1. Introduction

Ubuntu is based on Debian and all software packages are .deb files. Most software packages are free available from Ubuntu Repositories. Adding and removing software and a System Update are critical procedures, as for every system.

Debian packages (and Ubuntu of course) can be managed from command line using the package manager **apt**. Moreover, **dpkg** command (Debian package) is the low level package manager for Debian files (.deb), which unlike other Linux package management systems, cannot automatically download and install packages with their dependencies.

Ubuntu Desktop releases offer GUI (Graphical User Interface) utilities to handle Package Management and System Update:

Repository management:

- **Software & Updates**

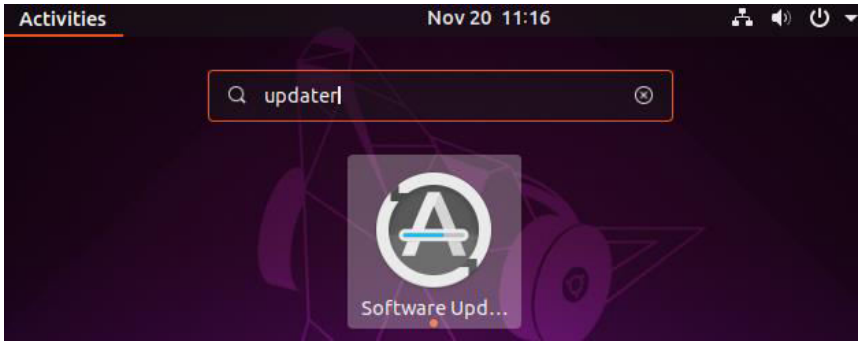
Add and remove software:

- **Ubuntu Software Center**
- **Synaptic Package Manager**

Software and System Update:

- **Software Updater**
- Updates are also available from **Ubuntu Software Center**

You can find these applications using the Ubuntu “activities” menu and searching the corresponding tool.



Please note that Synaptic is not included in default installation. To install it, use **Ubuntu Software Center** or open a terminal and use:

```
sudo apt-get install synaptic
```

2. Repository management

One of the biggest differences between Linux and Microsoft Windows is that most Linux software is free available from Software Repositories. Every Linux distribution releases its software from Repositories and offers a “package manager”.

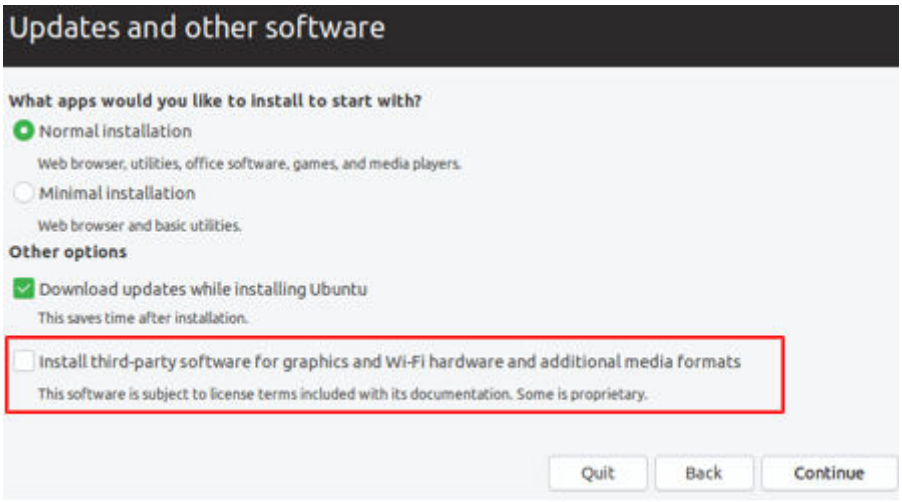
Ubuntu official Repositories are:

- Main
- Restricted
- Universe
- Multiverse

Main and Restricted are fully supported by Canonical (the company behind Ubuntu), while Universe and Multiverse are supported by the community.

In latest Ubuntu Desktop releases all four repositories enabled by default. If you want Ubuntu to setup software other than open source officially supported, then check "Install third-party software for graphics and Wi-Fi hardware, Flash, MP3 and other

media" during installation procedure. However, you can do it later, but it is recommended to be done during installation.



Except these repositories, there are many more, named PPA (Personal Package Archives) for third party programs. These repositories are hosted in **Launchpad** website. Obviously, these repositories are not supported from Canonical.

3. Adding repositories

3.1. Official repositories

Using the command line

Official Repositories are defined in `/etc/apt/sources.list`

A repository line seems like:

```
deb http://us.archive.ubuntu.com/ubuntu/ disco main restricted
# deb-src http://us.archive.ubuntu.com/ubuntu/ disco main restricted
```

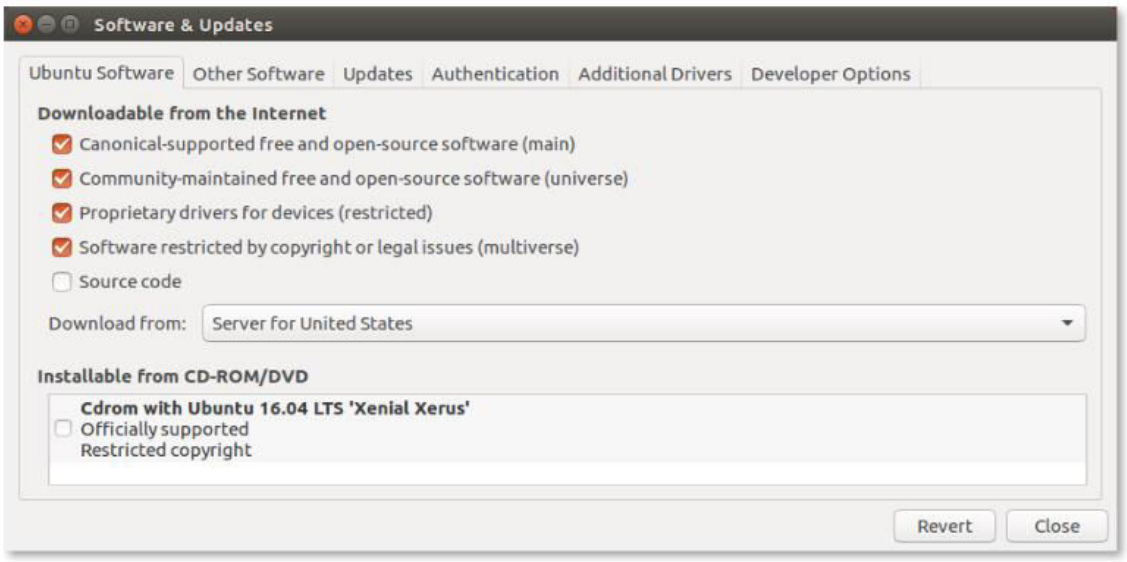
The name **disco** refers to the Ubuntu distribution (19.04 in this case), whereas main and restricted are the folders in the repositories which have all the components we want to install.

To enable a repository: uncomment its definition line (removing the # at the beginning of the line) and then refresh system software sources using:

```
sudo apt update
```

Using "Software & Updates"

Go to first TAB "Ubuntu Software", check the repository you want to enable and follow the instructions.



3.2. Other repositories (including PPA)

Using the command line

Suppose we want to add the following repository:
`deb http://download.virtualbox.org/virtualbox/debian disco contrib`

We can add a new line in `/etc/apt/sources.list`

Another option is to create a new file **.list** into the folder `/etc/apt/sources.list.d`

For example, `sudo nano /etc/apt/sources.list.d/virtualbox.list`

Regardless of the file, we have to add the corresponding line:
`deb http://download.virtualbox.org/virtualbox/debian disco contrib`

Anyway, the most efficient option is to use the command **`add-apt-repository`**

```
add-apt-repository 'deb http://download.virtualbox.org/virtualbox/debian disco
contrib'
```

Finally, update repositories in your system (software sources)

```
sudo apt update
```

We are likely to get an error related to the KEY. How to solve this issue will be explained later.

On the other hand, there is a special type of repositories mentioned before which are called PPA. In this case, it is possible to use a shortened URL like below:

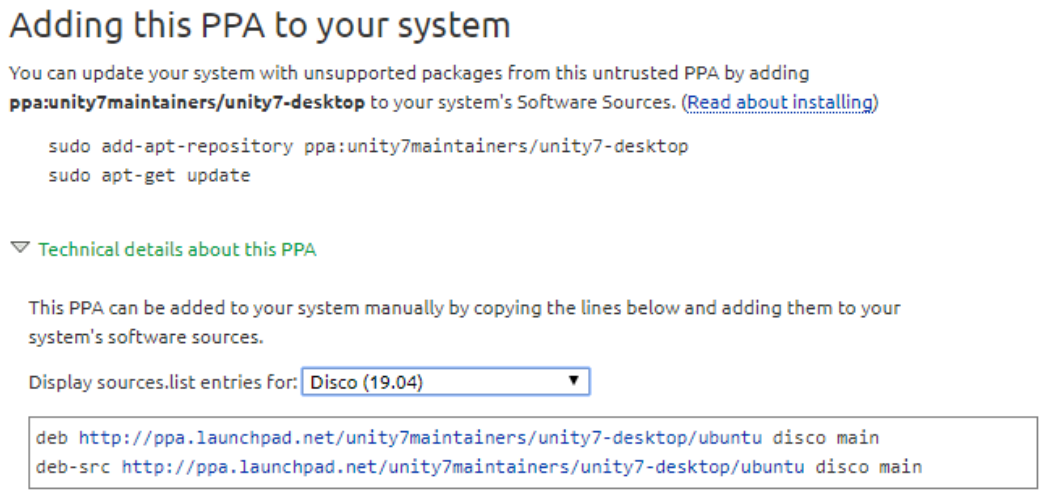
```
sudo add-apt-repository ppa:shnatsel/gimp-paint-studio
sudo apt update
```

When using this type of URL, the KEY is automatically added.

You can find all the launchpad repositories in the following website

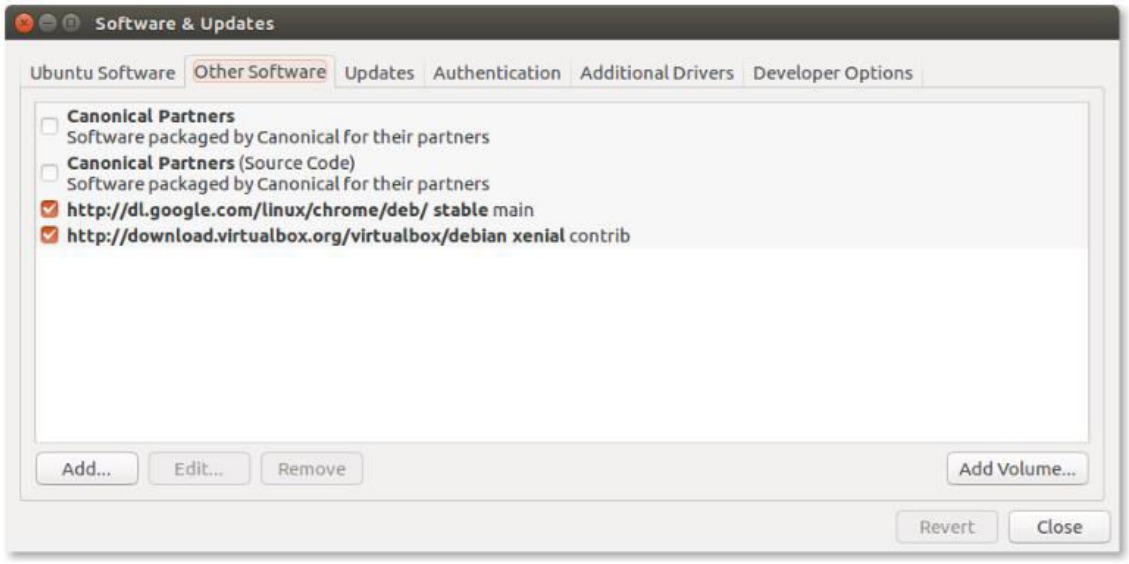
https://launchpad.net/ubuntu/+ppas

For each we can find useful information and the URLs to add the repository.



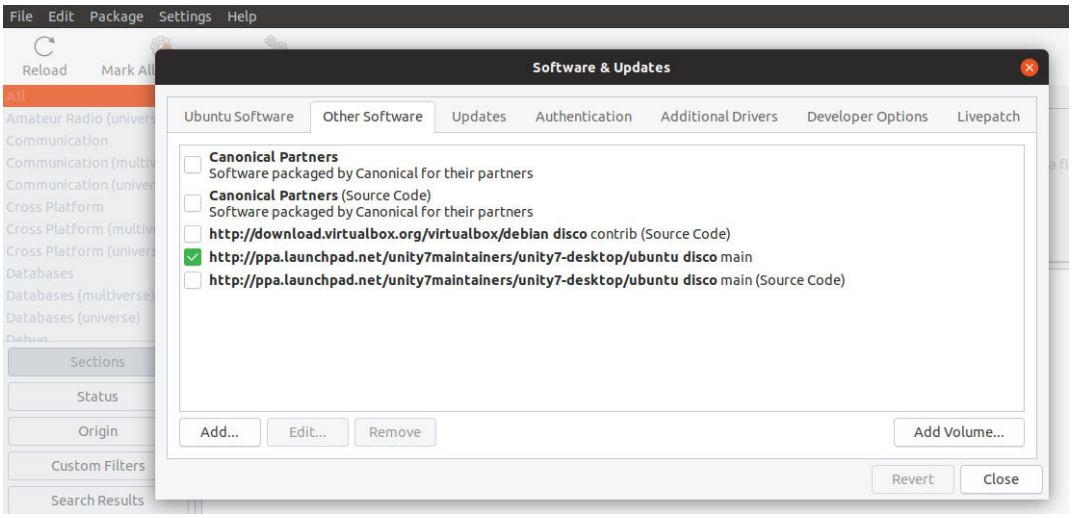
Using "Software & Updates"

Go to TAB "Other Software" press "ADD" and type a similar URL like when using "add-apt-repository".



You can both use a **PPA** URL or the **deb URL distribution components**.

We can also access this tool from the Synaptic menu: Settings -> Repositories.



4. Removing repositories

4.1. From the command line

To disable a repository, comment its definition in `/etc/apt/sources.list` or delete the relevant .list file in `/etc/apt/sources.list.d` and then refresh system software sources using:

```
sudo apt update
```

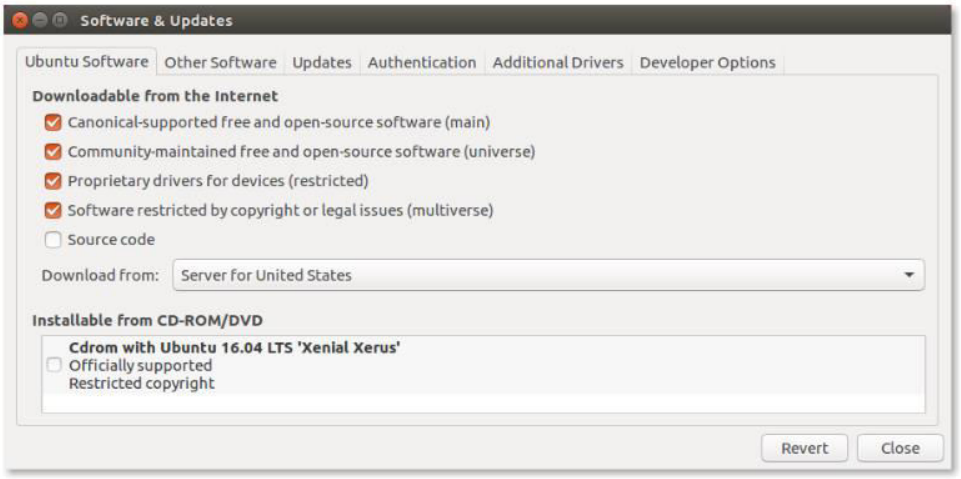
Another option is to use `add-apt-repository`

It is mainly used for PPA repositories

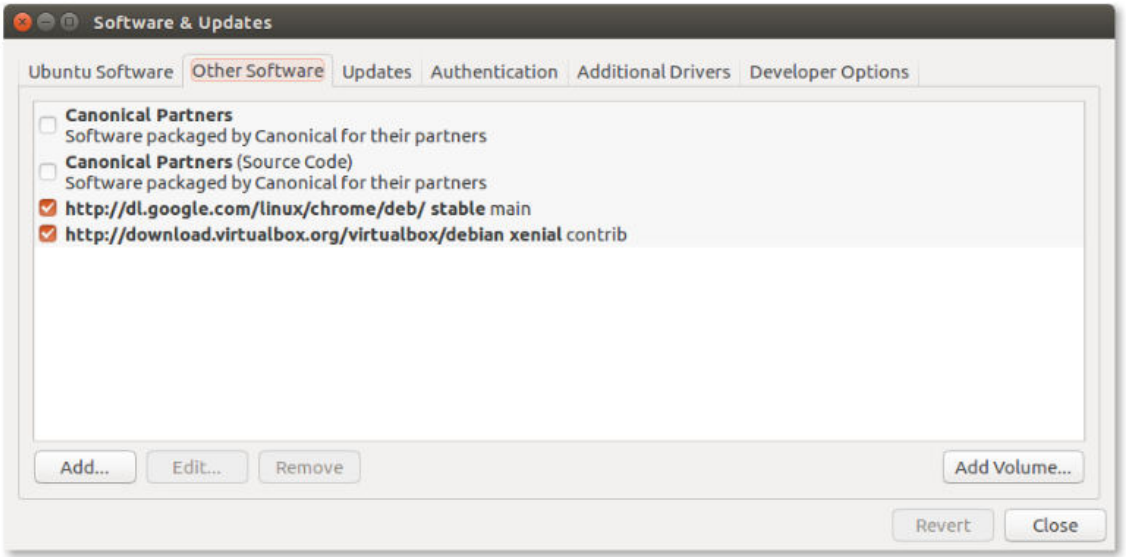
```
sudo add-apt-repository --remove ppa:whatever/ppa
```

4.2. From the graphical interface

Using **Software & Updates.** Uncheck Repository and follow the instructions on first TAB “Ubuntu Software”



Or in the tab “Other software”.



5. Managing keys

We can manage the keys from both the command line and graphical interface.

5.1. Adding keys

The easiest option is to use the add-apt-key command. It is not included by default, but Ubuntu will show a message explaining how to install it.

```
Command 'add-apt-key' not found, but can be installed with:

apt install add-apt-key
```

First of all, it is possible to list all the keys of the system using:

```
apt-key list
```

```
/etc/apt/trusted.gpg.d/ubuntu-keyring-2012-archive.gpg
----------------------------------------------------
pub   rsa4096 2012-05-11 [SC]
      790B C727 7767 219C 42C8  6F93 3B4F E6AC C0B2 1F32
uid           [ unknown] Ubuntu Archive Automatic Signing Key (2012) <ftpmaster@ubuntu.com>

/etc/apt/trusted.gpg.d/ubuntu-keyring-2012-cdimage.gpg
----------------------------------------------------
pub   rsa4096 2012-05-11 [SC]
      8439 38DF 228D 22F7 B374  2BC0 D94A A3F0 EFE2 1092
uid           [ unknown] Ubuntu CD Image Automatic Signing Key (2012) <cdimage@ubuntu.com>

/etc/apt/trusted.gpg.d/ubuntu-keyring-2018-archive.gpg
----------------------------------------------------
pub   rsa4096 2018-09-17 [SC]
      F6EC B376 2474 EDA9 D21B  7022 8719 20D1 991B C93C
uid           [ unknown] Ubuntu Archive Automatic Signing Key (2018) <ftpmaster@ubuntu.com>

/etc/apt/trusted.gpg.d/unity7maintainers_ubuntu_unity7-desktop.gpg
-----------------------------------------------------------------
pub   rsa4096 2017-11-16 [SC]
      BF14 C2B0 D6BF 125A 95DD  1BC9 D4A9 6E2C 1846 71DE
uid           [ unknown] Launchpad PPA for Unity7 Maintainers Team
```

Then, we need to configure the server, which will be used to download keys in the `/etc/default/add-apt-key` file

Below you will find some servers that normally work. You can only use one of them at the same time and it is necessary to comment the others typing **#**

```
# This is a configuration file for /usr/sbin/add-apt-key

# Select the default keyserver to retrieve GPG keys
KEYSERVER=pgp.mit.edu
# KEYSERVER=pgp.rediris.es
# KEYSERVER=subkeys.pgp.net
```

Finally, in order to add a new key, we have two options.

Key code

If we add a new repository and a key is necessary, we will normally get the following error:

```
W: GPG error: http://download.virtualbox.org/virtualbox/debian disco
 InRelease: The following signatures couldn't be verified because th
e public key is not available: NO_PUBKEY A2F683C52980AECF
```

You can see above a hexadecimal code. You need to take the last 8 digits as a parameter for the add-apt-key command.
`add-apt-key 2980AECF`

After running this command, you will be able to check that you have actually added the key with `apt-key list`

```
pub   rsa4096 2016-04-22 [SC]
      B9F8 D658 297A F3EF C18D  5CDF A2F6 83C5 2980 AECF
uid           [ unknown] Oracle Corporation (VirtualBox archive sign
ing key) <info@virtualbox.org>
sub   rsa4096 2016-04-22 [E]
```

Key file

There are certain types of software that allow you to download a file with .key extension.

We can add this files using.

`apt-key add` **`path`**

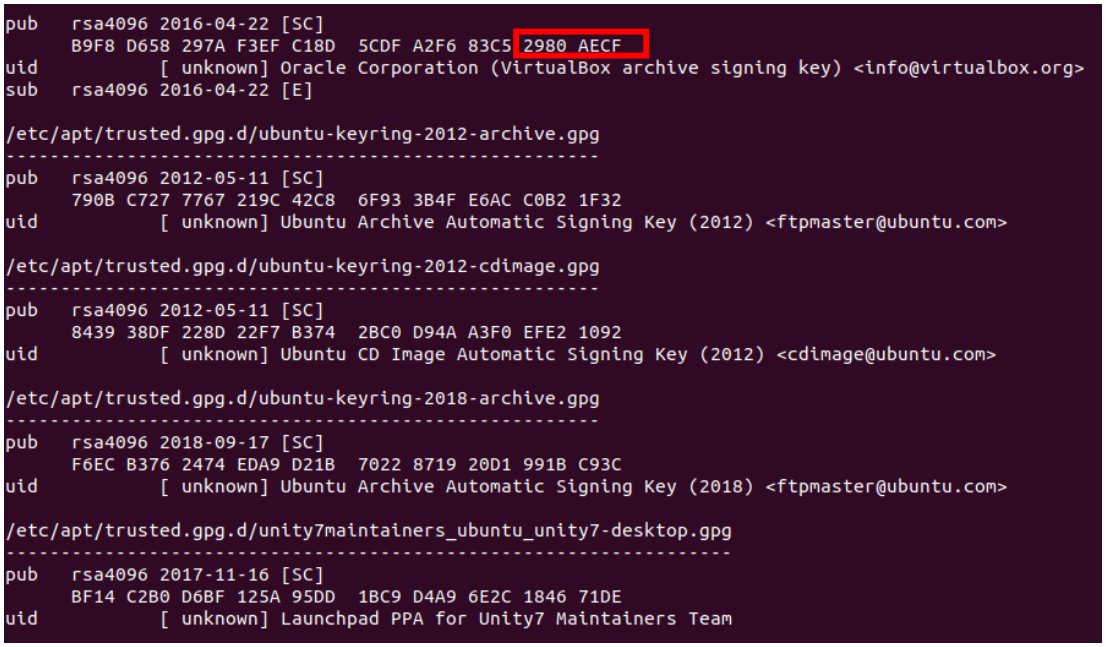
For example:

```
root@student-VirtualBox:/home/student# apt-key add Downloads/archive.key
OK
```

The path above is `Downloads/archive.key` and it is where we saved the key file.

5.2. Deleting keys

It is possible to delete keys using the last 8 digits according to the output of `apt-key list`.



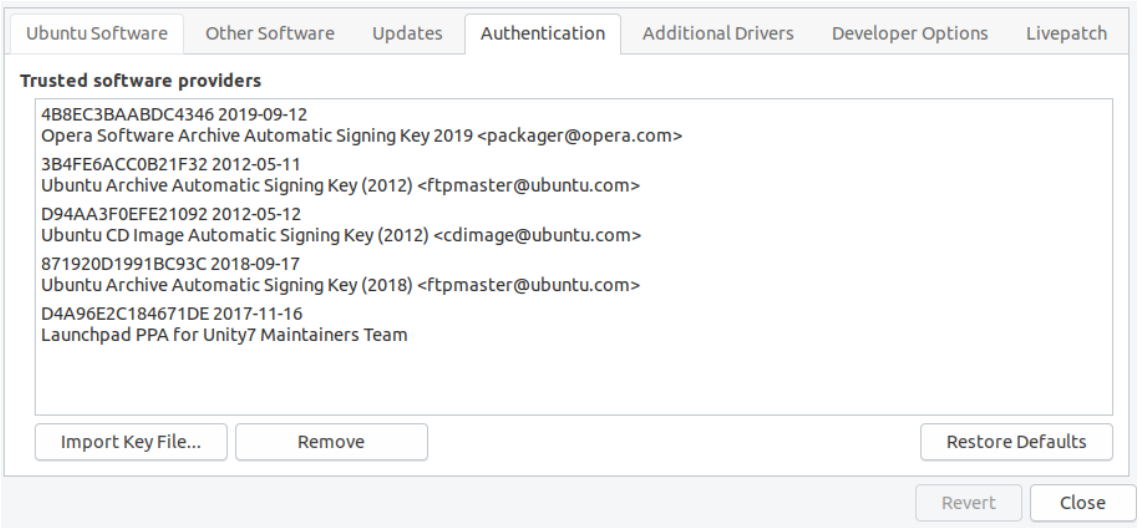
In the picture above, the red square indicates the last 8 digits of a repository. Then, we run

```
apt-key del 2980AECF
```

5.3. Graphical interface

From **Software & Updates**

We can “Import Key” files and “Remove” keys from the graphical interface. Regarding the “Import” option, it is only possible by using .key files.



6. Installing software

It is recommended to install software from Repositories, in order to keep your system secure and updated. In some cases, this is not possible (some Java applications or software with custom installers). In this case, you have to take care for updates and newer versions of these applications.

6.1. Command line using apt

Just use the command

```
sudo apt install package_name
```

For example:

```
sudo apt install synaptic
```

You can find all the packages for a repository in the directory `/var/lib/apt/lists/`

Here, all the files which end with _Packages contain information about the different packages you can install

```
security.ubuntu.com_ubuntu_dists_disco-security_main_i18n_Translation-en
security.ubuntu.com_ubuntu_dists_disco-security_multiverse_binary-amd64_Packages
security.ubuntu.com_ubuntu_dists_disco-security_multiverse_binary-i386_Packages
security.ubuntu.com_ubuntu_dists_disco-security_multiverse_cnf_Commands-amd64
security.ubuntu.com_ubuntu_dists_disco-security_multiverse_i18n_Translation-en
security.ubuntu.com_ubuntu_dists_disco-security_restricted_binary-amd64_Packages
security.ubuntu.com_ubuntu_dists_disco-security_restricted_cnf_Commands-amd64
security.ubuntu.com_ubuntu_dists_disco-security_restricted_i18n_Translation-en
security.ubuntu.com_ubuntu_dists_disco-security_universe_binary-amd64_Packages
security.ubuntu.com_ubuntu_dists_disco-security_universe_binary-i386_Packages
security.ubuntu.com_ubuntu_dists_disco-security_universe_cnf_Commands-amd64
```

6.2. Command line using dpkg

Using dpkg from command line. Just use the command:

```
sudo dpkg -i package_name
```

For example:

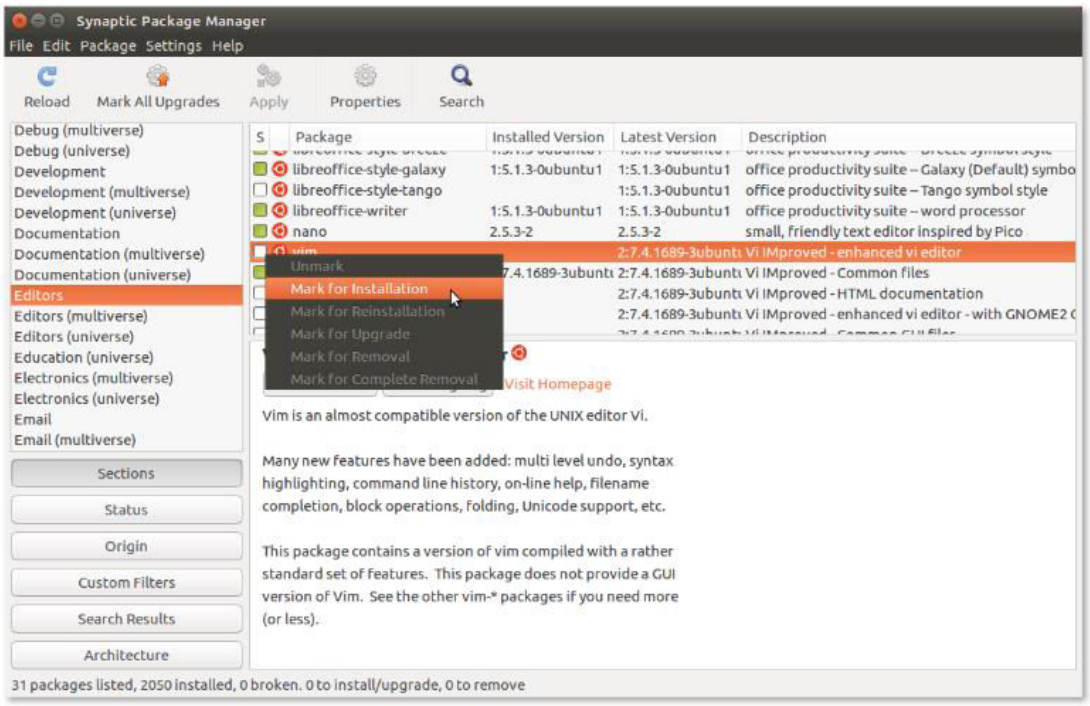
```
sudo dpkg -i chrome.deb
```

In case of dependency problems are reported, after using dpkg, install dependencies using:

```
sudo apt-get install -f
```

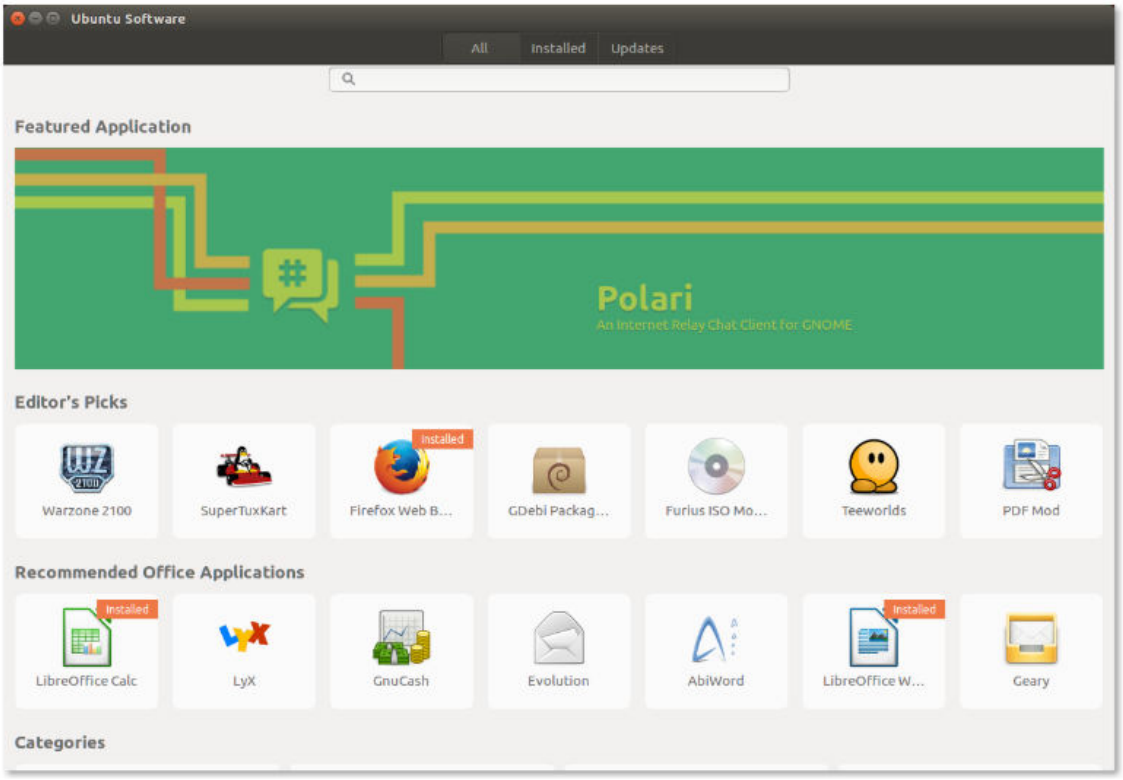
6.3. Graphical interface

Using Synaptic
Search for the package you want to install. Check “Mark for Installation”. Press “Apply”



Using Ubuntu Software

Search for this package. Check “Install”.



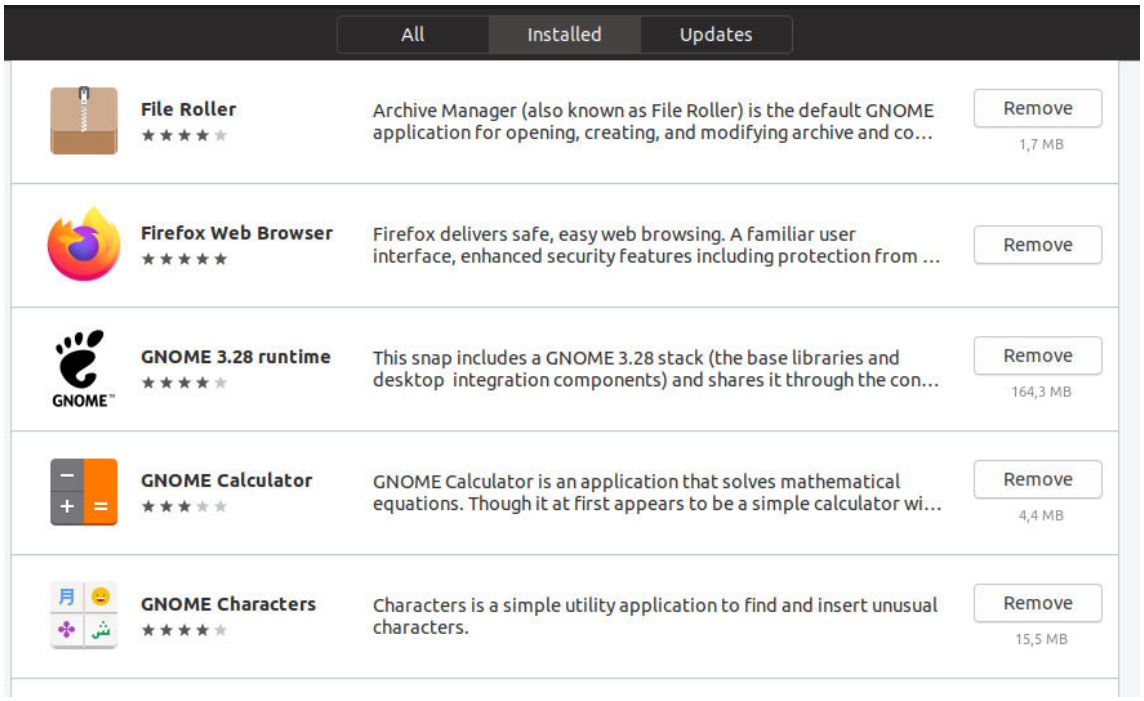
7. List installed packages

You can check the installed packages from the **command line** using `apt list -i | grep chrome`

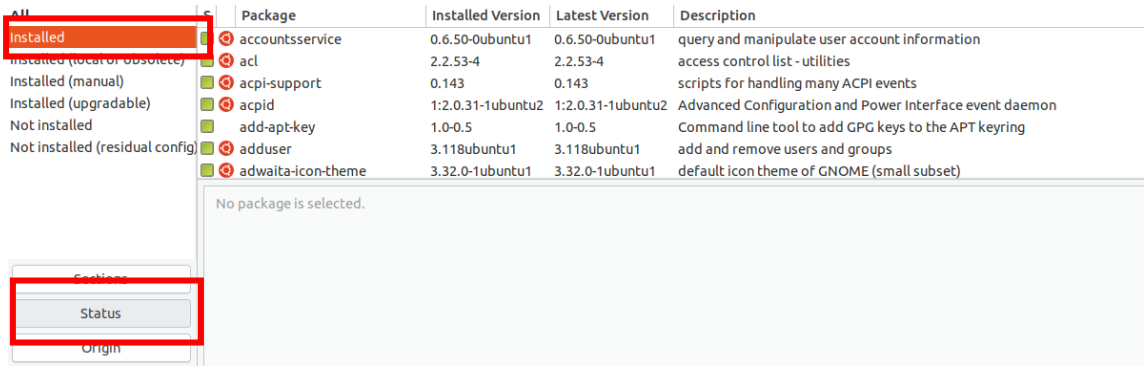
```
gnupg-utils/disco,now 2.2.12-1ubuntu3 amd64 [installed,automatic]
gnupg/disco,disco,now 2.2.12-1ubuntu3 all [installed,automatic]
google-chrome-stable/now 78.0.3904.108-1 amd64 [installed,local]
gpg-agent/disco,now 2.2.12-1ubuntu3 amd64 [installed,automatic]
gpg-wks-client/disco,now 2.2.12-1ubuntu3 amd64 [installed,automatic]
gpg-wks-server/disco,now 2.2.12-1ubuntu3 amd64 [installed,automatic]
gpg/disco,now 2.2.12-1ubuntu3 amd64 [installed,automatic]
gpgconf/disco,now 2.2.12-1ubuntu3 amd64 [installed,automatic]
gpgsm/disco,now 2.2.12-1ubuntu3 amd64 [installed,automatic]
gpgv/disco,now 2.2.12-1ubuntu3 amd64 [installed,automatic]
```

Here you can check if you have locally installed the programs using **dpkg** or automatically through **apt**

From the **Ubuntu Software Center** you can also list the installed programs from the “Installed” tab.



In addition, Synaptic also allows you to filter the “Installed” packages from the menu on the left, clicking the button below called “Status”.



8. Removing software

8.1. Command line using apt

Just use the command:

```
sudo apt-get remove package_name
```

If you want to also remove user data and configuration files:

```
sudo apt-get purge package_name
```

The dependencies are usually automatically removed. If not, you can use `apt-get autoremove`

8.2. Command line using dpkg

Just use the command:

```
sudo dpkg -r package_name
```

To remove a package and its configuration files.

```
sudo dpkg -P package_name
```

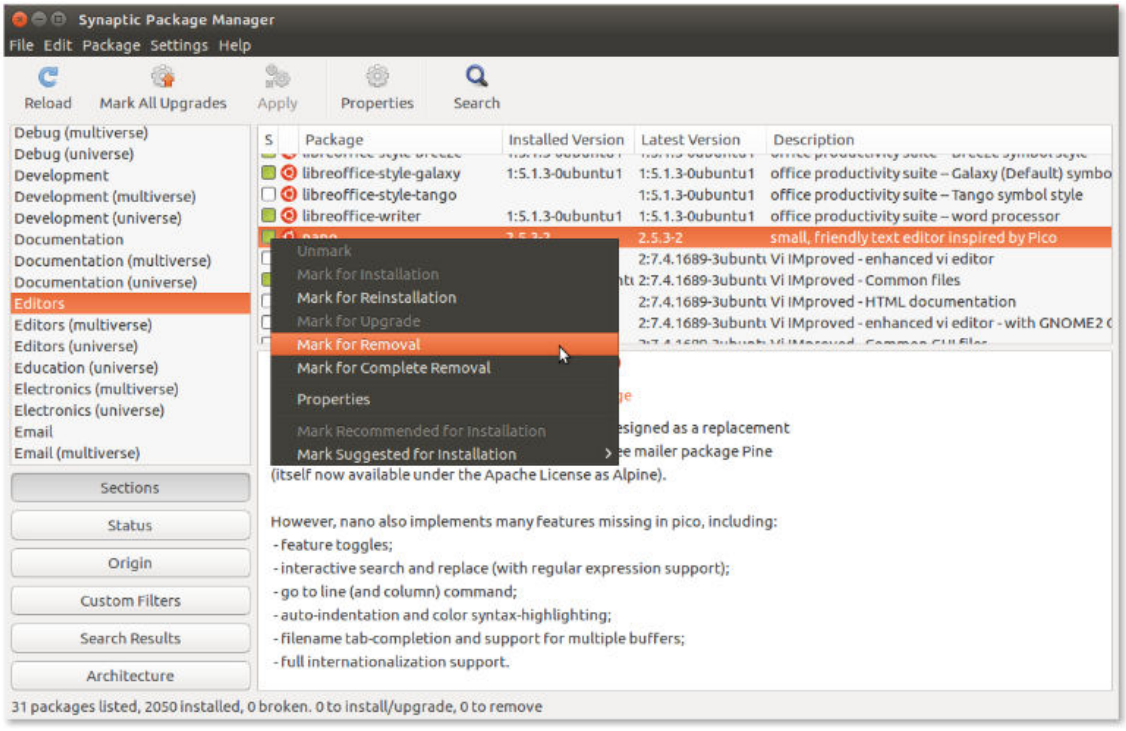
8.3. Graphical interface

Using Synaptic

Search for the corresponding package.

Check “Mark for Removal” (“Mark for Complete Removal” will also remove configuration files).

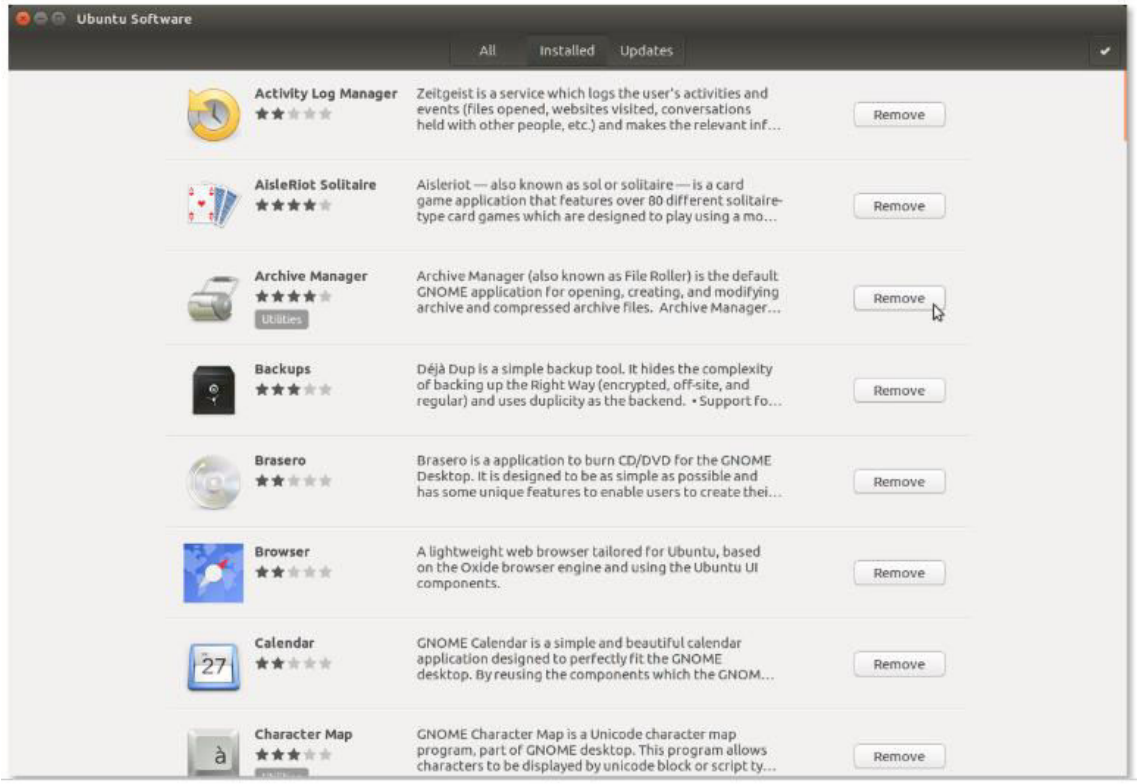
Press “Apply”.



Using Ubuntu Software Center

Find the corresponding package in TAB “Installed”.

Press “Remove”.


Ubuntu Software
All
Installed
Updates
Activity Log Manager
Zeitgeist is a service which logs the user's activities and events (files opened, websites visited, conversations held with other people, etc.) and makes the relevant inf…
Remove
AisleRiot Solitaire
Aisleriot — also known as sol or solitaire — is a card game application that features over 80 different solitaire-type card games which are designed to play using a mo…
Remove
Archive Manager
Archive Manager (also known as File Roller) is the default GNOME application for opening, creating, and modifying archive and compressed archive files. Archive Manager…
Utilities
Remove
Backups
Déjà Dup is a simple backup tool. It hides the complexity of backing up the Right Way (encrypted, off-site, and regular) and uses duplicity as the backend. • Support fo…
Remove
Brasero
Brasero is a application to burn CD/DVD for the GNOME Desktop. It is designed to be as simple as possible and has some unique features to enable users to create thei…
Remove
Browser
A lightweight web browser tailored for Ubuntu, based on the Oxide browser engine and using the Ubuntu UI components.
Remove
Calendar
GNOME Calendar is a simple and beautiful calendar application designed to perfectly fit the GNOME desktop. By reusing the components which the GNOM…
Remove
Character Map
GNOME Character Map is a Unicode character map program, part of GNOME desktop. This program allows characters to be displayed by unicode block or script ty…
Remove