

Preservation Action Plan: Moving Image/Digital Video National Archives and Records Administration (NARA)

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Electronic Record or Digital Surrogate Types and Associated Formats

Digital moving images consist of bitmap digital images or “frames” displayed in rapid succession at a constant rate, giving the appearance of movement. Digital Video is an electronic representation of moving images in the form of encoded digital data. The information is made up of a sequence of data rather than as a continuous signal. Digital video is defined as a video stream that has been created as, or converted into, digital form encoded as numerical samples in continuous sequence. Each frame is comprised of a series of pixels with resolution determined by the relative number of pixels in a frame (SD, HD, UHD). Digital video formats are generally composed of both a wrapper format, usually the common name associated with the file extension, and an encoding method or codec.

Significant Properties of Digital Video

To render an authentic digital video file one must preserve the structural and technical metadata that allows for proper transmission of the video stream (size, codec, frame rate, interlacing, chroma subsampling, duration, channels, and bit depth).

General requirements for digital video records: Migrate or digitize to standards appropriate for the accurate preservation of the original video, when converting analog material (e.g., video cassettes, open reel video, etc.). For reformatted video, 8-bit is acceptable but 10-bit is preferred.

Due to the variability and constant changes to most video file format specifications, some of the questions to consider when preserving video formats are:

- How do different platform or cross compatibility issues come into play?
- What tools are available to authenticate transforms from one format to another?

Appearance

Name	Definition	Function Description
Size	Determined by bit depth, frame rate, compression, sub/sampling rate, and duration.	

Structure

Name	Definition	Function Description
Layout Structure	Embedded technical metadata describing, among other things: GUID, file size, format, duration, codec, frame rate, frame width, frame height, bit depth, and bit rate for video and audio components.	

Behavior

Name	Definition	Function Description
Display	Image	Video signal is made up of Luminance, Chrominance, and frame rate.
Audio	Sound is an audio waveform that has been created as, or converted into, digital form and can be heard during playback of the video.	

Context

Name	Definition	Function Description
Descriptive Metadata	This includes but is not limited to: Unique identification number; Title; Creator; Copyright; Summary.	Digital Video Files could contain, or link to: metadata that describes any attribute that could be seen in a recording or provides information about the recording.

Technical Metadata	This includes but is not limited to: Originator: Unique identification number assigned by creator; origination date; coding history; levels.	Digital Video Files could contain or link to: data on the recording/ digitizing process including signal chain specifics, sample rate and bit depth, and other elements.
Administrative Metadata	This includes but is not limited to: catalog URL; classification or access level.	Digital Video Files could contain, or link to: metadata that describes how/ where to access the record.

Current NARA Transfer Guidance for Digital Video [Bulletin 2014-04](#)

- Preferred:
 - None specified
- Acceptable:
 - Audio Video Interleaved Format (AVI)
 - QuickTime File Format (MOV)
 - Windows Media Video 9 File Format (WMV)
 - Advanced Video Coding (MPEG 4)
 - MPEG-2 Video (MPEG2)
 - Material Exchange Format (MXF)

Current NARA Format(s) for Public Access and Reference for Digital Video

Formats for Public Access are those made available online through the National Archives Catalog. Formats for Reference are defined as those made available to researchers upon direct requests for digital copies.

Formats Available for Public Access: Content created or delivered for public access in the Catalog is delivered primarily in the following file formats: PDF (Textual and Image), JPEG (Textual and Image), MP3 (Audio), and MP4 (Audio/Video) and ASCII (Datasets). Other file formats may be present depending on when they were added to the Catalog.

Format(s) Available for Reference: MPEG 4 (H.264)

Comments and Notes

The following are accepted guidance for how to create, archive, and reformat Digital Video:

- FADGI - Digital File Formats for Videotape Reformatting
http://www.digitizationguidelines.gov/guidelines/FADGI_VideoReFormatCompare_pt5_20141202.pdf
- FADGI - Creating and Archiving Born Digital Video
http://www.digitizationguidelines.gov/guidelines/FADGI_BDV_p3_20141202.pdf
- FADGI - Detailed Matrixes Digital File Formats for Reformatting videotape
http://www.digitizationguidelines.gov/guidelines/video_reformatting_compare.html