

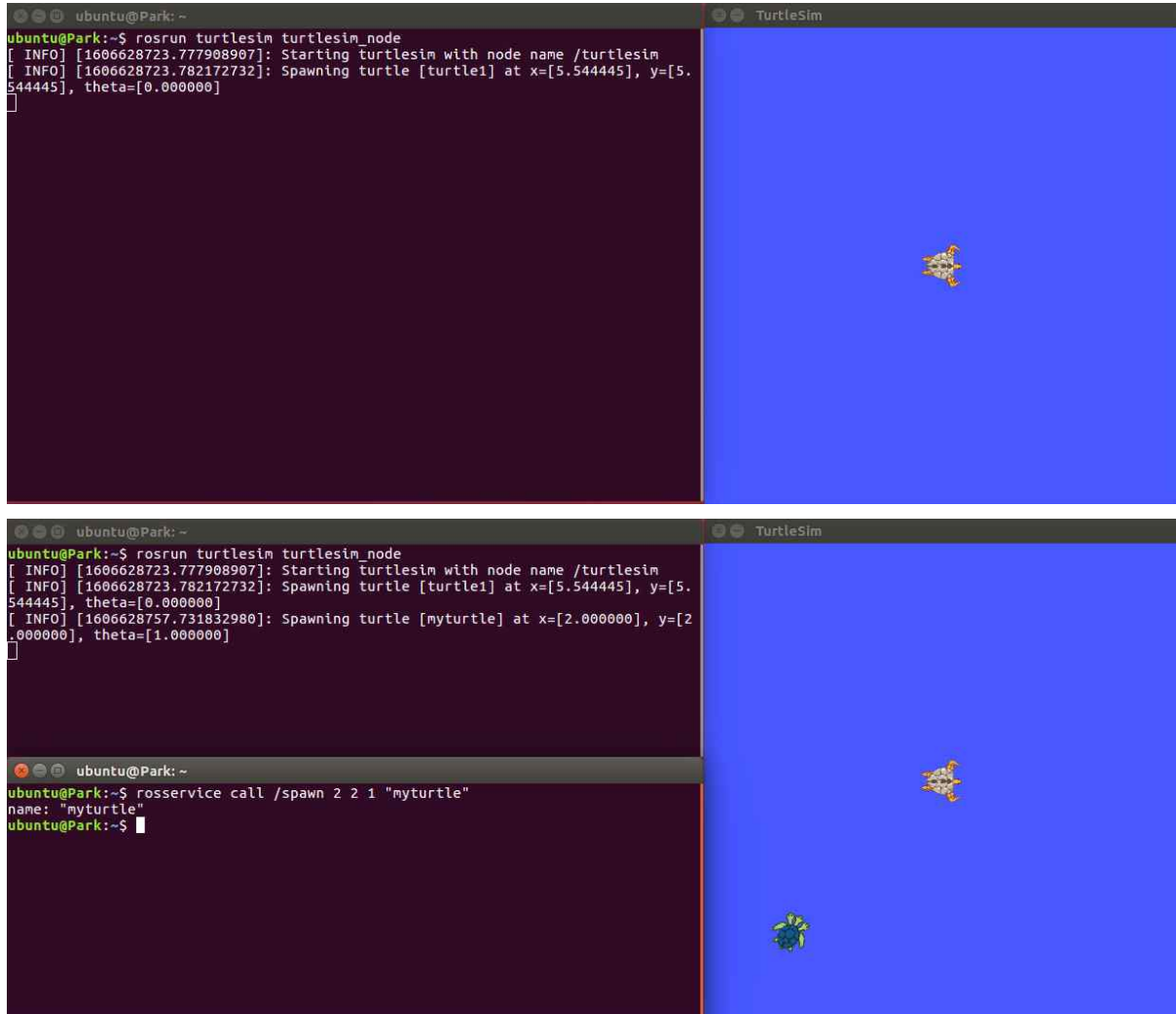
# ROS Message, Service, Param(2)

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## 1. ROS Service

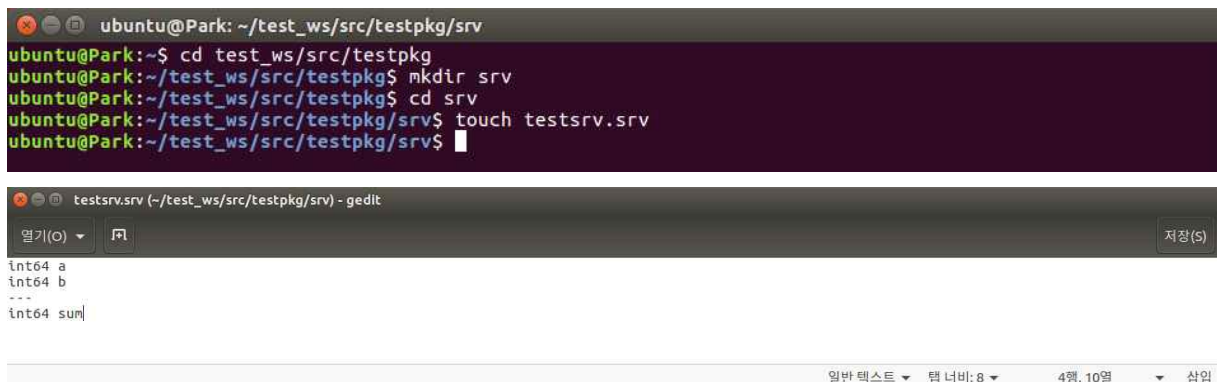
### 1) ROS Service

- rosservice를 이용해 service 호출(새로운 turtle 생성)

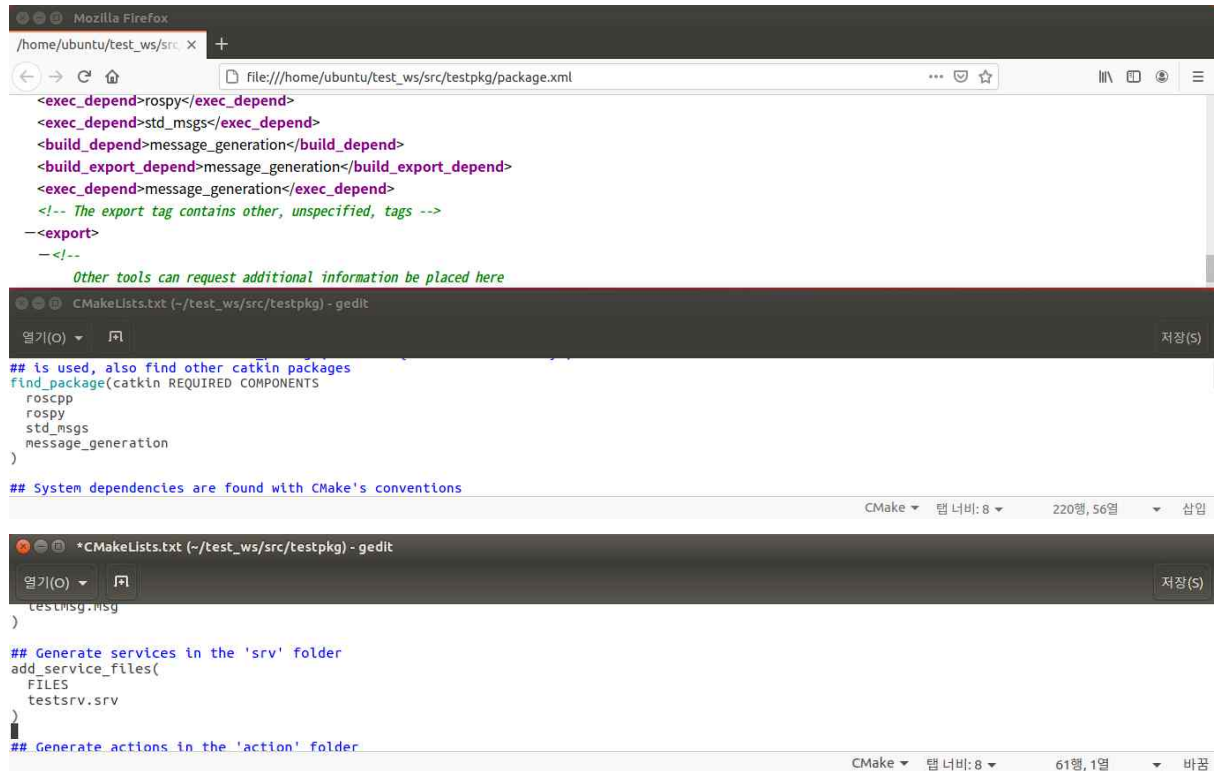


## 2) ROS Custom Service

- Testpkgdp srv 폴더 생성, testsrv.srv 생성



- package.xml, CMakeList.txt에 내용 추가 및 수정



The screenshot shows a web browser window with two tabs. The first tab, titled 'package.xml', displays the XML content of the file. The second tab, titled 'CMakeLists.txt (-/test\_ws/src/testpkg) - gedit', shows the CMakeLists.txt file in a code editor. The code in CMakeLists.txt includes comments and function calls for finding catkin packages and generating services and actions.

```

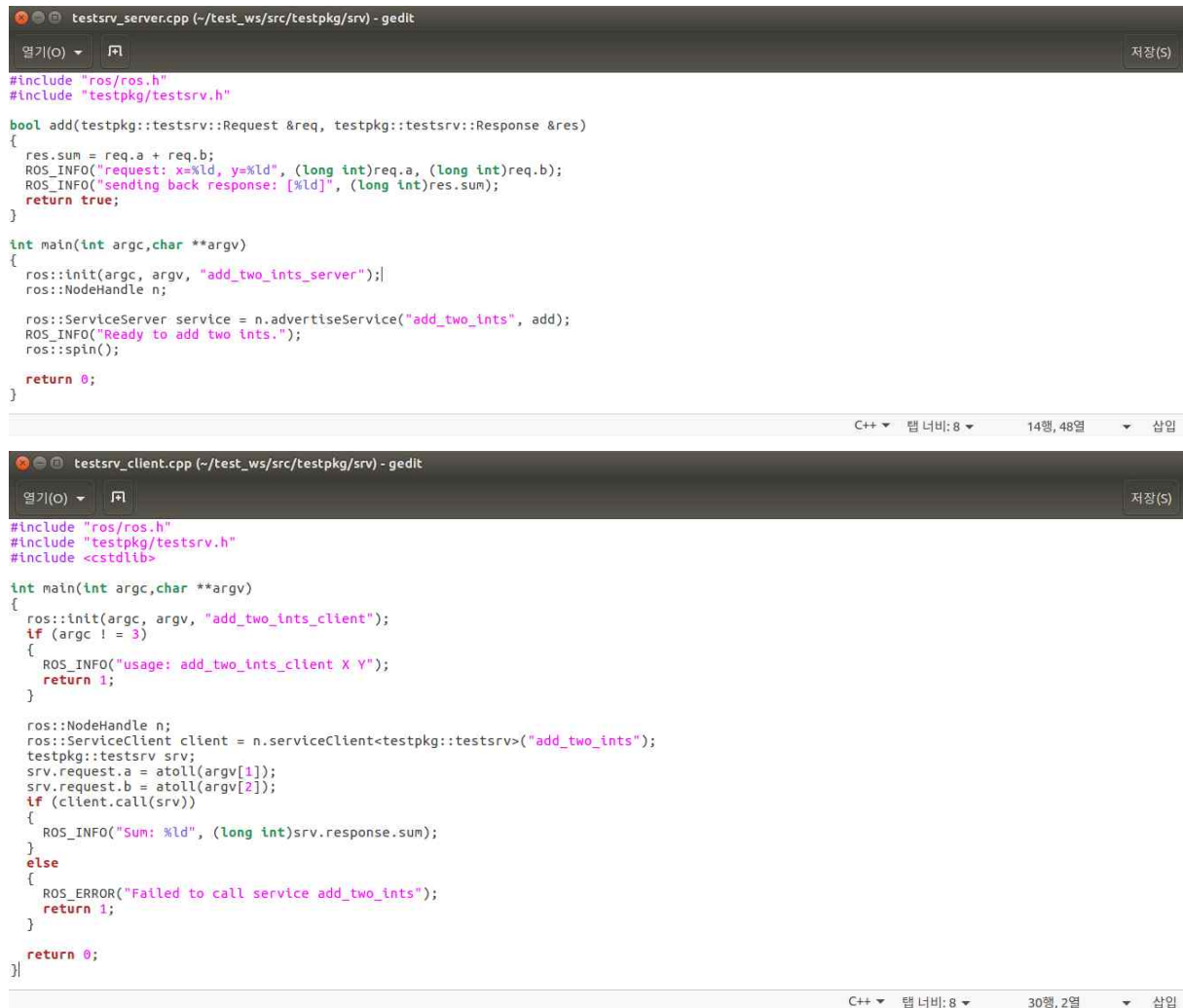
<exec_depend>rospy</exec_depend>
<exec_depend>std_msgs</exec_depend>
<build_depend>message_generation</build_depend>
<build_export_depend>message_generation</build_export_depend>
<exec_depend>message_generation</exec_depend>
<!-- The export tag contains other, unspecified, tags -->
-<export>
-<!--
    Other tools can request additional information be placed here
-->

## is used, also find other catkin packages
find_package(catkin REQUIRED COMPONENTS
  roscpp
  rospy
  std_msgs
  message_generation
)

## System dependencies are found with CMake's conventions

```

- testsrv\_server.cpp, testsrv\_client.cpp 생성



The screenshot shows two C++ source files in a code editor. The first file, testsrv\_server.cpp, defines a ROS service server that adds two integers. The second file, testsrv\_client.cpp, defines a ROS service client that calls the add\_two\_ints service and prints the result.

```

#include "ros/ros.h"
#include "testpkg/testsrv.h"

bool add(testpkg::testsrv::Request &req, testpkg::testsrv::Response &res)
{
    res.sum = req.a + req.b;
    ROS_INFO("request: x=%ld, y=%ld", (long int)req.a, (long int)req.b);
    ROS_INFO("sending back response: [%ld]", (long int)res.sum);
    return true;
}

int main(int argc, char **argv)
{
    ros::init(argc, argv, "add_two_ints_server");
    ros::NodeHandle n;

    ros::ServiceServer service = n.advertiseService("add_two_ints", add);
    ROS_INFO("Ready to add two ints.");
    ros::spin();

    return 0;
}

#include "ros/ros.h"
#include "testpkg/testsrv.h"
#include <cstdlib>

int main(int argc, char **argv)
{
    ros::init(argc, argv, "add_two_ints_client");
    if (argc != 3)
    {
        ROS_INFO("usage: add_two_ints_client X Y");
        return 1;
    }

    ros::NodeHandle n;
    ros::ServiceClient client = n.serviceClient<testpkg::testsrv>("add_two_ints");
    testpkg::testsrv srv;
    srv.request.a = atoll(argv[1]);
    srv.request.b = atoll(argv[2]);
    if (client.call(srv))
    {
        ROS_INFO("Sum: %ld", (long int)srv.response.sum);
    }
    else
    {
        ROS_ERROR("Failed to call service add_two_ints");
        return 1;
    }

    return 0;
}

```

- CMakeList에 server와 client 빌드 설정

```
CMakeLists.txt (~/.test_ws/src/testpkg) - gedit
add_executable(custommsg_subnode msg/custommsg_sub.cpp)
target_link_libraries(custommsg_subnode ${catkin_LIBRARIES})

add_executable(testsrv_server srv/testsrv_server.cpp)
target_link_libraries(testsrv_server ${catkin_LIBRARIES})
add_dependencies(testsrv_server testpkg)

add_executable(testsrv_client srv/testsrv_client.cpp)
target_link_libraries(testsrv_client ${catkin_LIBRARIES})
add_dependencies(testsrv_client testpkg)

CMake 탭 너비: 8 225행, 1열 삼입

ubuntu@Park: ~/test_ws
ubuntu@Park:~$ cd test_ws
ubuntu@Park:~/test_ws$ catkin_make
Base path: /home/ubuntu/test_ws
Source space: /home/ubuntu/test_ws/src
Build space: /home/ubuntu/test_ws/build
Devel space: /home/ubuntu/test_ws/devel
Install space: /home/ubuntu/test_ws/install
####
#### Running command: "make cmake_check_build_system" in "/home/ubuntu/test_ws/build"
####
#### Running command: "make -j8 -l8" in "/home/ubuntu/test_ws/build"
####
Scanning dependencies of target testsrv_client
[ 7%] Built target testnode
[ 14%] Built target custommsg_subnode
[ 29%] Built target custommsg_subnode
[ 29%] Built target testsrv_server
[ 37%] Built target talkernode
[ 40%] Building CXX object testpkg/CMakeFiles/testsrv_client.dir/srv/testsrv_client.cpp.o
[ 48%] Built target listnenernode
[ 48%] Built target std_msgs_generate_messages_cpp
[ 48%] Built target std_msgs_generate_messages_py
[ 48%] Built target std_msgs_generate_messages_lisp
[ 48%] Built target std_msgs_generate_messages_nodejs
[ 48%] Built target std_msgs_generate_messages_eus
[ 48%] Built target _testpkg_generate_messages_check_deps_testsrv
[ 48%] Built target _testpkg_generate_messages_check_deps_testmsg
[ 66%] Built target testpkg_generate_messages_cpp
[ 70%] Built target testpkg_generate_messages_py
[ 77%] Built target testpkg_generate_messages_nodejs
[ 85%] Built target testpkg_generate_messages_lisp
[ 96%] Built target testpkg_generate_messages_eus
[ 96%] Built target testpkg_generate_messages
[100%] Linking CXX executable /home/ubuntu/test_ws/devel/lib/testpkg/testsrv_client
[100%] Built target testsrv_client
ubuntu@Park:~/test_ws$

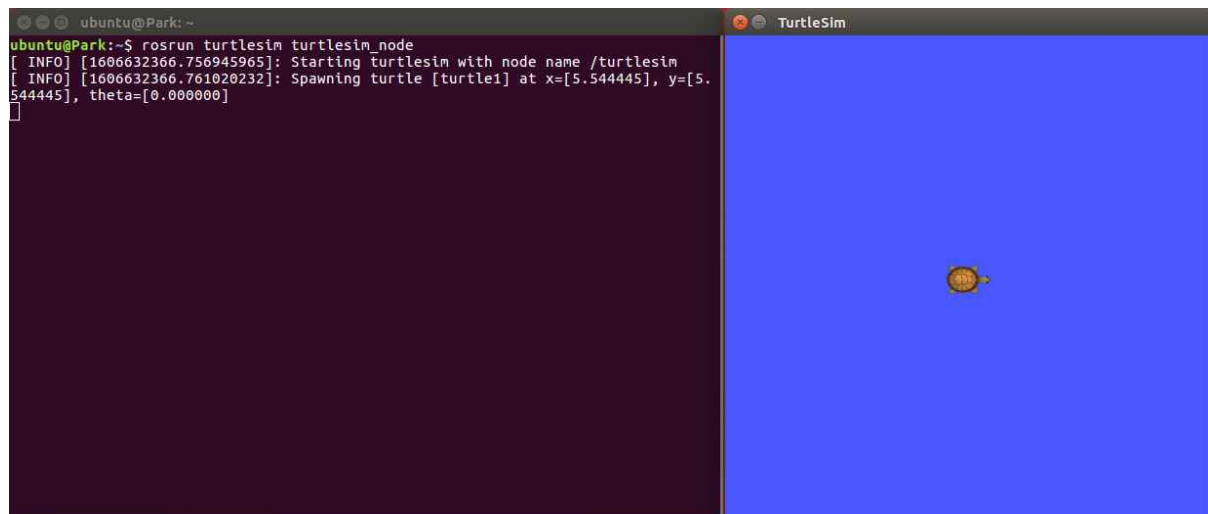
ubuntu@Park:~/test_ws$ source devel/setup.sh
ubuntu@Park:~/test_ws$ rosrn testpkg testsrv_server
[ INFO] [1606632082.208468641]: Ready to add two ints.
[ INFO] [1606632131.380286454]: request: x=100, y=200
[ INFO] [1606632131.380306276]: sending back response: [300]

ubuntu@Park:~/test_ws$
ubuntu@Park:~/test_ws$ cd test_ws
ubuntu@Park:~/test_ws$ source devel/setup.sh
ubuntu@Park:~/test_ws$ rosrn testpkg testsrv_client 100 200
[ INFO] [1606632131.380416513]: Sum: 300
ubuntu@Park:~/test_ws$
```

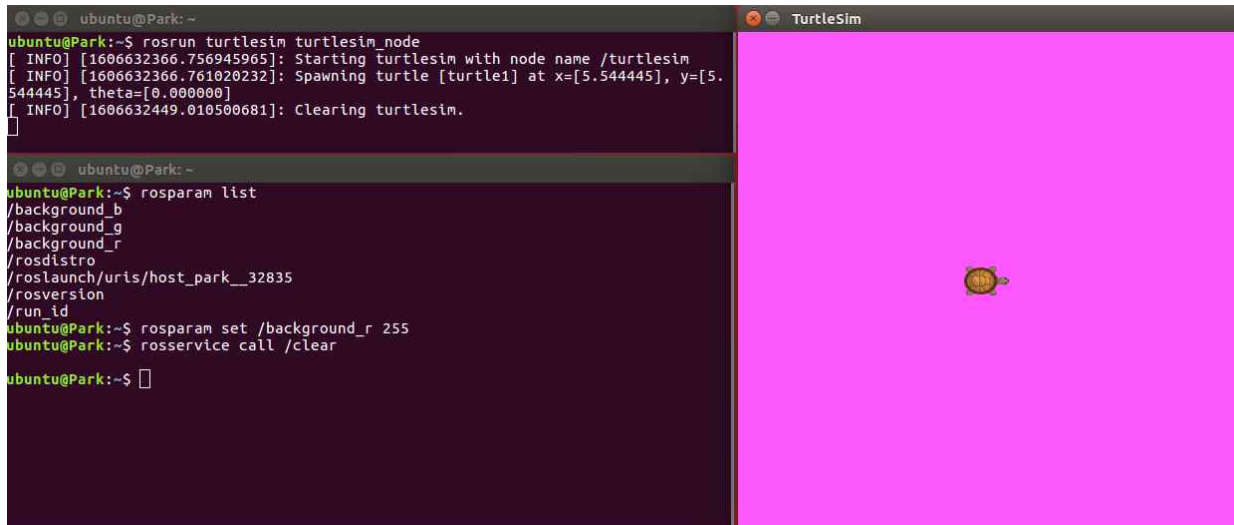
2. ROS Param

1) ROS Param example with turtlesim

- Turtlesim node 실행



- param list 확인, param의 값 변경

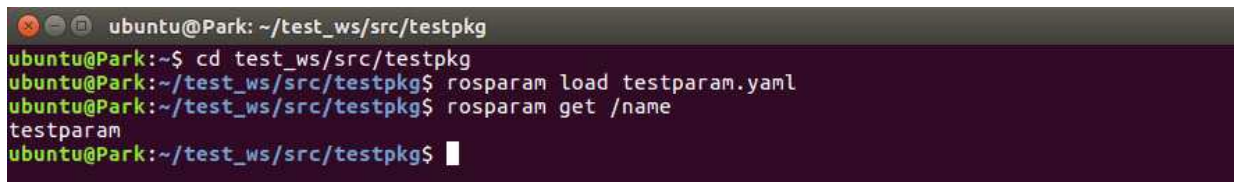


## 2) ROS Param

- Param의 정보를 갖는 yaml 파일 생성



- Rosparam command를 이용한 param load 및 param 확인



## 3) ROS Param - NODE에서 Param 사용

- paramtest.cpp 생성



- CMakeList에 추가, 빌드 후 실행





```

ubuntu@Park: ~/test_ws
ubuntu@Park:~$ cd test_ws
ubuntu@Park:~/test_ws$ catkin_make
Base path: /home/ubuntu/test_ws
Source space: /home/ubuntu/test_ws/src
Build space: /home/ubuntu/test_ws/build
Devel space: /home/ubuntu/test_ws/devel
Install space: /home/ubuntu/test_ws/install
####
#### Running command: "make cmake_check_build_system" in "/home/ubuntu/test_ws/build"
####
#### Running command: "make -j8 -l8" in "/home/ubuntu/test_ws/build"
####
Scanning dependencies of target paramtestnode
[ 6%] Built target testsrv_server
[ 13%] Built target testsrv_client
[ 20%] Built target custommsg_subnode
[ 34%] Built target talkernode
[ 34%] Built target custommsgnode
[ 37%] Building CXX object testpkg/CMakeFiles/paramtestnode.dir/src/paramtest.cpp.o
[ 44%] Built target listenernode
[ 51%] Built target testnode
[ 51%] Built target std_msgs_generate_messages_cpp
[ 51%] Built target std_msgs_generate_messages_lisp
[ 51%] Built target std_msgs_generate_messages_nodejs
[ 51%] Built target std_msgs_generate_messages_py
[ 51%] Built target std_msgs_generate_messages_eus
[ 51%] Built target _testpkg_generate_messages_check_deps_testmsg
[ 51%] Built target _testpkg_generate_messages_check_deps_testsrv
[ 65%] Built target testpkg_generate_messages_nodejs
[ 72%] Built target testpkg_generate_messages_py
[ 82%] Built target testpkg_generate_messages_eus
[ 89%] Built target testpkg_generate_messages_cpp
[ 96%] Built target testpkg_generate_messages_lisp
[ 96%] Built target testpkg_generate_messages
[100%] Linking CXX executable /home/ubuntu/test_ws/devel/lib/testpkg/paramtestnode
[100%] Built target paramtestnode
ubuntu@Park:~/test_ws$

```

- rosparam set을 이용한 parameter 변경

```

ubuntu@Park: ~/test_ws
[100%] Built target testpkg_generate_messages
ubuntu@Park:~/test_ws$ source devel/setup.sh
ubuntu@Park:~/test_ws$ rosrn testpkg paramtestnode
[ INFO] [1606633494.420312664]: param1 : 1.500000
[ INFO] [1606633494.420348675]: name : testparam
[ INFO] [1606633494.420368640]: param_bool : 1
ubuntu@Park:~/test_ws$ rosparam set name setparam
ubuntu@Park:~/test_ws$ rosrn testpkg paramtestnode
[ INFO] [1606633554.002141738]: param1 : 1.500000
[ INFO] [1606633554.002174262]: name : setparam
[ INFO] [1606633554.002184366]: param_bool : 1
ubuntu@Park:~/test_ws$

```