

Exercise 1 – Installing packages using **rpm**

Tasks to Perform on AlmaLinux:

Using the **rpm** command:

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

```
rpm -q net-tools
```

```
[root@server1 ~]#  
[root@server1 ~]# rpm -q net-tools  
net-tools-2.0-0.64.20160912git.el9.x86_64  
[root@server1 ~]#
```

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

```
rpm -evh net-tools
```

The **command** is used with the Red Hat Package Manager (RPM) to erase (uninstall) a package, while providing verbose output and a progress bar during the process.

-e: Stands for "erase," which removes the specified package from the system.
-v: Enables verbose mode, displaying detailed information about the process.
-h: Displays a progress bar (hash marks, '#') to visually indicate the progress of the removal.

```
[root@server1 ~]#  
[root@server1 ~]# rpm -evh net-tools  
Preparing...                                         ##### [100%]  
Cleaning up / removing...                          ##### [100%]  
1:net-tools-2.0-0.64.20160912git.el##### [100%]  
[root@server1 ~]#
```

3. Verify that the package is uninstalled.

```
rpm -q net-tools
```

```
[root@server1 ~]#  
[root@server1 ~]# rpm -q net-tools  
package net-tools is not installed  
[root@server1 ~]#
```

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).

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a. Look for the package

Name of the package - **net-tools**

System : **alma**

Arch - architecture **x86_64**: For 64-bit systems, which is the most common for modern computers

The screenshot shows a web browser displaying the results of a search for 'net-tools' on the rpmfind.net website. The search parameters are set to 'System: alma' and 'Arch: x86_64'. The results page title is 'RPM resource net-tool' and it indicates 'Found 3 RPM for net-tool'. The results table has columns for Package, Summary, Distribution, and Download. Three packages are listed, all of which are highlighted with a red border:

Package	Summary	Distribution	Download
net-tools-2.0-0.64.20160912git.el9.x86_64.html	Basic networking tools AlmaLinux 9.5 BaseOS for x86_64	net-tools-2.0-0.64.20160912git.el9.x86_64.rpm	
net-tools-2.0-0.62.20160912git.el9.x86_64.html	Basic networking tools AlmaLinux 9.4 BaseOS for x86_64	net-tools-2.0-0.62.20160912git.el9.x86_64.rpm	
net-tools-2.0-0.52.20160912git.el8.x86_64.html	Basic networking tools AlmaLinux 8.10 BaseOS for x86_64	net-tools-2.0-0.52.20160912git.el8.x86_64.rpm	

Generated by [rpm2html 1.6](#)

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We select AlmaLinux 9.5 based on the installed system

```
[root@server1 ~]# uname -a
Linux server1 5.14.0-583.33.1.el9_5.x86_64 #1 SMP PREEMPT_DYNAMIC Thu Mar 20 03:39:23 EDT 2025 x86_64 x86_64 x86_64 GNU/Linux
[root@server1 ~]# cat /etc/os-release
NAME="AlmaLinux"
VERSION="9.5 (Teal Serval)"
VERSION_ID="9.5"
PRETTY_NAME="AlmaLinux 9.5 (Teal Serval)"
ANSI_COLOR="0;34"
LOGO="fedora-logo-icon"
CPE_NAME="cpe:/o:almalinux:almalinux:9::baseos"
HOME_URL="https://almalinux.org/"
DOCUMENTATION_URL="https://wiki.almalinux.org/"
BUG_REPORT_URL="https://bugs.almalinux.org/"

ALMALINUX_MANTISBT_PROJECT="AlmaLinux-9"
ALMALINUX_MANTISBT_PROJECT_VERSION="9.5"
REDHAT_SUPPORT_PRODUCT="Almalinux"
REDHAT_SUPPORT_PRODUCT_VERSION="9.5"
SUPPORT_END=2032-06-01
[root@server1 ~]#
```

b. copy the website for rpm for 9.5

https://rpmfind.net/linux/almalinux/9.5/BaseOS/x86_64/os/Packages/net-tools-2.0-0.64.20160912git.el9.x86_64.rpm

c. Download the Package

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```
wget https://rpmfind.net/linux/almalinux/9.5/BaseOS/x86\_64/os/Packages/net-tools-2.0-0.64.20160912git.el9.x86\_64.rpm
```

```
[root@server1 ~]# 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 13:32:47-- 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.x86_64.rpm      100%[=====] 294.09K   681KB/s   in 0.4s

2025-03-25 13:32:48 (681 KB/s) - 'net-tools-2.0-0.64.20160912git.el9.x86_64.rpm' saved [301148/301148]
[root@server1 ~]#
```

5. Install the new net-tools package.

```
rpm -ivh net-tools-2.0-0.64.20160912git.el9.x86_64.rpm
```

```
[root@server1 ~]# rpm -ivh net-tools-2.0-0.64.20160912git.el9.x86_64.rpm
Verifying...                                              #####
Preparing...                                              #####
Updating / installing...
 1:net-tools-2.0-0.64.20160912git.el9.x86_64          #####
[root@server1 ~]#
```

6. Verify that the package is installed correctly.

```
rpm -q net-tools
```

```
[root@server1 ~]# rpm -q net-tools
net-tools-2.0-0.64.20160912git.el9.x86_64
[root@server1 ~]#
```

7. List all information about this package.

You can see the package and try a command like route to see if it works

```
rpm -qi net-tools
```

```
route
```

```
[root@server1 ~]# rpm -qi net-tools
Name        : net-tools
Version     : 2.0
Release    : 0.64.20160912git.el9
Architecture: x86_64
Install Date: Tue 25 Mar 2025 01:37:46 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@server1 ~]# route
Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
default         gateway        0.0.0.0        UG    100    0        0 ens160
192.168.204.0  0.0.0.0        255.255.255.0  U     100    0        0 ens160
[root@server1 ~]#
```

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

rpm -qd net-tools

```
[root@server1 ~]#  
[root@server1 ~]# 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@server1 ~]# █
```

9. List the configuration files for this package.

rpm -qc net-tools

```
[root@server1 ~]#  
[root@server1 ~]# rpm -qc net-tools  
[root@server1 ~]# █
```

Exercise 2 – Installing packages using **dpkg**

Tasks to Perform on Ubuntu:

Using the **dpkg** command:

Lab 2 – Software Installation

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

dpkg -s net-tools

```
mpererez@client1:~/Desktop$ 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.
mpererez@client1:~/Desktop$
```

- 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).

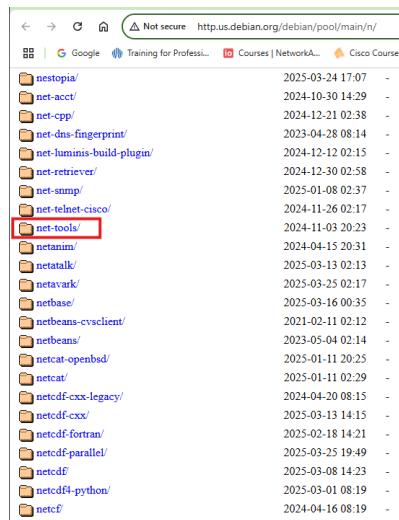
- Verify what is installed

uname -a

cat /etc/os-release

```
mpererez@client1:~/Desktop$ 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.
mpererez@client1:~/Desktop$ uname -a
Linux client1 6.8.0-52-generic #53~22.04.1-Ubuntu SMP PREEMPT_DYNAMIC Wed Jan 15 19:18:46 UTC 2024 x86_64 x86_64 x86_64 GNU
U/Linux
mpererez@client1:~/Desktop$ cat /etc/os-release
bash: cat/: No such file or directory
mpererez@client1:~/Desktop$ cat /etc/os-release
PRETTY_NAME="Ubuntu 22.04 LTS"
NAME="Ubuntu"
VERSION_ID="22.04"
VERSION="22.04.5 LTS (Jammy Jellyfish)"
VERSION_CODENAME=jammy
ID=ubuntu
ID_LIKE=debian
HOME_URL="https://www.ubuntu.com/"
SUPPORT_URL="https://help.ubuntu.com/"
BUG_REPORT_URL="https://bugs.launchpad.net/ubuntu/"
PRIVACY_POLICY_URL="https://www.ubuntu.com/legal/terms-and-policies/privacy-policy"
UBUNTU_CODENAME=jammy
mpererez@client1:~/Desktop$ uname -m
x86_64
mpererez@client1:~/Desktop$
```

- Locate package



Lab 2 – Software Installation

Name	Last modified	Size	Description
Parent Directory			
net-tools_2.10.1.1+b1_arm64.deb	2024-11-01 22:28	238K	
net-tools_1.60+git20181103.0eebce-1+deb11u1_ppc64el.deb	2024-08-21 21:05	255K	
net-tools_1.60+git20181103.0eebce-1+deb11u1_armel.deb	2024-08-21 21:05	227K	
net-tools_1.60+git20181103.0eebce-1+deb11u1_i386.deb	2024-08-21 21:05	246K	
net-tools_1.60+git20181103.0eebce-1+deb11u1_armhf.deb	2024-08-21 21:05	230K	
net-tools_1.60+git20181103.0eebce-1+deb11u1_mipsel.deb	2024-08-21 21:05	238K	
net-tools_1.60+git20181103.0eebce-1+deb11u1_mips64el.deb	2024-08-21 21:05	238K	
net-tools_1.60+git20181103.0eebce-1+deb11u1_arm64.deb	2024-08-21 21:05	242K	
net-tools_1.60+git20181103.0eebce-1+deb11u1_amd64.deb	2024-08-21 21:05	244K	
net-tools_1.60+git20181103.0eebce-1+deb11u1_s390x.deb	2024-08-21 21:00	238K	
net-tools_1.60+git20181103.0eebce-1+deb11u1_dsc	2024-08-21 18:07	1.7K	
net-tools_1.60+git20181103.0eebce-1+deb11u1_debian.tar.xz	2024-08-21 18:07	56K	
net-tools_2.10.1.1_riscv64.deb	2024-04-29 04:16	245K	
net-tools_2.10.1.1_armel.deb	2024-04-29 00:54	221K	
net-tools_2.10.1.1_s390x.deb	2024-04-29 00:54	237K	
net-tools_2.10.1.1_ppc64el.deb	2024-04-29 00:49	248K	
net-tools_2.10.1.1_mips64el.deb	2024-04-29 00:49	231K	
net-tools_2.10.1.1_armhf.deb	2024-04-29 00:49	224K	
net-tools_2.10.1.1_amd64.deb	2024-04-29 00:49	237K	
net-tools_2.10.1.1_i386.deb	2024-04-29 00:44	239K	
net-tools_2.10.1.1_dsc	2024-04-21 23:58	1.9K	
net-tools_2.10.1.1_debian.tar.xz	2024-04-21 22:59	55V	

c. Download latest version

```
wget http://http.us.debian.org/debian/pool/main/n/net-tools/net-tools\_2.10.1.1\_amd64.deb
```

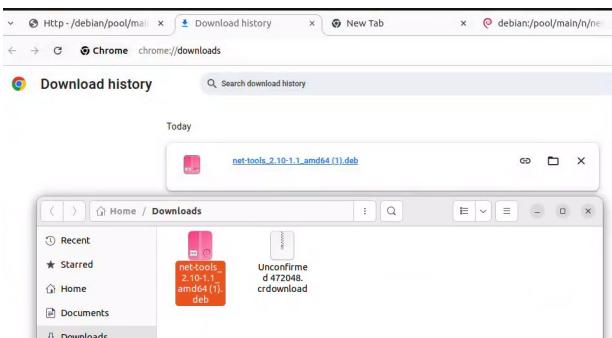
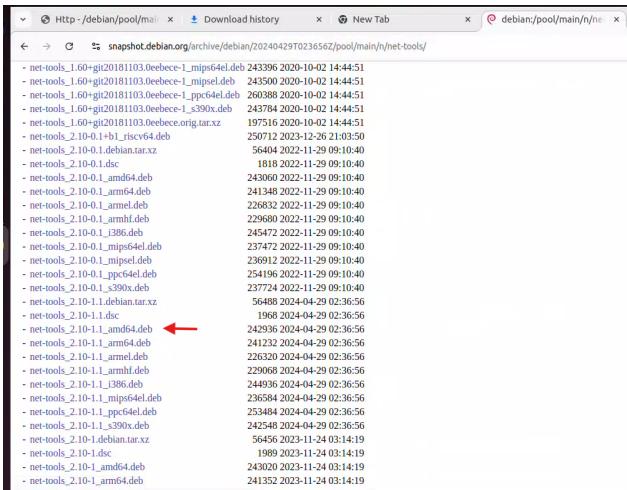
```
root@client1:~# wget http://http.us.debian.org/debian/pool/main/n/net-tools/net-tools-2.10.1.1-amd64.deb  
--2025-03-25 20:05:26-- http://http.us.debian.org/debian/pool/main/n/net-tools/net-tools-2.10.1.1-amd64.deb  
Resolving http.us.debian.org (http.us.debian.org)... 64.50.236.52, 64.50.233.100, 208.80.154.139, ...  
Connecting to http.us.debian.org (http.us.debian.org)|64.50.236.52|:80... connected.  
HTTP request sent, awaiting response... 404 Not Found  
2025-03-25 20:05:26 ERROR 404: Not Found.
```

Some issues found contacting this site, tried in chrome and got same issue



The site was changed

Lab 2 – Software Installation



```
 wget http://snapshot.debian.org/archive/debian/20240429T023656Z/pool/main/n/net-tools/net-tools\_2.10-1.1\_amd64.deb
```

```
root@client1:~# wget https://snapshot.debian.org/archive/debian/20240429T023656Z/pool/main/n/net-tools/net-tools_2.10-1.1_amd64.deb
--2025-03-25 20:28:23-- https://snapshot.debian.org/archive/debian/20240429T023656Z/pool/main/n/net-tools/net-tools_2.10-1.1_amd64.deb
Resolving snapshot.debian.org (snapshot.debian.org)... 151.101.126.132, 2a04:4e42:1e::644
Connecting to snapshot.debian.org (snapshot.debian.org)|151.101.126.132|:443... connected.
HTTP request sent, awaiting response... 302 FOUND
Location: /file/07cac0b79ad565a152b6169664a554464d2e1a1d/net-tools_2.10-1.1_amd64.deb [following]
--2025-03-25 20:28:23-- https://snapshot.debian.org/file/07cac0b79ad565a152b6169664a554464d2e1a1d/net-tools_2.10-1.1_amd64.deb
Reusing existing connection to snapshot.debian.org:443.
HTTP request sent, awaiting response... 200 OK
Length: 242936 (237K)
Saving to: 'net-tools_2.10-1.1_amd64.deb'

net-tools_2.10-1.1_amd64.deb 100%[=====] 237.24K --.KB/s in 0.03s

2025-03-25 20:28:23 [8.56 MB/s] - 'net-tools_2.10-1.1_amd64.deb' saved [242936/242936]

root@client1:~#
```

d. Confirm is downloaded

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```
root@client1:~#  
root@client1:~# ll  
total 284  
drwx----- 6 root root 4096 Mar 25 20:28 ./  
drwxr-xr-x 19 root root 4096 Mar 24 17:57 ../  
-rw----- 1 root root 326 Mar 24 22:35 .bash_history  
-rw-r--r-- 1 root root 3106 Oct 15 2021 .bashrc  
drwx----- 2 root root 4096 Aug 7 2023 .cache/  
drwx----- 3 root root 4096 Mar 24 22:34 .config/  
-rw----- 1 root root 20 Mar 25 20:02 .lessht  
drwxr-xr-x 3 root root 4096 Mar 24 22:34 .local/  
-rw-r--r-- 1 root root 242936 Apr 28 2024 net-tools_2.10-1.1_amd64.deb  
-rw-r--r-- 1 root root 161 Jul 9 2019 .profile  
drwx----- 2 root root 4096 Mar 24 17:56 snap/  
-rw-r--r-- 1 root root 174 Mar 25 20:28 .wget-hsts  
root@client1:~#
```

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

```
dpkg -I net-tools_2.10-1.1_amd64.deb
```

```
root@client1:~#  
root@client1:~# dpkg -i net-tools_2.10-1.1_amd64.deb  
Selecting previously unselected package net-tools.  
(Reading database ... 200587 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@client1:~#
```

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

```
dpkg -s net-tools
```

```
root@client1:~# 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/  
root@client1:~#
```

Verify the version loaded

```
dpkg-query -l net-tools
```

Lab 2 – Software Installation

```
root@client1:~# dpkg-query -l net-tools
Desired=Unknown/Install/Remove/Purge/Hold
| Status=Not/Inst/Conf-files/Unpacked/half-conf/Half-inst/trig-aWait/Trig-pend
|/ Err?=(none)/Reinst-required (Status,Err: uppercase=bad)
||/ Name          Version       Architecture Description
||++-+-----+-----+-----+-----+
ii  net-tools      2.10-1.1    amd64        NET-3 networking toolkit
```

Verify one of the commands work properly

route

```
root@client1:~# route
Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref Use Iface
default         _gateway       0.0.0.0        UG    100   0   0 ens33
link-local      0.0.0.0        255.255.0.0   U     1000  0   0 ens33
192.168.204.0  0.0.0.0        255.255.255.0 U     100   0   0 ens33
```

5. View all files in this package.

List files from an installed package:

dpkg -L net-tools

```
root@client1:~# dpkg -L net-tools
/.
/usr
/usr/bin
/usr/bin/netstat
/usr/sbin
/usr/sbin/arp
/usr/sbin/ifconfig
/usr/sbin/ipaddr
/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
/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/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/man8/pt_BR
/usr/share/man/man8/pt_BR/man8
/usr/share/man/man8/pt_BR/man8/arp.8.gz
/usr/share/man/man8/pt_BR/man8/ifconfig.8.gz
/usr/share/man/man8/pt_BR/man8/netstat.8.gz
/usr/share/man/man8/pt_BR/man8/rarp.8.gz
/usr/share/man/man8/pt_BR/man8/route.8.gz
/usr/share/man/man8/pt_BR/man8/slattach.8.gz
/usr/share/man/fr
```

Exercise 3 – Installing packages using `dnf`

Tasks to Perform on AlmaLinux:

Exercise 3.1

1. List the package repositories installed on the server.

This command only lists repositories that are currently enabled.

dnf repolist

dnf repolist all

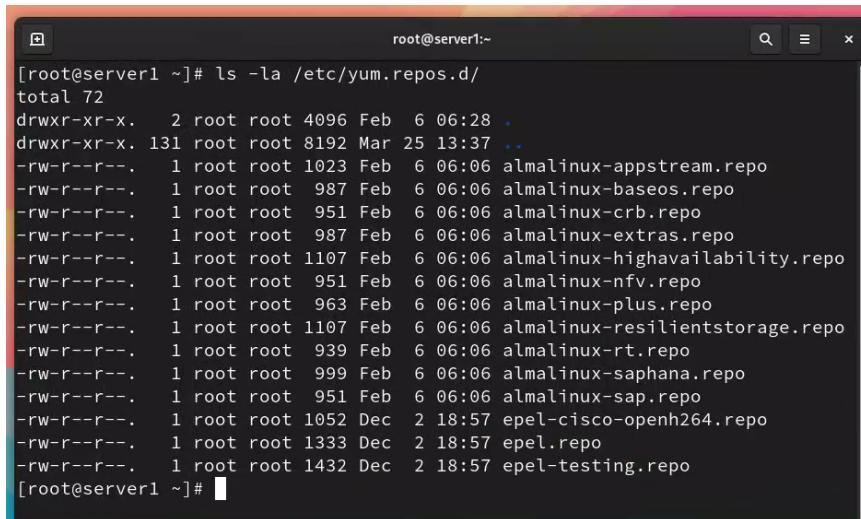
```
[root@server1 ~]# dnf repolist all
repo id          repo name
AlmaLinux 9 - AppStream
AlmaLinux 9 - AppStream - Debug
AlmaLinux 9 - AppStream - Source
AlmaLinux 9 - BaseOS
AlmaLinux 9 - BaseOS - Debug
AlmaLinux 9 - BaseOS - Source
AlmaLinux 9 - CRB
AlmaLinux 9 - CRB - Debug
AlmaLinux 9 - CRB - Source
epel             Extra Packages for Enterprise Linux 9 - x86_64
epel-cisco-openh264 Extra Packages for Enterprise Linux 9 openh264 (From Cisco) - x86_64
epel-cisco-openh264-debuginfo Extra Packages for Enterprise Linux 9 openh264 (From Cisco) - x86_64 - Debug
epel-cisco-openh264-source Extra Packages for Enterprise Linux 9 openh264 (From Cisco) - x86_64 - Source
epel-debuginfo   Extra Packages for Enterprise Linux 9 - x86_64 - Debug
epel-source      Extra Packages for Enterprise Linux 9 - x86_64 - Source
epel-testing     Extra Packages for Enterprise Linux 9 - Testing - x86_64
epel-testing-debuginfo Extra Packages for Enterprise Linux 9 - Testing - x86_64 - Debug
epel-testing-source Extra Packages for Enterprise Linux 9 - Testing - x86_64 - Source
extras           AlmaLinux 9 - Extras
extras-debuginfo AlmaLinux 9 - Extras - Debug
extras-source    AlmaLinux 9 - Extras - Source
highavailability AlmaLinux 9 - HighAvailability
highavailability-debuginfo AlmaLinux 9 - HighAvailability - Debug
highavailability-source AlmaLinux 9 - HighAvailability - Source
nfv              AlmaLinux 9 - NFV
nfv-debuginfo   AlmaLinux 9 - NFV - Debug
nfv-source       AlmaLinux 9 - NFV - Source
plus             AlmaLinux 9 - Plus
plus-debuginfo  AlmaLinux 9 - Plus - Debug
plus-source      AlmaLinux 9 - Plus - Source
resilientstorage AlmaLinux 9 - ResilientStorage
resilientstorage-debuginfo AlmaLinux 9 - ResilientStorage - Debug
resilientstorage-source AlmaLinux 9 - ResilientStorage - Source
rt               AlmaLinux 9 - RT
rt-debuginfo    AlmaLinux 9 - RT - Debug
rt-source        AlmaLinux 9 - RT - Source
sap              AlmaLinux 9 - SAP
sap-debuginfo   AlmaLinux 9 - SAP - Debug
sap-source       AlmaLinux 9 - SAP - Source
saphana          AlmaLinux 9 - SAPHANA
saphana-debuginfo AlmaLinux 9 - SAPHANA - Debug
saphana-source  AlmaLinux 9 - SAPHANA - Source
[root@server1 ~]#
```

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

The repository configuration is located in the folder /etc/yum.repos.d/

```
ls -la /etc/yum.repos.d/
```

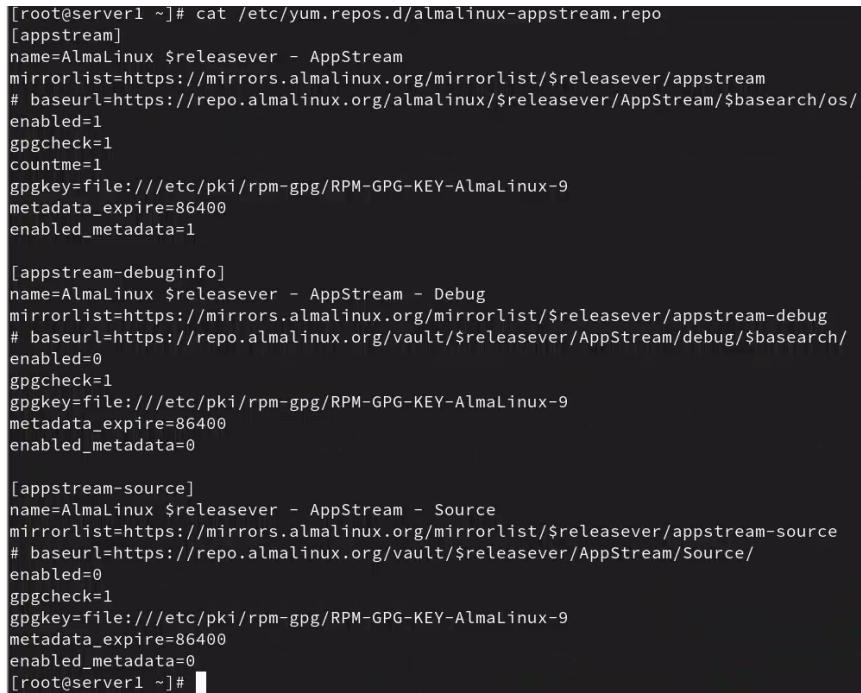
Lab 2 – Software Installation



```
[root@server1 ~]# 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 13:37 ..
-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@server1 ~]#
```

3. View repository configuration: AlmaLinux–AppStream.

cat /etc/yum.repos.d/almalinux-appstream.repo



```
[root@server1 ~]# 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

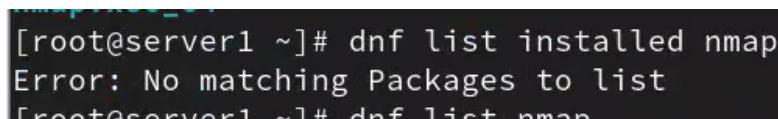
[appstream-source]
name=AlmaLinux $releasever - AppStream - Source
mirrorlist=https://mirrors.almalinux.org/mirrorlist/$releasever/appstream-source
# baseurl=https://repo.almalinux.org/vault/$releasever/AppStream/Source/
enabled=0
gpgcheck=1
gpgkey=file:///etc/pki/rpm-gpg/RPM-GPG-KEY-AlmaLinux-9
metadata_expire=86400
enabled_metadata=0
[root@server1 ~]#
```

Exercise 3.2

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

The nmap app is not installed.

dnf list installed nmap



```
[root@server1 ~]# dnf list installed nmap
Error: No matching Packages to list
[root@server1 ~]# dnf list nmap
```

Lab 2 – Software Installation

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

dnf list nmap

dnf info nmap

```
[root@server1 ~]# dnf list nmap
Last metadata expiration check: 1:19:37 ago on Tue 25 Mar 2025 08:08:10 PM.
Available Packages
nmap.x86_64                               3:7.92-3.el9
[root@server1 ~]# dnf info nmap
Last metadata expiration check: 1:19:44 ago on Tue 25 Mar 2025 08:08:10 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 nc), a utility
              for comparing scan results (ndiff), and a packet generation and response
              analysis tool (nping).
[root@server1 ~]#
```

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

dnf install nmap

```
[root@server1 ~]# dnf install nmap
Last metadata expiration check: 1:33:41 ago on Tue 25 Mar 2025 08:08:10 PM.
Dependencies resolved.
=====
Transaction Summary
=====
Install 1 Package
Total download size: 5.4 M
Installed size: 24 M
Is this ok [y/N]: 
Downloaded 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@server1 ~]#
```

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

dnf list installed nmap

```
[root@server1 ~]# dnf list installed nmap
Installed Packages
nmap.x86_64                               3:7.92-3.el9
[root@server1 ~]#
```

Test nmap

Lab 2 – Software Installation

nmap localhost

```
[root@server1 ~]# nmap localhost
Starting Nmap 7.92 ( https://nmap.org ) at 2025-03-25 21:58 EDT
Nmap scan report for localhost (127.0.0.1)
Host is up (0.0000030s latency).
Other addresses for localhost (not scanned): ::1
Not shown: 998 closed tcp ports (reset)
PORT      STATE SERVICE
22/tcp    open  ssh
631/tcp   open  ipp

Nmap done: 1 IP address (1 host up) scanned in 0.09 seconds
[root@server1 ~]#
```

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

dnf search named

6. Install the first package found.

First Package Found: pcp-pmda-named.x86_64

Verify if already installed

```
dnf list installed pcp-pmda-named.x86_64
```

```
[root@server1 ~]# dnf list installed pcp-pmda-named.x86_64
Error: No matching Packages to list
[root@server1 ~]#
```

```
dnf install pcp-pmda-named.x86_64
```

Lab 2 – Software Installation

7. Verify that this package is installed correctly.

```
dnf list installed pcp-pmda-named.x86_64
```

- #### 8. View all information about this package.

```
dnf info pcp-pmda-named
```

```
[root@server1 ~]# dnf info pcp-pmda-named
Last metadata expiration check: 2:30:59 ago on Tue 25 Mar 2025 08:08:10 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.

dnf remove pcp-pmda-named

```
[root@server1 ~]# dnf remove pcp-pmda-named
Dependencies resolved.

=====


| Package                              | Architecture | Version              | Repository | Size  |
|--------------------------------------|--------------|----------------------|------------|-------|
| <b>Removing:</b>                     |              |                      |            |       |
| pcp-pmda-named                       | x86_64       | 6.2.2-7.el9_5.alma.1 | @appstream | 8.3 k |
| <b>Removing unused dependencies:</b> |              |                      |            |       |
| pcp                                  | x86_64       | 6.2.2-7.el9_5.alma.1 | @appstream | 5.3 k |
| pcp-conf                             | x86_64       | 6.2.2-7.el9_5.alma.1 | @appstream | 7.0 k |
| pcp-tlbs                             | 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

Free 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
  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
  Erasing   : pcp-6.2.2-7.el9_5.alma.1.x86_64                  2/6
  Running scriptlet: perl-PCP-PMDA-6.2.2-7.el9_5.alma.1.x86_64
  Erasing   : perl-PCP-PMDA-6.2.2-7.el9_5.alma.1.x86_64        3/6
  Running scriptlet: pcp-selinux-6.2.2-7.el9_5.alma.1.x86_64
  Erasing   : pcp-selinux-6.2.2-7.el9_5.alma.1.x86_64          4/6
  Running scriptlet: pcp-tlbs-6.2.2-7.el9_5.alma.1.x86_64
  Erasing   : pcp-tlbs-6.2.2-7.el9_5.alma.1.x86_64             5/6
  Running scriptlet: pcp-conf-6.2.2-7.el9_5.alma.1.x86_64
  Erasing   : pcp-conf-6.2.2-7.el9_5.alma.1.x86_64            6/6
  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-tlbs-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
  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-tlbs-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-tlbs-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@server1 ~]#
```

Exercise 3.3

Lab 2 – Software Installation

1. List all the package groups.

dnf group list

```
Complete!
[root@server1 ~]# dnf group list
Last metadata expiration check: 2:37:04 ago on Tue 25 Mar 2025 08:08:10 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@server1 ~]#
```

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

dnf group info "Development Tools"

Lab 2 – Software Installation

```
[root@server1 ~]# dnf group info "Development Tools"
Last metadata expiration check: 2:38:04 ago on Tue 25 Mar 2025 08:08:10 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
[root@server1 ~]#
```

3. Install the group: "Development Tools".

dnf group install "Development Tools"

Lab 2 – Software Installation

Package	Architecture	Version	Repository	Size
Installing group/module packages:				
Dependencies resolved.				
ascidoc	noarch	9.1.6-3.el9	appstream	237 k
autoconf	noarch	2.69-39.el9	appstream	665 k
automake	x86_64	1.16.4-4.el9	appstream	602 k
bzip2	x86_64	3.1.7-5.el9	appstream	920 k
diffstat	x86_64	2.0.20210104-0.el9	appstream	38 k
file	x86_64	1.64-6.el9	appstream	43 k
gcc	x86_64	11.1.0-1.el9	appstream	307 k
gcc-c++	x86_64	11.1.0-5.el9_5.alma.1	appstream	32 M
gdb	x86_64	14.2-2.el9	appstream	13 M
git	x86_64	1.2.3-1.el9	appstream	146 k
glibc-devel	x86_64	2.34-125.el9_5.alma.1	appstream	103 k
gettext	noarch	0.51.1-20.el9	appstream	25 k
jai	x86_64	5.0-1.el9	appstream	55 k
libtalloc	x86_64	2.4.6-46.el9	appstream	208 k
ltrace	x86_64	0.7.91-43.el9	appstream	577 k
make	x86_64	1.4-3-8.el9	appstream	137 k
perl-fedoraview	x86_64	0.001-23.el9	bases	530 k
perl-generators	noarch	0.001-23.el9	appstream	23 k
signon	x86_64	1.11-12.el9	appstream	15 k
signon-gui-config	x86_64	200.0-1.el9.alma.1	appstream	167 k
rpm-build	x86_64	4.16.1-34.el9	appstream	56 k
rpm-sign	x86_64	4.16.1-34.el9	bases	59 k
signon-gui-light	x86_64	3.3-1.el9	appstream	609 k
systemtap	x86_64	5.1-4.el9_5	appstream	8.2 k
valgrind	x86_64	1:3.23.0-4.el9	appstream	4.7 M
valgrind-devel	x86_64	1:3.23.0-4.el9	appstream	46 k
Installing dependencies:				
anobin	x86_64	12.65-1.el9	appstream	1.0 M
boost-filystem	x86_64	1.75-6-8.el9	appstream	57 k
boost-regex	x86_64	1.75-6-8.el9	appstream	277 k
boost-system	x86_64	1.75-6-8.el9	appstream	13 k
boost-thread	x86_64	1.75-6-8.el9	appstream	55 k
copy-jdk-configs	x86_64	4.0-3.el9	appstream	27 k
docheck-dtds	noarch	1.0-1.el9	appstream	7 k
docheck-style-xsl	x86_64	1.0-1.el9	appstream	280 k
der	x86_64	1.79-26.el9	appstream	1.2 M
dnf	x86_64	9.0-10.el9	appstream	127 k
dnf-inst	x86_64	12.1-0.el9	appstream	3.6 M
efi-srpm-macros	noarch	6-2.el9.0.0.1	appstream	21 k
efivar-libs	x86_64	38-3.el9	bases	120 k
efi-srpm	x86_64	0.3-1.el9.alma.1	appstream	549 k
efiutil-devel	x86_64	0.191-4.el9.alma.1	appstream	47 k
font-srpm-devel	x86_64	1:2.6.5-7.el9.1	appstream	20 k
font-srpm-macros	noarch	1:2.6.5-7.el9.1	appstream	27 k
graphviz	x86_64	2.46-1.el9	appstream	3.5 M
ibus	x86_64	1.24-33.el9	appstream	23 k
ibus-gtk2	x86_64	1.5-25.el9	appstream	33 M
java-1.8.0-openjdk-headless	x86_64	1:1.8.0.442.b66-2.el9	appstream	9 k
java-vnc-viewer	x86_64	0.0.1-1.el9	appstream	350 k
kernel-srpm	x86_64	5.14-0-503.33.1.el9_5	appstream	15 k
libcom	x86_64	1.0-13-19.el9	appstream	197 k
liblabeltrace	x86_64	1.0-13-19.el9	appstream	18 k
libipt	x86_64	2.0-4-5.el9	appstream	55 k
libstdc++-dwarf	x86_64	11.5-0.5.el9_5.alma.1	appstream	2.2 M
libcrypt-devel	x86_64	1.5-1-2.el9	appstream	46 k
libcurl-devel	x86_64	1.0-19-3.el9_4	bases	96 k
lksctp-tools	x86_64	5.4-4.el9_5	appstream	187 k
lua	x86_64	33-5.el9	appstream	33 k
lua-posix	x86_64	1.6-19	appstream	84 k
lua-srpm-macros	x86_64	1.4-19-1.el9	appstream	294 k
md	x86_64	1.0-1-1.el9	appstream	47 k
mkfontscale	x86_64	2.0-8-4.el9	bases	435 k
mkostx1	x86_64	3.101-0-10.el9_2	appstream	7.7 k
ms-tools	x86_64	6-6.el9	appstream	13 k
oxaml-srpm-macros	noarch	2.0-1.el9	appstream	1.2 M
openml-srpm-macros	x86_64	1:3.2.2-6.el9.5.1	appstream	46 k
patch	x86_64	2.7-16.el9	appstream	127 k
perl-Error	x86_64	1:0.17829-1.el9	appstream	41 k
perl-File-Compare	noarch	1:0.17829-1.el9	appstream	13 k
perl-File-Copy	noarch	2.34-481.el9	appstream	19 k
perl-Git	noarch	2.43-5-2.el9_5	appstream	37 k
perl-MacKey	x86_64	2.0-1-1.el9	appstream	19 k
perl-Thread-Queue	x86_64	3.14-460.el9	appstream	21 k
perl-XML-Parser	x86_64	2.46-9.el9	appstream	229 k
perl-lib	x86_64	0.65-481.el9	appstream	13 k
perl-mks	x86_64	4.0-1-1.el9-481.el9	appstream	6 k
perl-srpm-macros	noarch	1-41.el9	appstream	8.1 k
perl-threads	x86_64	1:2.25-460.el9	appstream	57 k
perl-threads-shared	x86_64	1.63-460.el9	appstream	44 k
perl-tree-macros	x86_64	1.1-1-1.el9	appstream	33 k
python-srpm-macros	noarch	3.9-54.el9	appstream	16 k
qt5-srpm-macros	x86_64	5.15-9-3.el9	appstream	7.8 k
rust-srpm-macros	noarch	1.0-1-1.el9	appstream	9 k
sysctl	x86_64	0.6-1-56.el9	appstream	54 k
systemtap-client	x86_64	5.1-4.el9_5	appstream	3.6 M
Systemtap Client:				
systemtap-client	x86_64	5.1-4-0.el9_5	appstream	3.6 M
systemtap-devel	x86_64	5.1-4-1.el9_5	appstream	2.2 M
systemtap-runtime	x86_64	5.1-4-1.el9_5	appstream	441 k
tar	x86_64	20210101-0.5.1	appstream	168 k
tar-libs	x86_64	2025-1.el9	appstream	145 k
tar-zip	x86_64	7.5-33.el9	appstream	1.0 M
xx-devel	x86_64	5.1-5-8.el9_0	appstream	52 k
(3) xx-devel	x86_64	1.1-1-1.el9	appstream	44 k
zstd	x86_64	1.5-1.2.el9	bases	546 k
Installing web dependencies:				
gnome-themes	x86_64	3.20-14.el9	appstream	136 k
kernel-devel	x86_64	5.14-0-503.33.1.el9_5	appstream	18 M
libcanberra-gtk2	x86_64	0.38-27.el9	appstream	25 k
libxml2	x86_64	7.0.99-28.el9	appstream	62 k
Installing Groups:				
Development Tools				
Transaction Summary				
Install 109 Packages				
Total download size: 154 M				
Nothing to do. Run 'dnf clean all' to clear the cache.				
Is this ok [y/N]:				
Downloaded Packages:				
(1/109): asciidoc-9.4-0.1.el9.noarch.rpm				
(2/109): autoconf-2.69-39.el9.x86_64.rpm				
(3/109): adwaita-gtk2-theme-3.28-14.19.x86_64.rpm				
(4/109): automake-1.16-2.8-19.noarch.rpm				
(5/109): bzip2-1.0.6-10.el9.x86_64.rpm				
(6/109): boost-filystem-1.75-0-5.el9.x86_64.rpm				
(7/109): boost-regex-1.75-0-8-19.x86_64.rpm				
(8/109): boost-sys-1.75-0-10.el9.x86_64.rpm				
(9/109): boost-thread-1.75-0-8-19.x86_64.rpm				
(10/109): byacc-2.0.3-8230108.x86_64.rpm				
(11/109): curl-8.1.0-1.el9.x86_64.rpm				
(12/109): boost-system-1.75-0-9-19.x86_64.rpm				
(13/109): debugedit-0.5-0.el9.x86_64.rpm				
(14/109): docbook-dtds-1.0-10.el9.noarch.rpm				
(15/109): docbook-style-xsl-1.79-2-16.el9.noarch.rpm				
(16/109): docbook-style-xsl-1.79-2-19.noarch.rpm				
(17/109): docbook-style-xsl-1.79-2-20.noarch.rpm				
(18/109): efi-srpm-macros-2-0-8.0.1.noarch.rpm				
(19/109): elfutils-devel-0.191-4.el9.x86_64.rpm				
(20/109): dnf-inst-1.0-1.el9.x86_64.rpm				
(21/109): libcurl-devel-1.0-1.el9.x86_64.rpm				
(22/109): elfutils-l1bfel-devel-0.191-4.el9.x86_64.rpm				
(23/109): fonts-srpm-macros-2-0-5-7-19.0.1.noarch.rpm				
(24/109): glib-2.69-39.el9.x86_64.rpm				
(25/109): gdb-14.2-3.el9.x86_64.rpm				
(26/109): gcc-c++-11.1.5-5.el9.x86_5.alma.1.x86_64.rpm				
(27/109): gdb-headless-14.2-3.el9.x86_54-14.rpm				
(28/109): git-2.37.1-1.el9.x86_64.noarch.rpm				
(29/109): rpm-build-0.191-4.el9.x86_64.rpm				
(30/109): rpm-sign-0.191-4.el9.x86_64.rpm				
(31/109): signon-gui-light-1.11-12.el9				
(32/109): systemtap-client-7.0.99-28.el9				
(33/109): valgrind-1:3.23.0-4.el9				
(34/109): valgrind-devel-1:3.23.0-4.el9				
(35/109): font-srpm-devel-1:2.6.5-7.el9.1				
(36/109): font-srpm-macros-2-0-5-7-19.0.1.noarch.rpm				
(37/109): font-srpm-macros-2-0-5-7-19.0.1.x86_64.rpm				
(38/109): font-srpm-macros-2-0-5-7-19.0.1.x86_64.noarch.rpm				
(39/109): font-srpm-macros-2-0-5-7-19.0.1.x86_64.x86_64.rpm				
(40/109): font-srpm-macros-2-0-5-7-19.0.1.x86_64.noarch.x86_64.rpm				
(41/109): font-srpm-macros-2-0-5-7-19.0.1.x86_64.x86_64.noarch.rpm				
(42/109): font-srpm-macros-2-0-5-7-19.0.1.x86_64.x86_64.noarch.x86_64.rpm				
(43/109): font-srpm-macros-2-0-5-7-19.0.1.x86_64.x86_64.noarch.x86_64.noarch.rpm				
(44/109): font-srpm-macros-2-0-5-7-19.0.1.x86_64.x86_64.noarch.x86_64.x86_64.noarch.x86_64.rpm				
(45/109): font-srpm-macros-2-0-5-7-19.0.1.x86_64.x86_64.noarch.x86_64.x86_64.noarch.x86_64.noarch.rpm				
(46/109): font-srpm-macros-2-0-5-7-19.0.1.x86_64.x86_64.noarch.x86_64.x86_64.noarch.x86_64.noarch.x86_64.noarch.rpm				
(47/109): font-srpm-macros-2-0-5-7-19.0.1.x86_64.x86_64.noarch.x86_64.x86_64.noarch.x86_64.noarch.x86_64.noarch.x86_64.noarch.rpm				
(48/109): font-srpm-macros-2-0-5-7-19.0.1.x86_64.x86_64.noarch.x86_64.x86_64.noarch.x86_64.noarch.x86_64.noarch.x86_64.noarch.x86_64.noarch.rpm				
(49/109): font-srpm-macros-2-0-5-7-19.0.1.x86_64.x86_64.noarch.x86_64.x86_64.noarch.x86_64.noarch.x86_64.noarch.x86_64.noarch.x86_64.noarch.x86_64.noarch.rpm				
(50/109): font-srpm-macros-2-0-5-7-19.0.1.x86_64.x86_64.noarch.x86_64.x86_64.noarch.x86_64.noarch.x86_64.noarch.x86_64.noarch.x86_64.noarch.x86_64.noarch.x86_64.noarch.rpm				
(51/109): font-srpm-macros-2-0-5-7-19.0.1.x86_64.x86_64.noarch.x86_64.x86_64.noarch.x86_64.noarch.x86_64.noarch.x86_64.noarch.x86_64.noarch.x86_64.noarch.x86_64.noarch.x86_64.noarch.rpm				
(52/109): font-srpm-macros-2-0-5-7-19.0.1.x86_64.x86_64.noarch.x86_64.x86_64.noarch.x86_64.noarch.x86_64.noarch.x86_64.noarch.x86_64.noarch.x86_64.noarch.x86_64.noarch.x86_64.noarch.rpm				
(53/109): font-srpm-macros-2-0-5-7-19.0.1.x86_64.x86_64.noarch.x86_64.x86_64.noarch.x86_64.noarch.x86_64.noarch.x86_64.noarch.x86_64.noarch.x86_64.noarch.x86_64.noarch.x86_64.noarch.rpm				
(54/109): font-srpm-macros-2-0-5-7-19.0.1.x86_64.x86_64.noarch.x86_64.x86_64.noarch.x86_64.noarch.x86_64.noarch.x86_64.noarch.x86_64.noarch.x86_64.noarch.x86_64.noarch.x86_64.noarch.rpm				
(55/109): font-srpm-macros-2-0-5-7-19.0.1.x86_64.x86_64.noarch.x86_64.x86_64.noarch.x86_64.noarch.x86_64.noarch.x86_64.noarch.x86_64.noarch.x86_64.noarch.x86_64.noarch.x86_64.noarch.rpm				
(56/109): font-srpm-macros-2-0-5-7-19.0.1.x86_64.x86_64.noarch.x86_64.x86_64.noarch.x86_64.noarch.x86_64.noarch.x86_64.noarch.x86_64.noarch.x86_64.noarch.x86_64.noarch.x86_64.noarch.rpm				
(57/109): font-srpm-macros-2-0-5-7-19.0.1.x86_64.x86_64.noarch.x86_64.x86_64.noarch.x86_64.noarch.x86_64.noarch.x86_64.noarch.x86_64.noarch.x86_64.noarch.x86_64.noarch.x86_64.noarch.rpm				
(58/109): font-srpm-macros-2-0-5-7-19.0.1.x86_64.x86_64.noarch.x86_64.x86_64.noarch.x86_64.noarch.x86_64.noarch.x86_64.noarch.x86_64.noarch.x86_64.noarch.x86_64.noarch.x86_64.noarch.rpm				
(59/109): font-srpm-macros-2-0-5-7-19.0.1.x86_64.x86_64.noarch.x86_64.x86_64.noarch.x86_64.noarch.x86_64.noarch.x86_64.noarch.x86_64.noarch.x86_64.noarch.x86_64.noarch.x86_64.noarch.rpm				
(60/109): font-srpm-macros-2-0-5-7-19.0.1.x86_64.x86_64.noarch.x86_64.x86_64.noarch.x86_64.noarch.x86_64.noarch.x86_64.noarch.x86_64.noarch.x86_64.noarch.x86_64.noarch.x86_64.noarch.rpm				
(61/109): font-srpm-macros-2-0-5-7-19.0.1.x86_64.x86_64.noarch.x86_64.x86_64.noarch.x86_64.noarch.x86_64.noarch.x86_64.noarch.x86_64.noarch.x86_64.noarch.x86_64.noarch.x86_64.noarch.rpm				
(62/109): font-srpm-macros-2-0-5-7-19.0.1.x86_64.x86_64.noarch.x86_64.x86_64.noarch.x86_64.noarch.x86_64.noarch.x86_64.noarch.x86_64.noarch.x86_64.noarch.x86_64.noarch.x86_64.noarch.rpm				

Lab 2 – Software Installation

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

This will list all installed groups on your system, and you can check if "Development Tools" appears in the list.

dnf group list installed

```
[root@server1 ~]# dnf group list installed
Last metadata expiration check: 2:58:03 ago on Tue 25 Mar 2025 08:08:10 PM.
Installed Environment Groups:
  Server with GUI
Installed Groups:
  Container Management
  Development Tools
  Headless Management
[root@server1 ~]#
```

5. Uninstall the " Development Tools" group.

dnf group remove “Development tools”

Lab 2 – Software Installation

Packages	Architecture	Version	Repository	Size
Removing:				
abseil	noarch	9.1-0.9~e19	depotstream	940 k
abseil-cpp	noarch	2.09~99.e19	depotstream	2.2 M
abseil-make	noarch	1.16.2-8.e19	depotstream	1.7 M
abseil-test	noarch	3.7.1-0.1.e19	depotstream	3.1 M
abseil	x86_64	2.0.2612109-4.e19	depotstream	271 k
absl	x86_64	1.04~6~e19	depotstream	78 k
absl-base	x86_64	2.1.0~1~e19	depotstream	903 k
absl-cast	x86_64	11.5~0.5~e19.5.alma.1	depotstream	86 M
absl-cpp	x86_64	11.5~0.5~e19.5.alma.1	depotstream	32 M
absl-cs	x86_64	14.1~3~e19	depotstream	445 k
absl-cs-dev	x86_64	2.41.5~2~e19.5	depotstream	85 k
absl-cs-tests	x86_64	2.34~125~e19.5.alma.1	depotstream	38 k
absl-cs-util	x86_64	0.1~3~e19.5	depotstream	100 k
absl-cs-util	x86_64	5.6~0.6~e19	depotstream	459 k
absl-cs-util	x86_64	2.4~6~e19.9	depotstream	2.0 M
absl-cs-util	x86_64	0.7~3~e19.9	depotstream	300 k
absl-cs-util	x86_64	114.3~8~e19	absees	1.6 M
absl-cs-util	x86_64	0.4~2.7~e19.9	depotstream	210 k
absl-cs-util-vcp	x86_64	0.0~1~e19.9	depotstream	40 k
absl-cs-util-vcp	x86_64	1.1~1~e19	depotstream	21 k
absl-cs-util-vcp	x86_64	115~0.1~e19	depotstream	744 k
absl-cs-util-vcp	x86_64	200~1~e19.1.alma.1	depotstream	133 k
absl-cs-util-vcp	x86_64	4.12~1.1~3~e19	depotstream	146 k
absl-cs-util-vcp	x86_64	4.2~0.1~e19	absees	25 k
absl-cs-util-vcp	x86_64	3.1~1.2~e19.9	depotstream	2.2 M
absl-cs-util-vcp	x86_64	5.1~4~e19.5	depotstream	0
absl-cs-util-vcp	x86_64	113~23~0.4~e19	depotstream	20 M
absl-cs-util-vcp	x86_64	115~23~0.7~e19	depotstream	590 k
Removing unused dependencies:				
abseal	x86_64	1.1~0~e19	depotstream	1 M
abseal-fblayer	x86_64	1.15~0.5~e19	depotstream	134 k
boost-regex	x86_64	1.75~0.8~e19	depotstream	866 k
boost-system	x86_64	1.75~0.8~e19	depotstream	30 k
boost-thread	x86_64	1.15~0.8~e19	depotstream	121 k
copy_idc-configs	noarch	4.6~3~e19	depotstream	19 k
curl	x86_64	5.5~1~e19	depotstream	180 k
curl	x86_64	1.6~79~e19	depotstream	8.3 M
curlbook-diffs	noarch	1.7~0~2~16~e19	depotstream	19 M
curlbook-style-xsl	noarch	1.7~0~2~16~e19	depotstream	278 k
cryptopp	x86_64	0.1~1~e19	depotstream	14 M
cryptopp	x86_64	12.1~0~1~e19	depotstream	49 k
curl-source-macros	noarch	6.2~6~e19.8.0.1	depotstream	100 k
curl-source-macros	x86_64	23~3~e19	depotstream	300 k
curl-source-macros	x86_64	0.19~4~e19.5.alma.1	absees	2.8 M
curlutils	x86_64	0.19~4~e19.5.alma.1	depotstream	175 k
curlutils-dev	x86_64	0.19~4~e19.5.alma.1	depotstream	33 k
curlutils-dev	x86_64	0.3~3~e19	depotstream	55 k
curlutils-dev	x86_64	112~0.5~7~e19.1	depotstream	55 k
curlutils-dev	x86_64	11.5~0.5~e19.5.alma.1	depotstream	55 k
curlutils-macros	noarch	11.5~0.5~e19.5.alma.1	depotstream	55 k
curlutils-macros	x86_64	11.5~0.5~e19.5.alma.1	depotstream	55 k

Exercise 3.4

1. List the history of `dnf` commands.

`dnf history`

 2. View information about one of these commands.

dnf history 4

I Failed to remove entry from /etc/audit/auditctl		ID	Date and time	Action(s)	Altered
(root@server) -#		ID	Date and time	Action(s)	Altered
0 Command line					
8	group remove development Tools		2025-03-25 22:50:19	Removed	100 EB
7	group add development Tools		2025-03-25 22:50:19	Added	100 EB
6	remove rpm-pmcx-based		2025-03-25 22:41	Removed	
5	install rpm-pmcx-named.x86_64		2025-03-25 22:22	Install	6 EB
4	group add dev		2025-03-24 14:29	Added	
3	-y update		2025-03-24 14:29	1, I	153 >
2	install -y epel-release		2025-03-24 14:22	Install	190 >B
1			2025-03-24 14:18	Install	190 >B
[root@server ~]					
(root@server ~)	-#				
[root@server ~]# df history 4					
0 Command line		ID	Date and time	Action(s)	Altered
4	install rpm		2025-03-25 21:42	Install	
[root@server ~]	-#				

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

Lab 2 – Software Installation

Last command is 8 | group remove Development Tools

To reverse the last command install of “Development tools” needs to be done. Group install “Development tools” is done when undo 8 is issued.

dnf history undo 8

```
[root@server1 ~]# dnf history undo 8
Last metadata expiration check: 3:23:22 ago on Tue 25 Mar 2025 08:08:10 PM.
Dependencies resolved.
=====
Package                                         Architecture   Version      Repository  Size
=====
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      2.0.202101099-4.el9
diffstat                                         x86_64      1.64-6.el9
flex                                             x86_64      2.6.4-1.el9
gcc                                              x86_64      11.5.0-5.el9.5.alma.1
gcc-c++                                           x86_64      11.5.0-8.el9.5.alma.1
gdb                                              x86_64      14.2-3.el9
git                                              x86_64      2.43.5-2.el9.5
glibc-devel                                       x86_64      2.34-125.el9.5.3.alma.1
intltool                                         noarch       0.51.0-20.el9
jna                                              x86_64      5.6.0-8.el9
lthtool                                         x86_64      2.4-1.el9
ltrace                                           x86_64      0.7.01-43.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
design                                           x86_64      115-6.el9.1
redhat-rpm-config                               noarch       208-1.el9.1.alma.1
rpm-build                                         x86_64      4.10.1-10.el9
rpm-libs                                         x86_64      4.16.1-34.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
annobin                                         x86_64      12.65-1.el9
libcurl                                         x86_64      1:7.70.0-1.el9
=====
Installing dependencies:
=====
Repository  Size
appstream    237
appstream    665
appstream    662
appstream    920
appstream    88
appstream    43
appstream    307
appstream    31
appstream    13
appstream    146
appstream    50
appstream    25
appstream    55
appstream    268
appstream    577
appstream    137
baseos      530
appstream    99
appstream    23
appstream    15
appstream    167
appstream    66
appstream    59
baseos      17
appstream    689
appstream    8.2
appstream    4.7
appstream    46
appstream    1.0
=====
Total: 1530
```

Exercise 4 – Installing packages with apt

Tasks to Perform on Ubuntu:

1. Verify that bind9-dnsutils package is installed.

apt list bind9-dnsutils

```
root@client1:~# 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@client1:~#
```

apt list --installed | grep bind9-dnsutils

```
root@client1:~#
root@client1:~# apt list --installed | grep bind9-dnsutil
WARNING: apt does not have a stable CLI interface. Use with caution in scripts.

bind9-dnsutils/jammy-updates,jammy-security,now 1:9.18.30-0ubuntu0.22.04.2 amd64 [installed,automatic]
root@client1:~#
```

2. If it is installed, uninstall it.

Lab 2 – Software Installation

```
root@client1:~# 
root@client1:~# sudo apt remove bind9-dnsutils
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 ... 200641 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@client1:~#
```

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

```
root@client1:~# 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 ... 200624 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@client1:~#
```

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

apt list bind9-dnsutils

```
root@client1:~# 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@client1:~#
```

apt list –installed | grep bind9-dnsutils

Lab 2 – Software Installation

```
root@client1:~#  
root@client1:~# apt list --installed | grep bind9-dnsutil  
  
WARNING: apt does not have a stable CLI interface. Use with caution in scripts.  
  
bind9-dnsutils/jammy-updates,jammy-security,now 1:9.18.30-0ubuntu0.22.04.2 amd64 [installed]  
root@client1:~#
```

You can check if the bind9-dnsutils tools work by running a DNS query with the command

```
root@client1:~# dig google.com  
  
; <>> DiG 9.18.30-0ubuntu0.22.04.2-Ubuntu <>> google.com  
;; global options: +cmd  
;; Got answer:  
;; ->>HEADER<- opcode: QUERY, status: NOERROR, id: 14720  
;; flags: qr rd ra; QUERY: 1, ANSWER: 1, AUTHORITY: 0, ADDITIONAL: 1  
  
;; OPT PSEUDOSECTION:  
;; EDNS: version: 0, flags:; udp: 65494  
;; QUESTION SECTION:  
;google.com. IN A  
  
;; ANSWER SECTION:  
google.com. 5 IN A 142.251.33.174  
  
;; Query time: 7 msec  
;; SERVER: 127.0.0.53#53(127.0.0.53) (UDP)  
;; WHEN: Tue Mar 25 23:47:23 EDT 2025  
;; MSG SIZE rcvd: 55  
  
root@client1:~#
```

5. Get all the information about this app.

apt info bind9-dnsutils

```
root@client1:~# 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.  
. 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@client1:~#
```

apt show bind9-dnsutils

Lab 2 – Software Installation

```
root@client1:~# apt show 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
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.
- 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@client1:~#
```

6. Uninstall this package with all configuration files.

apt purge bind9-dnsutils

```
root@client1:~# 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 ... 200638 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@client1:~#
```

Verify now installed is not written

apt list bind9-dnsutils

```
root@client1:~# apt list bind9-dnsutils
Listing... Done
bind9-dnsutils/jammy-updates,jammy-security 1:9.18.30-0ubuntu0.22.04.2 amd64
bind9-dnsutils/jammy-updates,jammy-security 1:9.18.30-0ubuntu0.22.04.2 i386
root@client1:~#
```

apt list --installed | grep bind9-dnsutils

Lab 2 – Software Installation

```
root@client1:~# apt list --installed | grep bind9-dnsutils
WARNING: apt does not have a stable CLI interface. Use with caution in scripts.
root@client1:~#
```

Dig does not work anymore

`dig google.com`

```
root@client1:~# dig google.com
-bash: /usr/bin/dig: No such file or directory
root@client1:~# █
```