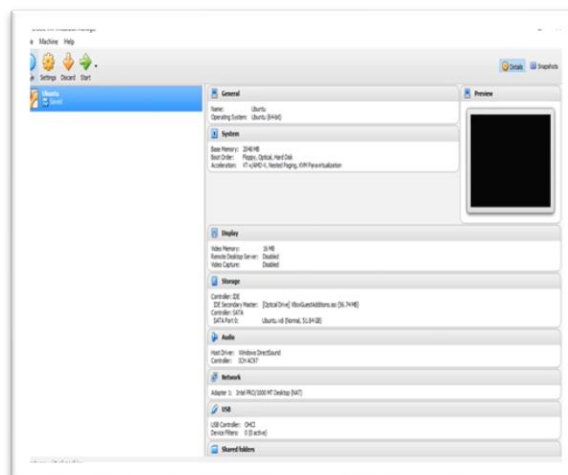
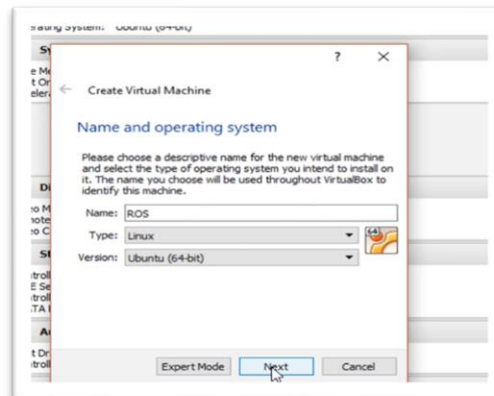
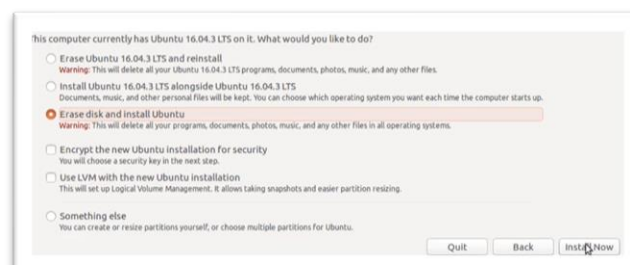


ROS on Windows installation

1. VirtualBox Installation



2. Download ubuntu
3. Run ROS



4. After install we write in command like this

- Setup your sources.list

```
sudo sh -c 'echo "deb http://packages.ros.org/ros/ubuntu $(lsb_release -sc) main" > /etc/apt/sources.list.d/ros-latest.list'
```
- Set up your keys

```
sudo apt-key adv --keyserver 'hkp://keyserver.ubuntu.com:80' --recv-key  
C1CF6E31E6BADE8868B172B4F42ED6FBAB17C654
```

after that make sure your Debian package index is up-to-date:

```
sudo apt-get update
```

```
ros-user@ros:~$ sudo apt-key adv --keyserver hkp://keyserver.ubuntu.com:80 --recv-key  
C1CF6E31E6BADE8868B172B4F42ED6FBAB17C654  
gpg: requesting key 801FA116 from hkp server hkp://keyserver.ubuntu.com:80  
gpg: key 801FA116: public key "ROS Builder <rosbuild@ros.org>" imported  
gpg: Total number processed: 1  
gpg:   imported: 1  
ros-user@ros:~$ sudo apt-get update  
Hit:1 http://dl.google.com/linux/chrome/deb stable InRelease  
Hit:2 http://ppa.launchpad.net/graphics-drivers/ppa/ubuntu xenial InRelease  
Hit:3 https://download.docker.com/linux/ubuntu xenial InRelease  
Hit:4 http://in.archive.ubuntu.com/ubuntu xenial InRelease  
Hit:5 http://security.ubuntu.com/ubuntu xenial-security InRelease [102 kB]  
Hit:6 http://dl.google.com/linux/chrome/deb stable Release  
Hit:7 http://in.archive.ubuntu.com/ubuntu xenial-updates InRelease [102 kB]  
Hit:8 http://ppa.launchpad.net/marten-baert/singlescreencoreorder/ubuntu xenial InRelease  
Hit:9 http://in.archive.ubuntu.com/ubuntu xenial-backports InRelease [102 kB]  
Hit:10 http://packages.ros.org/ros/ubuntu xenial InRelease [4,037 B]  
Hit:11 http://packages.ros.org/ros/ubuntu xenial/main amd64 Packages [488 kB]  
Hit:12 http://packages.ros.org/ros/ubuntu xenial/main amd64 Packages [488 kB]  
Get:1 [12 Packages 40.5 kB/488 kB 8%]
```

5. Installation

- we use this package

```
sudo apt-get install ros-kinetic-desktop
```

```
Setting up libvtk6-java (6.2.0+dfsg1-10build1+debian11.1+osrf1) ...  
Setting up python-vtk6 (6.2.0+dfsg1-10build1+debian11.1+osrf1) ...  
Setting up tcl-vtk6 (6.2.0+dfsg1-10build1+debian11.1+osrf1) ...  
Setting up vtk6 (6.2.0+dfsg1-10build1+debian11.1+osrf1) ...  
Setting up libvtk6-dev (6.2.0+dfsg1-10build1+debian11.1+osrf1) ...  
Setting up libvtk6-qt-dev (6.2.0+dfsg1-10build1+debian11.1+osrf1) ...  
Setting up ros-kinetic-opencv2 (3.2.0-0xenial-20170607-095735-0800) ...  
Setting up ros-kinetic-cv-bridge (1.12.4-0xenial-20170613-183021-0800) ...  
Setting up ros-kinetic-rqt-image-view (0.4.9-0xenial-20170907-154218-0800) ...  
Setting up ros-kinetic-rqt-common-plugins (0.4.8-0xenial-20170907-155633-0800) ...  
Setting up ros-kinetic-viz (1.3.1-0xenial-20170907-155908-0800) ...  
Setting up ros-kinetic-desktop (1.3.1-0xenial-20170915-160631-0800) ...  
Processing triggers for libc-bin (2.23-0ubuntu9) ...  
sbin/ldconfig.real: /usr/lib/nvidia-375/libEGL.so.1 is not a symbolic link  
Processing triggers for systemd (229-4ubuntu19) ...  
Processing triggers for ureadahead (0.100.0-19) ...  
ros-user@ros:~$
```

- initialize rosdep

```
sudo rosdep init  
rosdep update
```

```
Processing triggers for libc-bin (2.23-0ubuntu9) ...  
sbin/ldconfig.real: /usr/lib/nvidia-375/libEGL.so.1 is not a symbolic link  
Processing triggers for systemd (229-4ubuntu19) ...  
Processing triggers for ureadahead (0.100.0-19) ...  
ros-user@ros:~$ sudo rosdep init  
wrote /etc/ros/rosdep/sources.list.d/20-default.list  
recommended: please run  
  
rosdep update  
  
ros-user@ros:~$ rosdep update  
reading in sources list data from /etc/ros/rosdep/sources.list.d  
Hit https://raw.githubusercontent.com/ros/rosdistro/master/rosdep/osx-homebrew.yaml  
Hit https://raw.githubusercontent.com/ros/rosdistro/master/rosdep/base.yaml  
Hit https://raw.githubusercontent.com/ros/rosdistro/master/rosdep/python.yaml  
Hit https://raw.githubusercontent.com/ros/rosdistro/master/rosdep/ruby.yaml  
Hit https://raw.githubusercontent.com/ros/rosdistro/master/releases/fuerte.yaml  
query rosdistro index https://raw.githubusercontent.com/ros/rosdistro/master/index.yaml  
add distro "groovy"  
add distro "hydro"  
add distro "indigo"  
add distro "jade"
```

6. Environment setup

To do this setup:

Open the file: `~/.bashrc` At the end of that file, add the line: `echo "source
/opt/ros/hydro/setup.bash"`

Then, just this once, run that file so that the changes take effect immediately (in your current Terminal window), as follows:

```
source ~/.bashrc
```

From the above: Understand NOW what echo and source do in general.

7. Getting rosininstall

rosinstall is a frequently used command-line tool in ROS that is distributed separately. It enables you to easily download many source trees for ROS packages with one command. To get this tool, type in a Terminal window:

```
sudo apt-get install python-roinstall
```