Digital Collection Stewardship

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Abstract:

The National Film and Sound Archive of Australia (NFSA) is Australia's leading audiovisual archive and is the steward of the national audiovisual collection consisting of 2.3 million items of film, broadcast and sound works and their associated documents and artefacts.

In no other type of cultural collecting institution does technology play such a major role as it does in managing the NFSA's digital collection. Currently the digital collection comprises of 511,797 digital items totaling 575 terabytes.

Keeping pace with creators and the industry, the NFSA has modelled an end-to end workflow from acquisition through to preservation and access. It has built a digital collection infrastructure, system and network that manages both its born-digital and digitised works in an integrated manner within its collection management system where the catalogue record represents the lynch-pin to holistic audiovisual collection management.

This conference paper will draw on the audiovisual leadership of the NFSA as a case study of digital collection stewardship that successfully supports and manages Australia's national audiovisual digital collection and ensures that the NFSA can sustainably meet its legal mandate.

Keywords: Audiovisual, Archive, Digital, Collection, Stewardship, National Film and Sound Archive of Australia

By the very nature of the collections they manage, audiovisual archives and libraries have an intrinsic relationship with technology. From analogue to digital, across all generations of formats, the connection is eternal and inescapable. The National Film and Sound Archive of Australia (NFSA) is the steward of the national audiovisual collection consisting of 2.3 million items of film, broadcast and sound works and their associated documents and artefacts. It is a highly complex, technically demanding, ever changing audiovisual collection and by far the richest expression of Australia - her

stories, cultural heritage and diversity. Over time, as collection formats have changed, so have the acquisition, preservation and access workflows at the NFSA along with the staff skills and archival systems needed to manage the increasing trend of born-digital collection works.

The origin of the national audiovisual collection dates back to 1935 with the formation of the *National Historical Film and Speaking Record Library*. The 1960s and 70s saw the film and later the sound archive sections of the National Library of Australia emerge with a gradually evolving mission to collect and preserve the nation's film and sound heritage. In 1984, the NFSA was established and 24 years later became an independent statutory authority. The National Film and Sound Archive of Australia Act 2008 (*NFSA Act*)[1] provides a clear statement of the organisation's primary functions[2] with regard to the national audiovisual collection and the Australian public. These are:

(1) The functions of the National Film and Sound Archive of Australia are to:

(a) develop, preserve, maintain, promote and provide access to a national collection of programs and related material; and

(b) support and promote the collection by others of programs and related material in Australia; and

(c) support, promote or engage in:

(i) the preservation and maintenance of programs and related material that are not in the national collection; and

(ii) the provision of access to programs and related material that are not in the national collection; and

(d) support and promote greater understanding and awareness in Australia of programs; and

(e) undertake any other function conferred on it by any other law of the Commonwealth.

2) The ways in which the National Film and Sound Archive of Australia may provide support as mentioned in subsection (1) include (but are not limited to) doing any of the following:

(a) providing financial assistance (whether by way of loan, grant, investment or otherwise and whether on commercial terms or otherwise);

(b) commissioning or sponsoring programs or other activities;

(c) providing services, facilities, programs or equipment;

but does not include providing guarantees.

(3) In performing its functions, the National Film and Sound Archive of Australia is, as far as practical, to:

(a) place an emphasis on the historical and cultural significance of programs and related material; and

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[1] National Film and Sound Archive of Australia Act 2008: http://www.comlaw.gov.au/Details/C2012C00219
[2] s6(1-5), NFSA Act, 2008.

(b) use every endeavour to make the most advantageous use of the national collection in the national interest; and

(c) apply the highest curatorial standards; and

(d) promote the efficient, effective and ethical use of public resources.

National Film and Sound Archive of Australia may charge fees

(4) The National Film and Sound Archive of Australia may charge fees for things done in performing its functions.

National Film and Sound Archive of Australia may cooperate with others

(5) The National Film and Sound Archive of Australia may perform its functions alone or together with other persons.

The *NFSA Act* provides the legal mandate for the organisation to undertake the stewardship of the national audiovisual collection and, in turn, implement sustainable collection management practices underpinned by curatorial protocols and archival standards.

Audiovisual production encompasses a range of material from highly commercial blockbuster films, live broadcast transmissions and platinum records to amateur home movies and recordings. Dating from the late 19th century to the present day, the national audiovisual collection contains 2.3 million items, relating to film, television, radio and music production including its associated documents and artefacts.

The key collecting areas of moving image, audio recordings, and documents and artefacts are diverse and complex in nature. As a guide, their comparative representation in the collection is as follows:

- Moving Image (includes Television)   27%
- Audio Recordings (includes Radio and Oral Histories)   20%
- Documents and Artefacts   53%.

NFSA Curators acquire material that: represents a cultural and historical record of Australian creative and technical achievement in the audiovisual context; and is a reflection of the role, nature and status of audiovisual media in society. They do so in accordance with the 3 key principles identified in the NFSA's curatorial values as documented in the *NFSA Collection Policy, 2011:*[3]

- Collecting the artefacts – respect for the items and their diversity;
- Handling the artefacts – respect for the items' integrity; and
- Experiencing the artefacts – respect for the items' cultural identity.

Collecting audiovisual works is resource intensive and technologically demanding as all forms of audiovisual expression across digital and analogue platforms are represented in the NFSA collection. In curating the collection, having an informed understanding of the audiovisual landscape both in retrospective and contemporary terms is essential.

The first century of Australian audiovisual expression witnessed the development of the film, radio, television and recorded music industries. The current environment provides a range of new challenges given the explosion of content creation. The mainstream film, sound and commercial broadcast industries in Australia have openly embraced digital technologies for production, broadcasting and distribution. In 2009, digital radio was introduced in Australia, soon followed by digital television in

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[3] http://www.nfsa.gov.au/collection/collection-policy/

2011.[4] By the end of 2012, the major cinemas had converted most or all of their screens to digital projection, and 72% of all Australian screens were reported to be digital.[5]

Readily available and publically accessible technology has seen an explosion in creative endeavour and has provided the means for global promotion through rapid dissemination across social networking and sharing websites via the Internet. *Mankind Is No Island* (2008)[6] was shot entirely on a cell phone by Australian film maker Jason van Genderen[7] and went on to win *Tropest New York*[8] that year. Australian musician Goyte[9] posted his music video, *Somebody That I Used To Know*,[10] to YouTube in July 2011. In 2013, and 653,176,121 views later, he was awarded 3 Grammy Awards for Record of the Year, Best Pop Duo/Group Performance and Best Alternative Album. These are 2 prime examples of the power of digital technology and born-digital content that the NFSA needs to acquire.

Shouldering the persistent pace of change in the audiovisual sector, the nature of collection acquisitions have decidedly shifted from acquiring material 100% in analogue format to where, currently, 40% of material acquired by Curators is born-digital (that is, a digital output is the only and original form of the work).[11] Equally, audiovisual acquisitions do not necessary sit neatly as either analogue or digital; they also come in combinations of both. As Curators are at the forefront of collection development, they have needed to develop an enhanced skill set to manage born-digital acquisitions and handle all formats of collection items.

Similar to other cultural collecting institutions, preservation standards are essential tools and means of benchmarking performance in the audiovisual archiving profession. In past years, these standards served the NFSA well in an analogue world; however, audiovisual curators realised early on that these standards do not necessarily apply in a born-digital generation that is highly creative, IT savvy and openly experimental. New curatorial approaches have emerged which work in partnership with content creators to deliver material in preferred as well as supported formats.

As NFSA Curators increasingly began to acquire material in born-digital format, changes in the NFSA Collection Information team were also taking place. Collection Information is responsible for the cataloguing of all acquisitions regardless of format. The Curators prioritise acquisitions and Collection Information creates the catalogue record in the collection management system, describing the work both intellectually and technically. Collection Information team members also needed to expand their skill sets and can be credited with pioneering digital collection cataloguing at the NFSA.

There is, however, the realisation that as technology develops and systems improve the cataloguing of born-digital acquisitions may not remain the exclusive domain of a centralised team. There is a foreseeable future where born-digital works can be ingested and catalogue records automatically populated by the metadata embedded in the file. To this end, data quality management will come to the fore.

The first born-digital object added to the collection was in 2001. It was a publicity image[12] from the Australian film, *The Love of Lionel's Life* (John Ruane, 2000). This was also the time that the NFSA began to investigate and invest in digital preservation practices and processes for analogue works. The digital preservation of still images was the first system to be put in place. Soon after, the NFSA began digitising audio recordings with the first generation of *Quadriga*[13] work stations installed in the NFSA audio preservation studios. Currently, the focus is on film and video with the NFSA having purchased its first *Scanity*[14] digital film preservation scanner in 2013 ready for implementation. The roadmap of digital preservation at the NFSA is mirrored by the pattern of born-digital acquisitions entering into the

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[4] http://www.australia.gov.au/about-australia/australian-story/digital-broadcasting
[5] http://apo.org.au/files/Resource/SISR_CinemaInAustraliaAnIndustryProfile_June2013.pdf
[6] https://recordpreserveshare.wordpress.com/2008/11/01/mankind-is-no-island-winner-of-tropfest-new-york-2008/
[7] http://jasonvangenderen.com/
[8] http://tropfest.com/
[9] http://gotye.com/
[10] https://www.youtube.com/watch?v=8UVNT4wvIGY
[11] NFSA 2014-2015 Key Performance Indicator: Number of Acquisitions: 50,000
[12] NFSA Record Number: 492187-0001: [THE LOVE OF LIONE'S LIFE : PUBLICITY SHOT OF MATT DAY, RIGHT, WITH HIS ARM AROUND NADINE GARDNER WHO IS WEARING A WHITE T-SHIRT]
[13] http://www.cube-tec.com/products/quadriga/quadriga-overview
[14] http://www.dft-film.com/

collection. First to arrive were digital production stills and publicity material most often delivered on CDs; sound recordings were soon followed by feature film and television productions arriving on hard-drives.

During this time, the NFSA collection management system was in continuous redevelopment to manage both born-digital and digitally preserved collection material. The system had its foundations in analogue formats and served the NFSA's archival functions for close to 20 years. The increased demand for the system to perform digital collection processes spurred the realisation that its underlying technology and capability were dated and would need to be replaced.

In 2011, the NFSA introduced a new collection management system, Mediaflex[15] by TransMedia Dynamics. At its core, Mediaflex is a media asset management system and, integrated with the content storage and asset management system, DIVArchive,[16] enables the NFSA to administer and control the life cycle of its digital collection – content and metadata – from acquisition and preservation through to access. Yet by having purchased a collection management system that was designed to manage digital works, thereby changing the emphasis from analogue to digital collection management, the NFSA had to initially invest in enhancing Mediaflex to manage its physical collections also. Systems optimisation is a key practice at the NFSA and managing the national audiovisual collection in an integrated manner is an underlying principle in the organisation's archival business model.

Fundamental to managing digital collections successfully is a robust network, infrastructure and storage environment. The NFSA network has been partitioned to manage corporate and collection processes separately and a detailed Fibre Plan for the organisation has been developed to support network connectivity from 10 to 40 gigabits over Ethernet. Mediaflex is also able to move digital files across the network by scheduling and managing network traffic efficiently.

From the outset, the NFSA invested in digital collection storage by having in place disk capacity and a tape library robot to ensure the digital collection's safety and security. In alignment with NFSA practice and risk management protocols, the digital collection is backed up on Linear Tape Open (LTO) tapes and 3 copies are stored: online, onsite and offsite. Having incorporated tape backup into its digital preservation practices, the NFSA faces the continuous task of preserving the digital collection. The NFSA's approach of migrating the digital collection from one tape generation to the new generation has proven sustainable. Currently the NFSA is undertaking a program of migrating from LTO4 to LTO6 tapes which will take 6 months to complete. This will ensure collection accessibility and curtail tape obsolescence. An additional project is to correct past practices. This will entail copying 104 LTO1 tapes that were accessioned as collection carriers before ingest systems were in place. Once the project is completed legacy hardware and software will be able to be decommissioned.

From the implementation of Mediaflex, the NFSA's Digital Collection Infrastructure team has had a central focus on enhancements to strengthen the system's ability to directly ingest born-digital acquisitions, thereby facilitating the convergence of the acquisition and cataloguing processes. Initially, a dedicated network drive to temporarily store born-digital sound and documentation acquisitions was implemented; however, with the confirmed upward trend in terms of amount and size of born-digital acquisitions, particularly in terms of film and video, this will soon be enhanced with a dedicated disk that will also serve to support a fully-fledged born-digital quarantine regime.

In 2015, a *Digital Laboratory* was set up for use by all NFSA curatorial work areas; 6 ingest stations with high end graphics capability and software that enables a range of film, video, sound and document codecs to be played were deployed. These ingest station allow auditioning and quality assurance checking of uncompressed files, are able to generate XML manifests of acquisitions in addition to providing other bespoke functionality required by the NFSA. The machines are highly efficient and are connected to the 10 gigabit high speed network within the NFSA. To complement the *Digital Laboratory*, the NFSA has recently deployed *Virtual Acquisition Workstations* that can wrap and process files, perform checksum tasks and undertake validity testing. By using virtual desktop technology and an internal cloud for processing, these simpler processing tasks can remove the workload from the

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[15] http://www.tmd.tv/
[16] http://www.fpdigital.com/solutions/diva/divarchive

specialised workstation to a general environment. These developments have significantly eased the pressure on the NFSA's Preservation and Technical Services team who were once the only team able to deal with born-digital acquisition material and, as a result, curatorial autonomy in managing all acquisition processes regardless of content format has been enabled.

Access to the collection is managed by the NFSA's Collection Reference team who mediate client requests for collection material by placing orders through the Preservation and Technical Services job booking system. This process applies to all collection material whether the work is in analogue or digital format. The digital collection opens up new possibilities for Collection Reference staff to directly serve clients. In accordance with NFSA archival standards, Mediaflex stores the original uncompressed digital file (preservation category), as well as compressed distribution and access category copies. The systems in place are able to generate copies in a range of file formats that suit the client's needs. The opportunity to streamline existing process and enable the Collection Reference team to work directly with the digital collection is an upcoming priority for the Digital Collection Infrastructure team. Once implemented, significant efficiencies are envisioned in both time and resources, staff will enhance their skill suite and client request turn-around times will be greatly improved.

At present the NFSA identifies the digital collection profile to include both born-digital and digitised works. There are currently 511,797 digital items accessioned into the collection totalling 575 terabytes of data.[17] The collection grows by an average of 20 terabytes per month. The comparative representation of works in the digital collection, by collecting sector, is as follows:

- Moving Image (includes Television)   09%
- Audio Recordings (includes Radio and Oral Histories) 42%
- Documents and Artefacts   49% .

Born-digital works represent 152,250 files within the digital collection. This subset predominately represents acquisition ingest and grows by an average of 4 terabytes per month. The comparative born-digital works, by collecting sector, is as follows:

- Moving Image (includes Television)   06%
- Audio Recordings (includes Radio and Oral Histories) 17%
- Documents and Artefacts   77% .

In no other type of cultural collecting institution does technology play such a major role as it does at the NFSA in managing its digital collection. Technology impacts, influences and is the driver of change for the organisation as it continues to receive ever increasing amounts of born-digital collection material from across the film, television, radio and music sector whilst simultaneously managing its own collection digitisation program for preservation and access. The NFSA has to keep abreast with industry, current creative and technical trends, and move with – and often ahead of – the times in order to successfully and sustainably meet its legal mandate. Whilst the NFSA undertakes its responsibilities and functions toward the national audiovisual collection regardless of format, it acknowledges that it is faced with the ongoing challenge of managing a hybrid collection within finite financial resources. This challenge requires the strategic investment and application of building holistic and integrated systems that serve the digital collecting future.

Digital collection systems at the NFSA have grown and developed over time and have been able to do so with the collective involvement and unique contribution of audiovisual curatorial, stewardship and technical staff in developing workflows and systems that can support born-digital and well as digitised content. Systems have been developed with patience, planning and in collaboration with NFSA staff that need to work effectively within a workflow. It is through this approach that born-digital acquisitions are able to be successfully managed at the NFSA. Informed investment matched with a technically innovative NFSA spirit founded in scalable and optimised solutions underpin system enhancements to be prioritised in order to maximise efficiencies and serve the organisation's strategic directions.

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[17] NFSA statistics as of May 2015

Recognising that managing digital collections is a continuum, the NFSA can only responsibly implement systems, infrastructure and network requirements within existing capabilities and resources in order to meet sustainability measures. The NFSA has witnessed significant changes in managing the collection and recognises that no perfect system that supports all present and future iterations and formats of a born-digital work exists and if it did so would be financially prohibitive.

The NFSA has worked in the digital space for over 15 years and has contributed significantly to the development of technical standards through international committees and networks. The expertise within the NFSA is also leveraged to assist sister cultural institutions with managing their own collections of audiovisual works. Frequent cross-organisational meetings enable knowledge sharing and on site demonstrations of NFSA systems, standards and solutions. It has watched trends, built close working relationships with collection donors and has steadily tailored its business model to suit the needs of the collection, often questioning long established audiovisual archival standards and practices with professional debate to establish if they are applicable in both the analogue and digital collection worlds.

The national audiovisual collection includes over 50 format families in both analogue and digital media. The NFSA is committed to providing access to works in their original format for as long as those formats can be supported. This principle applies to both analogue and digital collection works and speaks to collection stewardship as an established model of governance and operation. The NFSA practices a holistic approach to collection stewardship and does not forsake analogue over digital or *vice versa*.

At the heart of audiovisual archiving lies the collection and its accessibility, and current trends show that the public expect access to the content held in its national collections anyplace at anytime on any form or device of their choosing. In a recent interview with Billboard, Jack White of The White Stripes[18] spoke of his own listening habits, saying *digital in the car, vinyl in the bedroom*.[19] The relationship between original format and content is unique and the experience that audiovisual works can bring to life is like no other – the NFSA is Australia's living archive, a recognised leader in its field and an institution of national standing.

Acknowledgments

References: see footnotes cited in the paper.

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[18] www.whitestripes.com/

[19] http://www.billboard.com/articles/columns/rock/6494432/jack-white-cover-story-sneak-peek-behind-scenes third-man-records