9. 7. 2023

https://industrial-training-master.readthedocs.io/en/melodic/_source/session1/Create-Catkin-Workspace.html

/home/ladak/Desktop/ws_2023

---

https://roboticscasual.com/ros-tutorial-how-to-create-a-moveit-config-for-the-ur5-and-a-gripper/

```
git clone -b noetic-devel https://github.com/ros-industrial/universal_robot.git
```

fatal: Remote branch noetic-devel not found in upstream origin – NO NOETIC BRANCH

=> use original folder `universal_robot`

```
wget https://raw.githubusercontent.com/utecrobotics/ur5/master/ur5_description/urdf/ur5_joint_limited_robot.urdf.xacro
```

.bashsrc:

```
#export ROS_MASTER_URI=http://192.168.0.10:11311
#export ROS_IP=192.168.0.100


export ROS_MASTER_URI=http://localhost:11311
export ROS_HOSTNAME=localhost
```

```
ladak@ladak-ThinkStation-P330:~/Desktop/ws_2023/src$ roslaunch moveit_setup_assistant setup_assistant.launch

... logging to /home/ladak/.ros/log/97880b22-1e77-11ee-a428-8f23e8d4e878/roslaunch-ladak-ThinkStation-P330-25435.log
Checking log directory for disk usage. This may take a while.
Press Ctrl-C to interrupt
Done checking log file disk usage. Usage is <1GB.

started roslaunch server http://localhost:38469/

SUMMARY
========

PARAMETERS
 * /rosdistro: noetic
 * /rosversion: 1.15.13

NODES
  /
    moveit_setup_assistant (moveit_setup_assistant/moveit_setup_assistant)

auto-starting new master
process[master]: started with pid [25443]
ROS_MASTER_URI=http://localhost:11311

...
```

```
/opt/ros/noetic/lib/moveit_setup_assistant/moveit_setup_assistant: error while loading
shared libraries: libmoveit_robot_state_rviz_plugin_core.so.1.1.11: cannot open shared
object file: No such file or directory
================================================================================REQUIRED
process [moveit_setup_assistant-2] has died!
process has died [pid 25456, exit code 127, cmd
/opt/ros/noetic/lib/moveit_setup_assistant/moveit_setup_assistant
__name:=moveit_setup_assistant __log:=/home/ladak/.ros/log/97880b22-1e77-11ee-a428-
8f23e8d4e878/moveit_setup_assistant-2.log].
log file:
/home/ladak/.ros/log/97880b22-1e77-11ee-a428-8f23e8d4e878/moveit_setup_assistant-2*.log
Initiating shutdown!
==================================================================…
```

https://github.com/ros-planning/moveit/issues/3303

sudo apt install --reinstall "?and(~i,~nros-noetic-moveit-*)"

This updated all move_it packages from 1.1.10 to 1.1.12.

---

libsrdfdom.so.0.6.4:

sudo apt-get install --reinstall ros-noetic-srdfdom

sudo apt-get install ros-noetic-geometric-shapes

I can run the GUI now!

TODO:
    try build NAIL sources (all move_it packages were reinstalled..)

---

10. 7. 2023

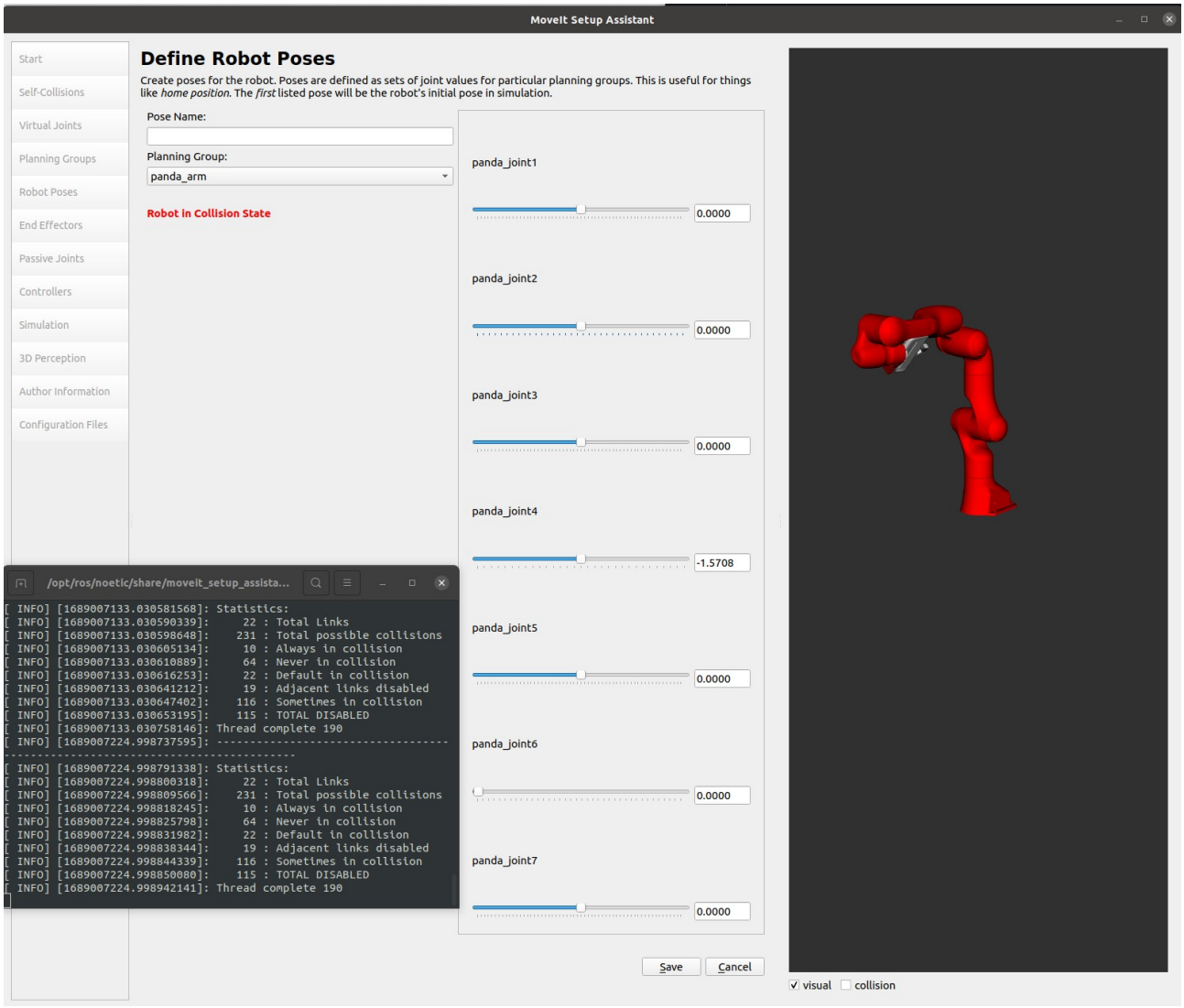
NAIL sources build OK; only with warnings on ur_kinematics:

```
Warnings   << ur_kinematics:check
/home/ladak/git/nail108-2021/getting_started/logs/ur_kinematics/build.check.017.log
CMake Warning (dev) at CMakeLists.txt:2 (project):
  Policy CMP0048 is not set: project() command manages VERSION variables.
  Run "cmake --help-policy CMP0048" for policy details.  Use the cmake_policy
  command to set the policy and suppress this warning.

  The following variable(s) would be set to empty:

    CMAKE_PROJECT_VERSION
    CMAKE_PROJECT_VERSION_MAJOR
    CMAKE_PROJECT_VERSION_MINOR
    CMAKE_PROJECT_VERSION_PATCH
This warning is for project developers.  Use -Wno-dev to suppress it.
```

setup_assistant_tutorial:

https://ros-planning.github.io/moveit_tutorials/doc/setup_assistant/setup_assistant_tutorial.html

Step 5: Add Robot Poses



https://github.com/ros-planning/moveit/issues/2332

---

15. 7. 2023

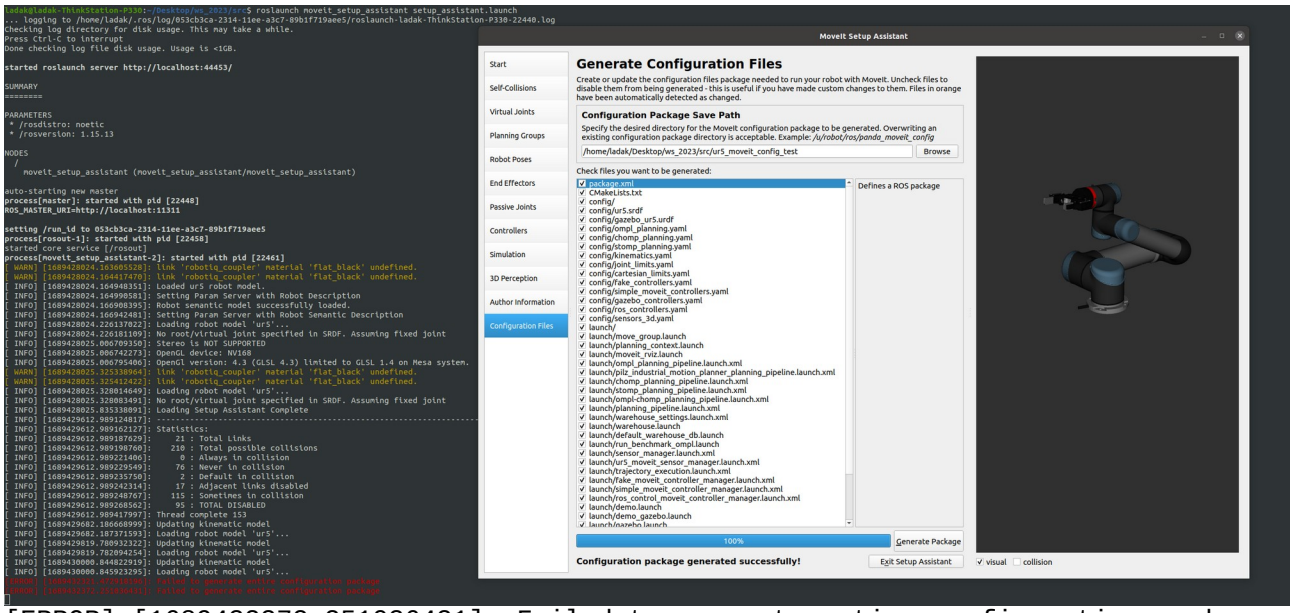
Universal_robot:

No Noetic branch, installed melodic dev:
git clone -b melodic-devel https://github.com/ros-industrial/universal_robot.git

Missing URDF files, cloned from kinetic:

ladak@ladak-ThinkStation-P330:~/Desktop/URDF_KINETIC$ git clone -b kinetic https://github.com/ros-industrial/universal_robot.git

Config generated with error msg in log (no error in GUI); instructions from https://roboticscasual.com/ros-tutorial-how-to-create-a-moveit-config-for-the-ur5-and-a-gripper/



[ERROR] [1689432372.251036431]: Failed to generate entire configuration package

roslaunch ur5_moveit_config_test demo_gazebo.launch:

...
[ERROR] [1689439171.369505782]: Exception while loading planner 'chomp_interface/CHOMPPlanner': Failed to load library /opt/ros/noetic/lib/libchomp_planner_plugin.so. Make sure that you are calling the PLUGINLIB_EXPORT_CLASS macro in the library code, and that names are consistent between this macro and your XML.
Error string: Could not load library (Poco exception = libchomp_motion_planner.so.1.1.12: cannot open shared object file: No such file or directory)
Available plugins: chomp_interface/CHOMPPlanner, ompl_interface/OMPLPlanner, pilz_industrial_motion_planner::CommandPlanner

sudo apt-get install ros-noetic-chomp-motion-planner

[ERROR] [1689439171.618177834]: Failed to initialize planning pipeline 'chomp'.

[ERROR] [1689439171.822043667]: Exception while loading planner 'ompl_interface/OMPLPlanner': Failed to load library /opt/ros/noetic/lib/libmoveit_ompl_planner_plugin.so. Make sure that you are calling the PLUGINLIB_EXPORT_CLASS macro in the library code, and that names are consistent between this macro and your XML. Error string: Could not load library (Poco exception = libompl.so.17: cannot open shared object file: No such file or directory)
Available plugins: chomp_interface/CHOMPPlanner, ompl_interface/OMPLPlanner, pilz_industrial_motion_planner::CommandPlanner

https://ompl.kavrakilab.org/installation.html

```
sudo sh -c 'echo "deb http://packages.ros.org/ros/ubuntu `lsb_release -sc` main" > /etc/apt/sources.list.d/ros-latest.list'

wget http://packages.ros.org/ros.key -O - | sudo apt-key add -

sudo apt-get update

sudo apt-get install ros-`rosversion -d`-ompl
```

```
[ERROR] [1689439171.825692367]: Failed to initialize planning pipeline 'ompl'.
```

```
[ERROR] [1689439171.867420686]: Exception while loading planner 'pilz_industrial_motion_planner::CommandPlanner': Failed to load library /opt/ros/noetic/lib//libpilz_industrial_motion_planner.so. Make sure that you are calling the PLUGINLIB_EXPORT_CLASS macro in the library code, and that names are consistent between this macro and your XML. Error string: Could not load library (Poco exception = libmoveit_planning_interface.so.1.1.10: cannot open shared object file: No such file or directory)
Available plugins: chomp_interface/CHOMPPlanner, ompl_interface/OMPLPlanner, pilz_industrial_motion_planner::CommandPlanner
```

```
[ERROR] [1689439171.868916919]: Failed to initialize planning pipeline 'pilz_industrial_motion_planner'.
[ERROR] [1689439171.870199450]: Failed to load any planning pipelines.
```

All errors resolved - except the last one (libpilz_industrial_motion_planner)

http://wiki.ros.org/pilz_robots/Tutorials/MoveRobotWithPilzCommand_planner#Install_Pilz_industrial_motion_package

```
sudo apt install ros-noetic-pilz-industrial-motion   -OK

roslaunch prbt_moveit_config moveit_planning_execution.launch pipeline:=pilz_command_planner                                    -error
```

```
sudo apt update
sudo apt install ros-noetic-pilz-industrial-motion
```

This installs the *pilz_extensions*, *pilz_msgs* and *pilz_trajectory_generation* package, which includes the *pilz_command_planner*. To test the successful installation (and your ROS environment) you can run in the terminal:

```
roslaunch prbt_moveit_config moveit_planning_execution.launch pipeline:=pilz_command_planner
```

Note: If you use *pilz_industrial_motion* 0.4.5 or lower use *pipeline:=command_planner*

Note: If you use the latest branch (noetic-devel) use *pipeline:=pilz_industrial_motion_planner*

23.7.2023

Can’t resolve the pilz package;
other way how to test generated **ur5_moveit_config_test** config:

https://roboticscasual.com/ros-tutorial-how-to-create-a-moveit-config-for-the-ur5-and-a-gripper/

- all modifications done in ur_description etc.

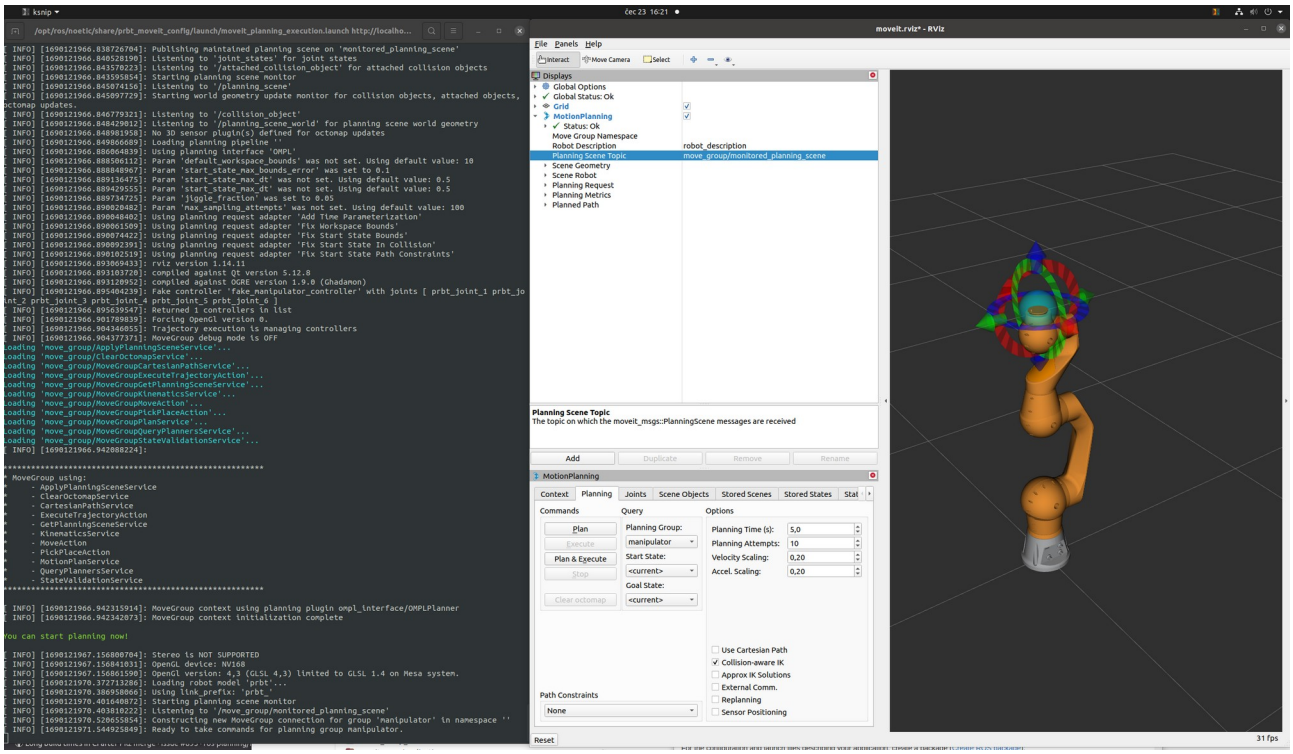
Use Moveit for motion planning in Rviz

roslaunch ur5_moveit_config_test demo_gazebo.launch

– same pilz error

http://wiki.ros.org/pilz_robots/Tutorials/ModelYourApplicationWithPRBT

```
sudo apt install ros-noetic-pilz-robots
roslaunch prbt_moveit_config moveit_planning_execution.launch
```



roslaunch ur5_moveit_config_test demo_gazebo.launch

Same error – because newer version is installed...

[ERROR] [1690122540.160497307]: Exception while loading planner 'pilz_industrial_motion_planner::CommandPlanner': Failed to load library /opt/ros/noetic/lib//libpilz_industrial_motion_planner.so. Make sure that you are calling the PLUGINLIB_EXPORT_CLASS macro in the library code, and that names are consistent between this macro and your XML. Error string: Could not load library (Poco exception = libmoveit_planning_interface.so.1.1.10: cannot open shared object file: No such file or directory)

Available plugins: chomp_interface/CHOMPPlanner, ompl_interface/OMPLPlanner, pilz_industrial_motion_planner::CommandPlanner

[ERROR] [1690122540.160543318]: Failed to initialize planning pipeline 'pilz_industrial_motion_planner'.

This didn’t work:

git clone **git@github.com**:ros-planning/moveit_visual_tools.git

```
# rosdep install --from-paths src --ignore-src –rosdistro noetic
```

https://github.com/ros-planning/moveit/issues/3303

“Same issue as above: you updated (from the ROS testing repo) while a rebuild was in progress. “

sudo apt upgrade and reinstalling moveit again helped with the pilz error;

however, there was another error and no robot arm was visible in rViz and gazebo:

Error [parser.cc:488] parse as old deprecated model file failed.

Error Code 4 Msg: Required attribute[filename] in element[plugin] is not specified in SDF.

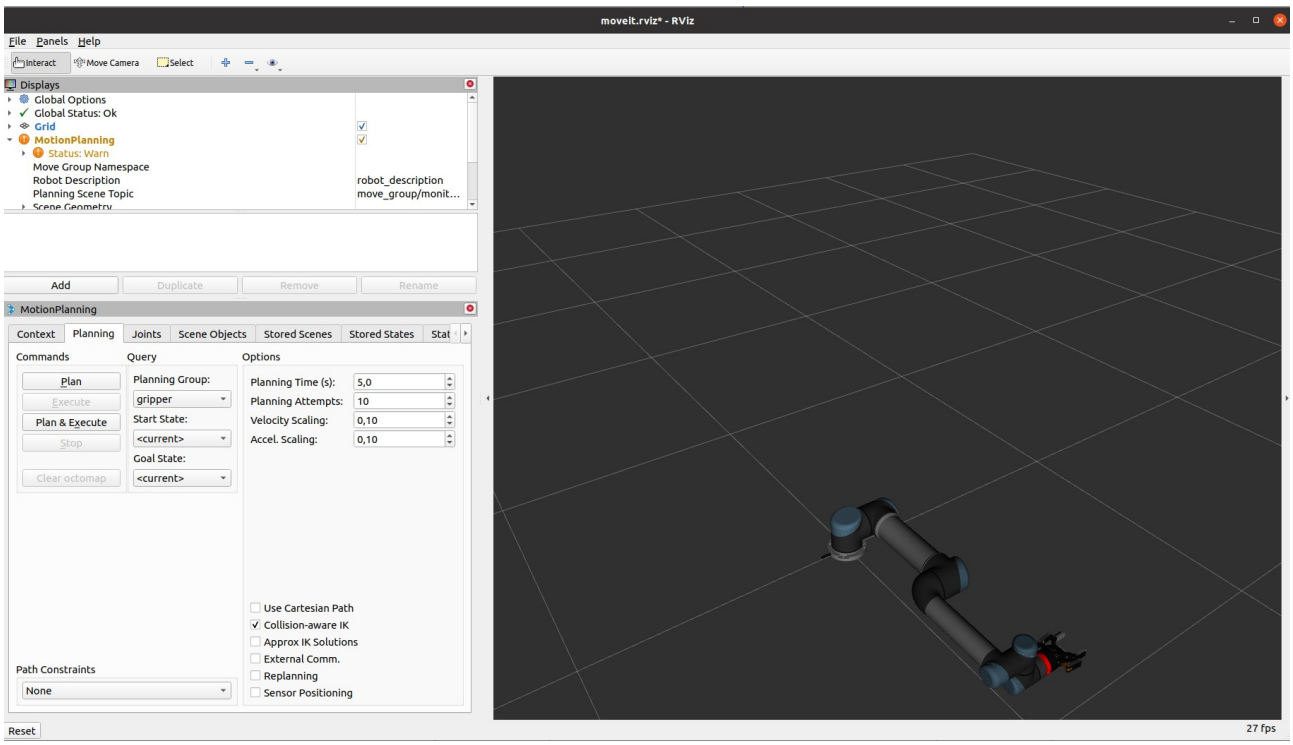
Error Code 8 Msg: Error reading element <plugin>

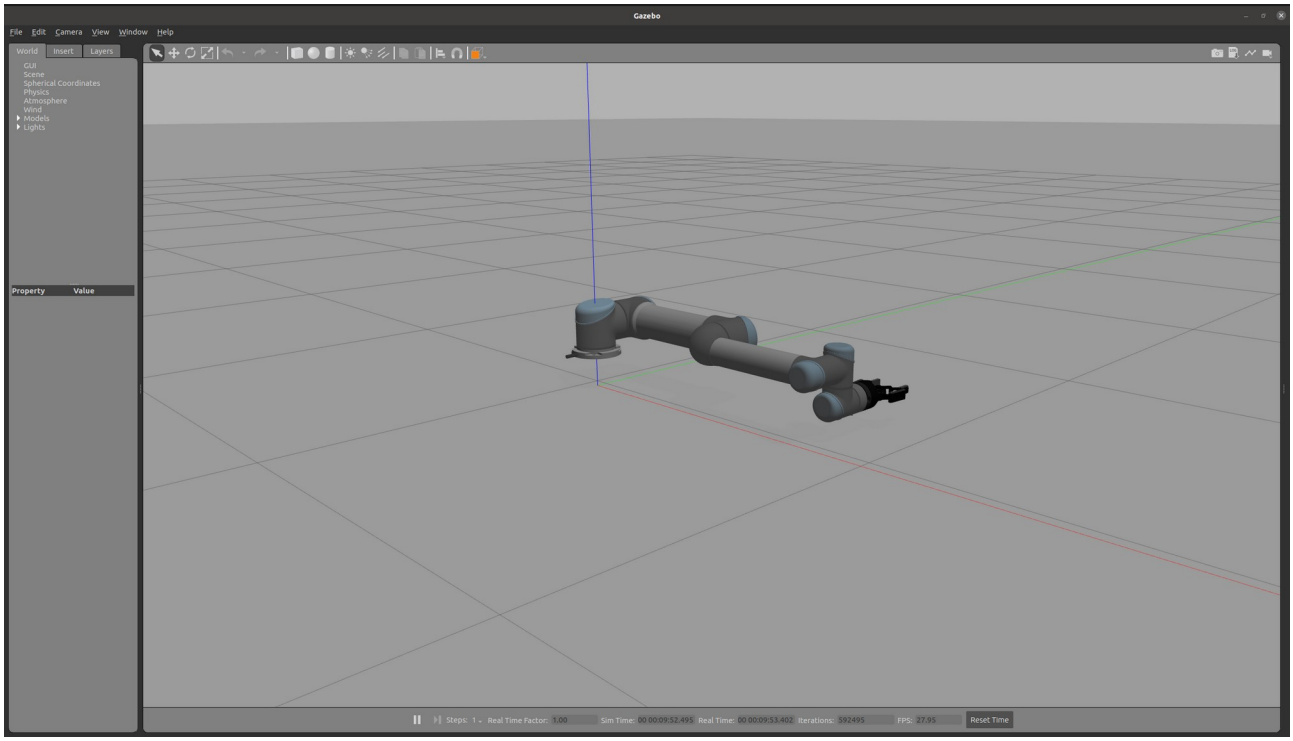
Error Code 8 Msg: Error reading element <model>

Error Code 8 Msg: Error reading element <sdf>

So I tried run the command with ur5_gripper_moveit_config (instead of the genrated package) and it somehow works – arm is visible (but there is many errors...):

roslaunch ur5_gripper_moveit_config demo_gazebo.launch


moveit.rviz* - RViz
File Panels Help
Interact
Move Camera
Select
Displays
Global Options
Global Status: Ok
Grid
MotionPlanning
Status: Warn
Move Group Namespace
Robot Description
robot_description
Planning Scene Topic
move_group/monit...
Add
Duplicate
Remove
Rename
MotionPlanning
Context
Planning
Joints
Scene Objects
Stored Scenes
Stored States
Commands
Plan
Execute
Plan & Execute
Stop
Clear octomap
Query
Planning Group:
gripper
Start State:
<current>
Goal State:
<current>
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
27 fps


Gazebo
File Edit Camera View Window Help
World
Insert
Layers
GUI
Scene
Spherical Coordinates
Physics
Atmosphere
Wind
Models
Lights
Property
Value
Steps: 1
Real Time Factor: 1.00
Sim Time: 00 00:09:52.495
Real Time: 00 00:09:53.402
Iterations: 592495
FPS: 27.95
Reset Time

TODO:

- do I need the move_it_visual_tools package? It was added to resolve the pilz version error…
- resolve launch errors
- try the generated config: roslaunch ur5_moveit_config_test demo_gazebo.launch
- generate the correct custom config

---

1. 8. 2023

Real robot UR5:

To run the robot arm follow the below steps:

- Power on the robot arm
- Run the below command on the DELL computer
  - **roslaunch ur_robot_driver ur5_bringup.launch robot_ip:=192.168.0.104 kinematics_config:=$(rospack find ur_calibration)/etc/ur5_calibration.yaml**
- Run the **ROS.urp** file on the robot teach pendant
- Run the below command on the DELL computer but wait for each to finish
  - **roslaunch ur5_moveit_config ur5_moveit_planning_execution.launch limited:=true**
- Run this command on the DELL computer to move the arm
  - **rosrun robot_arm_sequence robot_arm_sequence.py**

Move_it_assistant:

- needs proper config package -can't be combined:

roslaunch ur5_gripper_moveit_config demo_gazebo.launch

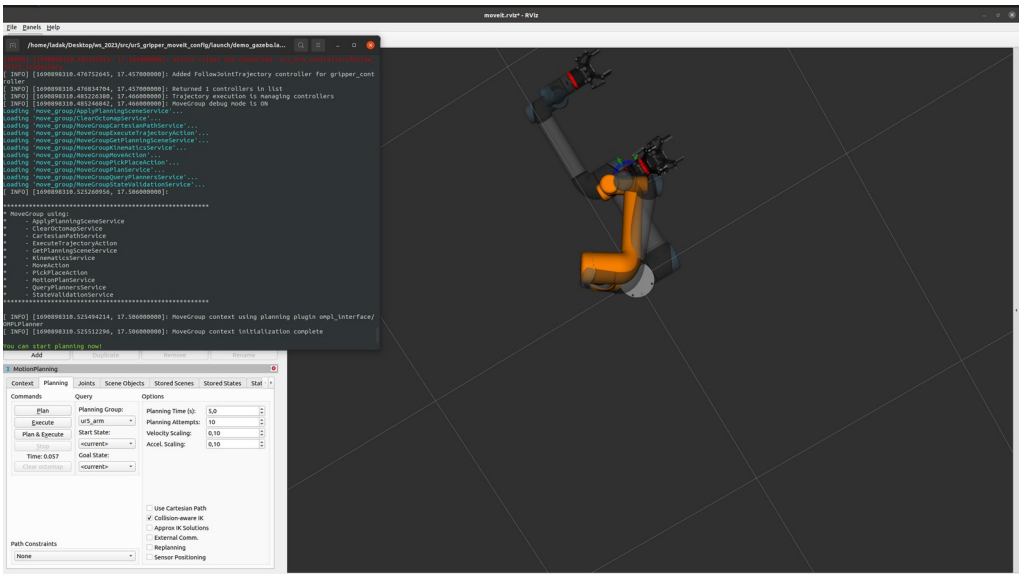
+ **roslaunch ur5_moveit_config ur5_moveit_planning_execution.launch limited:=true**

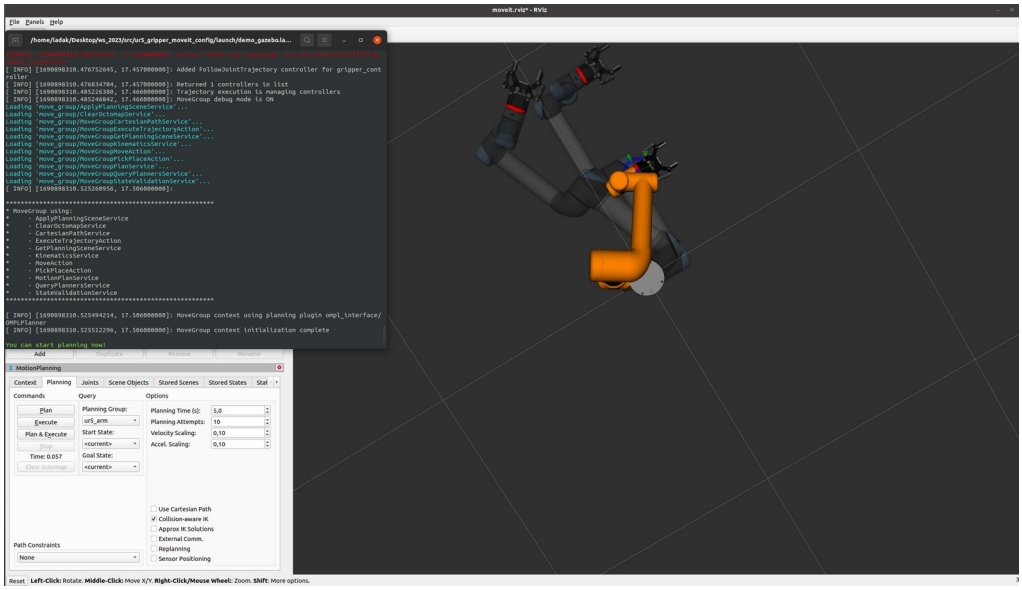
---

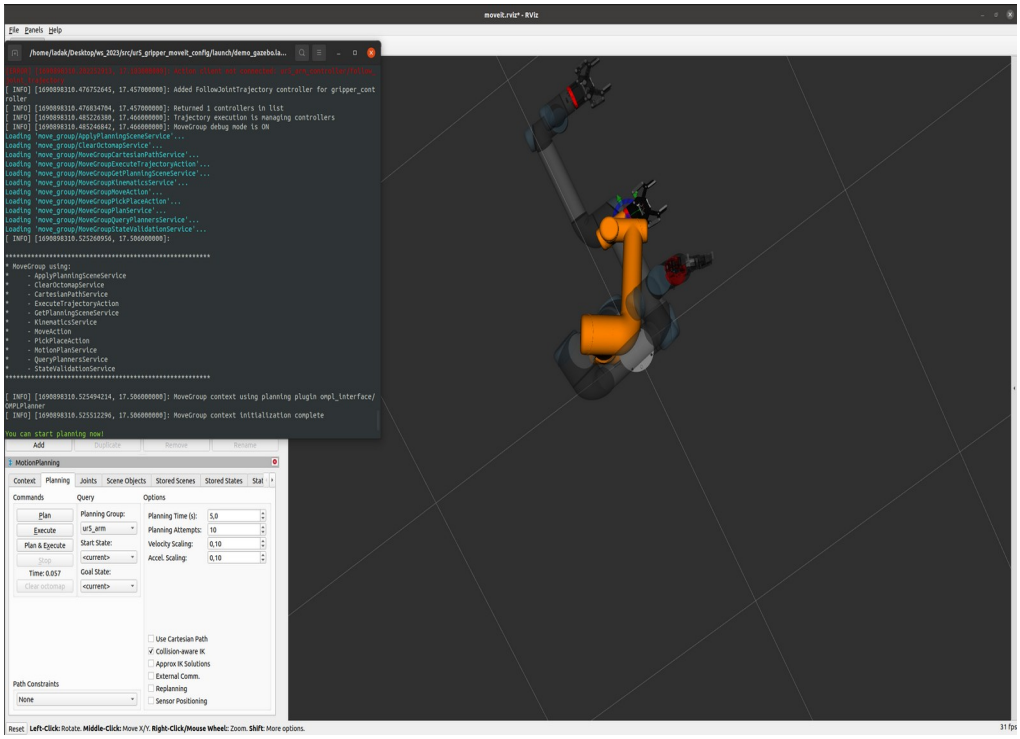
https://roboticscasual.com/ros-tutorial-how-to-create-a-moveit-config-for-the-ur5-and-a-gripper/#quickstart-moveit-config

- there is few errors but I can now manually move the arm in rViz:

roslaunch ur5_gripper_moveit_config demo_gazebo.launch


moveit.rviz* - RViz
File Panels Help
/home/ladak/Desktop/ws_2023/src/ur5_gripper_moveit_config/launch/demo_gazebo.la...
[INFO] [1690898310.476752645, 17.457000000]: Added FollowJointTrajectory controller for gripper_cont
roller
[INFO] [1690898310.476834704, 17.457000000]: Returned 1 controllers in list
[INFO] [1690898310.485226388, 17.466000000]: Trajectory execution is managing controllers
[INFO] [1690898310.485246842, 17.466000000]: MoveGroup debug mode is ON
Loading 'move_group/ApplyPlanningSceneService'...
Loading 'move_group/ClearOctomapService'...
Loading 'move_group/MoveGroupCartesianPathService'...
Loading 'move_group/MoveGroupExecuteTrajectoryAction'...
Loading 'move_group/MoveGroupGetPlanningSceneService'...
Loading 'move_group/MoveGroupKinematicsService'...
Loading 'move_group/MoveGroupMoveAction'...
Loading 'move_group/MoveGroupPickPlaceAction'...
Loading 'move_group/MoveGroupPlanService'...
Loading 'move_group/MoveGroupQueryPlannersService'...
Loading 'move_group/MoveGroupStateValidationService'...
[INFO] [1690898310.525260956, 17.506000000]:
****
* MoveGroup using:
*   - ApplyPlanningSceneService
*   - ClearOctomapService
*   - CartesianPathService
*   - ExecuteTrajectoryAction
*   - GetPlanningSceneService
*   - KinematicsService
*   - MoveAction
*   - PickPlaceAction
*   - MotionPlanService
*   - QueryPlannersService
*   - StateValidationService
****
[INFO] [1690898310.525494214, 17.506000000]: MoveGroup context using planning plugin ompl_interface/
OMPLPlanner
[INFO] [1690898310.525512296, 17.506000000]: MoveGroup context initialization complete
You can start planning now!
Add
Duplicate
Remove
Rename
MotionPlanning
Context
Planning
Joints
Scene Objects
Stored Scenes
Stored States
Stat
Commands
Plan
Execute
Plan & Execute
Stop
Time: 0.057
Clear octomap
Query
Planning Group:
ur5_arm
Start State:
<current>
Goal State:
<current>
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


moveit.rviz* - RViz
File Panels Help
/home/ladak/Desktop/ws_2023/src/ur5_gripper_moveit_config/launch/demo_gazebo.la...
[INFO] [1690898310.476752645, 17.457000000]: Added FollowJointTrajectory controller for gripper_cont
roller
[INFO] [1690898310.476834704, 17.457000000]: Returned 1 controllers in list
[INFO] [1690898310.485226388, 17.466000000]: Trajectory execution is managing controllers
[INFO] [1690898310.485246842, 17.466000000]: MoveGroup debug mode is ON
Loading 'move_group/ApplyPlanningSceneService'...
Loading 'move_group/ClearOctomapService'...
Loading 'move_group/MoveGroupCartesianPathService'...
Loading 'move_group/MoveGroupExecuteTrajectoryAction'...
Loading 'move_group/MoveGroupGetPlanningSceneService'...
Loading 'move_group/MoveGroupKinematicsService'...
Loading 'move_group/MoveGroupMoveAction'...
Loading 'move_group/MoveGroupPickPlaceAction'...
Loading 'move_group/MoveGroupPlanService'...
Loading 'move_group/MoveGroupQueryPlannersService'...
Loading 'move_group/MoveGroupStateValidationService'...
[INFO] [1690898310.525260956, 17.506000000]:
****
* MoveGroup using:
*   - ApplyPlanningSceneService
*   - ClearOctomapService
*   - CartesianPathService
*   - ExecuteTrajectoryAction
*   - GetPlanningSceneService
*   - KinematicsService
*   - MoveAction
*   - PickPlaceAction
*   - MotionPlanService
*   - QueryPlannersService
*   - StateValidationService
****
[INFO] [1690898310.525494214, 17.506000000]: MoveGroup context using planning plugin ompl_interface/
OMPLPlanner
[INFO] [1690898310.525512296, 17.506000000]: MoveGroup context initialization complete
You can start planning now!
Add
Duplicate
Remove
Rename
MotionPlanning
Context
Planning
Joints
Scene Objects
Stored Scenes
Stored States
Stat
Commands
Plan
Execute
Plan & Execute
Stop
Time: 0.057
Clear octomap
Query
Planning Group:
ur5_arm
Start State:
<current>
Goal State:
<current>
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
Left-Click: Rotate. Middle-Click: Move X/Y. Right-Click/Mouse Wheel: Zoom. Shift: More options.
3


moveit.rviz* - RViz
File Panels Help
/home/ladak/Desktop/ws_2023/src/ur5_gripper_moveit_config/launch/demo_gazebo.la...
[INFO] [1690898310.476752645, 17.457000000]: Added FollowJointTrajectory controller for gripper_cont
roller
[INFO] [1690898310.476834704, 17.457000000]: Returned 1 controllers in list
[INFO] [1690898310.485226388, 17.466000000]: Trajectory execution is managing controllers
[INFO] [1690898310.485246842, 17.466000000]: MoveGroup debug mode is ON
Loading 'move_group/ApplyPlanningSceneService'...
Loading 'move_group/ClearOctomapService'...
Loading 'move_group/MoveGroupCartesianPathService'...
Loading 'move_group/MoveGroupExecuteTrajectoryAction'...
Loading 'move_group/MoveGroupGetPlanningSceneService'...
Loading 'move_group/MoveGroupKinematicsService'...
Loading 'move_group/MoveGroupMoveAction'...
Loading 'move_group/MoveGroupPickPlaceAction'...
Loading 'move_group/MoveGroupPlanService'...
Loading 'move_group/MoveGroupQueryPlannersService'...
Loading 'move_group/MoveGroupStateValidationService'...
[INFO] [1690898310.525260956, 17.506000000]:
****
* MoveGroup using:
*   - ApplyPlanningSceneService
*   - ClearOctomapService
*   - CartesianPathService
*   - ExecuteTrajectoryAction
*   - GetPlanningSceneService
*   - KinematicsService
*   - MoveAction
*   - PickPlaceAction
*   - MotionPlanService
*   - QueryPlannersService
*   - StateValidationService
****
[INFO] [1690898310.525494214, 17.506000000]: MoveGroup context using planning plugin ompl_interface/
OMPLPlanner
[INFO] [1690898310.525512296, 17.506000000]: MoveGroup context initialization complete
You can start planning now!
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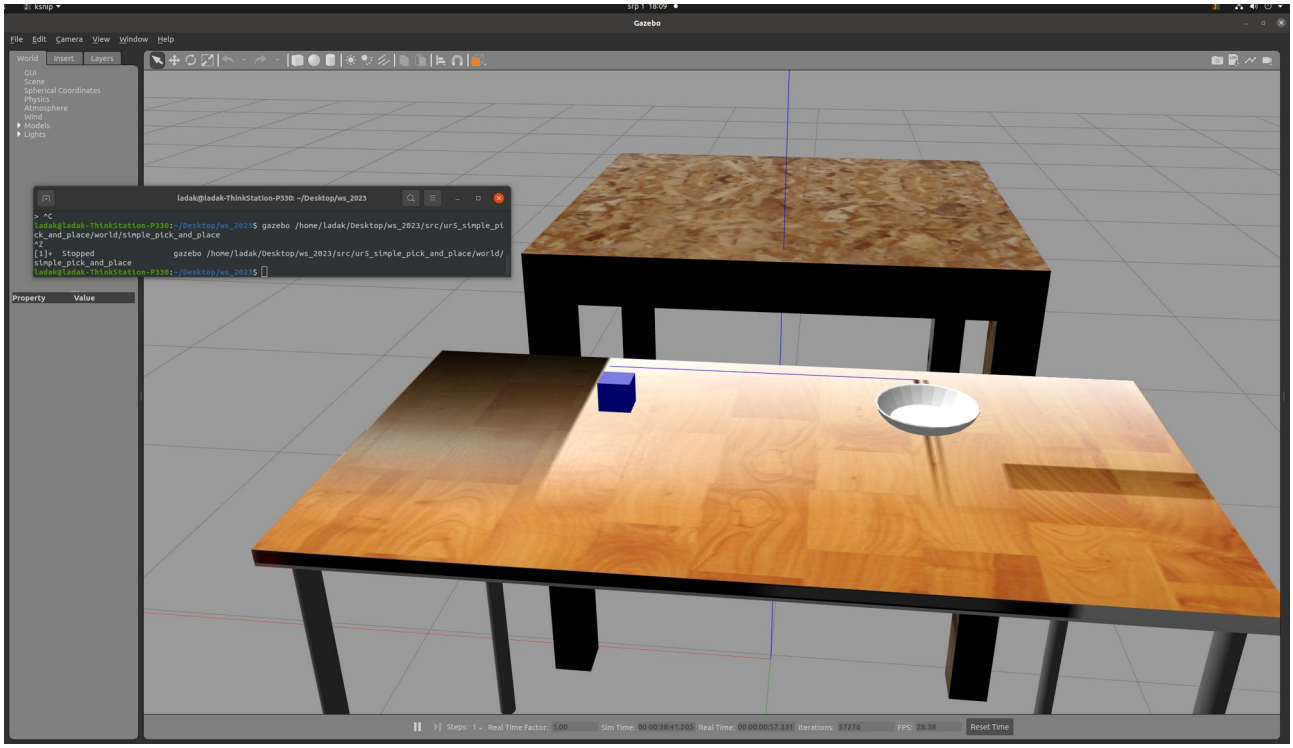
Duplicate
Remove
Rename
MotionPlanning
Context
Planning
Joints
Scene Objects
Stored Scenes
Stored States
Stat
Commands
Plan
Execute
Plan & Execute
Stop
Time: 0.057
Clear octomap
Query
Planning Group:
ur5_arm
Start State:
<current>
Goal State:
<current>
Options
Planning Time (s):
5,0
Planning Attempts:
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
Left-Click: Rotate. Middle-Click: Move X/Y. Right-Click/Mouse Wheel: Zoom. Shift: More options.
31 fps

ROS Tutorial: Pick and Place task with the Moveit C++ interface

https://roboticscasual.com/ros-tutorial-pick-and-place-task-with-the-moveit-c-interface/



7.8.2023

Another try: MoveIt_Tutorial

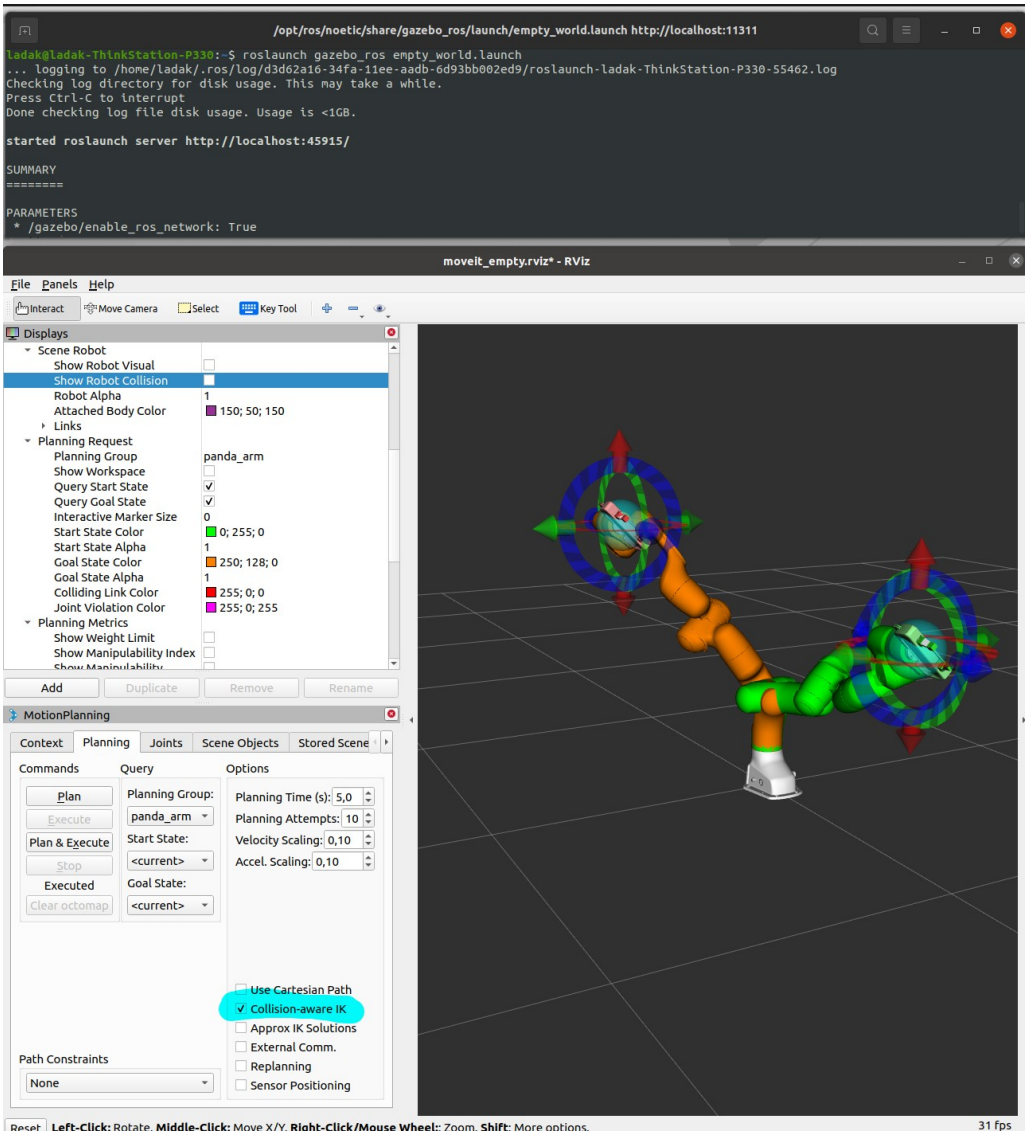
1. Getting started - OK

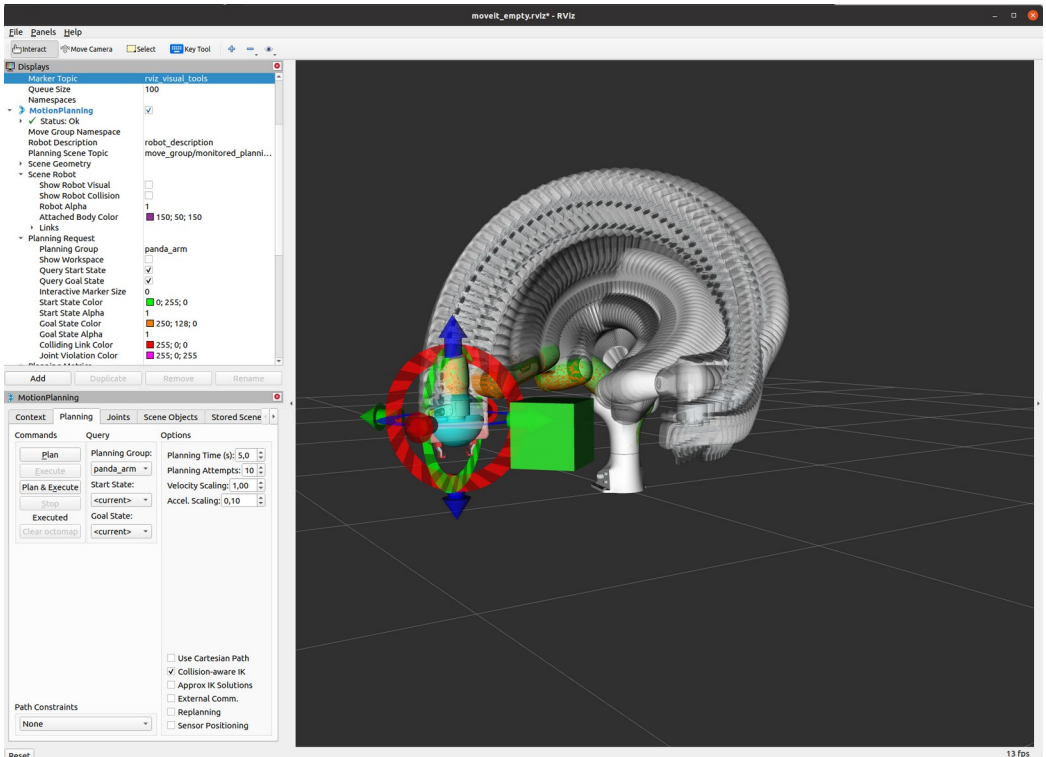
https://ros-planning.github.io/moveit_tutorials/doc/getting_started/getting_started.html

2. rViz with Panda arm – OK

https://ros-planning.github.io/moveit_tutorials/doc/quickstart_in_rviz/quickstart_in_rviz_tutorial.html

The “Use Collision-Aware IK” checkbox found within the MotionPlanning plugin under the Planning tab allows you to toggle the behavior of the IK solver. When the checkbox is ticked, the solver will keep attempting to find a collision-free solution for the desired end-effector pose.





16.08.2023

https://ros-planning.github.io/moveit_tutorials/doc/quickstart_in_rviz/quickstart_in_rviz_tutorial.html – OK with panda configuration

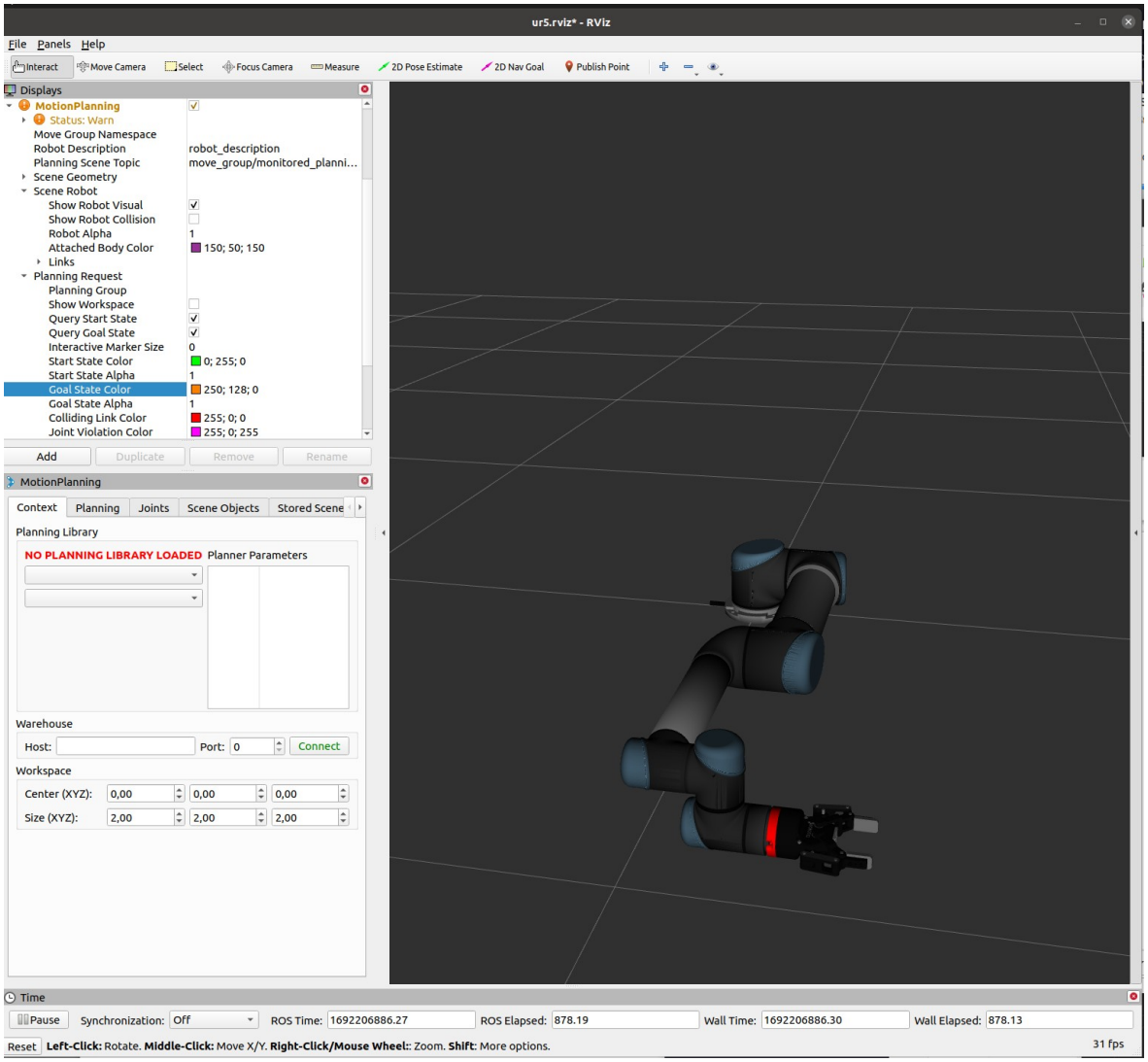
UR5 with gripper:
Visualization in rViz and gazebo

https://github.com/utecrobotics/ur5

- cloned robotiq (removed robotiq_gazebo) and ur5;

- replaced type ‘state_publisher’ by ‘robot_state_publisher’

1. roslaunch ur5_description display_with_gripper.launch



2. roslaunch ur5_gazebo ur5_cubes.launch

- some warnings and errors as:

[WARN] [1692207424.389240714]: Deprecated syntax, please prepend 'hardware_interface/' to 'PositionJointInterface' within the <hardwareInterface> tag in joint 'shoulder_pan_joint'.

[ERROR] [1692207424.390017465]: No p gain specified for pid. Namespace: /gazebo_ros_control/pid_gains/shoulder_pan_joint