Node Test:
ESP32 IMU Node

Node test set up and prerequisites:

The ability to run the node. We need an ESP32 and Arduino IDE 2.

IMU

Test1 : IMU data check
Tester : Rik van Velzen
date : 03/11/2025

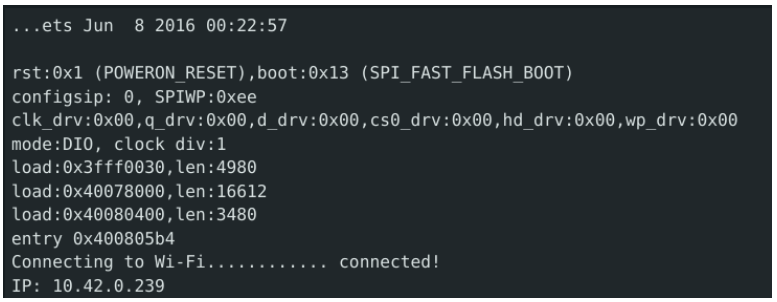
Short description test: - Check if there is coming data from the IMU.
Input test: - Settings for connection: Sensor_id = 55 address = 0x28 Baudrate = 115200
Expected result : - The ESP32 receives data from the IMU and publishes it on the serial output.
Result test: - Data from IMU is received as visual output.

```
Gyroscope (rad/s): X: 0.015  Y: 0.009  Z: 6.115 | Linear Accel (m/s²): X: -0.160  Y: -0.220  Z: -0.290
Gyroscope (rad/s): X: 0.012  Y: -0.007  Z: 2.078 | Linear Accel (m/s²): X: -0.170  Y: -0.410  Z: -0.360
Gyroscope (rad/s): X: 0.022  Y: -0.009  Z: 0.632 | Linear Accel (m/s²): X: 0.280  Y: -0.680  Z: -0.350
Gyroscope (rad/s): X: 0.000  Y: -0.003  Z: -3.207 | Linear Accel (m/s²): X: 0.100  Y: 0.190  Z: -0.360
Gyroscope (rad/s): X: -0.014  Y: -0.009  Z: -5.058 | Linear Accel (m/s²): X: -0.150  Y: -0.240  Z: -0.340
Gyroscope (rad/s): X: -0.011  Y: 0.013  Z: -1.242 | Linear Accel (m/s²): X: -0.460  Y: -0.130  Z: -0.380
```

Wireless

Test1 : Connection check
Tester : Rik van Velzen
date : 06/11/2025

Short description test:

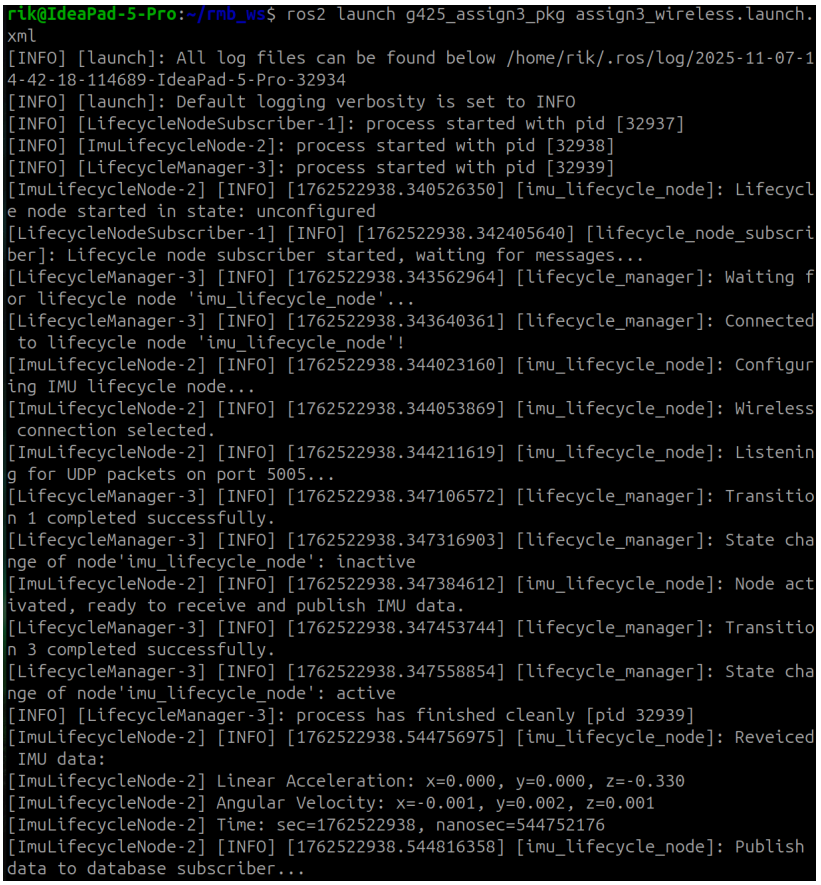
- We observe if the IMU ESP32 is connected to our ROS system (computer).
Input test: - Settings for connection: ssid = "IMU"; password = "IMUsensor1234"; host_ip = "10.42.0.1"; host_port = 5005;
Expected result : - There is a wireless connection through which data can be sent.
Result test: - Wireless connection is established.  ...ets Jun 8 2016 00:22:57 rst:0x1 (POWERON_RESET),boot:0x13 (SPI_FAST_FLASH_BOOT) configsip: 0, SPIWP:0xee clk_drv:0x00,q_drv:0x00,d_drv:0x00,cs0_drv:0x00,hd_drv:0x00,wp_drv:0x00 mode:DIO, clock div:1 load:0x3fff0030,len:4980 load:0x40078000,len:16612 load:0x40080400,len:3480 entry 0x400805b4 Connecting to Wi-Fi..... connected! IP: 10.42.0.239

Test2 : Data sending check
Tester : Rik van Velzen
date : 06/11/2025

Short description test: - Check if the IMU ESP32 is sending data to our ROS system (computer).
Input test: - Settings for connection: ssid = "IMU"; password = "IMUsensor1234"; host_ip = "10.42.0.1"; host_port = 5005;
Expected result : - There is a wireless connection through which data can be sent.

Result test:

- Wireless connection is established and data is received.



Wired

Test1 : Connection check
Tester : Rik van Velzen
date : 03/11/2025

Short description test:

- We observe if the IMU ESP32 is connected to our ROS system (computer).

Input test:

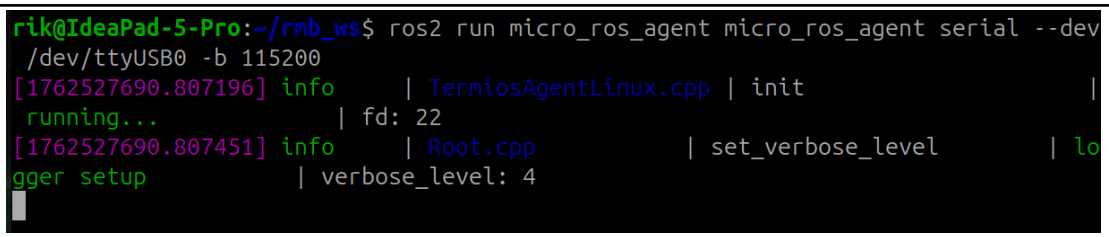
- Settings for connection:
  Baudrate = 115200
  Publisher: /imu_data_esp

Expected result :

- There is a wired connection through which data can be sent.

Result test:

- The wired connection is established.



Test2 : Data sending check
Tester : Rik van Velzen
date : 03/11/2025

Short description test: - Check if the IMU ESP32 is sending data to our ROS system (computer).
Input test: - Settings for connection: Baudrate = 115200 Publisher: /imu_data_esp Timer_period_ms = 200
Expected result : - There is a wireless connection through which data can be sent.
Result test: - Wireless connection is established and data is received.

```
[LifecycleManager-4] [INFO] [1762527557.831352170] [lifecycle_manager]: State cha
nge of node'imu_lifecycle_node': inactive
[micro_ros_agent-1] [1762527558.759862] info     | Root.cpp           | create_cl
ient           | create                 | client_key: 0x7E9244AB, session_id: 0x
81
[micro_ros_agent-1] [1762527558.759908] info     | SessionManager.hpp | establish
_session       | session established    | client_key: 0x7E9244AB, address: 0
[micro_ros_agent-1] [1762527558.779007] info     | ProxyClient.cpp    | create_pa
rticipant      | participant created    | client_key: 0x7E9244AB, participant_id
: 0x000(1)
[micro_ros_agent-1] [1762527558.792715] info     | ProxyClient.cpp    | create_to
pic            | topic created          | client_key: 0x7E9244AB, topic_id: 0x00
0(2), participant_id: 0x000(1)
[micro_ros_agent-1] [1762527558.801719] info     | ProxyClient.cpp    | create_pu
blisher        | publisher created      | client_key: 0x7E9244AB, publisher_id:
0x000(3), participant_id: 0x000(1)
[micro_ros_agent-1] [1762527558.812047] info     | ProxyClient.cpp    | create_da
tawriter       | datawriter created     | client_key: 0x7E9244AB, datawriter_id:
 0x000(5), publisher_id: 0x000(3)
[ImuLifecycleNode-3] [WARN] [1762527559.052787122] [imu_lifecycle_node]: Node is
not active. Ignoring incoming IMU data.
[LifecycleManager-4] [INFO] [1762527559.052812330] [lifecycle_manager]: IMU data
received → activate node
[ImuLifecycleNode-3] [INFO] [1762527559.052890439] [imu_lifecycle_node]: Node act
ivated, ready to receive and publish IMU data.
[LifecycleManager-4] [INFO] [1762527559.052945233] [lifecycle_manager]: Transitio
n 3 completed successfully.
[LifecycleManager-4] [INFO] [1762527559.053029583] [lifecycle_manager]: State cha
nge of node'imu_lifecycle_node': active
[ImuLifecycleNode-3] [INFO] [1762527559.286745520] [imu_lifecycle_node]: Reveiced
 IMU data:
[ImuLifecycleNode-3] Linear Acceleration: x=0.000, y=0.010, z=-0.340
[ImuLifecycleNode-3] Angular Velocity: x=-0.002, y=-0.002, z=-0.001
[ImuLifecycleNode-3] Time: sec=4, nanosec=144000000
[ImuLifecycleNode-3] [INFO] [1762527559.286777651] [imu_lifecycle_node]: Publish
data to database subscriber...
```

- esp32_imu_node is sending imu messages to the lifecyclenode.
  RQT_graph: