

2、 Basic communication

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2.1、 Node settings

Function pack path: ~/transbot_ws/src/transbot_bringup

Transbot needs to realize the functions: speed control, speed information feedback, robotic arm control, robotic arm status feedback, battery voltage feedback, buzzer control, water lamp control, searchlight control, servo platform control.

The content of setting the Transbot bottom driver node according to the requirements is as follows:

- Topic
 - Publish odometer message 【/transbot/get_vel】
 - Publish imu news 【/transbot/imu】
 - Publish battery voltage message 【/voltage】
 - Subscribe to car sports news [/cmd_vel]
 - Subscribe to robotic arm control messages [/TargetAngle]
 - Subscribe to gimbal servo control message [/PWMServo]
- Service (client)
 - Receive buzzer control message 【/Buzzer】
 - Receive searchlight control message [/Headlight]
 - Receive and feedback the current angle message of the robotic arm [/CurrentAngle]
 - Receive flow light control message [/RGBLight]

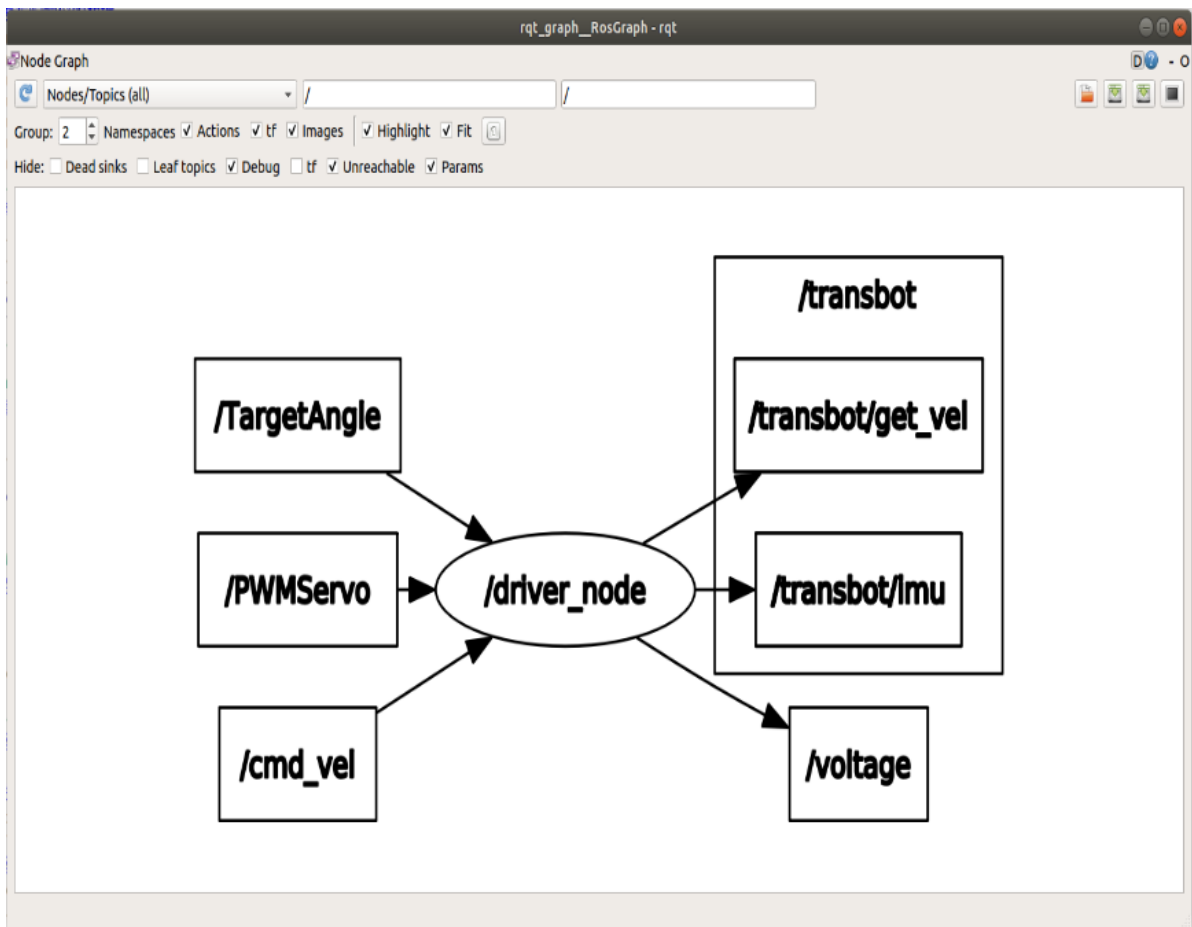
2.2、 Node data view

1) Start up

```
roscore
roslaunch transbot_bringup transbot_driver.py
```

2) View node graph

```
rqt_graph
```



3) View service

```
rosservice list
```

The system will print the following content:

```
/Buzzer  
/CurrentAngle  
/Headlight  
/RGBLight  
... ..
```

```
# Buzzer  
rosservice call /Buzzer "buzzer: 1" # open  
rosservice call /Buzzer "buzzer: 0" # close  
# running water light  
rosservice call /RGBLight "effect: 1  
speed: 0"  
# searchlight  
rosservice call /Headlight "Headlight: 1"  
# Get the current angle of the robotic arm  
rosservice call /CurrentAngle "apply: 'GetJoint'"
```

- Running water light

【effect】 : [0: stop light effect, 1: running water light, 2: marquee light, 3: breathing light, 4: gradient light, 5: starlight, 6: battery display]

【speed】 : [1, 10], The smaller the value, the faster the change.

- Searchlight

【Headlight】 : [0, 100], The larger the value, the greater the brightness.

- Robotic arm

```

yahboom@Yahboom:~$ rosservice call /CurrentAngle "apply: 'GetJoint'"
RobotArm:
  joint:
    -
      id: 7
      run_time: 500
      angle: 161.0
    -
      id: 8
      run_time: 500
      angle: 146.0
    -
      id: 9
      run_time: 500
      angle: 90.0
yahboom@Yahboom:~$ rostopic pub /TargetAngle transbot_msgs/Arm "joint:
- id: 9
  run_time: 500
  angle: 120.0"
publishing and latching message. Press ctrl-C to terminate
^C
yahboom@Yahboom:~$
  
```

id	servo	angle	running time
7	servo connected to the body	【0, 225】	【10, 2000】
8	Second section servo	【30, 270】	【10, 2000】
9	Servo on the clip	【30, 180】	【10, 2000】

- Control servo platform **

Note: If you are using the Astra camera, please do not use the command line to control the servo, it will damage the camera. The neutral angle of all servos is 90.

Input command in the terminal, as shown below.

```

yahboom@Yahboom:~$ rostopic pub /PWMServo transbot_msgs/PWMServo "id: 1
angle: 90"
publishing and latching message. Press ctrl-C to terminate
^C
yahboom@Yahboom:~$
  
```

id	servo	angle	camera
1	Move left and right (X)	【0, 180】	High frame rate
2	Move up and down (Y)	【0, 180】	High frame rate
1	Move left and right (X)	【50, 130】	Astra

4) Check topic

Input command in the terminal, as shown below.

```
yahboom@Yahboom:~$ rostopic pub /cmd_vel geometry_msgs/Twist "linear:
  x: 0.3
  y: 0.0
  z: 0.0
angular:
  x: 0.0
  y: 0.0
  z: 1.0"
publishing and latching message. Press ctrl-C to terminate
yahboom@Yahboom:~$ rostopic pub /cmd_vel geometry_msgs/Twist "linear:
  x: 0.0
  y: 0.0
  z: 0.0
angular:
  x: 0.0
  y: 0.0
  z: 0.0"
publishing and latching message. Press ctrl-C to terminate
^C yahboom@Yahboom:~$
```

Execute motion

Cancel Motion

Use rqt_topic tool

```
roslaunch rqt_topic rqt_topic
```

Topic	Type	Bandwidth	Hz	Value
<input type="checkbox"/> /cmd_vel	geometry_msgs/Twist			not monitored
<input type="checkbox"/> /driver_node/parameter_descriptions	dynamic_reconfigure/ConfigDescription			not monitored
<input type="checkbox"/> /driver_node/parameter_updates	dynamic_reconfigure/Config			not monitored
<input type="checkbox"/> /rosout	rosgraph_msgs/Log			not monitored
<input type="checkbox"/> /rosout_agg	rosgraph_msgs/Log			not monitored
<input checked="" type="checkbox"/> /transbot/get_vel	geometry_msgs/Twist	905.22B/s	18.86	
angular	geometry_msgs/Vector3			
x	float64			0.0
y	float64			0.0
z	float64			0.99
linear	geometry_msgs/Vector3			
x	float64			0.2
y	float64			0.0
z	float64			0.0
<input checked="" type="checkbox"/> /transbot/imu	sensor_msgs/Imu	5.94KB/s	18.84	
angular_velocity	geometry_msgs/Vector3			
x	float64			-0.010658499067005937
y	float64			-0.05915466982188295
z	float64			0.01865237336726039
angular_velocity_covariance	float64[9]			(0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0)
header	std_msgs/Header			
linear_acceleration	geometry_msgs/Vector3			
x	float64			-0.02587890625
y	float64			-0.057861328125
z	float64			0.89697265625
linear_acceleration_covariance	float64[9]			(0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0)
orientation	geometry_msgs/Quaternion			
orientation_covariance	float64[9]			(0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0)
<input checked="" type="checkbox"/> /voltage	transbot_msgs/Battery	76.13B/s	18.86	11.600000381469727
Voltage	float32			

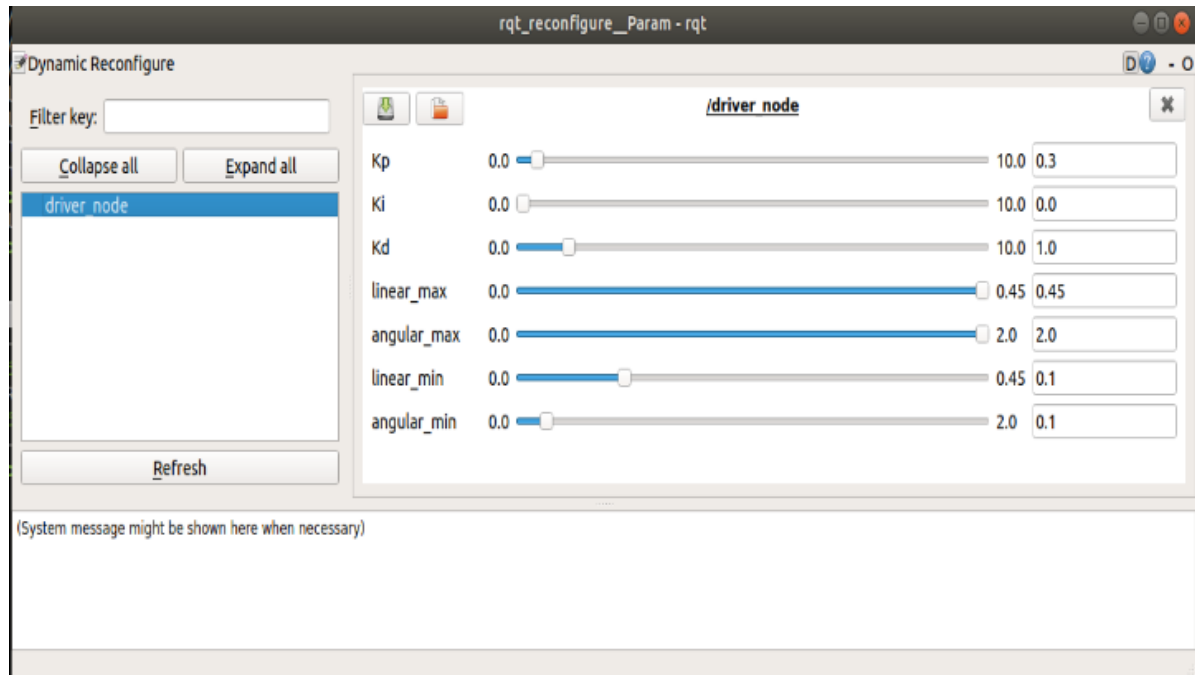
According to the figure above, we need to put a check mark in the front box before we can print the data.

At this time, the battery voltage is 11.6V; the linear velocity and angular velocity of the car are [0.2, 0.99] in decibels; there is also the imu information of the car.

5) Dynamic parameter configuration

No need adjust in our image system, this course just for reference.

```
roslaunch rqt_reconfigure rqt_reconfigure
```



【linear_max】：line speed max value

【angular_max】：Angle speed max value

【linear_min】：line speed min value

【angular_min】：Angle speed min value