5 Subscribers

5.1 Subscribers

The subscriber receives the data published by the publisher, and then enters its callback function and processes the received data in the callback function. Its core content is a callback function, and each subscriber subscribes to a topic that has a callback function.

5.2 Create a Subscriber

5.2.1 Creation steps

1. initialize the ROS node
2. create a handle
3. subscribe to the topic you need
4. wait for the topic message in a loop, and enter the callback function after receiving the message
5. complete the message processing in the callback function.

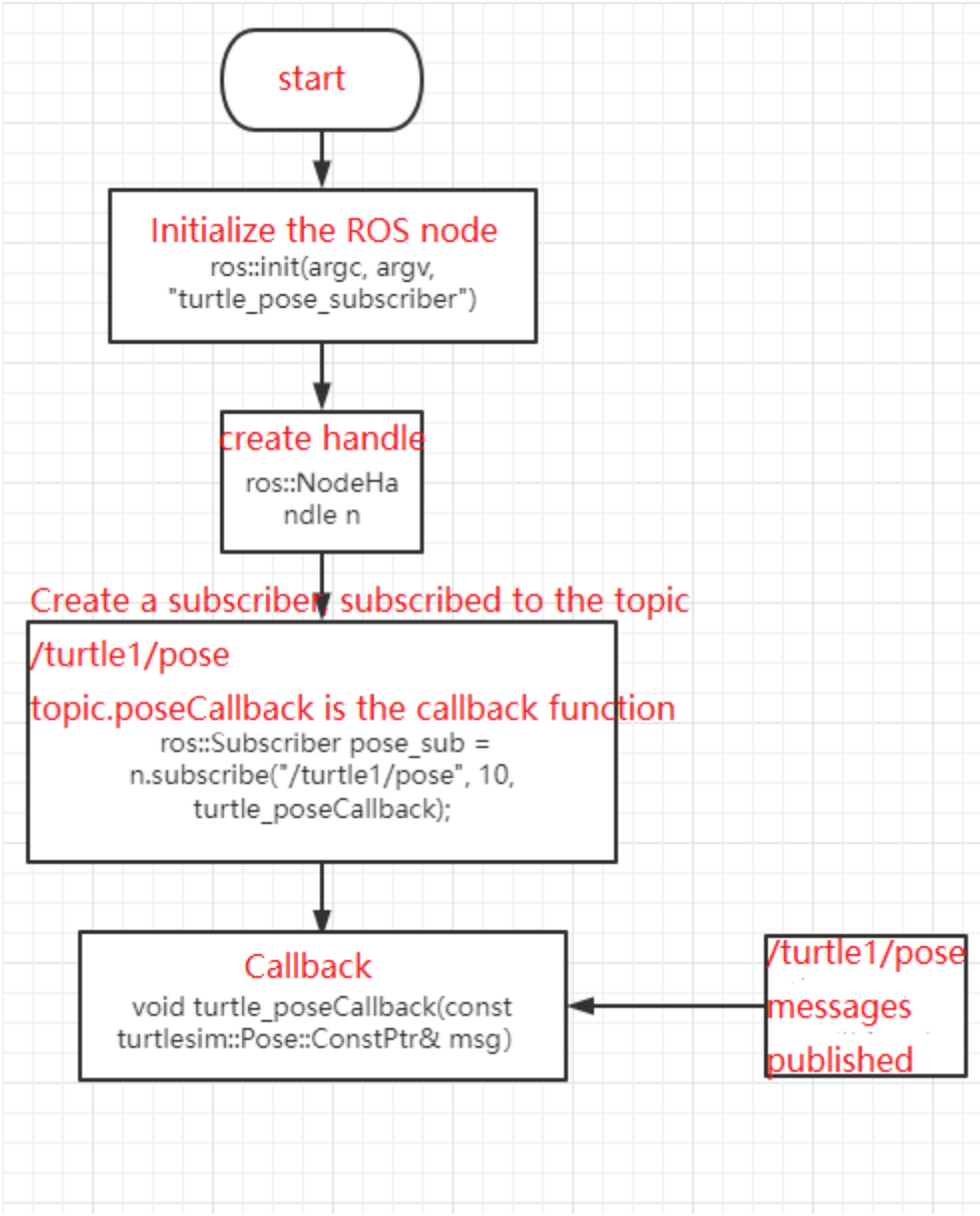
5.2.2 C++ language implementation

1. In the "Publisher" tutorial, create a new c++ file under the src folder of the created function package and name it turtle_pose_subscriber.cpp
2. Copy and paste the program code below into the turtle_pose_subscriber.cpp file

```
/*Create a small turtle's current pose information to receive*/
#include <ros/ros.h>
#include "turtlesim/Pose.h"
// After receiving the message, it will enter the message callback function, and
the callback function will process the received data
void  turtle_poseCallback(const  turtlesim::Pose::ConstPtr &  msg){
    // print received message
    ROS_INFO("Turtle pose: x:%0.3f, y:%0.3f", msg -> x, msg -> y);
}

int  main(int argc, char ** argv){

    ros::init(argc, argv, "turtle_pose_subscriber"); // initialize the ROS node

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

    // Create a subscriber, the subscribed topic is the topic of /turtle1/pose,
and poseCallback is the callback function
    ros::Subscriber  pose_sub  =  n.subscribe("/turtle1/pose", 10,
turtle_poseCallback);
```

```
    ros::spin(); // loop waiting for callback function

    return  0;
}
```

3. Program flow chart, which can be viewed corresponding to the content of 5.2.1



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

```
add_executable(turtle_pose_subscriber src/turtle_pose_subscriber.cpp)
target_link_libraries(turtle_pose_subscriber ${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
```

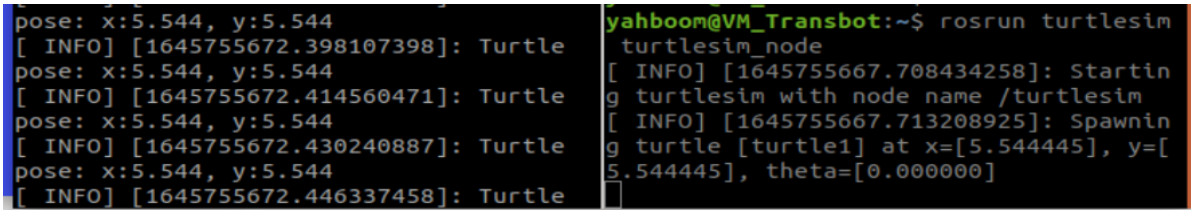
- Run the turtle node

```
rosrun turtlesim turtlesim_node
```

- Run the subscription to continuously receive the pose data sent by the turtle

```
rosrun learning_topic turtle_pose_subscriber
```

7. run the screenshot



8. program operation instructions

- After running the node of the turtle, the turtle will continuously send its own pose information, and the topic name sent is

/turtle1/pose

- After turtle_pose_subscriber runs, it will receive the data messages sent by the turtle, and then print the information in the callback function.

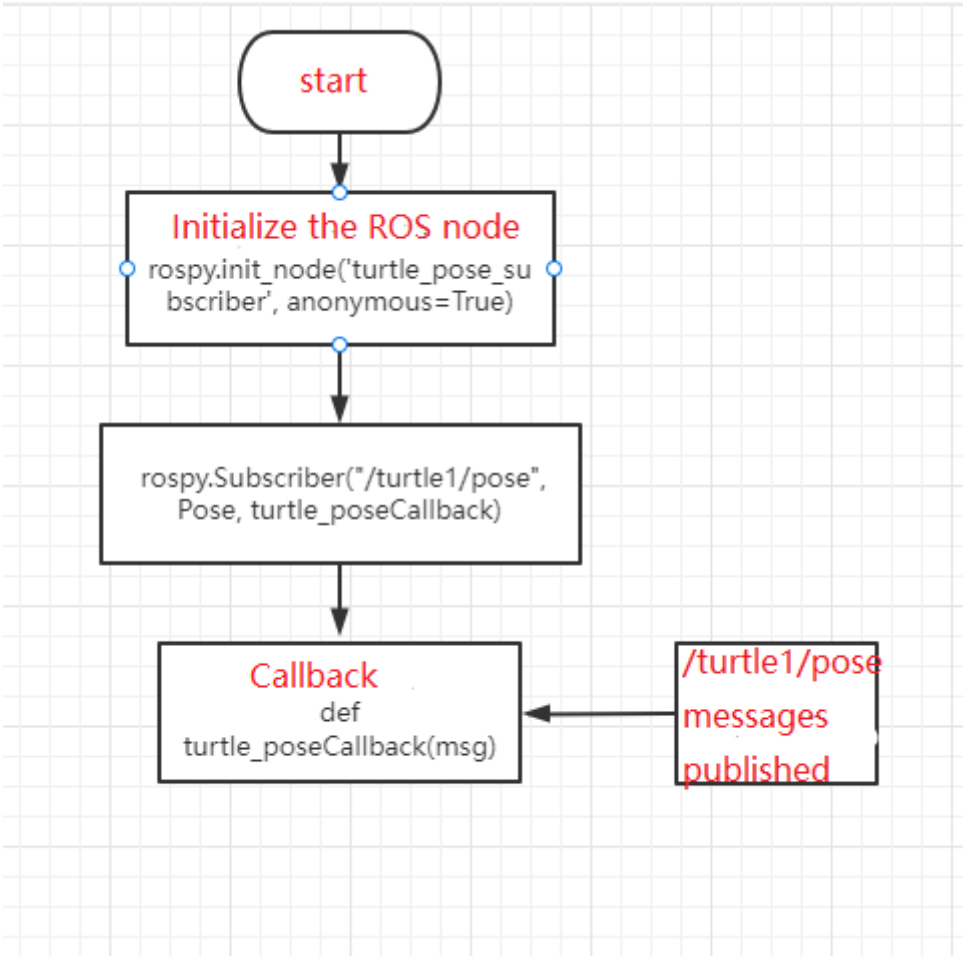
5.2.3 Python language implementation

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_pose_subscriber.py
2. copy and paste the following program code into the turtle_pose_subscriber.py file

```
#!/usr/bin/env python
# -*- coding: utf-8 -*-

import  rospy
from  turtlesim.msg  import  Pose

 def poseCallback(msg):
    rospy.loginfo("Turtle pose: x:%0.3f, y:%0.3f", msg.x, msg.y)

 def turtle_pose_subscriber():

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

    # Create a Subscriber, subscribe to the topic named /turtle1/pose, register
the callback function poseCallback
    rospy.Subscriber("/turtle1/pose", Pose, poseCallback)


    rospy.spin() # loop waiting for the callback function
```

```
if __name__ == '__main__' :
    turtle_pose_subscriber()
```

3. program flow chart



4. run the program

- run roscore

```
roscore
```

- Run the turtle node

```
rosrun turtlesim turtlesim_node
```

- Run the subscriber to continuously receive the pose data sent by the turtle

```
rosrun learning_topic turtle_pose_subscriber.py
```

5. Refer to 5.2.2 for operation effect and program description.