# **ROS + SLAM Setup Tutorial for Unitree L2 LiDAR**

## **Overview**

This guide walks you step-by-step through setting up your environment, configuring the Unitree L2 LiDAR, and running SLAM using ROS Noetic and Point-LIO. It assumes **zero prior experience** with ROS or LiDAR systems.

## **📦 Requirements**

* Ubuntu **20.04** (preferably on a physical machine or bridged VM)
* ROS **Noetic**
* Unitree **L2 LiDAR**
* Internet connection for package installation

## **🛠️ 1. Environment Setup**

### **1.1 Install ROS Noetic**

sudo apt update

sudo apt install curl gnupg lsb-release

sudo sh -c 'echo "deb http://packages.ros.org/ros/ubuntu $(lsb\_release -sc) main" > /etc/apt/sources.list.d/ros-latest.list'

curl -s https://raw.githubusercontent.com/ros/rosdistro/master/ros.asc | sudo apt-key add -

sudo apt update

sudo apt install ros-noetic-desktop-full

### **1.2 Initialize ROS**

echo "source /opt/ros/noetic/setup.bash" >> ~/.bashrc

source ~/.bashrc

sudo apt install python3-rosdep python3-rosinstall python3-rosinstall-generator python3-wstool build-essential

sudo rosdep init

rosdep update

### **1.3 Install PCL and Eigen**

sudo apt install libpcl-dev libeigen3-dev

## **🌐 2. Network Configuration**

### **2.1 Configure Ethernet**

Connect the Unitree L2 LiDAR to your PC using Ethernet (directly or via a switch).

### **2.2 Assign Static IP to PC**

Find your Ethernet interface:

ip addr

Example output shows enp0s8. Then:

sudo ip addr add 192.168.1.3/24 dev enp0s8

### **2.3 Confirm LiDAR is Reachable**

ping 192.168.1.4

Expected result: replies from 192.168.1.4

## **📁 3. Clone Required Repositories**

### **3.1 Create workspace**

mkdir -p ~/unilidar\_sdk2 && cd ~/unilidar\_sdk2

git clone https://github.com/unitreerobotics/unilidar\_sdk2.git

### **3.2 Build SDK Examples**

cd unilidar\_sdk2/unitree\_lidar\_sdk

mkdir build && cd build

cmake .. && make -j4

### **3.3 Set LiDAR to UDP Mode**

cd ../bin

./set\_to\_udp\_mode

./set\_ip\_address

Then **reboot the LiDAR**.

## **🤖 4. Build and Launch ROS Driver**

### **4.1 Build the ROS Package**

cd ~/unilidar\_sdk2/unilidar\_sdk2/unitree\_lidar\_ros

catkin\_make

source devel/setup.bash

### **4.2 Update Config**

Edit src/unitree\_lidar\_ros/config/config.yaml:

initialize\_type: 2 # UDP

lidar\_ip: "192.168.1.4"

pc\_ip: "192.168.1.3"

### **4.3 Run Driver**

roslaunch unitree\_lidar\_ros run\_without\_rviz.launch

Leave this terminal running.

## **🧭 5. Run Point-LIO SLAM**

### **5.1 Build Point-LIO**

cd ~/unilidar\_sdk2/unilidar\_sdk2/unitree\_lidar\_ros

mkdir -p catkin\_point\_lio\_unilidar/src && cd catkin\_point\_lio\_unilidar/src

git clone https://github.com/unitreerobotics/point\_lio\_unilidar.git

cd ..

catkin\_make

roslaunch unitree\_lidar\_ros run\_without\_rviz.launch

### **5.2 Launch Mapping**

roslaunch point\_lio\_unilidar mapping\_unilidar\_l2.launch

### **5.3 View Results**

rviz

* Add topic: /pointlio/laser\_map
* Fixed Frame: camera\_init

## **🗂️ 6. Save and View Map**

After you’ve finished mapping:

pcl\_viewer ~/unilidar\_sdk2/.../scans.pcd

(Adjust path based on your actual workspace)

## **📌 Troubleshooting**

### **No PointCloud in RViz?**

* Run:

rostopic hz /unilidar/cloud

* Confirm it’s publishing at ~12 Hz

### **LiDAR Not Pinging?**

sudo ip addr add 192.168.1.3/24 dev enp0s8

ping 192.168.1.4

### **Port Busy?**

sudo lsof -i :6201

## **✅ Summary Checklist**

## **🙋 Need Help?**

Post issues to: https://github.com/unitreerobotics/unilidar\_sdk2/issues

*Created by: Atombot SLAM Team Lead (2025)*