

Apple Lossless

Apple Lossless, also known as **Apple Lossless Audio Codec** (**ALAC**), or **Apple Lossless Encoder** (**ALE**), is an audio coding format, and its reference audio codec implementation, developed by [Apple Inc.](#) for [lossless data compression](#) of digital [music](#). After initially keeping it [proprietary](#) from its inception in 2004, in late 2011 Apple made the codec available [open source](#) and [royalty-free](#). Traditionally, Apple has referred to the codec as *Apple Lossless*, though more recently it has begun to use the abbreviated term *ALAC* when referring to the codec.^{[1][2]}

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Apple Lossless

Developer(s)	Apple Inc.
Initial release	April 28, 2004
Stable release	October 28, 2011
Type	Audio codec
License	Apache License 2.0
Website	alac.macosforge.org (http://alac.macosforge.org)

Filename extension	.m4a .caf
Developed by	Apple Inc.
Type of format	Lossless data compression , audio file format
Contained by	MPEG-4 Part 14

Codec

Apple Lossless supports up to 8 channels of audio at 16, 20, 24 and 32 bit depth with a maximum sample rate of 384kHz. Apple Lossless data is frequently stored within an [MP4 container](#) with the [filename extension](#) *.m4a*. This extension is also used by Apple for lossy AAC audio data in an MP4 container (same container, different audio encoding). However, Apple Lossless is not a variant of [AAC](#) (which is a lossy format), but rather a distinct lossless format that uses [linear prediction](#) similar to other lossless codecs. These other lossless codecs, such as [FLAC](#) and [Shorten](#), are not natively supported by Apple's [iTunes](#) nor the later [Music applications](#) (either the macOS or Windows versions) or by [iOS devices](#) running [iOS 10](#) or below. In order to be played through the iTunes and Music applications on iOS, audio files using these lossless codecs may be converted via various [third-party](#) tools into ALAC-encoded files with no change in fidelity. However, it is possible to use certain third-party applications downloaded from the [App Store](#) to play such files without converting them. Devices running [iOS 11](#) or above do support FLAC playback natively, through the [Files](#) application only.^[3] The method of importing the files to or acquiring them on the device varies between applications, including Files, as there is currently no official support for doing so.^[4] Users of the iTunes or Music applications who wish to use a lossless format which allows the addition of [metadata](#) (unlike [WAV/AIFF](#) or other PCM-type formats, where [metadata is usually ignored](#)) must use ALAC.^[5] All current iOS devices can play ALAC-encoded files. ALAC also does not use any [DRM](#) scheme; but by the nature of the [MP4 container](#), it is feasible that DRM could be applied to ALAC much in the same way it is applied to files in other QuickTime containers.

According to Apple, audio files compressed with its lossless codec will use up "about half the storage space" that the uncompressed data would require. Testers using a selection of music have found that compressed files are about 40% to 60% the size of the originals depending on the kind of music, which is similar to other

lossless formats.^{[6][7]} Furthermore, compared to some other formats, it is not as difficult to decode, making it practical for a limited-power device, such as older iOS devices.^{[8][9]}

Partly because of the use of an MP4 container, Apple Lossless does not contain integrated error checking.^[10]

While not nearly as common, the ALAC format can also use the .CAF file type container.

History

The data compression software for encoding into ALAC files, Apple Lossless Encoder, was introduced into the Mac OS X Core Audio framework on April 28, 2004 together with the QuickTime 6.5.1 update, thus making it available in iTunes since version 4.5 and above, and its replacement, the Music application.^[11] The codec is also used in the AirPort and AirPlay implementation.

The Apple Lossless Encoder (and decoder) were released as open source software under the Apache License version 2.0 on October 27, 2011,^{[12][13][14]} however, an independent reverse-engineered open-source encoder and decoder were already available before the release.

Other players

David Hammerton and Cody Brocious have analyzed and decoded this codec without any documents on the format. On March 5, 2005, Hammerton published a simple open source decoder written in the C programming language on the basis of the reverse engineering work.^[15]

The open source library libavcodec incorporates both a decoder and an encoder for the Apple Lossless format, which means that media players based on that library (including VLC media player and MPlayer, as well as many media center applications for home theater computers, such as Plex, XBMC, and Boxee) are able to play Apple Lossless files. Windows 10 supports ALAC encoding and decoding since 2015, thereby enabling other media players to use it, e.g. Windows Media Player when ripping CDs or the Spotify desktop client for playback of local .m4a files. The library was subsequently optimized for ARM processors and included in Rockbox. Foobar2000 will also play Apple Lossless files as will JRiver Media Center and BitPerfect.

See also

- Audio Interchange File Format (AIFF)
- Comparison of audio coding formats
- Free Lossless Audio Codec (FLAC)
- Monkey's Audio
- TTA
- WavPack
- Windows Media Audio 9 Lossless

References

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2. "Access your music collection on all of your devices with Apple Music" (<https://support.apple.com/en-us/HT205919>). Apple Inc. May 12, 2017. Retrieved May 31, 2017. "We create AAC 256Kbps versions of songs that are encoded in ALAC, WAV, or AIFF formats and add the AAC version to iCloud Music Library."
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External links

- ALAC Project (<http://alac.macosforge.org>) at MacOSForge
- ALAC (<http://alac.macosforge.org/trac/browser/trunk/ReadMe.txt>) technical features at MacOSForge

- [ALAC \(https://web.archive.org/web/20110329002415/http://www.apple.com/itunes/features/#importing\)](https://web.archive.org/web/20110329002415/http://www.apple.com/itunes/features/#importing) importing at [Apple](#)
 - [ALAC compression rates for different types of music \(https://kirkville.com/an-overview-of-apple-lossless-compression-results\)](https://kirkville.com/an-overview-of-apple-lossless-compression-results) article by Kirk McElhern
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