

# **ROS2 Book study**

**[3rd] Week**

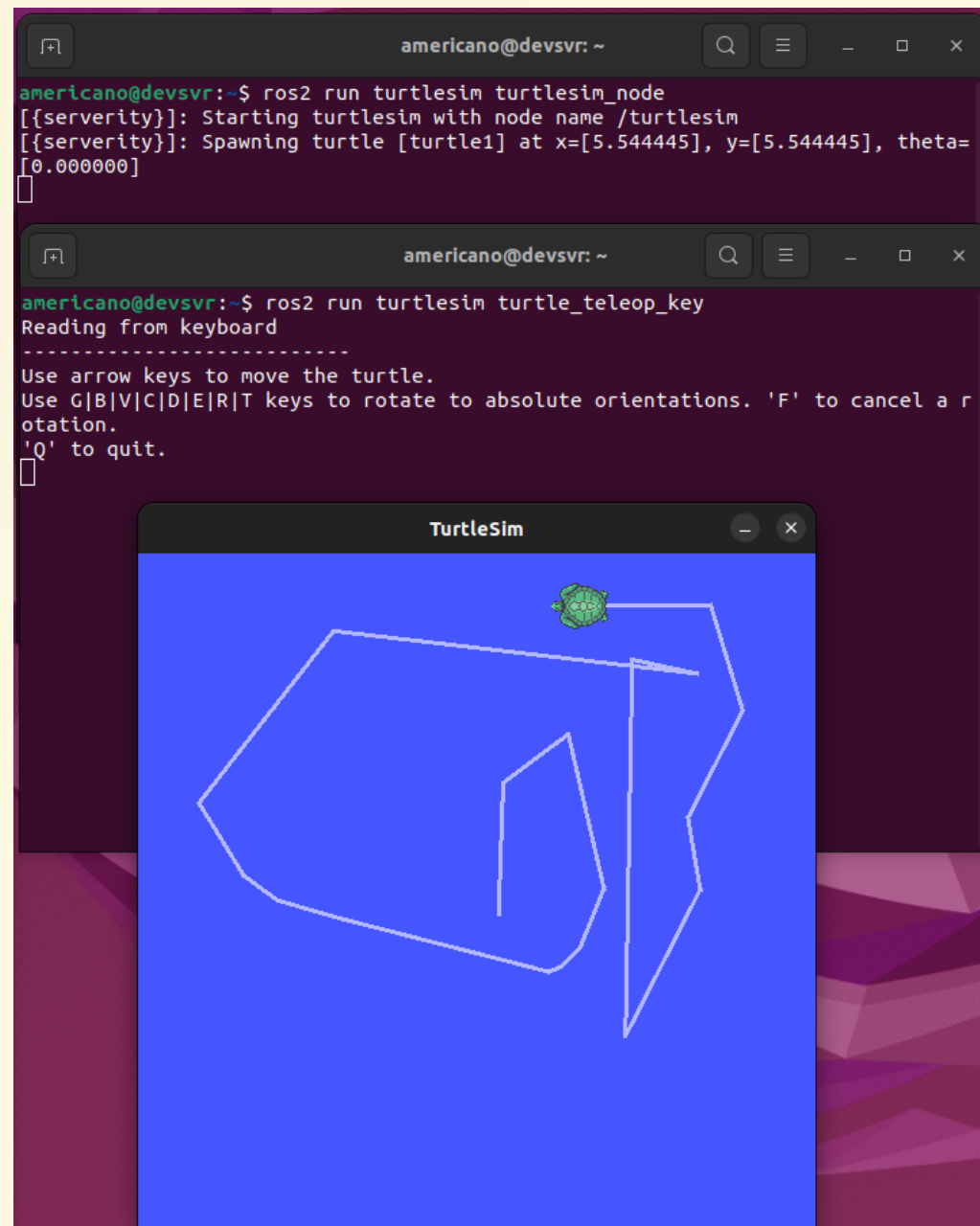
**Created by HanSop Kim ([@seobi](#))**

# 9. 패키지 설치와 노드 실행

## Turtlesim

```
sudo apt update  
sudo apt install ros-humble-turtlesim
```

# 9. Turtlesim 패키지 지의 노드 실행



The image shows a terminal window and a TurtleSim window. The terminal window has a title bar 'americano@devsvr: ~' and shows the following commands and output:

```
americano@devsvr:~$ ros2 run turtlesim turtlesim_node
[serverity]: Starting turtlesim with node name /turtlesim
[serverity]: Spawning turtle [turtle1] at x=[5.544445], y=[5.544445], theta=[0.000000]

```

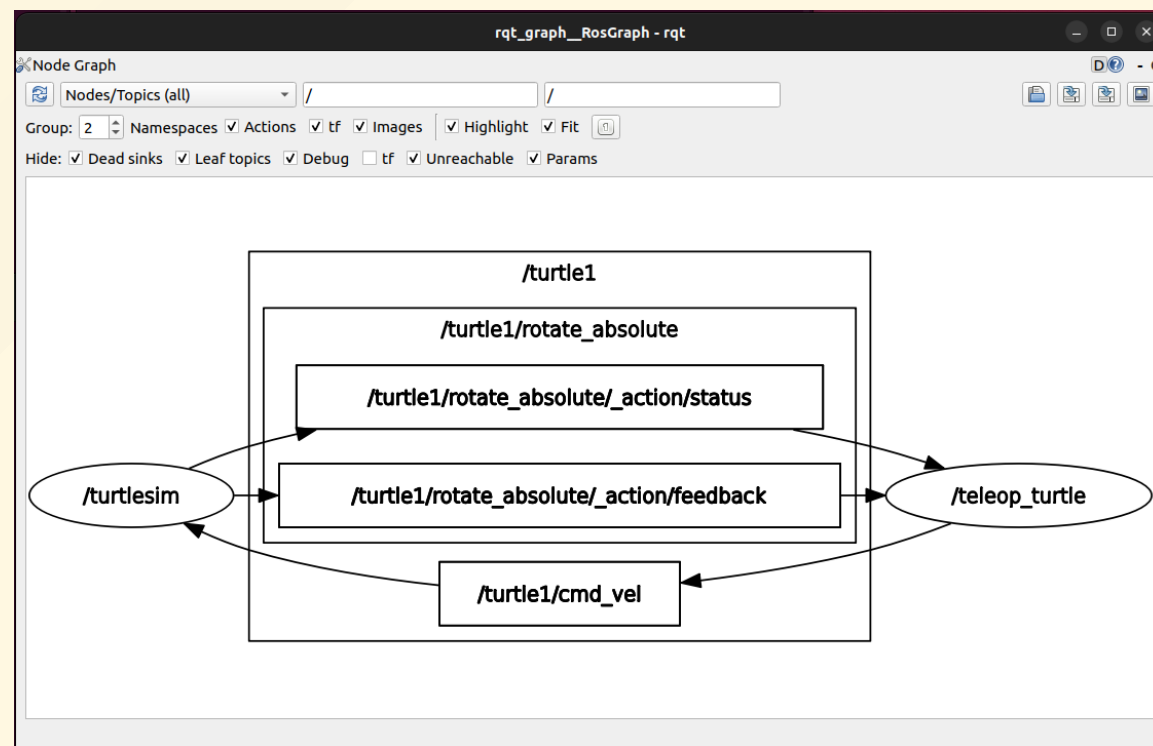
The second terminal window also has a title bar 'americano@devsvr: ~' and shows the following commands and output:

```
americano@devsvr:~$ ros2 run turtlesim turtle_teleop_key
Reading from keyboard
-----
Use arrow keys to move the turtle.
Use G|B|V|C|D|E|R|T keys to rotate to absolute orientations. 'F' to cancel a rotation.
'Q' to quit.

```

The TurtleSim window has a title bar 'TurtleSim' and shows a blue square environment with a green turtle icon in the top right corner. A white line represents the path of the turtle, showing a series of connected line segments forming a complex shape.

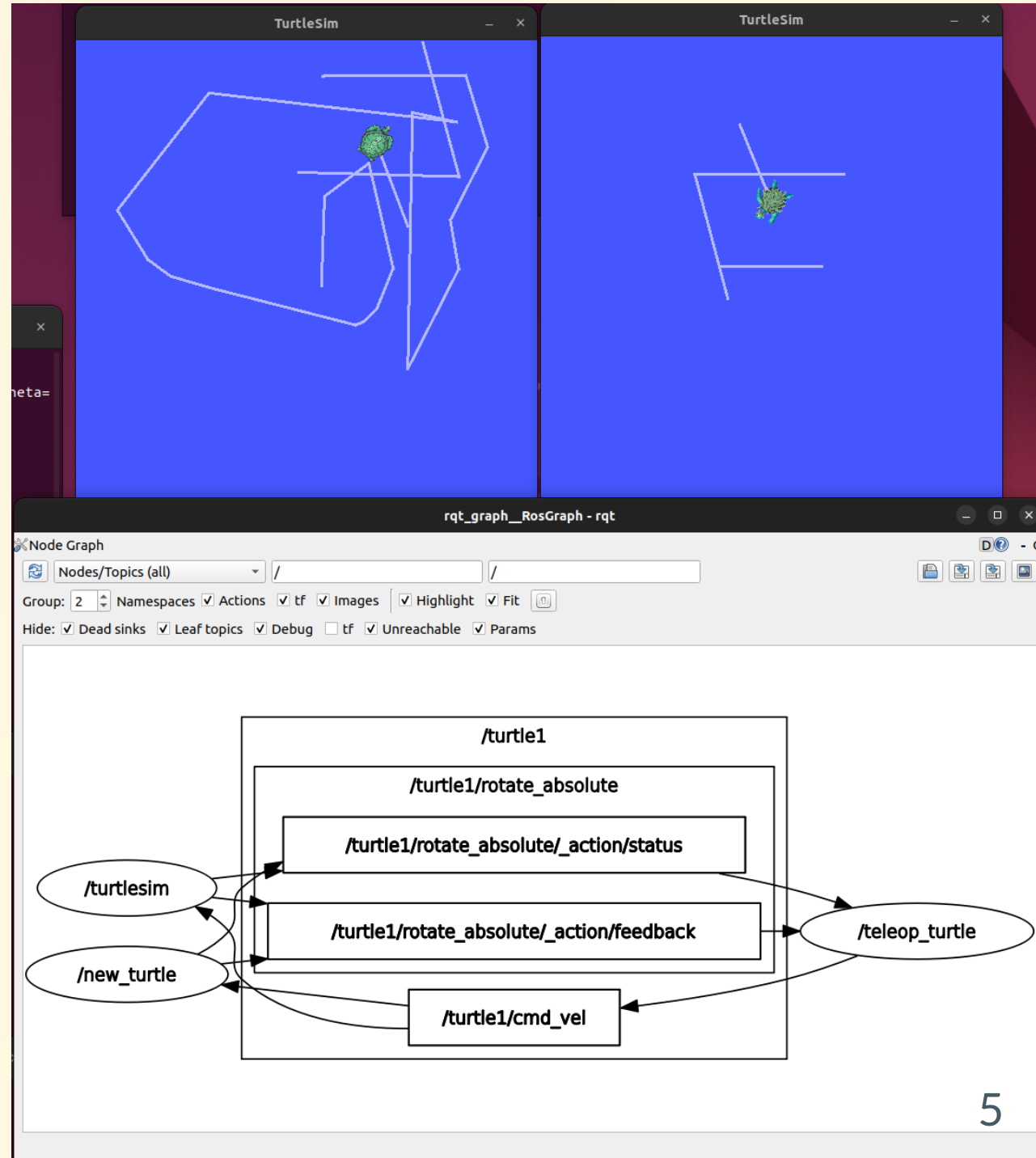
# 9. rqt\_graph로 보는 노드와 토픽의 그 래프 뷰



# 10. ROS2 노드와 데이터 통신

: 토픽, 서비스, 액션, 파라미터

노드 추가 하여 rqt\_graph 확인



# 10. 노드 정보

: 지정된 노드(turtlesim)의  
Publishers, Subscriber,  
Service, Action, Parameter 정보

```
americano@devsvr: ~  
americano@devsvr:~$ ros2 node info /turtlesim  
/turtlesim  
Subscribers:  
  /parameter_events: rcl_interfaces/msg/ParameterEvent  
  /turtle1/cmd_vel: geometry_msgs/msg/Twist  
Publishers:  
  /parameter_events: rcl_interfaces/msg/ParameterEvent  
  /rosout: rcl_interfaces/msg/Log  
  /turtle1/color_sensor: turtlesim/msg/Color  
  /turtle1/pose: turtlesim/msg/Pose  
Service Servers:  
  /clear: std_srvs/srv/Empty  
  /kill: turtlesim/srv/Kill  
  /reset: std_srvs/srv/Empty  
  /spawn: turtlesim/srv/Spawn  
  /turtle1/set_pen: turtlesim/srv/SetPen  
  /turtle1/teleport_absolute: turtlesim/srv/TeleportAbsolute  
  /turtle1/teleport_relative: turtlesim/srv/TeleportRelative  
  /turtlesim/describe_parameters: rcl_interfaces/srv/DescribeParameters  
  /turtlesim/get_parameter_types: rcl_interfaces/srv/GetParameterTypes  
  /turtlesim/get_parameters: rcl_interfaces/srv/GetParameters  
  /turtlesim/list_parameters: rcl_interfaces/srv/ListParameters  
  /turtlesim/set_parameters: rcl_interfaces/srv/SetParameters  
  /turtlesim/set_parameters_atomically: rcl_interfaces/srv/SetParametersAtomically  
Service Clients:  
  
Action Servers:  
  /turtle1/rotate_absolute: turtlesim/action/RotateAbsolute  
Action Clients:  
  
americano@devsvr:~$
```

# 11. ROS2 토픽

: 토픽 정보에 따라 1:N, N:1, N:N  
가능

토픽 정보 확인

```
ros2 topic info /turtle1/cmd_vel
```

토픽 내용 확인

```
ros2 topic echo /turtle1/cmd_vel
```

```
americano@devsvr: ~  
americano@devsvr:~$ ros2 topic info /turtle1/cmd_vel  
Type: geometry_msgs/msg/Twist  
Publisher count: 1  
Subscription count: 2  
americano@devsvr:~$ ros2 topic echo /turtle1/cmd_vel  
linear:  
  x: 2.0  
  y: 0.0  
  z: 0.0  
angular:  
  x: 0.0  
  y: 0.0  
  z: 0.0  
---  
linear:  
  x: 0.0  
  y: 0.0  
  z: 0.0  
angular:  
  x: 0.0  
  y: 0.0  
  z: -2.0  
---  
linear:  
  x: 0.0  
  y: 0.0  
  z: 0.0  
angular:  
  x: 0.0  
  y: 0.0  
  z: -2.0
```

# 12. ROS2 서버스

- 서비스 요청(Request)하는 쪽을 Service Client
- 요청받은 서비스를 수행한 후 서비스 응답(Response)하는 쪽을 Service Server
- 복수의 클라이언트를 가질수 있도록 설계



# 12. ROS2 서버스

서비스 목록 확인

`ros2 service list`

서비스 형태 확인

`ros2 service list -t`

```
americano@devsvr: ~  
americano@devsvr:~$ ros2 service list  
/clear  
/kill  
/new_turtle/describe_parameters  
/new_turtle/get_parameter_types  
/new_turtle/get_parameters  
/new_turtle/list_parameters  
/new_turtle/set_parameters  
/new_turtle/set_parameters_atomically  
/reset  
/rqt_gui_py_node_6039/describe_parameters  
/rqt_gui_py_node_6039/get_parameter_types  
/rqt_gui_py_node_6039/get_parameters  
/rqt_gui_py_node_6039/list_parameters  
/rqt_gui_py_node_6039/set_parameters  
/rqt_gui_py_node_6039/set_parameters_atomically  
/spawn  
/teleop_turtle/describe_parameters  
/teleop_turtle/get_parameter_types  
/teleop_turtle/get_parameters  
/teleop_turtle/list_parameters  
/teleop_turtle/set_parameters  
/teleop_turtle/set_parameters_atomically  
/turtle1/set_pen  
/turtle1/teleport_absolute  
/turtle1/teleport_relative  
/turtlesim/describe_parameters  
/turtlesim/get_parameter_types  
/turtlesim/get_parameters  
/turtlesim/list_parameters  
/turtlesim/set_parameters  
/turtlesim/set_parameters_atomically  
americano@devsvr:~$ ros2 service list -t  
/clear [std_srvs/srv/Empty]  
/kill [turtlesim/srv/Kill]  
/new_turtle/describe_parameters [rcl_interfaces/srv/DescribeParameters]  
/new_turtle/get_parameter_types [rcl_interfaces/srv/GetParameterTypes]  
/new_turtle/get_parameters [rcl_interfaces/srv/GetParameters]  
/new_turtle/list_parameters [rcl_interfaces/srv/ListParameters]  
/new_turtle/set_parameters [rcl_interfaces/srv/SetParameters]  
/new_turtle/set_parameters_atomically [rcl_interfaces/srv/SetParametersAtomically]  
/reset [std_srvs/srv/Empty]  
/rqt_gui_py_node_6039/describe_parameters [rcl_interfaces/srv/DescribeParameters]  
/rqt_gui_py_node_6039/get_parameter_types [rcl_interfaces/srv/GetParameterTypes]  
/rqt_gui_py_node_6039/get_parameters [rcl_interfaces/srv/GetParameters]  
/rqt_gui_py_node_6039/list_parameters [rcl_interfaces/srv/ListParameters]  
/rqt_gui_py_node_6039/set_parameters [rcl_interfaces/srv/SetParameters]  
/rqt_gui_py_node_6039/set_parameters_atomically [rcl_interfaces/srv/SetParametersAtomically]  
/spawn [turtlesim/srv/Spawn]  
/teleop_turtle/describe_parameters [rcl_interfaces/srv/DescribeParameters]  
/teleop_turtle/get_parameter_types [rcl_interfaces/srv/GetParameterTypes]  
/teleop_turtle/get_parameters [rcl_interfaces/srv/GetParameters]
```