

## Using superuser access for package management and adding users

This is a group activity. Each group should have installed a Linux virtual machine by now. You cannot perform these commands on lab machines or servers. You should use the virtual machine you created in the last week's tutorial.

### Part I

Ubuntu/Xubuntu comes with many pre-installed applications, but if you require more, the Ubuntu/Xubuntu Software Center provides an excellent way to browse the additional applications which are available in the software repositories. But in this tutorial, we'll see how to install software using the CLI.

#### What is a repository?

A **repository (repo)** is a collection of software for a Linux distribution which is available on a server. Users can grab information on the software that is available using the packaging tools (in Ubuntu/Xubuntu it is apt-get and in RHEL/CentOS it is yum) and download the software directly from those servers.

apt-get package management uses **public key cryptography** to authenticate downloaded packages. Public key cryptography is based on pairs of keys, a public key and a private key. The public key is given out to the world; the private key must be kept a secret. Anyone possessing the public key can encrypt a message so that it can only be read by someone possessing the private key. It's also possible to use a private key to sign a file, not encrypt it. If a private key is used to sign a file, then anyone who has the public key can check that the file was signed by that key. You'll learn more about this in your 3<sup>rd</sup> year. (You can read more on the topic from -> [https://en.wikipedia.org/wiki/Public-key\\_cryptography](https://en.wikipedia.org/wiki/Public-key_cryptography))

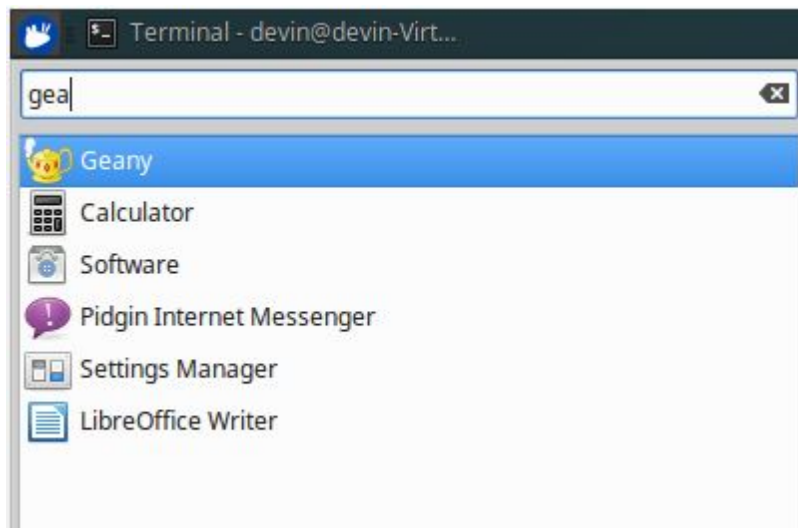
Assume you want to install Geany, which is a lightweight GUI text editor. Since apt-get already know how to download it. You just have to type

```
sudo apt-get install geany
```

It will prompt 'Do you want to continue? [Y/n]' press Y and Enter and Geany will be installed.

```
devin@devin-VirtualBox:~$ sudo apt-get install geany
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  geany-common
The following NEW packages will be installed:
  geany geany-common
0 upgraded, 2 newly installed, 0 to remove and 137 not upgraded.
Need to get 2,772 kB of archives.
After this operation, 10.8 MB of additional disk space will be used.
Do you want to continue? [Y/n]
```

If nothing goes wrong, then you've successfully installed Geany...!!!



Next, let's try to install Google Chrome on your Xubuntu Desktop.

In Google Chrome's case, repos are available on a 3<sup>rd</sup> Party server. To add the public key to your machine you can use the wget tool as follows.

```
wget -q -O - https://dl-ssl.google.com/linux/linux\_signing\_key.pub | sudo apt-key add -
```

If it succeeds, you'll get an 'OK' response.

Then, to set the repositories. You can do the following:

```
echo 'deb [arch=amd64] http://dl.google.com/linux/chrome/deb/ stable main' | sudo tee /etc/apt/sources.list.d/google-chrome.list
```

(remember pipes?) (tee is a command in command-line interpreters using standard streams which reads standard input and writes it to both standard output and one or more files, effectively duplicating its input.)

Then, you can use the following command to retrieve the updated package lists

```
sudo apt-get update
```

Finally, install google-chrome using the following command

```
sudo apt-get install google-chrome-stable
```

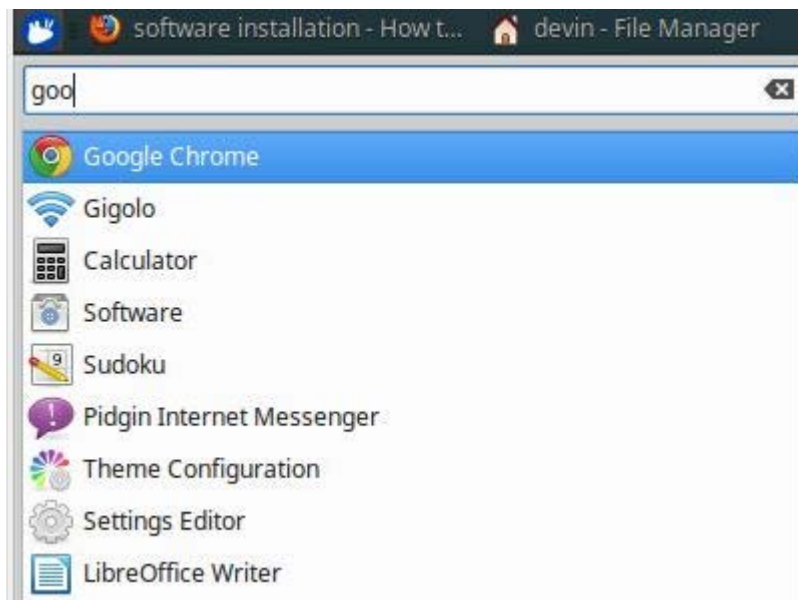
Type 'Y' and press Enter key when it asks Do you want to continue? [Y/n]

After the installation finishes, you can search for Google Chrome in the program list.

```

devin@devin-VirtualBox:~$ wget -q -O - https://dl-ssl.google.com/linux/linux_signing_key.pub | sudo apt-key add -
[sudo] password for devin:
OK
devin@devin-VirtualBox:~$ echo 'deb [arch=amd64] http://dl.google.com/linux/chrome/deb/ stable main' | sudo tee /etc/apt/sources.list.d/google-chrome.list
[sudo] password for devin:
deb [arch=amd64] http://dl.google.com/linux/chrome/deb/ stable main
devin@devin-VirtualBox:~$ sudo apt-get update
Ign:1 http://dl.google.com/linux/chrome/deb stable InRelease
Get:2 http://dl.google.com/linux/chrome/deb stable Release [1,189 B]
Get:3 http://dl.google.com/linux/chrome/deb stable Release.gpg [819 B]
Hit:4 http://lk.archive.ubuntu.com/ubuntu xenial InRelease
Get:5 http://security.ubuntu.com/ubuntu xenial-security InRelease [102 kB]
Get:6 http://dl.google.com/linux/chrome/deb stable/main amd64 Packages [1,385 B]
Get:7 http://lk.archive.ubuntu.com/ubuntu xenial-updates InRelease [102 kB]
Get:8 http://lk.archive.ubuntu.com/ubuntu xenial-backports InRelease [102 kB]
Fetched 310 kB in 1s (194 kB/s)
Reading package lists... Done
devin@devin-VirtualBox:~$ sudo apt-get install google-chrome-stable

```



(For more info: <https://askubuntu.com/questions/510056/how-to-install-google-chrome>)

## Part II

In this part let's try to know more about apt-get. Apt stores a list of repositories or software channels in the file,

```
/etc/apt/sources.list
```

and in any file with the suffix .list under the directory

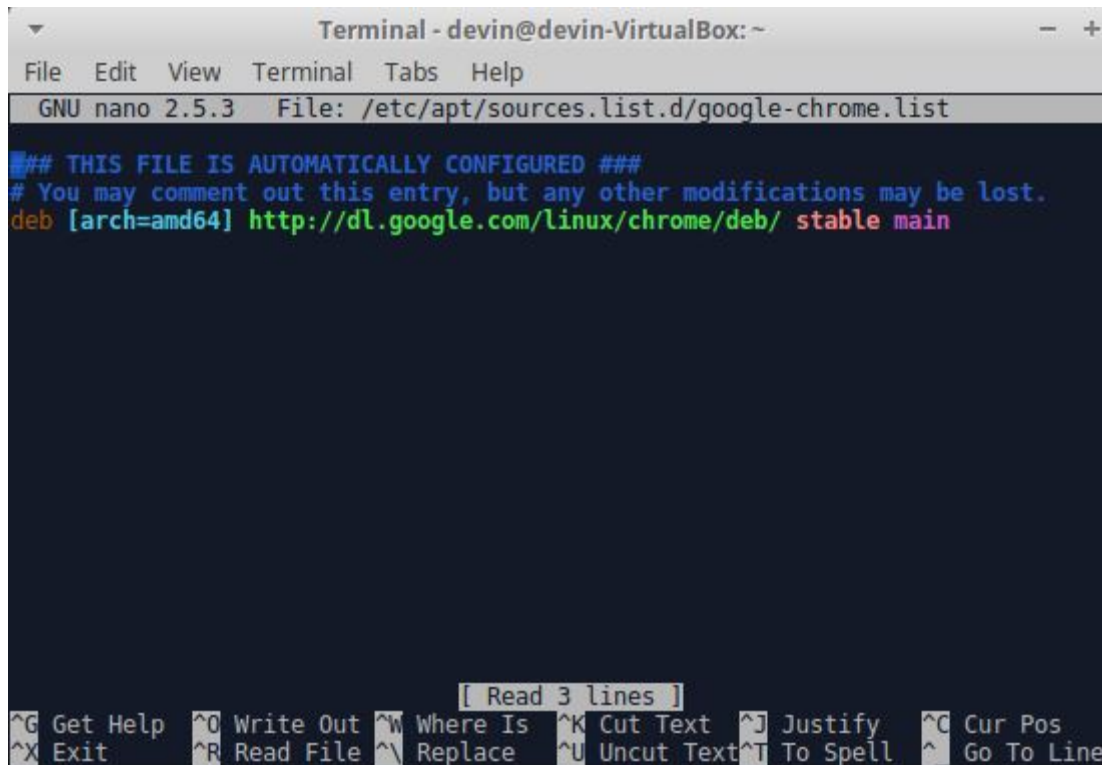
```
/etc/apt/sources.list.d/
```

Now you can understand why we did

```
echo 'deb [arch=amd64] http://dl.google.com/linux/chrome/deb/ stable main' | sudo tee /etc/apt/sources.list.d/google-chrome.list
```

It is simply writing the **'deb [arch] http://dl...'** line into **.../sources.list.d/google-chrome.list** file. You can use nano to open the file. (press Ctrl+X to exit nano). (Don't change this file, thus it is better to skip the sudo part.)

```
sudo nano /etc/apt/sources.list.d/google-chrome.list
```



```
Terminal - devin@devin-VirtualBox: ~
File Edit View Terminal Tabs Help
GNU nano 2.5.3 File: /etc/apt/sources.list.d/google-chrome.list

## THIS FILE IS AUTOMATICALLY CONFIGURED ###
# You may comment out this entry, but any other modifications may be lost.
deb [arch=amd64] http://dl.google.com/linux/chrome/deb/ stable main

[ Read 3 lines ]
^G Get Help  ^O Write Out ^W Where Is  ^K Cut Text  ^J Justify   ^C Cur Pos
^X Exit      ^R Read File ^\ Replace   ^U Uncut Text ^T To Spell  ^_ Go To Line
```

There, you'll see the line you echoed.

Moreover, you can see the source files by running this command.

```
sudo nano /etc/apt/sources.list
```

Please be careful not to alter these files (only if you are still new to Linux).

Note: In the Ubuntu/Xubuntu documents '#' character is used for comments  
# This line is a comment. In nano's interface, almost all the commands you need is listed.  
(nano's '^' symbol stands for Ctrl key in a PC)

You can refer the official Ubuntu website for more details

<https://help.ubuntu.com/community/Repositories/CommandLine>

## Part III

### Package Management with APT (Advanced Package Tool)

Let's formally study the 'apt' package.

You can install a new package, remove an installed package, or update all installed packages to the latest versions by using APT.

Following is a list of frequently used apt-get commands

Installation commands

```
sudo apt-get install <package_name>
```

This command installs a new package.

```
sudo apt-get install google-chrome-stable
```

can be given as an example.

**Trick: If you forgot to put 'sudo' in front of a command. All you have to do is type**

```
sudo !!
```

**'!!' will automatically be replaced with your previous command**

APT will accept multiple package names as a space delimited list.

For example:

```
sudo apt-get install <package1_name> <package2_name> <package3_name>
```

```
sudo apt-get install htop geany
```

Use the -s flag to simulate an action. For example:

```
sudo apt-get -s install <package_name>
```

will simulate installing the package, showing you what packages will be installed and configured.

### Maintenance commands:

`apt-get update`

`apt-get upgrade`

You should first run the update, then upgrade. Neither of them automatically runs the other.

- apt-get update updates the list of available packages and their versions, but it does not install or upgrade any packages.
- apt-get upgrade actually installs newer versions of the packages you have. After updating the lists, the package manager knows about available updates for the software you have installed. This is why you first want to update.

### How to Uninstall programs?

```
sudo apt-get remove <package_name>
```

This command removes an installed package, leaving configuration files intact.

Eg: apt-get remove geany

```
sudo apt-get purge <package_name>
```

This command completely removes a package and the associated configuration files. Configuration files residing in ~ are not usually affected by this command.

### Tricks: + operator

If you want to remove package1 and install package2 in one step:

```
apt-get remove <package1> <package2>+
```

Following command removes packages that were installed by other packages and are no longer needed.

```
sudo apt-get autoremove
```

Following command removes an installed package and dependencies.

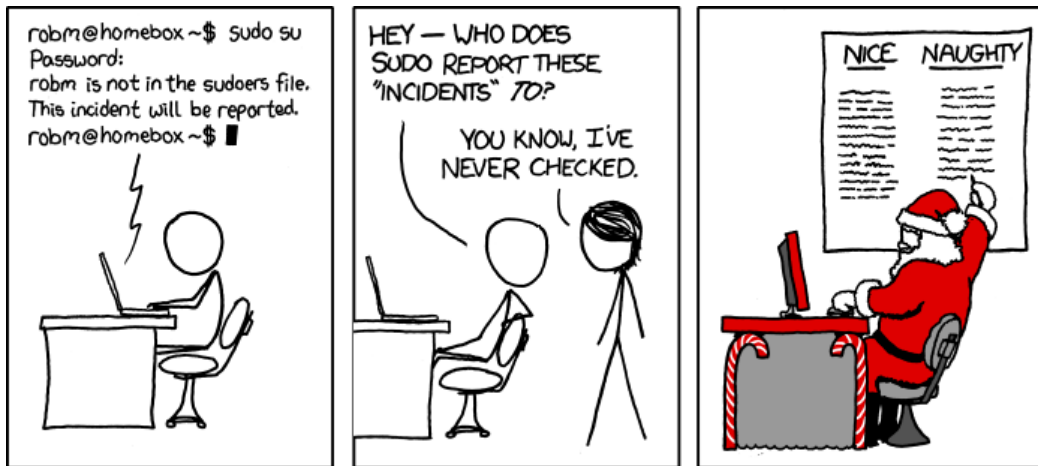
```
sudo apt-get autoremove <package_name>
```

(Visit <https://help.ubuntu.com/community/AptGet/Howto> for more details)



### Did you know?

- sudo stands for “**super user do!**”
- **sudo rm -rf /** will force deletion of everything in the root directory. (Never try this...!!!)
- sudo is also a package that can be installed via ‘apt-get install sudo’ (On a typical Debian installation it does not install sudo by default. You have to manually install it later.) By default, the root account is accessed by sudo.
- Moreover, by default, the root account password is locked in Ubuntu.



- ❖ <https://stackoverflow.com/questions/13546933/where-are-sudo-incidents-reported>
- ❖ Sudo vs Su <https://www.howtogeek.com/111479/htg-explains-whats-the-difference-between-sudo-su/>
- ❖ <https://help.ubuntu.com/community/RootSudo>

## Exercise

**It is discouraged to copy and paste these commands. Always enter them manually**

**Part 1:** You have to install Sublime text, which is one of the most used text editors.

You can install sublime text using the following commands. Do the following in your Terminal.

1. Add the GPG (GNU Privacy Guard) key  
**wget -qO - https://download.sublimetext.com/sublimehq-pub.gpg | sudo apt-key add -**
2. Then add the repository (note: the following command is a single line)  
**echo "deb https://download.sublimetext.com/ apt/stable/" | sudo tee /etc/apt/sources.list.d/sublime-text.list**
3. **sudo apt-get update**
4. **sudo apt-get install sublime-text**
5. You can open sublime text by typing `subl` in the terminal or `subl <filename>.<extension>` eg: `subl e15000.txt`  
For more information, visit -> <http://tipsonubuntu.com/2017/05/30/install-sublime-text-3-ubuntu-16-04-official-way/>

**Part 2:** You have to create a new user called `exxyyyzzz` (here, `xxx,yyy,zzz` are the E nos of your group members)

Eg: Assuming your E numbers are E15501, E15502, e15503 the user should be named 'e501502503'

1. **sudo adduser username**  
eg: `sudo adduser e501502503`  
Set and confirm the new user's password at the prompt. A strong password is highly recommended.  
*Set password prompts:*  
*Enter new UNIX password:*  
*Retype new UNIX password:*  
*passwd: password updated successfully*  
  
Then it will prompt for your details. (It is not necessary to enter them, just press enter to bypass them.)  
  
*Is the information correct? [Y/n] - > Y*

(DDoS (denial-of-service) attack after a successful SSH Brute Force attack is not a joke. They actually exist. Thus, **always put stronger passwords**. In a Reverse Brute-force/Dictionary attack, a single password is tested against multiple usernames or encrypted files.)

2. Then, add the user to the sudo group.  
**sudo usermod -aG sudo username**  
eg: `sudo usermod -aG sudo e501502503`



Trick: you don't have to type `sudo e501502503` again (your username), you can press tab after typing '`sudo usermod -aG sudo e`' and it'll automatically complete the command as `sudo usermod -aG sudo e501502503`

3. Test sudo access on new user account

**su - username**

eg: `su - e501502503`

(again you can use tab key)

4. To confirm that indeed you have sudo powers, try **sudo apt-get update**

### Submission:

These are the instructions you should follow. You have to submit a screenshot of your Terminal (One submission per group). (Note: executing the following commands [only 3<sup>rd</sup> and 4<sup>th</sup> commands] should be visible in the terminal's screenshot)

1. You should have to complete both part 1 and part 2 of the above exercise.
2. Open a new Terminal (Ctrl+Alt+T is the keyboard shortcut for the terminal)
3. Switch to your newly created user (`su - username`)  
Eg: In my case it is `e501502503`  
So, **su - e501502503**
4. Type the below command manually. (Copy and pasting is discouraged, might not work!!!)  
**sudo -- sh -c 'ifconfig | grep addr; subl temp.txt; date'**  
(ifconfig is a system administration utility used for network configurations.)

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