

4 Publisher

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4.1 Publisher

Publisher, as the name suggests, plays the role of publishing news. The message here can be the sensor information transmitted by the lower computer to the upper computer, and then packaged and packaged by the upper computer and sent to the subscribers who have subscribed to the topic; it can also be the data of the upper computer after the operation is packaged and packaged and sent to the Subscribers to this topic.

4.2 Create workspace and topic package

4.2.1 Create a workspace

```
mkdir -p ~/catkin_ws/src
cd ~/catkin_ws/src
catkin_init_workspace
```

4.2.2 Compilation workspace

```
cd ~/catkin_ws/
catkin_make
```

4.2.3 Update environment variables

```
source devel/setup.bash
```

4.2.4 Check environment variables

```
echo $ROS_PACKAGE_PATH
```

4.2.5 Create function package

```
cd ~/catkin_ws/src
catkin_create_pkg learning_topic std_msgs rospy roscpp geometry_msgs turtlesim
#Explanation: learning_topic is the name of the function package
```

4.2.6 Compile function package

```
cd ~/catkin_ws
catkin_make
source ~/catkin_ws/devel/setup.bash
```

4.3 create a publisher

4.3.1 Creation steps

1. initialize the ROS node
2. create a handle
3. Register node information with ROS Master, including the topic name published, the message type in the topic, and the queue length
4. create and initialize message data
5. Send messages cyclically according to a certain frequency

4.3.2 C++ language implementation

1. In the src folder of the function package, create a c++ file(the file suffix is .cpp) and name it turtle_velocity_publisher.cpp
2. copy and paste the program code below into the turtle_velocity_publisher.cpp file

```
/* Create a speed publisher for a baby turtle */
#include <ros/ros.h>
#include <geometry_msgs/Twist.h>
int main(int argc, char ** argv){

    ros::init(argc, argv, "turtle_velocity_publisher"); //ROS node
    initialization

    ros::NodeHandle n; //here is to create handle

    //Create a Publisher, publish a topic named /turtle1/cmd_vel, the message
    type is geometry_msgs::Twist, and the queue length is 10
    ros::Publisher turtle_vel_pub = n.advertise < geometry_msgs::Twist >
    ("/turtle1/cmd_vel", 10);

    ros::Rate loop_rate(10); //Set the frequency of the loop

    while (ros::ok()){
        //Initialize the message to be published, the type must be
        consistent with Publisher
        geometry_msgs::Twist turtle_vel_msg;
        turtle_vel_msg.linear.x = 0.8;
        turtle_vel_msg.angular.z = 0.6;

        turtle_vel_pub.publish(turtle_vel_msg); // publish velocity message
    }
```

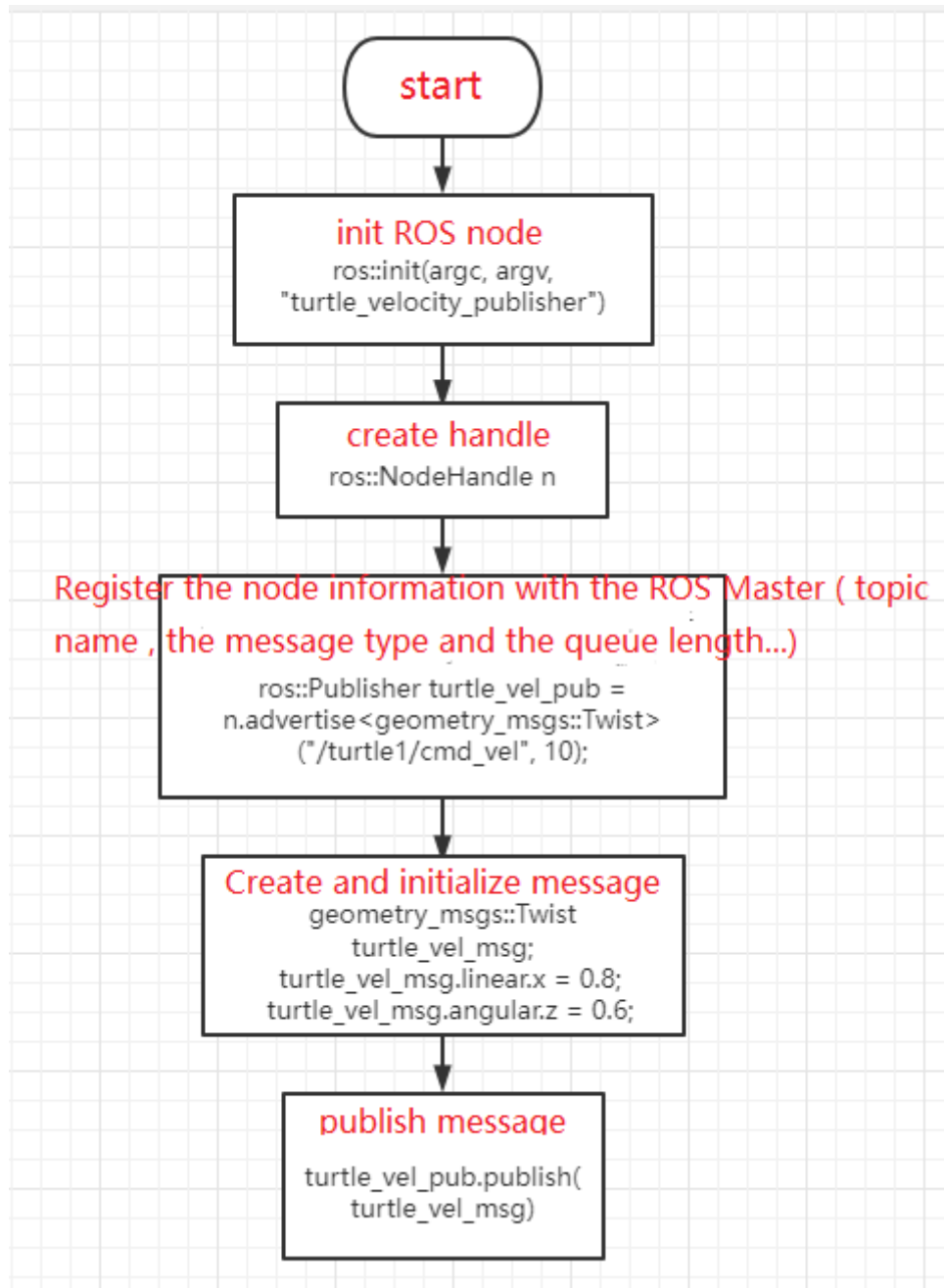
```

//Print the published speed content
ROS_INFO("Publish turtle velocity command[%0.2f m/s, %0.2f rad/s]",
turtle_vel_msg.linear.x, turtle_vel_msg.angular.z);

loop_rate.sleep(); //Delay according to the loop frequency
}
return 0;
}

```

3. the program flow chart, which can be viewed corresponding to the content of 1.3.1



4. configure in CMakeList.txt, under the build area, add the following content

```

add_executable(turtle_velocity_publisher src/turtle_velocity_publisher.cpp)
target_link_libraries(turtle_velocity_publisher ${catkin_LIBRARIES})

```

5. Compile the code in the workspace directory

```
cd ~/catkin_ws
catkin_make
source devel/setup.bash #Environment variables need to be configured, otherwise
the system cannot find the running program
```

6. run the program

- run roscore

```
roscore
```

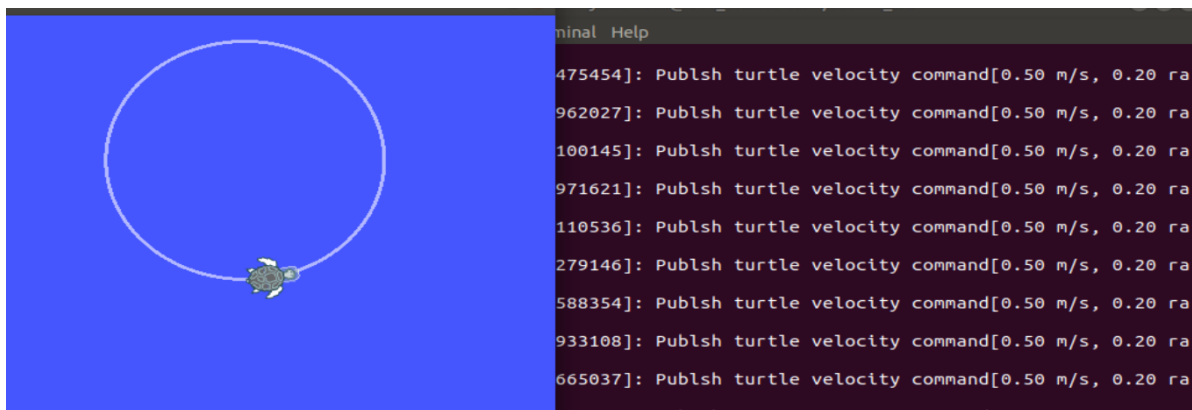
- Run the turtle node

```
roslaunch turtlesim turtlesim_node
```

- Run the publisher to continuously send the speed to the little turtle

```
roslaunch learning_topic turtle_velocity_publisher
```

7. Screenshot of running effect



8. program operation instructions

- Enter `rostopic list` in the terminal to view the topic list and you will find the topic `/turtle1/cmd_vel`
- We use `rostopic info /turtle1/cmd_vel` to find out

```
yahboom@VM_Transbot:~/catkin_ws$ rostopic info /turtle1/cmd_vel
Type: geometry_msgs/Twist

Publishers:
 * /velocity_publisher (http://192.168.2.84:37251/)

Subscribers:
 * /turtlesim (http://192.168.2.84:40003/)
```

This shows that the little turtle is a subscription to the speed topic `/turtle1/cmd_vel`. Therefore, the publisher keeps sending speed data. After the little turtle receives it, it starts to move according to the speed.

4.3.3 Python language implementation

1. In the function package directory, create a new folder `scripts`, and then create a new python file (file suffix `.py`) in the `scripts` folder, named `turtle_velocity_publisher.py`
2. copy and paste the program code below into the `turtle_velocity_publisher.py` file

```

#!/usr/bin/env python
# -*- coding: utf-8 -*-
# This routine will publish turtle1/cmd_vel topic, message type
geometry_msgs::Twist

import rospy
from geometry_msgs.msg import Twist

def turtle_velocity_publisher():

    rospy.init_node('turtle_velocity_publisher', anonymous = True) # ROS node
    initialization

    # Create a small turtle speed publisher, publish a topic named
    # /turtle1/cmd_vel, the message type is geometry_msgs::Twist, and 8 represents the
    # message queue length
    turtle_vel_pub = rospy.Publisher('/turtle1/cmd_vel', Twist, queue_size =
8)

    rate = rospy.Rate(10) # set the frequency of the loop

    while not rospy.is_shutdown():
        # Initialize a message of type geometry_msgs::Twist
        turtle_vel_msg = Twist()
        turtle_vel_msg.linear.x = 0.8
        turtle_vel_msg.angular.z = 0.6

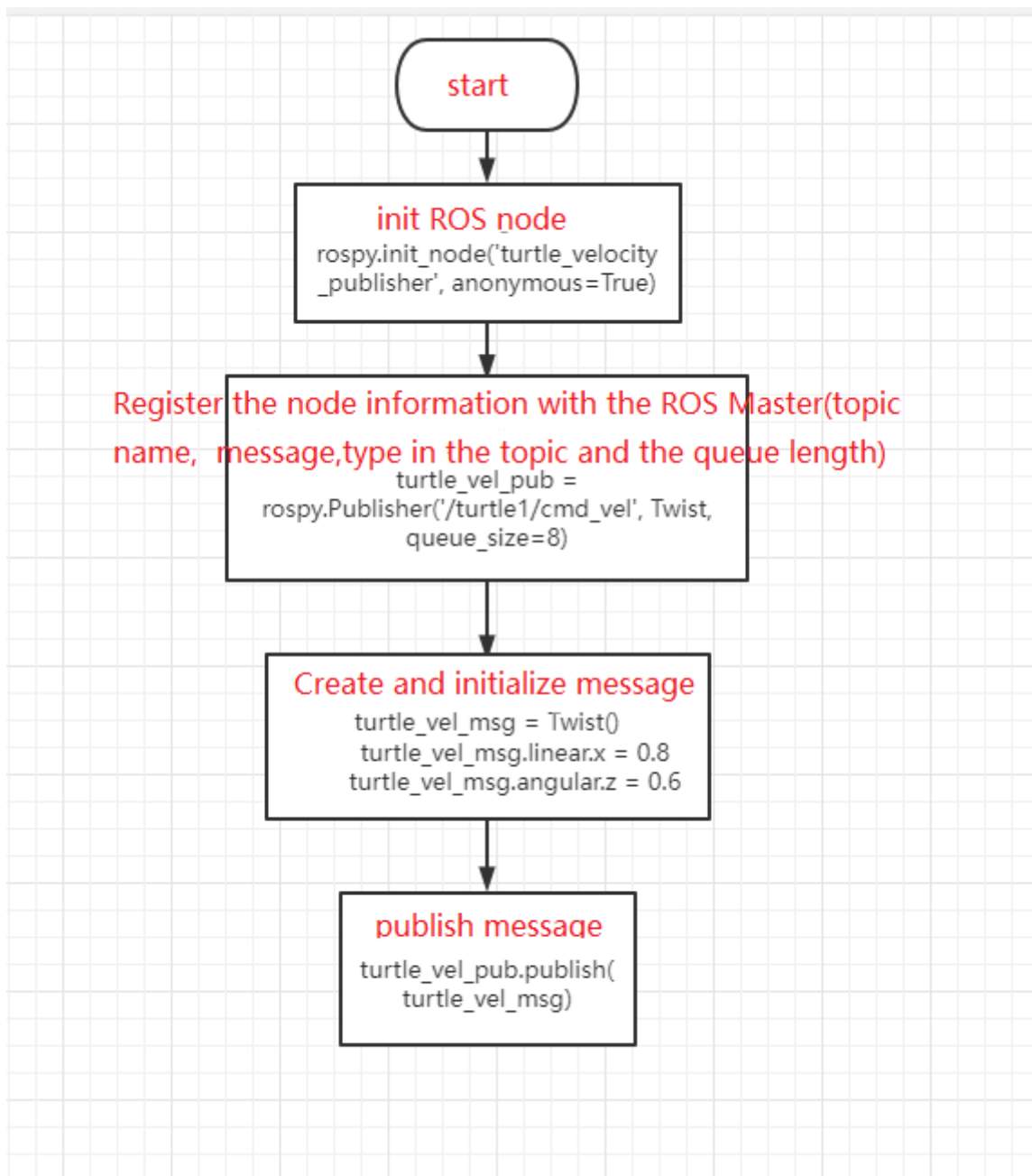
        # make an announcement
        turtle_vel_pub.publish(turtle_vel_msg)
        rospy.loginfo("linear is :%0.2f m/s, angular is :%0.2f rad/s",
            turtle_vel_msg.linear.x, turtle_vel_msg.angular.z)

        rate.sleep() # Delay according to the loop frequency

if __name__ == '__main__':
    try :
        turtle_velocity_publisher()
    except rospy.ROSInterruptException :
        pass

```

3. program flow chart



4. run the program

- run roscore

```
roscore
```

- Run the turtle node

```
roslaunch turtlesim turtlesim_node
```

- Run the publisher to continuously send the speed to the little turtle

```
roslaunch learning_topic turtle_velocity_publisher.py
```

Note: Before running, you need to add executable permissions to `turtle_velocity_publisher.py`, open the terminal in the `turtle_velocity_publisher` folder,

```
sudo chmod a+x turtle_velocity_publisher.py
```

All pythons need to add execute file permissions, otherwise an error will be reported!

5. Refer to 1.3.2 for operation effect and program description.