Lesson 14 Common Visualization Tools

1. A Introduction to RQT Tool

1.1 Overview

RQT is a graphical user interface framework that implements various tools and interfaces in the form of plugins.

One can run all the existing GUI tools as dockable windows within RQT. When in use, RQT tools and plugins can be ran with command “rqt”. This GUI allows you to choose any available plugins on your system. In addition, you can also run plugins in standalone window.

1.2 RQT Component Structure

RQT consists of three metapackages：

1) Rqt: core infrastucture modules

2) rqt_common_plugins: back-end tool for building

3) rqt_robot_plugins: tool for interacting with robots

1.3 Advantage of RQt framework

Compared to building your own GUIs from scratch:

1) Standardized common procedures for GUI (start-shutdown hook, restore previous states).

2) Multiple widgets can be docked in a single window.

3) Easily turn your existing Qt widgets into RQt plugins.

4) Expect support at ROS Answers (ROS community website for the

questions).

From system architecture's perspective:

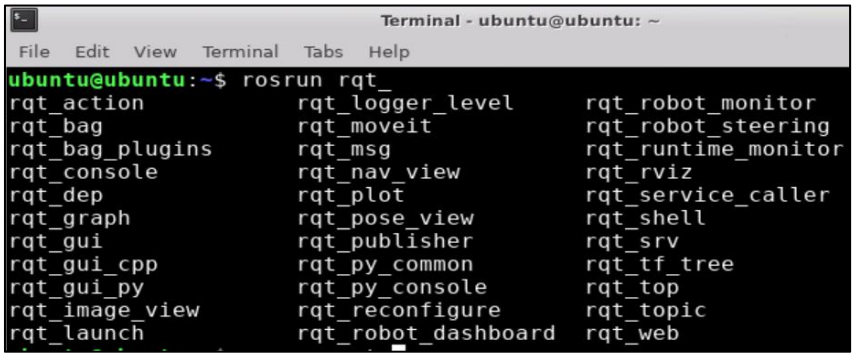
1) Support multi-platformand multi-language (Python, C++).

2) Manageable lifecycle: RQt plugins using common API makes maintainance and reuse easier.

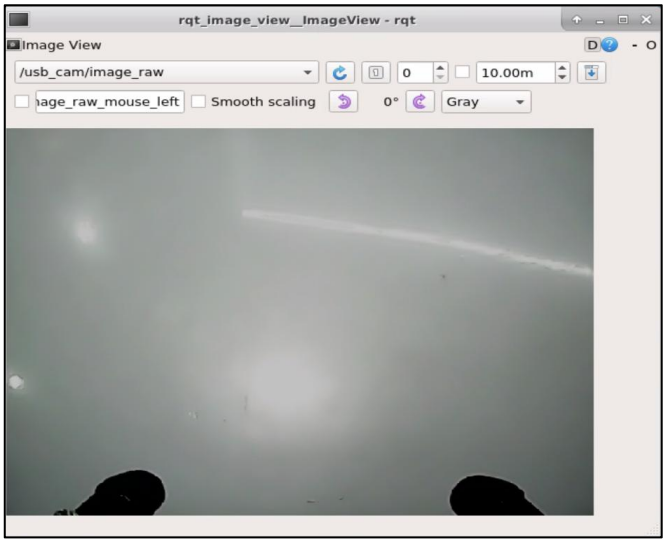
2. RQT Running

Note: After ROS is installed successfully, it comes with RQT tool, no need to reinstall.

1) Open the terminal, and then enter "rosrun rqt_" and press "Tab" key to unlist the following command:

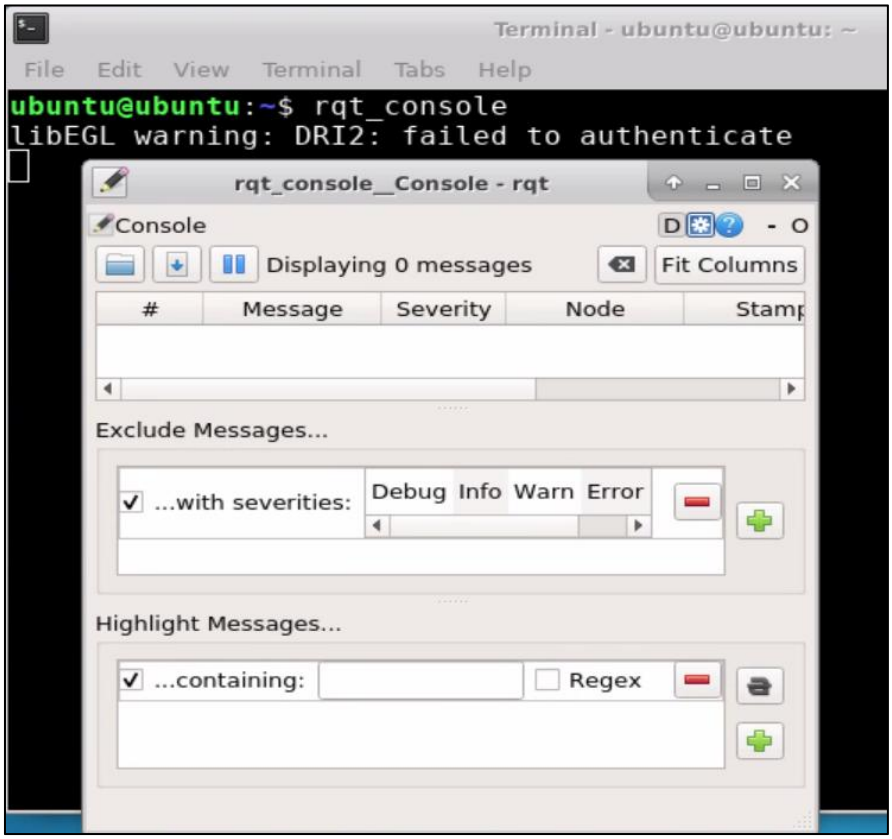


rqt_image_view is used to display the returned image.

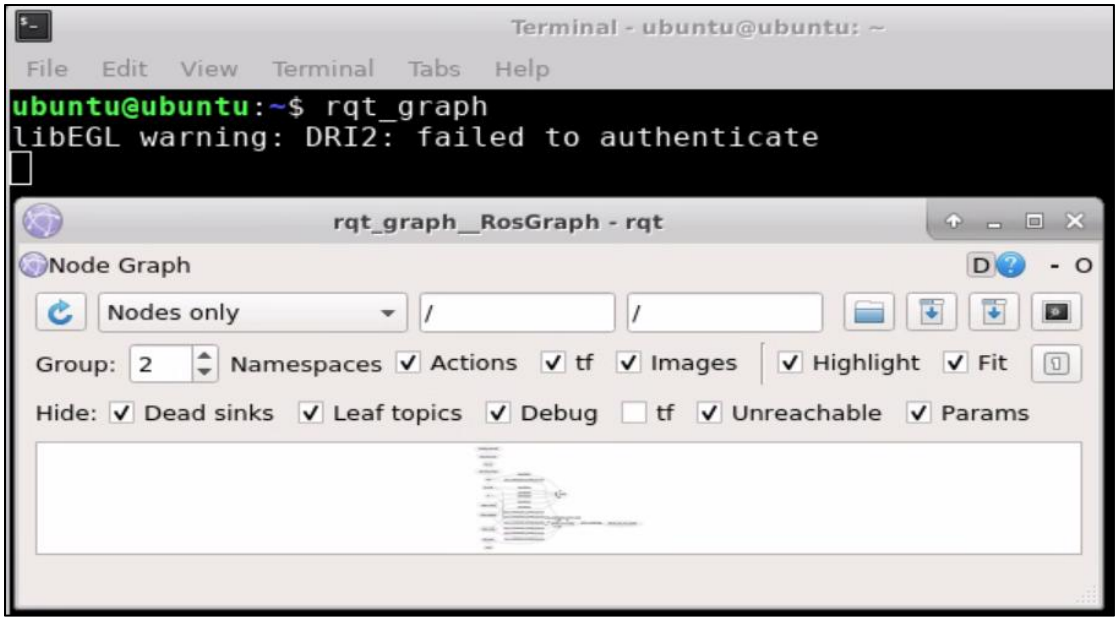


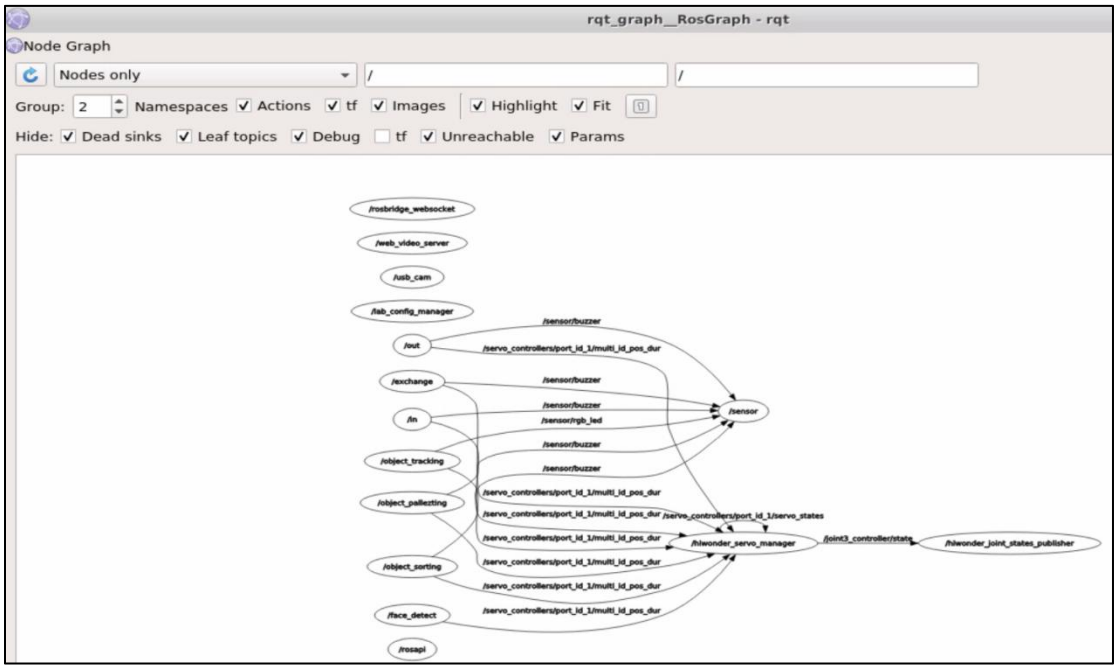
Several tools are introduced for you:

1) rqt_console：Log output tool

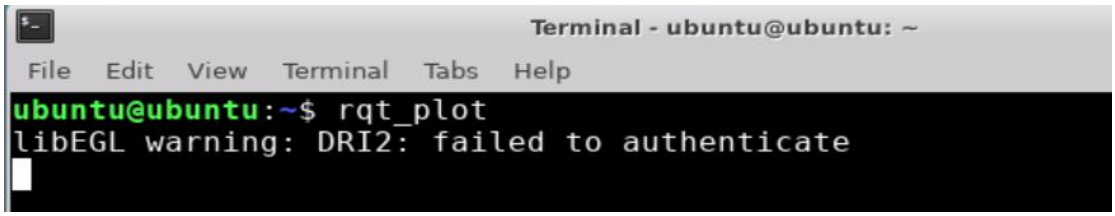


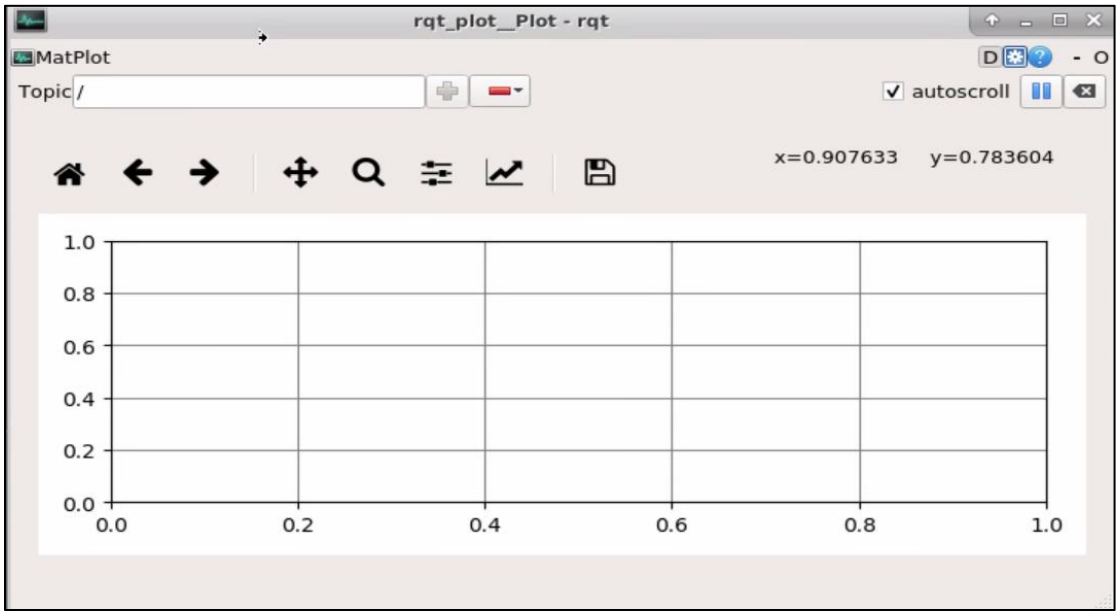
2) graph visualization tool





3) rqt_plot： graph visualization tool





3. Plugins Function Introduction

Some useful plugins are enumerated in the following table:

Plugins	Function Instruction
topics monitor	Moitor the current transmisson data of a topic, bandwidth consumption, topic frequency, etc, which is equivalent to the original rostopic echo msg_name
message publisher	Publish a topic with a custom name as well as specfiy the message type, publishing data and publishing frequency of the topic
message type brower	View all currently defined message types including own defined msg, which is basically equivalent to the function of rosmsg show msg_name
robot steering	Publish a topic cmd_vel to publish Twist topic message, which can visually modify the speed, angle variables. It is convenient for testing some control commands conviniently
bag	Record a bag and arbitrarily choose and specify which topic to record. It can also open a bag, in which you can easily control the play or pause of the bag play, and specify the previous and next frames to be played.

The plugins in bag are shown in the following table:

Plugins	Function Instruction
node_graph	View all the nodes running in current node

process monitor	View all current nodes and PID, CPU and RAM usage of node
launch	Easily choose package and launch files in visualization interface, run and stop a node of lauch file
image view	Easily view the image messages delivered in ROS topic, which is convenient for us to observe the images that the robot is looking at.
plot	The data of a topic (all or part of the data) can be displayed on a graph, so that we can see the changes of the topic messages more visually, which is convenient for us to debug
tf tree	Display the stucture of current tf tree
rviz	rivz is also integrated in rqt, which is convenient for us to open rviz tool in here