

Preserving State Government Digital Information Minnesota Historical Society

Resource List for Digital Audio and Video White Paper

AboutVideoEditing.com. *Streaming Video Over the Web*. 2008.
<http://www.aboutvideoediting.com/articles/web-streaming-video.shtml>

A discussion about streaming media including advantages and disadvantages of the technology as well as an explanation of the process and how to choose the best format and encoding parameters. Includes general information on the features of RealPlayer, QuickTime and Windows Media Player.

Adobe. *Adobe Audition 1.0: A Digital Audio Primer*. 2003.
<http://www.adobe.com/products/audition/pdfs/audaudioprimer.pdf>

The basic ideas of digital audio are explained in this primer starting with the fundamentals of analog sound moving into the details of digital audio. Graphs help to clarify the physics of sound and provide a physical explanation of sampling rate and bit depth.

Arms, Caroline R. and Carl Fleischhauer. *Sustainability of Digital Formats Planning for Library of Congress Collections*. Library of Congress. May 21, 2007.
<http://www.digitalpreservation.gov/formats/index.shtml>

This website gathers information on digital file formats and places them in a centralized location. The site includes an inventory of current and emerging digital formats with descriptions about how they can be used and if they are appropriate for long-term preservation. Information on audio and video files as well as still images and textual formats are included.

Audio-Visual Working Group. *Audio-Visual Working Group*. Federal Agencies Digitization Guidelines Initiative. February 6, 2009. <http://www.digitizationguidelines.gov/audio-visual/>

A working group whose goal it is to develop and share information on standards and best practices for digital reformatting of audio-visual materials with some consideration of born digital materials for federal agencies. Formats and metadata are major topics of discussion.

Besser, Howard. "Digital Longevity," in Maxine K. Sitts, ed., *Handbook for Digital Projects: A Management Tool for Preservation and Access*. Northeast Document Conservation Center. 2000. <http://www.gseis.ucla.edu/~howard/Papers/sfs-longevity.html>

Addresses many issues digital files may be effected by in the process of trying to preserve them including; format obsolescence, software incompatibilities, and lack of preservation policies. A few options for improving access over time are also discussed including the value of metadata.

Bibliographic Center for Research. *BCR's CDP Digital Imaging Best Practices Version 2.0*. June 2008. <http://www.bcr.org/cdp/best/digital-imaging-bp.pdf>

A general best practice guide that addresses all aspects of a digitization project including background information, creation basics, hardware and software considerations, guidelines for master images, preservation metadata, storage options, and long-term access. Audio and video files are included.

Bouthillier, Larry. *Streaming vs. Downloading Video: Understanding the Differences*. StreamingMedia.com. July 22, 2003. <http://www.streamingmedia.com/r/printerfriendly.asp?id=8456>

An explanation of two methods of transmitting files, streaming and downloading with a discussion about storing files on a web server vs. a streaming server.

Brylawski, Samuel. "Preservation of Digitally Recorded Sound." *Building a National Strategy for Digital Preservation: Issues in Digital Media Archiving*. Council on Library and Information Resources and Library of Congress. April 2002. <http://www.clir.org/pubs/reports/pub106/pub106.pdf>

Addresses preservation concerns including format changes, distribution concerns, rights management, and the importance of metadata. The importance of developing standards, using repositories and collaboration is also covered.

Cakewalk by Roland. *Desktop Music Handbook Glossary of MIDI and Digital Audio Terms*. <http://www.cakewalk.com/Tips/desktop-glossary.asp>

Glossary of digital audio terms.

Casey, Mike and Bruce Gordon. Sound Directions: Best Practices Guide for Audio Preservation. 2007. Indiana University Digital Library Program.

http://www.dlib.indiana.edu/projects/sounddirections/papersPresent/sd_bp_07.pdf

Includes best practice information on required personnel and equipment, digital formats, metadata, storage practices, and preservation systems. Specific details are provided by Indiana University and Harvard University for each recommendation.

The Center for Research Libraries (CRL) and Online Computer Library Center (OCLC).

Trustworthy Repositories Audit and Certification: Criteria and Checklist. February 2007.

<http://www.crl.edu/PDF/trac.pdf>

This guide and checklist can be used to evaluate repositories for levels of trustworthiness based on their organizational structure, digital object management practices, technical infrastructure, and security.

Clair, Kevin. "Developing an Audiovisual Metadata Application Profile: A Case Study." *Library Collections, Acquisitions, and Technical Services* 32, no. 1 (2008): 53-57.

Discusses how audiovisual materials have additional metadata requirements than textual documents. The application profile they created uses both Dublin Core and PBCore. It is hoped that by developing and sharing strategies for metadata implementation best practices can be developed.

Collaborative Digitization Program (CDP)'s Digital Audio Working Group. *Digital Audio Best Practices Version 2.1*. Bibliographic Center for Research. October 2006.

<http://www.bcr.org/cdp/best/digital-audio-bp.pdf>

Best practice guide that focuses on digital audio materials. The guide discusses planning, implementing, and managing an audio digitizing project. Metadata standards for digital audio are discussed including how to document the legal and intellectual property rights issues. Explanation of how Dublin Core is used as the metadata best practice.

Guidelines of audio recording methods are also covered, including modes of capture, sample rate, bit depth, source types, and file types. The issues of storage, preservation and access to files are addressed.

Columbia University Libraries: Preservation Division. *Survey Instrument for Audio and Moving Image Collections*. Columbia University Libraries. 2005.

<http://www.columbia.edu/cu/lweb/services/preservation/audiosurvey.html>

The Preservation Division of the Columbia University Libraries developed and tested a survey instrument that helps inventory and addresses the physical condition and intellectual control of audio and moving image materials in a collection. The survey instrument and instruction manual are available for free download.

The Commission on Preservation and Access and the Research Libraries Group. *Preserving Digital Information*. Report of the Task Force on Archiving Digital Information. May 1, 1996.

<http://www.ifla.org/documents/libraries/net/tfadi-fr.pdf>

General concerns about archiving digital information including technological obsolescence, migration, legal concerns, and data integrity. A depository library model and a digital archive model are explained as methods of preservation and access.

Dance Heritage Coalition. *Digital Video Preservation Reformatting Project*. Dance Heritage Coalition, Inc. June 2004. [http://www.media-](http://www.media-matters.net/docs/resources/Digital%20Files/MotionJPEG%202000/DigitalVideoPreservation1.pdf)

[matters.net/docs/resources/Digital%20Files/MotionJPEG%202000/DigitalVideoPreservation1.pdf](http://www.media-matters.net/docs/resources/Digital%20Files/MotionJPEG%202000/DigitalVideoPreservation1.pdf)

A report on a specific digital video reformatting project including documentation of the entire process of choosing a suitable file format, analyzing various codecs, and testing the conversion process. A summary analysis of the project and recommendations follow.

Digital Conservancy. *Digital Audio Guidelines*. University of Minnesota. 2007.

<http://conservancy.umn.edu/bp-audio.jsp>

Guidelines in place at the University of Minnesota for digital audio files at the Digital Conservancy. Minimum, recommended and optimal standards for sample rate and bit-depth are given. Preferred file formats are also discussed.

DigitalTips. *Digital Audio 101*. <http://www.digitaltips.org/audio/audio101.asp>

Information about digital audio files including how they work, compression types, file formats, storage devices, and playback concerns.

Fells, Nick and Pauline Donachy and Catherine Owen. *Arts and Humanities Data Service Guides to Good Practice: Creating Digital Audio Resources: A Guide to Good Practice*. Arts and Humanities Data Service (AHDS).

http://ahds.ac.uk/creating/guides/audio-resources/GGP_Audio_Overview.htm

The Arts and Humanities Data Service created a guide that addresses best practices when working with digital audio. Copyright issues, digitization methods, playback concerns, delivery methods, and preservation are all covered. The guide also includes a glossary, bibliography, and case studies. Chapter 8: *Documenting Digital Audio Resources*. (http://ahds.ac.uk/creating/guides/audio-resources/GGP_Audio_8.1.htm) discusses metadata.

Formats Group, Deep Blue. *Best Practices for Producing Quality Digital Audio Files Version 1.0*. University of Michigan July 10, 2006. <http://hdl.handle.net/2027.42/40248>

Guidelines in place at the University of Michigan for digital audio files. Minimum, recommended and optimal standards for sample rate and bit-depth are given. Preferred file formats are also discussed. Differentiates direct to digital and analog to digital processes for creating high quality files.

Grammy Foundation. Grammy Foundation Basic Methodology for Preservation, Conservation and Archiving Recorded Media. May 2008.

http://www.grammy.com/PDFs/GRAMMY_Foundation/Methodology_2009_Final.pdf

Includes information on the long-term storage efforts of the Grammy Foundation. Links to industry standards are included. Conversions, archiving, and preservation standards are addressed.

Guy, Marieke. *QA Focus Documents: Choosing a Suitable Digital Video Format*. UKOLN. October 1, 2004. <http://www.ukoln.ac.uk/qa-focus/documents/briefings/briefing-25/html/>

Provides general background information on digital video files. Information on screen size, pixels per frame, bit depth, frames per second, and bandwidth, all of which effect video quality, are discussed. Also discusses distribution methods and possible challenges, and defines relevant terms for digital video files.

Harvard University Library. *Administrative Metadata for Digital Audio Files*. Harvard University Library: Library Digital Initiative. 2004.
<http://preserve.harvard.edu/resources/audiometadata.pdf>

Discusses and provides definitions for technical metadata necessary when describing digital audio files. Includes specific information on the metadata tag, if it is required or optional, repeatable or not, and details on its values; examples for each are included.

Hass, Jeffrey. "Chapter 5: Digital Audio: 8: Digital audio file formats," in *Introduction to Computer Music: Volume 1*. 2005.
http://www.indiana.edu/~emusic/etext/digital_audio/chapter5_file.shtml

General background on digital audio files followed by a list of common file formats.

Jantz, Ronald and Michael Giarlo. "Digital Archiving and Preservation: Technologies and Processes for a Trusted Repository." *Journal of Archival Organization*. 2007. 4:1, 193-213.

Discusses the need for a trusted repository as a method for long-term preservation of digital items. Trust is associated with the standards, policies, and technological infrastructure of the repository as well as the trustworthiness of the hardware and software used in the system. Examples are given in regards to workflow scenarios. Key ideas include digital signatures, persistent identifiers, validating object integrity, audit trails, and overall stability.

Knight, Gareth and John McHugh. *Preservation Handbook: Digital Audio*. Arts and Humanities Data Service (AHDS). United Kingdom. July 25, 2005.
<http://ahds.ac.uk/preservation/audio-preservation-handbook.pdf>

Quality of audio files is affected by sampling frequency, bit-rate, and codec, all of which are discussed here. Compression techniques are also discussed. Includes a chart of common formats listing format name, extension, and selected information about each format.

Lawrence, Gregory W. et al. *Risk Management of Digital Information: A File Format Investigation*. Council on Library and Information Resources. June 2000.
<http://www.clir.org/pubs/reports/pub93/contents.html>

Categories of risk that may affect migration and long-term preservation of file formats are defined and explained. A case study and risk assessment workbook are included.

Lockhorn, Jeremy. *Video Search Catches Up with Video Tagging*. ClickZ. January 29, 2007.
<http://www.clickz.com/3624735>

Addresses video tagging as a method of maximizing video distribution and consumption and its importance in search functions.

McDonough, Jerome and Mona Jimenez. "Video Preservation and Digital Reformatting: Pain and Possibility." *Journal of Archival Organization*, 2006, Vol. 4 Issue ½, p. 167-191, 25 p, 1 diagram.

Discusses the importance of metadata in regards to digital video preservation. Covers descriptive metadata as well as intellectual property rights metadata, technical metadata, digital provenance metadata, and structural metadata. Other issues surrounding digital artifacts are also covered.

MP3 Sound Stream. *History of Streaming Audio*. October 15, 2008.
<http://mp3soundstream.com/streaming-audio/history-of-streaming-audio/>

The development of streaming technology, its shortcomings, associated costs, current use, and future use are all discussed. A more general history of digital audio is also included.

National Archives Records Administration (NARA). *Frequently Asked Questions (FAQ) About Digital Audio and Video Records*. The National Archives. <http://www.archives.gov/records-mgmt/initiatives/dav-faq.html>

NARA's general guidelines for digital audio and video files are found in the Frequently Asked Questions section as formal guidelines have not been issued. General questions about selecting file formats, conversion processes, metadata, data structure and codecs are answered. Answers to more specific questions about digital audio and video files follow, including recommendations on appropriate file formats, codecs, bit depth, sample rate, height and width requirements, and color requirements.

Ottewill, Matt. *Digital Audio File Formats and Codecs*. Planet of Tunes.
<http://www.planetoftunes.com/digiaudio/daudiofiles.html>

Introduction to digital audio file formats and associated codecs. Parameters that affect digital audio quality are also defined. A chart shows file format, compression codecs, sample rate, bit depth and number of channels for common audio file formats. The relationship between compression, audio file parameters, and file size are discussed.

Ottewill, Matt. *Digital Video File Formats and Codecs*. Planet of Tunes. November 2008.
<http://www.planetoftunes.com/dv/videofiles.html>

A discussion on video quality and file size as affected by the codec. Explains the range of locations a codec can be found and used on video formats. A chart with some file formats, their associated codec/s, and methods of use shows the variety of digital video file formats.

Tittel, Ed. *A Quick 'Rip' Through Digital Audio File Formats*. Peachpit. July 30, 2004, updated October 11, 2004. <http://www.peachpit.com/articles/article.aspx?p=212411>

A discussion about digital audio quality, types of players, and compression methods including a chart of common digital audio formats with file format name, extension, date of creation, compression type, and various notes about each format. A resource list is also included.

UKOLN at the University of Bath. *Good Practice Guide for Developers of Cultural Heritage Web Services*. July 2008. <http://www.ukoln.ac.uk/interop-focus/gpg/>

Intended to provide advice for cultural heritage agencies developing web services, this resource provides information on digitization and preservation of digital formats including audio and video. The section on *Image Formats* (<http://www.ukoln.ac.uk/interop-focus/gpg/Formats/> updated April 2006) and the section on *Digital Preservation* (<http://www.ukoln.ac.uk/interop-focus/gpg/Preservation/> updated January 2005) are especially relevant.

University of Iowa. *ITS Video Services: Terms and Explanation*. August 6, 2008.
<http://www.its.uiowa.edu/tns/videoservices/streamdef.htm>

Although written specifically for University of Iowa's systems, this includes a general explanation of the streaming process with a graphical representation of streaming vs. downloading. Definitions of basic terms including selected codecs and file formats are also included.

Waclar, Howard D. and Michael G. Christel. "Digital Video Archives: Managing Through Metadata." *Building a National Strategy for Digital Preservation: Issues in Digital Media Archiving*. Council on Library and Information Resources and Library of Congress. April 2002.
<http://www.clir.org/pubs/reports/pub106/pub106.pdf>

Addresses the concerns and issues relating to digital video metadata. Dublin Core, and video production level metadata standards are discussed including MPEG-7 and MPEG-21. The relationship between metadata and preservation is also discussed.