ESTIMATING STORAGE REQUIREMENTS FOR DIGITAL AUDIO

When planning a digitization project, it is easy to overlook the amount of server space required to store the digital files. This document provides the information needed to reasonably estimate the size of an audio file based on its format, sample rate, bit depth, and duration.

ARCHIVAL MASTERS

According to archival best practices, audio formats should be digitized as uncompressed WAV files at a sample rate between 44.1 and 96 kilohertz (KHz) and a bit depth of 16 or 24 bits. More complex recordings, such as musical recordings, should be digitized using a higher sample rate and bit depth. The following chart indicates the size of a one-hour WAV file using different sample rates and bit depths for both stereo and mono.

Formula: bit depth x KHz = kilobits per second (for mono)

bit depth x KHz x 2 = kilobits per second (for stereo)

kilobits per second / 8 = kilobytes per second

Example: 16 (bit depth) x 96 (KHz)=1,536 kilobits per second=192 KB per second (mono)

Bit depth and sample rate	Bit rate (mono)	File size per second (mono)	File size per minute (mono)	File size per hour (mono)
16 bit, 44.1 KHz	705.6 Kbps	88.2 KB	5.292 MB	317.52 MB
16 bit, 48 KHz	768 Kbps	96 KB	5.57 MB	345.6 MB
24 bit, 48 KHz	1,152 Kbps	144 KB	8.64 MB	518.4 MB
24 bit, 96 KHz	2,304 Kbps	288 KB	17.28 MB	1.0368 GB

Bit depth and sample rate	Bit rate (stereo)	File size per second (stereo)	File size per minute (stereo)	File size per hour (stereo)
16 bit, 44.1 KHz	705.6 Kbps	176.4 KB	10.584 MB	635.04 MB
16 bit, 48 KHz	768 Kbps	192 KB	11.14 MB	691.2 MB
24 bit, 48 KHz	1,152 Kbps	288 KB	17.28 MB	1.0368 GB
24 bit, 96 KHz	2,304 Kbps	576 KB	34.56 MB	2.0736 GB

ACCESS COPIES

MP3s are the recommended file type for sharing digitized audio. When converting a WAV to an MP3, an audio editing program will discard information depending to save on storage space. The amount of information discarded depends upon the target bit rate set by the user. Using a lower bit rate causes more information to be lost, but also creates smaller files. The chart below calculates file size based on bit rate per second.

Bit rate	File size per second	File size per minute	File size per hour
56 kbps	7 KB	420 KB	25.2 MB