SLAM

Study:

ROS 및 SLAM Tutorial 입문기

CAILab CYBER-PHYSICAL SYSTEMS ARTIFICIAL INTELLIGENCE

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SLAM

ROS-meiodic 환경에서 패키지 설치하기

```
$ sudo apt-get install ros-melodic-joy ros-melodic-teleop-twist-joy ros-melodic-teleop-twist-keyboard ros-melodic-laser-proc ros-melodic-rgbd-launch ros-melodic-depthimage-to-laserscan ros-melodic-rosserial-arduino ros-melodic-rosserial-python ros-melodic-rosserial-server ros-melodic-rosserial-client ros-melodic-rosserial-msgs ros-melodic-amcl ros-melodic-map-server ros-melodic-move-base ros-melodic-urdf ros-melodic-xacro ros-melodic-compressed-image-transport ros-melodic-rqt-image-view ros-melodic-gmapping ros-melodic-navigation
```

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ROS-melodic 환경에서 패키지 설치하기

현재 나의 환경 :

1. Ubuntu 18.04
2. ROS-melodic
3. CUDA setting : X

```
$ cd mkdir -p ~/catkin_ws/src
$ cd ~/catkin_ws/src/
$ git clone https://github.com/ROBOTIS-GIT/turtlebot3.git
$ git clone https://github.com/ROBOTIS-GIT/turtlebot3_msgs.git
$ git clone https://github.com/ROBOTIS-GIT/turtlebot3_simulations.git
$ cd ~/catkin_ws && catkin_make
```

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Gazebo 상에서 가상의 로봇을 구동

```
$ roscore
```

```
$ cd catkin_ws
$ source devel/setup.bash
$ export TURTLEBOT3_MODEL=waffle_pi
$ roslaunch turtlebot3_gazebo turtlebot3_world.launch
```

만약 실행 중 아래의 오류가 발생하면

```
[Err] [REST.cc:205] Error in REST request
Libcurl: (51) SSL : no alternative certificate subject name matches target host name ‘api.ignitionfu-el.org’
```

gedit ~/.ignition/fuel/config.yaml
url: https://api.ignitionfuel.org ->
url: https://api.ignitionrobotics.org
로 수정

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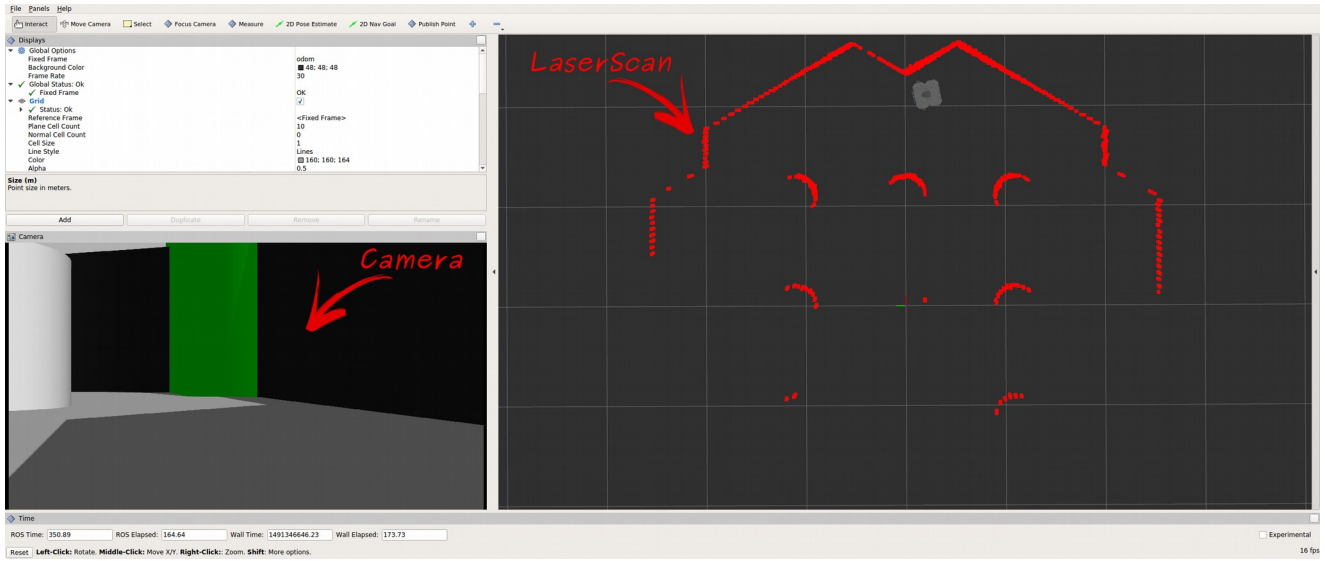
Gazebo 상에서 가상의 로봇을 구동

```
$ cd catkin_ws
$ source devel/setup.bash
$ roslaunch turtlebot3_teleop turtlebot3_teleop_key.launch
```

```
$ cd catkin_ws
$ source devel/setup.bash
$ export TURTLEBOT3_MODEL=waffle_pi
$ roslaunch turtlebot3_gazebo turtlebot3_gazebo_rviz.launch
```



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Gazebo 상에서 SLAM 하기

주의 ! 이전 과정을 모두 종료 후(roscore 포함) 시작할 것

- **Gazebo 실행**

```
$ cd catkin_ws
source devel/setup.bash
export TURTLEBOT3_MODEL=waffle_pi
roslaunch turtlebot3_gazebo turtlebot3_world.launch
```

- **SLAM 실행**

```
$ cd catkin_ws
source devel/setup.bash
export TURTLEBOT3_MODEL=waffle_pi
roslaunch turtlebot3_slam turtlebot3_slam.launch slam_methods:=gmapping
```

- **터틀봇 원격 조종**

```
$ cd catkin_ws
source devel/setup.bash
export TURTLEBOT3_MODEL=waffle_pi
roslaunch turtlebot3_teleop turtlebot3_teleop_key.launch
```

- **지도 출력**

```
$ cd catkin_ws
$ source devel/setup.bash
$ rosrun map_server map_saver -f ~/map
```

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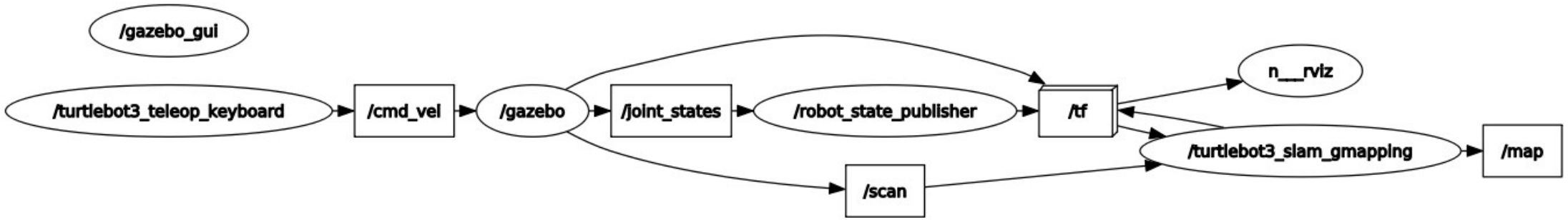
rqt_graph



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rosnode list

```
gmac92@gmac92:~$ rosnode list
/gazebo
/gazebo_gui
/robot_state_publisher
/rosout
/rqt_gui_cpp_node_3799
/rqt_gui_py_node_3799
/rviz
/turtlebot3_slam_gmapping
/turtlebot3_teleop_keyboard
gmac92@gmac92:~$
```

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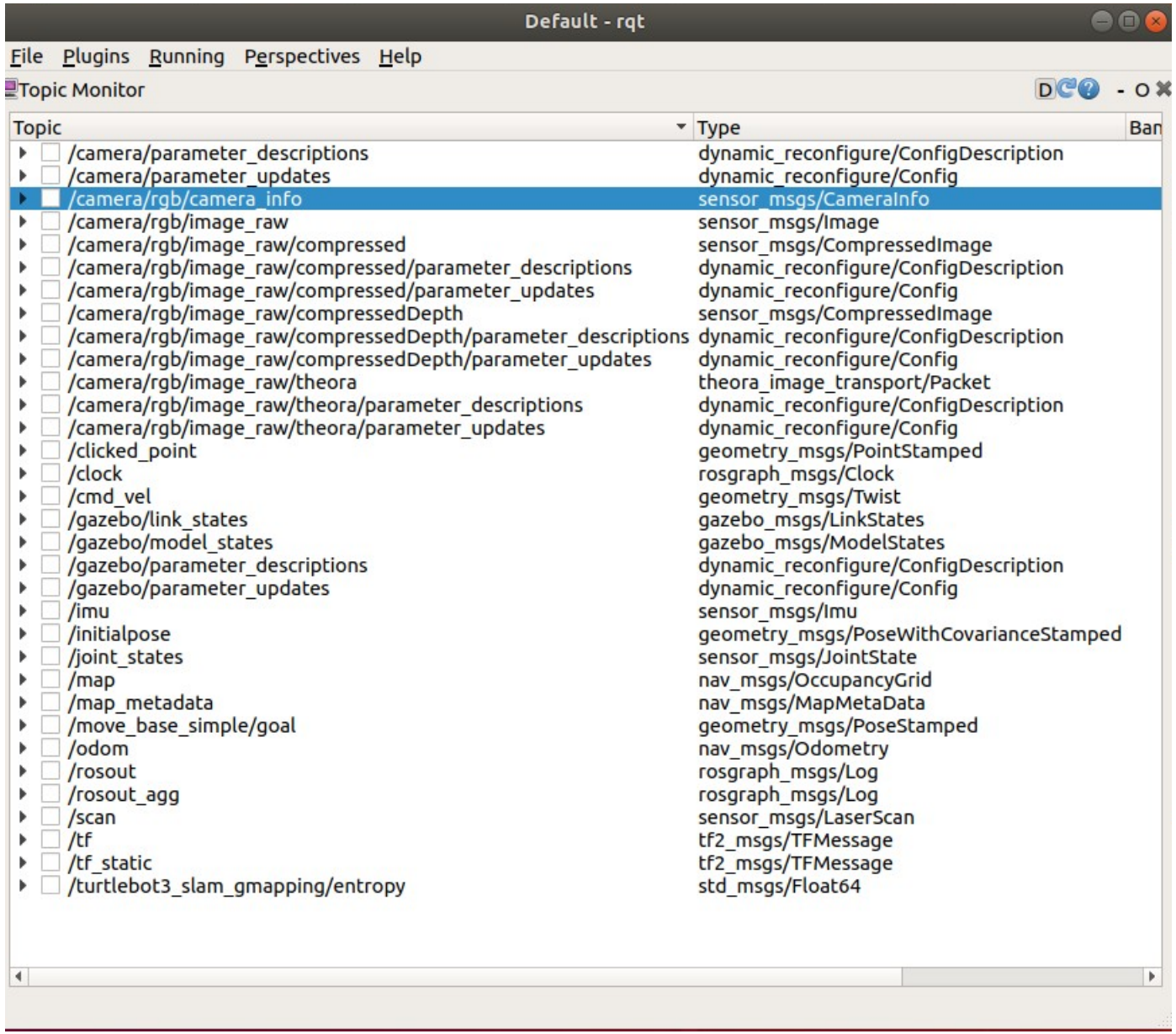
Rqt -> Topic Monitor



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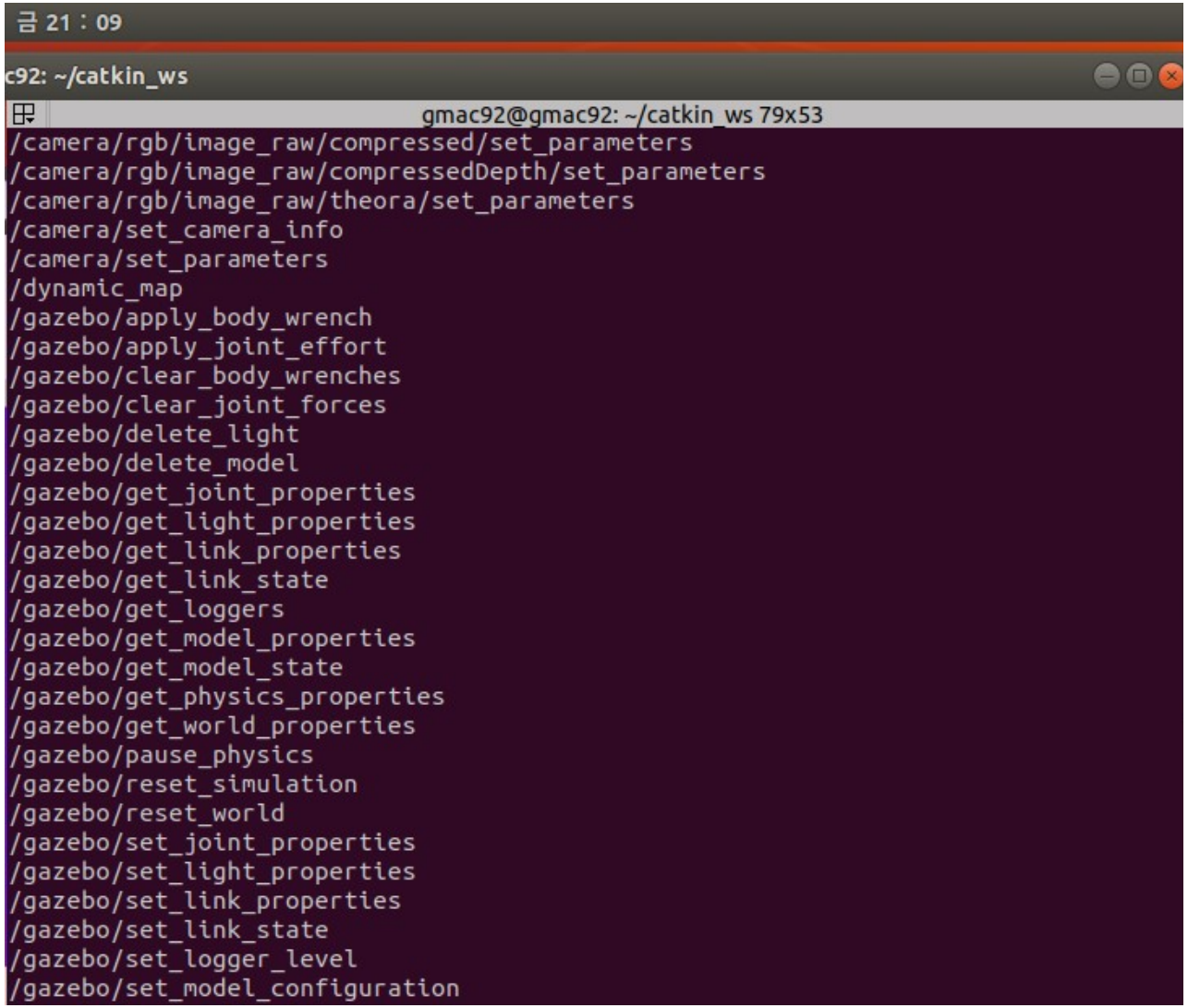
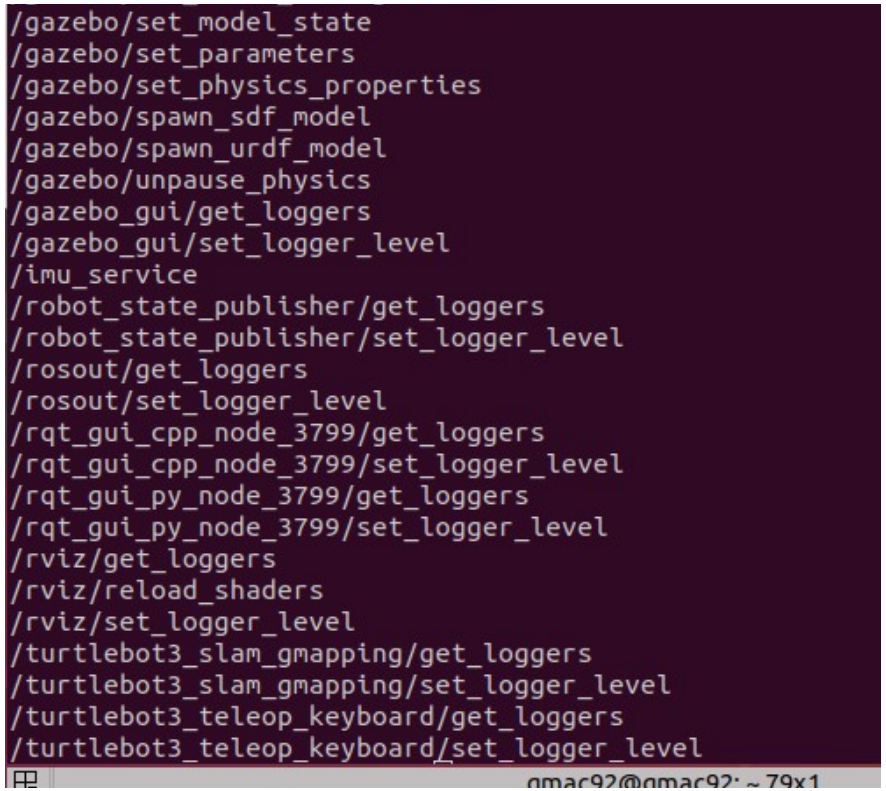
rosservice list





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Gazebo 상에서 Navigatinon 하기

- **Gazebo 실행**

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```
$ cd catkin_ws
$ source devel/setup.bash
$ export TURTLEBOT3_MODEL=waffle_pi
$ roslaunch turtlebot3_gazebo turtlebot3_world.launch
```

```
$ cd catkin_ws
$ source devel/setup.bash
$ export TURTLEBOT3_MODEL=waffle_pi
$ roslaunch turtlebot3_navigation turtlebot3_navigation.launch map_file:=$HOME/map.yaml
```