8.Server side

In the previous lesson, we talked about how the client requests services and then the server provides services. In this lesson, we will talk about how the server implements providing services.

8.1. C++Language Implementation

8.1.1 Implementation steps

1) Initialize ROS node
2) Create Server Instance
3) Loop waiting for service request, entering callback function
4) Complete the functional processing of the service in the callback function and provide feedback on the response data

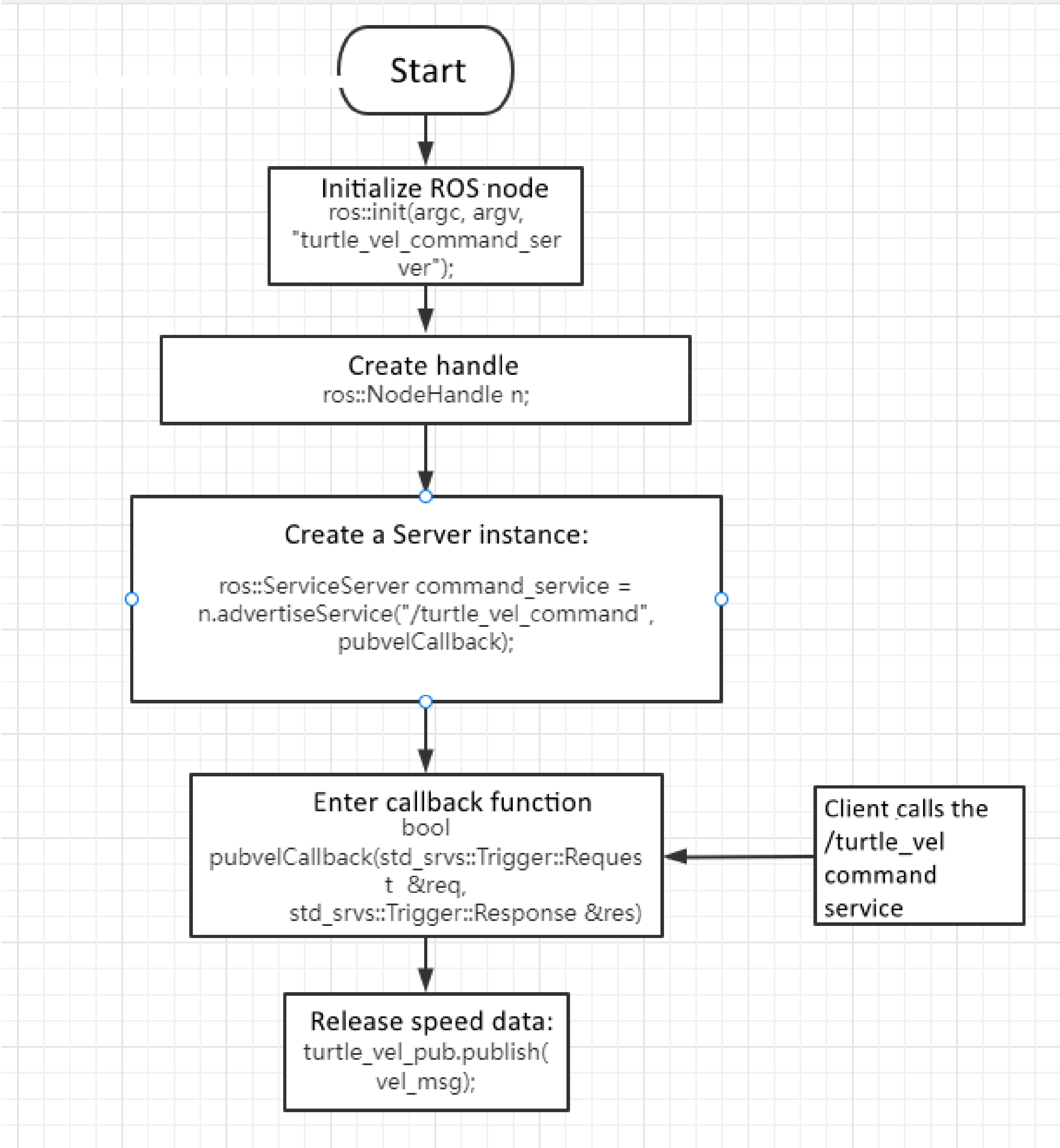
8.1.2. Switch to~/catkin_ ws/src/learning_ Create a new. cpp file under the server/src directory and name it turtle_ vel_ command_ Server, paste the following code inside

turtle_vel_command_server.cpp

```
#include <ros/ros.h>
#include <geometry_msgs/Twist.h>
#include <std_srvs/Trigger.h>

ros::Publisher turtle_vel_pub;
bool pubvel = false;


bool pubvelCallback(std_srvs::Trigger::Request  &req,
                    std_srvs::Trigger::Response &res)
{
    pubvel = !pubvel;

        ROS_INFO("Do you want to publish the vel?: [%s]",
pubvel==true?"Yes":"No");

    res.success = true;
    res.message = "The status is changed!";

    return true;
}

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

    ros::init(argc, argv, "turtle_vel_command_server");


    ros::NodeHandle n;
```

```
    ros::ServiceServer command_service = 
n.advertiseService("/turtle_vel_command", pubvelCallback);

    turtle_vel_pub = n.advertise<geometry_msgs::Twist>("/turtle1/cmd_vel", 8);

    ros::Rate loop_rate(10);

    while(ros::ok())
    {

        ros::spinOnce();// View a callback function queue

        //If pubvel is True, the turtle speed command is issued.
        if(pubvel)
        {
            geometry_msgs::Twist vel_msg;
            vel_msg.linear.x = 0.6;
            vel_msg.angular.z = 0.8;
            turtle_vel_pub.publish(vel_msg);
        }

        loop_rate.sleep();//Delay according to the cycle frequency
    }

    return 0;
}
```

1. Process Flow Chart



2. Configure in CMakelist.txt, under the build area, add the following content

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

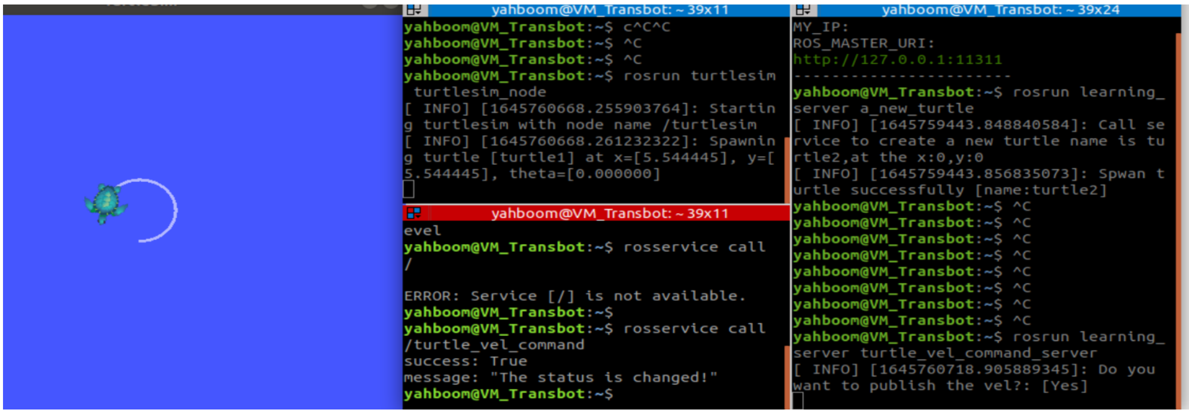
3. Compiling code under workspace directory

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

4. run a program

```
roscore
rosrun turtlesim turtlesim_node
rosrun learning_server turtle_vel_command_server
```

5. Running effect screenshot



6. Program Description

Firstly, after running the Little Turtle node, you can enter the rossservice list on the terminal to view the current services. The results are as follows

```
yahboom@VM_Transbot:~$ rosservice list
/clear
/kill
/reset
/rosout/get_loggers
/rosout/set_logger_level
/spawn
/turtle1/set_pen
/turtle1/teleport_absolute
/turtle1/teleport_relative
/turtlesim/get_loggers
/turtlesim/set_logger_level
```

Then, we will run turtle again_ vel_ command_ Server program, and then enter the rossservice list, you will find that there are multiple turns_ vel_ command_ Server, as shown in the following figure

```
yahboom@VM_Transbot:~$ rosservice list
/clear
/kill
/reset
/rosout/get_loggers
/rosout/set_logger_level
/spawn
/turtle1/set_pen
/turtle1/teleport_absolute
/turtle1/teleport_relative
/turtle_vel_command
/turtle_vel_command_server/get_loggers
/turtle_vel_command_server/set_logger_l
evel
/turtlesim/get_loggers
/turtlesim/set_logger_level
```

Then, we input rossservice call/tour at the terminal_ vel_ command_ When the server calls this service, it will find that the little turtle is doing circular motion. If the service is called again, the little turtle stops moving. This is because in the service callback function, we invert the value of pubvel and provide feedback. The main function will determine the value of pubvel. If it is true, we will issue speed instructions, and if it is false, we will not issue instructions.

8.2. Python Language Implementation

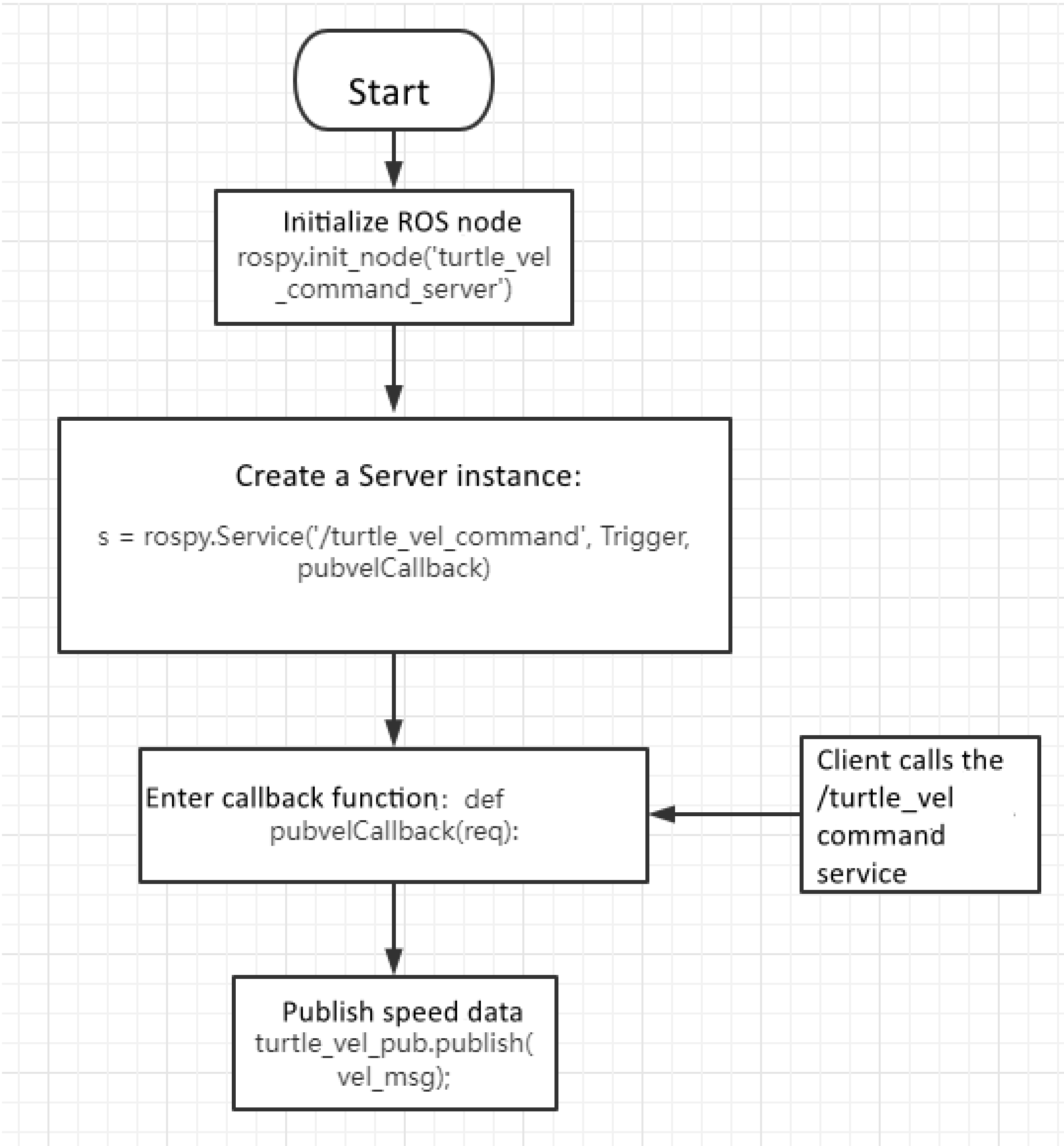
8.2.1. Switch to~/catkin_ ws/src/learning_ Under the server directory, create a new script folder, cut it in, and create a new py file named turtle_ vel_ command_ Server, paste the following code inside

turtle_vel_command_server.py

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


import rospy
import thread,time
from geometry_msgs.msg import Twist
from std_srvs.srv import Trigger, TriggerResponse

pubvel = False;
turtle_vel_pub = rospy.Publisher('/turtle1/cmd_vel', Twist, queue_size=8)

def pubvel_thread():
    while True:
        if pubvel:
            vel_msg = Twist()
            vel_msg.linear.x = 0.6
            vel_msg.angular.z = 0.8
            turtle_vel_pub.publish(vel_msg)

        time.sleep(0.1)

def pubvelCallback(req):
    global pubvel

    pubvel = bool(1-pubvel)

    rospy.loginfo("Do you want to publish the vel?[%s]", pubvel)# Display request
data

    return TriggerResponse(1, "Change  state!")# Feedback data

def turtle_pubvel_command_server():

    rospy.init_node('turtle_vel_command_server')# ROS node initialization


    s = rospy.Service('/turtle_vel_command', Trigger, pubvelCallback)

    # Loop waiting for callback function
```

```
    print "Ready to receive turtle_pub_vel_command."

    thread.start_new_thread(pubvel_thread, ())
    rospy.spin()

if __name__ == "__main__":
    turtle_pubvel_command_server()
```

1. Process Flow Chart



2. run a program

```
roscore
rosrun turtlesim turtlesim_node
rosrun learning_server turtle_vel_command_server.py
```

3. The program operation effect and program description are consistent with the implementation effect in C++.