ROS Indigo Cheatsheet

Filesystem Management Tools

`rospack`	A tool for inspecting packages.
`rospack profile`	Fixes path and pluginlib problems.
`roscd`	Change directory to a package.
`rospd/rosd`	Pushd equivalent for ROS.
`rosls`	Lists package or stack information.
`rosed`	Open requested ROS file in a text editor.
`roscp`	Copy a file from one place to another.
`rosdep`	Installs package system dependencies.
`roswtf`	Displays a errors and warnings about a running ROS system or launch file.
`catkin_create_pkg`	Creates a new ROS stack.
`wstool`	Manage many repos in workspace.
`catkin_make`	Builds a ROS catkin workspace.
`rqt_dep`	Displays package structure and dependencies.

Usage:
```
$ rospack find [package]
$ roscd [package[/subdir]]
$ rospd [package[/subdir] | +N | -N]
$ rosd
$ rosls [package[/subdir]]
$ rosed [package] [file]
$ roscp [package] [file] [destination]
$ rosdep install [package]
$ roswtf or roswtf [file]
$ catkin_create_pkg [package_name] [depend1]..[dependN]
$ wstool [init | set | update]
$ catkin_make
$ rqt_dep [options]
```

Start-up and Process Launch Tools

roscore

The basis nodes and programs for ROS-based systems. A roscore must be running for ROS nodes to communicate.

Usage:
```
$ roscore
```

rosrun

Runs a ROS package's executable with minimal typing.

Usage:
```
$ rosrun package_name executable_name
```

Example (runs turtlesim):
```
$ rosrun turtlesim turtlesim_node
```

roslaunch

Starts a roscore (if needed), local nodes, remote nodes via SSH, and sets parameter server parameters.

Examples:

Launch a file in a package:
```
$ roslaunch package_name file_name.launch
```
Launch on a different port:
```
$ roslaunch -p 1234 package_name file_name.launch
```
Launch on the local nodes:
```
$ roslaunch --local package_name file_name.launch
```

Logging Tools

rosbag

A set of tools for recording and playing back of ROS topics.

Commands:

`rosbag record`	Record a bag file with specified topics.
`rosbag play`	Play content of one or more bag files.
`rosbag compress`	Compress one or more bag files.
`rosbag decompress`	Decompress one or more bag files.
`rosbag filter`	Filter the contents of the bag.

Examples:

Record select topics:
```
$ rosbag record topic1 topic2
```
Replay all messages without waiting:
```
$ rosbag play -a demo_log.bag
```
Replay several bag files at once:
```
$ rosbag play demo1.bag demo2.bag
```

Introspection and Command Tools

rosmsg/rossrv

Displays Message/Service (msg/srv) data structure definitions.

Commands:

`rosmsg show`	Display the fields in the msg/srv.
`rosmsg list`	Display names of all msg/srv.
`rosmsg md5`	Display the msg/srv md5 sum.
`rosmsg package`	List all the msg/srv in a package.
`rosmsg packages`	List all packages containing the msg/srv.

Examples:

Display the Pose msg:
```
$ rosmsg show Pose
```
List the messages in the nav_msgs package:
```
$ rosmsg package nav_msgs
```
List the packages using sensor_msgs/CameraInfo:
```
$ rosmsg packages sensor_msgs/CameraInfo
```

rosnode

Displays debugging information about ROS nodes, including publications, subscriptions and connections.

Commands:

`rosnode ping`	Test connectivity to node.
`rosnode list`	List active nodes.
`rosnode info`	Print information about a node.
`rosnode machine`	List nodes running on a machine.
`rosnode kill`	Kill a running node.

Examples:

Kill all nodes:
```
$ rosnode kill -a
```
List nodes on a machine:
```
$ rosnode machine aqy.local
```
Ping all nodes:
```
$ rosnode ping --all
```

rostopic

A tool for displaying information about ROS topics, including publishers, subscribers, publishing rate, and messages.

Commands:

`rostopic bw`	Display bandwidth used by topic.
`rostopic echo`	Print messages to screen.
`rostopic find`	Find topics by type.
`rostopic hz`	Display publishing rate of topic.
`rostopic info`	Print information about an active topic.
`rostopic list`	List all published topics.
`rostopic pub`	Publish data to topic.
`rostopic type`	Print topic type.

Examples:

Publish hello at 10 Hz:
```
$ rostopic pub -r 10 /topic_name std_msgs/String hello
```
Clear the screen after each message is published:
```
$ rostopic echo -c /topic_name
```
Display messages that match a given Python expression:
```
$ rostopic echo --filter "m.data=='foo'" /topic_name
```
Pipe the output of rostopic to rosmsg to view the msg type:
```
$ rostopic type /topic_name | rosmsg show
```

rosparam

A tool for getting and setting ROS parameters on the parameter server using YAML-encoded files.

Commands:

`rosparam set`	Set a parameter.
`rosparam get`	Get a parameter.
`rosparam load`	Load parameters from a file.
`rosparam dump`	Dump parameters to a file.
`rosparam delete`	Delete a parameter.
`rosparam list`	List parameter names.

Examples:

List all the parameters in a namespace:
```
$ rosparam list /namespace
```
Setting a list with one as a string, integer, and float:
```
$ rosparam set /foo "['1', 1, 1.0]"
```
Dump only the parameters in a specific namespace to file:
```
$ rosparam dump dump.yaml /namespace
```

rosservice

A tool for listing and querying ROS services.

Commands:

`rosservice list`	Print information about active services.
`rosservice node`	Print name of node providing a service.
`rosservice call`	Call the service with the given args.
`rosservice args`	List the arguments of a service.
`rosservice type`	Print the service type.
`rosservice uri`	Print the service ROSRPC uri.
`rosservice find`	Find services by service type.

Examples:

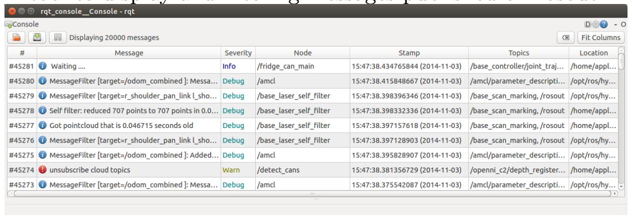
Call a service from the command-line:
```
$ rosservice call /add_two_ints 1 2
```
Pipe the output of rosservice to rossrv to view the srv type:
```
$ rosservice type add_two_ints | rossrv show
```
Display all services of a particular type:
```
$ rosservice find rospy_tutorials/AddTwoInts
```

ROS Indigo Cheatsheet

Logging Tools

rqt_console

A tool to display and filtering messages published on rosout.



rqt_console__Console - rqt

Console

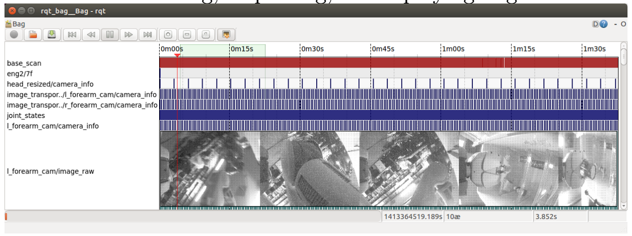
Displaying 20000 messages

#	Message	Severity	Node	Stamp	Topics	Location
#45281	Waiting	Info	/fridge_can_main	15:47:38.434765844 (2014-11-03)	/base_controller/joint_traj...	/home/appl...
#45280	MessageFilter [target=/odom_combined]: Messa...	Debug	/amcl	15:47:38.415848667 (2014-11-03)	/amcl/parameter_descripti...	/opt/ros/hy...
#45279	MessageFilter [target=r_shoulder_pan_link l_sho...	Debug	/base_laser_self_filter	15:47:38.398396346 (2014-11-03)	/base_scan_marking, /rosout	/opt/ros/hy...
#45278	Self filter: reduced 707 points to 707 points in 0.0...	Debug	/base_laser_self_filter	15:47:38.398332336 (2014-11-03)	/base_scan_marking, /rosout	/home/appl...
#45277	Got pointcloud that is 0.046715 seconds old	Debug	/base_laser_self_filter	15:47:38.397157618 (2014-11-03)	/base_scan_marking, /rosout	/home/appl...
#45276	MessageFilter [target=r_shoulder_pan_link l_sho...	Debug	/base_laser_self_filter	15:47:38.397128903 (2014-11-03)	/base_scan_marking, /rosout	/opt/ros/hy...
#45275	MessageFilter [target=/odom_combined]: Added...	Debug	/amcl	15:47:38.395828907 (2014-11-03)	/amcl/parameter_descripti...	/opt/ros/hy...
#45274	unsubscribe cloud topics	Warn	/detect_cans	15:47:38.381356729 (2014-11-03)	/openni_c2/depth_register...	/home/appl...
#45273	MessageFilter [target=/odom_combined]: Messa...	Debug	/amcl	15:47:38.375542087 (2014-11-03)	/amcl/parameter_descripti...	/opt/ros/hy...

Usage:
```
  $ rqt_console
```

rqt_bag

A tool for visualizing, inspecting, and replaying bag files.



Usage, viewing:
```
  $ rqt_bag bag_file.bag
```
Usage, bagging:
```
  $ rqt_bag *press the big red record button.*
```

rqt_logger_level

Change the logger level of ROS nodes. This will increase or decrease the information they log to the screen and rqt_console.

Usage:
```
  viewing $ rqt_logger_level
```

Introspection & Command Tools

rqt_topic

A tool for viewing published topics in real time.

Usage:
```
  $ rqt
  Plugin Menu->Topic->Topic Monitor
```

rqt_msg, rqt_srv, and rqt_action

A tool for viewing available msgs, srvs, and actions.

Usage:
```
  $ rqt
  Plugin Menu->Topic->Message Type Browser
  Plugin Menu->Service->Service Type Browser
  Plugin Menu->Action->Action Type Browser
```

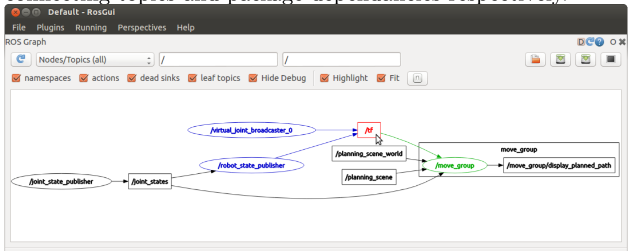
rqt_publisher, and rqt_service_caller

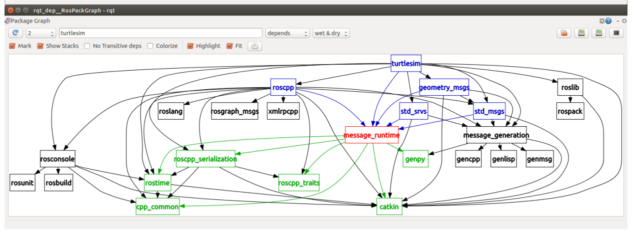
Tools for publishing messages and calling services.

Usage:
```
  $ rqt
  Plugin Menu->Topic->Message Publisher
  Plugin Menu->Service->Service Caller
```

rqt_graph, and rqt_dep

Tools for displaying graphs of running ROS nodes with connecting topics and package dependancies respectively.





Usage:
```
  $ rqt_graph
  $ rqt_dep
```

rqt_top

A tool for ROS specific process monitoring.

Usage:
```
  $ rqt
  Plugin Menu->Introspection->Process Monitor
```

rqt_reconfigure

A tool for dynamically reconfiguring ROS parameters.

Usage:
```
  $ rqt
  Plugin Menu->Configuration->Dynamic Reconfigure
```

Development Environments

rqt_shell, and rqt_py_console

Two tools for accessing an xterm shell and python console respectively.

Usage:
```
  $ rqt
  Plugin Menu->Miscellaneous Tools->Shell
  Plugin Menu->Miscellaneous Tools->Python Console
```

Data Visualization Tools

tf_echo

A tool that prints the information about a particular transformation between a source_frame and a target_frame.

Usage:
```
  $ rosrun tf tf_echo <source_frame> <target_frame>
```

Examples:

To echo the transform between /map and /odom:
```
  $ rosrun tf tf_echo /map /odom
```

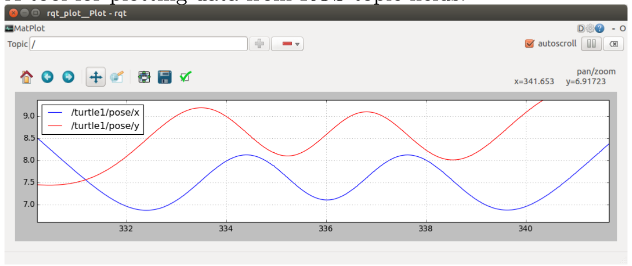
view_frames

A tool for visualizing the full tree of coordinate transforms.

Usage:
```
  $ rosrun tf2_tools view_frames.py
  $ evince frames.pdf
```

rqt_plot

A tool for plotting data from ROS topic fields.

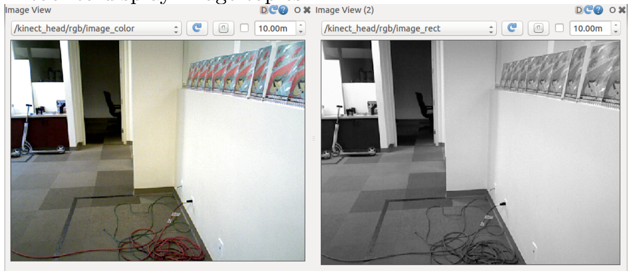


Examples:

To graph the data in different plots:
```
  $ rqt_plot /topic1/field1 /topic2/field2
```
To graph the data all on the same plot:
```
  $ rqt_plot /topic1/field1,/topic2/field2
```
To graph multiple fields of a message:
```
  $ rqt_plot /topic1/field1:field2:field3
```

rqt_image_view

A tool to display image topics.



Usage:
```
  $ rqt_image_view
```

ROS Indigo Catkin Workspaces

Create a catkin workspace

Setup and use a new catkin workspace from scratch.

Example:
```
$ source /opt/ros/hydro/setup.bash
$ mkdir -p ~/catkin_ws/src
$ cd ~/catkin_ws/src
$ catkin_init_workspace
```

Checkout an existing ROS package

Get a local copy of the code for an existing package and keep it up to date using wstool.

Examples:
```
$ cd ~/catkin_ws/src
$ wstool init
$ wstool set tutorials --git git://github.com/ros/ros_tutorials.git
$ wstool update
```

Create a new catkin ROS package

Create a new ROS catkin package in an existing workspace with catkin create package. After using this you will need to edit the CMakeLists.txt to detail how you want your package built and add information to your package.xml.

Usage:
```
$ catkin_create_pkg <package_name> [depend1] [depend2]
```

Example:
```
$ cd ~/catkin_ws/src
$ catkin_create_pkg tutorials std_msgs rospy roscpp
```

Build all packages in a workspace

Use catkin_make to build all the packages in the workspace and then source the setup.bash to add the workspace to the ROS_PACKAGE_PATH.

Examples:
```
$ cd ~/catkin_ws
$ ~/catkin_make
$ source devel/setup.bash
```