

Digital Preservation at Oxford and Cambridge

A collaborative research project to evaluate and provide sustainable recommendations for our digital preservation programmes

Audiovisual creation and preservation: part 2

Posted on **25 August, 2017** by **somaya**

Paul Heslin, Digital Collection Infrastructure Support Officer/Film Preservation Officer at the National Film and Sound Archive of Australia (NFSA) has generously contributed the following blog post. Introduction by Cambridge Policy and Planning Fellow, Somaya.

Introduction

As Digital Preservation is such a wide-ranging field, people working in this field can't be an absolute expert on absolutely everything. It's important to have areas of expertise and to connect and collaborate with others who can share their knowledge and experience.

While I have a background in audio, broadcast radio, multimedia and some video editing, moving image preservation is not my area of speciality. It is for this reason I invited Paul Heslin to compose a follow-up to my [Audiovisual creation and preservation](#) blog post. Paul Heslin is a Digital Archivist at the NFSA, currently preoccupied with migrating the digital collection to a new generation of LTO tapes.

I am incredibly indebted to Paul and the input from his colleagues and managers (some of whom are also my former colleagues, from when I worked at the NFSA).

Background to moving image preservation

A core concern for all archives is the ongoing accessibility of their collections. In this regard film archives have traditionally been spoilt: a film print does not require any intermediate machinery for assessment, and conceptually a projector is not a complicated device (at least in regards to presenting the visual qualities of the film). Film material can be expected to [last hundreds of years](#) if kept in appropriate vault conditions; other moving image formats are not so lucky. Many flavours of videotape are predicted to be [extinct within a decade](#), due to loss of machinery or expertise, and born-digital moving image items can arrive at the archive in any possible format. This situation necessitates digitisation and migration to formats which can be trusted to continue to be suitable. But not only suitable!

Optimistically, the digital preservation of these formats carries the promise of these items maintaining their integrity perpetually. Unlike analogue preservation, there is no assumption of degradation over time, however there are other challenges to consider. The equipment requirements for playing back a digital audiovisual file can be complicated, especially as the vast majority of such files are compressed using encoding/decoding systems called codecs. There can be very interesting results when these systems go wrong!



— Example of Bad Compression (in Paris). Copyright Paul Heslin

Codecs

Codecs can be used in an archival context for much the same reason as the commercial world. Data storage is expensive and money saved can certainly be spent elsewhere. However, a key difference is that archives require truly lossless compression. So, it is important here to distinguish between lossless codecs which are *mathematically lossless* and those which are *visually lossless*. The latter claims to encode in a way which is visually indistinguishable from an original source file, but it still dispenses with 'superfluous' data. This is not appropriate for archival usage, as this data loss cannot be recovered, and accumulated migration will ultimately result in visual and aural imperfections.

Another issue for archivists is that many codecs are proprietary or commercially owned: Apple's ProRes format is a good example. While it is ubiquitously used within the production industry, it is an especially troubling example given signs that [Apple will not be providing support into the future, especially for non-Mac platforms](#). This is not a huge issue for production companies who will have moved on to new projects and codecs, but for archives collecting these materials this presents a real problem. For this reason there is interest in dependable open standards which exist outside the commercial sphere.

FFV1

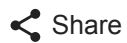
One of the more interesting developments in this area has been the emergence of the FFV1 codec. FFV1 started life in the early 2000s as a lossless codec associated with the FFMPEG free software project and has since gained some traction as a potential audiovisual preservation codec for the future. The advantages of the codec are:

- It is non-proprietary, unlike the many other popular codecs currently in use.
- It makes use of truly lossless compression, so archives can store more material in less space without compromising quality.
- FFV1 files are ALWAYS losslessly compressed, which avoids accidents that can result from using formats which can either encode losslessly or lossily (like the popular JPEG-2000 archival format).
- It internally [holds checksums for each frame](#), allowing archivists to check that everything is as it should be. Frame checksums are especially useful in identifying where error has specifically occurred.

- Benchmark tests indicate that [conversion speeds are quicker than JPEG-2000](#). This makes a difference for archives dealing with large collections and limited computing resources.

The final, and possibly most exciting, attribute of FFV1 is that it is developing out of the needs of the archival community, rather than relying on specifications designed for industry use. Updates from the original developer, Michael Niedermayer, have introduced beneficial features for archival use and so far the codec has been implemented in different capacities by the The National Archives in the UK, the Austrian National Archives, and the Irish Film Institute, as well as being featured in the [FIAF Journal Of Film Preservation](#).

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