

RUCORE RUTGERS COMMUNITY REPOSITORY

Recommended minimum standards for preservation sampling of moving image objects

Introduction

This document will set forth a standards recommendation for moving images and digital video. In particular, this video object standard will recommend specific file formats for the preservation master and derivatives, for implementation into the Workflow Management System (WMS), as well as recommend sampling rates and specifications for presentation derivatives.

As with all other standard types established thus far, it will be mandatory to archive an uncompressed archival master, to ensure an object of the highest quality is preserved. Additionally, two downsampled and compressed presentations copies will be made available for end users wishing to access these objects online. These presentation copies are to be stored and accessible in formats that users will find easy to play back, and will use file formats and codecs that are compatible with multiple computer platforms.

Sampling and Digitization Rationale

The handling and preservation of digitized moving images presents a unique challenge to digital repositories. Presently, uncompressed digital video demands an extremely large amount of storage space, and produces incredibly large files. Yet, the need to store an uncompressed or reliable lossless-compressed object is paramount to ensure its longevity. While it is recognized that work continues in perfecting lossless video compression standards, we feel that these codecs are not mature enough and have not yet reached a critical mass in terms of user base and supporting software to implement in place of an uncompressed stream. We remain open to revisiting this stance in the future.

In spite of the present need to store an uncompressed stream when digitizing from an analog master, it is obvious that delivering such an object to end users would be impractical given current average connection speeds. Consequently, there is an additional need for downsampled, compressed presentation formats for video objects, more than any other object type addressed by the repository.

As always, the guidelines presented here are recommendations, and there may be cases where judgment calls will need to be made about objects that would be better preserved by modifying the recommended guidelines for this purpose. The RUcore Media Standards Working group or the Advisory Committee should be consulted for guidance when such adaptations are require

Recommended Standards for NJDH and RU-CORE Video Digitization

For preservation masters:

File format: *Uncompressed, Full Frame Video (AVI file format)*

Frame rate for analog Standard Definition (SD) video, NTSC: *29.97 frames per second, 640 x 480 resolution (assuming square pixels). 4:2:2 quantization, 30MiB/s data rate.*

We recognize this sampling scheme as the minimum acceptable rate to ensure a good preservation master of analog SD video archives, and will be the most common sampling rate for objects that come to us as SD analog video. This standard is based on our experiences with digitizing S/VHS video objects.

For Digital objects (i.e. DV/HDV), including high definition video: *Use and preserve same frame rate, resolution and bit rate as the original*

For born-digital video objects such as DV or MPEG-2, the logical course of action is to preserve the exact specifications of the original. It will not be wise to downsample the original as that will cause a loss of object data, and no improvement in quality will be gained from upsampling.

All other objects: Make best effort to preserve frame rate and resolution of the original content. The goal in digitizing the various analog formats that may come to us will be to create a digital master file that preserves the content of the analog original as accurately as the digital media permits. A wide degree of flexibility and some experimentation may be required to determine accurate settings for each unique case.

Recommended output formats for presentation derivatives:

- **One downloadable video clip for low-speed (dialup) connections**
 - **Quicktime Format (.MOV),**
 - For SD: Frame size of **320 x 240 resolution (square pixels), 30 frames per second, multi-pass encoding**
 - For HD: Frame size of **854 x 480 resolution (square pixels), 30 frames per second, multi-pass encoding**
 - Data rate of **256kbps**
 - **Key frames inserted every 30 frames. This rate should be adjusted when necessary.**

This recommendation is aimed at reducing the file size of the presentation video clip at the expense of playback quality. This format may be a better choice for users of 56K dial-up internet connections, and will lend itself to streaming capabilities to be added at a future date. This presentation format simulates the experience of streaming video, allowing the user to view the beginning of the video object while the remainder continues to download in the background. Users choosing to view this format will need to download a free Quicktime player from Apple Computer, Inc.

- **One progressive-download video clip for high-speed connections**
 - **Flash Video Format (.FLV), using Sorenson Squeeze Codec**
 - For SD: Frame size of **640 x 480 resolution (square pixels), 30 frames per second**
 - For HD: Frame size of **1280 x 720 resolution (square pixels), 30 frames per second**
 - Data rate of **300-600kbps**
 - **Key frames inserted every 30 frames. This rate should be adjusted when necessary.**

Our experimentation has shown these output settings to be an ideal compromise, producing a clip viewable at acceptable quality on a computer screen while providing a reasonably manageable file size. This format will best accommodate users on a high speed campus or corporate network, wireless broadband (such as WiMax or WiFi) or on a home broadband connection such as DSL or cable modem. Dial-up users may also use this datastream, however they can expect to wait a significant period of time for the clip to download before they can play its contents. Users choosing to view this format will need to download the latest version of a free Macromedia Flash Plug-in, provided by Adobe Systems, Inc.