ROS Cheat Sheet

Filesystem Command-line Tools

rospack/rosstack	A tool inspecting packages/stacks.
roscd	Changes directories to a package or stack.
rosls	Lists package or stack information.
roscreate-pkg	Creates a new ROS package.
roscreate-stack	Creates a new ROS stack.
rosdep	Installs ROS package system dependencies.
rosmake	Builds a ROS package.
roswtf	Displays a errors and warnings about a running ROS system or launch file.

Usage:

```
$ rospack find [package]
$ roscd [package[/subdir]]
$ rosls [package[/subdir]]
$ roscreate-pkg [package_name]
$ rosmake [package]
$ rosdep install [package]
$ roswtf or roswtf [file]
```

Common Command-line Tools

roscore

A collection of nodes and programs that are pre-requisites of a ROS-based system. You must have a roscore running in order for ROS nodes to communicate.

roscore is currently defined as:

- master
- parameter server
- rosout

Usage:

```
$ roscore
```

rosmsg/rossrv

rosmsg/rossrv displays Message/Service (msg/srv) data structure definitions.

Commands:

`rosmsg show`	Display the fields in the msg.
`rosmsg users`	Search for code using the msg.
`rosmsg md5`	Display the msg md5 sum.
`rosmsg package`	List all the messages in a package.
`rosnode packages`	List all the packages with messages.

Examples:

Display the Pose msg:

```
$ rosmsg show Pose
```

List the messages in nav_msgs:

```
$ rosmsg package nav_msgs
```

List the files using sensor_msgs/CameraInfo:

```
$ rosmsg users sensor_msgs/CameraInfo
```

rosrun

rosrun allows you to run an executable in an arbitrary package without having to cd (or roscd) there first.

Usage:

```
$ rosrun package executable
```

Example:

Run turtlesim:

```
$ rosrun turtlesim turtlesim_node
```

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 particular machine.
`rosnode kill`	Kills 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
```

roslaunch

Starts ROS nodes locally and remotely via SSH, as well as setting parameters on the parameter server.

Examples:

Launch on a different port:

```
$ roslaunch -p 1234 package filename.launch
```

Launch a file in a package:

```
$ roslaunch package filename.launch
```

Launch on the local nodes:

```
$ roslaunch --local package filename.launch
```

rostopic

A tool for displaying debug 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 hz`	Display publishing rate of topic.
`rostopic list`	Print information about active topics.
`rostopic pub`	Publish data to topic.
`rostopic type`	Print topic type.
`rostopic find`	Find topics by 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 the name of the 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
```

Logging Command-line Tools

rosbag

This is a set of tools for recording from and playing back to ROS topics. It is intended to be high performance and avoids deserialization and reserializationof the messages.

rosbag record will generate a ".bag" file (so named for historical reasons) with the contents of all topics that you pass to it.

Examples:

Record all topics:

```
$ rosbag record -a
```

Record select topics:

```
$ rosbag record topic1 topic2
```

rosbag play will take the contents of one or more bag file, and play them back in a time-synchronized fashion.

Examples:

Replay all messages without waiting:

```
$ rosbag play -a demo_log.bag
```

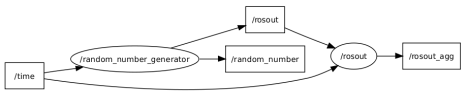
Replay several bag files at once:

```
$ rosbag play demo1.bag demo2.bag
```

Graphical Tools

rqt_graph

Displays a graph of the ROS nodes that are currently running, as well as the ROS topics that connect them.

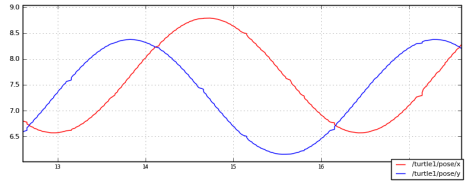


Usage:

```
$ rqt_graph
```

rqt_plot

A tool for plotting data from one or more ROS topic fields using matplotlib.



Examples:

To graph the data in different plots:

```
$ rqt_plot /topic1/field1 /topic2/field2
```

To graph the data all on the same plot:

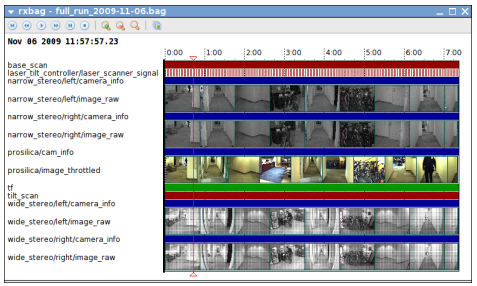
```
$ rqt_plot /topic1/field1,/topic2/field2
```

To graph multiple fields of a message:

```
$ rqt_plot /topic1/field1:field2:field3
```

rqt_bag

A tool for visualizing, inspecting, and replaying histories (bag files) of ROS messages.

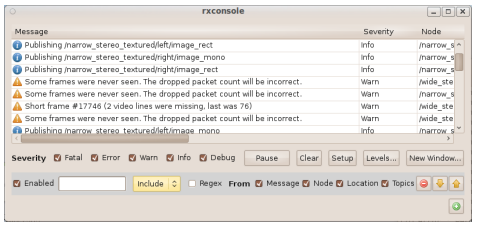


Usage:

```
$ rqt_bag bag_file.bag
```

rqt_console

A tool for displaying and filtering messages published on rosout.



Usage:

```
$ rqt_console
```

tf Command-line 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 tf view_frames
$ evince frames.pdf
```