Moveit Cartesian path

1. Usage environment

Motherboard: Jetson Orin Nano/Nx

ROS2: Humble

2. Driving the real machine

Driving the real machine is to convert the joint state information of the robot arm into the control of the real robot arm by subscribing to the `/joint_states` topic of Moveit2.

Note: Since the real robot arm does not have an obstacle avoidance function, some positions may hit obstacles; so the planned robot arm movements should be as reasonable as possible and avoid obstacles

(It is recommended to use preset positions to demonstrate driving the real machine)

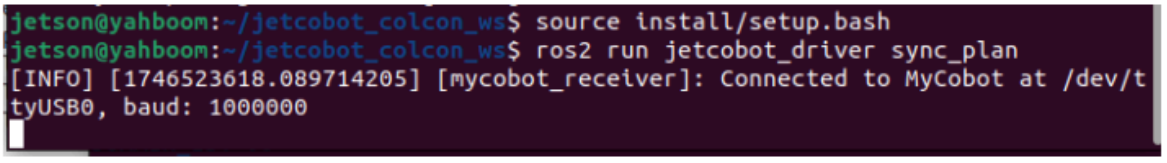
2.1. Start the real machine

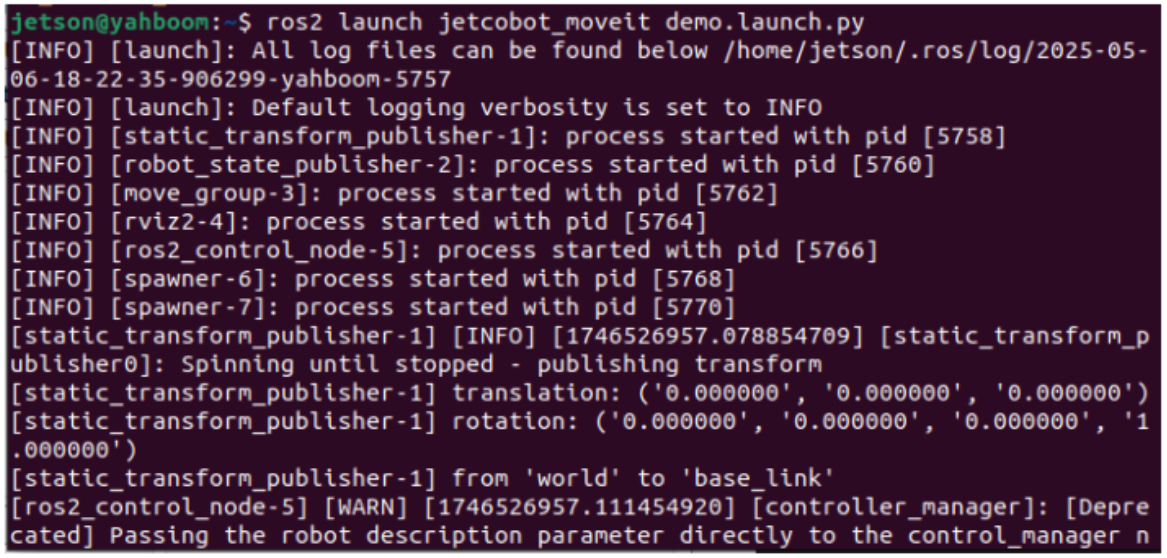
If you do not drive the real machine, simulate the robot arm movements in MoveIt:

```
ros2 run jetcobot_driver sync_plan
```

2.2. Start MoveIt2

```
ros2 launch jetcobot_moveit demo.launch.py
```





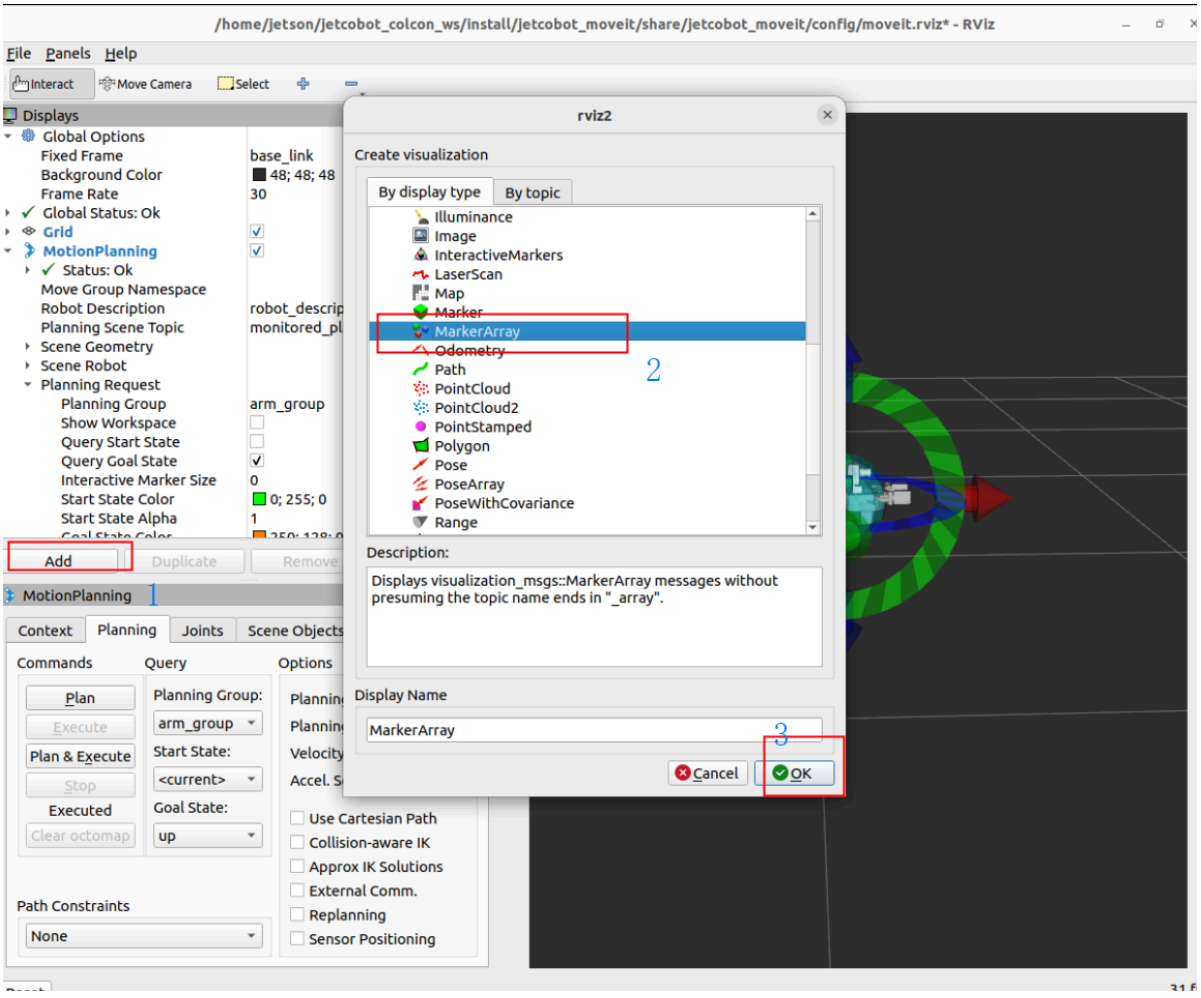
3. Cartesian path

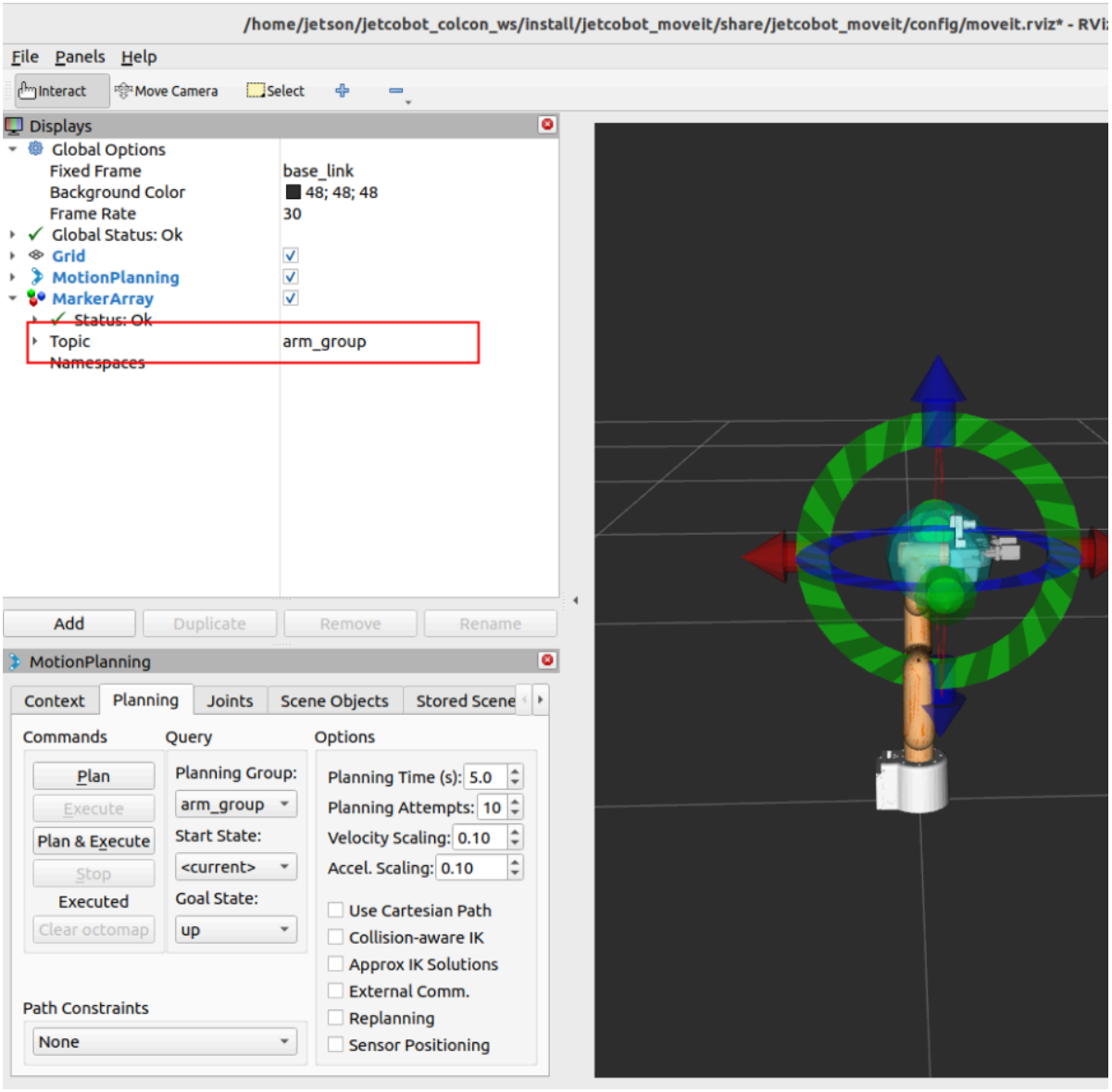
Cartesian path refers to the linear motion path of the robot end effector in the Cartesian coordinate system.

```
Due to the limitation of the robot's freedom and structure, the Cartesian path point is very difficult to find
```

3.1, Visualization

Before starting the command, you need to add the `MarkerArray` plug-in in `RViz2` to display the Cartesian planned straight line path: `MarkerArray` needs to select the `arm_group` topic



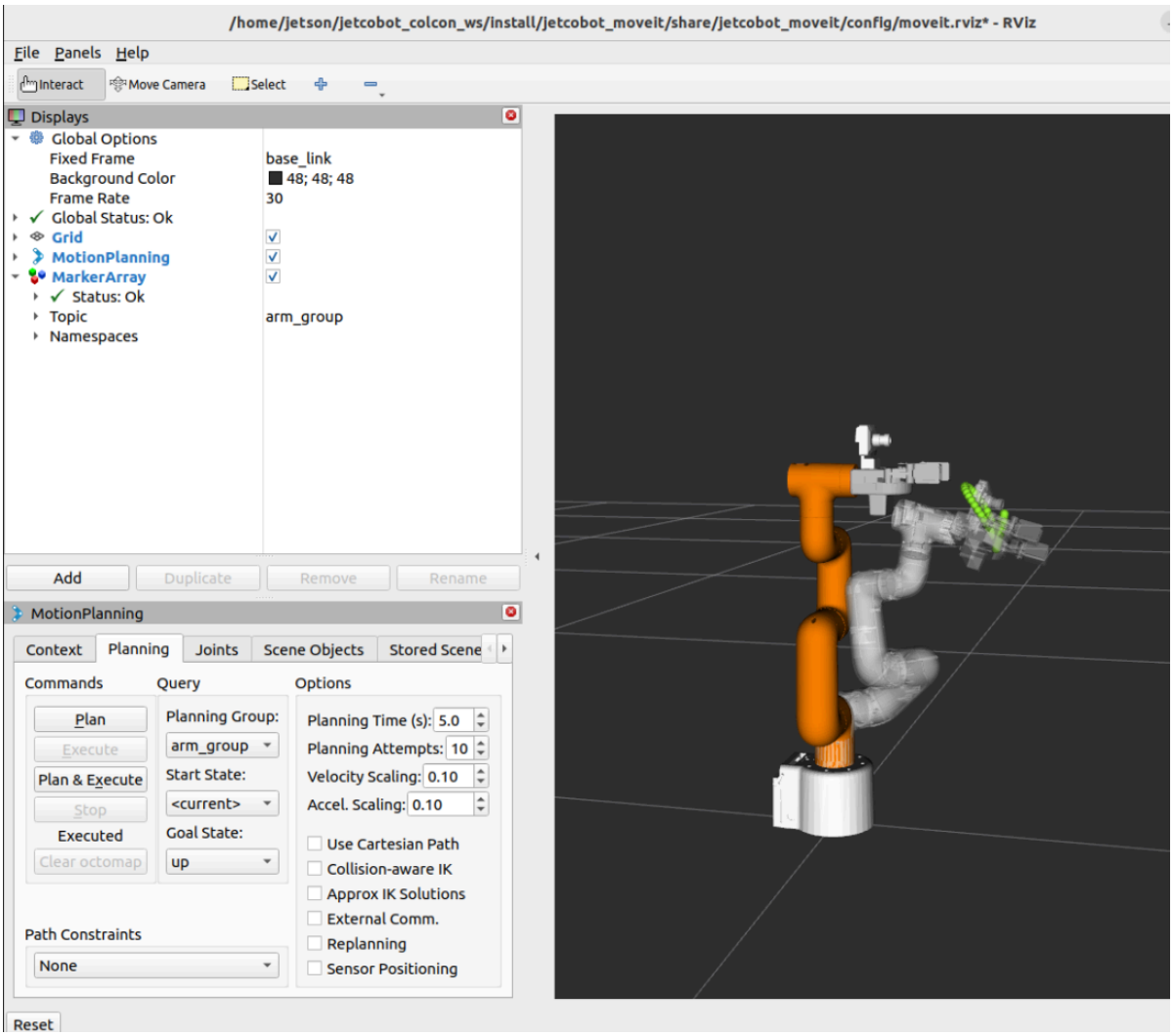


3.2, Start Command

The robot needs to be successfully loaded in MoveIt and `You can start planning now!` appears to run the following command: The robot will plan the Cartesian path by itself

```
ros2 run jetcobot_moveit cartesian_path
```

```
jetson@yahboom:~/app_jetcobot$ ros2 run jetcobot_moveit cartesian_path
[INFO] [1746529258.187369108] [cartesian_path_planning]: Initializing CartesianPathPlanning.
[INFO] [1746529258.841187537] [moveit_rdf_loader.rdf_loader]: Loaded robot model in 0.653408 seconds
[INFO] [1746529258.841284820] [moveit_robot_model.robot_model]: Loading robot model 'jetcobot'...
[WARN] [1746529258.841307828] [moveit_robot_model.robot_model]: Skipping virtual joint 'virtual_joint' because its child frame 'base_li
nk' does not match the URDF frame 'dummy'
[INFO] [1746529258.841321301] [moveit_robot_model.robot_model]: No root/virtual joint specified in SRDF. Assuming fixed joint
[WARN] [1746529259.081823538] [moveit_ros.robot_model_loader]: No kinematics plugins defined. Fill and load kinematics.yaml!
[INFO] [1746529259.142811588] [moveit_rdf_loader.rdf_loader]: Loaded robot model in 0.0605039 seconds
[INFO] [1746529259.142870022] [moveit_robot_model.robot_model]: Loading robot model 'jetcobot'...
[WARN] [1746529259.142884998] [moveit_robot_model.robot_model]: Skipping virtual joint 'virtual_joint' because its child frame 'base_li
nk' does not match the URDF frame 'dummy'
[INFO] [1746529259.142895526] [moveit_robot_model.robot_model]: No root/virtual joint specified in SRDF. Assuming fixed joint
[WARN] [1746529259.360812954] [moveit_ros.robot_model_loader]: No kinematics plugins defined. Fill and load kinematics.yaml!
[INFO] [1746529259.387153013] [move_group_interface]: Ready to take commands for planning group arm_group.
[INFO] [1746529259.403444769] [move_group_interface]: Plan and Execute request accepted
[INFO] [1746529261.764048497] [move_group_interface]: Plan and Execute request complete!
[INFO] [1746529261.764148756] [cartesian_path_planning]: Moved to initial position successfully.
[INFO] [1746529261.764313529] [cartesian_path_planning]: Waypoints:
[INFO] [1746529261.764367962] [cartesian_path_planning]: Waypoint 0: [x: 0.360930, y: -0.007044, z: 0.360930]
[INFO] [1746529261.764444189] [cartesian_path_planning]: Waypoint 1: [x: 0.250930, y: -0.022044, z: 0.360930]
[INFO] [1746529261.764494206] [cartesian_path_planning]: Waypoint 2: [x: 0.000032, y: -0.000043, z: -0.000036]
[INFO] [1746529261.801560189] [cartesian_path_planning]: Cartesian path planned successfully (1.21% achieved)
[INFO] [1746529261.816568323] [move_group_interface]: Execute request accepted
[INFO] [1746529272.702991795] [move_group_interface]: Execute request success!
```


/home/jetson/jetcobot_colcon_ws/install/jetcobot_moveit/share/jetcobot_moveit/config/moveit.rviz* - RViz
File Panels Help
Interact
Move Camera
Select
Displays
Global Options
Fixed Frame
base_link
Background Color
48; 48; 48
Frame Rate
30
Global Status: Ok
Grid
MotionPlanning
MarkerArray
Status: Ok
Topic
arm_group
Namespaces
Add
Duplicate
Remove
Rename
MotionPlanning
Context
Planning
Joints
Scene Objects
Stored Scene
Commands
Plan
Execute
Plan & Execute
Stop
Executed
Clear octomap
Query
Planning Group:
arm_group
Start State:
<current>
Goal State:
up
Options
Planning Time (s): 5.0
Planning Attempts: 10
Velocity Scaling: 0.10
Accel. Scaling: 0.10
Use Cartesian Path
Collision-aware IK
Approx IK Solutions
External Comm.
Replanning
Sensor Positioning
Path Constraints
None
Reset