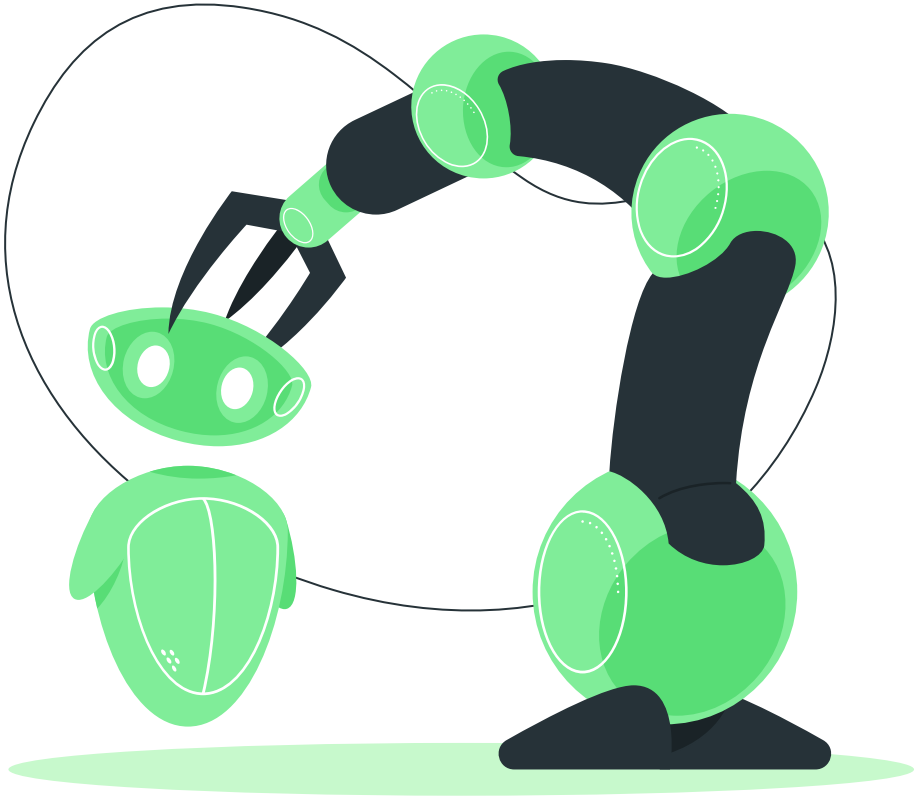
What is ROS ?

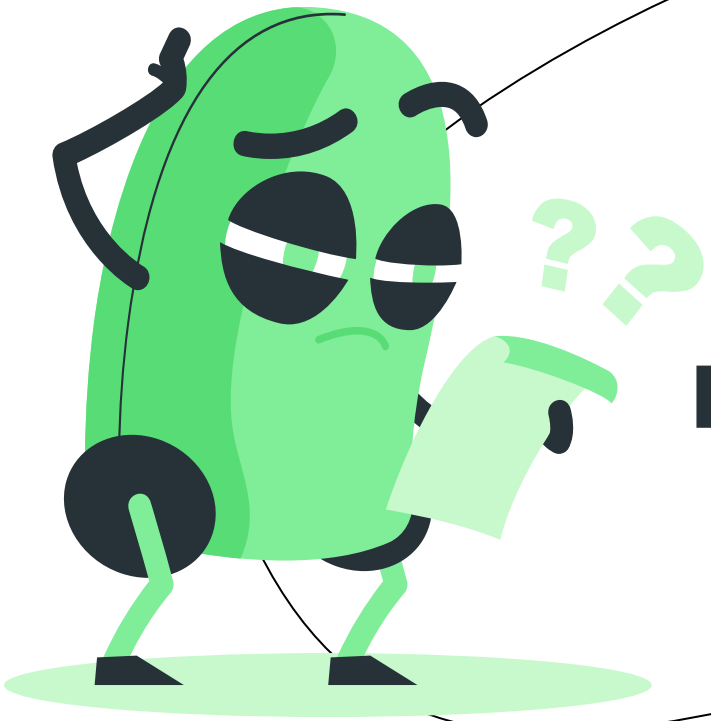


Presented by:
Moneera Banjar

@mn_banjar

Agenda

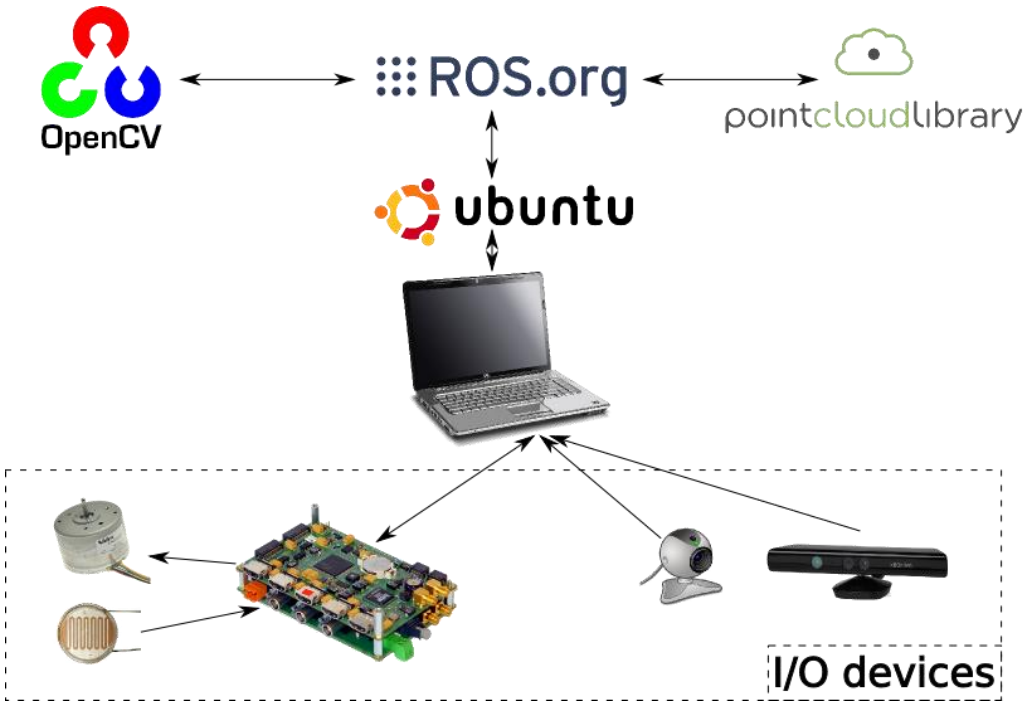
1. **ROS concept**
2. **The powerful of ROS**
3. **ROS installation**
   In computer and Raspberry Pi
4. **System demo**
5. **Challenges and further topics**



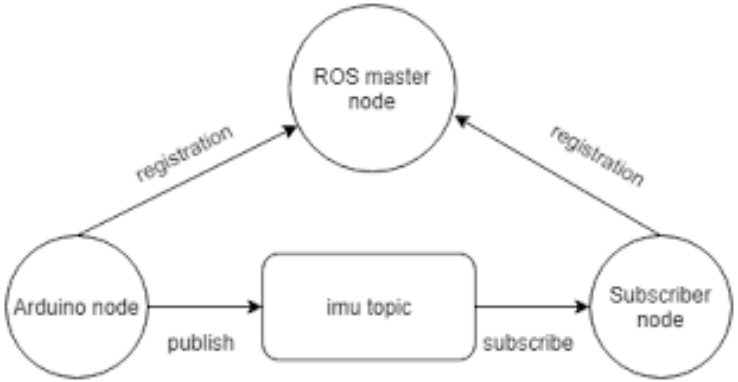
Have you ever programmed a robot ?

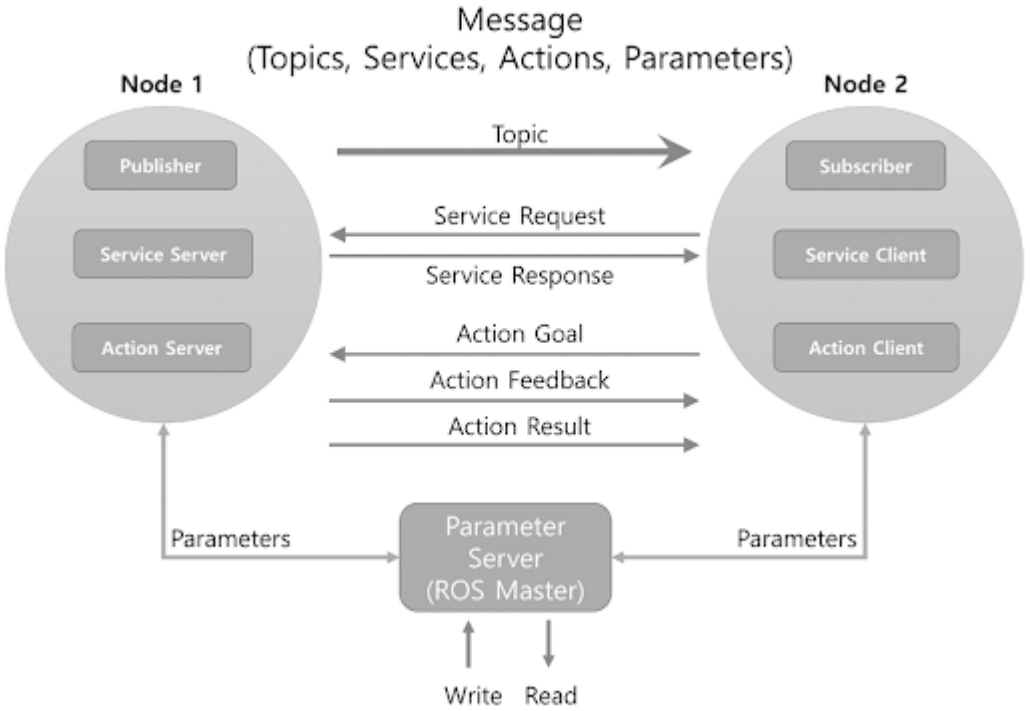
What is ROS

Robot Operating System

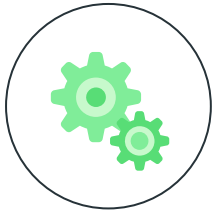


ROS concept


ROS master node
registration
registration
Arduino node
publish
imu topic
subscribe
Subscriber node

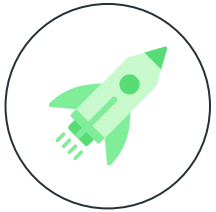

Message
(Topics, Services, Actions, Parameters)
Node 1
Node 2
Publisher
Topic
Subscriber
Service Server
Service Request
Service Response
Service Client
Action Server
Action Goal
Action Feedback
Action Result
Action Client
Parameters
Parameter Server (ROS Master)
Parameters
Write
Read

The powerful of ROS



Synchronization

Topics, services, actions

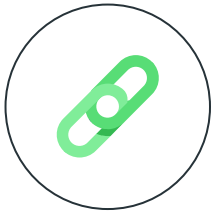


Open source

https://robots.ros.org/

Simulation

Gazebo & Rviz



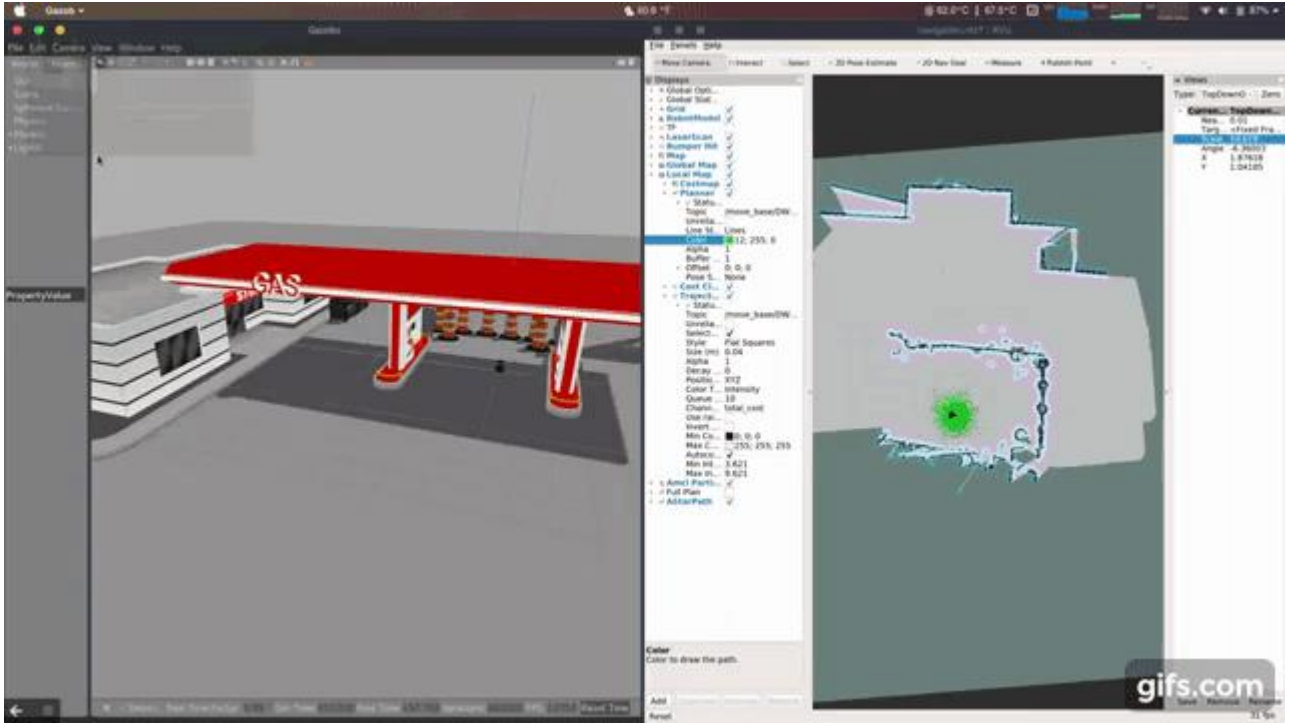
Packages & plugins

Moveit for kinematics, SLAM for navigation, sensor fusion and Kalman filters.

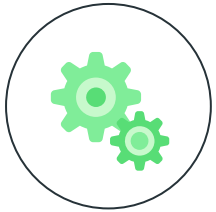
The powerful of ROS

GAZEBO

RViz

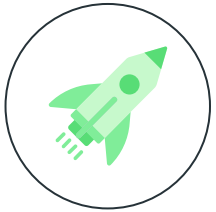


The powerful of ROS



Synchronization

Topics, services, actions



Open source

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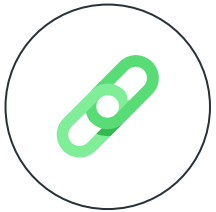
Simulation

Gazebo & Rviz

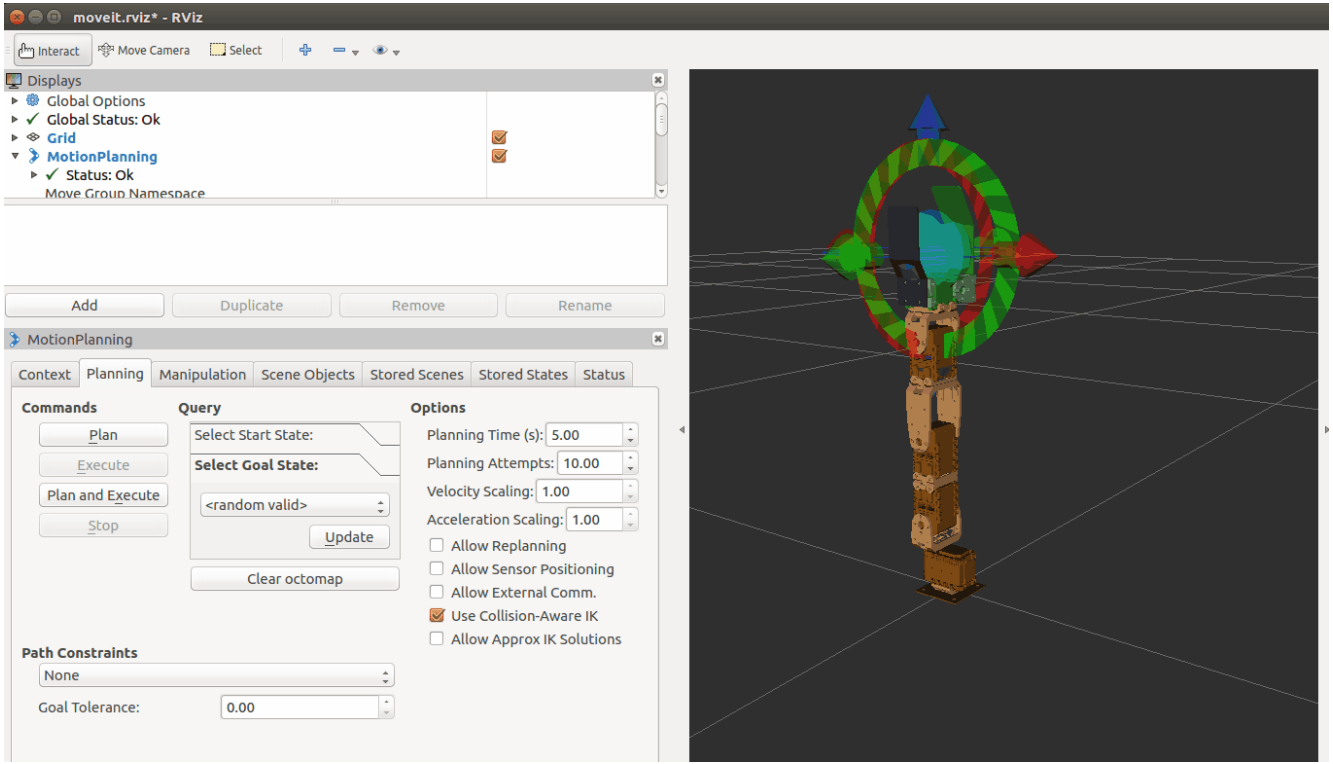


Packages & plugins

Moveit for kinematics, SLAM for navigation, sensor fusion and Kalman filters.

The powerful of ROS

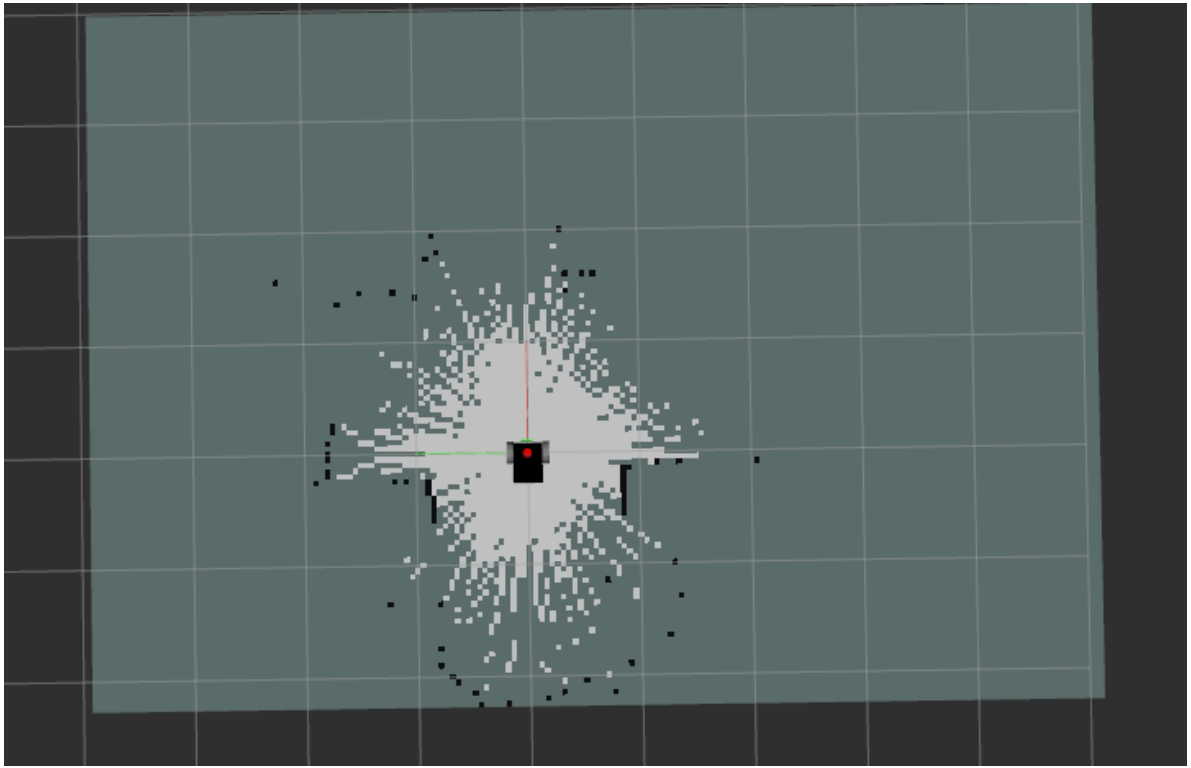
MoveIt



The powerful of ROS

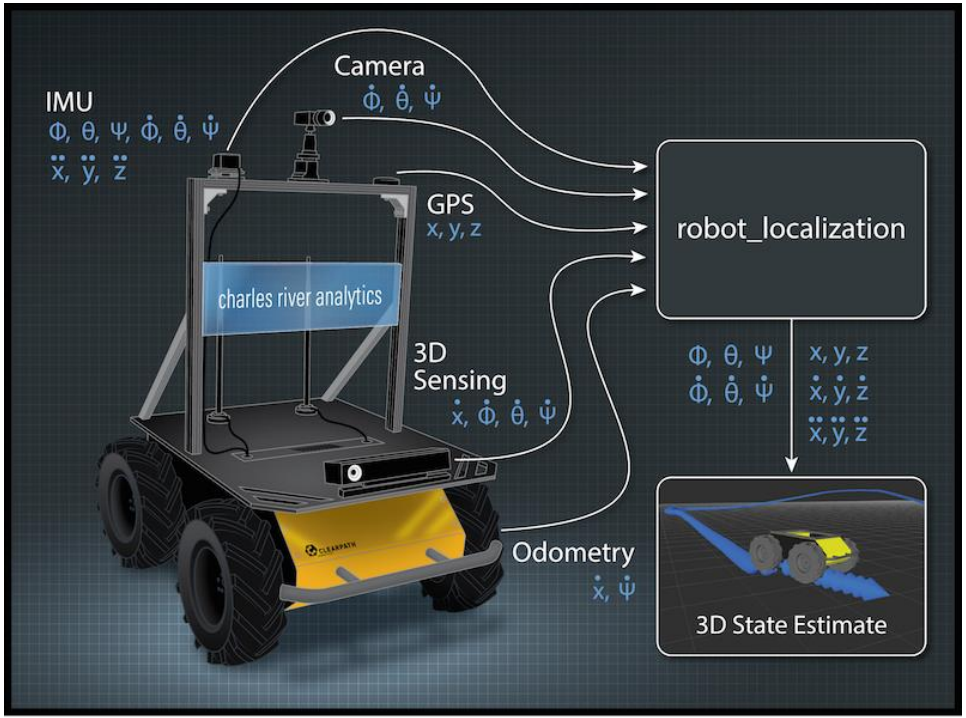
SLAM

Simultaneous localization and mapping



The powerful of ROS

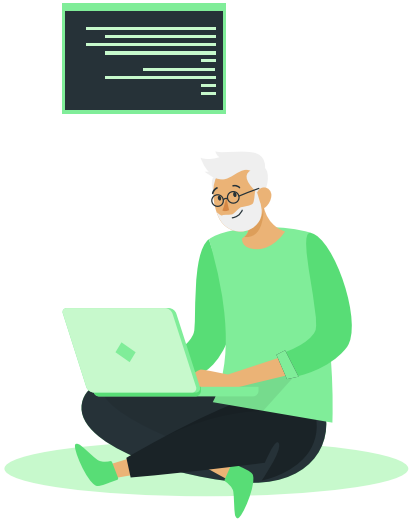
Sensor fusion
robot_localization
package



ROS installation

ROS distros Kinetic, melodic, noetic, foxy ...

http://wiki.ros.org/ROS/Installation



ROS melodic on Ubuntu

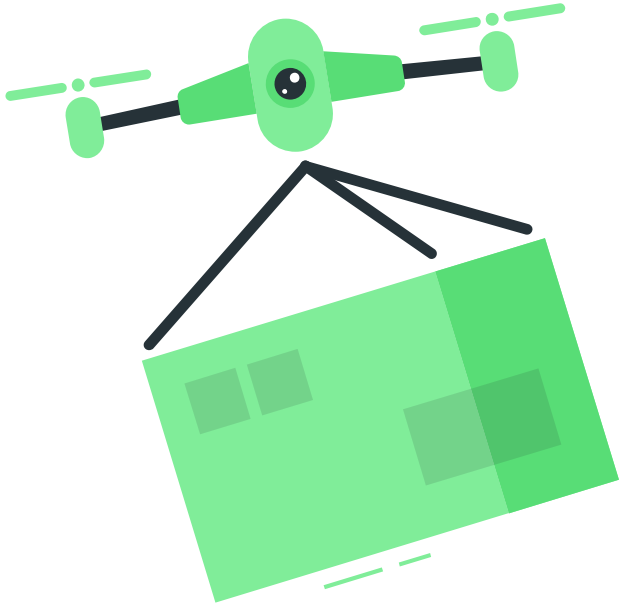
VirtualBox

RaspberryPi

Follow these instructions:

https://github.com/mn-banjar/ROS_on_RaspberryPi3/wiki/How-to-install-ROS-melodic

System demo



GitHub projects:

https://github.com/Psi-Bots/drone_simulation

https://github.com/NishanthARao/ROS-Quadcopter-Simulation

Alternatives

ROS development studio

Online, no installation required

Needs specific configurations to run Gazebo

http://rds.theconstructsim.com/

Ubiquity

Based on Ubuntu 16.04 with built-in ROS kinetic,
for raspberry Pi and VirtualBox

Raspberry Pi image:

There’re some restrictions while running Rviz & Gazebo

https://downloads.ubiquityrobotics.com/

Challenges & further topics

Dependencies

ROS is a middleware

ROS 2

The future of ROS and ROBOTICS !

For issues

https://answers.ros.org/

Thanks!

Moneera Banjar

@mn_banjar

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