ROS Industrial

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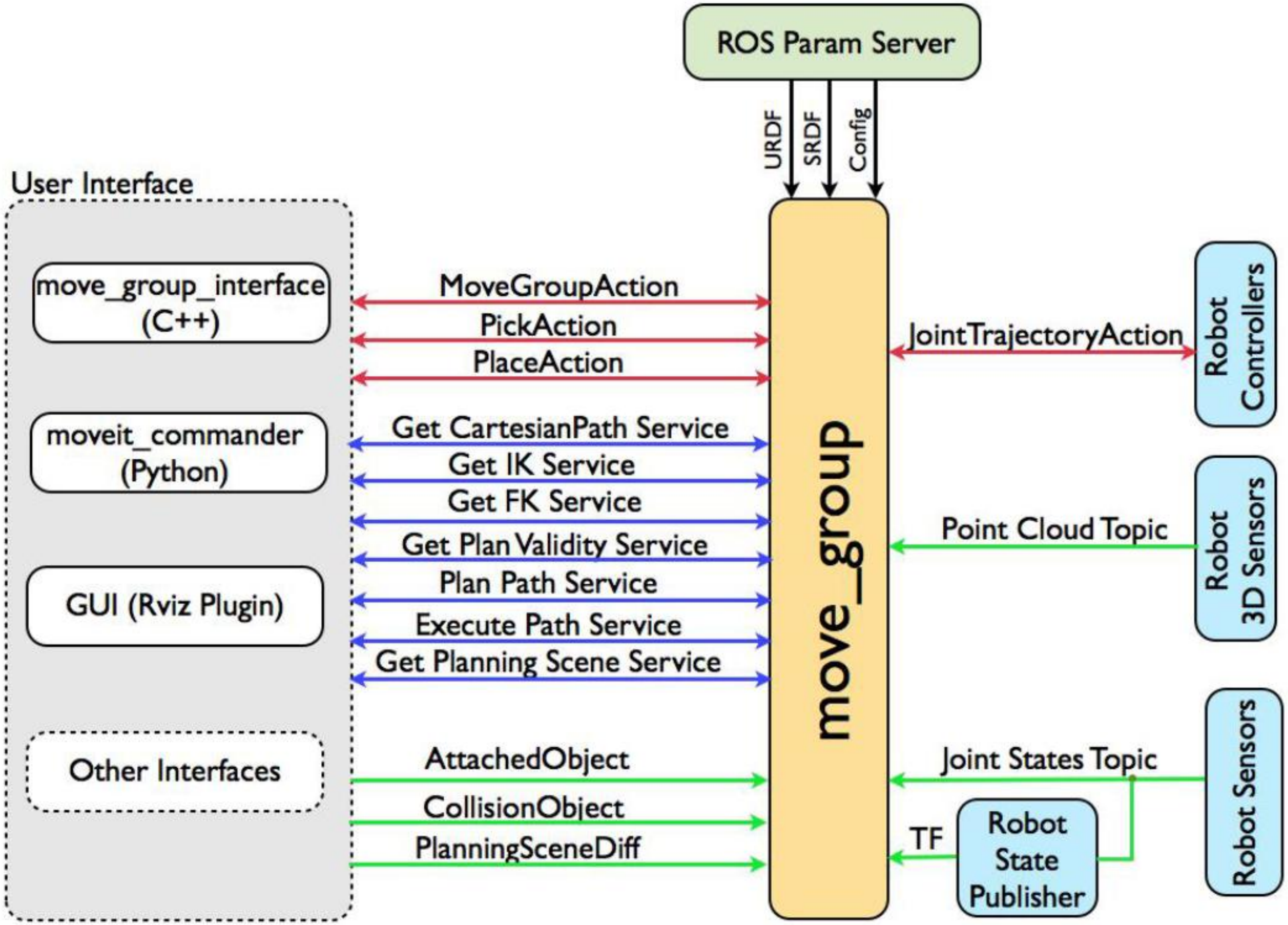
ECNU Intelligent Robot Lab

MoveIt!: Overview

- Motion Planning for industrial robot



ROS Param Server

URDF

SRDF

Config

move_group

User Interface

move_group_interface (C++)

moveit_commander (Python)

GUI (Rviz Plugin)

Other Interfaces

MoveGroupAction

PickAction

PlaceAction

Get CartesianPath Service

Get IK Service

Get FK Service

Get Plan Validity Service

Plan Path Service

Execute Path Service

Get Planning Scene Service

AttachedObject

CollisionObject

PlanningSceneDiff

JointTrajectoryAction

Robot Controllers

Point Cloud Topic

Robot 3D Sensors

Joint States Topic

Robot Sensors

TF

Robot State Publisher

HowTo:

Set Up a New Robot

1. Create a URDF
2. Create a MoveIt! Package
3. Update MoveIt! Package for ROS-I
4. Test on ROS-I Simulator
5. Test on “Real” Robot

Model

- ROS packages for robot modeling
  - robot_model:
    - urdf
    - joint_state_publisher

  - robot_state_publisher
  - xacro

URDF: Example

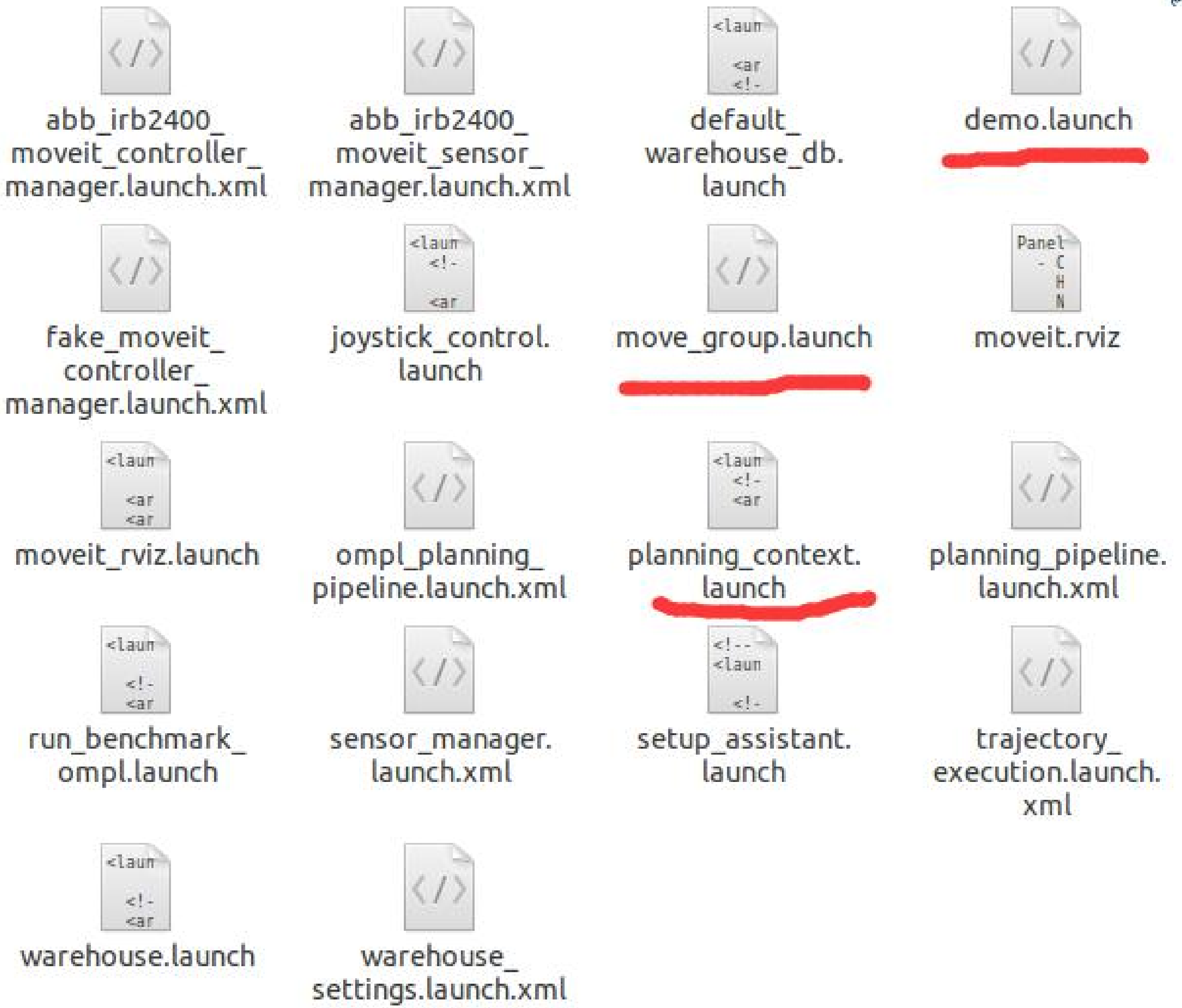
- ABB + gripper + workpiece
  - $ roslaunch lesson_xacro lesson_xacro.launch
- Keyboard Control
  - modify launch file

MoveIt! Package

- Launch the MoveIt Setup Assistant

- Setup Assistant generates a *generic* package

MoveIt! Package



abb_irb2400_moveit_controller_manager.launch.xml
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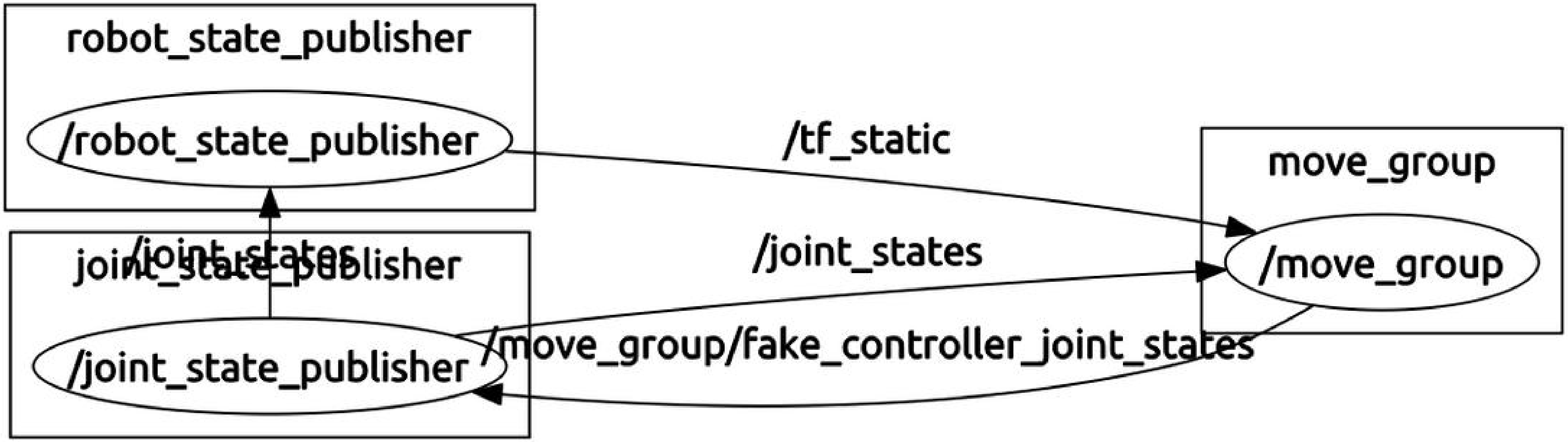
default_warehouse_db.launch
demo.launch
fake_moveit_controller_manager.launch.xml
joystick_control.launch
move_group.launch
moveit.rviz
moveit_rviz.launch
ompl_planning_pipeline.launch.xml
planning_context.launch
planning_pipeline.launch.xml
run_benchmark_ompl.launch
sensor_manager.launch.xml
setup_assistant.launch
trajectory_execution.launch.xml
warehouse.launch
warehouse_settings.launch.xml

MoveIt!

roslaunch demo.launch


robot_state_publisher
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/tf_static
move_group
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joint_state_publisher
/joint_states
/joint_states
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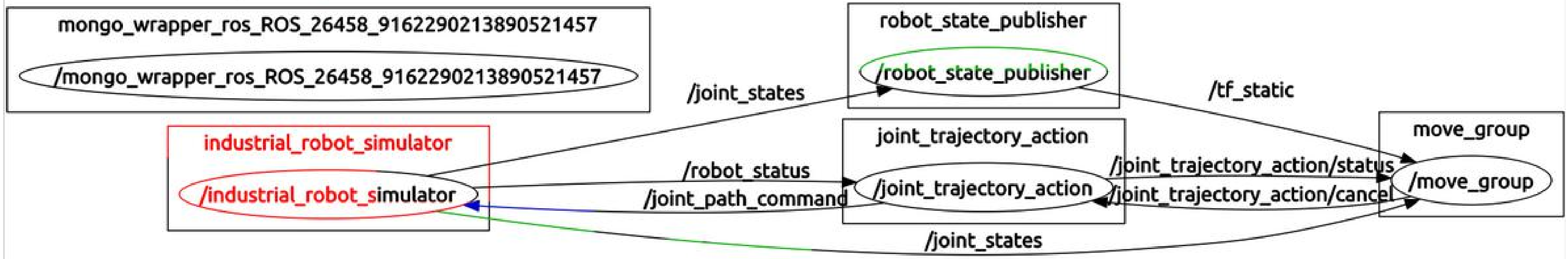
/move_group/fake_controller_joint_states

roslaunch moveit_planning_execution.launch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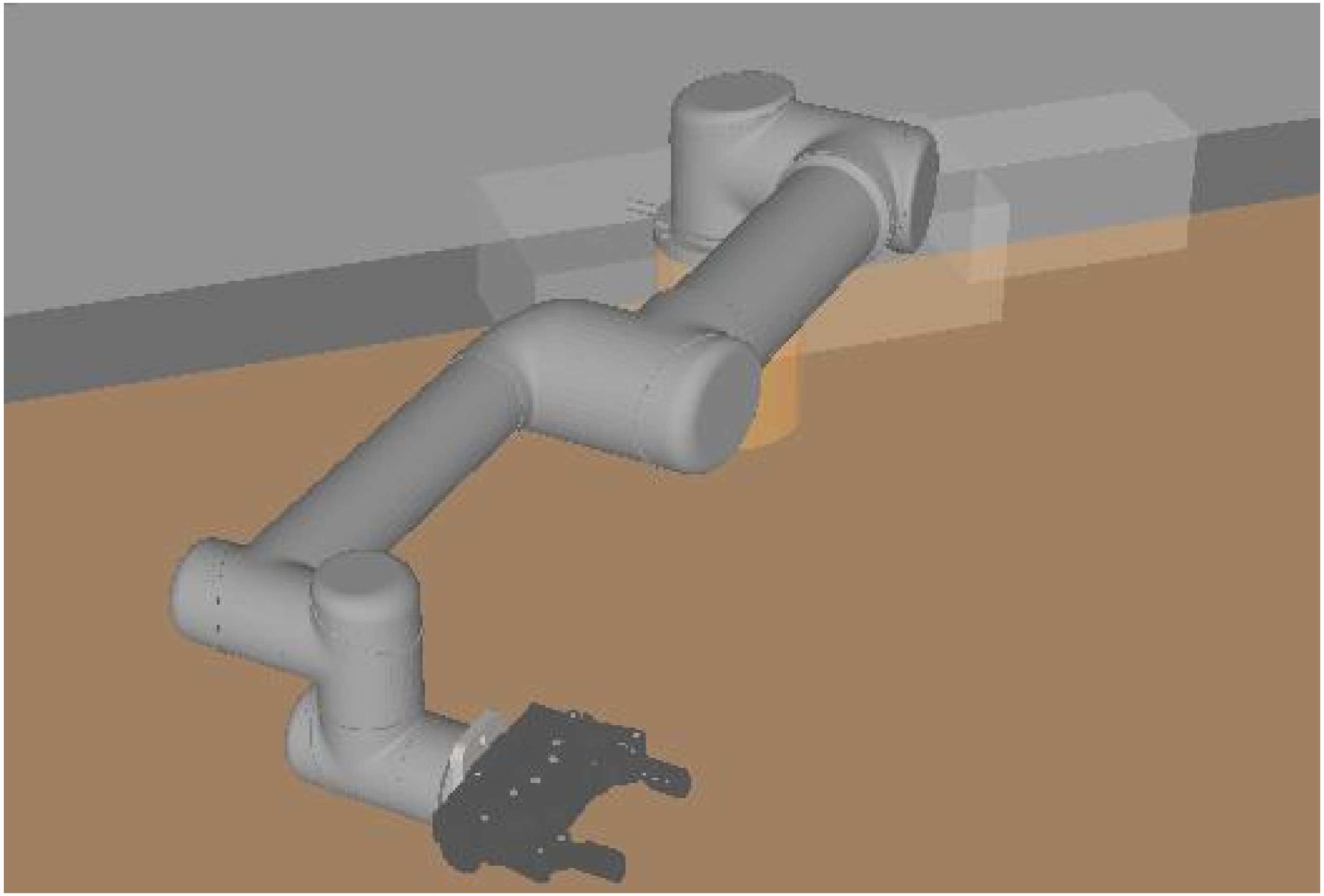
/joint_path_command
joint_trajectory_action
/joint_trajectory_action
/joint_trajectory_action/status
/joint_trajectory_action/cancel
move_group
/move_group
/joint_states

Motion Planning using C++

- $ roslaunch irb2400_moveit_cfg moveit_planning_execution.launch
- $ rosrun lesson_move_group lesson_move_group_1



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