Note: This tutorial assumes that you have completed the previous tutorials: creating a ROS package (/ROS/Tutorials/CreatingPackage).

🔆 Please ask about problems and questions regarding this tutorial on • answers.ros.org (http://answers.ros.org). Don't forget to include in your question the link to this page, the versions of your OS & ROS, and also add appropriate tags.

## Building a ROS Package

Description: This tutorial covers the toolchain to build a package.

Tutorial Level: BEGINNER

Next Tutorial: Understanding ROS Nodes (/ROS/Tutorials/UnderstandingNodes)

catkin	rosbuild			
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## 1. Building Packages

As long as all of the system dependencies of your package are installed, we can now build your new package.

	Note: If you installed ROS using apt or some other package manager, you should already have all of your dependencies.				
E	Before continuing remember to source your environment setup file if you have not already. On Ubuntu it would be something like this:				
	<pre># source /opt/ros/%YOUR_ROS_DISTRO%/setup.bash \$ source /opt/ros/kinetic/setup.bash</pre>				
(					

## 1.1 Using catkin\_make

catkin\_make (/catkin/commands/catkin\_make) is a command line tool which adds some convenience to the standard catkin workflow. You can imagine that catkin\_make (/catkin/commands/catkin\_make) combines the calls to cmake and make in the standard CMake workflow.

Usage:

# In a catkin workspace
\$ catkin\_make [make\_targets] [-DCMAKE\_VARIABLES=...]

For people who are unfamiliar with the standard CMake workflow, it breaks down as follows:

Note: If you run the below commands it will not work, as this is just an example of how CMake generally works.

# In a CMake project
\$ mkdir build
\$ cd build
\$ cmake ..
\$ make
\$ make install # (optionally)

This process is run for each CMake project. In contrast catkin projects can be built together in workspaces. Building zero to many catkin packages in a workspace follows this work flow:

```
# In a catkin workspace
$ catkin_make
$ catkin_make install # (optionally)
```

The above commands will build any catkin projects found in the src folder. This follows the recommendations set by REP128 (http://ros.org/reps/rep-0128.html). If your source code is in a different place, say my\_src then you would call catkin\_make like this:

Note: If you run the below commands it will not work, as the directory my\_src does not exist.

```
# In a catkin workspace
```

```
$ catkin_make --source my_src
```

\$ catkin\_make install --source my\_src # (optionally)

For more advanced uses of catkin\_make (/catkin/commands/catkin\_make) see the documentation: catkin/commands/catkin\_make (/catkin/commands/catkin\_make)

## 1.2 Building Your Package

If you are using this page to build your own code, please also take a look at the later tutorials (C++) (/ROS/Tutorials/WritingPublisherSubscriber%28c%2B%2B%29)/(Python) (/ROS/Tutorials/WritingPublisherSubscriber%28python%29) since you may need to modify CMakeLists.txt.

You should already have a catkin workspace (/catkin/Tutorials/create\_a\_workspace) and a new catkin package called beginner\_tutorials from the previous tutorial, Creating a Package (/ROS/Tutorials/CreatingPackage). Go into the catkin workspace if you are not already there and look in the src folder:

\$ cd ~/catkin\_ws/
\$ ls src

a is sic

beginner\_tutorials/ CMakeLists.txt@

You should see that there is a folder called beginner\_tutorials which you created with catkin\_create\_pkg (/catkin/commands/catkin\_create\_pkg) in the previous tutorial. We can now build that package using catkin\_make (/catkin/commands/catkin\_make):

\$ catkin\_make

You should see a lot of output from cmake and then make, which should be similar to this:

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Note that catkin\_make (/catkin/commands/catkin\_make) first displays what paths it is using for each of the 'spaces'. The spaces are described in the **PEP128** (http://ros.org /reps/rep-0128.html) and by documentation about catkin workspaces on the wiki: catkin/workspaces (/catkin/workspaces). The important thing to notice is that because of these default values several folders have been created in your catkin workspace. Take a look with ls:

\$ ls	\$ ls			
	build devel src			

The build folder is the default location of the build space (/catkin/workspaces#Build\_Space) and is where cmake and make are called to configure and build your packages. The devel folder is the default location of the devel space (/catkin/workspaces#Development\_.28Devel.29\_Space), which is where your executables and libraries go before you install your packages.

Now that you have built your ROS package let's talk more about ROS Nodes (/ROS/Tutorials/UnderstandingNodes).

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(https://plus.google.com/113789706402978299308) Wik: ROS/Tutorials/BuildingPackages (last edited 2012-12-24 23:17:03 by IsaacSaito (/IsaacSaito)) (https://plus.google.com/113789706402978299308)

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