PICKNIK

Retro ROS 2 Launch

Remember XML files?

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Tyler Weaver

PICKNIK

- Racing Kart Driver
- MoveIt Maintainer
- Rust Evangelist
- Docker Skeptic

Comfort Zone: ROS 1 Launch

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```
<launch>
  <arg name="pipeline" default="ompl" />
  <arg name="capabilities" default=""/>

  <node name="move_group" pkg="moveit_ros_move_group" type="move_group"
    output="screen">
    <param name="default_planning_pipeline" value="$(arg pipeline)" />
    <param name="capabilities" value="$(arg capabilities)" />
  </node>
</launch>
```

The launch we have at home

```python
import os
from launch import LaunchDescription
from launch.actions import DeclareLaunchArgument, OpaqueFunction
from launch.substitutions import LaunchConfiguration, PathJoinSubstitution
from launch.conditions import IfCondition, UnlessCondition
from launch_ros.actions import Node
from launch_ros.substitutions import FindPackageShare
from launch.actions import ExecuteProcess
from ament_index_python.packages import get_package_share_directory
from moveit_configs_utils import MoveItConfigsBuilder


def generate_launch_description():
    declared_arguments = []
    declared_arguments.append(
        DeclareLaunchArgument("rviz_config",
            default_value="kinova_moveit_config_demo.rviz",
            description="RViz configuration file",
        )
    )
    return LaunchDescription(declared_arguments + [OpaqueFunction(function=launch_setup)])


def launch_setup(context, *args, **kwargs):
    launch_arguments = {
        "robot_ip": "xxx.yyy.zzz.www",
        "use_fake_hardware": "true",
        "gripper": "robotiq_2f_85",
        "dof": "7",
    }

    moveit_config = (
        MoveItConfigsBuilder("gen3", package_name="kinova_gen3_7dof_robotiq_2f_85_moveit_config")
        .robot_description(mappings=launch_arguments)
        .trajectory_execution(file_path="config/moveit_controllers.yaml")
        .planning_scene_monitor(publish_robot_description=True, publish_robot_description_semantic=True)
        .planning_pipelines(pipelines=["ompl", "stomp", "pilz_industrial_motion_planner"])
        .to_moveit_configs()
    )
```

```python
    # Start the actual move_group node/action server
    run_move_group_node = Node(
        package="moveit_ros_move_group",
        executable="move_group",
        output="screen",
        parameters=[moveit_config.to_dict()],
    )

    rviz_base = LaunchConfiguration("rviz_config")
    rviz_config = PathJoinSubstitution([FindPackageShare("moveit2_tutorials"), "launch", rviz_b

    # RViz
    rviz_node = Node(
        package="rviz2",
        executable="rviz2",
        name="rviz2",
        output="log",
        arguments=["-d", rviz_config],
        parameters=[
            moveit_config.robot_description,
            moveit_config.robot_description_semantic,
            moveit_config.robot_description_kinematics,
            moveit_config.planning_pipelines,
            moveit_config.joint_limits,
        ],
    )

    # Static TF
    static_tf = Node(
        package="tf2_ros",
        executable="static_transform_publisher",
        name="static_transform_publisher",
        output="log",
        arguments=["--frame-id", "world", "--child-frame-id", "base_link"],
    )

    # Publish TF
    robot_state_publisher = Node(
        package="robot_state_publisher",
        executable="robot_state_publisher",
        name="robot_state_publisher",
        output="both",
        parameters=[moveit_config.robot_description],
    )

    nodes_to_start = [
        rviz_node,
        static_tf,
        robot_state_publisher,
        run_move_group_node
    ]

    return nodes_to_start
```

The launch she never told you about

PICKNIK

```
<launch>
  <arg name="robot_ip" default="xxx.yyy.zzz.www" />
  <arg name="use_fake_hardware" default="true" />
  <arg name="gripper" default="robotiq_2f_85" />
  <arg name="dof" default="7" />

  <let name="robot_description" value="$(command 'xacro $(find-pkg-share kortex_description)/robots/gen3
  <let name="robot_description_semantic" value="$(command 'xacro $(find-pkg-share kinova_gen3_7dof_robot

  <!-- MoveGroup -->
  <node pkg="moveit_ros_move_group" exec="move_group" output="screen">
    <param name="robot_description" value="$(var robot_description)" type="str" />
    <param name="robot_description_semantic" value="$(var robot_description_semantic)" type="str" />
    <param from="$(find-pkg-share easy_launch_demo)/config/moveit.yaml" />
  </node>

  <!-- RViz -->
  <node pkg="rviz2" exec="rviz2" name="rviz2" output="log" args="-d $(find-pkg-share moveit2_tutorials)/
    <param name="robot_description" value="$(var robot_description)" type="str" />
    <param name="robot_description_semantic" value="$(var robot_description_semantic)" type="str" />
    <param from="$(find-pkg-share easy_launch_demo)/config/moveit.yaml" />
  </node>

  <!-- Static TF -->
  <node pkg="tf2_ros" exec="static_transform_publisher" name="static_transform_publisher" output="log"
    args="--frame-id world --child-frame-id base_link" />
```

The launch she never told you about

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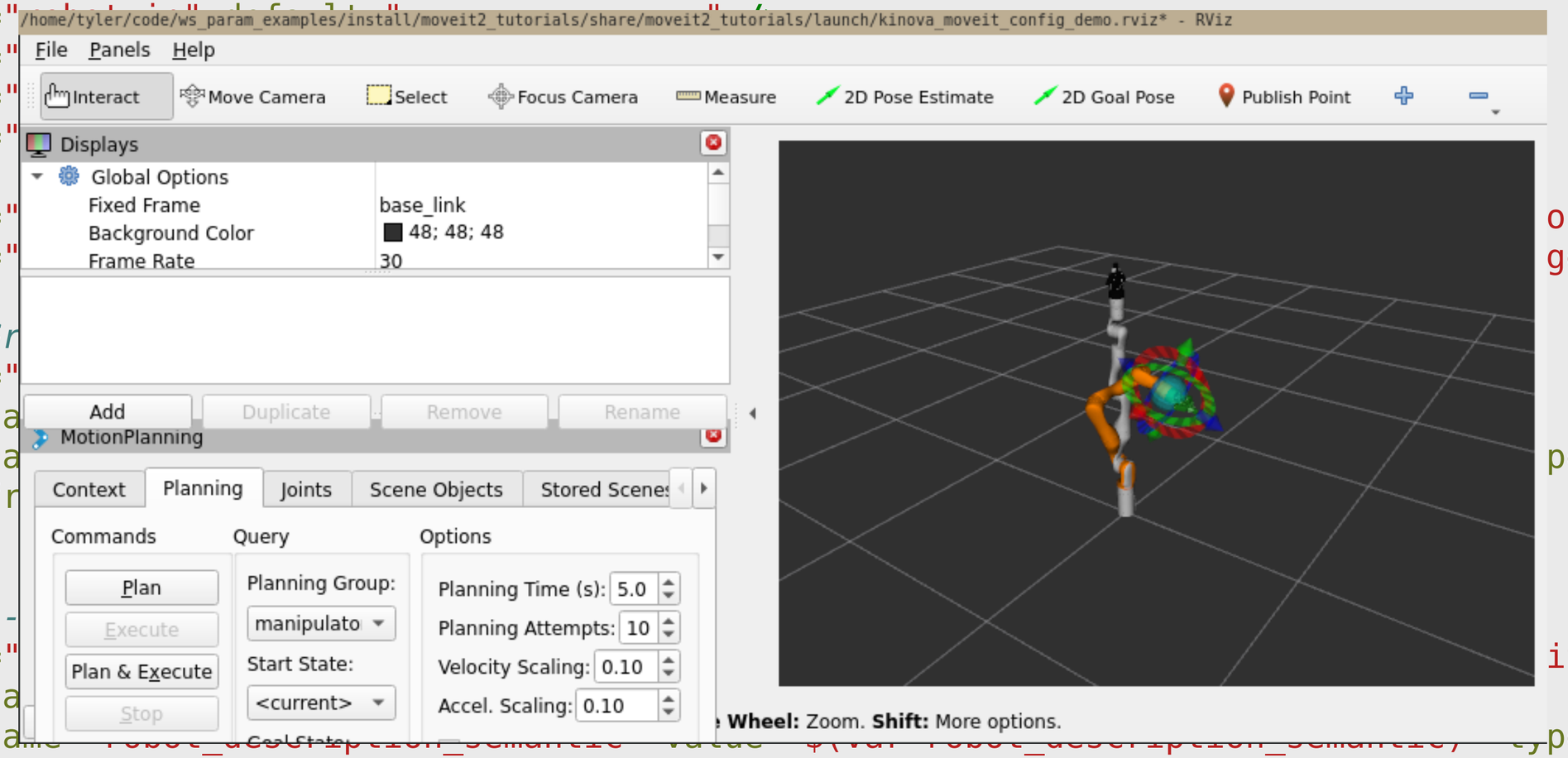
```
<launch>
  <arg name="
  <arg name="
  <arg name="
  <arg name="

  <let name="
  <let name="

  <!-- MoveGr
  <node pkg="
    <param na
    <param na
    <param fr
  </node>

  <!-- RViz -
  <node pkg="
    <param na
    <param name="robot_description_semantic" value="$(var robot_description_semantic)" type="str" />
    <param from="$(find-pkg-share easy_launch_demo)/config/moveit.yaml" />
  </node>

  <!-- Static TF -->
  <node pkg="tf2_ros" exec="static_transform_publisher" name="static_transform_publisher" output="log"
    args="--frame-id world --child-frame-id base_link" />
```



Better Place: ROS 2 XML Launch

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- Launch MoveIt with **43** lines of XML vs **~1000** lines of Python
- Single moveit.yaml config for MoveIt
- Try it yourself: tylerjw.dev/posts/xml-launch