Lesson 2 ROS Installation and Settings

This lesson is applicable for building a ROS environment from scratch on Jetson Nano official image. Here, we provide two methods for ROS installation. Method one is a one-click installation, where you only need to execute a single command to automatically install the entire ROS system. Method two requires to set up download sources and configure environment variables.

If you are new to ROS, it is recommended to choose “one-click installation” for a quick and easy installation.

Method 1: One-click Installation (Recommended)

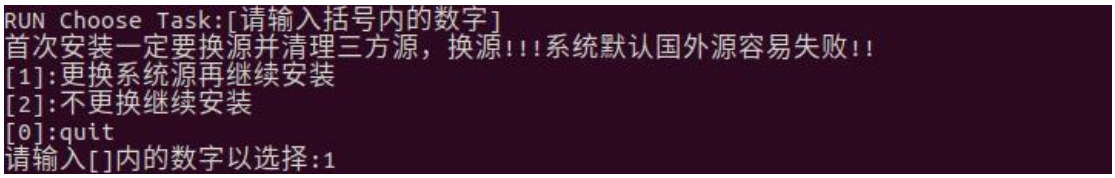
Click on  to open the command line terminal. Enter command “**wget http://fishros.com/install -O fishros && . fishros**” and press Enter, then enter the password.

```
hiwonder@ubuntu:~$ wget http://fishros.com/install -O fishros && . fishros
--2023-06-03 10:38:17--  http://fishros.com/install
正在解析主机 fishros.com (fishros.com)... 139.9.131.171
正在连接 fishros.com (fishros.com)|139.9.131.171|:80... 已连接。
已发出 HTTP 请求，正在等待回应... 301 Moved Permanently
位置: http://fishros.com/install/ [跟随至新的 URL]
--2023-06-03 10:38:17--  http://fishros.com/install/
再次使用存在的到 fishros.com:80 的连接。
已发出 HTTP 请求，正在等待回应... 200 OK
```

Enter “1” to select the one-click ROS installation method.

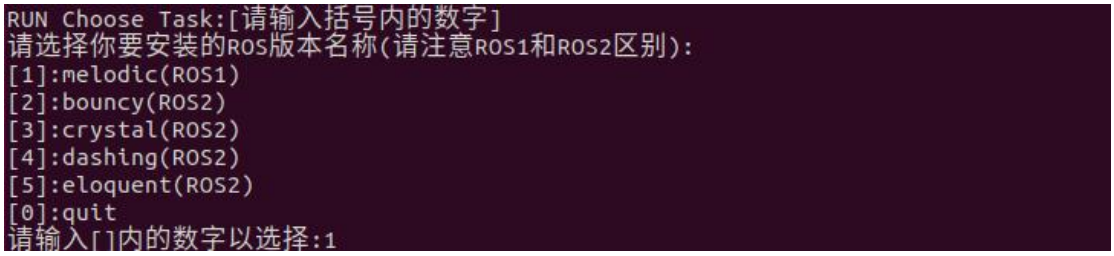
```
RUN Choose Task:[请输入括号内的数字]
---众多工具，等君来用---
[1]:一键安装:ROS(支持ROS和ROS2,树莓派Jetson)
[2]:一键安装:github桌面版(小鱼常用的github客户端)
[3]:一键配置:rosdep(小鱼的rosdepc,又快又好用)
[4]:一键配置:ROS环境(快速更新ROS环境设置,自动生成环境选择)
[5]:一键配置:系统源(更换系统源,支持全版本Ubuntu系统)
[6]:一键安装:nodejs
[7]:一键安装:VsCode开发工具
[8]:一键安装:Docker
[9]:一键安装:Cartographer(内测版v0.1)
[10]:一键安装:微信(可以在Linux上使用的微信)
[11]:一键安装:ROS+Docker(支持所有版本ROS/ROS2)
[12]:一键安装:PlateformIO MicroROS开发环境(支持Fishbot)
[77]:测试模式:运行自定义工具测试
[0]:quit
请输入[]内的数字以选择:1
```

During the initial installation, you need to change the source and clean up third-party sources. Enter “1” to choose to replace the system source before installing.

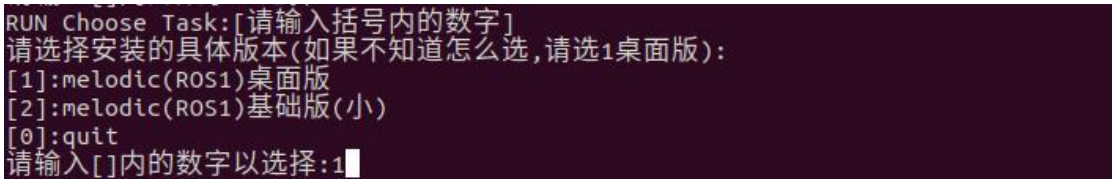


Enter “2” to choose to replace the system source and clear up the third-party sources.

Enter “1” to choose to install melodic (ROS1) version.



Enter “1” to choose to install melodic (ROS1) desktop version and wait for the installation to complete.



Method 2: Step-by-step Installation (Routine Method)

1. Version Selection

Different versions of Ubuntu have different corresponding versions of ROS . The corresponding ROS version of Ubuntu 18.04 is Melodic.

Ubuntu版本	ROS版本
Ubuntu16.04	Kinetic
Ubuntu18.04	Melodic
Ubuntu20.04	Noetic

2. Check Ubuntu Software and Update Source

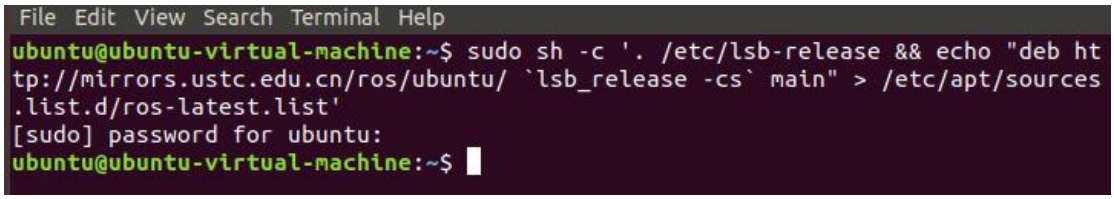
1) Find “Software and update” in system.

2) Ensure the following options are checked and change the download source which can be used in your country.

3. Set the Download Source for ROS

3.1 Set the Download Source

Open a new command line terminal. Enter command "**sudo sh -c '. /etc/lsb-release && echo "deb http://mirrors.ustc.edu.cn/ros/ubuntu/ `lsb_release -cs` main" > /etc/apt/sources.list.d/ros-latest.list'**" and press **Enter**. Then enter the password of the virtual machine "**ubuntu**". (The password can be changed, and it uses "ubuntu" here as example.)



3.2 Set Public Key

Enter command "**sudo apt-key adv --keyserver 'hkp://keyserver.ubuntu.com:80' --recv-key C1CF6E31E6BADE8868B172B4F42ED6FBAB17C654**" and press **Enter**.

```
ubuntu@ubuntu-virtual-machine:~$ sudo apt-key adv --keyserver 'hkp://keyserver.
ubuntu.com:80' --recv-key C1CF6E31E6BADE8868B172B4F42ED6FBAB17C654
Executing: /tmp/apt-key-gpghome.JqM65juhYg/gpg.1.sh --keyserver hkp://keyserver
.ubuntu.com:80 --recv-key C1CF6E31E6BADE8868B172B4F42ED6FBAB17C654
gpg: key F42ED6FBAB17C654: "Open Robotics <info@osrfoundation.org>" 1 new signa
ture
gpg: Total number processed: 1
gpg:               new signatures: 1
```

3.3 Update Software Package

Enter command “sudo apt update”.

```
ubuntu@ubuntu-virtual-machine:~$ sudo apt update
```

4. Install ROS

Open a command line terminal. Enter command “**sudo apt install ros-melodic-desktop-full**” to install ROS. The installation process generally needs to take around 10 min, depending on the network status.

```
ubuntu@ubuntu-virtual-machine:~$ sudo apt install ros-melodic-desktop-full
```

5. Set the Environment Variables

Open a command line terminal. Enter command “**echo "source /opt/ros/melodic/setup.bash" >> ~/.bashrc**” and “**echo "source /opt/ros/melodic/setup.bash" >> ~/.bashrc**” in sequence to complete the configuration for environment variables.

```
ubuntu@ubuntu-virtual-machine:~$ echo "source /opt/ros/melodic/setup.bash" >> ~/.bashrc
ubuntu@ubuntu-virtual-machine:~$ source ~/.bashrc
```

6. Install rosdep

Enter command “**sudo apt-get install python3-rosdep**” and press Enter to install rosdep. When the installation confirmation prompt occurs, enter “**Y**”.

```
ubuntu@ubuntu-virtual-machine:~$ sudo apt-get install python3-rosdep
[sudo] password for ubuntu:
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  python3-catkin-pkg-modules python3-docutils python3-pygments
  python3-pyparsing python3-roman python3-rosdep-modules
  python3-rosdistro-modules python3-rospkg-modules
Suggested packages:
  fonts-linuxlibertine | ttf-linux-libertine texlive-lang-french
  texlive-latex-base texlive-latex-recommended python-pyparsing-doc
The following packages will be REMOVED:
  python-rosdep
The following NEW packages will be installed:
  python3-catkin-pkg-modules python3-docutils python3-pygments
  python3-pyparsing python3-roman python3-rosdep python3-rosdep-modules
  python3-rosdistro-modules python3-rospkg-modules
0 upgraded, 9 newly installed, 1 to remove and 659 not upgraded.
Need to get 1,153 kB of archives.
After this operation, 6,290 kB of additional disk space will be used.
Do you want to continue? [Y/n] Y
```

7. Initialization

Enter command "**cd /etc/ros/rosdep/sources.list.d**" and press Enter to enter the "**cd /etc/ros/rosdep/sources.list.d**" folder.

```
ubuntu@ubuntu-virtual-machine:~$ cd /etc/ros/rosdep/sources.list.d
```

1) Enter command "**sudo gedit 20-default.list**" and press Enter to edit this file.

```
ubuntu@ubuntu-virtual-machine:/etc/ros/rosdep/sources.list.d$ sudo gedit 20-defa
ult.list
```

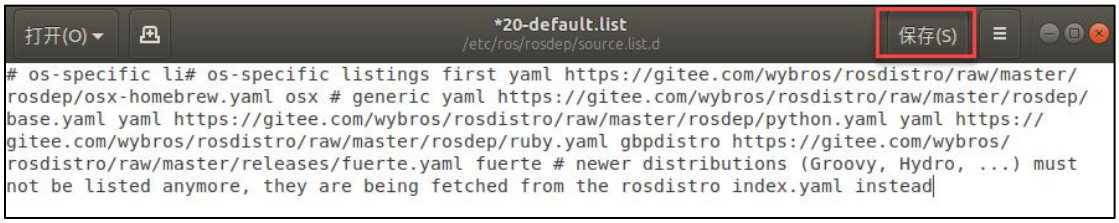
2) Replace the content in the original file with the below content. (Do not manually enter the content. Please directly copy and paste, and do not need)

```
# os-specific li# os-specific listings first yaml
https://gitee.com/wybros/rosdistro/raw/master/rosdep/osx-homebrew.yaml osx # generic yaml
https://gitee.com/wybros/rosdistro/raw/master/rosdep/base.yaml yaml
https://gitee.com/wybros/rosdistro/raw/master/rosdep/python.yaml yaml
https://gitee.com/wybros/rosdistro/raw/master/rosdep/ruby.yaml gbpdistro
```

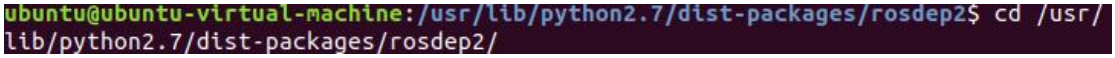
https://gitee.com/wybros/rosdistro/raw/master/releases/fuerte.yaml fuerte # newer distributions (Groovy, Hydro, ...) must not be listed anymore, they are being fetched from the rosdistro index.yaml instead

During the modification, a warning will appear in terminal. It is a normal phenomena that can be ignored.

3) After the replacement is done, click “Save” to save the file, then close.



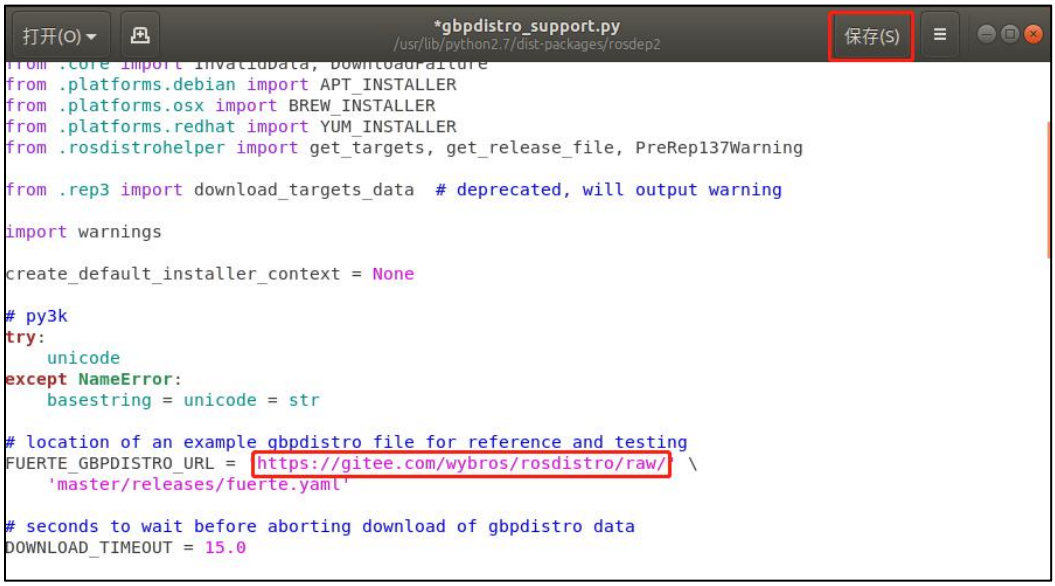
4) Enter command “**cd /usr/lib/python2.7/dist-packages/rosdep2/**” and press Enter to get access to the “**rosdep2**” directory.



5) Enter command “**sudo gedit gbpdistro_support.py**” and press Enter. You might be prompted to enter the password of the virtual machine. Then press Enter to open the “**gbpdistro_support.py**” file and locate the “**FUERTE_GBPDISTRO_URL**” code.

```
# location of an example gbpdistro file for reference and testing
FUERTE_GBPDISTRO_URL = 'https://raw.githubusercontent.com/ros/rosdistro/' \
    'master/releases/fuerte.yaml'
```

6) Change “https://raw.githubusercontent.com/ros/rosdistro/” to “https://gitee.com/wybros/rosdistro/raw/”. (Only the content shown in following red box requires to modify) Then click “Save” and close the file.

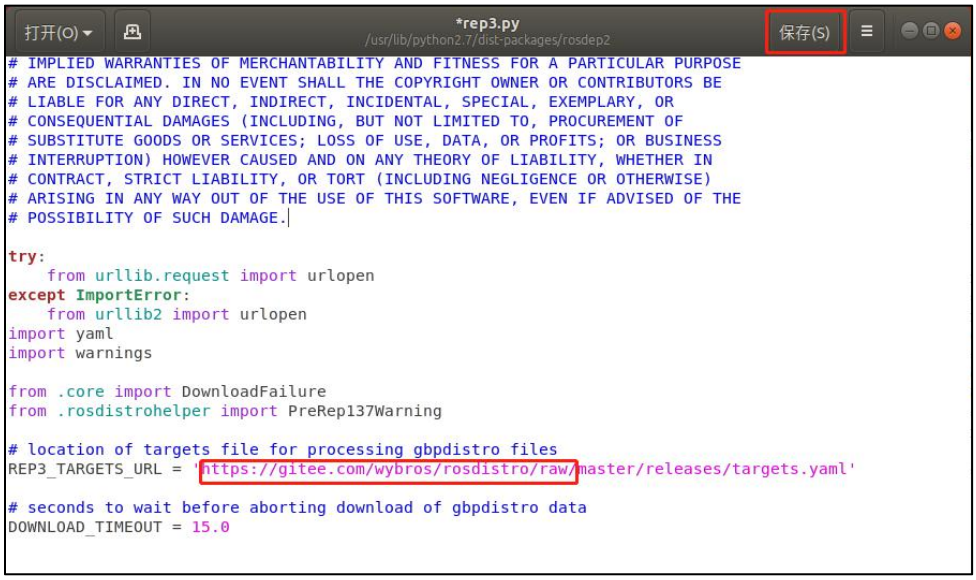


7) Enter command “**sudo gedit rep3.py**” and press Enter to open the “**rep3.py**” file and locate the “REP3_TARGETS_URL” code.

```
ubuntu@ubuntu-virtual-machine:/usr/lib/python2.7/dist-packages/rosdep2$ sudo ge
dit rep3.py
```

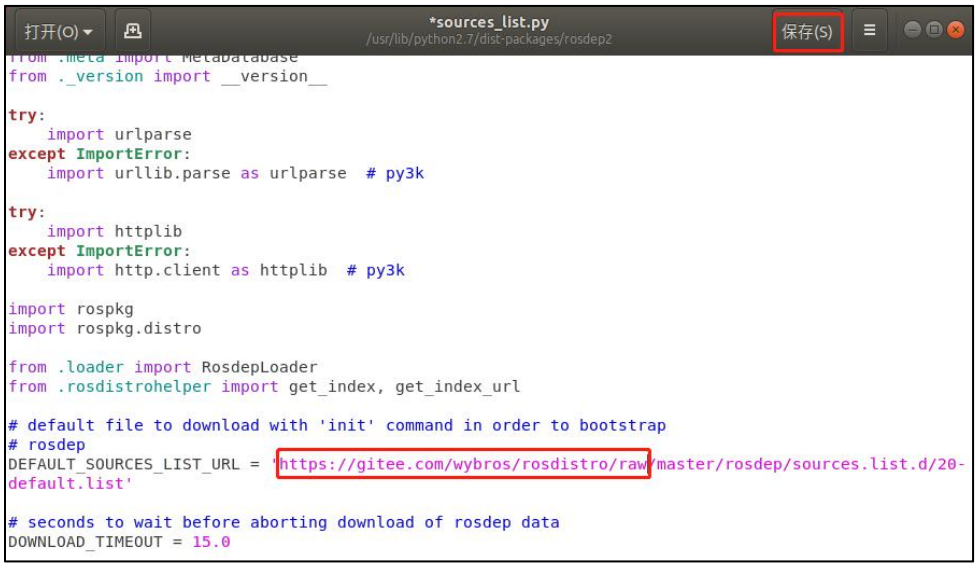
```
# location of targets file for processing gbpdistro files
REP3_TARGETS_URL = 'https://raw.githubusercontent.com/ros/rosdistro/master/releases/targets.yaml'
```

8) Change “**https://raw.githubusercontent.com/ros/rosdistro/”** to “**https://gitee.com/wybros/rosdistro/raw/**” (Only the content shown in following red box requires to modify) Then click “Save” and close the file.



9) Enter command “**sudo gedit sources_list.py**” and press Enter to open the “**sources_list.py**” file and locate the “**DEFAULT_SOURCES_LIST_URL**” code.

10) Change “**https://raw.githubusercontent.com/ros/rosdistro/**” to “**https://gitee.com/wybros/rosdistro/raw/**”. (Only the content shown in following red box requires to modify) Then click “Save” and close the file.



11) Enter command "**cd /usr/lib/python2.7/dist-packages/rosdistro/**" and press Enter to get access to the "**rosdistro**" directory.

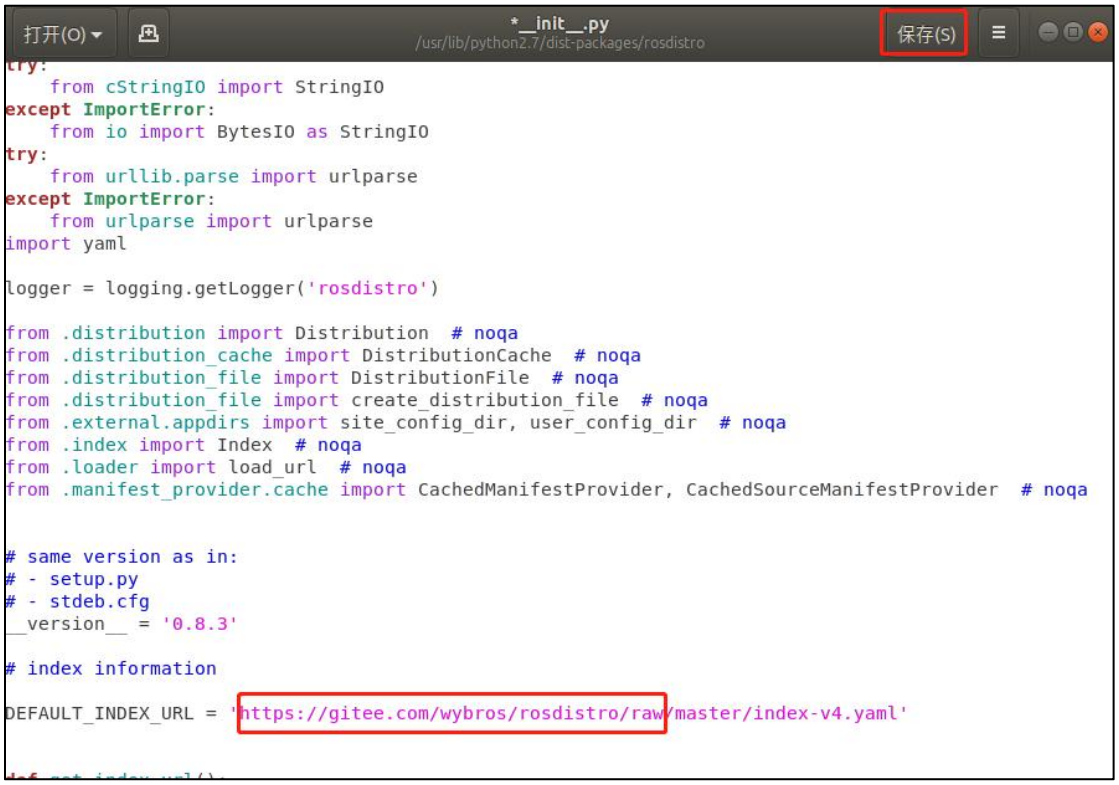
```
ubuntu@ubuntu-virtual-machine:/usr/lib/python2.7/dist-packages/rosdep2$ cd /usr
/lib/python2.7/dist-packages/rosdistro/
```

12) Enter command "**sudo gedit __init__.py**" and press Enter to get access to "**__init__.py**" file, and locate the "DEFAULT_INDEX_URL" code.

```
ubuntu@ubuntu-virtual-machine:/usr/lib/python2.7/dist-packages/rosdistro$ sudo
gedit __init__.py
```

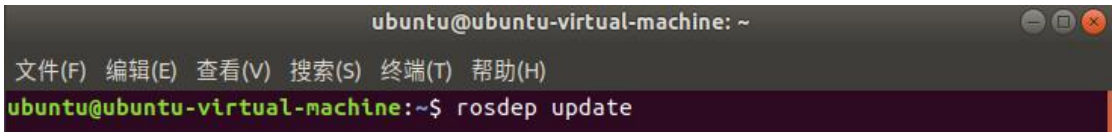
```
# index information

DEFAULT_INDEX_URL = 'https://raw.githubusercontent.com/ros/rosdistro/master/index-v4.yaml'
```

13) Change "**https://raw.githubusercontent.com/ros/rosdistro/**" to "**https://gitee.com/wybros/rosdistro/raw/**". (Only the content shown in following red box requires to modify) Then click "Save" and close the file.

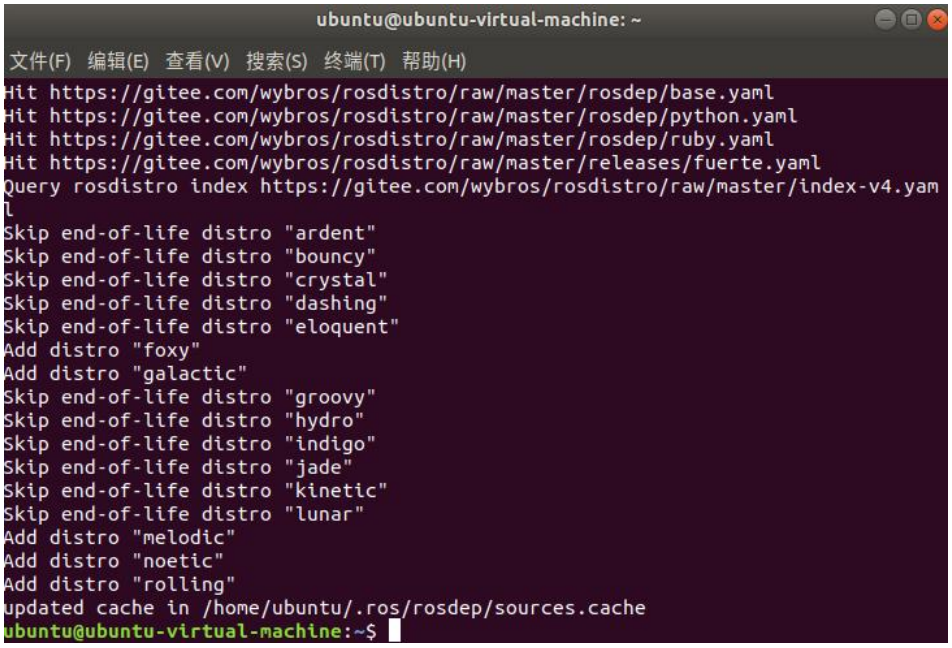


8. Update

Open a new command line terminal and enter command “**rosdep update**”.



The below information represents the update is successfully complete.



If you encounter a timeout error as shown in the figure, it may be due to network issues. In this case, you can try entering "**rosdep update**" multiple times to attempt updating. If it still fails to update, you should check the contents of "**1.7 Initialization**" to ensure that the modifications made are correct. After verifying the changes, the user can try running "**rosdep update**" again to perform the update.