Audio File Types for Preservation and Access

Introduction

This resource guide identifies and compares audio file formats commonly used for preservation masters and access copies for both born digital and digitized materials. There are a wide range of audio file formats available, each with their own uses, considerations, and best practices.

For more information about technical details see the glossary and additional resources linked at the end of this resource guide.

For more information about audio files, view related items connected to this resource on the Sustainable Heritage Network in the "Audio Recordings" category.

Audio File Formats for Preservation Masters

Lossless files (either uncompressed, or using lossless compression) are best used for preservation masters as they have the highest audio quality and fidelity, however, they produce the largest file sizes. Preservation Masters are generally not edited, or are minimally edited because their purpose is to serve as the most faithful copy of the original recording possible.

WAV (Waveform Audio File Format)

- Uncompressed
- Proprietary (IBM), but very widely used
- Accessible on all operating systems and most audio software
- A variant called BWF (Broadcast Wave File Format) allows embedding of additional metadata

FLAC (Free Lossless Audio Codec)

- Compressed (lossless)
- Open format
- Accessible on all operating systems, but additional free plugins or specific software may be required for use

AIFF (Audio Interchange File Format)

- Uncompressed
- Proprietary (Apple)
- Easily accessible on macOS, may be limited on other operating systems

ALAC (Apple Lossless Audio Codec)

- Compressed (lossless)
- Proprietary (Apple)
- Easily accessible on macOS, iOS, and iTunes, may be limited on other operating systems

Audio File Formats for Access Copies

Lossy files are best used for access copies (see the glossary at the end of this guide for more information). Their reduced file size makes hosting and access in online platforms easier. Access copies are usually generated from preservation masters, and are often edited to improve audio quality, remove silence, noise or unwanted sections of a recording, or divide a longer recording into smaller segments for easier distribution.

MP3 (MPEG Audio Layer III)

- Compressed (lossy)
- Open format (very common)
- Accessible on all operating systems and most audio software

AAC (Advanced Audio Coding)

- Compressed (lossy)
- Proprietary (Dolby)
- Accessible on all operating systems and most audio software
- Often encoded with the file extensions .m4a or .mp4

OGG (Ogg Vorbis)

- Compressed (lossy)
- Open format (less common)
- Accessible on all operating systems and some audio software

GLOSSARY

Access Copies

Access copies are generally lower quality copies of an audio recording generated for ease of access and distribution (compared to preservation masters), and are often edited. These files are usually much smaller than the preservation masters they are generated from, and have lower fidelity to the original audio sample.

Compression

Compression refers to how the algorithms behind each file format work to optimize data and deliver the desired output with the smallest file size. Compressed file formats use either lossless or lossy compression. Every compressed file format uses a different algorithm that produces unique results.

Uncompressed files do not undergo compression, are lossless, and no data is modified or removed from the files. Uncompressed files have the greatest fidelity, and the largest file sizes.

Lossless compression algorithms reduce file sizes but do not remove any data. Lossless files are smaller than uncompressed files, but larger than lossy files. While they are identified as “lossless”, there are heated debates in the audio community about just what degree of fidelity is maintained with lossless compression.

Lossy compression algorithms remove data from files, and then interpolate the missing data on playback. Lossy files have the smallest file size, but the poorest quality and fidelity.

Fidelity

Fidelity refers to how faithfully recordings capture and represent the original audio sample as it would have been heard in person. This does not necessarily mean that it will sound as good as possible, and certain recordings may benefit from post-processing or editing to deliver a better final product. For example, a quiet recording of a very faint voice may need to be amplified and edited before it is made available as an access copy, but the preservation master should remain unedited to preserve its fidelity.

Preservation Masters

Preservation masters refer to the highest quality capture of an audio recording available. These files can be quite large, and represent the greatest fidelity to the original audio sample, and generally undergo little to no editing. Access copies are often generated from preservation masters.

Proprietary and Open Formats

Many file formats are proprietary, meaning they have been developed by a specific company or developer. Proprietary formats may require software sold or distributed by the developer, but some are licensed or otherwise made more widely available. While some proprietary formats have become ubiquitous, be cautious of less commonly used file formats, as they may not be as well supported across multiple platforms and/or softwares. Where possible, consider using open formats to promote future compatibility and sustainability of your files.

Additional Resources

- Wikipedia
    - List of many audio formats, with links out to technical details of each
- NCH Software
    - Comparison of many open and proprietary formats
- JISC Digital Media
    - Access Copies
    - Digitized and Born Digital preservation masters