Instructions on installing ROS in an Ubuntu docker image

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Step 1: install docker desktop

- Install Docker Desktop https://docs.docker.com/get-docker/
- Start the Docker Desktop

Step 2: run the docker image of ubuntu 20.04

- Ubuntu image information https://hub.docker.com/_/ubuntu
- Run command “docker run –i –t ubuntu:20.04 /bin/bash”

Step 3: install ROS noetic according to the following link in docker

- Install ROS http://wiki.ros.org/noetic/Installation/Ubuntu

Step 4: install the terminator terminal in docker

- Run command “apt install terminator”
- Terminator information https://manpages.ubuntu.com/manpages/bionic/en/man1/terminator.1.html

Step 5: install and start X server in order to have display in docker

- Windows: VcXsrv Windows X Server https://sourceforge.net/projects/vcxsrv/
    - Follow instructions from here https://medium.com/@potatowagon/how-to-use-gui-apps-in-linux-docker-container-from-windows-host-485d3e1c64a3
- Mac: Xquartz https://www.xquartz.org/
    - Follow instructions from here https://gist.github.com/sorny/969fe55d85c9b0035b0109a31cbcb088

- Start the X server
- Check your IP address
- In the docker ubuntu terminal, run “export DISPLAY=my_ip:0.0”

Step 6: verify your terminator installation

- Run command “terminator” in your docker ubuntu terminal. You should see the terminator window

Step 7: test the ROS installation by running Rviz, a visualization tool in ROS

- In one terminator terminal, start roscore
  - “source /opt/ros/noetic/setup.bash”
  - “roscore”
- In another terminator terminal, start rviz
  - “source /opt/ros/noetic/setup.bash”
  - “rosrun rviz rviz”

Step 8: we have already installed ROS and terminator. Let’s save the docker image for next time

- After you exit the docker container
- Run the command “docker container list -a” to see all the containers. Find the container ID of the latest one
- Run the command “docker container commit <CONTAINER_ID>”
- Run the command “docker image list -a” to see the latest image ID
- Run the command “docker image tag <IMAGE_ID> TAG”. Give a name to this image such as “ubuntu:ros”

Up to now, you have a docker image named “ubuntu:ros” with the installed packages. To use this docker image, run the command “docker run –i –t ubuntu:ros /bin/bash”.

Step 8 is an interactive way to install packages into a docker image. You can use these commands to install more packages to your docker image in the future. You can overwrite your docker image by giving the same tag name to it. Then you only need to maintain a single docker image for your project.