5、Data conversion and point cloud

5.1、ROS and PCD

Start up interl camera

```
roslaunch astra_camera astraproplus.launch
```

Point cloud display: rviz (start the rviz command, select the corresponding topic, modify the parameters, and present different effects); pcl_visualization tool.

```
roslaunch astra_visual pointCloud_visualize.launch
cloud_topic:=/camera/depth_registered/points
```

(1) pointcloud_to_pcd

```
rosrun pcl_ros pointcloud_to_pcd input:=/camera/depth/points
rosrun pcl_ros pointcloud_to_pcd input:=/camera/depth_registered/points
```

Save the ROS point cloud message in the specified PCD file.

(2) convert_pcd_to_image

```
rosrun pcl_ros convert_pcd_to_image <cloud.pcd>
```

Load a PCD file and publish it as a ROS image message five times per second.

(3) convert_pointcloud_to_image

```
rosrun pcl_ros convert_pointcloud_to_image
input:=/camera/depth_registered/points  output:=/my_image
View image: rosrun image_view image_view image:=/my_image
```

Subscribe to a topic of ROS point cloud and publish it with image information.

(4) pcd_to_pointcloud

```
rosrun pcl_ros pcd_to_pointcloud <file.pcd> [ <interval> ]
```

Load a PCD file and publish one or more times as a ROS point cloud messag

- file.pcd: The name of the (required) file to be read.
- interval: (Optional) The number of seconds to sleep between messages. If the parameter [interval] is zero or not specified, the message will be published once.

```
roslaunch astra_visual pointCloud_visualize.launch cloud_topic:=/cloud_pcd
```

(5) bag_to_pcd

rosbag Record

Command: rosbag record topic1 [topic2 topic3 ...]

```
rosbag record /camera/depth_registered/points
```

bag_to_pcd

```
rosrun pcl_ros bag_to_pcd <input_file.bag> <topic> <output_directory>
# E.g:
rosrun pcl_ros bag_to_pcd 2021-09-09-11-41-56.bag
/camera/depth_registered/points my_pcd
```

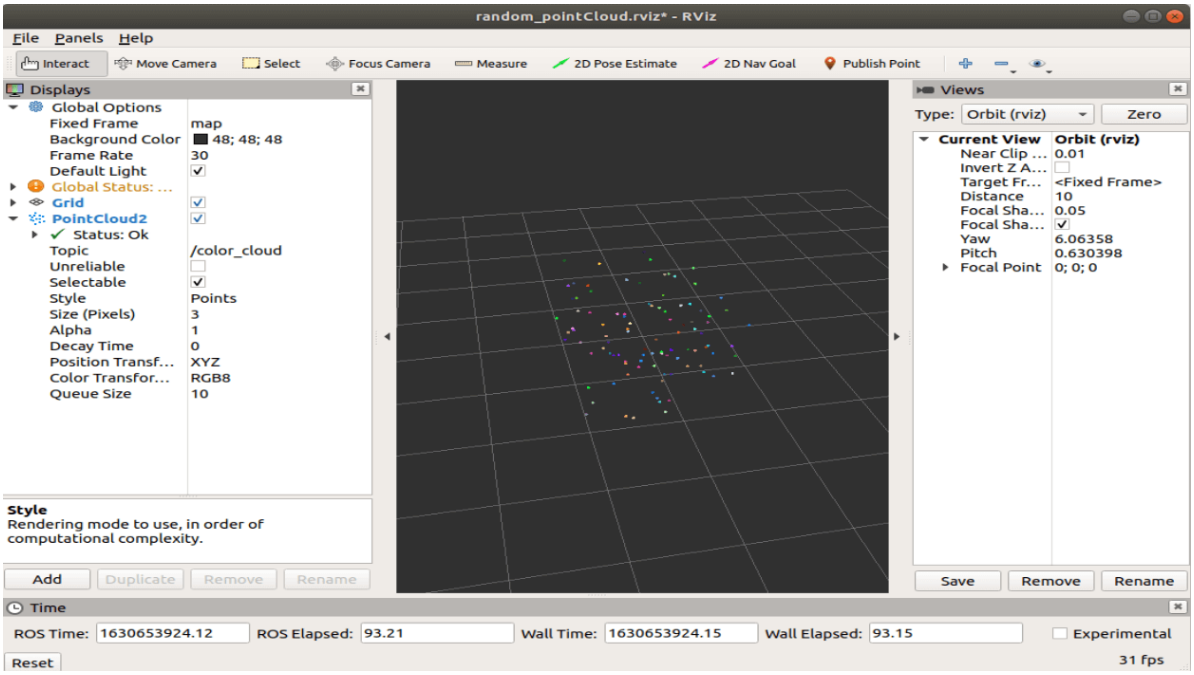
Read a package file and save the ROS point cloud message in the specified PCD file. This requires a bag file.

5.2、PCL 3D point cloud

5.2.1、start up

Release point cloud, the launch file contains the launch of rviz. So I can clearly see a cloud of dots flashing in the middle of rviz.

```
roslaunch astra_visual pointCloud_pub.launch
```



Another way to start, this way you need to manually start [rviz], and add the component [PointCloud2] to select the topic [/color_cloud].

```
roscore
rosrun astra_visual pointCloud_pub
```

- Code analysis

Path: ~/astra_ws/src/astra_visual/src/pub_pointCloud.cpp

5.2.2、Point cloud visualization

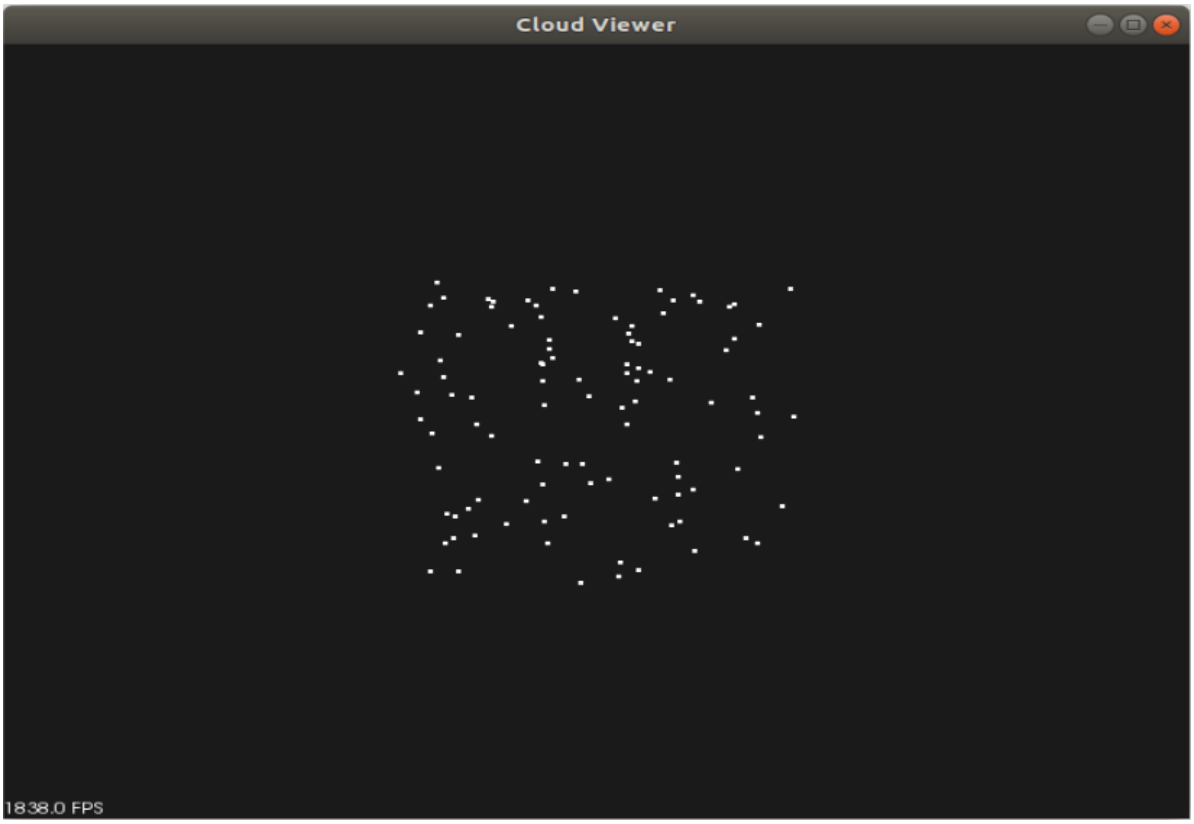
- rviz

```
rviz
```

- pcl_visualization

Start up command

```
roslaunch astra_visual pointCloud_visualize.launch
rosrun astra_visual pointCloud_visualize
```



- Shortcut key

【Ctrl】+【-】

【Shift】+【+】

【Alt】+【-】

【Alt】+【+】

The mouse wheel and left and right buttons can also be controlled.

- Code analysis

Path: ~/astra_ws/src/astra_visual/src/pcl_visualize.cpp