Born-digital media for long term preservation and access: Selection or deselection of media independent music productions

Trond Valberg
Head Curator, Music Section, National Library of Norway, Norway
E-mail: trond.valberg@nb.no

Abstract:

Most music productions made today are digitally recorded, mixed, mastered and distributed. This applies to both commercial releases and private music productions for sharing on the Internet. Obviously, a vast number of digital recordings are being created every day. Furthermore, any born-digital collection needs to be organized and managed if the material shall be preserved for future generations. Until now, most libraries and archives around the world have focused on published recordings (LPs, CDs, etc.). This paper discusses whether it is time for a change, giving a few specific reasons for this as well as presenting a new tool for managing the metadata and the born-digital material itself.

Keywords: audiovisual sound music digital archiving record productions media management born-digital metadata National Library of Norway

Introduction

Even from the early days of recorded sound both the recording itself and distribution has been dependent on the use of a carrier. Edison's invention of the phonograph in 1877 was exceptional both with in respect to being able to capture sound and reproduce the sound from the same carrier. Not until Philips launched the Compact Cassette in 1963 were most users given this opportunity back. The gramophone record totally changed the way we listen to music from a selection of numerous available releases. Throughout the analog history of

recorded sound various improvements have been made to sound quality, and the concept 'high fidelity' was used as early as in the late 1950s. Even today (2015) the vinyl record (maybe a bit surprisingly) is a popular medium, but generally there has been a significant change in the recording industry over the last decades towards born-digital material (and some of the vinyl releases are also born-digital although the vinyl disc itself truly is an analogue format).

The history of digital recording started over 70 years ago as a telephony technology, and the first digital tape technology appeared in the late 1960s. Moreover, you may even argue that the piano rolls back from the beginning of the 20th century are equivalents to data storage, especially MIDI files used to store musical performance data. Nevertheless, most of us think of the introduction of the CD in 1982 as a starting point. This is also true when we look at the first digitally recorded albums of popular music. Ry Cooder's "Bop till you drop" was probably the very first one recorded in 1979. I will use the concept of born-digital with reference to the use of pulse-code modulation (PCM) or other digital encoding technology (e.g. DSD) in the recording process, but not limited to the original sound recordings of the performers only. Several record productions (as well as digital video) may include both born-digital and digitized material. You may even argue that any initial digitalization of an analogue recording, for preservation or access purposes, points towards 'born-digital' (but in this context I will not discuss that any further). As of today born-digital sound recordings are characterized by being independent of a physical carrier and the content may be available for download or streaming on the Internet.

Archiving record productions

Published recordings such as CDs, vinyl and Blu-ray discs constitute the bulk of the sound collections you expect to find in most libraries or sound archives around the world. Obviously, for instance national sound archives, research libraries, and archives of traditional music may store other sound recordings as well, but still the record releases constitute the majority of recordings. There is nothing wrong with collecting and accessioning published material, which in fact is the basis for any legal deposit legalization. But you may ask what about tracking recordings (stems), mixing recordings and the final mastering? What about out-takes, artists' talking, incomplete or unreleased recordings? What about amateur recordings or recordings that primarily were not made for any distribution at all? The huge increase of born-digital materials surely leads us to make some important and sometimes difficult choices.

Since the 1990s the National Library of Norway has acquired production material from the recording industry as part of our collections of recorded music. Traditional master tapes from every stage of the record production have been stored and made available for the right holders of the recordings, or made accessible for research and documentation purposes. As of today the number of master tapes (including multitrack recordings) approximately equals the number of record releases (in total some 160.000 items ex. broadcasting, film and other collections that may include audio). The change to media independent music productions has led to the need for a solution to get musical projects delivered to the National Library. The

most challenging part may prove to be the metadata, partly due to the lack of international standards. Therefore we have developed an application that handles both the born-digital material (including digital videos) and a (minimum) set of metadata (more on that later).

Selection policies are based on various criteria, and deselection is likely more difficult in the digital domain compared to analogue material. Thinking of the huge number of duplicated audio files from record releases that are being produced or migrated every day around the world, you may ask whether this effort is really needed – or even wanted. Furthermore, several online music services offer the exact same recordings that you may find in your own library, whether the material is born-digital or digitally reformatted. In times when the number of users of traditional library services is decreasing (at least in Norway) it may be a good idea to consider new strategies. One option might be to provide access to digital production material, for instance the multitrack recordings that may be remixed or used for karaoke versions. At the National Library of Norway we have more requests for the production material than the published recordings, mostly from the right holders though.

The loudness wars

Let me point at two specific reasons for archiving born-digital record productions. Firstly, the so-called 'loudness war' has seriously affected several digital record releases since the early 1990s. The trend of increasing audio levels in mastering for CDs and distributed audio files has origins in broadcasting as well as the analogue period of the record industry (e.g. 7" singles for radio play). The most striking broadcasting examples are the radio and TV commercials that usually are produced with a significantly higher audio level compared to the surrounding program. Obviously it is an attempt to get the viewer or listener's attention.

In the digital domain increasing loudness above the maximum peak is possible through techniques such as dynamic range compression and equalization. This kind of compression may result in audible distortion, but usually it only affects the dynamic range in the music by blurring the low and high level parts of the recording. Visually this can be seen as bigger color areas near the peak in a waveform spectrogram. If you compare the audio level on remastered albums with the original CD releases some 20 to 30 years ago, it is quite common that the level has increased as much as 20 dB (also due to the fact that some of the early releases were mastered with too low levels). Examples of re-released albums with heavy dynamic compression that have been criticized for poor sound are "Death magnetic" by Metallica, "Memory almost full" by Paul McCartney, and "Modern times" by Bob Dylan. Paradoxically, Dylan is among those that have strongly criticized this practice, but he has probably not been responsible for it himself. So, a lesson to learn is that remastered albums do not always sound any better than the previous or the original release. Furthermore, you need to go "backstage" to get access to the uncompressed born-digital recordings.

Lossy audio

Any data compression, lossy or lossless, is most commonly used to reduce the amount of data for storage or transfer, for instance on the Internet. Lossy compression is based on approximations of the original content (data file) and is usually more storage efficient than

any lossless alternative. Typically, lossy compression is used to compress data of audio, video and still images. JPEG is the most common file format in digital photography whereas MP3 became the most popular lossy audio format since its release in 1995. It has been argued that MP3 (and similar formats) can reproduce the original uncompressed source (e.g. CD) without affecting the sound quality for most listeners. I believe the success has likely more to do with the ease of creating and sharing MP3s (either legally or illegally), and the fact that portable devices (MP3-players) quickly became very popular as a consequence of the new format itself. The music industry's commitment to streaming over the last decade has been successful in respect of reducing illegal file sharing. A recent study shows that 70% of Norwegians under 30 downloaded music for free in 2009 whereas the corresponding share last year was just 4%.

For those of us that really care about sound quality it is disappointing that recently launched Apple Music still offers streaming based on lossy audio (256 kbps AAC). (Lossless music streaming has been available in Norway since 2013.) The fact that most digital distribution of music still makes use of lossy audio formats may be explained by financial and infrastructural causalities, but it also reflects a change in the way many of us listen to music. The discussion whether most of us can hear any difference comparing lossy audio with lossless audio, or uncompressed files from CD (16 bit/44,1 kHz) with high resolution audio files (e.g. 24 bit/96 kHz) might be interesting for some of us. For preservation purposes, however, there should be no doubt that we should aim for the best available file format and quality, i.e. usually not any lossy audio format.

Any digital recording or digitization is based on samples or approximations of the acoustic or analogue audio, which theoretically implies that we can never exactly reproduce any analogue source. This is also the reason why audio professionals record in very high definition. In addition some record labels or stores even offer born-digital material for download in formats such as DXD (24 bit/352,8 kHz), DSD (1 bit/2,8224 MHz) or more common PCM 24 bit from 44,1 kHz to 192 kHz (lossless encoded). This implies that the consumers might be offered high resolution audio files that exceed the IASA recommended preservation standard of 24 bit resolution and 96 kHz sampling rate. In the scope of born-digital production material and high resolution distribution formats, I believe we should start the discussion whether the existing international recommendations for digitizing analogue audio should be revised.

The metadata challenge

As previously mentioned managing metadata is an essential and sometimes demanding part of any work on born-digital material. Regarding record productions the quality of metadata is more or less dependent on the engineer or record producer's own notes. The practice varies from one recording studio to another, but an option might be collecting the digital material from the mastering engineer. At the National Library we have initiated a dialogue with some audio professionals in Norway, but we are still in a phase of testing various solutions. However, we do believe that the application named "MediaIDEditor" might be useful in this context. Basically, the media editor produces XML files from the metadata associated with the digital recordings as well as renaming the associated audio or video files. External

documents such as cue sheets, text files, PDF documents and .adl files (session info) may also be uploaded to the XML file. The XMLs as well as the media files could then be exported to any database or content management system (CMS). The naming structure and metadata sets are based on recommendations from the Recording Academy (associated with the Grammy Awards), the Audio Engineering Society, and the European Broadcasting Union among others.

Until now, however, the media editor has proved to be most successful in the context of non-professional recordings. The National Library has acquired a collection of more than 4000 born-digital recordings (and an equal number of XMLs) by non-established pop and rock artists from all over Norway. This collection gives a good picture of local band activities based on the music competition "Bandwagon". Originally Bandwagon was a joint project between the newspaper group Amedia and Rock City (a national resource center for pop and rock).

Let us work together towards better tools, international standards, and strategies for preserving and accessioning born-digital material! Bibliographic control is even more important than ever since any lost or hidden data file usually means the non-existence of such. If you would like to test the MediaIDEditor (version available in English), you are welcome to contact anyone at the National Library of Norway.