-8.el9.noarch
boost-system-1.75.0-8.el9.x86_64
debugedit-5.9-5.el9.x86_64
dwr-0.14-3.el9.x86_64
elfutils-0.191-4.el9.almalinux.x86_64
font-srpm-macros-1.2.0-5-7.el9.noarch
gcc-11.3.0-5.el9.x86_64
ghc-srpm-macros-1.5-0-6.el9.noarch
gro-srpm-macros-3.6-0-3.el9.noarch
java-packages-filesystem-6.0-7.el9_5.noarch
libb2-3.1.0-1.el9.x86_64
libtool-2.4.6-46.el9.x86_64
lua-5.4-4.4.el9.x86_64
make-1.4.3-8.el9.x86_64
ocaml-4.13.0-3.el9.x86_64
patchutils-0.6-6.el9.noarch
patchutils-0.6-2-7.el9.x86_64
perl-File-Copy-2.34-481.el9.noarch
perl-Lmarc-2.46-9.el9.x86_64
perl-lmarc-4.5-32-1-el9.noarch
psimg-115-0-6.el9.x86_64
redhat-rpm-config-208-1.el9.almalinux
sgml-common-0.6.3-38.el9.noarch
systemtap-devel-5.1-4.el9.x86_64
valgrind-1.13.23.0-4.el9.x86_64
zlib-devel-1.21.11-0.el9.x86_64

```

Exercise 3.4

Lab 2 – Software Installation

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

```
[root@server12 ~]# dnf history
```

ID	Command line	Date and time	Action(s)	Altered
9	group remove Development Tools	2025-03-25 15:31	Removed	102 EE
8	group install development tools	2025-03-25 15:26	Install	106 EE
7	remove pcp-pmda-named	2025-03-25 15:20	Removed	6
6	install pcp-pmda-named.x86_64	2025-03-25 15:16	Install	6 EE
5	install nmap	2025-03-25 15:03	Install	1 <
4	install glibc glibc-devel	2025-03-25 13:31	Install	4 ><
3	-y update	2025-03-24 14:54	I, U	153 >
2	install -y epel-release	2025-03-24 14:53	Install	1 E
1		2025-03-24 14:47	Install	1198 >E

2. View information about one of these commands.

```
[root@server12 ~]# dnf history info command 5
No transaction which manipulates package 'command' was found.
Transaction ID : 5
Begin time      : Tue 25 Mar 2025 03:03:57 PM
Begin rpmdb     : ef7758b5712883b9b8c265563545469ae8680b7961d6e640b74d7896a5cb52ba
End time        : Tue 25 Mar 2025 03:03:57 PM (0 seconds)
End rpmdb       : e3473b5272b8146bd9f8c926174c7f11824df17f4f4995666b8e07a6557784ab
User            : Laetitia Mohammed <lmohammed>
Return-Code     : Success
Releasever      : 9
Command Line    : install nmap
Comment         :
Packages Altered:
  Install nmap-3:7.92-3.el9.x86_64 @appstream
[root@server12 ~]#
```

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

```
[root@server12 ~]# dnf history undo 9
Last metadata expiration check: 1:57:18 ago on Tue 25 Mar 2025 01:41:11 PM.
Dependencies resolved.
=====
Package                                     Architecture          Version                Repository
=====
Installing group/module packages:
asciideoc                                   noarch                9.1.0-3.el9            appstre
autoconf                                   noarch                2.69-39.el9            appstre
automake                                   noarch                1.16.2-8.el9            appstre
bison                                      x86_64                3.7.4-5.el9            appstre
byacc                                      x86_64                2.0.20210109-4.el9      appstre
diffstat                                   x86_64                1.64-6.el9             appstre
flex                                       x86_64                2.6.4-9.el9            appstre
gcc                                          x86_64                11.5.0-5.el9_5.alma.1  appstre
gcc-c++                                    x86_64                11.5.0-5.el9_5.alma.1  appstre
gdb                                         x86_64                14.2-3.el9             appstre
git                                         x86_64                2.43.5-2.el9_5         appstre
intltool                                   noarch                0.51.0-20.el9          appstre
jna                                         x86_64                5.6.0-8.el9            appstre
libtool                                   x86_64                2.4.6-46.el9           appstre
ltrace                                     x86_64                0.7.91-43.el9          appstre
make                                       x86_64                1:4.3-8.el9            baseos
patchutils                                x86_64                0.4.2-7.el9            appstre
perl-Pedora-VSP                            noarch                0.001-23.el9           appstre
perl-generators                            noarch                1.11-12.el9            appstre
pesign                                      x86_64                1:5-6.el9_1            appstre
redhat-rpm-config                          noarch                208-1.el9.alma.1       appstre
rpm-build                                   x86_64                4.16.1.3-34.el9        appstre
rpm-sign                                    x86_64                4.16.1.3-34.el9        baseos
source-highlight                           x86_64                3.1.9-12.el9           appstre
systemtap                                  x86_64                5.1-4.el9_5            appstre
valgrind                                   x86_64                1:3.23.0-4.el9         appstre
valgrind-devel                             x86_64                1:3.23.0-4.el9         appstre
Installing dependencies:
annobin                                    x86_64                12.65-1.el9            appstre
boost-filesystem                           x86_64                1.75.0-8.el9           appstre
boost-regex                                x86_64                1.75.0-8.el9           appstre
boost-system                               x86_64                1.75.0-8.el9           appstre
boost-thread                               x86_64                1.75.0-8.el9           appstre
copy-jdk-configs                           noarch                4.0-3.el9              appstre
debugedit                                   x86_64                5.0-5.el9              appstre
```

- 4.

Lab 2 – Software Installation

```
Transaction Summary
=====
Install 101 Packages

Total download size: 146 M
Installed size: 512 M
Is this ok [y/N]: y
Downloading Packages:
(1/101): asciidoc-9.1.0-3.el9.noarch.rpm
(2/101): annobin-12.65-1.el9.x86_64.rpm
(3/101): autoconf-2.69-39.el9.noarch.rpm
(4/101): boost-filesystem-1.75.0-8.el9.x86_64.rpm
(5/101): automake-1.16.2-8.el9.noarch.rpm
(6/101): boost-system-1.75.0-8.el9.x86_64.rpm
(7/101): boost-thread-1.75.0-8.el9.x86_64.rpm
(8/101): boost-regex-1.75.0-8.el9.x86_64.rpm
(9/101): bison-3.7.4-5.el9.x86_64.rpm
(10/101): copy-jdk-configs-4.0-3.el9.noarch.rpm
(11/101): byacc-2.0.2010109-4.el9.x86_64.rpm
(12/101): debugedit-5.0-5.el9.x86_64.rpm
(13/101): diffstat-1.64-6.el9.x86_64.rpm
(14/101): docbook-dtds-1.0-79.el9.noarch.rpm
(15/101): dwz-0.14-3.el9.x86_64.rpm
(16/101): efi-srpm-macros-6-2.el9_0.0.1.noarch.rpm
(17/101): elfutils-devel-0.191-4.el9.alma.1.x86_64.rpm
(18/101): elfutils-libelf-devel-0.191-4.el9.alma.1.x86_64.rpm
(19/101): flex-2.6.4-9.el9.x86_64.rpm
(20/101): fonts-srpm-macros-2.0.5-7.el9.1.noarch.rpm
(21/101): docbook-style-xsl-1.79.2-16.el9.noarch.rpm
(22/101): dyninst-12.1.0-1.el9.x86_64.rpm
(23/101): gcc-plugin-annobin-11.5.0-5.el9_5.alma.1.x86_64.rpm
(24/101): gdb-14.2-3.el9.x86_64.rpm
(25/101): gdb-headless-14.2-3.el9.x86_64.rpm
(26/101): gettext-common-devel-0.21-8.el9.noarch.rpm
(27/101): gettext-devel-0.21-8.el9.x86_64.rpm
(28/101): ghc-srpm-macros-1.5.0-6.el9.noarch.rpm
(29/101): git-2.43.5-2.el9_5.x86_64.rpm
(30/101): git-core-2.43.5-2.el9_5.x86_64.rpm
(31/101): git-core-doc-2.43.5-2.el9_5.noarch.rpm
(32/101): go-srpm-macros-3.6.0-3.el9.noarch.rpm
(33/101): gcc-c++-11.5.0-5.el9_5.alma.1.x86_64.rpm
(34/101): intltool-0.51.0-20.el9.noarch.rpm
(35/101): graphviz-2.44.0-26.el9.x86_64.rpm
(36/101): javapackages-filesystem-6.0.0-7.el9_5.noarch.rpm
(37/101): jna-5.6.0-8.el9.x86_64.rpm
(38/101): gcc-11.5.0-5.el9_5.alma.1.x86_64.rpm
(39/101): kernel-srpm-macros-1.0-13.el9.noarch.rpm
(40/101): libXaw-1.0.13-19.el9.x86_64.rpm
(41/101): libbabeltrace-1.5.8-10.el9.x86_64.rpm
(42/101): libipt-2.0.4-5.el9.x86_64.rpm
(43/101): kernel-devel-5.14.0-503.33.1.el9_5.x86_64.rpm
(44/101): libstdc++-devel-11.5.0-5.el9_5.alma.1.x86_64.rpm
(45/101): libstdc++-devel-11.5.0-5.el9_5.alma.1.x86_64.rpm
```

5.

```

Installed:
anobin-12.65-1.el9.x86_64
bison-3.7.4-5.el9.x86_64
boost-thread-1.75-0.8.el9.x86_64
diffstat-1.64-6.el9.x86_64
elfutils-12.10-1.el9.x86_64
elfutils-devel-0.191-4.el9.almalinux1.el9.x86_64
gcc-11.5.0-5.el9.5.almalinux1.x86_64
gdb-headless-14.2-3.el9.x86_64
git-2.43.5-2.el9.x86_64
graphviz-2.44-0-26.el9.x86_64
jms-6-0.8.el9.x86_64
libbabeltrace-1.5.8-10.el9.x86_64
libzstd-devel-1.5.1-2.el9.x86_64
lua-posix-35.0-8.el9.x86_64
mkfontscale-1.2.1-3.el9.x86_64
openalat-srpm-macros-2.11.el9.norarch
perl-Error-1.10.17029-7.el9.norarch
perl-Git-2.43.5-2.el9.5.norarch
perl-generators-11-11.12.el9.norarch
perl-threads-12.25-60.el9.x86_64
perl-test-srpm-macros-2.11.el9.norarch
rpm-build-4.16.1.3-14.el9.x86_64
source-highlight-3.1.9-12.el9.x86_64
systemtap-runtime-5-1.4.el9.5.x86_64
valgrind-devel-13.23.0-4.el9.x86_64
zstd-1.5.1-2.el9.x86_64

asciidoc-devel-1.0-3.el9.norarch
boost-fs-1.75-0.8.el9.x86_64
byacc-2.02210109-4.el9.x86_64
docbook-dtds-1.0-79.el9.norarch
efi-srpm-macros-6-2.el9.0.1.norarch
elfutils-devel-0.191-4.el9.almalinux1.x86_64
gcc-c++-11.5.0-5.el9.5.almalinux1.x86_64
gettext-common-devel-0.21.8-1.el9.norarch
git-core-2.43.5-2.el9.5.x86_64
inttool-0.51-0-26.el9.x86_64
kernel-devel-5.14.0-503.23.1.el9.5.x86_64
libipt-2.0.4-5.el9.x86_64
lksctp-tools-1.0.3-19.4.el9.x86_64
lua-srpm-macros-1-0.el9.norarch
mokutil-2.0-6.0-4.el9.x86_64
openssl-devel-1.2.1-26.el9.5.x86_64
perl-Fedora-VSP-0.001-23.el9.norarch
perl-ThreadQueue-2.38-11.el9.x86_64
perl-tib-0.05-481.el9.x86_64
perl-threads-shared-1.61-460.el9.x86_64
python3-srpm-macros-3.0-24.el9.norarch
rpm-sig-4.16.1.3-14.el9.x86_64
systemtap-5-1.4.el9.5.x86_64
tbb-2020.3-8.el9.5.1.x86_64
xorg-x11-fonts-ISO8859-1-100dpi-7-53.el9.norarch

autoconf-2.69-39.el9.norarch
boost-regex-1.75-0.8.el9.x86_64
copy-jdk-configs-4.0-3.el9.norarch
docbook-style-xsl-1.79-2.16.el9.norarch
efivar-libs-39-3.el9.x86_64
flex-2.6.4-9.el9.x86_64
gcc-plugin-anobin-11.5-0-5.el9.5.almalinux1.x86_64
gettext-devel-0.21.8-1.el9.x86_64
git-core-doc-2.43.5-2.el9.5.norarch
java-1.8.0-openjdk-headless-1.8.0-442.b06-2.el9.x86_64
kernel-srpm-macros-1-0.13.el9.norarch
libstdc++-devel-11.5-0-5.el9.5.almalinux1.x86_64
ltrace-0.7.91-43.el9.x86_64
ml-1.4.19-1.el9.x86_64
nss-tools-3.101.0-10.el9.2.x86_64
patch-2.7.6-16.el9.x86_64
perl-File-Compare-1.100.600-481.el9.norarch
perl-Thread-Queue-3.14-460.el9.x86_64
perl-macros-4.5.32-1-481.el9.norarch
perl-version-7.0.99-28.el9.x86_64
python3-srpm-macros-3.0-24.el9.norarch
rust-srpm-macros-17-4.el9.norarch
systemtap-client-5-1.4.el9.5.x86_64
tzdata-java-2025a-1.el9.norarch
xz-devel-5.2.5-8.el9.x86_64

automake-1.16.2-6.el9.norarch
boost-system-1.75-0.8.el9.x86_64
debugedit-5-0.19.el9.x86_64
dwz-0.14-3.el9.x86_64
elfutils-0.191-4.el9.almalinux1.x86_64
findutils-srpm-macros-12.0-5-7.el9.1.norarch
gdb-14-2-3.el9.x86_64
ghc-srpm-macros-1.5-0-6.el9.norarch
go-srpm-macros-3.6.0-3.el9.norarch
javadocpages-filesystem-0-0-7.el9.5.norarch
libxml2-2.10.4-10.el9.x86_64
libtool-2.4.6-48.el9.x86_64
lua-5.4.4-4.el9.x86_64
make-14.1-3-8.el9.x86_64
ocaml-srpm-macros-6-6.el9.norarch
patchutils-0.2-27.el9.x86_64
perl-File-Compare-3.14-481.el9.norarch
perl-FML-Parser-2.46-9.el9.x86_64
perl-srpm-macros-1-41.el9.norarch
python-115-6-19.1.x86_64
python3-srpm-macros-3.0-24.el9.almalinux1.norarch
sgml-common-0.6.3-58.el9.norarch
systemtap-devel-5-1.4.el9.5.x86_64
valgrind-13.23.0-4.el9.x86_64
zlib-devel-1.2.11-40.el9.x86_64

```


Exercise 4 – Installing packages with **apt**

Tasks to Perform on Ubuntu:

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

```
root@client12:~# 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
root@client12:~#
```

2. If it is installed, uninstall it.

```
root@client12:~# apt remove bind9-dnsutils
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following packages were automatically installed and are no longer required:
  libwpe-1.0-1 libwpebackend-fdo-1.0-1
Use 'apt autoremove' to remove them.
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 ... 200655 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) ...
root@client12:~#
```

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

```
root@client12:~# apt install bind9-dnsutils
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following packages were automatically installed and are no longer required:
  libwpe-1.0-1 libwpebackend-fdo-1.0-1
Use 'apt autoremove' to remove them.
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 ... 200638 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) ...
root@client12:~#
```

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

Lab 2 – Software Installation

```
root@client12:~# 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
root@client12:~#
```

5. Get all the information about this app.

```
root@client12:~# 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), libidn2-2.0.0), 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.
.
This package delivers various client programs related to DNS that are
derived from the BIND 9 source tree.
.
- dig - query the DNS in various ways
- nslookup - the older way to do it
- nsupdate - perform dynamic updates (See RFC2136)

N: There is 1 additional record. Please use the '-a' switch to see it
root@client12:~#
```

6. Uninstall this package with all configuration files.

```
root@client12:~# apt purge bind9-dnsutils
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following packages were automatically installed and are no longer required:
  libwpe-1.0-1 libwpebackend-fdo-1.0-1
Use 'apt autoremove' to remove them.
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]
```

```
Do you want to continue? [Y/n] y
(Reading database ... 200652 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) ...
root@client12:~#
```

