

# ROS PACKAGE

```
kjj@kjj-500R5M-500R5W-501R5M:~$ mkdir -p test_ws/src
kjj@kjj-500R5M-500R5W-501R5M:~$ cd test_ws/
kjj@kjj-500R5M-500R5W-501R5M:~/test_ws$ catkin_ws
catkin_ws: 명령을 찾을 수 없습니다
kjj@kjj-500R5M-500R5W-501R5M:~/test_ws$ catkin_make
Base path: /home/kjj/test_ws
Source space: /home/kjj/test_ws/src
Build space: /home/kjj/test_ws/build
Devel space: /home/kjj/test_ws/devel
Install space: /home/kjj/test_ws/install
Creating symlink "/home/kjj/test_ws/src/CMakeLists.txt" pointing to "/opt/ros/kinetic/share/catkin/cmake/toplevel.cmake"
####
#### Running command: "cmake /home/kjj/test_ws/src -DCATKIN_DEVEL_PREFIX=/home/kjj/test_ws/devel -DCMAKE_INSTALL_PREFIX=/home/kjj/test_ws/install -G Unix Makefiles" in "/home/kjj/test_ws/build"
####
-- The C compiler identification is GNU 5.4.0
-- The CXX compiler identification is GNU 5.4.0
-- Check for working C compiler: /usr/bin/cc
-- Check for working C compiler: /usr/bin/cc -- works
-- Detecting C compiler ABI info
-- Detecting C compiler ABI info - done
-- Detecting C compile features
-- Detecting C compile features - done
-- Check for working CXX compiler: /usr/bin/c++
-- Check for working CXX compiler: /usr/bin/c++ -- works
-- Detecting CXX compiler ABI info
-- Detecting CXX compiler ABI info - done
-- Detecting CXX compile features
-- Detecting CXX compile features - done
-- Using CATKIN_DEVEL_PREFIX: /home/kjj/test_ws/devel
-- Using CMAKE_PREFIX_PATH: /opt/ros/kinetic
-- This workspace overlays: /opt/ros/kinetic
-- Found PythonInterp: /usr/bin/python2 (found suitable version "2.7.12", minimum required is "2")
-- Using PYTHON_EXECUTABLE: /usr/bin/python2
-- Using Debian Python package layout
-- Using empy: /usr/bin/empy
-- Using CATKIN_ENABLE_TESTING: ON
-- Call enable_testing()
-- Using CATKIN_TEST_RESULTS_DIR: /home/kjj/test_ws/build/test_results
-- Found gtest sources under '/usr/src/gmock': gtests will be built
-- Found gmock sources under '/usr/src/gmock': gmock will be built
-- Found PythonInterp: /usr/bin/python2 (found version "2.7.12")
-- Looking for pthread.h
-- Looking for pthread.h - found
-- Looking for pthread_create
-- Looking for pthread_create - not found
-- Looking for pthread_create in pthreads
-- Looking for pthread_create in pthreads - not found
-- Looking for pthread_create in pthread
-- Looking for pthread_create in pthread - found
-- Found Threads: TRUE
-- Using Python nosetests: /usr/bin/nosetests-2.7
-- catkin 0.7.29
-- BUILD_SHARED_LIBS is on
-- BUILD_SHARED_LIBS is on
-- Configuring done
-- Generating done
-- Build files have been written to: /home/kjj/test_ws/build
####
#### Running command: "make -j4 -l4" in "/home/kjj/test_ws/build"
####
kjj@kjj-500R5M-500R5W-501R5M:~/test_ws$ cd /src
bash: cd: /src: 그런 파일이나 디렉터리가 없습니다
```

# ROS PACKAGE

```
-- The C compiler identification is GNU 5.4.0
-- The CXX compiler identification is GNU 5.4.0
-- Check for working C compiler: /usr/bin/cc
-- Check for working C compiler: /usr/bin/cc -- works
-- Detecting C compiler ABI info
-- Detecting C compiler ABI info - done
-- Detecting C compile features
-- Detecting C compile features - done
-- Check for working CXX compiler: /usr/bin/c++
-- Check for working CXX compiler: /usr/bin/c++ -- works
-- Detecting CXX compiler ABI info
-- Detecting CXX compiler ABI info - done
-- Detecting CXX compile features
-- Detecting CXX compile features - done
-- Using CATKIN_DEVEL_PREFIX: /home/kjj/test_ws/devel
-- Using CMAKE_PREFIX_PATH: /opt/ros/kinetic
-- This workspace overlays: /opt/ros/kinetic
-- Found PythonInterp: /usr/bin/python2 (found suitable version "2.7.12", minimum required is "2")
-- Using PYTHON_EXECUTABLE: /usr/bin/python2
-- Using Debian Python package layout
-- Using empy: /usr/bin/empy
-- Using CATKIN_ENABLE_TESTING: ON
-- Call enable_testing()
-- Using CATKIN_TEST_RESULTS_DIR: /home/kjj/test_ws/build/test_results
-- Found gtest sources under '/usr/src/gmock': gtests will be built
-- Found gmock sources under '/usr/src/gmock': gmock will be built
-- Found PythonInterp: /usr/bin/python2 (found version "2.7.12")
-- Looking for pthread.h
-- Looking for pthread.h - found
-- Looking for pthread_create
-- Looking for pthread_create - not found
-- Looking for pthread_create in pthreads
-- Looking for pthread_create in pthreads - not found
-- Looking for pthread_create in pthread
-- Looking for pthread_create in pthread - found
-- Found Threads: TRUE
-- Using Python nosetests: /usr/bin/nosetests-2.7
-- catkin 0.7.29
-- BUILD_SHARED_LIBS is on
-- BUILD_SHARED_LIBS is on
-- Configuring done
-- Generating done
-- Build files have been written to: /home/kjj/test_ws/build
####
#### Running command: "make -j4 -l4" in "/home/kjj/test_ws/build"
####
kjj@kjj-500R5M-500R5W-501R5M:~/test_ws$ cd /src
bash: cd: /src: 그런 파일이나 디렉터리가 없습니다
kjj@kjj-500R5M-500R5W-501R5M:~/test_ws$ cd src/
kjj@kjj-500R5M-500R5W-501R5M:~/test_ws/src$ catkin_create_pkg testpkg roscpp rospy std_msgs
Created file testpkg/package.xml
Created file testpkg/CMakeLists.txt
Created folder testpkg/include/testpkg
Created folder testpkg/src
Successfully created files in /home/kjj/test_ws/src/testpkg. Please adjust the values in package.xml.
kjj@kjj-500R5M-500R5W-501R5M:~/test_ws/src$ cd test_ws
bash: cd: test_ws: 그런 파일이나 디렉터리가 없습니다
kjj@kjj-500R5M-500R5W-501R5M:~/test_ws/src$ cd testpkg
kjj@kjj-500R5M-500R5W-501R5M:~/test_ws/src/testpkg$ catkin_make
Base path: /home/kjj/test_ws/src/testpkg
The specified base path "/home/kjj/test_ws/src/testpkg" contains a package but "catkin_make" must be invoked in the root of workspace
kjj@kjj-500R5M-500R5W-501R5M:~/test_ws/src/testpkg$
```

# ROS PACKAGE

```
kjj@kjj-500R5M-500R5W-501R5M:~$ cd test_ws/src
kjj@kjj-500R5M-500R5W-501R5M:~/test_ws/src$ catkin_create_pkg testpkg roscpp rospy std_msgs
usage: catkin_create_pkg [-h] [--meta] [-s [SYS_DEPS [SYS_DEPS ...]]] [-V PKG_VERSION]
                        [-b [BOOST_COMPS [BOOST_COMPS ...]]] [-V PKG_VERSION]
                        [-d DESCRIPTION] [-l LICENSE] [-a AUTHOR]
                        [-m MAINTAINER] [--rosdistro ROSDISTRO]
                        name [dependencies [dependencies ...]]
catkin_create_pkg: error: File exists: /home/kjj/test_ws/src/testpkg/package.xml
kjj@kjj-500R5M-500R5W-501R5M:~/test_ws/src$ cd testpkg
kjj@kjj-500R5M-500R5W-501R5M:~/test_ws/src/testpkg$ catkin
catkin: 명령을 찾을 수 없습니다
kjj@kjj-500R5M-500R5W-501R5M:~/test_ws/src/testpkg$ catkin_make
Base path: /home/kjj/test_ws/src/testpkg
The specified base path "/home/kjj/test_ws/src/testpkg" contains a package but "catkin_make" must be invoked in the root of workspace
kjj@kjj-500R5M-500R5W-501R5M:~/test_ws/src/testpkg$ cd
kjj@kjj-500R5M-500R5W-501R5M:~$ cd testws
bash: cd: testws: 그런 파일이나 디렉터리가 없습니다
kjj@kjj-500R5M-500R5W-501R5M:~$ cd test_ws
kjj@kjj-500R5M-500R5W-501R5M:~/test_ws$ catkin_make
Base path: /home/kjj/test_ws
Source space: /home/kjj/test_ws/src
Build space: /home/kjj/test_ws/build
Devel space: /home/kjj/test_ws/devel
Install space: /home/kjj/test_ws/install
####
#### Running command: "cmake /home/kjj/test_ws/src -DCATKIN_DEVEL_PREFIX=/home/kjj/test_ws/devel -DCMAKE_INSTALL_PREFIX=/home/kjj/test_ws/install -G Unix Makefiles" in "/home/kjj/test_ws/build"
####
-- Using CATKIN_DEVEL_PREFIX: /home/kjj/test_ws/devel
-- Using CMAKE_PREFIX_PATH: /opt/ros/kinetic
-- This workspace overlays: /opt/ros/kinetic
-- Found PythonInterp: /usr/bin/python2 (found suitable version "2.7.12", minimum required is "2")
-- Using PYTHON_EXECUTABLE: /usr/bin/python2
-- Using Debian Python package layout
-- Using empy: /usr/bin/empy
-- Using CATKIN_ENABLE_TESTING: ON
-- Call enable_testing()
-- Using CATKIN_TEST_RESULTS_DIR: /home/kjj/test_ws/build/test_results
-- Found gtest sources under '/usr/src/gmock': gtests will be built
-- Found gmock sources under '/usr/src/gmock': gmock will be built
-- Found PythonInterp: /usr/bin/python2 (found version "2.7.12")
-- Using Python nosetests: /usr/bin/nosetests-2.7
-- catkin 0.7.29
-- BUILD_SHARED_LIBS is on
-- BUILD_SHARED_LIBS is on
--
-- ~~~~ traversing 1 packages in topological order:
-- ~~~~ - testpkg
--
-- ~~~~ processing catkin package: 'testpkg'
-- ==> add_subdirectory(testpkg)
-- Configuring done
-- Generating done
-- Build files have been written to: /home/kjj/test_ws/build
####
#### Running command: "make -j4 -l4" in "/home/kjj/test_ws/build"
####
kjj@kjj-500R5M-500R5W-501R5M:~/test_ws$ █
```

# ROS NODE

```
src > testpkg > CMakeLists.txt
172
173 ## Mark libraries for installation
174 ## See http://docs.ros.org/melodic/api/catkin/html/howto/format1/building\_libraries.html
175 # install(TARGETS ${PROJECT_NAME}
176 #   ARCHIVE DESTINATION ${CATKIN_PACKAGE_LIB_DESTINATION}
177 #   LIBRARY DESTINATION ${CATKIN_PACKAGE_LIB_DESTINATION}
178 #   RUNTIME DESTINATION ${CATKIN_GLOBAL_BIN_DESTINATION}
179 # )
180
181 ## Mark cpp header files for installation
182 # install(DIRECTORY include/${PROJECT_NAME}/
183 #   DESTINATION ${CATKIN_PACKAGE_INCLUDE_DESTINATION}
184 #   FILES_MATCHING PATTERN "*.h"
185 #   PATTERN ".svn" EXCLUDE
186 # )
187
188 ## Mark other files for installation (e.g. launch and bag files, etc.)
189 # install(FILES
190 #   # myfile1
191 #   # myfile2
192 #   DESTINATION ${CATKIN_PACKAGE_SHARE_DESTINATION}
193 # )
194
195 #####
196 ## Testing ##
197 #####
198
199 ## Add gtest based cpp test target and link libraries
200 # catkin_add_gtest(${PROJECT_NAME}-test test/test_testpkg.cpp)
201 # if(TARGET ${PROJECT_NAME}-test)
202 #   target_link_libraries(${PROJECT_NAME}-test ${PROJECT_NAME})
203 # endif()
204
205 ## Add folders to be run by python nosetests
206 # catkin_add_nosetests(test)
207
208 add_executable(testnode src/testnode.cpp)
209 target_link_libraries(testnode ${catkin_LIBRARIES})
210
```

# ROS NODE

The image shows a Visual Studio Code editor window with a dark theme. The Explorer sidebar on the left displays a project structure for 'TEST\_WS' with folders for '.vscode', 'build', 'devel', 'src', and 'testpkg'. Inside 'testpkg', there are 'include' and 'src' subfolders. The 'testnode.cpp' file is selected and open in the main editor. The CMakeLists.txt file is also open in a second tab. The code in testnode.cpp is as follows:

```
src > testpkg > src > testnode.cpp > ...
1  #include "ros/ros.h"
2
3  int main(int argc, char **argv)
4  {
5      //master에 등록
6      ros::init(argc, argv, "test");
7      //timestamp와 함께 출력.
8      ROS_INFO("Hello ROS!");
9
10
11  return 0;
12  }
13
14
```

The status bar at the bottom indicates the active workspace is 'ROS1.kinetic', the Python interpreter is 'Python 3.5.2 64-bit', and the current cursor position is 'Ln 13, Col 1'. It also shows 'Spaces: 4', the file encoding 'UTF-8', the line ending 'LF', and the active language 'C++'.

# ROS NODE

```
kjj@kjj-500R5M-500R5W-501R5M:~$ cd test_ws
kjj@kjj-500R5M-500R5W-501R5M:~/test_ws$ catkin_make
Base path: /home/kjj/test_ws
Source space: /home/kjj/test_ws/src
Build space: /home/kjj/test_ws/build
Devel space: /home/kjj/test_ws/devel
Install space: /home/kjj/test_ws/install
####
#### Running command: "make cmake_check_build_system" in "/home/kjj/test_ws/build"
####
-- Using CATKIN_DEVEL_PREFIX: /home/kjj/test_ws/devel
-- Using CMAKE_PREFIX_PATH: /opt/ros/kinetic
-- This workspace overlays: /opt/ros/kinetic
-- Found PythonInterp: /usr/bin/python2 (found suitable version "2.7.12", minimum required is "2")
-- Using PYTHON_EXECUTABLE: /usr/bin/python2
-- Using Debian Python package layout
-- Using empy: /usr/bin/empy
-- Using CATKIN_ENABLE_TESTING: ON
-- Call enable_testing()
-- Using CATKIN_TEST_RESULTS_DIR: /home/kjj/test_ws/build/test_results
-- Found gtest sources under '/usr/src/gmock': gtests will be built
-- Found gmock sources under '/usr/src/gmock': gmock will be built
-- Found PythonInterp: /usr/bin/python2 (found version "2.7.12")
-- Using Python nosetests: /usr/bin/nosetests-2.7
-- catkin 0.7.29
-- BUILD_SHARED_LIBS is on
-- BUILD_SHARED_LIBS is on
--
-- traversing 1 packages in topological order:
--   - testpkg
--
-- +++ processing catkin package: 'testpkg'
==> add_subdirectory(testpkg)
-- Configuring done
-- Generating done
-- Build files have been written to: /home/kjj/test_ws/build
####
#### Running command: "make -j4 -l4" in "/home/kjj/test_ws/build"
####
Scanning dependencies of target testnode
[ 50%] Building CXX object testpkg/CMakeFiles/testnode.dir/src/testnode.cpp.o
[100%] Linking CXX executable /home/kjj/test_ws/devel/lib/testpkg/testnode
[100%] Built target testnode
kjj@kjj-500R5M-500R5W-501R5M:~/test_ws$ source devel/setup.sh
kjj@kjj-500R5M-500R5W-501R5M:~/test_ws$ rosrn testpkg testnode
[ INFO] [1606035332.014928797]: Hello ROS!
kjj@kjj-500R5M-500R5W-501R5M:~/test_ws$ █
```

## ROS TOPIC

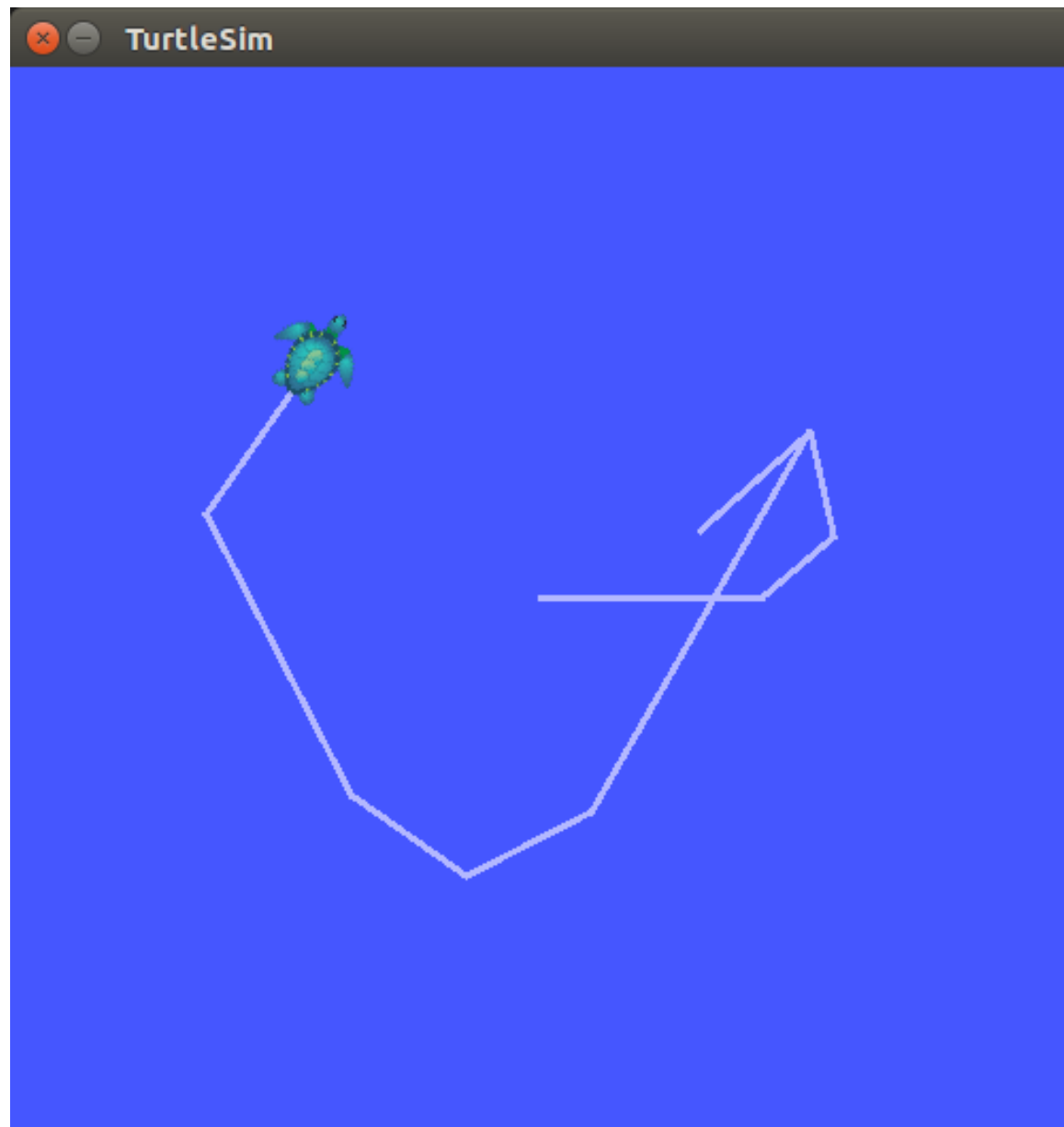
```
kjj@kjj-500R5M-500R5W-501R5M: ~  
kjj@kjj-500R5M-500R5W-501R5M:~$ sudo apt-get install ros-kinetic-ros-tutorials  
[sudo] password for kjj:  
패키지 목록을 읽는 중입니다... 완료  
의존성 트리를 만드는 중입니다  
상태 정보를 읽는 중입니다... 완료  
ros-kinetic-ros-tutorials is already the newest version (0.7.1-0xenial-20201017-  
222010+0000).  
ros-kinetic-ros-tutorials 패키지는 수동설치로 지정합니다.  
0개 업그레이드, 0개 새로 설치, 0개 제거 및 107개 업그레이드 안 함.  
kjj@kjj-500R5M-500R5W-501R5M:~$ rosrunc turtle1 turtle1_node  
[ INFO] [1606035413.317156794]: Starting turtlesim with node name /turtle1  
[ INFO] [1606035413.323584369]: Spawning turtle [turtle1] at x=[5.544445], y=[5.  
544445], theta=[0.000000]  
█
```

## ROS TOPIC

```
kjj@kjj-500R5M-500R5W-501R5M: ~  
kjj@kjj-500R5M-500R5W-501R5M:~$ rosrn turtlesim turtle_teleop_key  
Reading from keyboard  
-----  
Use arrow keys to move the turtle.  
█
```



## ROS TOPIC



## ROS TOPIC

[illegible]

## ROS TOPIC

[illegible]

## ROS TOPIC

kjj@kjj-500R5M-500R5W-501R5M: ~

---  
data: "hello"

---  
data: "hello"

---  
data: "hello"

---  
data: "hello"

---  
data: "hello"

---  
data: "hello"

---  
data: "hello"

---  
data: "hello"

---  
data: "hello"

---  
data: "hello"

---  
data: "hello"

---  
data: "hello"

# ROS TOPIC

```
kjj@kjj-500R5M-500R5M-501R5M:~$ rostopic bw /testtopic
subscribed to [/testtopic]
average: 92.81B/s
    mean: 9.00B min: 9.00B max: 9.00B window: 9
average: 91.29B/s
    mean: 9.00B min: 9.00B max: 9.00B window: 19
average: 90.81B/s
    mean: 9.00B min: 9.00B max: 9.00B window: 29
average: 90.59B/s
    mean: 9.00B min: 9.00B max: 9.00B window: 39
average: 90.45B/s
    mean: 9.00B min: 9.00B max: 9.00B window: 49
average: 90.36B/s
    mean: 9.00B min: 9.00B max: 9.00B window: 59
average: 90.29B/s
    mean: 9.00B min: 9.00B max: 9.00B window: 69
average: 90.25B/s
    mean: 9.00B min: 9.00B max: 9.00B window: 79
average: 90.21B/s
    mean: 9.00B min: 9.00B max: 9.00B window: 89
average: 90.18B/s
    mean: 9.00B min: 9.00B max: 9.00B window: 99
average: 90.16B/s
    mean: 9.00B min: 9.00B max: 9.00B window: 100
average: 90.15B/s
    mean: 9.00B min: 9.00B max: 9.00B window: 100
average: 90.16B/s
    mean: 9.00B min: 9.00B max: 9.00B window: 100
average: 90.13B/s
    mean: 9.00B min: 9.00B max: 9.00B window: 100
average: 90.12B/s
    mean: 9.00B min: 9.00B max: 9.00B window: 100
average: 90.12B/s
    mean: 9.00B min: 9.00B max: 9.00B window: 100
average: 90.12B/s
    mean: 9.00B min: 9.00B max: 9.00B window: 100
average: 90.11B/s
    mean: 9.00B min: 9.00B max: 9.00B window: 100
average: 90.10B/s
    mean: 9.00B min: 9.00B max: 9.00B window: 100
average: 90.09B/s
    mean: 9.00B min: 9.00B max: 9.00B window: 100
average: 90.07B/s
    mean: 9.00B min: 9.00B max: 9.00B window: 100
average: 90.07B/s
    mean: 9.00B min: 9.00B max: 9.00B window: 100
average: 90.07B/s
    mean: 9.00B min: 9.00B max: 9.00B window: 100
average: 90.04B/s
    mean: 9.00B min: 9.00B max: 9.00B window: 100
average: 90.03B/s
    mean: 9.00B min: 9.00B max: 9.00B window: 100
average: 90.02B/s
    mean: 9.00B min: 9.00B max: 9.00B window: 100
average: 90.00B/s
    mean: 9.00B min: 9.00B max: 9.00B window: 100
average: 90.90B/s
    mean: 9.00B min: 9.00B max: 9.00B window: 100
average: 90.89B/s
    mean: 9.00B min: 9.00B max: 9.00B window: 100
average: 90.88B/s
    mean: 9.00B min: 9.00B max: 9.00B window: 100
```

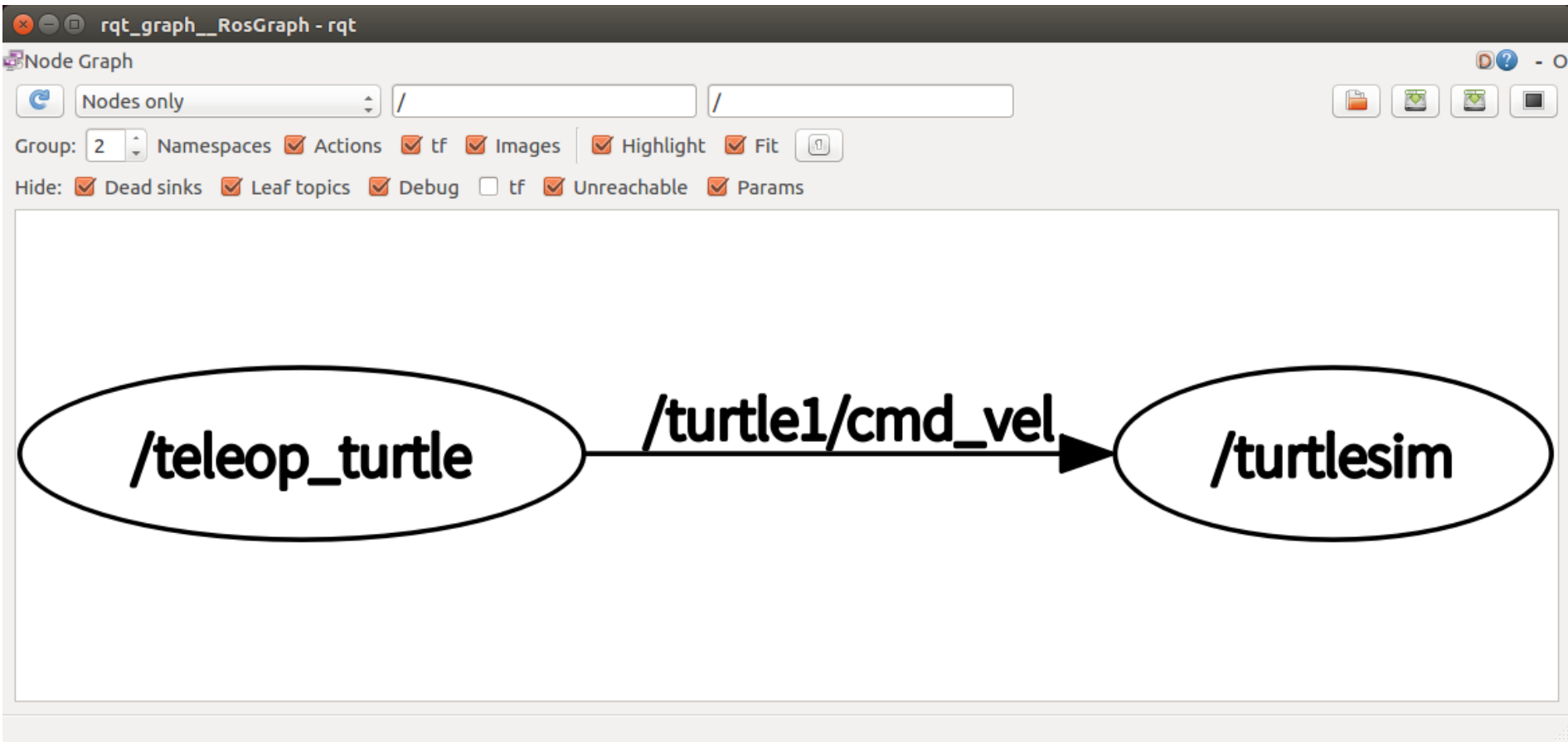
# ROS TOPIC

```
kjj@kjj-500R5M-500R5M-501R5M:~$ rostopic hz /testtopic
subscribed to [/testtopic]
average rate: 10.001
  min: 0.099s max: 0.101s std dev: 0.00048s window: 9
average rate: 9.999
  min: 0.099s max: 0.101s std dev: 0.00066s window: 19
average rate: 9.998
  min: 0.098s max: 0.103s std dev: 0.00097s window: 29
average rate: 10.000
  min: 0.098s max: 0.103s std dev: 0.00090s window: 39
average rate: 9.999
  min: 0.098s max: 0.103s std dev: 0.00082s window: 49
average rate: 10.000
  min: 0.098s max: 0.103s std dev: 0.00079s window: 59
average rate: 10.000
  min: 0.098s max: 0.103s std dev: 0.00077s window: 69
average rate: 10.000
  min: 0.098s max: 0.103s std dev: 0.00078s window: 79
average rate: 10.000
  min: 0.098s max: 0.103s std dev: 0.00075s window: 89
average rate: 10.000
  min: 0.098s max: 0.103s std dev: 0.00073s window: 100
average rate: 10.000
  min: 0.098s max: 0.103s std dev: 0.00072s window: 110
average rate: 10.000
  min: 0.097s max: 0.103s std dev: 0.00081s window: 120
```

# ROS TOPIC

```
kjj@kjj-500R5M-500R5W-501R5M:~$ rostopic type /testtopic
std_msgs/String
kjj@kjj-500R5M-500R5W-501R5M:~$
```

# ROS TOPIC

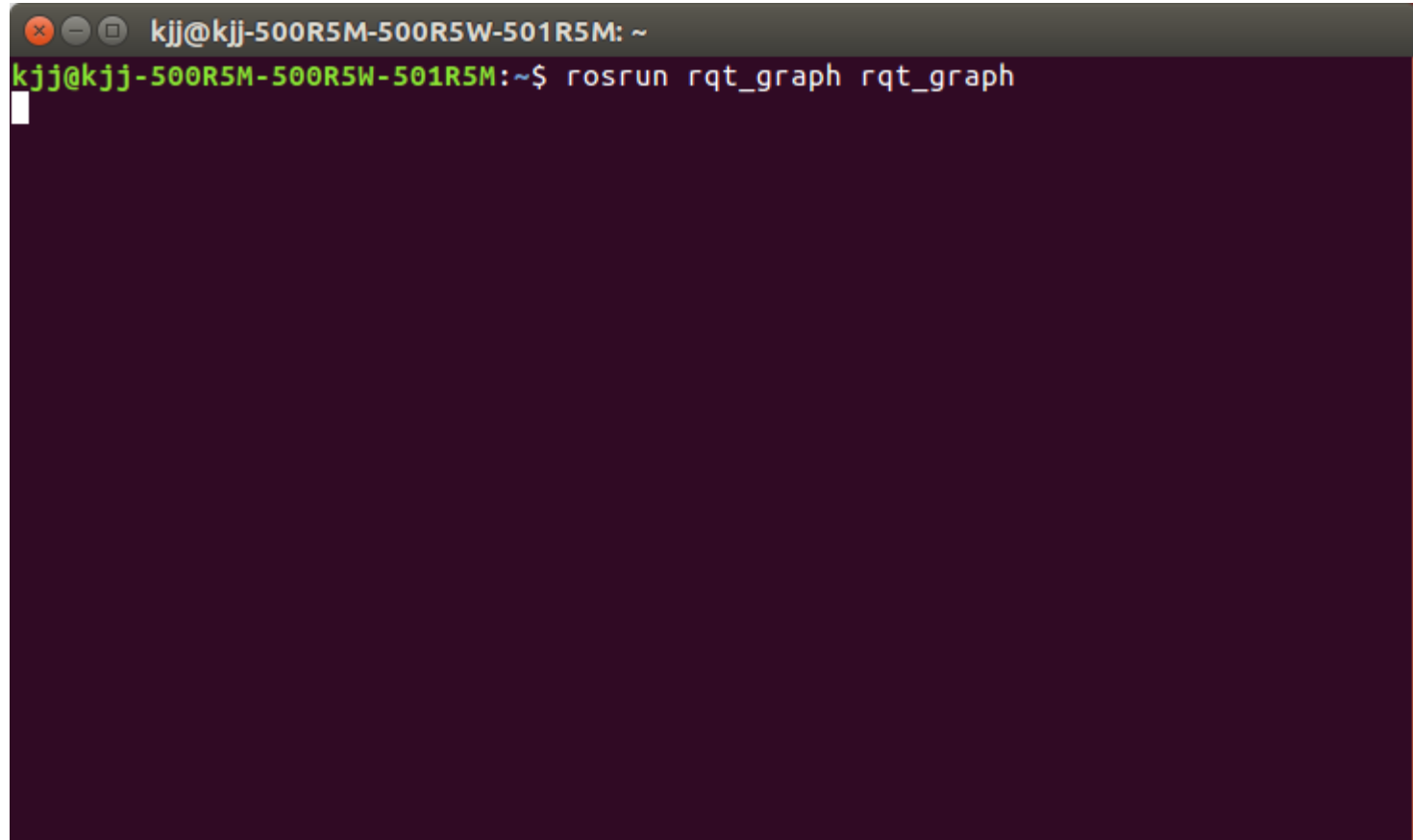




# ROS TOPIC

```
kjj@kjj-500R5M-500R5M-501R5M:~$ rostopic bw /testtopic
subscribed to [/testtopic]
average: 92.81B/s
    mean: 9.00B min: 9.00B max: 9.00B window: 9
average: 91.29B/s
    mean: 9.00B min: 9.00B max: 9.00B window: 19
average: 90.81B/s
    mean: 9.00B min: 9.00B max: 9.00B window: 29
average: 90.59B/s
    mean: 9.00B min: 9.00B max: 9.00B window: 39
average: 90.45B/s
    mean: 9.00B min: 9.00B max: 9.00B window: 49
average: 90.36B/s
    mean: 9.00B min: 9.00B max: 9.00B window: 59
average: 90.29B/s
    mean: 9.00B min: 9.00B max: 9.00B window: 69
average: 90.25B/s
    mean: 9.00B min: 9.00B max: 9.00B window: 79
average: 90.21B/s
    mean: 9.00B min: 9.00B max: 9.00B window: 89
average: 90.18B/s
    mean: 9.00B min: 9.00B max: 9.00B window: 99
average: 90.16B/s
    mean: 9.00B min: 9.00B max: 9.00B window: 100
average: 90.15B/s
    mean: 9.00B min: 9.00B max: 9.00B window: 100
average: 90.16B/s
    mean: 9.00B min: 9.00B max: 9.00B window: 100
average: 90.13B/s
    mean: 9.00B min: 9.00B max: 9.00B window: 100
average: 90.12B/s
    mean: 9.00B min: 9.00B max: 9.00B window: 100
average: 90.12B/s
    mean: 9.00B min: 9.00B max: 9.00B window: 100
average: 90.12B/s
    mean: 9.00B min: 9.00B max: 9.00B window: 100
average: 90.11B/s
    mean: 9.00B min: 9.00B max: 9.00B window: 100
average: 90.10B/s
    mean: 9.00B min: 9.00B max: 9.00B window: 100
average: 90.09B/s
    mean: 9.00B min: 9.00B max: 9.00B window: 100
average: 90.07B/s
    mean: 9.00B min: 9.00B max: 9.00B window: 100
average: 90.07B/s
    mean: 9.00B min: 9.00B max: 9.00B window: 100
average: 90.07B/s
    mean: 9.00B min: 9.00B max: 9.00B window: 100
average: 90.04B/s
    mean: 9.00B min: 9.00B max: 9.00B window: 100
average: 90.03B/s
    mean: 9.00B min: 9.00B max: 9.00B window: 100
average: 90.02B/s
    mean: 9.00B min: 9.00B max: 9.00B window: 100
average: 90.00B/s
    mean: 9.00B min: 9.00B max: 9.00B window: 100
average: 90.90B/s
    mean: 9.00B min: 9.00B max: 9.00B window: 100
average: 90.89B/s
    mean: 9.00B min: 9.00B max: 9.00B window: 100
average: 90.88B/s
    mean: 9.00B min: 9.00B max: 9.00B window: 100
```

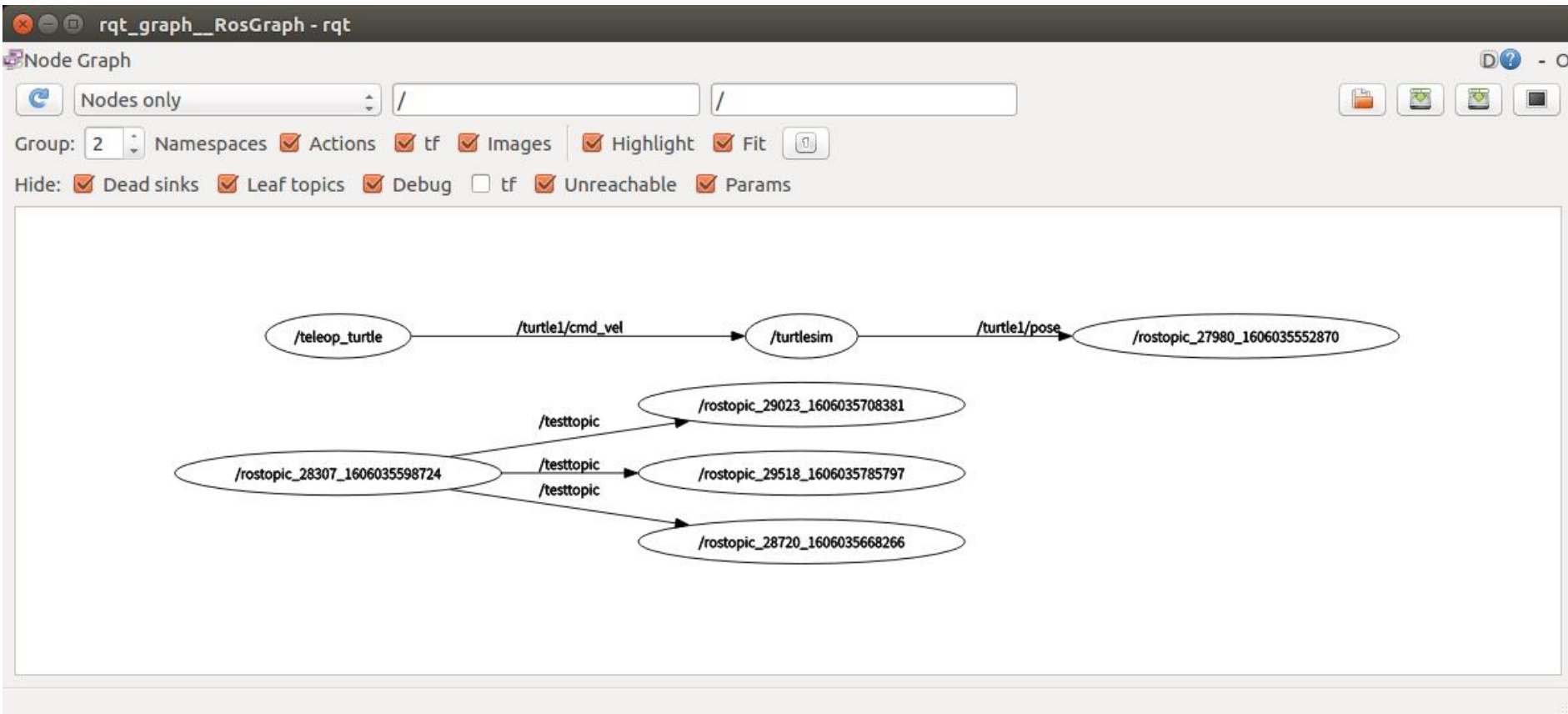
## ROS TOPIC



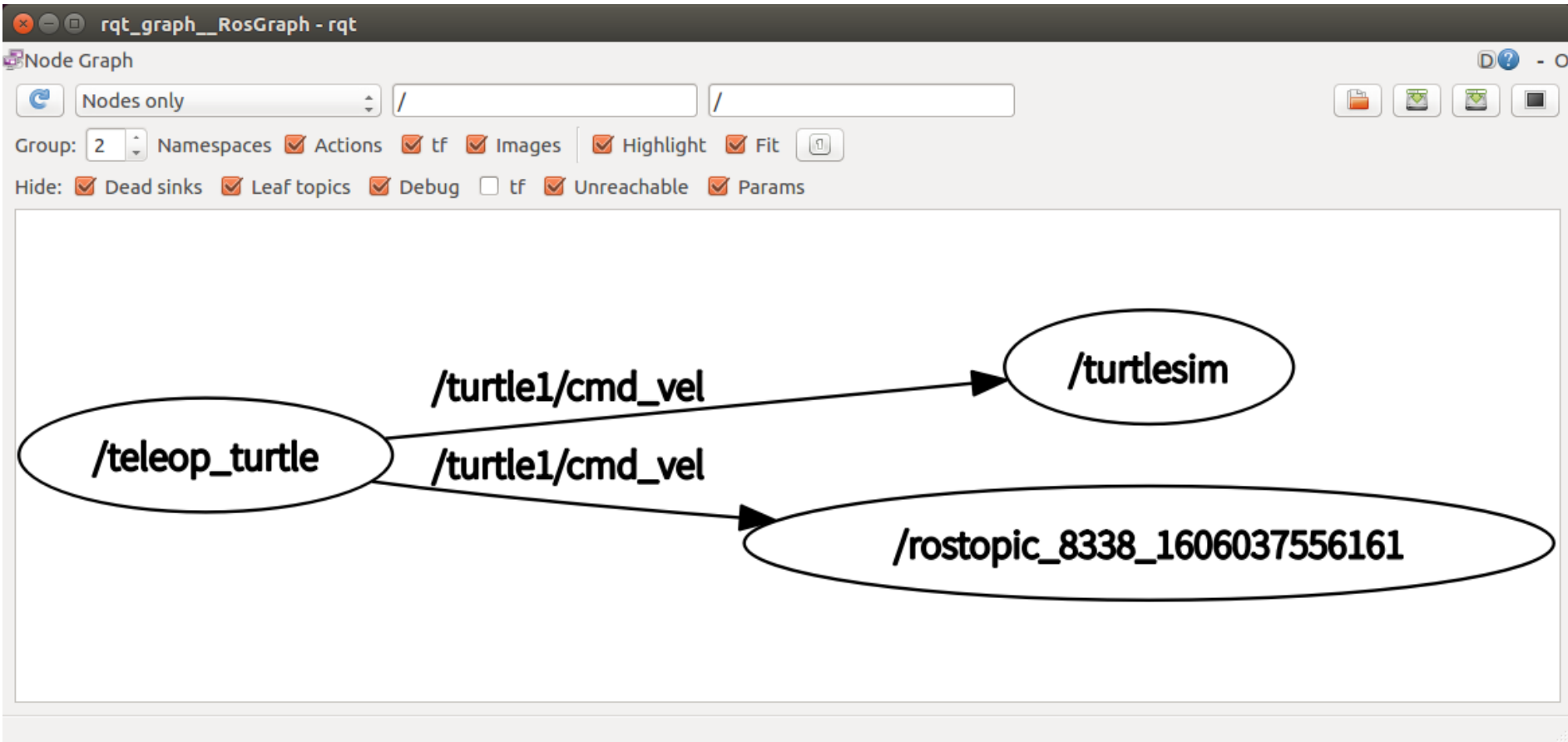
```
kjj@kjj-500R5M-500R5W-501R5M: ~  
kjj@kjj-500R5M-500R5W-501R5M:~$ rosrunc rqt_graph rqt_graph
```

A terminal window with a dark gray title bar containing three window control icons (close, minimize, maximize) and the text "kjj@kjj-500R5M-500R5W-501R5M: ~". The terminal area has a dark purple background. The prompt "kjj@kjj-500R5M-500R5W-501R5M:~\$" is shown in green, followed by the command "rosrunc rqt\_graph rqt\_graph" in white. A white cursor is positioned at the end of the command line.

# ROS TOPIC



# ROS TOPIC



# ROS NODE

The image shows a Visual Studio Code editor window with a CMakeLists.txt file open. The Explorer sidebar on the left shows the project structure, including folders like src, include, and testpkg. The main editor displays the CMakeLists.txt file with various CMake commands for installing headers, libraries, and executables. The status bar at the bottom indicates the project is ROS1.kinetic and the editor is in debug mode.

```
src > testpkg > CMakeLists.txt
175 # install(TARGETS ${PROJECT_NAME}
176 #   ARCHIVE DESTINATION ${CATKIN_PACKAGE_LIB_DESTINATION}
177 #   LIBRARY DESTINATION ${CATKIN_PACKAGE_LIB_DESTINATION}
178 #   RUNTIME DESTINATION ${CATKIN_GLOBAL_BIN_DESTINATION}
179 # )
180
181 ## Mark cpp header files for installation
182 # install(DIRECTORY include/${PROJECT_NAME}/
183 #   DESTINATION ${CATKIN_PACKAGE_INCLUDE_DESTINATION}
184 #   FILES_MATCHING PATTERN "*.h"
185 #   PATTERN ".svn" EXCLUDE
186 # )
187
188 ## Mark other files for installation (e.g. launch and bag files, etc.)
189 # install(FILES
190 #   # myfile1
191 #   # myfile2
192 #   DESTINATION ${CATKIN_PACKAGE_SHARE_DESTINATION}
193 # )
194
195 #####
196 ## Testing ##
197 #####
198
199 ## Add gtest based cpp test target and link libraries
200 # catkin_add_gtest(${PROJECT_NAME}-test test/test_testpkg.cpp)
201 # if(TARGET ${PROJECT_NAME}-test)
202 #   target_link_libraries(${PROJECT_NAME}-test ${PROJECT_NAME})
203 # endif()
204
205 ## Add folders to be run by python nosetests
206 # catkin_add_nosetests(test)
207
208 add_executable(talkernode src/talker.cpp)
209 target_link_libraries(talkernode ${catkin_LIBRARIES})
210
211 add_executable(listenernode src/listener.cpp)
212 target_link_libraries(listenernode ${catkin_LIBRARIES})
213
214
215
```

ROS1.kinetic Python 3.5.2 64-bit 3 0 CMake: [Debug]: 준비 선택된 키트가 없음 빌드 [all] Ln 202, Col 64 Spaces: 2 UTF-8 LF Plain Text

# ROS TOPIC

```
kjj@kjj-500R5M-500R5W-501R5M:~$ cd test_ws
kjj@kjj-500R5M-500R5W-501R5M:~/test_ws$ catkin_make
Base path: /home/kjj/test_ws
Source space: /home/kjj/test_ws/src
Build space: /home/kjj/test_ws/build
Devel space: /home/kjj/test_ws/devel
Install space: /home/kjj/test_ws/install
####
#### Running command: "make cmake_check_build_system" in "/home/kjj/test_ws/build"
####
####
#### Running command: "make -j4 -l4" in "/home/kjj/test_ws/build"
####
Scanning dependencies of target talkernode
Scanning dependencies of target listenernode
[ 50%] Building CXX object testpkg/CMakeFiles/listenernode.dir/src/listener.cpp.o
[ 50%] Building CXX object testpkg/CMakeFiles/talkernode.dir/src/talker.cpp.o
[ 75%] Linking CXX executable /home/kjj/test_ws/devel/lib/testpkg/talkernode
[ 75%] Built target talkernode
[100%] Linking CXX executable /home/kjj/test_ws/devel/lib/testpkg/listenernode
[100%] Built target listenernode
kjj@kjj-500R5M-500R5W-501R5M:~/test_ws$ source devel/setup.sh
kjj@kjj-500R5M-500R5W-501R5M:~/test_ws$ rosrun testpkg talkernode
[ INFO] [1606049048.930311094]: hello world 0
[ INFO] [1606049049.030462099]: hello world 1
[ INFO] [1606049049.130568835]: hello world 2
[ INFO] [1606049049.230421335]: hello world 3
[ INFO] [1606049049.330491603]: hello world 4
[ INFO] [1606049049.430447337]: hello world 5
[ INFO] [1606049049.530476899]: hello world 6
[ INFO] [1606049049.630482274]: hello world 7
[ INFO] [1606049049.730446086]: hello world 8
[ INFO] [1606049049.830426261]: hello world 9
[ INFO] [1606049049.930559819]: hello world 10
[ INFO] [1606049050.030491462]: hello world 11
[ INFO] [1606049050.130454295]: hello world 12
[ INFO] [1606049050.230479329]: hello world 13
[ INFO] [1606049050.330694184]: hello world 14
[ INFO] [1606049050.430422943]: hello world 15
[ INFO] [1606049050.530641003]: hello world 16
[ INFO] [1606049050.630611391]: hello world 17
[ INFO] [1606049050.730603034]: hello world 18
[ INFO] [1606049050.830499460]: hello world 19
[ INFO] [1606049050.930715498]: hello world 20
[ INFO] [1606049051.030732126]: hello world 21
[ INFO] [1606049051.130731442]: hello world 22
[ INFO] [1606049051.230599802]: hello world 23
[ INFO] [1606049051.330708208]: hello world 24
[ INFO] [1606049051.430698088]: hello world 25
[ INFO] [1606049051.530732824]: hello world 26
[ INFO] [1606049051.630724815]: hello world 27
[ INFO] [1606049051.730660583]: hello world 28
[ INFO] [1606049051.830609763]: hello world 29
[ INFO] [1606049051.930695420]: hello world 30
[ INFO] [1606049052.030686599]: hello world 31
[ INFO] [1606049052.130667248]: hello world 32
[ INFO] [1606049052.230650474]: hello world 33
[ INFO] [1606049052.330650990]: hello world 34
[ INFO] [1606049052.430621790]: hello world 35
[ INFO] [1606049052.530610233]: hello world 36
[ INFO] [1606049052.630592216]: hello world 37
[ INFO] [1606049052.730460018]: hello world 38
```

# ROS TOPIC

```
kjj@kjj-500R5M-500R5M-501R5M:~$ cd test_ws
kjj@kjj-500R5M-500R5M-501R5M:~/test_ws$ cake_make
cake_make: 명령을 찾을 수 없습니다
kjj@kjj-500R5M-500R5M-501R5M:~/test_ws$ catkin_make
Base path: /home/kjj/test_ws
Source space: /home/kjj/test_ws/src
Build space: /home/kjj/test_ws/build
Devel space: /home/kjj/test_ws/devel
Install space: /home/kjj/test_ws/install
####
#### Running command: "make cmake_check_build_system" in "/home/kjj/test_ws/build"
####
####
#### Running command: "make -j4 -l4" in "/home/kjj/test_ws/build"
####
[100%] Built target listenernode
[100%] Built target talkernode
kjj@kjj-500R5M-500R5M-501R5M:~/test_ws$ source devel/setup.sh
kjj@kjj-500R5M-500R5M-501R5M:~/test_ws$ rosrun testpkg listenernode
[ INFO] [1606049212.532233109]: I heard: [hello world 1636]
[ INFO] [1606049212.631619046]: I heard: [hello world 1637]
[ INFO] [1606049212.731366059]: I heard: [hello world 1638]
[ INFO] [1606049212.831722021]: I heard: [hello world 1639]
[ INFO] [1606049212.931494346]: I heard: [hello world 1640]
[ INFO] [1606049213.031477434]: I heard: [hello world 1641]
[ INFO] [1606049213.131728625]: I heard: [hello world 1642]
[ INFO] [1606049213.231753059]: I heard: [hello world 1643]
[ INFO] [1606049213.331663981]: I heard: [hello world 1644]
[ INFO] [1606049213.431584042]: I heard: [hello world 1645]
[ INFO] [1606049213.531544007]: I heard: [hello world 1646]
[ INFO] [1606049213.631378455]: I heard: [hello world 1647]
[ INFO] [1606049213.731611894]: I heard: [hello world 1648]
[ INFO] [1606049213.831547962]: I heard: [hello world 1649]
[ INFO] [1606049213.931473353]: I heard: [hello world 1650]
[ INFO] [1606049214.031759272]: I heard: [hello world 1651]
[ INFO] [1606049214.131696513]: I heard: [hello world 1652]
[ INFO] [1606049214.231800331]: I heard: [hello world 1653]
[ INFO] [1606049214.331712807]: I heard: [hello world 1654]
[ INFO] [1606049214.431534420]: I heard: [hello world 1655]
[ INFO] [1606049214.531748676]: I heard: [hello world 1656]
[ INFO] [1606049214.631626017]: I heard: [hello world 1657]
[ INFO] [1606049214.731761624]: I heard: [hello world 1658]
[ INFO] [1606049214.831606642]: I heard: [hello world 1659]
[ INFO] [1606049214.931829376]: I heard: [hello world 1660]
[ INFO] [1606049215.031582522]: I heard: [hello world 1661]
[ INFO] [1606049215.131745691]: I heard: [hello world 1662]
[ INFO] [1606049215.231738024]: I heard: [hello world 1663]
[ INFO] [1606049215.331602140]: I heard: [hello world 1664]
[ INFO] [1606049215.431566116]: I heard: [hello world 1665]
[ INFO] [1606049215.531740947]: I heard: [hello world 1666]
[ INFO] [1606049215.631475977]: I heard: [hello world 1667]
[ INFO] [1606049215.731603809]: I heard: [hello world 1668]
[ INFO] [1606049215.831549444]: I heard: [hello world 1669]
[ INFO] [1606049215.931510858]: I heard: [hello world 1670]
[ INFO] [1606049216.031575948]: I heard: [hello world 1671]
[ INFO] [1606049216.131815561]: I heard: [hello world 1672]
[ INFO] [1606049216.231478303]: I heard: [hello world 1673]
[ INFO] [1606049216.331269389]: I heard: [hello world 1674]
[ INFO] [1606049216.431343461]: I heard: [hello world 1675]
[ INFO] [1606049216.531573433]: I heard: [hello world 1676]
[ INFO] [1606049216.631262954]: I heard: [hello world 1677]
[ INFO] [1606049216.731284228]: I heard: [hello world 1678]
```

# ROS TOPIC

