

Finding Files: find and locate

coursera.org/learn/linux-tools-for-developers/supplement/uR16F/finding-files-find-and-locate

The `find` command line utility provides an extremely powerful and flexible method for locating files based on their properties, including name. It does not search the interior of files for patterns, etc.; that is more the province of **grep** and its variations.

The general form of a **find** command is:

```
$ find [location] [criteria] [actions]
```

where there are three classes of arguments, each of which may be omitted. If no location is given, the current directory (**.**) is assumed; if no criteria are given, all files are displayed; and, if no actions are given, only a listing of the names is given.

There are many logical expressions which can be used for criteria. For example, the command:

```
$ find /etc -name "*.conf"
```

will print out the names of all files in the **/etc** directory and its descendants, recursively, that end in **.conf**. To specify a simple action request:

```
$ find /etc -name "*.conf" -ls
```

will print out a long listing, not just the names.

A little more complicated example is the following:

```
$ find /tmp /etc -name "*.conf" -or -newer /tmp/.X0-lock -ls
```

will look in subdirectories under **/etc** and **/tmp** for files whose names end in **.conf**, or are newer than **/tmp/.X0-lock** and print out a long listing.

You can perform actions with the **-exec** option, as in:

```
$ find . -name "*~" -exec rm {} ';' 
```

where **{}** is a fill in for the files to be operated on, and **;'** indicates the end of the command. This can be unwieldy and one often pipes into the **xargs** program, as in:

```
$ find . -name "*~" | xargs rm
```

which accomplishes the same action. A third way to do the same action would be:

```
$ for names in $(find . -name "*~" ); do rm $names ; done
```

If a filename has a blank space in it (or some other special characters), some of the previous commands will fail.

It is generally a disfavored practice to utilize such file names in UNIX-like operating systems, but it is not uncommon for such files to exist, either in files brought in from other systems, or from applications which are also used in other systems.

In such a case, the following variant will work just fine:

```
$ find . -name "*~" -print0 | xargs -0 rm
```

as will the command that uses **-exec rm {} ';'.**

There are many options to **find**, especially regarding selection of files to display. This can be done based on size, time of creation or access, type of file, owner, etc. A quick synopsis is provided by **find --help**:

```
File Edit View Search Terminal Help
c7:/tmp>find --help
Usage: find [-H] [-L] [-P] [-0level] [-D help|tree|search|stat|rates|opt|exec] [path...] [expression]

default path is the current directory; default expression is -print
expression may consist of: operators, options, tests, and actions:

operators (decreasing precedence; -and is implicit where no others are given):
    ( EXPR )  ! EXPR  -not EXPR  EXPR1 -a EXPR2  EXPR1 -and EXPR2
    EXPR1 -o EXPR2  EXPR1 -or EXPR2  EXPR1 , EXPR2

positional options (always true): -daystart -follow -regextype

normal options (always true, specified before other expressions):
    -depth --help -maxdepth LEVELS -mindepth LEVELS -mount -noleaf
    --version -xautofs -xdev -ignore_readdir_race -noignore_readdir_race

tests (N can be +N or -N or N): -amin N -anewer FILE -atime N -cmin N
    -cnewer FILE -ctime N -empty -false -fstype TYPE -gid N -group NAME
    -ilname PATTERN -iname PATTERN -inum N -iwholename PATTERN -iregex PATTERN
    -links N -lname PATTERN -mmin N -mtime N -name PATTERN -newer FILE
    -nouser -nogroup -path PATTERN -perm [-/]MODE -regex PATTERN
    -readable -writable -executable
    -wholename PATTERN -size N[bcwKMG] -true -type [bcdpflsD] -uid N
    -used N -user NAME -xtype [bcdpfls]
    -context CONTEXT

actions: -delete -print0 -printf FORMAT -fprintf FILE FORMAT -print
    -fprintf0 FILE -fprintf FILE -ls -fls FILE -prune -quit
    -exec COMMAND ; -exec COMMAND {} + -ok COMMAND ;
    -execdir COMMAND ; -execdir COMMAND {} + -okdir COMMAND ;

Report (and track progress on fixing) bugs via the findutils bug-reporting
page at http://savannah.gnu.org/ or, if you have no web access, by sending
email to <bug-findutils@gnu.org>.
c7:/tmp>
```

Another method of locating files is provided by the **locate** command, which searches

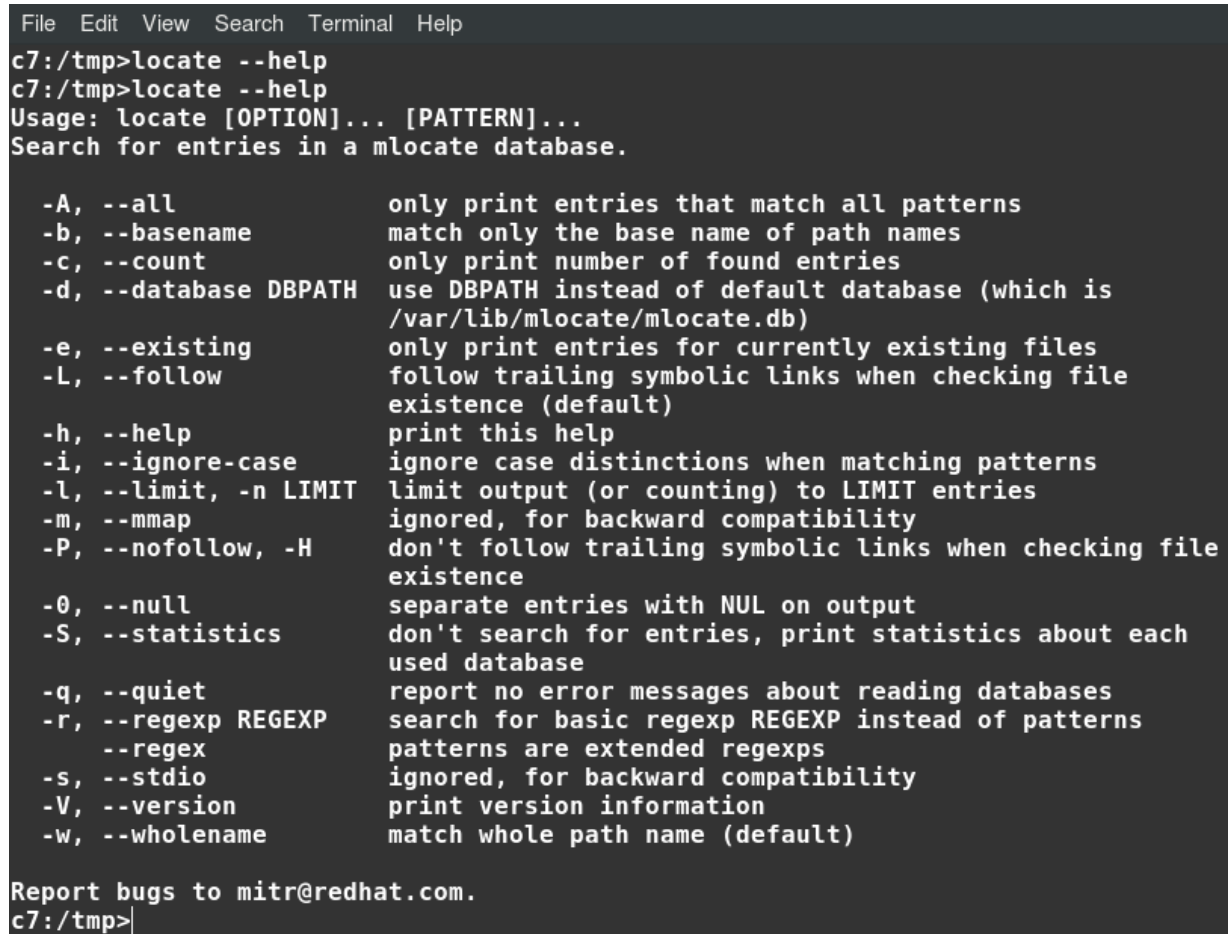
your entire filesystem (except for paths which have been excluded) and works off a database that is updated periodically with **updatedb**. Thus, it is very fast.

Thus, the command:

```
$ locate .conf
```

will find all files on your system that have **.conf** in them.

A quick synopsis is provided by **locate --help**:



```
File Edit View Search Terminal Help
c7:/tmp>locate --help
c7:/tmp>locate --help
Usage: locate [OPTION]... [PATTERN]...
Search for entries in a mlocate database.

-A, --all                only print entries that match all patterns
-b, --basename          match only the base name of path names
-c, --count              only print number of found entries
-d, --database DBPATH   use DBPATH instead of default database (which is
                        /var/lib/mlocate/mlocate.db)
-e, --existing           only print entries for currently existing files
-L, --follow             follow trailing symbolic links when checking file
                        existence (default)
-h, --help              print this help
-i, --ignore-case        ignore case distinctions when matching patterns
-l, --limit, -n LIMIT   limit output (or counting) to LIMIT entries
-m, --mmap              ignored, for backward compatibility
-P, --nofollow, -H      don't follow trailing symbolic links when checking file
                        existence
-0, --null              separate entries with NUL on output
-S, --statistics        don't search for entries, print statistics about each
                        used database
-q, --quiet             report no error messages about reading databases
-r, --regex REGEXP      search for basic regexp REGEXP instead of patterns
                        --regex patterns are extended regexps
-s, --stdio             ignored, for backward compatibility
-V, --version           print version information
-w, --wholename          match whole path name (default)

Report bugs to mitr@redhat.com.
c7:/tmp>
```

locate will only find files that were already in existence the last time the database was updated. On most systems, this is done by a background **cron** job, usually daily. To force an update, you need to do:

```
$ sudo updatedb
```