

TECHNOLOGY



Ubuntu Fundamentals

Package Management



Learning Objectives

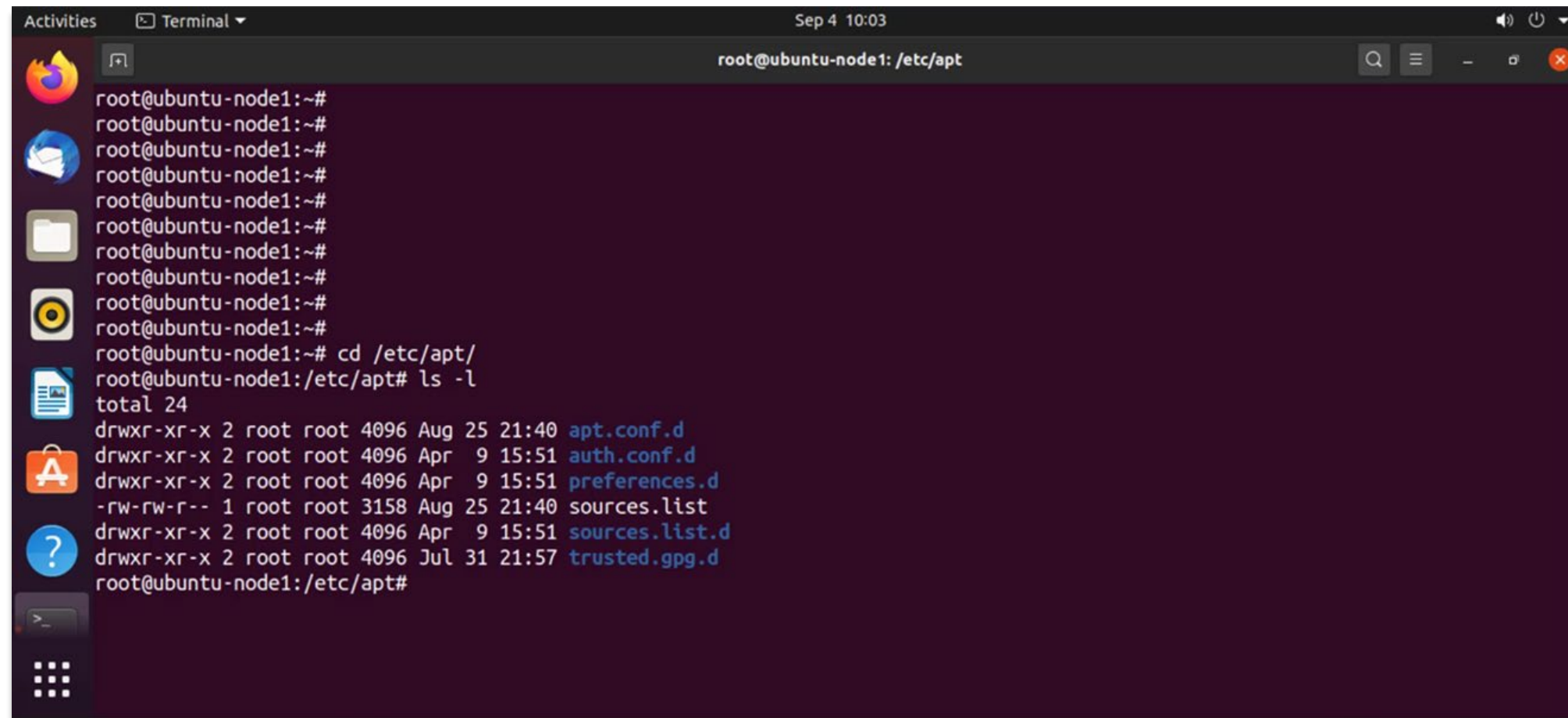
By the end of this lesson, you will be able to:

- 👁 Access the repository
- 👁 Apply the apt/apt-get command
- 👁 Install PPA



Repository

A repository can be defined as a central storage area for all software packages.



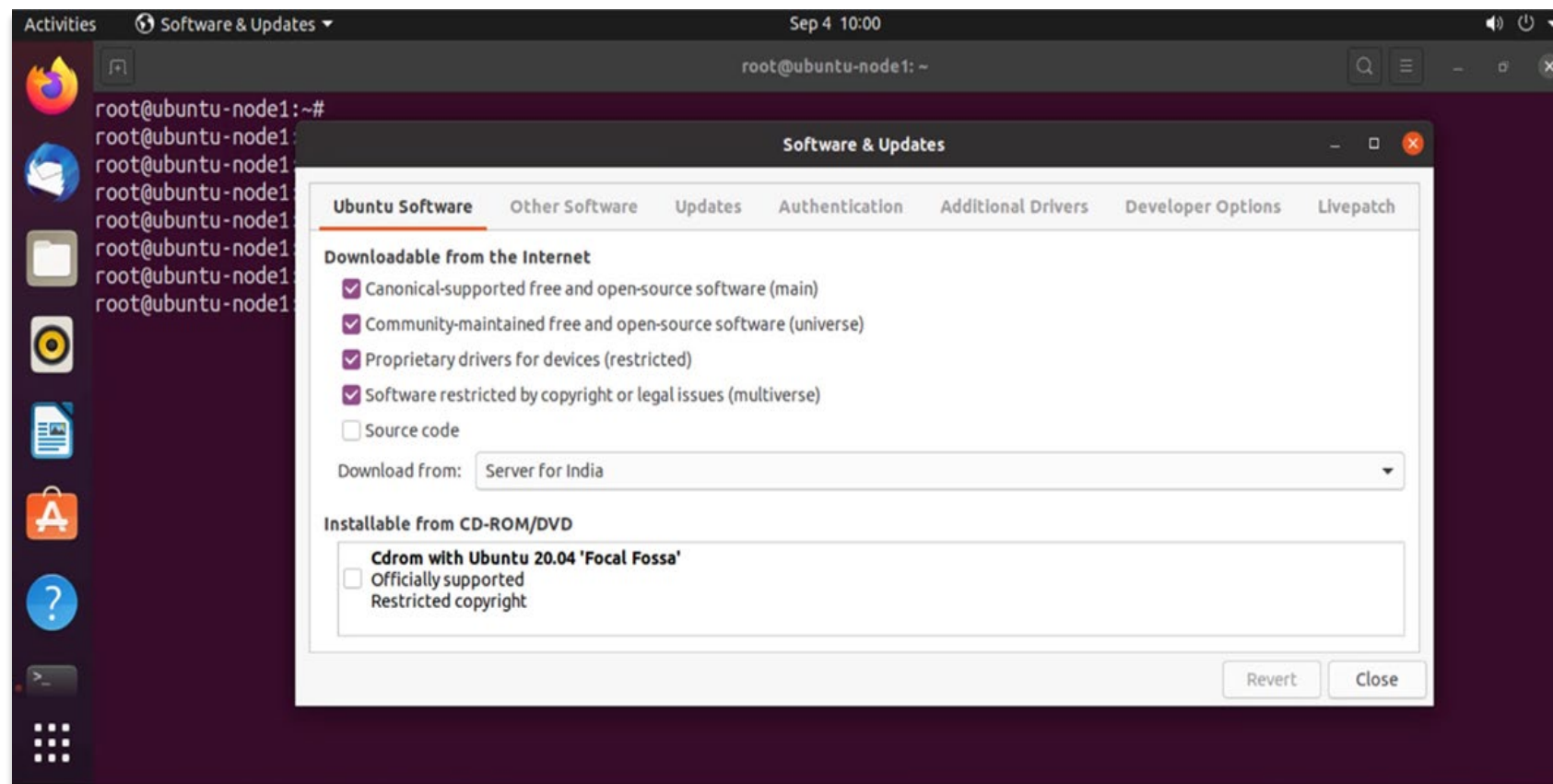
A terminal window titled 'Terminal' with a dark purple background. The window shows the command prompt 'root@ubuntu-node1:~#' and the user navigating to the '/etc/apt' directory. The command 'ls -l' is executed, displaying a list of files with their permissions, owner, group, size, date, and filename. The files listed are 'apt.conf.d', 'auth.conf.d', 'preferences.d', 'sources.list', 'sources.list.d', and 'trusted.gpg.d'. The window also shows a sidebar with various application icons and a top bar with system information like 'Sep 4 10:03'.

```
root@ubuntu-node1:~#  
root@ubuntu-node1:~#  
root@ubuntu-node1:~#  
root@ubuntu-node1:~#  
root@ubuntu-node1:~#  
root@ubuntu-node1:~#  
root@ubuntu-node1:~#  
root@ubuntu-node1:~#  
root@ubuntu-node1:~#  
root@ubuntu-node1:~# cd /etc/apt/  
root@ubuntu-node1:/etc/apt# ls -l  
total 24  
drwxr-xr-x 2 root root 4096 Aug 25 21:40 apt.conf.d  
drwxr-xr-x 2 root root 4096 Apr 9 15:51 auth.conf.d  
drwxr-xr-x 2 root root 4096 Apr 9 15:51 preferences.d  
-rw-rw-r-- 1 root root 3158 Aug 25 21:40 sources.list  
drwxr-xr-x 2 root root 4096 Apr 9 15:51 sources.list.d  
drwxr-xr-x 2 root root 4096 Jul 31 21:57 trusted.gpg.d  
root@ubuntu-node1:/etc/apt#
```

The repository list can be found in the `/etc/apt/sources.list` directory of Ubuntu OS.

Types of Repositories

The four types of repositories to download software from are:



- Main
- Restricted
- Universe
- Multiverse

Types of Repositories

Main

This is the default repository and all the packages in this are free.

Restricted

This is a closed-source software supported by Canonical for a price till the end of the life cycle of the release.

Universe

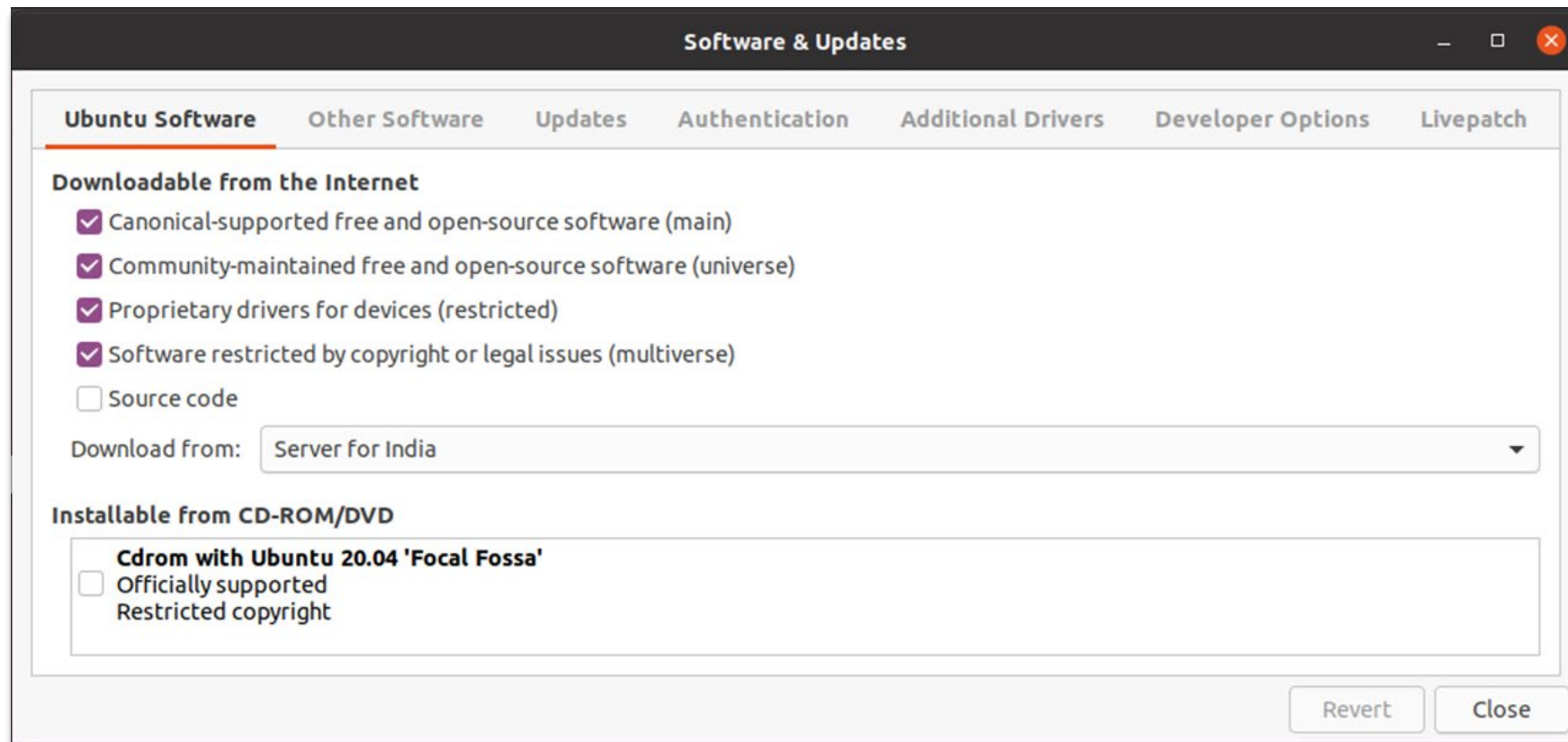
This is a community-supported open-source software. Canonical will not support this in terms of providing updates for this release software.

Multiverse

This includes closed-source software, such as adobe flash. It also includes open-source software with some restrictions.

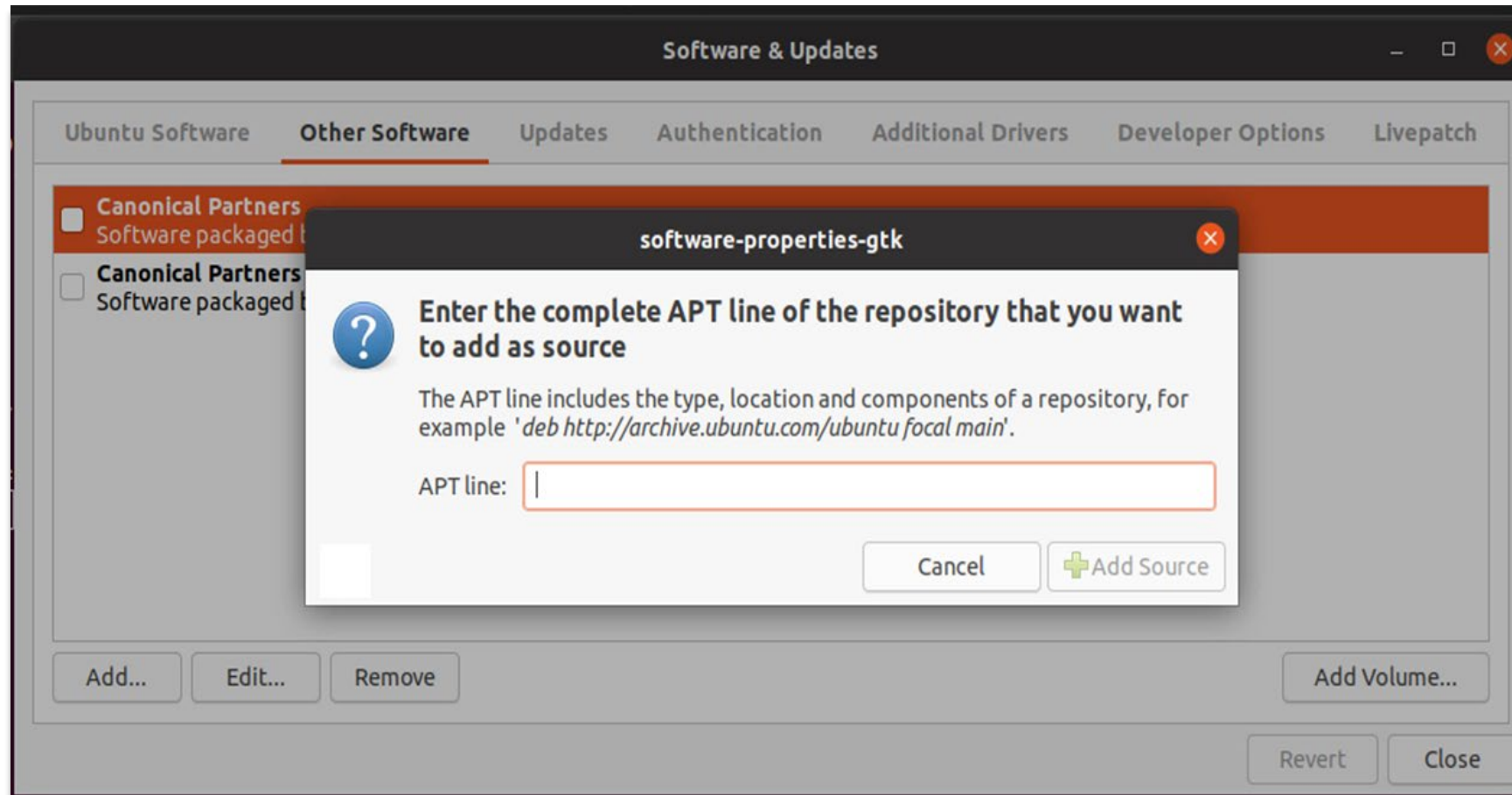
Repository Access

To access a repository, the system should be connected to the internet.



- Select the required repository from the Ubuntu software center console along with the source location.

Repository Access



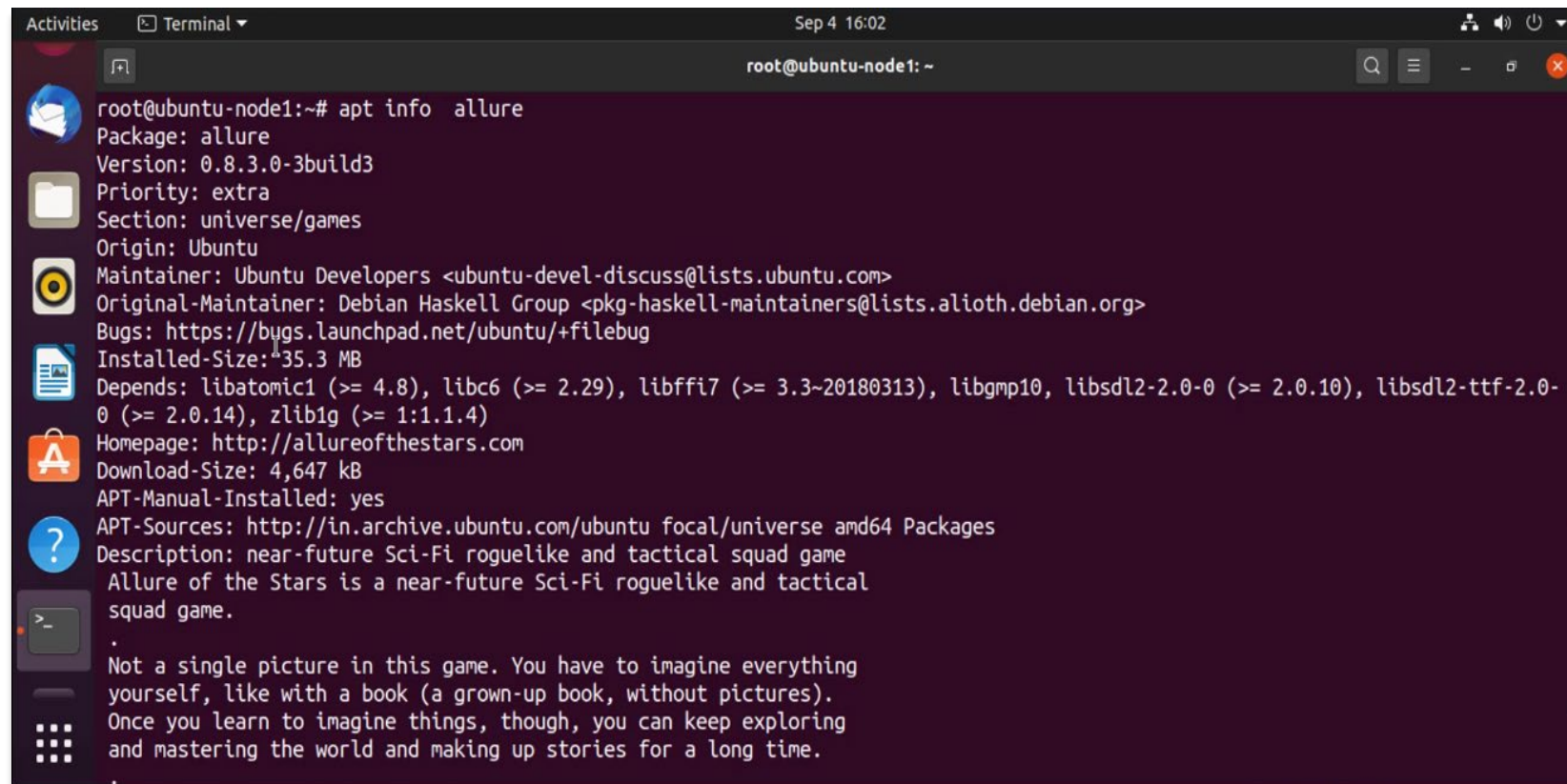
- In the next tab, add repository URL into the file `/etc/apt/sources.list`.
- To check for updates and new releases, use the command `$ sudo apt-get update`.

Software with .deb Extension

- In case the software packages are released in a .deb file format, there is no need to use the repository commands such as **apt** or **apt-get**.
- Use the command **\$ sudo dpkg -i <package name>** to directly install the software, and if there are any dependency failures, use the command **\$ sudo apt-get install -f**.



Introduction to apt/apt-get Command

A terminal window titled 'Terminal' with a dark background and light text. The prompt is 'root@ubuntu-node1:~#'. The command 'apt info allure' has been executed, resulting in a detailed output for the 'allure' package. The output includes package name, version (0.8.3.0-3build3), priority (extra), section (universe/games), origin (Ubuntu), maintainer (Ubuntu Developers), original maintainer (Debian Haskell Group), bugs link, installed size (35.3 MB), dependencies, homepage, download size, and a description of the game 'Allure of the Stars'.

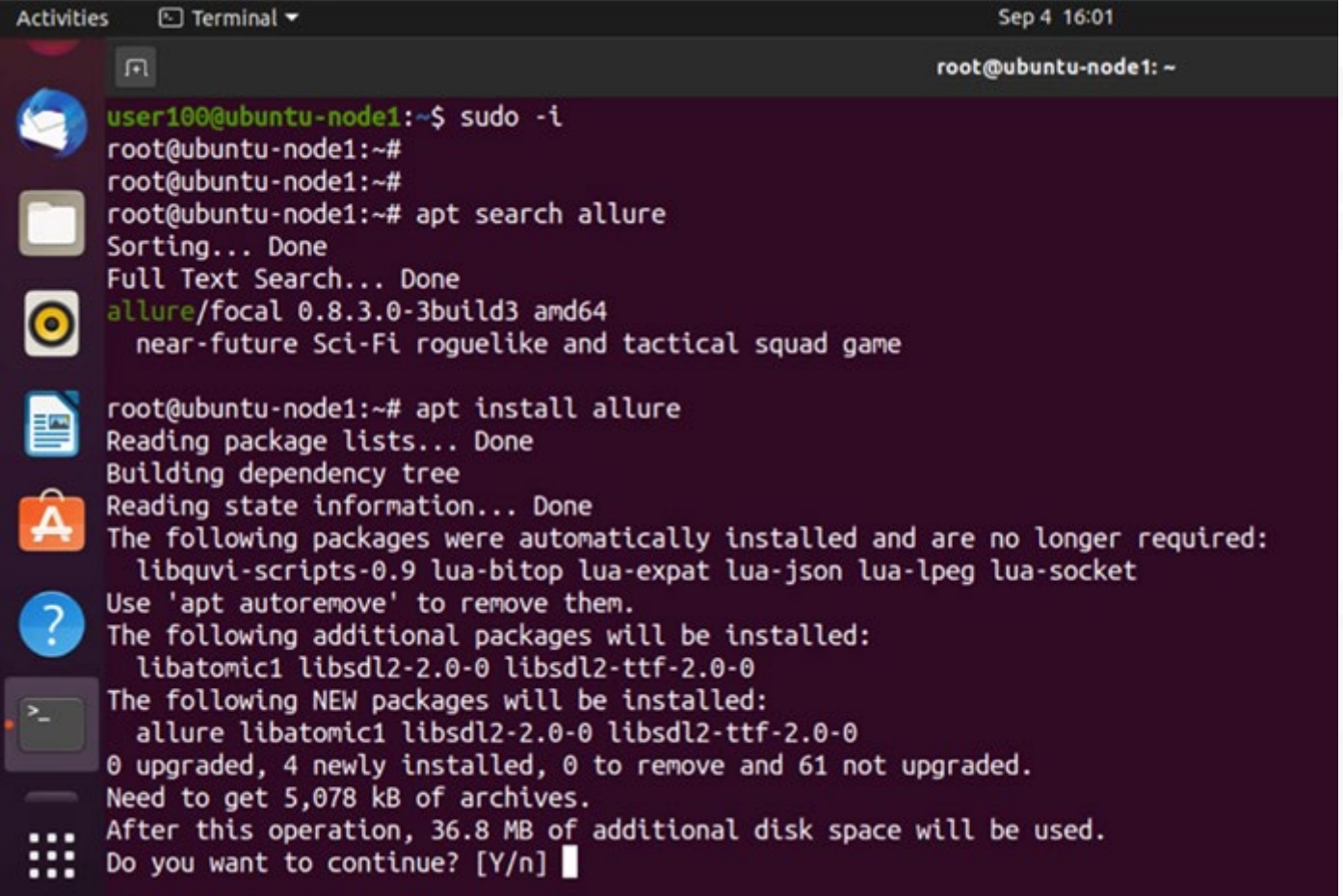
```
root@ubuntu-node1:~# apt info allure
Package: allure
Version: 0.8.3.0-3build3
Priority: extra
Section: universe/games
Origin: Ubuntu
Maintainer: Ubuntu Developers <ubuntu-devel-discuss@lists.ubuntu.com>
Original-Maintainer: Debian Haskell Group <pkg-haskell-maintainers@lists.alioth.debian.org>
Bugs: https://bugs.launchpad.net/ubuntu/+filebug
Installed-Size: 35.3 MB
Depends: libatomic1 (>= 4.8), libc6 (>= 2.29), libffi7 (>= 3.3~20180313), libgmp10, libsdl2-2.0-0 (>= 2.0.10), libsdl2-ttf-2.0-0 (>= 2.0.14), zlib1g (>= 1:1.1.4)
Homepage: http://allureofthestars.com
Download-Size: 4,647 kB
APT-Manual-Installed: yes
APT-Sources: http://in.archive.ubuntu.com/ubuntu focal/universe amd64 Packages
Description: near-future Sci-Fi roguelike and tactical squad game
 Allure of the Stars is a near-future Sci-Fi roguelike and tactical
 squad game.
.
Not a single picture in this game. You have to imagine everything
yourself, like with a book (a grown-up book, without pictures).
Once you learn to imagine things, though, you can keep exploring
and mastering the world and making up stories for a long time.
.
```

- The **apt** command is a CLI command used to download, install, and remove the software packages.
- The earlier version of **apt** command was called **apt-get** command.
- All new releases of Ubuntu have the **apt** command.

Introduction to apt/apt-get Command

Some of the frequently used apt commands are to:

- Install packages with the syntax:
\$ sudo apt install <app-package1> <app-package2>
- Uninstall packages with the syntax:
\$ sudo apt <app-package1>
- Remove orphaned application packages automatically.
 - While installing the packages, apt resolves the dependencies automatically.
 - Similarly, while uninstalling, it removes the critical dependencies of the application automatically. It is done by the command **\$ sudo apt autoremove**.
- Search packages with the syntax:
\$ sudo apt search <keyword>.



```
Activities Terminal Sep 4 16:01
root@ubuntu-node1: ~
user100@ubuntu-node1:~$ sudo -i
root@ubuntu-node1:~#
root@ubuntu-node1:~# apt search allure
Sorting... Done
Full Text Search... Done
allure/focal 0.8.3.0-3build3 amd64
  near-future Sci-Fi roguelike and tactical squad game

root@ubuntu-node1:~# apt install allure
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following packages were automatically installed and are no longer required:
  libquvi-scripts-0.9 lua-bitop lua-expat lua-json lua-lpeg lua-socket
Use 'apt autoremove' to remove them.
The following additional packages will be installed:
  libatomic1 libsdl2-2.0-0 libsdl2-ttf-2.0-0
The following NEW packages will be installed:
  allure libatomic1 libsdl2-2.0-0 libsdl2-ttf-2.0-0
0 upgraded, 4 newly installed, 0 to remove and 61 not upgraded.
Need to get 5,078 kB of archives.
After this operation, 36.8 MB of additional disk space will be used.
Do you want to continue? [Y/n]
```


Update vs. Upgrade

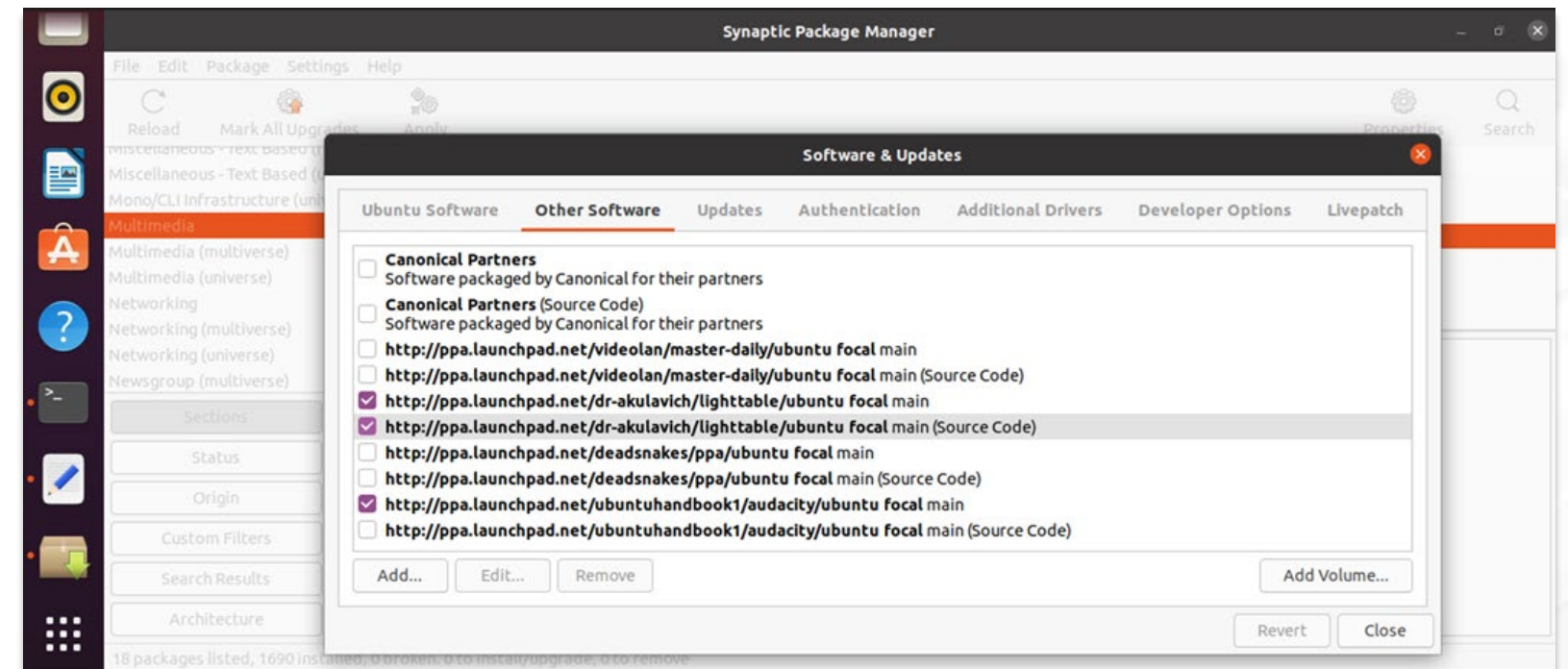
Update will check the availability of new versions of a given package, whereas upgrade will update the packages to a new version.

```
root@ubuntu-node1: ~  
I: (UUID=cc352017-c3e1-4d91-848c-03b6a580be39)  
I: Set the RESUME variable to override this.  
/etc/kernel/postinst.d/zz-update-grub:  
Sourcing file `/etc/default/grub'  
Sourcing file `/etc/default/grub.d/init-select.cfg'  
Generating grub configuration file ...  
Found linux image: /boot/vmlinuz-5.4.0-45-generic  
Found initrd image: /boot/initrd.img-5.4.0-45-generic  
Found linux image: /boot/vmlinuz-5.4.0-42-generic  
Found initrd image: /boot/initrd.img-5.4.0-42-generic  
Found memtest86+ image: /memtest86+.elf  
Found memtest86+ image: /memtest86+.bin  
done  
Processing triggers for libc-bin (2.31-0ubuntu9) ...  
root@ubuntu-node1:~# apt update  
Hit:1 http://in.archive.ubuntu.com/ubuntu focal InRelease  
Hit:2 http://in.archive.ubuntu.com/ubuntu focal-updates InRelease  
Hit:3 http://in.archive.ubuntu.com/ubuntu focal-backports InRelease  
Hit:4 http://security.ubuntu.com/ubuntu focal-security InRelease  
Reading package lists... Done  
Building dependency tree  
Reading state information... Done  
All packages are up to date.  
root@ubuntu-node1:~#
```

```
root@ubuntu-node1:~#  
root@ubuntu-node1:~#  
root@ubuntu-node1:~# apt upgrade  
Reading package lists... Done  
Building dependency tree  
Reading state information... Done  
Calculating upgrade... Done  
The following package was automatically installed and is no longer required:  
  libfprint-2-tod1  
Use 'apt autoremove' to remove it.
```

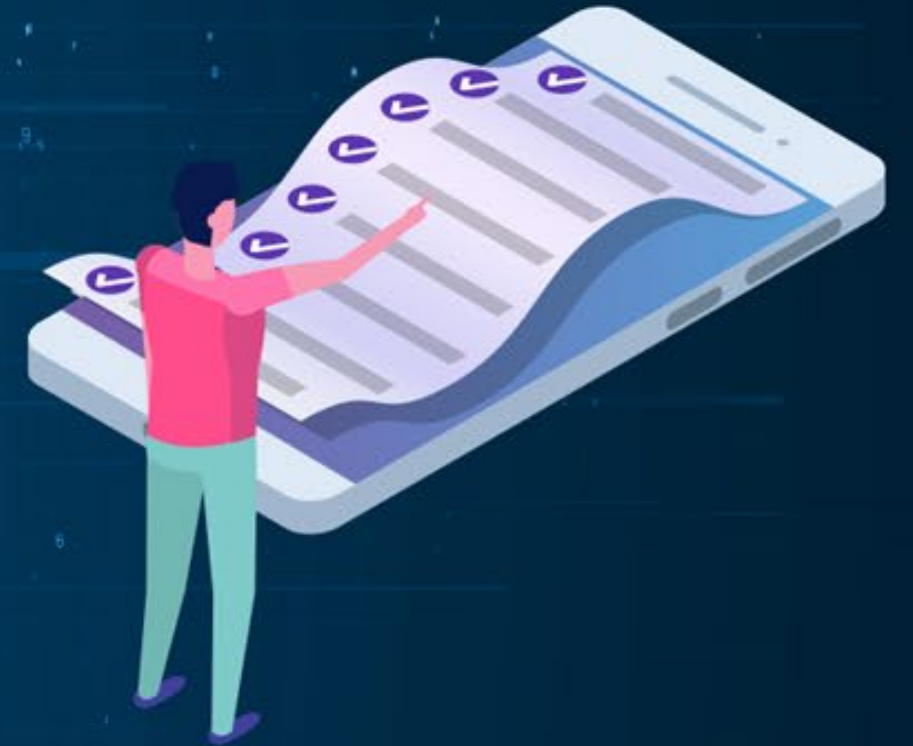

Introduction to PPA

- Personal Package Archives (PPA) are software packages that are released by the developer without any testing for publishing in the repository.
- These are published separately and can be installed from the software center.



Key Takeaways

- Repository can be defined as a central storage area for all software packages.
- \$ sudo apt-get update command is used to check for updates to the software on the system.
- The apt command is a command-line interface command used to download, install, and remove the software packages.
- PPA or Personal Package Archives are software packages released by the developer without testing.





Knowledge Check

Knowledge Check

1

Which among the following is used to describe the storage space of software packages?

- A. Media
- B. Repository
- C. Cloud
- D. None of above



Knowledge
Check

1

Which among the following is used to describe the storage space of software packages?

- A. Media
- B. Repository
- C. Cloud
- D. None of above



The correct answers is **B**

Repository is a storage space used to store software packages.

Knowledge
Check

2

Which directory contains the URL for a repository?

- A. /etc
- B. /home
- C. /etc/apt/source.list
- D. /proc



Knowledge
Check

2

Which directory contains the URL for a repository?

- A. /etc
- B. /home
- C. /etc/apt/source.list
- D. /proc



The correct answer is **C**

The file or directory `/etc/apt/source.list` contains the list of repositories available for download.

Knowledge
Check

3

Which command is used to install software packages in Ubuntu?

- A. rpm
- B. install
- C. apt
- D. download



Knowledge
Check

3

Which command is used to install software packages in Ubuntu?

- A. rpm
- B. install
- C. apt
- D. download



The correct answer is **C**

The apt command is used to install software packages in Ubuntu.

What does PPA represent?

- A. Packages released but not published in repositories
- B. Non-Ubuntu packages
- C. tar files
- D. CLI commands



What does PPA represent?

- A. Packages released but not published in repositories
- B. Non-Ubuntu packages
- C. tar files
- D. CLI commands



The correct answer is **A**

PPA represent the packages that are released by the developer without any testing for publishing.