自定义消息的发布订阅

1

新建工作空间

```
mkdir -p p3_ws/src
cd p3_ws
catkin_make
code . //打开vscode
```

2

预编译
调整task.json文件

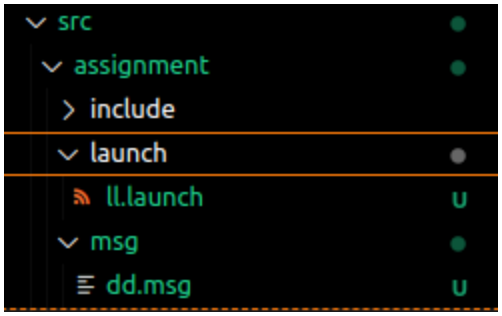
```
{
        // 有关 tasks.json 格式的文档，请参见
                // https://go.microsoft.com/fwlink/?LinkId=733558
                "version": "2.0.0",
                "tasks": [
                        {
                                "label": "catkin_make:debug", //代表提示的描述性信息
                                "type": "shell",  //可以选择shell或者process,如果是shell代
                                "command": "catkin_make",//这个是我们需要运行的命令
                                "args": [],//如果需要在命令后面加一些后缀，可以写在这里，比如-
                                "group": {"kind":"build","isDefault":true},
                                "presentation": {
                                        "reveal": "always"//可选always或者silence，代表是否
                                },
                                "problemMatcher": "$msCompile"
                        }
                ]
        }
```

3

在/src目录下新建功能包assignment
依赖：roscpp rospy std_msgs

4

在功能包下新建msg文件夹，新建dd.msg



文件内容：

```
int64 x
int64 y
int64 z
```

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编辑package.xml
添加

```
<build_depend>message_generation</build_depend>
<exec_depend>message_runtime</exec_depend>
```

```
<buildtool_depend>catkin</buildtool_depend>
<build_depend>roscpp</build_depend>
<build_depend>rospy</build_depend>
<build_depend>std_msgs</build_depend>
<build_depend>message_generation</build_depend>
<build_export_depend>roscpp</build_export_depend>
<build_export_depend>rospy</build_export_depend>
<build_export_depend>std_msgs</build_export_depend>
<exec_depend>roscpp</exec_depend>
<exec_depend>rospy</exec_depend>
<exec_depend>std_msgs</exec_depend>
<exec_depend>message_runtime</exec_depend>
```

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编辑功能包下的CMakeLists.txt

```
find_package(catkin REQUIRED COMPONENTS
  roscpp
  rospy
  std_msgs
  message_generation
)
```

```
find_package(catkin REQUIRED COMPONENTS
  roscpp
  rospy
  std_msgs
  message_generation
)
```

```
# Generate messages in the 'msg' folder
add_message_files(
  FILES
  dd.msg
)
```

```
# Generate messages in the 'msg' folder
add_message_files(
  FILES
  dd.msg
)
```

```
generate_messages(
  DEPENDENCIES
  std_msgs
)
```

```
## Generate added messages and services with any dependencies listed here
generate_messages(
  DEPENDENCIES
  std_msgs
)
```

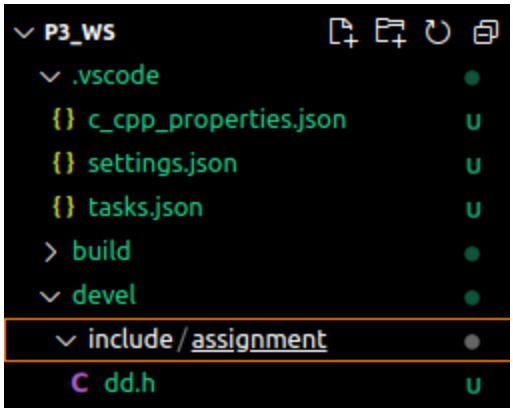
```
catkin_package(
#  INCLUDE_DIRS include
#  LIBRARIES assignment
 CATKIN_DEPENDS roscpp rospy std_msgs message_runtime
#  DEPENDS system_lib
)
```

```
catkin_package(
#  INCLUDE_DIRS include
#  LIBRARIES assignment
 CATKIN_DEPENDS roscpp rospy std_msgs message_runtime
#  DEPENDS system_lib
)
```

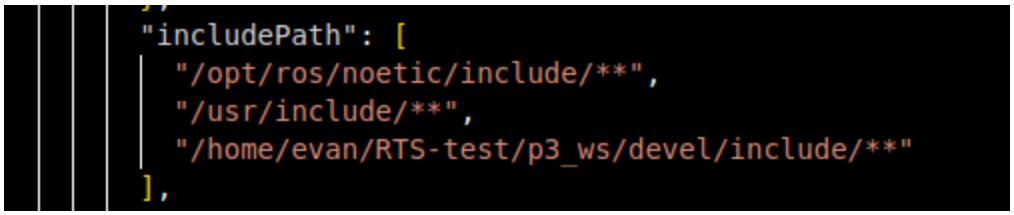
然后编译

7

在p3_ws/devel下找到include



复制路径在c_cpp_properties.json文件中添加



include/**表示包含include下所有文件

8

在功能包下src中新建文件talker.cpp作为发布者

8.1

包含ros和自定义消息的头文件

```
#include "ros/ros.h"
#include "assignment/dd.h"
```

8.2

进入main函数，将括号内*argv默认的const去掉

8.3

解决中文乱码问题

```
setlocale(LC_ALL,"");
```

节点初始化，命名为talker

```
ros::init(argc,argv,"talker");
```

创建节点句柄

```
ros::NodeHandle nh;
```

8.4

创建发布者对象，定义发布消息类型为assignment::dd,定义话题名称为"chat"，最大存储10次已发布的消息

```
ros::Publisher pub = nh.advertise<assignment::dd>("chat",10);
```

8.5

新建消息
设置消息中参数的值

```
assignment::dd msg;
    msg.x = 111;
    msg.y = 111;
    msg.z = 232;
```

8.6

设置发布频率为一秒一次并循环发布

```
ros::Rate r(1);
    while (ros::ok())
    {
        pub.publish(msg);
        r.sleep();
        ros::spinOnce();
    }
```

8.7 最终效果

```
#include "ros/ros.h"
#include "assignment/dd.h"

int main(int argc, char  *argv[])
{
    setlocale(LC_ALL,"");
    ros::init(argc,argv,"talker");
    ros::NodeHandle nh;
    ros::Publisher pub = nh.advertise<assignment::dd>("chat",10);
    assignment::dd msg;
    msg.x = 111;
    msg.y = 111;
    msg.z = 232;

    ros::Rate r(1);
    while (ros::ok())
    {
        pub.publish(msg);
        r.sleep();
        ros::spinOnce();
    }

    return 0;
}
```

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在功能包下src中新建文件listener.cpp作为订阅者

9.1

包含头文件

```
#include "ros/ros.h"
#include "assignment/dd.h"
```

9.2

声明并写出处理消息的函数：接到消息后打印每个值

```
void domsg(const assignment::dd::ConstPtr& Msg){
    ROS_INFO("x:%d y:%d z:%d",Msg->x,Msg->y,Msg->z);
}
```

9.3

进入main函数，并将*argv前的const去掉

9.4

初始化节点，命名为listener

```
ros::init(argc,argv,"listener");
```

创建节点句柄

```
ros::NodeHandle nh;
```

9.5

创建订阅者对象，订阅消息类型为assignment：：dd，订阅话题为"chat",最大存储10次已发布的消息，处理函数为domsg

```
ros::Subscriber sub = nh.subscribe<assignment::dd>("chat",10,domsg);
```

9.6

循环订阅

```
ros::spin();
```

9.7 最终效果

```
#include "ros/ros.h"
#include "assignment/dd.h"


void domsg(const assignment::dd::ConstPtr& Msg){
    ROS_INFO("x:%d y:%d z:%d",Msg->x,Msg->y,Msg->z);
}


int main(int argc, char  *argv[])
{
    ros::init(argc,argv,"listener");
    ros::NodeHandle nh;
    ros::Subscriber sub = nh.subscribe<assignment::dd>("chat",10,domsg);

    ros::spin();

    return 0;
}
```

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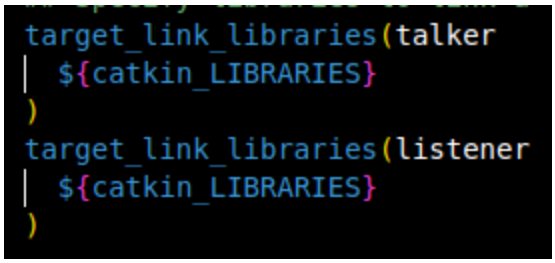
编辑功能包下的CMakeLists.txt

```
136   add_executable(talker src/talker.cpp)
137   add_executable(listener src/listener.cpp)
```

```
add_executable(talker src/talker.cpp)
add_executable(listener src/listener.cpp)
```

```
148   add_dependencies(talker ${${PROJECT_NAME}_EXPORTED_TARGETS} ${catkin_EXPORTED_TARGETS})
149   add_dependencies(listener ${${PROJECT_NAME}_EXPORTED_TARGETS} ${catkin_EXPORTED_TARGETS})
```

```
add_dependencies(talker ${${PROJECT_NAME}_EXPORTED_TARGETS} ${catkin_EXPORTED_TARGETS})
add_dependencies(listener ${${PROJECT_NAME}_EXPORTED_TARGETS} ${catkin_EXPORTED_TARGETS}
```




```
target_link_libraries(talker
  ${catkin_LIBRARIES}
)
target_link_libraries(listener
  ${catkin_LIBRARIES}
)
```

编译

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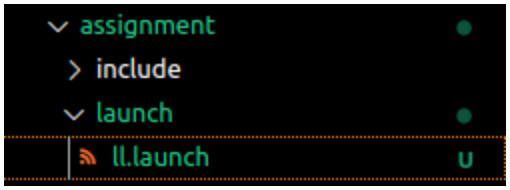
在功能包下创建launch文件夹，新建ll.launch文件




```
<launch>
    <node pkg="assignment" type="talker" name="talker"/>
    <node pkg="assignment" type="listener" name="listener" output="screen"/>
</launch>
```

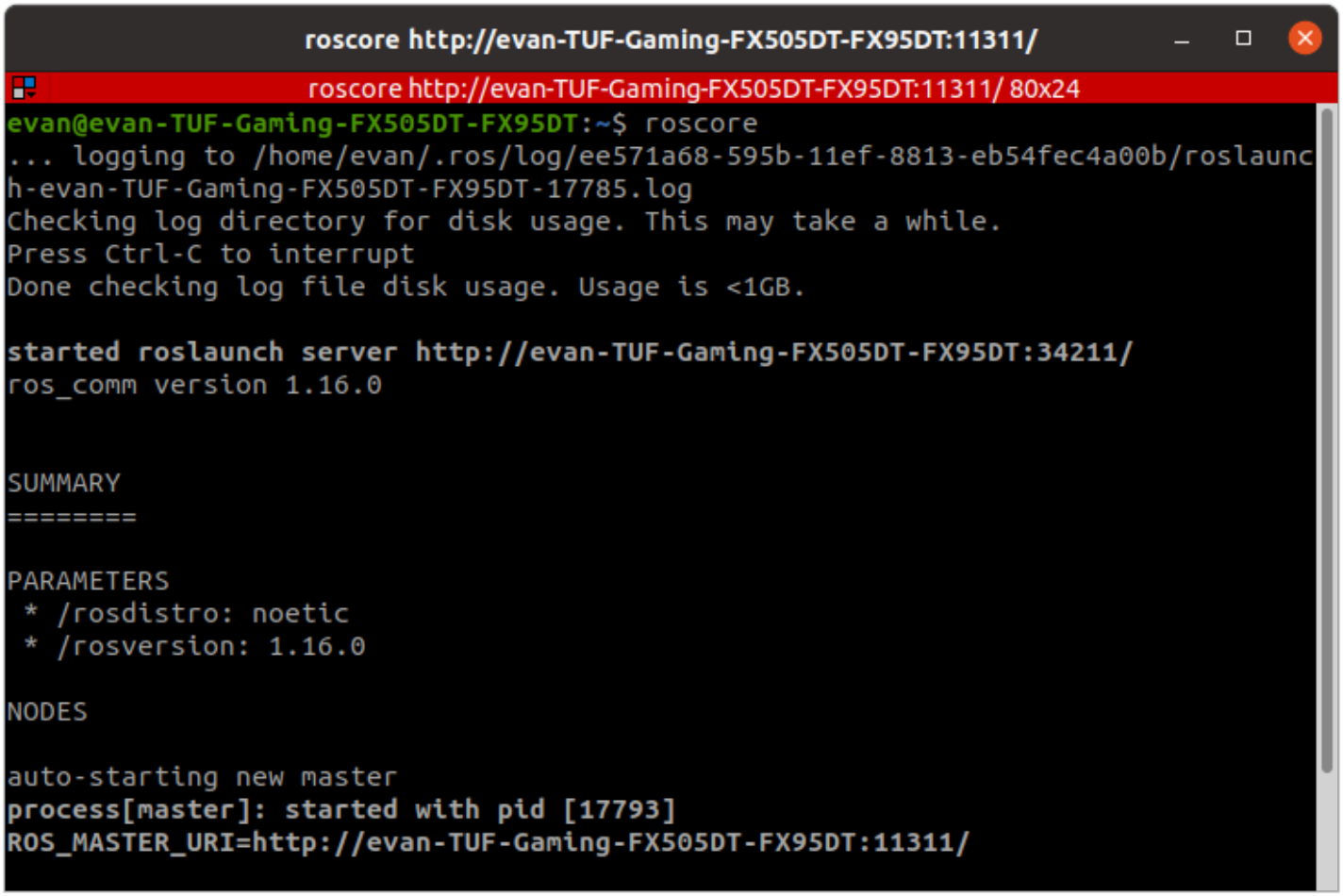
pkg:功能包名
type:文件名
name:节点名
output:输出端
然后编译

12 最终执行

打开两个终端

12.1

roscore启动核心



12.2

更新环境变量

roslaunch启动两个节点

```
evan@evan-TUF-Gaming-FX505DT-FX95DT:~/RTS-test/p3_ws$ roslaunch assignment ll.launch
... logging to /home/evan/.ros/log/ee571a68-595b-11ef-8813-eb54fec4a00b/roslaunch-evan-TUF-Gami
ng-FX505DT-FX95DT-18236.log
Checking log directory for disk usage. This may take a while.
Press Ctrl-C to interrupt
Done checking log file disk usage. Usage is <1GB.

started roslaunch server http://evan-TUF-Gaming-FX505DT-FX95DT:46625/

SUMMARY
========

PARAMETERS
 * /rosdistro: noetic
 * /rosversion: 1.16.0

NODES
  /
    listener (assignment/listener)
    talker (assignment/talker)

ROS_MASTER_URI=http://localhost:11311

process[talker-1]: started with pid [18250]
process[listener-2]: started with pid [18251]
[ INFO] [1723544007.898226229]: x:111 y:111 z:232
[ INFO] [1723544008.897841929]: x:111 y:111 z:232
[ INFO] [1723544009.898131833]: x:111 y:111 z:232
```

```
source ./devel/setup.bash
roslaunch assignment ll.launch
```