NAME

lzma, unlzma, lzcat − LZMA compression and decompression tool

SYNOPSIS

lzma [**−123456789cdefhkLqtvV**] [**−S** *suffix*] [*filenames ...*]
unlzma [**−cfhkLqtvV**] [**−S** *suffix*] [*filenames ...*]
lzcat [**−fhLqV**] [*filenames ...*]

DESCRIPTION

LZMA (Lempel-Ziv-Markov chain-Algorithm) is an improved version of famous LZ77 compression algorithm. It was improved in way of maximum increasing of compression ratio, keeping high decompression speed and low memory requirements for decompressing.

lzma command line tool has a similar interface to **gzip**(1) and **bzip2**(1) and is intended to make use of LZMA compression easy for the users who are already familiar with gzip and bzip2.

In this manual **lzma** is compared mostly to bzip2 because that is currently one of the most widely used free software to compress tar files made for distribution. Comparing lzma to gzip is not practical because neither lzma nor bzip2 can compete with gzip in compression speed. On the other hand the compression ratio of gzip is worse than of lzma and bzip2.

lzma provides notably better compression ratio than bzip2 especially with files having other than plain text content. The other advantage of **lzma** is fast decompression which is many times quicker than bzip2. The major disadvantage is that achieving the highest compression ratios requires extensive amount of system resources, both CPU time and RAM. Also software to handle LZMA compressed files is not installed by default on most distributions.

When compressing or decompressing with **lzma**, the new file will have the same ownership information, permissions and timestamps as the original file. However the this information is not stored into the compressed file like gzip does.

STREAMED VS. NON-STREAMED

LZMA files can be either streamed or non-streamed. Non-streamed files are created only when the size of the file being compressed is known. In practice this means that the source file must be a regular file. In other words, if compressing from the standard input or from a named pipe (fifo) the compressed file will always be streamed.

Both streamed and non-streamed files are compressed identically; the only differences are found from the beginnings and ends of LZMA compressed files: Non-streamed files contain the uncompressed size of the file in the LZMA file header; streamed files have uncompressed size marked as unknown. To know where to stop decoding, streamed files have a special End Of Stream marker at the end of the LZMA file. The EOS marker makes streamed files five or six bytes bigger than non-streamed.

So in practice creating non-streamed files has two advantages: 1) the compressed file is a few bytes smaller and 2) the uncompressed size of the file can be checked without decompressing the file. To view the data stored in the LZMA header use **lzmainfo**(1).

OPTIONS

Short options can be grouped like **−cd.**

−c −−stdout −−to−stdout
The output is written to the standard output. The original files are kept unchanged. When compressing to the standard output there can be only one input file. This option is implied when input is read from the standard input or the script is invoked as **lzcat**.

−d −−decompress −−uncompress
Force decompression regardless of the invocation name. This the default when called as **unlzma** or **lzcat**.

–f ––force
Force compression or decompression even if source file is a symlink, target exists, or target is a terminal. In contrast to gzip and bzip2, if input data is not in LZMA format, ––force does not make lzma behave like **cat**. **lzma** never prompts if target file should be overwritten; existing files are skipped or, in case of **––force**, overwritten.

–h ––help
Show a summary of supported options and quit.

–k ––keep
Do not delete the input files after compression or decompression.

–L ––license
Show licensing information of **lzma**.

–q ––quiet
Suppress all warnings. You can still check the exit status to detect if a warning had been shown.

–S ––suffix *.suf*
Use *.suf* instead of the default **.lzma**. A null suffix forces unlzma to decompress all the given files regardless of the filename suffix.

–t ––test
Check the integrity of the compressed file(s). Without **––verbose** no output is produced if no errors are found.

–v ––verbose
Show the filename and percentage reduction of each processes file.

–V ––version
Show the version number of **lzma**.

–z ––compress
Force compression regardless of the invocation name.

–1 .. **–9**
Set the compression ratio. See the next chapter for detailed information. These options have no effect when decompressing.

––fast Alias to **–1**.

––best Alias to **–9**.

COMPRESSION OPTIONS AND MEMORY USAGE

The compression options of **lzma** are divided to two groups. The first two (**–1** and **–2**) are designed for fast compression speed. **–3** .. **–9** provide good to excellent compression ratio but require more CPU time and system memory.

For relatively fast compression with medium compression ratio **–1** is the recommended setting. It's faster than 'bzip2 ––fast' and usually creates smaller files than 'bzip2 ––best'. **–2** makes somewhat smaller files but doubles the compression time close to what 'bzip2 ––best' takes.

Generally for excellent compression ratio, acceptable compression time and memory requirements (about 83 MB for compression, 9 MB for decompression) you should use **–7** which is also the default. **–8** and **–9** will give some gain especially with bigger files (>=tens of megabytes) but also increase the CPU and memory requirements dramatically. See the table below for memory requirements of different compression settings.

Flag	Compress usage	Decompress usage
-1	2 MB	1 MB
-2	12 MB	2 MB
-3	12 MB	1 MB
-4	16 MB	2 MB

-5	26 MB	3 MB
-6	45 MB	5 MB
-7	83 MB	9 MB
-8	159 MB	17 MB
-9	311 MB	33 MB

DIAGNOSTICS

Exit status:
0 – Everything OK.
1 – An error occurred.
2 – Something worth a warning happened but no errors.

AUTHORS

The LZMA algorithm and the implementation used in LZMA utils was developed by Igor Pavlov. The original code is available in LZMA SDK which can be found from http://7-zip.org/sdk.html .

lzma command line tool was written by Ville Koskinen. http://tukaani.org/lzma/

This manual page is inspired by manual pages of **gzip** and **bzip2**.

SEE ALSO

lzmadec(1), **lzmainfo**(1), **gzip**(1), **bzip2**(1)