



Preparations: Hands-on #1

ROS.org



Handling ROS Tutorial

Introductory tutorial to ROS and its use for robot in-hand manipulation

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1. Summary

Attendees should follow these guidelines before the start of Hands-on #1 Session. In this session, attendees will interface with a specific SQL database, containing 3D models of a set of common household objects. A local database will be used because it can be modified, whereas the database hosted at Willow Garage has remote read-only access.

Please make sure that you preinstall the required modules and dependencies on your machine. See below sections.

2. The Database

The database has been created for IROS ST2 Tutorial, using the SQL database from household_objects_database package as starting point:

http://www.ros.org/wiki/household_objects_database

For a detailed description of the database itself as a SQL entity, its schema, the data that is contains and the design decisions, see the household objects website:

<http://www.ros.org/wiki/household%20objects>

3. Download the source code

The code **has been tested** using ROS **Electric** and **Ubuntu** 11.10, thus it has not been tested against the Fuerte distribution of ROS yet.

You should download and install all the following modules:

```
$ sudo apt-get install ros-electric-object-manipulation
```

ROS nodes iros_st2_database and iros_st2_database_msgs from the website:

<http://mrl.isr.uc.pt/events/iros2012tutorial/#downloads>

3.1. Setup

Add the modules path to the `ROS_PACKAGE_PATH` environment variable if necessary.

4. Compile the modules

For Electric:

```
$ rosmake --rosdep-install ros-electric-object-manipulation
$ rosmake --rosdep-install iros_st2_database_msgs
$ rosmake --rosdep-install iros_st2_database
```

5. Install the database on your local machine

You must install a PostgreSQL 9.* server on your machine. You can find the tutorial here:

http://www.ros.org/wiki/sql_database/Tutorials/Installing%20a%20PostgreSQL%20Server

Note: Although that tutorial is for PostgreSQL 8.4, please install a PostgreSQL 9.* server because the .backup has been dumped from a PostgreSQL server 9.x version. In case you need to restore the .backup to an older server running a 8.x version and you would get an error, you could solve the problem following these instructions: <http://softlabpro.blogspot.com.es/2011/05/postgresql-restore-9x-backup-in-8x.html>

5.1. Database Creation and restore the database

You should create a database and install database backup file on that local database server. You can find the database backup file (iros_st2_objects_database.backup) in the path of `.../iros_st2_objects_database/config/`, thus:

1. Start **pgadmin3**, then log into your PostgreSQL server.
2. In the server drop-down list, right-click Databases and choose New Database.
3. In the dialog menu that appears, set the desired name, `iros_st2_objects_database`, for your database and click OK.
4. Right-click your newly created database and click Restore.

5. Point the dialog to the downloaded backup file and click OK.
6. Wait for the restoration to finish, and then close the dialog.

5.2. Modify the parameter file for the connection with your local database server

You should now point the ROS wrapper node for the database at your newly created database. The ROS node wrapper provides some of the most common database queries as ROS services. It requires the following node parameters on startup to establish a connection with the database server:

- ⤴ `/household_objects_database/database_host`: the address of the database server
- ⤴ `/household_objects_database/database_port`: the port to establish the connection on
- ⤴ `/household_objects_database/database_user`: the database username
- ⤴ `/household_objects_database/database_password`: the password for the database username
- ⤴ `/household_objects_database/database_name`: the name of the database to connect to

Default settings:

- ⤴ `household_objects_database`:
- ⤴ `database_host`: `localhost`
- ⤴ `database_port`: `5432`
- ⤴ `database_user`: `willow`
- ⤴ `database_pass`: `willow`
- ⤴ `database_name`: `iros_st2_objects_database`

If you changed the default settings, you should modify the parameter file replacing the values with the correct ones for your system:

```
iros_st2_database/config/iros_st2_database_server.yaml
```

To start the database wrapper node, we provide the launch file which uses those parameters in `iros_st2_database/launch/iros_st2_database_server.launch`.

5.3. Modify the model_root

For working with the local database, you should update the `model_root` (entry in the "variables" tab) because it is used to define a base path that all paths in the `file_path` table are relative to. Thus, the path `../iros_st2_database/database` is the `MODEL_ROOT` variable. For updating the `MODEL_ROOT` entry in the variables tab:

7. Open pgadmin3 and connect to the server.
8. See the list of the tables: Schemas-->public-->Tables
9. In variable table, right-click: View Data-->View All Rows
10. In the field `variable_value` text (third column): write your path (for example: `/home/handle/ros/irost2_database/database`).