7 devtool Quick Reference

The devtool command-line tool provides a number of features that help you build, test, and package software. This command is available alongside the bitbake command. Additionally, the devtool command is a key part of the extensible SDK.

This chapter provides a Quick Reference for the devtool command. For more information on how to apply the command when using the extensible SDK, see the "Using the Extensible SDK" chapter in the Yocto Project Application Development and the Extensible Software Development Kit (eSDK) manual.

7.1 Getting Help

The devtool command line is organized similarly to Git in that it has a number of sub-commands for each function. You can run devtool --help to see all the commands:

```
$ devtool -h
NOTE: Starting bitbake server...
usage: devtool [--basepath BASEPATH] [--bbpath BBPATH] [-d] [-q] [--color COLOR] [-h]
<subcommand> ...

OpenEmbedded development tool

options:
  --basepath BASEPATH   Base directory of SDK / build directory
  --bbpath BBPATH       Explicitly specify the BBPATH, rather than getting it from the
metadata
  -d, --debug           Enable debug output
  -q, --quiet           Print only errors
  --color COLOR         Colorize output (where COLOR is auto, always, never)
  -h, --help            show this help message and exit

subcommands:
  Beginning work on a recipe:
    add                   Add a new recipe
    modify                Modify the source for an existing recipe
    upgrade               Upgrade an existing recipe
  Getting information:
    status                Show workspace status
    latest-version        Report the latest version of an existing recipe
    check-upgrade-status  Report upgradability for multiple (or all) recipes
    search                Search available recipes
  Working on a recipe in the workspace:
    build                 Build a recipe
    rename                Rename a recipe file in the workspace
    edit-recipe           Edit a recipe file
    find-recipe           Find a recipe file
    configure-help        Get help on configure script options
    update-recipe         Apply changes from external source tree to recipe
    reset                 Remove a recipe from your workspace
    finish                Finish working on a recipe in your workspace
  Testing changes on target:
    deploy-target         Deploy recipe output files to live target machine
    undeploy-target       Undeploy recipe output files in live target machine
    build-image           Build image including workspace recipe packages
  Advanced:
    create-workspace      Set up workspace in an alternative location
    extract               Extract the source for an existing recipe
    sync                  Synchronize the source tree for an existing recipe
    menuconfig            Alter build-time configuration for a recipe
    import                Import exported tar archive into workspace
    export                Export workspace into a tar archive
  other:
    selftest-reverse      Reverse value (for selftest)
    pluginfile            Print the filename of this plugin
    bbdir                 Print the BBPATH directory of this plugin
    count                 How many times have this plugin been registered.
    multiloaded           How many times have this plugin been initialized
Use devtool <subcommand> --help to get help on a specific command
```

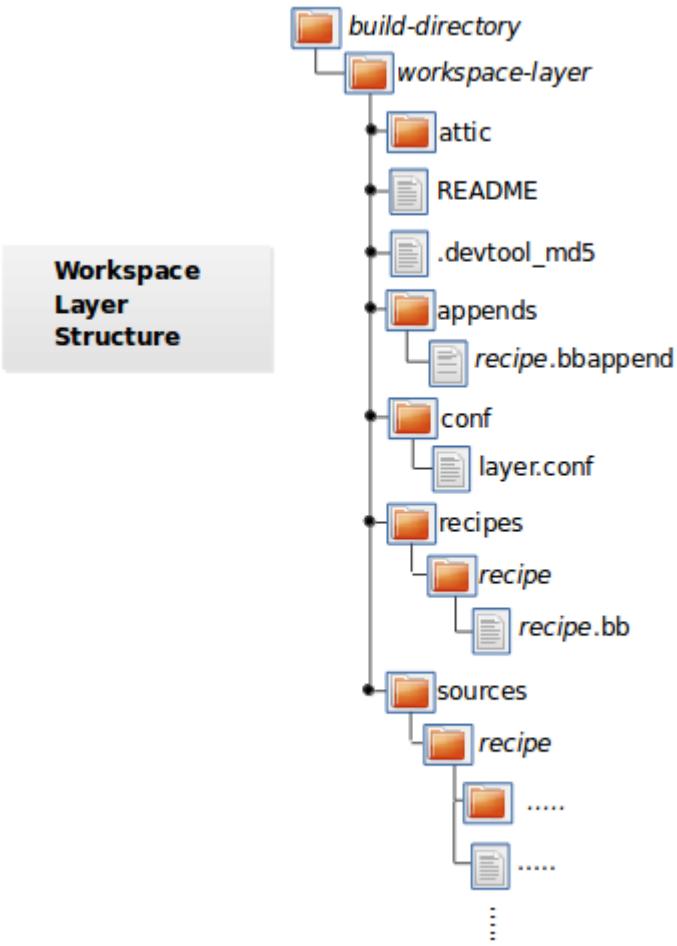
As directed in the general help output, you can get more syntax on a specific command by providing the command name and using `--help`:

```
$ devtool add --help
NOTE: Starting bitbake server...
usage: devtool add [-h] [--same-dir | --no-same-dir] [--fetch URI] [--npm-dev] [--
version VERSION] [--no-git] [--srcrev SRCREV | --autorev] [--srcbranch SRCBRANCH] [--
binary] [--also-native] [--src-subdir SUBDIR] [--mirrors]
                  [--provides PROVIDES]
                  [recipename] [srctree] [fetchuri]

Adds a new recipe to the workspace to build a specified source tree. Can optionally
fetch a remote URI and unpack it to create the source tree.

arguments:
  recipename            Name for new recipe to add (just name - no version, path or
extension). If not specified, will attempt to auto-detect it.
  srctree               Path to external source tree. If not specified, a subdirectory
of /media/build1/poky/build/workspace/sources will be used.
  fetchuri              Fetch the specified URI and extract it to create the source
tree

options:
  -h, --help            show this help message and exit
  --same-dir, -s        Build in same directory as source
  --no-same-dir         Force build in a separate build directory
  --fetch URI, -f URI   Fetch the specified URI and extract it to create the source
tree (deprecated - pass as positional argument instead)
  --npm-dev             For npm, also fetch devDependencies
  --version VERSION, -V VERSION
                        Version to use within recipe (PV)
  --no-git, -g          If fetching source, do not set up source tree as a git
repository
  --srcrev SRCREV, -S SRCREV
                        Source revision to fetch if fetching from an SCM such as git
(default latest)
  --autorev, -a         When fetching from a git repository, set SRCREV in the recipe
to a floating revision instead of fixed
  --srcbranch SRCBRANCH, -B SRCBRANCH
                        Branch in source repository if fetching from an SCM such as git
(default master)
  --binary, -b          Treat the source tree as something that should be installed
verbatim (no compilation, same directory structure). Useful with binary packages e.g.
RPMs.
  --also-native         Also add native variant (i.e. support building recipe for the
build host as well as the target machine)
  --src-subdir SUBDIR   Specify subdirectory within source tree to use
  --mirrors             Enable PREMIRRORS and MIRRORS for source tree fetching (disable
by default).
  --provides PROVIDES, -p PROVIDES
                        Specify an alias for the item provided by the recipe. E.g.
virtual/libgl
```

7.2 The Workspace Layer Structure

`devtool` uses a “Workspace” layer in which to accomplish builds. This layer is not specific to any single `devtool` command but is rather a common working area used across the tool.

The following figure shows the workspace structure:




```
attic - A directory created if devtool believes it must preserve
        anything when you run "devtool reset".  For example, if you
        run "devtool add", make changes to the recipe, and then
        run "devtool reset", devtool takes notice that the file has
        been changed and moves it into the attic should you still
        want the recipe.

README - Provides information on what is in workspace layer and how to
         manage it.

.devtool_md5 - A checksum file used by devtool.

appends - A directory that contains *.bbappend files, which point to
          external source.

conf - A configuration directory that contains the layer.conf file.

recipes - A directory containing recipes.  This directory contains a
          folder for each directory added whose name matches that of the
          added recipe.  devtool places the recipe.bb file
          within that sub-directory.

sources - A directory containing a working copy of the source files used
          when building the recipe.  This is the default directory used
          as the location of the source tree when you do not provide a
          source tree path.  This directory contains a folder for each
          set of source files matched to a corresponding recipe.
```

7.3 Adding a New Recipe to the Workspace Layer

Use the `devtool add` command to add a new recipe to the workspace layer. The recipe you add should not exist — `devtool` creates it for you. The source files the recipe uses should exist in an external area.

The following example creates and adds a new recipe named `jackson` to a workspace layer the tool creates. The source code built by the recipes resides in `/home/user/sources/jackson`:

```
$ devtool add jackson /home/user/sources/jackson
```

If you add a recipe and the workspace layer does not exist, the command creates the layer and populates it as described in "The Workspace Layer Structure" section.

Running `devtool add` when the workspace layer exists causes the tool to add the recipe, append files, and source files into the existing workspace layer. The `.bbappend` file is created to point to the external source tree.

> **Note**
>
> If your recipe has runtime dependencies defined, you must be sure that these packages exist on the target hardware before attempting to run your application. If dependent packages (e.g. libraries) do not exist on the target, your application, when run, will fail to find those functions. For more information, see the "Deploying Your Software on the Target Machine" section.

By default, `devtool add` uses the latest revision (i.e. master) when unpacking files from a remote URI. In some cases, you might want to specify a source revision by branch, tag, or commit hash. You can specify these options when using the `devtool add` command:

- To specify a source branch, use the `--srcbranch` option:

  ```
  $ devtool add --srcbranch nanbield jackson /home/user/sources/jackson
  ```

  In the previous example, you are checking out the nanbield branch.

- To specify a specific tag or commit hash, use the `--srcrev` option:

```
$ devtool add --srcrev yocto-4.3.999 jackson /home/user/sources/jackson
$ devtool add --srcrev some_commit_hash /home/user/sources/jackson
```

The previous examples check out the yocto-4.3.999 tag and the commit associated with the some_commit_hash hash.

Note

If you prefer to use the latest revision every time the recipe is built, use the options `--autorev` or `-a`.

7.4 Extracting the Source for an Existing Recipe

Use the `devtool extract` command to extract the source for an existing recipe. When you use this command, you must supply the root name of the recipe (i.e. no version, paths, or extensions), and you must supply the directory to which you want the source extracted.

Additional command options let you control the name of a development branch into which you can checkout the source and whether or not to keep a temporary directory, which is useful for debugging.

7.5 Synchronizing a Recipe's Extracted Source Tree

Use the `devtool sync` command to synchronize a previously extracted source tree for an existing recipe. When you use this command, you must supply the root name of the recipe (i.e. no version, paths, or extensions), and you must supply the directory to which you want the source extracted.

Additional command options let you control the name of a development branch into which you can checkout the source and whether or not to keep a temporary directory, which is useful for debugging.

7.6 Modifying an Existing Recipe

Use the `devtool modify` command to begin modifying the source of an existing recipe. This command is very similar to the add command except that it does not physically create the recipe in the workspace layer because the recipe already

exists in an another layer.

The `devtool modify` command extracts the source for a recipe, sets it up as a Git repository if the source had not already been fetched from Git, checks out a branch for development, and applies any patches from the recipe as commits on top. You can use the following command to checkout the source files:

```
$ devtool modify recipe
```

Using the above command form, `devtool` uses the existing recipe's SRC_URI statement to locate the upstream source, extracts the source into the default sources location in the workspace. The default development branch used is "devtool".

7.7 Edit an Existing Recipe

Use the `devtool edit-recipe` command to run the default editor, which is identified using the `EDITOR` variable, on the specified recipe.

When you use the `devtool edit-recipe` command, you must supply the root name of the recipe (i.e. no version, paths, or extensions). Also, the recipe file itself must reside in the workspace as a result of the `devtool add` or `devtool upgrade` commands.

7.8 Updating a Recipe

Use the `devtool update-recipe` command to update your recipe with patches that reflect changes you make to the source files. For example, if you know you are going to work on some code, you could first use the devtool modify command to extract the code and set up the workspace. After which, you could modify, compile, and test the code.

When you are satisfied with the results and you have committed your changes to the Git repository, you can then run the `devtool update-recipe` to create the patches and update the recipe:

```
$ devtool update-recipe recipe
```

If you run the `devtool update-recipe` without committing your changes, the command ignores the changes.

Often, you might want to apply customizations made to your software in your own layer rather than apply them to the original recipe. If so, you can use the `-a` or `--append` option with the `devtool update-recipe` command. These options allow you to specify the layer into which to write an append file:

```
$ devtool update-recipe recipe -a base-layer-directory
```

The `*.bbappend` file is created at the appropriate path within the specified layer directory, which may or may not be in your `bblayers.conf` file. If an append file already exists, the command updates it appropriately.

7.9 Checking on the Upgrade Status of a Recipe

Upstream recipes change over time. Consequently, you might find that you need to determine if you can upgrade a recipe to a newer version.

To check on the upgrade status of a recipe, you can use the `devtool latest-version recipe` command, which quickly shows the current version and the latest version available upstream. To get a more global picture, use the `devtool check-upgrade-status` command, which takes a list of recipes as input, or no arguments, in which case it checks all available recipes. This command will only print the recipes for which a new upstream version is available. Each such recipe will have its current version and latest upstream version, as well as the email of the maintainer and any additional information such as the commit hash or reason for not being able to upgrade it, displayed in a table.

This upgrade checking mechanism relies on the optional UPSTREAM_CHECK_URI, UPSTREAM_CHECK_REGEX, UPSTREAM_CHECK_GITTAGREGEX, UPSTREAM_CHECK_COMMITS and UPSTREAM_VERSION_UNKNOWN variables in package recipes.

Note

- Most of the time, the above variables are unnecessary. They are only required when upstream does something unusual, and default mechanisms cannot find the new upstream versions.
- For the `oe-core` layer, recipe maintainers come from the maintainers.inc file.

- If the recipe is using the Git Fetcher (git://) rather than a tarball, the commit hash points to the commit that matches the recipe's latest version tag, or in the absence of suitable tags, to the latest commit (when UPSTREAM_CHECK_COMMITS set to `1` in the recipe).

As with all `devtool` commands, you can get help on the individual command:

```
$ devtool check-upgrade-status -h
NOTE: Starting bitbake server...
usage: devtool check-upgrade-status [-h] [--all] [recipe [recipe ...]]

Prints a table of recipes together with versions currently provided by recipes, and
latest upstream versions, when there is a later version available

arguments:
  recipe      Name of the recipe to report (omit to report upgrade info for all
recipes)

options:
  -h, --help  show this help message and exit
  --all, -a   Show all recipes, not just recipes needing upgrade
```

Unless you provide a specific recipe name on the command line, the command checks all recipes in all configured layers.

Following is a partial example table that reports on all the recipes:

```
$ devtool check-upgrade-status
...
INFO: bind                     9.16.20         9.16.21         Armin Kuster
<akuster808@gmail.com>
INFO: inetutils                2.1             2.2             Tom Rini
<trini@konsulko.com>
INFO: iproute2                 5.13.0          5.14.0          Changhyeok Bae
<changhyeok.bae@gmail.com>
INFO: openssl                  1.1.1l          3.0.0           Alexander Kanavin
<alex.kanavin@gmail.com>
INFO: base-passwd              3.5.29          3.5.51          Anuj Mittal
<anuj.mittal@intel.com>  cannot be updated due to: Version 3.5.38 requires cdebconf for
update-passwd utility
...
```

Notice the reported reason for not upgrading the `base-passwd` recipe. In this example, while a new version is available upstream, you do not want to use it because the dependency on `cdebconf` is not easily satisfied. Maintainers can explicit the reason that is shown by adding the RECIPE_NO_UPDATE_REASON variable to the corresponding recipe. See base-passwd.bb for an example:

```
RECIPE_NO_UPDATE_REASON = "Version 3.5.38 requires cdebconf for update-passwd utility"
```

Last but not least, you may set UPSTREAM_VERSION_UNKNOWN to `1` in a recipe when there's currently no way to determine its latest upstream version.

7.10 Upgrading a Recipe

As software matures, upstream recipes are upgraded to newer versions. As a developer, you need to keep your local recipes up-to-date with the upstream version releases. There are several ways of upgrading recipes. You can read about them in the "Upgrading Recipes" section of the Yocto Project Development Tasks Manual. This section overviews the `devtool upgrade` command.

Before you upgrade a recipe, you can check on its upgrade status. See the "Checking on the Upgrade Status of a Recipe" section for more information.

The `devtool upgrade` command upgrades an existing recipe to a more recent version of the recipe upstream. The command puts the upgraded recipe file along with any associated files into a "workspace" and, if necessary, extracts the source tree to a specified location. During the upgrade, patches associated with the recipe are rebased or added as needed.

When you use the `devtool upgrade` command, you must supply the root name of the recipe (i.e. no version, paths, or extensions), and you must supply the directory to which you want the source extracted. Additional command options let you control things such as the version number to which you want to upgrade (i.e. the PV), the source revision to which you want to upgrade (i.e. the SRCREV), whether or not to apply patches, and so forth.

You can read more on the `devtool upgrade` workflow in the "Use devtool upgrade to Create a Version of the Recipe that Supports a Newer Version of the Software" section in the Yocto Project Application Development and the Extensible Software Development Kit (eSDK) manual. You can also see an example of how to use `devtool upgrade` in the "Using devtool upgrade" section in the Yocto Project Development Tasks Manual.

7.11 Resetting a Recipe

Use the `devtool reset` command to remove a recipe and its configuration (e.g. the corresponding `.bbappend` file) from the workspace layer. Realize that this command deletes the recipe and the append file. The command does not physically move them for you. Consequently, you must be sure to physically relocate your updated recipe and the append file outside of the workspace layer before running the `devtool reset` command.

If the `devtool reset` command detects that the recipe or the append files have been modified, the command preserves the modified files in a separate “attic” subdirectory under the workspace layer.

Here is an example that resets the workspace directory that contains the `mtr` recipe:

```
$ devtool reset mtr
NOTE: Cleaning sysroot for recipe mtr...
NOTE: Leaving source tree /home/scottrif/poky/build/workspace/sources/mtr as-is; if you
no longer need it then please delete it manually
$
```

7.12 Building Your Recipe

Use the `devtool build` command to build your recipe. The `devtool build` command is equivalent to the `bitbake -c populate_sysroot` command.

When you use the `devtool build` command, you must supply the root name of the recipe (i.e. do not provide versions, paths, or extensions). You can use either the `-s` or the `--disable-parallel-make` options to disable parallel makes during the build. Here is an example:

```
$ devtool build recipe
```

7.13 Building Your Image

Use the `devtool build-image` command to build an image, extending it to include packages from recipes in the workspace. Using this command is useful when you want an image that ready for immediate deployment onto a device for testing. For proper integration into a final image, you need to edit your custom image recipe appropriately.

When you use the `devtool build-image` command, you must supply the name of the image. This command has no command line options:

```
$ devtool build-image image
```

7.14 Deploying Your Software on the Target Machine

Use the `devtool deploy-target` command to deploy the recipe's build output to the live target machine:

```
$ devtool deploy-target recipe target
```

The target is the address of the target machine, which must be running an SSH server (i.e. `user@hostname[:destdir]`).

This command deploys all files installed during the do_install task. Furthermore, you do not need to have package management enabled within the target machine. If you do, the package manager is bypassed.

> **Note**
>
> The `deploy-target` functionality is for development only. You should never use it to update an image that will be used in production.

Some conditions could prevent a deployed application from behaving as expected. When both of the following conditions are met, your application has the potential to not behave correctly when run on the target:

- You are deploying a new application to the target and the recipe you used to build the application had correctly defined runtime dependencies.

- The target does not physically have the packages on which the application depends installed.

If both of these conditions are met, your application will not behave as expected. The reason for this misbehavior is because the `devtool deploy-target` command does not deploy the packages (e.g. libraries) on which your new application depends. The assumption is that the packages are already on the target. Consequently, when a runtime call is made in the application for a dependent function (e.g. a library call), the function cannot be found.

To be sure you have all the dependencies local to the target, you need to be sure that the packages are pre-deployed (installed) on the target before attempting to run your application.

7.15 Removing Your Software from the Target Machine

Use the `devtool undeploy-target` command to remove deployed build output from the target machine. For the `devtool undeploy-target` command to work, you must have previously used the "devtool deploy-target" command:

```
$ devtool undeploy-target recipe target
```

The target is the address of the target machine, which must be running an SSH server (i.e. `user@hostname`).

7.16 Creating the Workspace Layer in an Alternative Location

Use the `devtool create-workspace` command to create a new workspace layer in your Build Directory. When you create a new workspace layer, it is populated with the `README` file and the `conf` directory only.

The following example creates a new workspace layer in your current working and by default names the workspace layer "workspace":

```
$ devtool create-workspace
```

You can create a workspace layer anywhere by supplying a pathname with the command. The following command creates a new workspace layer named “new-workspace”:

```
$ devtool create-workspace /home/scottrif/new-workspace
```

7.17 Get the Status of the Recipes in Your Workspace

Use the `devtool status` command to list the recipes currently in your workspace. Information includes the paths to their respective external source trees.

The `devtool status` command has no command-line options:

```
$ devtool status
```

Following is sample output after using devtool add to create and add the `mtr_0.86.bb` recipe to the `workspace` directory:

```
$ devtool status
mtr:/home/scottrif/poky/build/workspace/sources/mtr
(/home/scottrif/poky/build/workspace/recipes/mtr/mtr_0.86.bb)
$
```

7.18 Search for Available Target Recipes

Use the `devtool search` command to search for available target recipes. The command matches the recipe name, package name, description, and installed files. The command displays the recipe name as a result of a match.

When you use the `devtool search` command, you must supply a keyword. The command uses the keyword when searching for a match.