

Autoware NDT Mapping manual

1. Go to **Autoware/ros** directory
2. Run Autoware using “**./run**” command
3. Go to Simulation tab and Load a ROSBAG
4. Click **Play** and immediately **PAUSE**

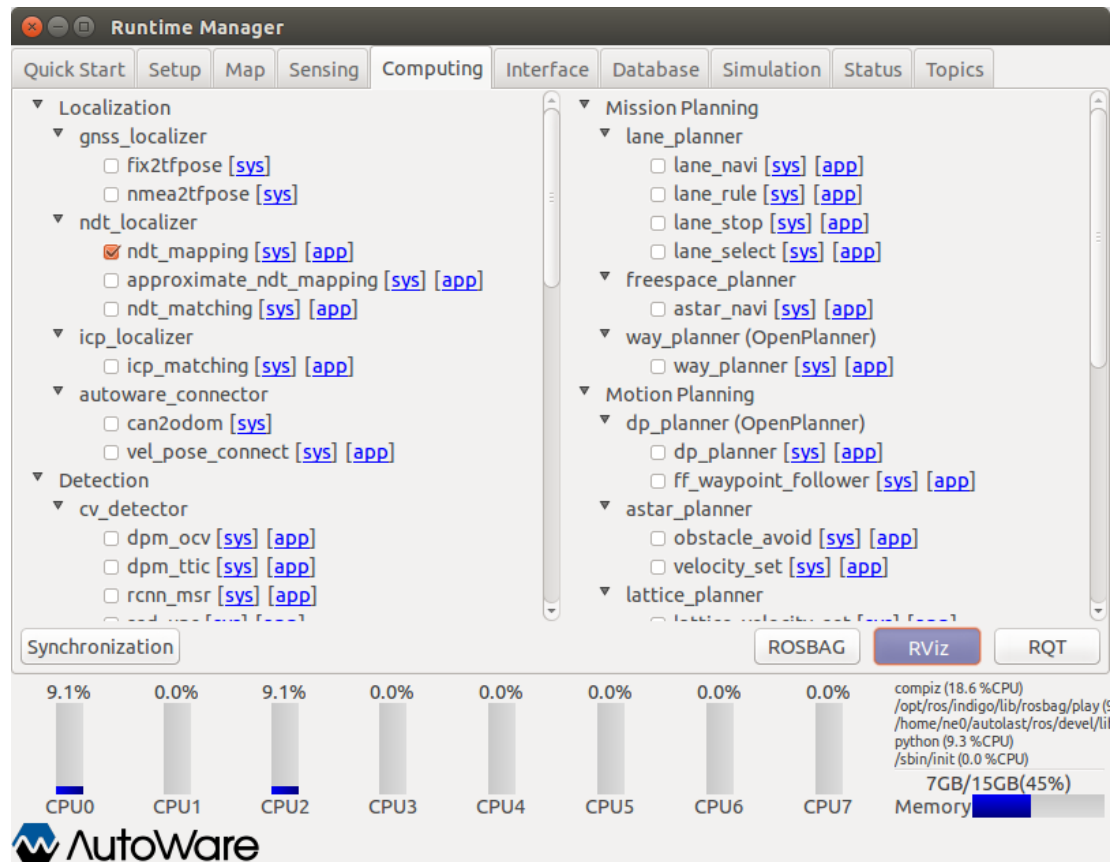
The screenshot displays the Autoware Runtime Manager interface. At the top, there are tabs for 'Quick Start', 'Setup', 'Map', 'Sensing', 'Computing', 'Interface', 'Database', 'Simulation', 'Status', and 'Topics'. The 'Simulation' tab is active. Below the tabs, a text input field contains the path '/media/ne0/TRANSCEND/apex/one_lidar_vlp16_hd_commercial_street_long_loop_0.bag'. Below this, there are controls for 'Rate: 0.3', 'Start Time (s): 0', and a 'Repeat' checkbox. A 'Play' button is highlighted in blue, and a 'Pause' button is highlighted in red. A progress bar shows 'Playing... 0%' with a value of 0 out of 325. Below the progress bar, the following information is displayed:

```
path: /media/ne0/TRANSCEND/apex/one_lidar_vlp16_hd_commercial_street_long_loop_0.bag
version: 2.0
duration: 5:25s (325s)
start: Oct 24 2017 07:14:03.95 (1508796843.95)
end: Oct 24 2017 07:19:29.32 (1508797169.32)
size: 2.0 GB
messages: 6477
compression: none [1650/1650 chunks]
types: sensor_msgs/PointCloud2 [1158d486dd51d683ce2f1be655c3c181]
      tf2_msgs/TFMessage [94810edda583a504dfa3829e70d7eec]
topics: /front/velodyne_points 3227 msgs : sensor_msgs/PointCloud2
      /tf 3250 msgs : tf2_msgs/TFMessage
```

At the bottom, there are buttons for 'Gazebo', 'ROSBAG', 'RViz', and 'RQT'. Below these buttons is a CPU usage bar chart showing usage for CPU0 through CPU7. The usage values are: CPU0 (0.0%), CPU1 (0.0%), CPU2 (0.0%), CPU3 (0.0%), CPU4 (9.1%), CPU5 (0.0%), CPU6 (0.0%), and CPU7 (8.3%). To the right of the CPU chart, there is a list of processes and their CPU usage: python (8.9% CPU), /sbin/init (0.0% CPU), [kthread] (0.0% CPU), [ksoftirqd/0] (0.0% CPU), and [kworker/0:0] (0.0% CPU). Below this list, there is a memory usage bar chart showing '6GB/15GB(44%)'.

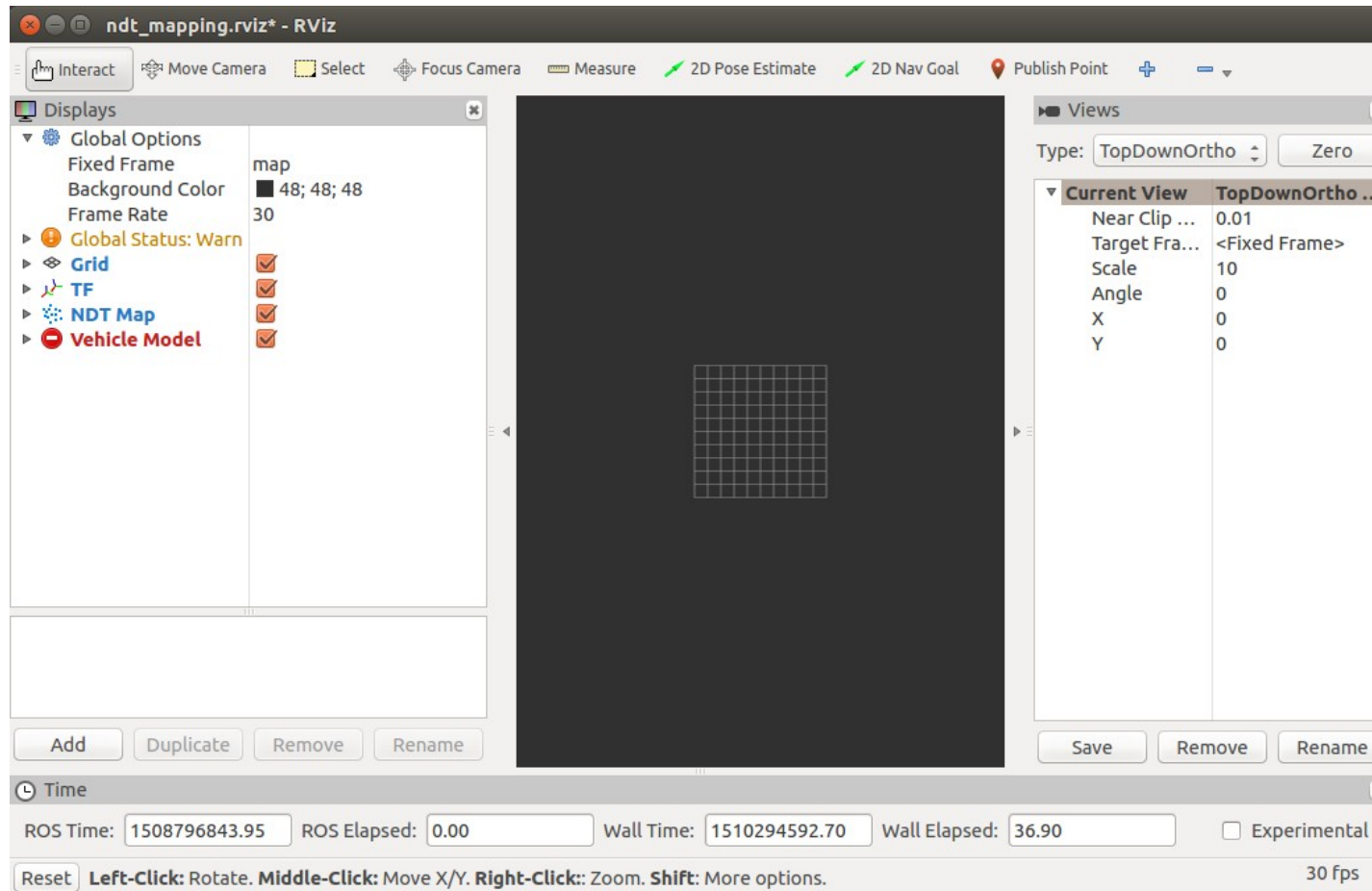
AutoWare

5. Click **Computing** tab and select **ndt_mapping**



5. Click **RViz** button at the bottom

6. In **Rviz** click File menu and then click **Open Config** to select visualization template for **ndt_mapping.rviz** located in **Autoware/src/.config/rviz**



7. ndt_mapping will read from **/points_raw**

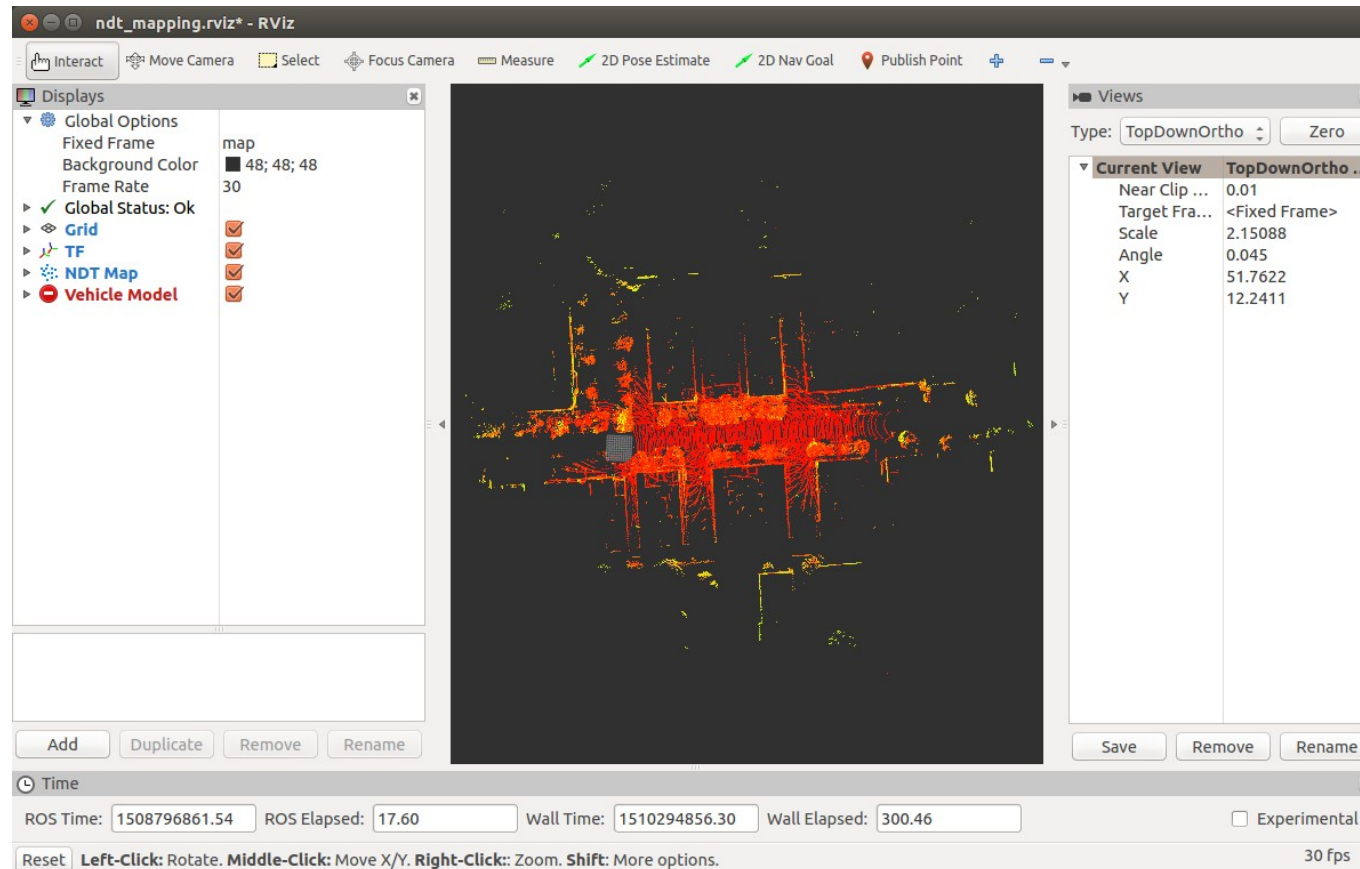
IF the pointcloud is being published in a different topic, use the relay tool in a new terminal window

```
roslaunch topic_tools relay /front/velodyne_points /points_raw
```

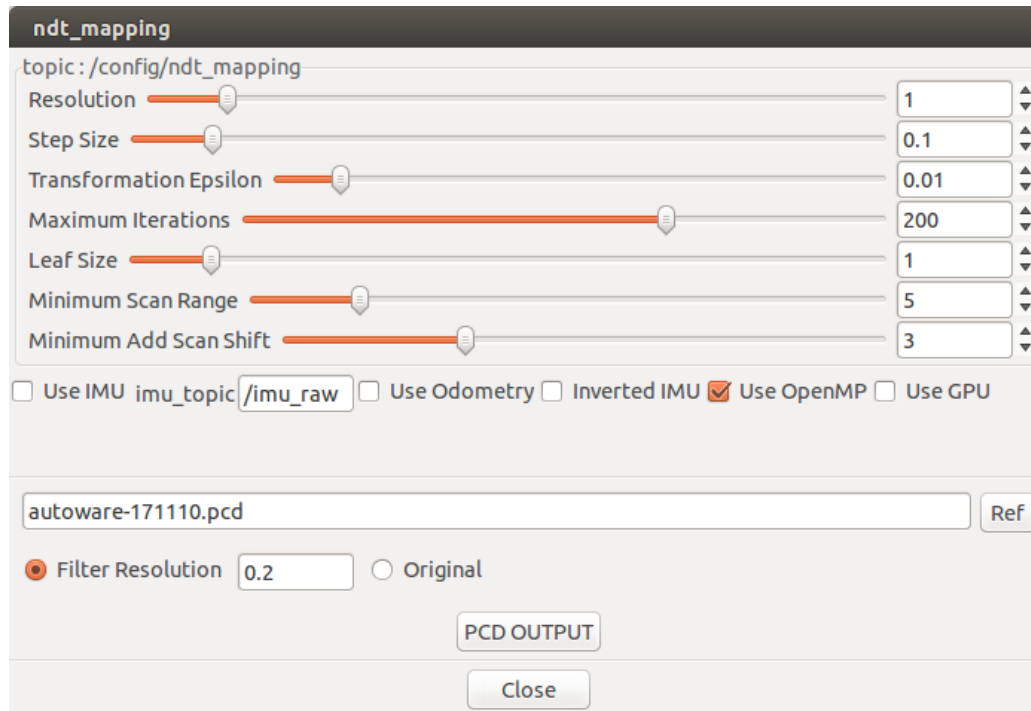
This will forward the topic /front/velodyne_points to /points_raw

8. Go back to **Simulation** tab and click **Pause** to start mapping

9. Mapping process can be seen from **Rviz**



10. Once the desired area is mapped. Click **[app]** button next to ndt_mapping
11. Select the desired path specified using the **Ref** button
12. Press the PCD OUTPUT to generate the file.
13. Uncheck the ndt_mapping node to stop.



The image shows the ROS parameter interface for the `ndt_mapping` node. The window title is `ndt_mapping`. The topic is `/config/ndt_mapping`. The parameters are:

- Resolution: 1
- Step Size: 0.1
- Transformation Epsilon: 0.01
- Maximum Iterations: 200
- Leaf Size: 1
- Minimum Scan Range: 5
- Minimum Add Scan Shift: 3

Options:

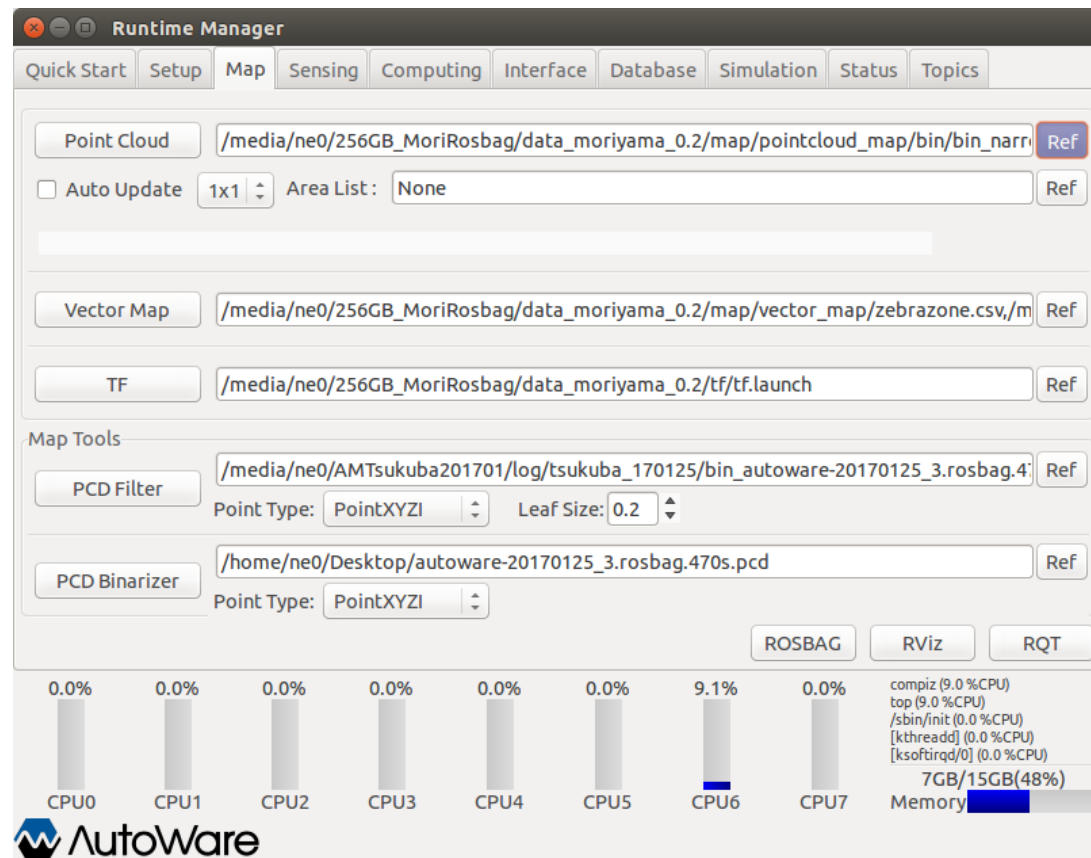
- Use IMU imu_topic `/imu_raw`
- Use Odometry
- Inverted IMU
- Use OpenMP
- Use GPU

File selection: `autoware-171110.pcd` (Ref button)

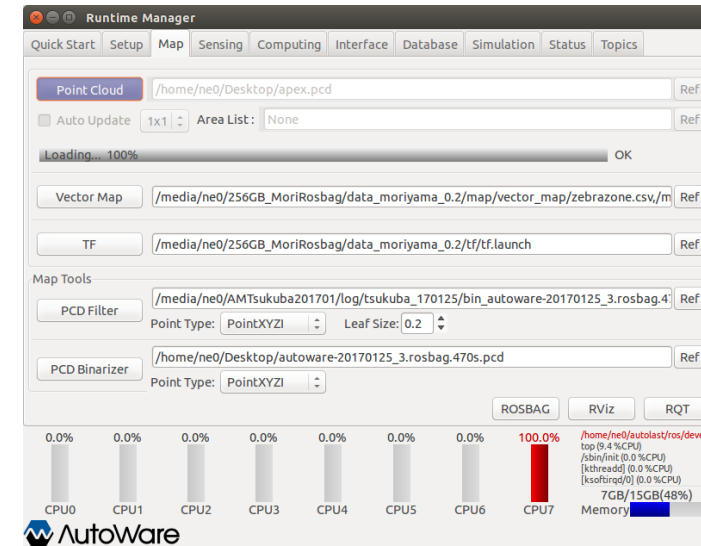
Filter Resolution: 0.2 Original

Buttons: PCD OUTPUT, Close

Verify Map



1. Select **Map** tab in runtime Manager and click on **Ref** button
2. Select the recently created file
3. Click on the **PointCloud** button and wait until the progress bar reaches Loading... 100%



4. Open RVIZ, Click the ADD button
5. Select the **By Topic** Tab
6. Double Click on **/points_map PointCloud2**
7. The map will be displayed (remember to set the frame to **map**)

