QBii Plus
ROS2 Setup Guide

1 January 2024

QUANTUM ROBOTIC SYSTEMS

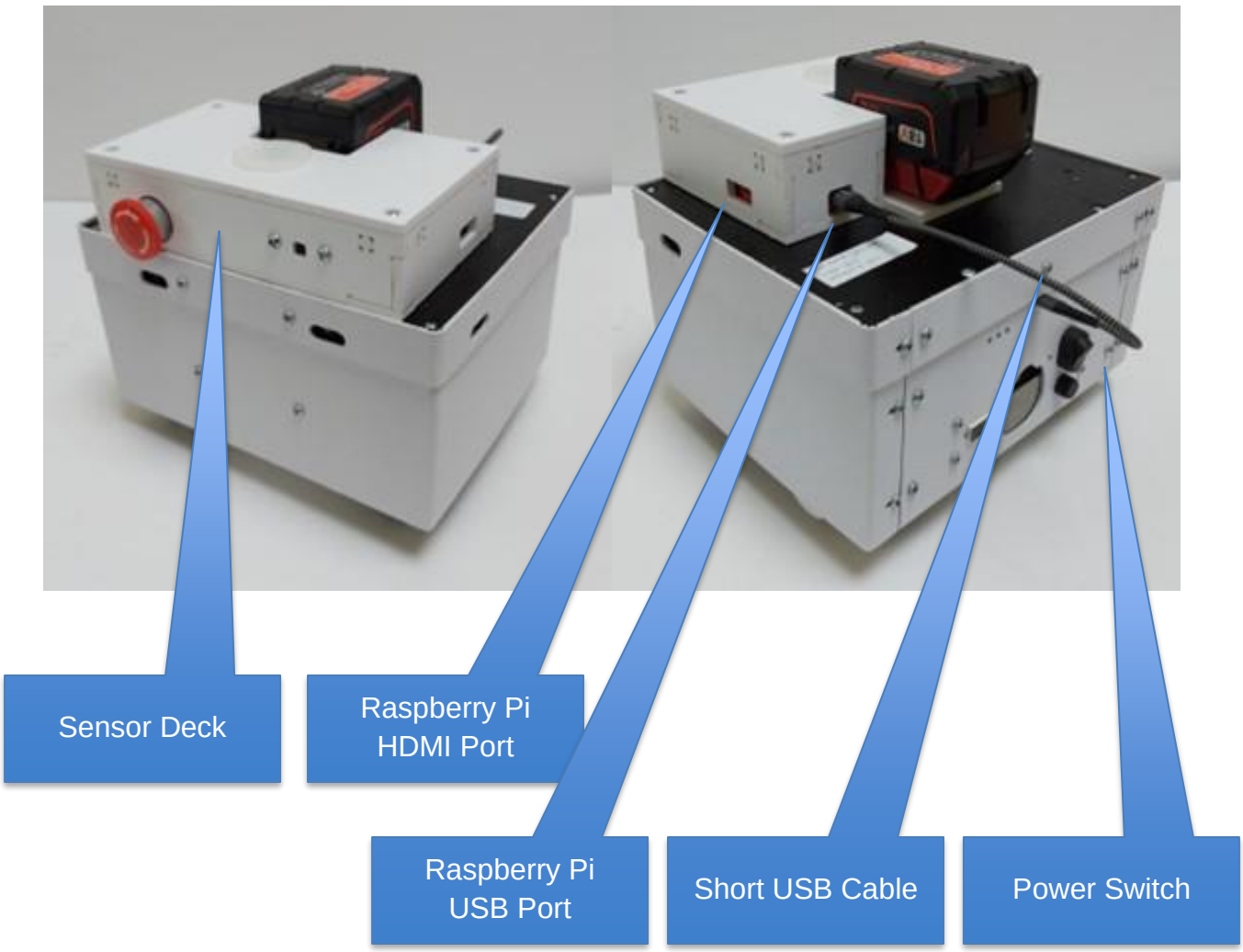
Contents

QBii Plus ROS2 Setup Guide

1. Hardware Setup (see Figure 1)

- Make sure the power switch is in off position (switch LED should be in raised position).
- Connect a USB keyboard to the Raspberry Pi (located at the back of the Sensor Deck). If the Short USB Cable connecting the Pi and the robot's ESP32 is in place, unplug temporarily.
- Connect HDMI cable to the Raspberry Pi (located on the left side of the Sensor Deck). Attach to a monitor of choice.
- Turn on QBii Plus

Figure 1: Ports and Cables



2. Network Setup

- After turning on the robot, wait for the Raspberry Pi to load.
- Login to Pi with the following credentials:
  - User: qrs
  - Password: qrs
- Change the wireless configuration by modifying the configuration in '50-cloud-init.yaml' file (location: */etc/netplan/50-cloud-init.yaml*)

3. Accessing QBii Plus over Wi-Fi

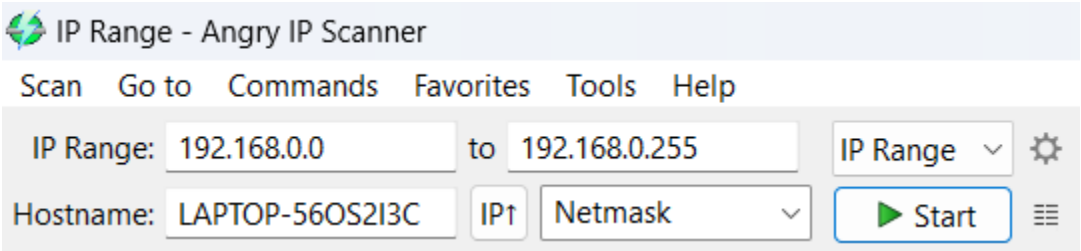
- After disconnecting HDMI and USB keyboard from the Raspberry Pi, connect (or re-connect) the included USB cable to QBii Plus as shown in Figure 1.

- After a reboot the Raspberry will connect to the local wireless network and the ROS2 nodes will launch automatically

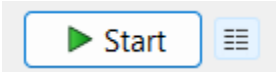
- To verify the wireless connection use a IP scanner to see the IP address of the Pi

  - Suggested IP scanner app: [Angry IP Scanner]

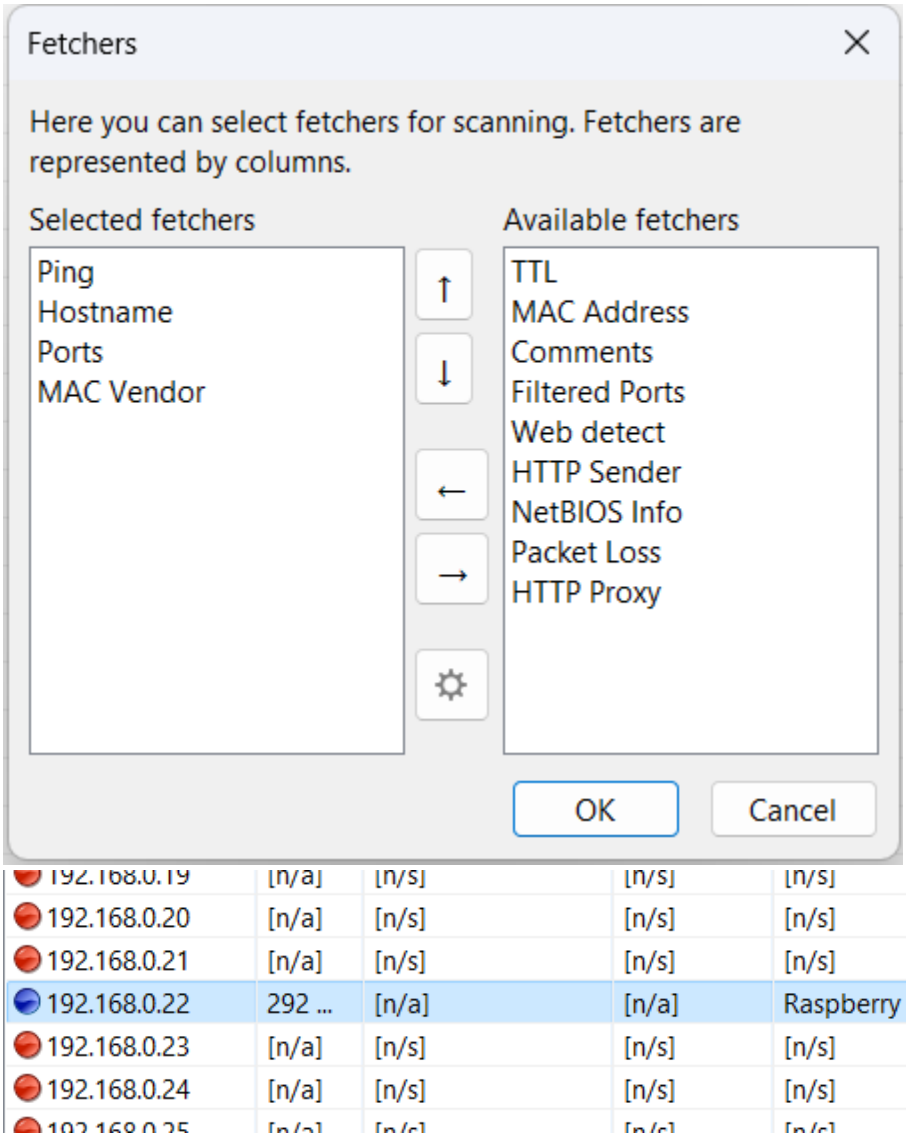
  - Select IP Range and scan the IP on the office subnet 192.168.0.0 to 192.168.0.255.



  - Then, click on the bar icon next to the Start button to open the Fetchers panel



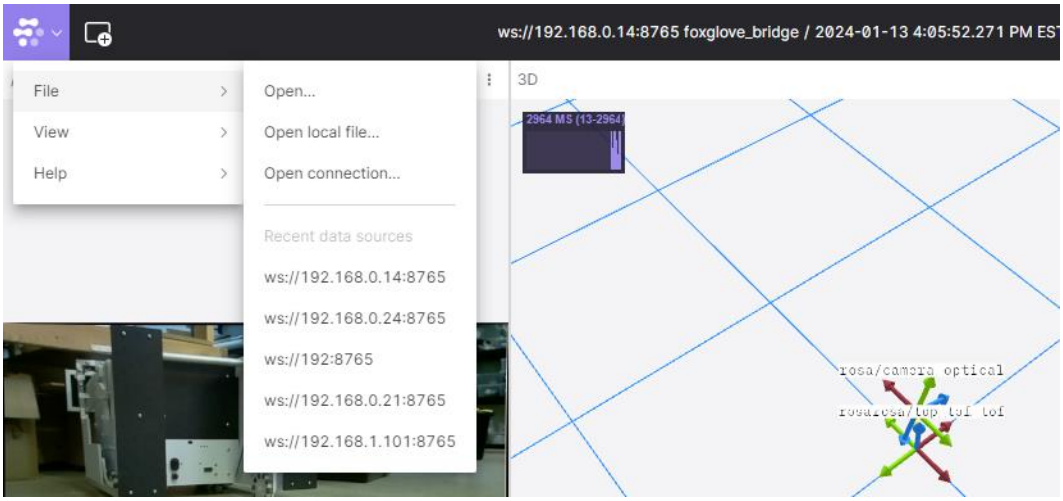
- In the Fetchers panel, you can enable MAC Vendor which will help you discover which IP is the Pi.

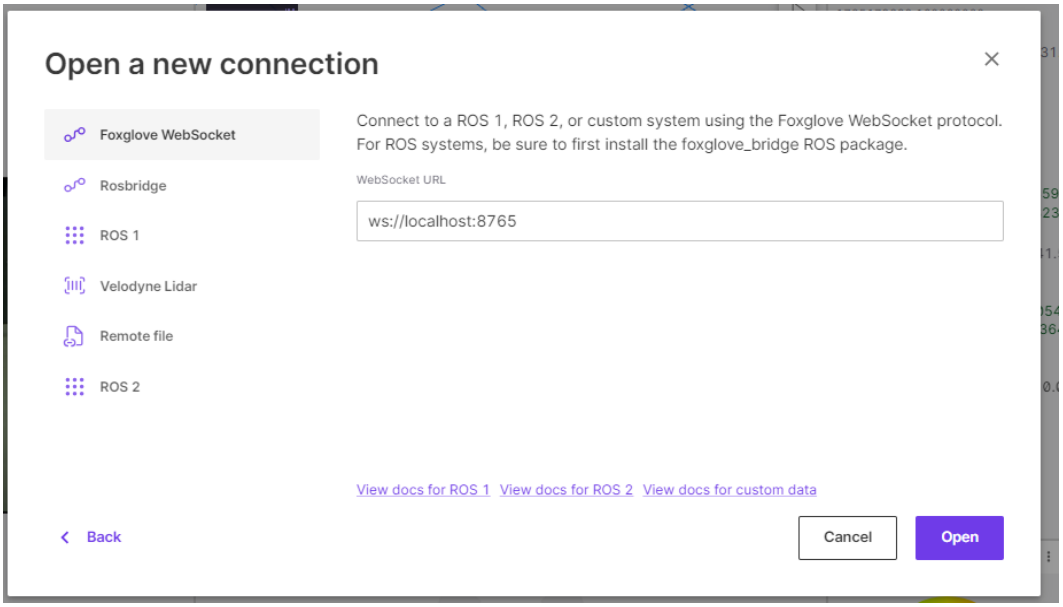


4. Configuring Foxglove Studio

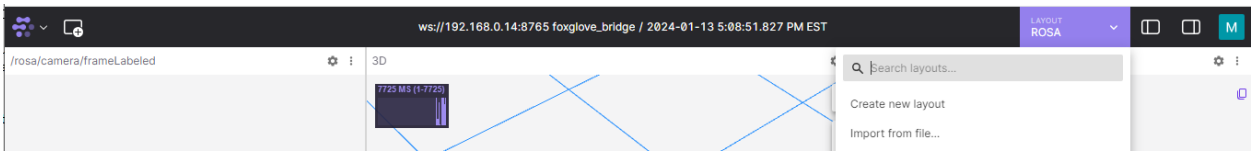
- This section assumes you are accessing QBii Plus from Foxglove Studio.

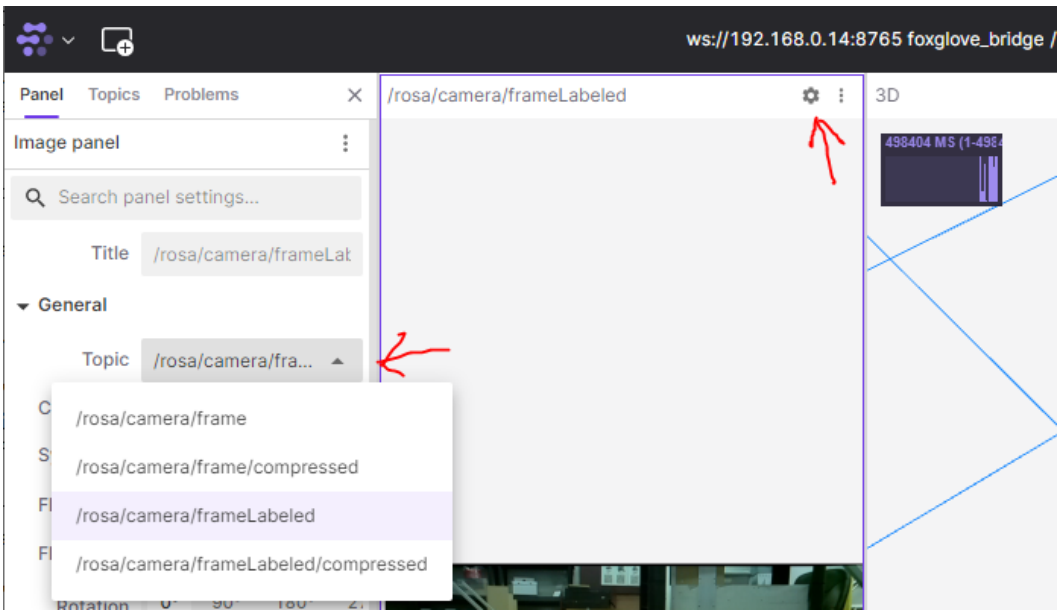
- Go to [Foxglove studio]
    - Log in with preferred credentials
    - Add new local connection by inserting the previously found Raspberry Pi IP in the connection input field
    - Only replace localhost with the Raspberry Pi IP



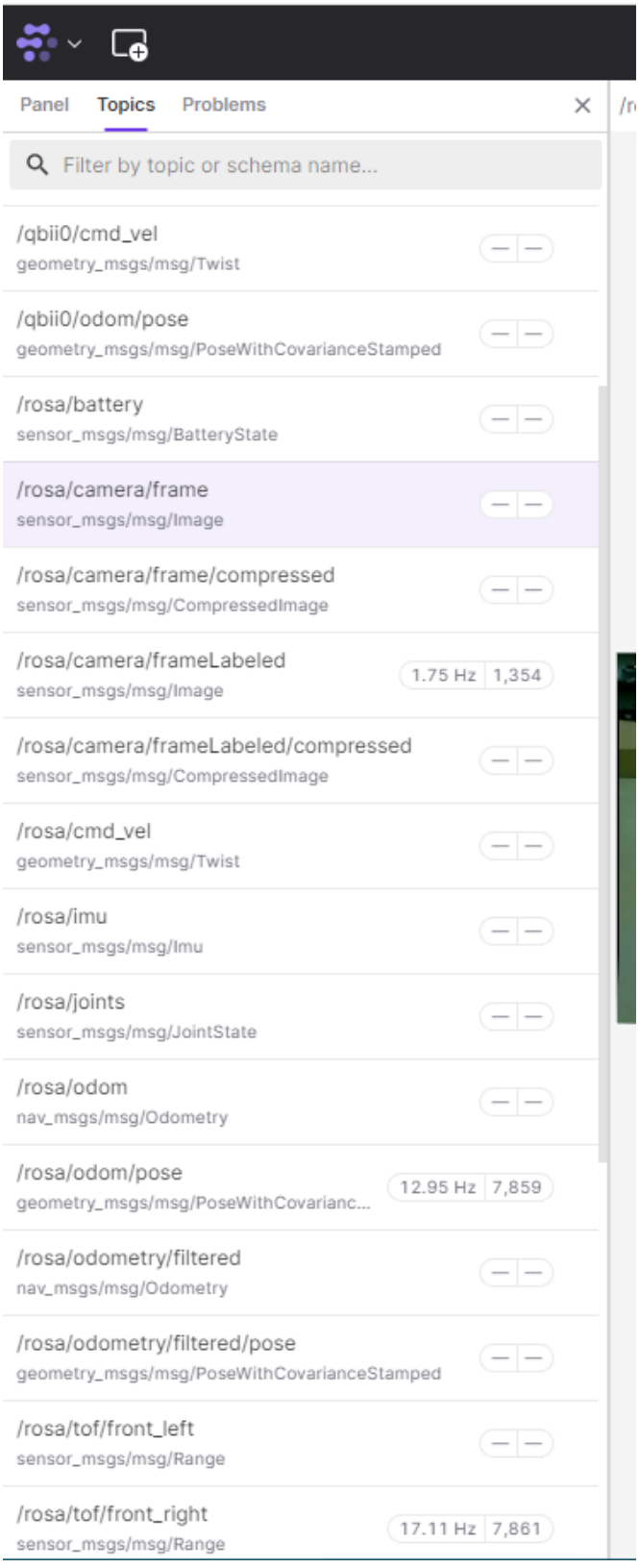


- Select layout and Open from file (sample layout json file is provided in zip folder)
- Change the topic of each panel to the available topic running on the QBii Plus



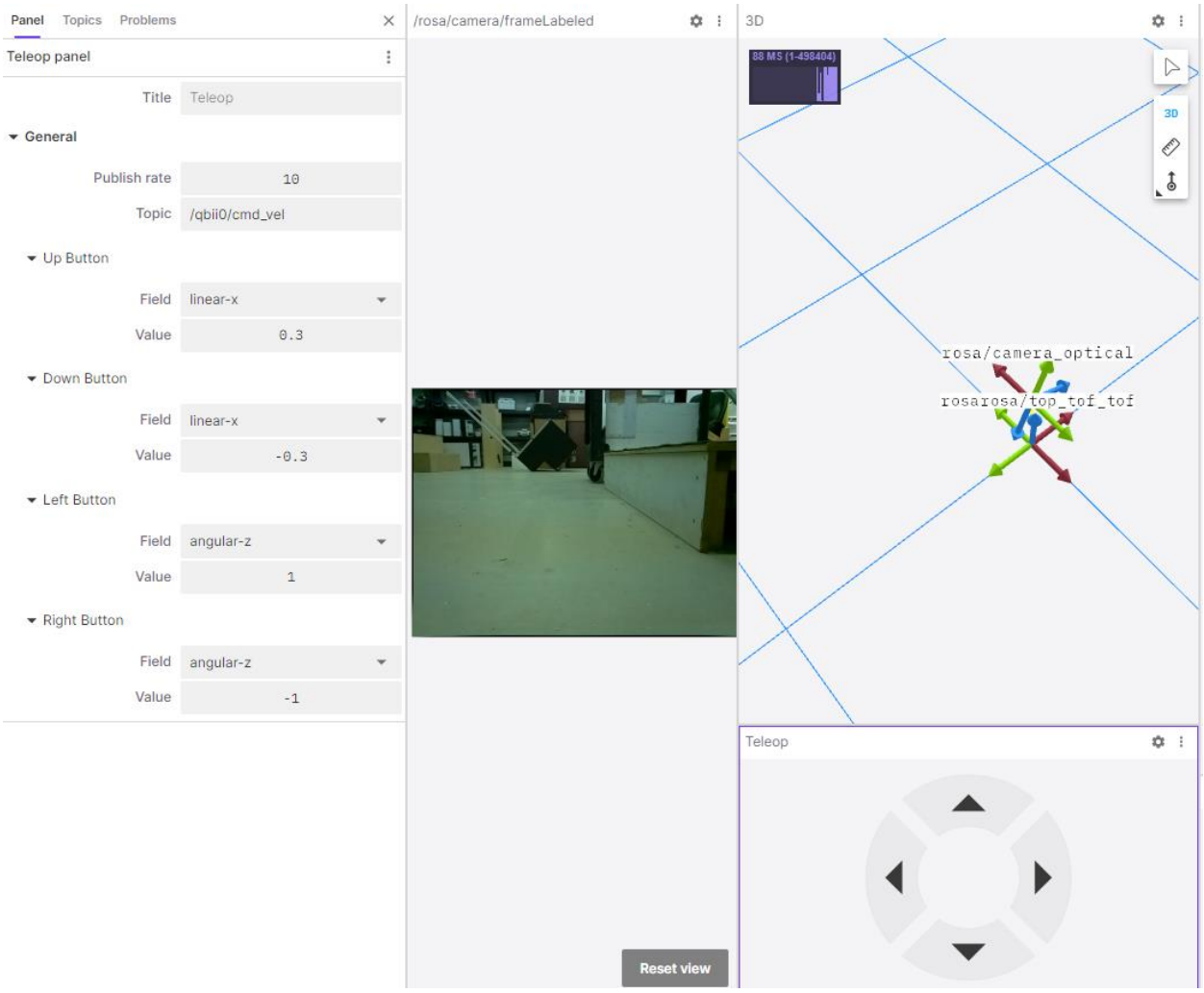


- List of topics should look something like the following:



- Teleop panel configuration should look similar to the following:

- Clicking the arrows on the Teleop panel should drive the QBii Plus robot over Wi-Fi



5. Configuring with Custom ROS2 Nodes

- QBii Plus ROS2 nodes are exposed over local wireless network using foxglove bridge

- All QBii Plus topics can be accessed by integrating foxglove bridge to your custom ros nodes and through ws://[qbii-ip-address]:8765 websocket