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B (HTTPS://GITHUB.COM/ROS2/ROS2_DOCUMENTATION/EDIT/MASTER/SOURCE/INSTALLATION/FOXY/LINUX-INSTALL-DEBIANS.RST)

Installing ROS 2 via Debian Packages¶

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- Uninstall

Debian packages for ROS 2 Foxy Fitzroy are available for Ubuntu Focal.

Resources¶

- Status Page:
  - ROS 2 Foxy (Ubuntu Focal): amd64 (http://repo.ros2.org/status_page/ros_foxy_default.html), arm64 (http://repo.ros2.org/status_page/ros_foxy_ubv8.html)
- Jenkins Instance (http://build.ros2.org/)
- Repositories (http://repo.ros2.org)

Setup Locale¶

Make sure you have a locale which supports `UTF-8`. If you are in a minimal environment, such as a docker container, the locale may be something minimal like POSIX. We test with the following settings. It should be fine if you're using a different UTF-8 supported locale.

```
sudo locale-gen en_US en_US.UTF-8
sudo update-locale LC_ALL=en_US.UTF-8 LANG=en_US.UTF-8
export LANG=en_US.UTF-8
```

Setup Sources¶

You will need to add the ROS 2 apt repositories to your system. To do so, first authorize our GPG key with apt like this:

```
udo apt update && sudo apt install curl gnupg2 lsb-release
url -s https://raw.githubusercontent.com/ros/rosdistro/master/ros.asc | sudo apt-key add
```

And then add the repository to your sources list:

```
'echo "deb [arch=$(dpkg --print-architecture)] http://packages.ros.org/ros2/ubuntu $(lsb
```

Install ROS 2 packages¶

Update your apt repository caches after setting up the repositories.

```
sudo apt update
```

Desktop Install (Recommended): ROS, RViz, demos, tutorials.

```
sudo apt install ros-foxy-desktop
```

ROS-Base Install (Bare Bones): Communication libraries, message packages, command line tools. No GUI tools.

```
sudo apt install ros-foxy-ros-base
```

See specific sections below for how to also install the ros1_bridge, TurtleBot packages, or alternative RMW packages.

Environment setup¶

Sourcing the setup script¶

Set up your environment by sourcing the following file.

```
source /opt/ros/foxy/setup.bash
```

Install argcomplete (optional)¶

ROS 2 command line tools use argcomplete to autocompletion. So if you want autocompletion, installing argcomplete is necessary.

```
sudo apt install python3-argcomplete
```

Try some examples¶

If you installed `ros-foxy-desktop` above you can try some examples.

In one terminal, source the setup file and then run a C++ `talker`:

```
source /opt/ros/foxy/setup.bash
ros2 run demo_nodes_cpp talker
```

In another terminal source the setup file and then run a Python `listener`:

```
source /opt/ros/foxy/setup.bash
ros2 run demo_nodes_py listener
```

You should see the `talker` saying that it's `Publishing` messages and the `listener` saying `I heard` those messages. This verifies both the C++ and Python APIs are working properly. Hooray!

See the tutorials and demos (../../../Tutorials/) for other things to try.

Install additional RMW implementations (optional)¶

By default the RMW implementation `Fast RTPS` is used. `Cyclone DDS` is also installed.

To install support for `RTI Connext`:

```
sudo apt update
sudo apt install ros-foxy-rmw-connext-cpp # for RTI Connext (requires license agreement
```

By setting the environment variable `RMW_IMPLEMENTATION=rmw_connext_cpp` you can switch to use RTI Connext instead.

You can also install the Connext DDS-Security plugins (../../DDS-Implementations/Install-Connext-Security-Plugins/) or use the University, purchase or evaluation (../../DDS-Implementations/Install-Connext-University-Eval/) options for RTI Connext.

Install additional packages using ROS 1 packages¶

The `ros1_bridge` as well as the TurtleBot demos are using ROS 1 packages. To be able to install them please start by adding the ROS 1 sources as documented here (https://wiki.ros.org/Installation/Ubuntu?distro=noetic).

If you're using Docker for isolation you can start with the image `ros:noetic` or `osrf/ros:noetic-desktop`. This will also avoid the need to setup the ROS sources as they will already be integrated.

Now you can install the remaining packages:

```
sudo apt update
sudo apt install ros-foxy-ros1-bridge
```

The turtlebot2 packages are not currently available in Foxy.

Build your own packages¶

If you would like to build your own packages, refer to the tutorial "Using Colcon to build packages" (../../../Tutorials/Colcon-Tutorial/).

Troubleshooting¶

Troubleshooting techniques can be found here (../../../Troubleshooting/).

Uninstall¶

If you need to uninstall ROS 2 or switch to a source-based install once you have already installed from binaries, run the following command:

```
sudo apt remove ros-foxy-* && sudo apt autoremove
```