03.Environmental construction

Note: The supporting virtual machine has already been set up in the environment, and there is no need to build it again. Here is an explanation of the work required to build on a new motherboard or virtual machine.

The configuration of the virtual machine environment is as follows:

Ubuntu20.04 + ROS-Noetic+ OpenCV 4.2+Python3.8

2.1 Installation related dependencies

Terminal input,

```
sudo apt install libgflags-dev  ros-$ROS_DISTRO-image-geometry ros-$ROS_DISTRO-camera-info-manager ros-$ROS_DISTRO-image-transport ros-$ROS_DISTRO-image-publisher libgoogle-glog-dev libusb-1.0-0-dev libeigen3-dev
```

2.2 Create ROS workspace

To create a file named orbbec in the~directory_ Take the workspace of ws as an example.

Input the following command

```
mkdir -p ~/orbbec_ws/src
```

Extract the "source code folder and remove the OrbbecSDK from it_ Copy ROS folder to~/orbbec_ Under ws/src.

Then, input the following command to compile.

```
cd ~/orbbec_ws
catkin_make
```

After compiling, input following command to open the edit~/. bashrc file.

```
sudo vim ~/.bashrc
```

Press the [i] key to enter editing mode, add the workspace to the environment variable.

Add in the last sentence of the file.

```
source ~/orbbec_ws/devel/setup.bash
```

Press [ESC] to exit editing mode, then enter [:] followed by [wq], press Enter, save and exit.

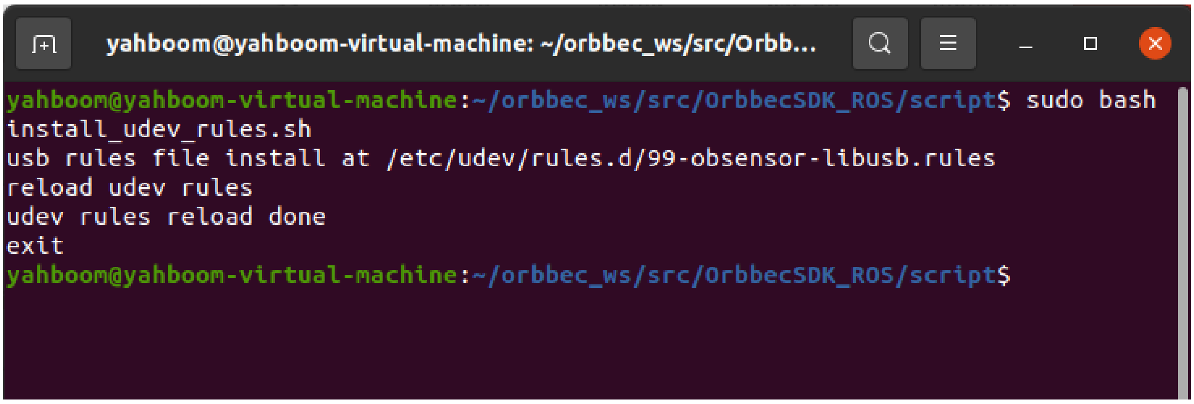
Then, input following command to refresh again.

```
source ~/.bashrc
```

2.3 Install camera udev rule files

Input the following command:

```
cd ~/orbbec_ws/src/OrbbecSDK_ROS/script
sudo chmod 777 install_udev_rules.sh
sudo bash install_udev_rules.sh
```

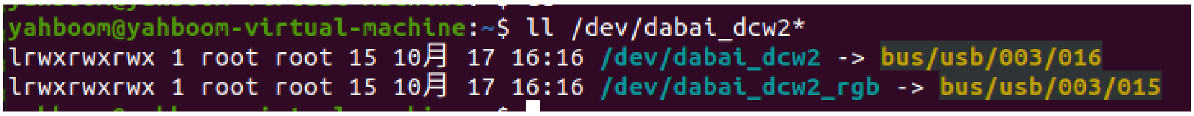


```
yahboom@yahboom-virtual-machine:~/orbbec_ws/src/OrbbecSDK_ROS/script$ sudo bash
install_udev_rules.sh
usb rules file install at /etc/udev/rules.d/99-obsensor-libusb.rules
reload udev rules
udev rules reload done
exit
yahboom@yahboom-virtual-machine:~/orbbec_ws/src/OrbbecSDK_ROS/script$
```

Input following MING command for verification.

```
ll /dev/dabai_dcw2*
```

The following message indicates successful binding:

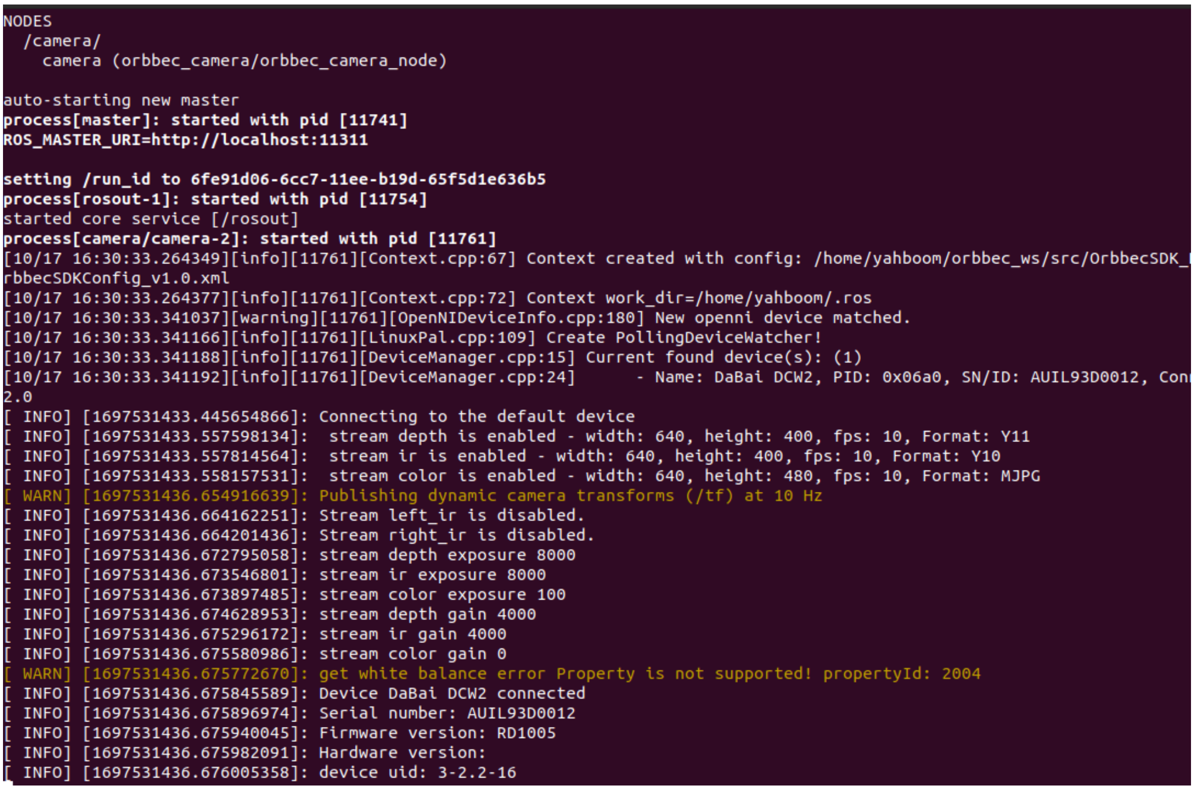


```
yahboom@yahboom-virtual-machine:~$ ll /dev/dabai_dcw2*
lrwxrwxrwx 1 root root 15 10月  17 16:16 /dev/dabai_dcw2 -> bus/usb/003/016
lrwxrwxrwx 1 root root 15 10月  17 16:16 /dev/dabai_dcw2_rgb -> bus/usb/003/015
```

2.4 Use camera

Input the following command:

```
roslaunch orbbec_camera dabai_dcw2.launch
```

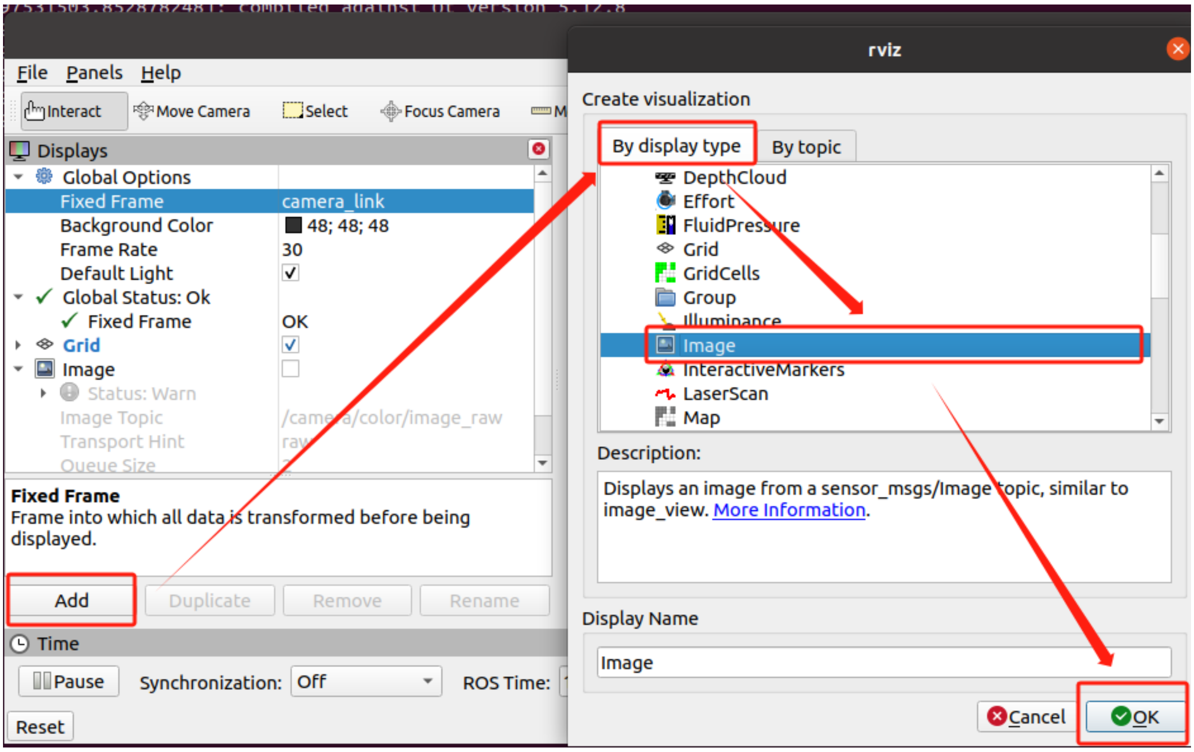


```
NODES
  /camera/
    camera (orbbec_camera/orbbec_camera_node)

auto-starting new master
process[master]: started with pid [11741]
ROS_MASTER_URI=http://localhost:11311

setting /run_id to 6fe91d06-6cc7-11ee-b19d-65f5d1e636b5
process[rosout-1]: started with pid [11754]
started core service [/rosout]
process[camera/camera-2]: started with pid [11761]
[10/17 16:30:33.264349][info][11761][Context.cpp:67] Context created with config: /home/yahboom/orbbec_ws/src/OrbbecSDK_
rbbecSDKConfig_v1.0.xml
[10/17 16:30:33.264377][info][11761][Context.cpp:72] Context work_dir=/home/yahboom/.ros
[10/17 16:30:33.341037][warning][11761][OpenNIDeviceInfo.cpp:180] New openni device matched.
[10/17 16:30:33.341166][info][11761][LinuxPal.cpp:109] Create PollingDeviceWatcher!
[10/17 16:30:33.341188][info][11761][DeviceManager.cpp:15] Current found device(s): (1)
[10/17 16:30:33.341192][info][11761][DeviceManager.cpp:24]      - Name: DaBai DCW2, PID: 0x06a0, SN/ID: AUIL93D0012, Con
2.0
[ INFO] [1697531433.445654866]: Connecting to the default device
[ INFO] [1697531433.557598134]:  stream depth is enabled - width: 640, height: 400, fps: 10, Format: Y11
[ INFO] [1697531433.557814564]:  stream ir is enabled - width: 640, height: 400, fps: 10, Format: Y10
[ INFO] [1697531433.558157531]:  stream color is enabled - width: 640, height: 480, fps: 10, Format: MJPG
[ WARN] [1697531436.654916639]: Publishing dynamic camera transforms (/tf) at 10 Hz
[ INFO] [1697531436.664162251]: Stream left_ir is disabled.
[ INFO] [1697531436.664201436]: Stream right_ir is disabled.
[ INFO] [1697531436.672795058]: stream depth exposure 8000
[ INFO] [1697531436.673546801]: stream ir exposure 8000
[ INFO] [1697531436.673897485]: stream color exposure 100
[ INFO] [1697531436.674628953]: stream depth gain 4000
[ INFO] [1697531436.675296172]: stream ir gain 4000
[ INFO] [1697531436.675580986]: stream color gain 0
[ WARN] [1697531436.675772670]: get white balance error Property is not supported! propertyId: 2004
[ INFO] [1697531436.675845589]: Device DaBai DCW2 connected
[ INFO] [1697531436.675896974]: Serial number: AUIL93D0012
[ INFO] [1697531436.675940045]: Firmware version: RD1005
[ INFO] [1697531436.675982091]: Hardware version:
[ INFO] [1697531436.676005358]: device uid: 3-2.2-16
```

Input the following command to view the image using rviz.

```
rviz
```

Modify Fixed Frame to camera_ Link, and then install the image display plugin as shown in the following figure.



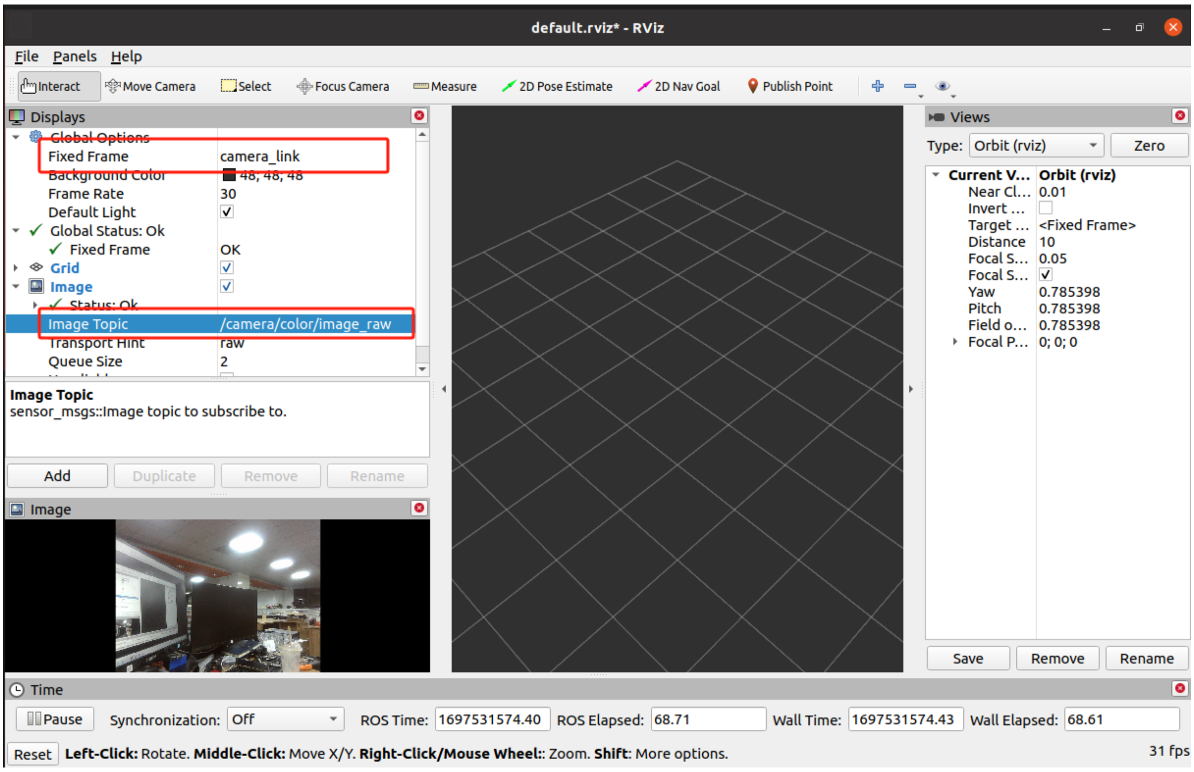
Fixed Frame: camera_link
Background Color: 48; 48; 48
Frame Rate: 30
Default Light: ☑
Global Status: Ok
Fixed Frame: OK
Grid: ☑
Image: □
Status: Warn
Image Topic: /camera/color/image_raw
Transport Hint: raw

Fixed Frame
Frame into which all data is transformed before being displayed.

Description:
Displays an image from a sensor_msgs/Image topic, similar to image_view. More Information.

Display Name: Image

Then, click on Image and select Display Color Image in the Image Topic bar: * */camera/color/image_ Raw**.



default.rviz* - RViz

File Panels Help
Interact Move Camera Select Focus Camera Measure 2D Pose Estimate 2D Nav Goal Publish Point
Displays
Views
Add Duplicate Remove Rename
Save Remove Rename
Zero
Pause
Reset

Global Options
Fixed Frame camera_link
Background Color 48; 48; 48
Frame Rate 30
Default Light ☑
Global Status: Ok
Fixed Frame OK
Grid ☑
Image ☑
Status: Ok
Image Topic /camera/color/image_raw
Transport Hint raw
Queue Size 2

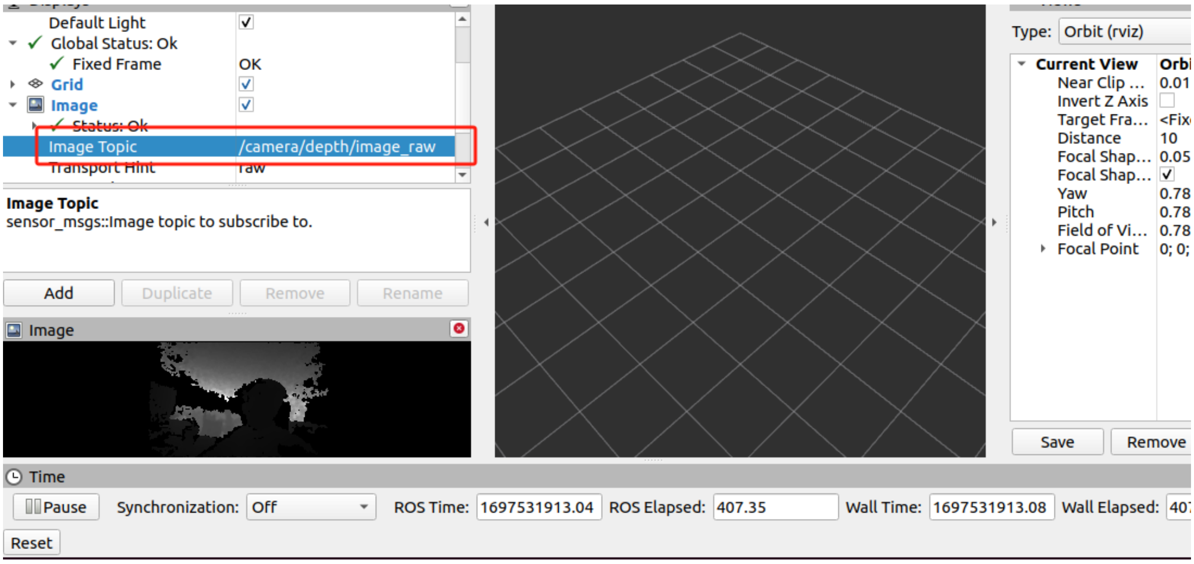
Image Topic
sensor_msgs::Image topic to subscribe to.

Type: Orbit (rviz)
Current V... Orbit (rviz)
Near Cl... 0.01
Invert ... □
Target ... <Fixed Frame>
Distance 10
Focal S... 0.05
Focal S... ☑
Yaw 0.785398
Pitch 0.785398
Field o... 0.785398
Focal P... 0; 0; 0

Time
Synchronization: Off ROS Time: 1697531574.40 ROS Elapsed: 68.71 Wall Time: 1697531574.43 Wall Elapsed: 68.61

Left-Click: Rotate. **Middle-Click:** Move X/Y. **Right-Click/Mouse Wheel:**: Zoom. **Shift**: More options. 31 fps

In the Image Topic column, select Display Depth Image: * */camera/depth/image_ Raw**



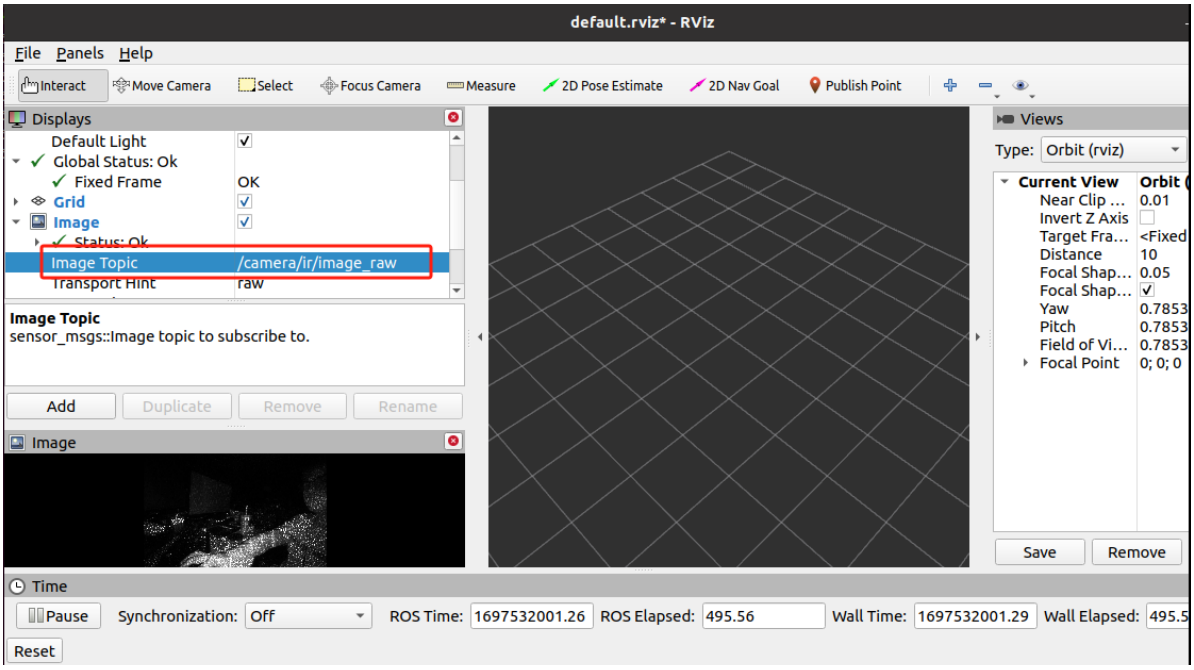
Default Light ☑
Global Status: Ok
Fixed Frame OK
Grid ☑
Image ☑
Status: Ok
Image Topic /camera/depth/image_raw
Transport Hint raw

Image Topic
sensor_msgs::Image topic to subscribe to.

Type: Orbit (rviz)
Current View Orbi
Near Clip ... 0.01
Invert Z Axis □
Target Fra... <Fix
Distance 10
Focal Shap... 0.05
Focal Shap... ☑
Yaw 0.78
Pitch 0.78
Field of Vi... 0.78
Focal Point 0; 0;

Time
Synchronization: Off ROS Time: 1697531913.04 ROS Elapsed: 407.35 Wall Time: 1697531913.08 Wall Elapsed: 407

In the Image Topic bar, select to display IR images: * */camera/ir/image_ Raw**



Default Light ☑
Global Status: Ok
Fixed Frame OK
Grid ☑
Image ☑
Status: Ok
Image Topic /camera/ir/image_raw
Transport Hint raw

Image Topic
sensor_msgs::Image topic to subscribe to.

Type: Orbit (rviz)

Current View	Orbit (
Near Clip ...	0.01
Invert Z Axis	□
Target Fra...	<Fixed
Distance	10
Focal Shap...	0.05
Focal Shap...	☑
Yaw	0.7853
Pitch	0.7853
Field of Vi...	0.7853
Focal Point	0; 0; 0

Synchronization: Off ROS Time: 1697532001.26 ROS Elapsed: 495.56 Wall Time: 1697532001.29 Wall Elapsed: 495.5