

Week_3

- bringup 오류

```
source /opt/ros/humble/setup.bash
source ~/turtlebot3_ws/install/setup.bash
export ROS_DOMAIN_ID=30 #TURTLEBOT3
export LDS_MODEL=LDS-01
ubuntu@ubuntu:~$ source ~/.bashrc
ubuntu@ubuntu:~$ export TURTLEBOT3_MODEL=burger
ubuntu@ubuntu:~$ ros2 launch turtlebot3_bringup robot.launch.py
[INFO] [launch]: All log files can be found below /home/ubuntu/.ros/log/2023-07-20-12-19-02-529334-ubuntu-1666
[INFO] [launch]: Default logging verbosity is set to INFO
urdf_file_name : turtlebot3_burger.urdf
[INFO] [robot_state_publisher-1]: process started with pid [1667]
[INFO] [hlds_laser_publisher-2]: process started with pid [1669]
[INFO] [turtlebot3_ros-3]: process started with pid [1671]
[hlds_laser_publisher-2] [INFO] [1689855543.190552170] [hlds_laser_publisher]: Init hlds_laser_publisher Node Main
[hlds_laser_publisher-2] [INFO] [1689855543.190889889] [hlds_laser_publisher]: port : /dev/ttyUSB0 frame_id : base_scan
[robot_state_publisher-1] [INFO] [1689855543.192695228] [robot_state_publisher]: got segment base_footprint
[robot_state_publisher-1] [INFO] [1689855543.193030892] [robot_state_publisher]: got segment base_link
[robot_state_publisher-1] [INFO] [1689855543.193085059] [robot_state_publisher]: got segment base_scan
[robot_state_publisher-1] [INFO] [1689855543.193116743] [robot_state_publisher]: got segment caster_back_link
[robot_state_publisher-1] [INFO] [1689855543.193145817] [robot_state_publisher]: got segment imu_link
[robot_state_publisher-1] [INFO] [1689855543.193172725] [robot_state_publisher]: got segment wheel_left_link
[robot_state_publisher-1] [INFO] [1689855543.193199317] [robot_state_publisher]: got segment wheel_right_link
[turtlebot3_ros-3] [INFO] [1689855543.201055852] [turtlebot3_node]: Init TurtleBot3 Node Main
[turtlebot3_ros-3] [INFO] [1689855543.201693329] [turtlebot3_node]: Init DynamixelSDKWrapper
[turtlebot3_ros-3] [INFO] [1689855543.205230451] [DynamixelSDKWrapper]: Succeeded to open the port(/dev/ttyACM0)!
[turtlebot3_ros-3] [INFO] [1689855543.212900784] [DynamixelSDKWrapper]: Succeeded to change the baudrate!
[turtlebot3_ros-3] [ERROR] [1689855543.247506697] [turtlebot3_node]: Failed connection with Devices
[turtlebot3_ros-3] [INFO] [1689855543.250780432] [turtlebot3_node]: Add Motors
[turtlebot3_ros-3] [INFO] [1689855543.251006375] [turtlebot3_node]: Add Wheels
[turtlebot3_ros-3] [INFO] [1689855543.251107930] [turtlebot3_node]: Add Sensors
[turtlebot3_ros-3] terminate called after throwing an instance of 'rclcpp::exceptions::RCLError'
[turtlebot3_ros-3] what(): could not create publisher: rcl node's context is invalid, at ./src/rcl/node.c:428
[ERROR] [turtlebot3_ros-3]: process has died [pid 1671, exit code -6, cmd '/home/ubuntu/turtlebot3_ws/install/turtlebot3_node/lib/turtlebot3_node/turtlebot3_ros -i /dev/ttyACM0 --ros-args --params-file /home/ubuntu/turtlebot3_ws/install/turtlebot3_bringup/share/turtlebot3_bringup/param/burger.yaml'].
```

- 오류 1

```
[turtlebot3_ros-3] [ERROR] [1689855543.247506697] [turtlebot3_node]: Failed connection with Devices
```

```
[turtlebot3_ros-3] [INFO] [1689855543.201055852] [turtlebot3_node]: Init TurtleBot3 Node Main
[turtlebot3_ros-3] [INFO] [1689855543.201693329] [turtlebot3_node]: Init DynamixelSDKWrapper
[turtlebot3_ros-3] [INFO] [1689855543.205230451] [DynamixelSDKWrapper]: Succeeded to open the port(/dev/ttyACM0)!
[turtlebot3_ros-3] [INFO] [1689855543.212900784] [DynamixelSDKWrapper]: Succeeded to change the baudrate!
[turtlebot3_ros-3] [ERROR] [1689855543.247506697] [turtlebot3_node]: Failed connection with Devices
[turtlebot3_ros-3] [INFO] [1689855543.250780432] [turtlebot3_node]: Add Motors
[turtlebot3_ros-3] [INFO] [1689855543.251006375] [turtlebot3_node]: Add Wheels
[turtlebot3_ros-3] [INFO] [1689855543.251107930] [turtlebot3_node]: Add Sensors
[turtlebot3_ros-3] terminate called after throwing an instance of 'rclcpp::exceptions::RCLError'
[turtlebot3_ros-3] what(): could not create publisher: rcl node's context is invalid, at ./src/rcl/node.c:428
[ERROR] [turtlebot3_ros-3]: process has died [pid 1671, exit code -6, cmd '/home/ubuntu/turtlebot3_ws/install/turtlebot3_node/lib/turtlebot3_node/turtlebot3_ros -i /dev/ttyACM0 --ros-args --params-file /home/ubuntu/turtlebot3_ws/install/turtlebot3_bringup/share/turtlebot3_bringup/param/burger.yaml'].

```

- OpenCR 펌웨어 버전과 dynamixel-sdk 버전 불일치?

- OpenCR board manager 1.4.12
- DYNAMIXEL2Arduino 라이브러리 0.3.0
 - 실패
- OpenCR board manager 1.8.6
- DYNAMIXEL2Arduino 라이브러리 0.6.3
 - 실패

```
ubuntu@ubuntu:~$ ros2 launch turtlebot3_bringup robot.launch.py
[INFO] [launch]: All log files can be found below /home/ubuntu/.ros/log/2023-07-20-12-33-05-841855-ubuntu-1199
[INFO] [launch]: Default logging verbosity is set to INFO
urdf_file_name : turtlebot3_burger.urdf
[INFO] [robot_state_publisher-1]: process started with pid [1200]
[INFO] [hlds_laser_publisher-2]: process started with pid [1202]
[INFO] [turtlebot3_ros-3]: process started with pid [1204]
[hlds_laser_publisher-2] [INFO] [1689856387.074853625] [hlds_laser_publisher]: Init hlds_laser_publisher Node Main
[hlds_laser_publisher-2] [INFO] [1689856387.075275199] [hlds_laser_publisher]: port : /dev/ttyUSB0 frame_id : base_scan
[turtlebot3_ros-3] [INFO] [1689856387.090010319] [turtlebot3_node]: Init TurtleBot3 Node Main
[turtlebot3_ros-3] [INFO] [1689856387.094449050] [turtlebot3_node]: Init DynamixelSDKWrapper
[turtlebot3_ros-3] [INFO] [1689856387.101852466] [DynamixelSDKWrapper]: Succeeded to open the port(/dev/ttyACM0)!
[turtlebot3_ros-3] [INFO] [1689856387.109997359] [DynamixelSDKWrapper]: Succeeded to change the baudrate!
[turtlebot3_ros-3] [ERROR] [1689856387.14424557] [turtlebot3_node]: Failed connection with Devices
[turtlebot3_ros-3] [INFO] [1689856387.146583552] [turtlebot3_node]: Add Motors
[turtlebot3_ros-3] [INFO] [1689856387.146814632] [turtlebot3_node]: Add Wheels
[turtlebot3_ros-3] [INFO] [1689856387.146932950] [turtlebot3_node]: Add Sensors
[robot_state_publisher-1] [INFO] [1689856387.147147033] [robot_state_publisher]: got segment base_footprint
[robot_state_publisher-1] [INFO] [1689856387.147614712] [robot_state_publisher]: got segment base_link
[robot_state_publisher-1] [INFO] [1689856387.147711718] [robot_state_publisher]: got segment base_scan
[robot_state_publisher-1] [INFO] [1689856387.147761674] [robot_state_publisher]: got segment caster_back_link
[robot_state_publisher-1] [INFO] [1689856387.147805798] [robot_state_publisher]: got segment imu_link
[robot_state_publisher-1] [INFO] [1689856387.147847034] [robot_state_publisher]: got segment wheel_left_link
[robot_state_publisher-1] [INFO] [1689856387.147888047] [robot_state_publisher]: got segment wheel_right_link
[turtlebot3_ros-3] terminate called after throwing an instance of 'rclcpp::exceptions::RCLError'
[turtlebot3_ros-3] what(): could not create publisher: rcl node's context is invalid, at ./src/rcl/node.c:428
[ERROR] [turtlebot3_ros-3]: process has died [pid 1204, exit code -6, cmd '/home/ubuntu/turtlebot3_ws/install/turtlebot3_node/lib/turt

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- 오류 2

```
[turtlebot3_ros-3] [INFO] [1689855543.201055852] [turtlebot3_node]: Init TurtleBot3 Node Main
[turtlebot3_ros-3] [INFO] [1689855543.201693329] [turtlebot3_node]: Init DynamixelSDKWrapper
[turtlebot3_ros-3] [INFO] [1689855543.205230451] [DynamixelSDKWrapper]: Succeeded to open the port(/dev/ttyACM0)!
[turtlebot3_ros-3] [INFO] [1689855543.212900784] [DynamixelSDKWrapper]: Succeeded to change the baudrate!
[turtlebot3_ros-3] [ERROR] [1689855543.247506697] [turtlebot3_node]: Failed connection with Devices
[turtlebot3_ros-3] [INFO] [1689855543.250780432] [turtlebot3_node]: Add Motors
[turtlebot3_ros-3] [INFO] [1689855543.251006375] [turtlebot3_node]: Add Wheels
[turtlebot3_ros-3] [INFO] [1689855543.251107930] [turtlebot3_node]: Add Sensors
[turtlebot3_ros-3] terminate called after throwing an instance of 'rclcpp::exceptions::RCLError'
[turtlebot3_ros-3] what(): could not create publisher: rcl node's context is invalid, at ./src/rcl/node.c:428
[ERROR] [turtlebot3_ros-3]: process has died [pid 1671, exit code -6, cmd '/home/ubuntu/turtlebot3_ws/install/turtlebot3_node/lib/turtlebot3_node/turtlebot3_ros -i /dev/ttyACM0 --ros-args --params-file /home/ubuntu/turtlebot3_ws/install/turtlebot3_bringup/share/turtlebot3_bringup/param/burger.yaml'].
```

```
[turtlebot3_ros-3] terminate called after throwing an instance of 'rclcpp::exceptions::RCLError'
[turtlebot3_ros-3] what(): could not create publisher: rcl node's context is invalid, at ./src/rcl/node.c:428
```

- 배터리 연결 없이, 어댑터로 연결해서 사용중이기 때문에 battery state publisher를 생성하지 못해서 에러 발생?

```
[turtlebot3_ros-3] [INFO] [turtlebot3_node]: Add Motors
[turtlebot3_ros-3] [INFO] [turtlebot3_node]: Add Wheels
[turtlebot3_ros-3] [INFO] [turtlebot3_node]: Add Sensors
[turtlebot3_ros-3] [INFO] [turtlebot3_node]: Succeeded to create battery state publisher
[turtlebot3_ros-3] [INFO] [turtlebot3_node]: Succeeded to create imu publisher
[turtlebot3_ros-3] [INFO] [turtlebot3_node]: Succeeded to create sensor state publisher
[turtlebot3_ros-3] [INFO] [turtlebot3_node]: Succeeded to create joint state publisher
[turtlebot3_ros-3] [INFO] [turtlebot3_node]: Add Devices
[turtlebot3_ros-3] [INFO] [turtlebot3_node]: Succeeded to create motor power server
[turtlebot3_ros-3] [INFO] [turtlebot3_node]: Succeeded to create reset server
[turtlebot3_ros-3] [INFO] [turtlebot3_node]: Succeeded to create sound server
[turtlebot3_ros-3] [INFO] [turtlebot3_node]: Run!
[turtlebot3_ros-3] [INFO] [diff_drive_controller]: Init Odometry
[turtlebot3_ros-3] [INFO] [diff_drive_controller]: Run!
```

- 배터리 구매 후 battery state publisher를 정상적으로 생성하도록 하거나,
 - OpenCR 펌웨어 버전과 dynamixel-sdk 버전,
 - PC와 시리얼 통신으로 OpenCR 상태 진단 등을 시도해볼 수 있음

메모리 스왑

```
ubuntu@ubuntu:~$ sudo fallocate -l 2G /swapfile
ubuntu@ubuntu:~$ ls
DynamixelSDK-3.0  turtlebot3_ws  v3.0.tar.gz
ubuntu@ubuntu:~$ sudo chmod 600 /swapfile
ubuntu@ubuntu:~$ sudo mkswap /swapfile
Setting up swapspace version 1, size = 2 GiB (2147479552 bytes)
no label, UUID=1fa83b5f-477c-4fa2-8b6f-f576bab20bca
ubuntu@ubuntu:~$ sudo swapon /swapfile
ubuntu@ubuntu:~$ sh -c "echo \"/swapfile swap swap defaults 0 0\" >> /etc/fstab"
sh: 1: cannot create /etc/fstab: Permission denied
ubuntu@ubuntu:~$ sudo sh -c "echo \"/swapfile swap swap defaults 0 0\" >> /etc/fstab"
ubuntu@ubuntu:~$
```

```
ubuntu@ubuntu:~$ cd /
ubuntu@ubuntu:/$ ls
bin  dev  home  lost+found  mnt  proc  run  snap  swapfile  tmp  var
boot  etc  lib  media  opt  root  sbin  srv  sys  usr
```

```
echo "[Setup 2GB Swap Partition]"

// 2G 크기인 swapfile 파일을 생성한다
sudo fallocate -l 2G /swapfile

// swapfile의 권한을 설정한다.
sudo chmod 600 /swapfile

// swapfile을 스왑 영역으로 설정한다.
sudo mkswap /swapfile

// 스왑을 활성화한다.
sudo swapon /swapfile

// 부팅 시마다 스왑이 자동 활성화되도록 설정한다.
sh -c "echo \"/swapfile swap swap defaults 0 0\" >> /etc/fstab"
```