ROS2 Container to container communication

To-Do

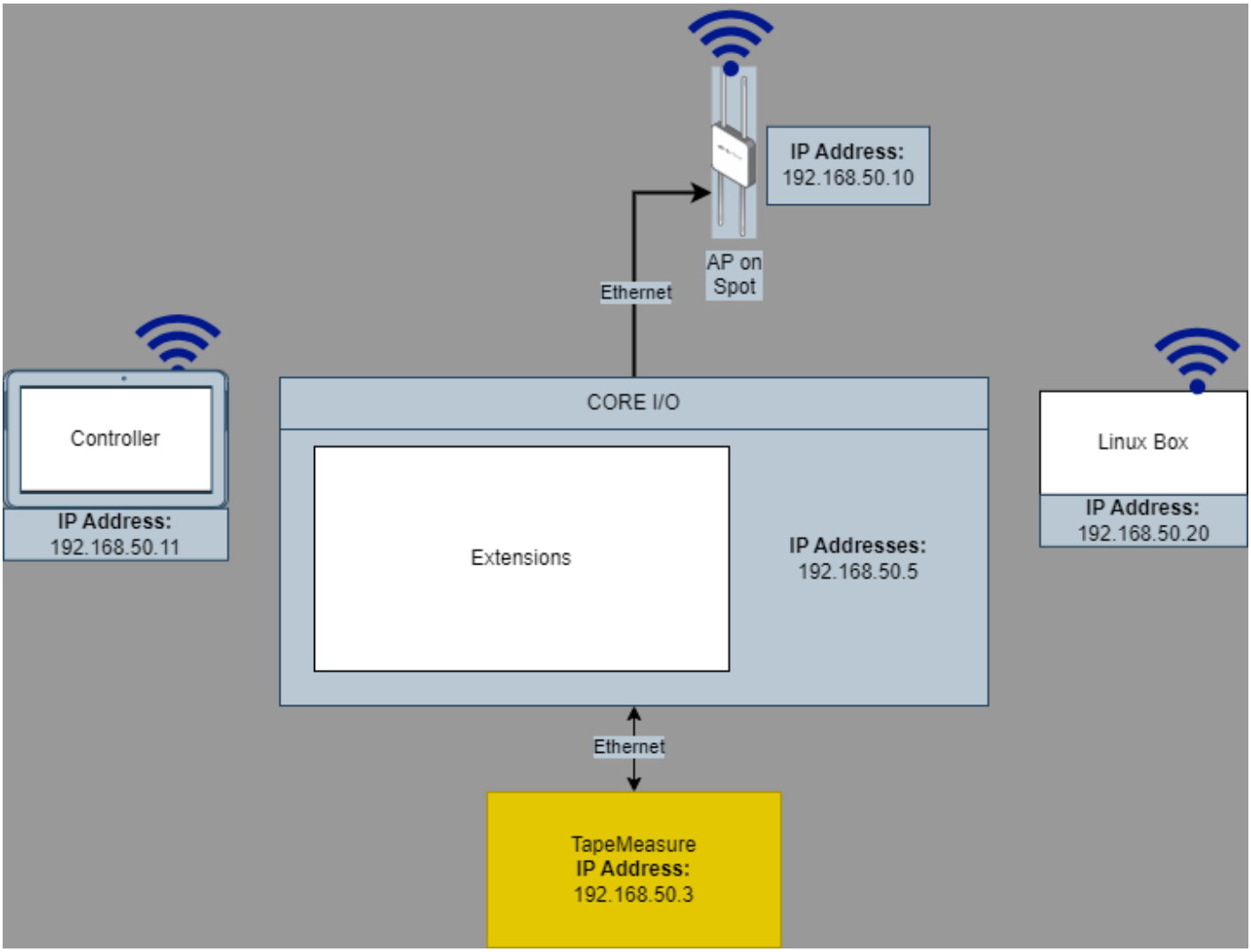
- Determine why multicast send and receive are not working on our network.
- More testing with other ROS2 packages.

Setup

In this setup, we have two containers:

1. The Boston Dynamics ROS2 Spot ROS2 container in the an extension file build using these instructions.
2. Our container built for Spot.

Network



Container Configuration

Extension Container

1. You need to ssh into the CORE I/O via the default IP of 192.168.80.3 or 192.168.50.3 if you are connected directly to the CORE I/O.
   - `ssh 192.168.80.3`
2. You will need to lock down the CORE I/O to a specific port range. This is so that the containers choose ports that are open.
   - `echo "21000 22000" | sudo tee /proc/sys/net/ipv4/ip_local_port_range`
3. **You must restart the containers/extension after changing the ports on the CORE I/O**
4. You need to find the container id of your ROS2 installation.
   - `sudo docker container ls`

1. Once you have your container id you will need to open up into the container.
    - `sudo docker exec -it 8966bcde886b /bin/bash # replace "8966bcde886b" with your container id`
2. Once inside the container.
    - The Extension container was setup with the following commands to test:

```
ping 192.168.50.20 # Ping test the dev computer.

export ROS_DISCOVERY_SERVER=192.168.50.5:21000 # This was changed from the BD default of
192.168.80.3 because we are using our own WiFi setup that bypasses Spot's internal network.

source ./install/setup.bash # Source workspace
source /opt/ros/humble/setup.bash # Source ROS2

ros2 run demo_nodes_cpp listener --ros-args --remap __node:=listener_discovery_server
```

Dev Container

The Dev container was setup with the following commands to test:

```
ping 192.168.50.5 # Ping test the CORE I/O.

export ROS_DISCOVERY_SERVER=192.168.50.5:21000 # This was changed from the BD default of
192.168.80.3 because we are using our own WiFi setup that bypasses Spot's internal network.

source ./install/setup.bash # Source workspace
source /opt/ros/humble/setup.bash # Source ROS2

ros2 run demo_nodes_cpp talker --ros-args --remap __node:=talker_discovery_server
```

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