

# ROS\_1일차\_과제\_2번\_보고서\_20기\_인턴\_2025402040\_컴퓨터정보공학부\_ 노기문

1. 공통적 통신원리

2. 결과 화면

cpp 2 cpp

cpp 2 py

py 2 py

py 2 cpp

## 공통적 통신 원리

### 1. Publisher (발행자)

C++ 버전 (publisher.cpp)

Python 버전 (publisher.py)

동작 원리

rclcpp::Node (C++) 또는 rclpy.node.Node (Python)를 상속해 노드 생성.

세 가지 토픽을 만든다:

"int\_topic" → std\_msgs/msg/Int32

"string\_topic" → std\_msgs/msg/String

"float\_topic" → std\_msgs/msg/Float32

타이머(1초 주기)를 사용해 주기적으로 메시지를 발행한다.

int: 카운터 값

string: "Hello <카운트>"

float: 3.14 \* 카운트

로그로 발행한 값 출력.

### 2. Subscriber (구독자)

C++ 버전 (subscriber.cpp)

Python 버전 (listener.py)

동작 원리

Publisher와 동일하게 노드 생성.

같은 세 가지 토픽을 구독한다:

"int\_topic" → 정수 수신 후 출력

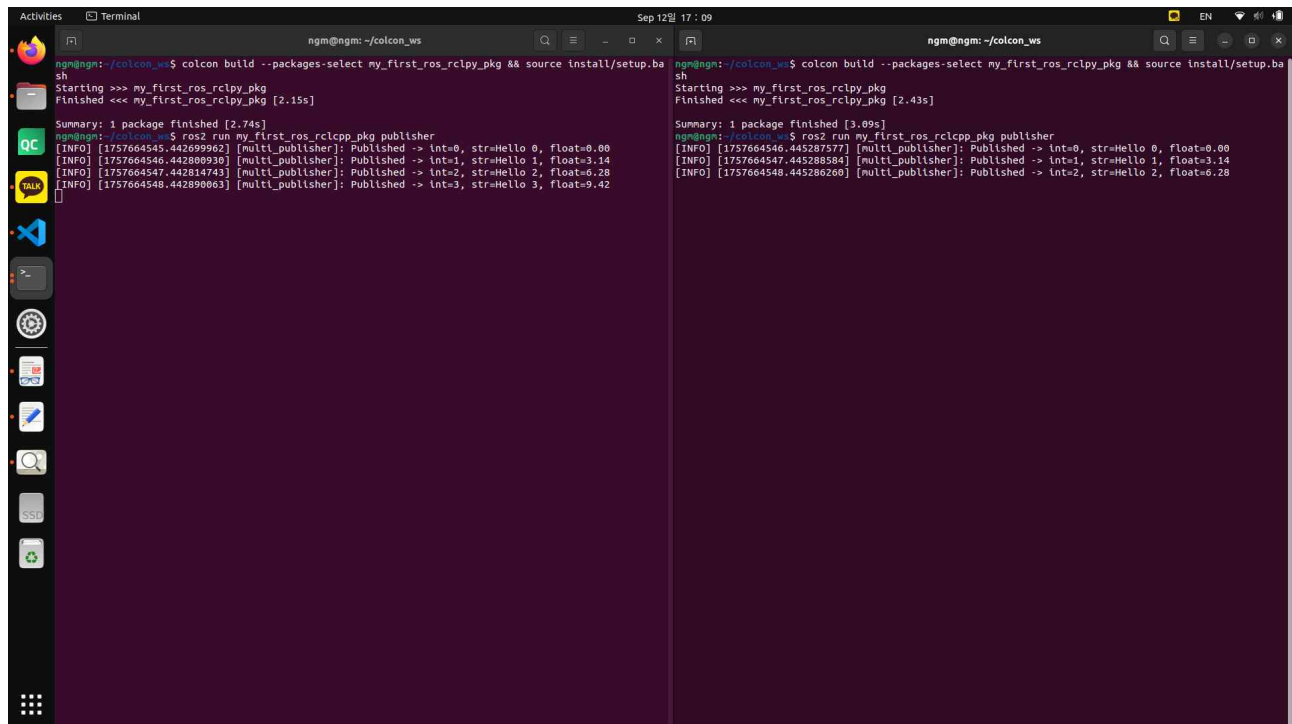
"string\_topic" → 문자열 수신 후 출력

"float\_topic" → 실수 수신 후 출력

콜백 함수가 자동 실행되어 RCLCPP\_INFO (C++) 또는 get\_logger().info (Python)로 수신 데이터를 로그에 기록.

result screen

cpp 2 cpp



The image shows two terminal windows side-by-side. The left window shows the command `colcon build --packages-select my_first_ros_rcldpy_pkg` and its output, including a summary of the build process and a list of published data points. The right window shows the command `colcon build --packages-select my_first_ros_rcldpy_pkg && source install/setup.bash` and its output, including a summary of the build process and a list of published data points.

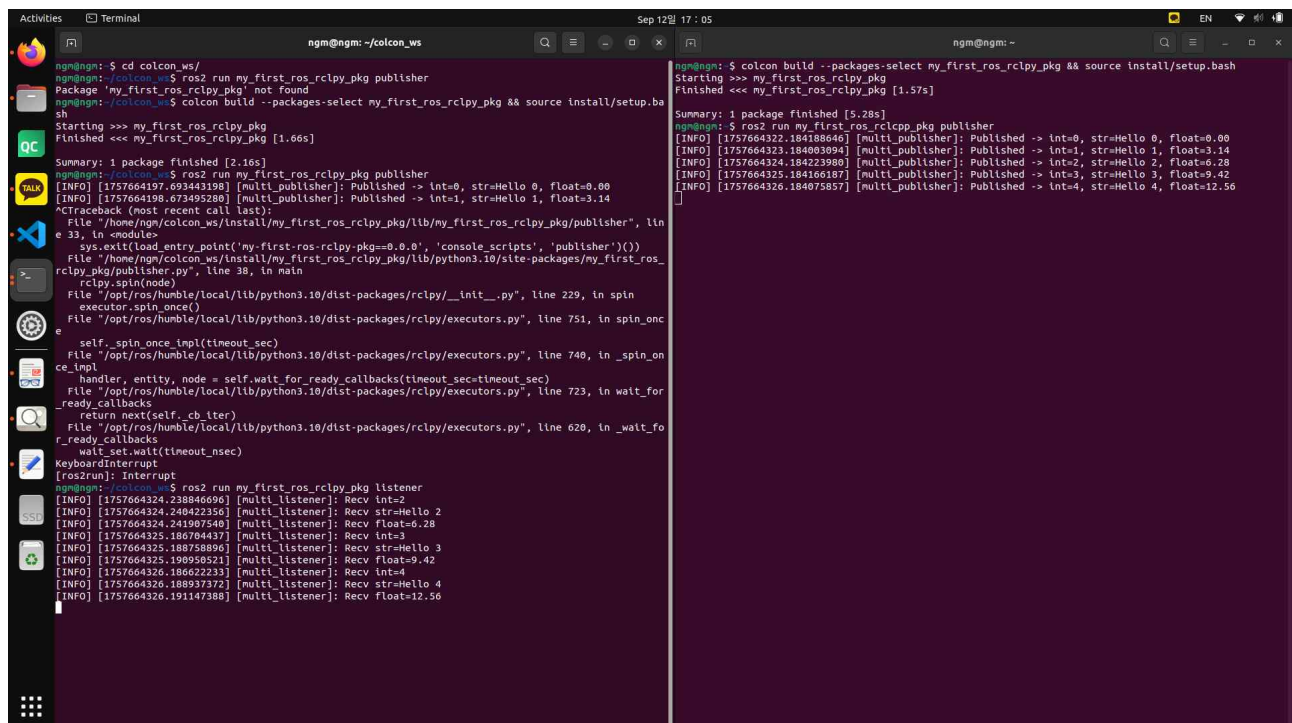
```
ngm@ngm: ~/colcon_ws
$ colcon build --packages-select my_first_ros_rcldpy_pkg
Starting my_first_ros_rcldpy_pkg
Finished my_first_ros_rcldpy_pkg [2.15s]

Summary: 1 package finished [2.74s]
ngm@ngm: ~/colcon_ws$ ros2 run my_first_ros_rcldpy_pkg publisher
[INFO] [1757664545.442699962] [multi_publisher]: Published -> int=0, str=Hello 0, float=0.00
[INFO] [1757664546.442800938] [multi_publisher]: Published -> int=1, str=Hello 1, float=3.14
[INFO] [1757664547.442814743] [multi_publisher]: Published -> int=2, str=Hello 2, float=6.28
[INFO] [1757664548.442890663] [multi_publisher]: Published -> int=3, str=Hello 3, float=9.42

ngm@ngm: ~/colcon_ws$ colcon build --packages-select my_first_ros_rcldpy_pkg && source install/setup.bash
Starting my_first_ros_rcldpy_pkg
Finished my_first_ros_rcldpy_pkg [2.43s]

Summary: 1 package finished [3.09s]
ngm@ngm: ~/colcon_ws$ ros2 run my_first_ros_rcldpy_pkg publisher
[INFO] [1757664546.445287577] [multi_publisher]: Published -> int=0, str=Hello 0, float=0.00
[INFO] [1757664547.445288584] [multi_publisher]: Published -> int=1, str=Hello 1, float=3.14
[INFO] [1757664548.445286260] [multi_publisher]: Published -> int=2, str=Hello 2, float=6.28
```

cpp 2 py



The image shows two terminal windows side-by-side. The left window shows the command `colcon build --packages-select my_first_ros_rcldpy_pkg` and its output, including a summary of the build process and a list of published data points. The right window shows the command `colcon build --packages-select my_first_ros_rcldpy_pkg && source install/setup.bash` and its output, including a summary of the build process and a list of published data points. The left window also shows a traceback for a `KeyboardInterrupt` error.

```
ngm@ngm: ~/colcon_ws
$ colcon build --packages-select my_first_ros_rcldpy_pkg
Starting my_first_ros_rcldpy_pkg
Finished my_first_ros_rcldpy_pkg [1.66s]

Summary: 1 package finished [2.16s]
ngm@ngm: ~/colcon_ws$ ros2 run my_first_ros_rcldpy_pkg publisher
[INFO] [1757664197.693443198] [multi_publisher]: Published -> int=0, str=Hello 0, float=0.00
[INFO] [1757664198.673495288] [multi_publisher]: Published -> int=1, str=Hello 1, float=3.14
^CTraceback (most recent call last):
  File "/home/ngm/colcon_ws/install/my_first_ros_rcldpy_pkg/lib/my_first_ros_rcldpy_pkg/publisher", line 33, in <module>
    sys.exit(load_entry_point('my-first-ros-rcldpy-pkg==0.0.0', 'console_scripts', 'publisher')())
  File "/home/ngm/colcon_ws/install/my_first_ros_rcldpy_pkg/lib/python3.10/site-packages/my_first_ros_rcldpy_pkg/publisher.py", line 38, in main
    rcldpy.spin(node)
  File "/opt/ros/humble/lib/python3.10/dist-packages/rcldpy/_init_.py", line 229, in spin
    executor.spin_once()
  File "/opt/ros/humble/lib/python3.10/dist-packages/rcldpy/executors.py", line 751, in spin_once
    self.spin_once_impl(timeout_sec)
  File "/opt/ros/humble/lib/python3.10/dist-packages/rcldpy/executors.py", line 740, in _spin_once_impl
    handler, entity, node = self.wait_for_ready_callbacks(timeout_sec=timeout_sec)
  File "/opt/ros/humble/lib/python3.10/dist-packages/rcldpy/executors.py", line 723, in wait_for_ready_callbacks
    return next(self._cb_iter)
  File "/opt/ros/humble/lib/python3.10/dist-packages/rcldpy/executors.py", line 620, in _wait_for_ready_callbacks
    wait_set.wait(timeout_nsec)
KeyboardInterrupt
[ros2run]: Interrupt
ngm@ngm: ~/colcon_ws$ ros2 run my_first_ros_rcldpy_pkg listener
[INFO] [1757664324.238846696] [multi_listener]: Recv int=2
[INFO] [1757664324.240422356] [multi_listener]: Recv str=Hello 2
[INFO] [1757664324.241907546] [multi_listener]: Recv float=6.28
[INFO] [1757664325.186704437] [multi_listener]: Recv int=3
[INFO] [1757664325.188758896] [multi_listener]: Recv str=Hello 3
[INFO] [1757664325.190950521] [multi_listener]: Recv float=9.42
[INFO] [1757664326.186822233] [multi_listener]: Recv int=4
[INFO] [1757664326.188937372] [multi_listener]: Recv str=Hello 4
[INFO] [1757664326.191147388] [multi_listener]: Recv float=12.56
```

py 2 py

```
Activities Terminal Sep 12일 17: 08
ngm@ngm: ~/colcon_ws
ngm@ngm:~/colcon_ws$ ros2 run my_first_ros_rcplpy_pkg publisher
Package 'my_first_ros_rcplpy_pkg' not found
ngm@ngm:~/colcon_ws$ colcon build --packages-select my_first_ros_rcplpy_pkg && source install/setup.bash
Starting >>> my_first_ros_rcplpy_pkg
Finished <<< my_first_ros_rcplpy_pkg [2.12s]
Summary: 1 package finished [3.01s]
ngm@ngm:~/colcon_ws$ ros2 run my_first_ros_rcplpy_pkg publisher
[INFO] [1757664489.83874859] [multi_publisher]: Published -> int=0, str=Hello 0, float=0.00
[INFO] [1757664490.888434937] [multi_publisher]: Published -> int=1, str=Hello 1, float=3.14
[INFO] [1757664491.809216663] [multi_publisher]: Published -> int=2, str=Hello 2, float=6.28
[INFO] [1757664492.810108536] [multi_publisher]: Published -> int=3, str=Hello 3, float=9.42
ngm@ngm:~/colcon_ws$ ros2 run my_first_ros_rcplpy_pkg listener
Package 'my_first_ros_rcplpy_pkg' not found
ngm@ngm:~/colcon_ws$ colcon build --packages-select my_first_ros_rcplpy_pkg && source install/setup.bash
Starting >>> my_first_ros_rcplpy_pkg
Finished <<< my_first_ros_rcplpy_pkg [2.10s]
Summary: 1 package finished [2.75s]
ngm@ngm:~/colcon_ws$ ros2 run my_first_ros_rcplpy_pkg listener
[INFO] [1757664490.910776886] [multi_listener]: Recv int=1
[INFO] [1757664490.91077179] [multi_listener]: Recv str=Hello 1
[INFO] [1757664490.912442193] [multi_listener]: Recv float=3.14
[INFO] [1757664491.809599415] [multi_listener]: Recv int=2
[INFO] [1757664491.810767625] [multi_listener]: Recv str=Hello 2
[INFO] [1757664491.811680964] [multi_listener]: Recv float=6.28
[INFO] [1757664492.810818454] [multi_listener]: Recv int=3
[INFO] [1757664492.812848593] [multi_listener]: Recv str=Hello 3
[INFO] [1757664492.814255079] [multi_listener]: Recv float=9.42
```

py 2 cpp

```
Activities Terminal Sep 12일 17: 06
[ros2run]: Interrupt
ngm@ngm:~/colcon_ws$ ros2 run my_first_ros_rcplpy_pkg listener
[INFO] [1757664324.238846696] [multi_listener]: Recv int=2
[INFO] [1757664324.240422356] [multi_listener]: Recv str=Hello 2
[INFO] [1757664324.241907540] [multi_listener]: Recv float=6.28
[INFO] [1757664325.186704437] [multi_listener]: Recv int=3
[INFO] [1757664325.188758896] [multi_listener]: Recv str=Hello 3
[INFO] [1757664325.190985521] [multi_listener]: Recv float=9.42
[INFO] [1757664326.186622233] [multi_listener]: Recv int=4
[INFO] [1757664326.188937372] [multi_listener]: Recv str=Hello 4
[INFO] [1757664326.191147388] [multi_listener]: Recv float=12.56
[INFO] [1757664327.186183377] [multi_listener]: Recv int=5
[INFO] [1757664327.188332521] [multi_listener]: Recv str=Hello 5
[INFO] [1757664327.190423726] [multi_listener]: Recv float=15.70
[INFO] [1757664328.185227217] [multi_listener]: Recv int=6
[INFO] [1757664328.186395167] [multi_listener]: Recv str=Hello 6
[INFO] [1757664328.187500790] [multi_listener]: Recv float=18.84
[INFO] [1757664329.185048978] [multi_listener]: Recv int=7
[INFO] [1757664329.185946695] [multi_listener]: Recv str=Hello 7
[INFO] [1757664329.186873289] [multi_listener]: Recv float=21.98
[INFO] [1757664330.184941706] [multi_listener]: Recv int=8
[INFO] [1757664330.186004285] [multi_listener]: Recv str=Hello 8
[INFO] [1757664330.186985157] [multi_listener]: Recv float=25.12
^C[Traceback (most recent call last):
  File "/home/ngm/colcon_ws/install/my_first_ros_rcplpy_pkg/lib/my_first_ros_rcplpy_pkg/listener", line
33, in <module>
    sys.exit(load_entry_point('my-first-ros-rcplpy-pkg==0.0.0', 'console_scripts', 'listener'))()
  File "/home/ngm/colcon_ws/install/my_first_ros_rcplpy_pkg/lib/python3.10/site-packages/my_first_ros_
rcplpy_pkg/listener.py", line 25, in main
    rcplpy.spin(node)
  File "/opt/ros/humble/local/lib/python3.10/dist-packages/rcplpy/__init__.py", line 229, in spin
    executor.spin_once()
  File "/opt/ros/humble/local/lib/python3.10/dist-packages/rcplpy/executors.py", line 751, in spin_onc
e
    self.spin_once_impl(timeout_sec)
  File "/opt/ros/humble/local/lib/python3.10/dist-packages/rcplpy/executors.py", line 740, in _spin_on
ce_impl
    handler, entity, node = self.wait_for_ready_callbacks(timeout_sec=timeout_sec)
  File "/opt/ros/humble/local/lib/python3.10/dist-packages/rcplpy/executors.py", line 723, in wait_for
_ready_callbacks
    return next(self._cb_iter)
  File "/opt/ros/humble/local/lib/python3.10/dist-packages/rcplpy/executors.py", line 620, in _wait_fo
r_ready_callbacks
    wait_set.wait(timeout_nsec)
KeyboardInterrupt
[ros2run]: Interrupt
ngm@ngm:~/colcon_ws$ ros2 run my_first_ros_rcplpy_pkg publisher
[INFO] [1757664386.78381133] [multi_publisher]: Published -> int=0, str=Hello 0, float=0.00
[INFO] [1757664387.753406413] [multi_publisher]: Published -> int=1, str=Hello 1, float=3.14
[INFO] [1757664388.732777311] [multi_publisher]: Published -> int=2, str=Hello 2, float=6.28
[INFO] [1757664389.752630882] [multi_publisher]: Published -> int=3, str=Hello 3, float=9.42
[INFO] [1757664390.751733181] [multi_publisher]: Published -> int=4, str=Hello 4, float=12.56
[INFO] [1757664391.753191688] [multi_publisher]: Published -> int=5, str=Hello 5, float=15.70
[INFO] [1757664392.753262963] [multi_publisher]: Published -> int=6, str=Hello 6, float=18.84
ngm@ngm:~/colcon_ws$ colcon build --packages-select my_first_ros_rcplpy_pkg && source install/setup.bash
Starting >>> my_first_ros_rcplpy_pkg
Finished <<< my_first_ros_rcplpy_pkg [1.57s]
Summary: 1 package finished [3.28s]
ngm@ngm:~/colcon_ws$ ros2 run my_first_ros_rcplpy_pkg publisher
[INFO] [1757664322.184188646] [multi_publisher]: Published -> int=0, str=Hello 0, float=0.00
[INFO] [1757664323.184003894] [multi_publisher]: Published -> int=1, str=Hello 1, float=3.14
[INFO] [1757664324.184223980] [multi_publisher]: Published -> int=2, str=Hello 2, float=6.28
[INFO] [1757664325.184166187] [multi_publisher]: Published -> int=3, str=Hello 3, float=9.42
[INFO] [1757664326.184075857] [multi_publisher]: Published -> int=4, str=Hello 4, float=12.56
[INFO] [1757664327.183908323] [multi_publisher]: Published -> int=5, str=Hello 5, float=15.70
[INFO] [1757664328.183888929] [multi_publisher]: Published -> int=6, str=Hello 6, float=18.84
[INFO] [1757664329.183849672] [multi_publisher]: Published -> int=7, str=Hello 7, float=21.98
[INFO] [1757664330.183757038] [multi_publisher]: Published -> int=8, str=Hello 8, float=25.12
[INFO] [1757664331.183749333] [multi_publisher]: Published -> int=9, str=Hello 9, float=28.26
[INFO] [1757664332.183733204] [multi_publisher]: Published -> int=10, str=Hello 10, float=31.40
^C[INFO] [1757664333.183591357] [multi_publisher]: Published -> int=11, str=Hello 11, float=34.54
[INFO] [1757664334.183678880] [multi_publisher]: Published -> int=12, str=Hello 12, float=37.68
^C[INFO] [1757664334.221416622] [rcplpy] signal handler(signum=2)
ngm@ngm:~/colcon_ws$ ros2 run my_first_ros_rcplpy_pkg subscriber
ngm@ngm:~/colcon_ws$ cd colcon_ws/
ngm@ngm:~/colcon_ws$ ros2 run my_first_ros_rcplpy_pkg subscriber
[INFO] [1757664387.75187184] [multi_listener]: Recv int=1
[INFO] [1757664387.752025905] [multi_listener]: Recv str=Hello 1
[INFO] [1757664387.752225759] [multi_listener]: Recv float=3.14
[INFO] [1757664388.751274035] [multi_listener]: Recv int=2
[INFO] [1757664388.751507948] [multi_listener]: Recv str=Hello 2
[INFO] [1757664388.751725514] [multi_listener]: Recv float=6.28
[INFO] [1757664389.751235524] [multi_listener]: Recv int=3
[INFO] [1757664389.751475917] [multi_listener]: Recv str=Hello 3
[INFO] [1757664389.751599655] [multi_listener]: Recv float=9.42
[INFO] [1757664390.750848111] [multi_listener]: Recv int=4
[INFO] [1757664390.750989354] [multi_listener]: Recv str=Hello 4
[INFO] [1757664390.751050350] [multi_listener]: Recv float=12.56
[INFO] [1757664391.751190536] [multi_listener]: Recv int=5
[INFO] [1757664391.751456663] [multi_listener]: Recv str=Hello 5
[INFO] [1757664391.751668283] [multi_listener]: Recv float=15.70
[INFO] [1757664392.751245215] [multi_listener]: Recv int=6
[INFO] [1757664392.751488260] [multi_listener]: Recv str=Hello 6
[INFO] [1757664392.751719078] [multi_listener]: Recv float=18.84
```