ESTABLISHING A CONNECTION OVER THE ROS_DOMAIN_ID

1. Be connected on the same hotspot
2. Need a Linux Machine in order to see ros topics
3. Have Ros2 Foxy on both your ROBOT and MACHINE
4. Make sure both the ROBOT and YOUR MACHINE have the same ROS_DOMAIN_ID
5. Make sure to disable both firewalls on both the ROBOT and MACHINE using '*ufw disable*'
6. Check to make sure there is a connection by ping from both machines
    a. ROBOT ping MACHINE: ping <MACHINE_ip_address> (from deepracer)
    b. MACHINE ping ROBOT: ping <ROBOT_ip_address> (from MACHINE)
7. Should be good to go

PID - Quick Tutorial: Controlling Self Driving Cars

1. P - push robot towards desired reference/set point
2. I - minimize/zero out potential steady state errors. Not too relevant in our project
3. D - rate of reaching desired goal. Regulates the change caused by P.

Nav2 and Slam Toolbox

1. Install Nav2 and SLAM Toolbox following this guide.
2. SLAM will not work on the robot, so you need to run it on YOUR MACHINE
3. All other nodes you can run on the robot: nav2 bringup, deepracer bringup, and rviz.
4. You will need to edit a certain file, that subscribes to the rplidar_scan topic. The original setup in the guide is configured for ros NOT ros2. – details to be added

SLAM startup --------CURRENTLY STOPS CORE NODES AND REPLACES THEM. MIGHT NEED TO LAUNCH CORE NODES AGAIN OR INCORPORATE THEM IN THE LAUNCH COMMANDS BELOW

Terminal 1 (deepracer):

source ~/deepracer_nav2_ws/aws-deepracer/install/setup.bash

ros2 launch deepracer_bringup deepracer.launch.py

Terminal 2 (deepracer)

source ~/deepracer_nav2_ws/aws-deepracer/install/setup.bash

ros2 launch nav2_bringup bringup_launch.py use_sim_time:=False autostart:=True map:=/root/deepracer_nav2_ws/aws-deepracer/map_faulte_over.yaml params_file:=/root/deepracer_nav2_ws/aws-deepracer/deepracer_bringup/config/nav2_params_nav_amcl_dr_demo.yaml

Terminal 3 (laptop)

source ~/deepracer_nav2_ws/aws-deepracer/install/setup.bash

slam

ros2 launch deepracer_bringup slam_toolbox.launch.py use_sim_time:=False params_file:=/root/deepracer_nav2_ws/deepracer/deepracer_bringup/config/slam_toolbox.yaml

Terminal 4 (laptop)

ros2 run rviz2 rviz2 -d ~/deepracer_nav2_ws/aws-deepracer/deepracer_bringup/config/nav2_default_view.rviz

Terminal 5 (laptop) for teleop - COULD ALSO USE ANY OTHER CONTROLLER

ros2 run teleop_twist_keyboard teleop_twist_keyboard

SAVING MAP

ros2 service call /slam_toolbox/save_map slam_toolbox/srv/SaveMap "name: data: 'map_name'"

ros2 run nav2_map_server map_saver_cli -f "map_name" --ros-args -p map_subscribe_transient_local:=true

ros2 run nav2_map_server map_saver_cli -f my_map

- my_map.yaml: this file contains the metadata for the map, as well as the path to the image file.
- my_map.pgm: this is the image file with white, black and grey pixels, representing the free, occupied, and unknown space.

MapData

https://drive.google.com/drive/folders/1GtO2pkOOS1d0SMXTBYfCx3U_kBbnHKaB?usp=sharing

Planning

Terminal 1 (deepracer):

source ~/deepracer_nav2_ws/aws-deepracer/install/setup.bash

ros2 launch deepracer_bringup deepracer.launch.py

Terminal 2 (deepracer)NO

source ~/deepracer_nav2_ws/aws-deepracer/install/setup.bash

ros2 launch nav2_bringup bringup_launch.py use_sim_time:=False autostart:=True map:=/root/deepracer_nav2_ws/aws-deepracer/map.yaml params_file:=/root/deepracer_nav2_ws/aws-deepracer/deepracer_bringup/config/nav2_params_nav_amcl_dr_demo.yaml

Terminal 2 (laptop)

ros2 launch nav2_bringup bringup_launch.py use_sim_time:=False autostart:=True map:=/home/rameez/map_faulte_over.yaml params_file:=/home/rameez/deepracer_nav2_ws/aws-deepracer/deepracer_bringup/config/nav2_params_nav_amcl_dr_demo.yaml

Terminal 3 (laptop)

ros2 run rviz2 rviz2 -d

~/deepracer_nav2_ws/aws-deepracer/deepracer_bringup/config/nav2_default_view.rviz

WAYPOINTS via Nav2Goal

ROS2 Nodes not showing:

1. Try `ros2 node list`. If nodes are missing, try `ros2 node list --no-daemon`.
   If this does not fix it, go to step 2.
2. `ros2 daemon stop`
   `ros2 daemon start`
   If this still does not fix it, go to step 3
3. Restart the robot and try again and again…

Clear Log Folders if they are taking space/Robot not booting to GUI: ---- need to look at some other logs

echo "" > /var/log/kern.log

echo "" > /var/log/syslog

service syslog restart

cd .ros & rm -rf log

BRINGING NODES BACK UP AFTER RUNNING THE NAV PACKAGES

After starting the nav2 nodes, you will lose some nodes, all you need to do is re-source them and they should all be back up.

source /opt/ros/foxy/setup.bash
source /opt/aws/deepracer/lib/setup.bash
source /opt/intel/openvino_2021/bin/setupvars.sh

PLANNING
smac_planner

NAV2 Output

oot@amss-r12l:/home/deepracer# ros2 launch nav2_bringup bringup_launch.py use_sim_time:=False autostart:=True map:=/root/deepracer_nav2_ws/aws-deepracer/map.yaml params_file:=/root/deepracer_nav2_ws/aws-deepracer/deepracer_bringup/config/nav2_params_nav_amcl_dr_demo.yaml
[INFO] [launch]: All log files can be found below /root/.ros/log/2023-12-16-22-30-02-022441-amss-r12l-5228
[INFO] [launch]: Default logging verbosity is set to INFO
[INFO] [map_server-1]: process started with pid [5236]
[INFO] [amcl-2]: process started with pid [5238]
[INFO] [lifecycle_manager-3]: process started with pid [5240]
[INFO] [controller_server-4]: process started with pid [5242]
[INFO] [planner_server-5]: process started with pid [5244]
[INFO] [recoveries_server-6]: process started with pid [5246]
[INFO] [bt_navigator-7]: process started with pid [5248]