How I Learned to Stop Worrying and Love the Bomb on Thursday evening. The full 4K restoration process was introduced earlier in the day at presentation by Daniel DeVincent, Director of Digital Imaging at Cineric, Inc. Throughout the restoration workflow, the project was kept at 4K resolution, never downsized, in order to eliminate the risk of loss or artifacts. Yet this requires an enormous amount of storage and makes processing time consuming. True to the 4K workflow, the film was screened at this resolution for JTS attendees and the public. The results were stunning, though almost eerily so. The image was perfectly stable, and it appeared as if every grain was visible.

Other challenges of moving to high resolution were presented from the perspective of content creation. John Galt of Panavision walked the audience through the complexity of quality control for digital cinematography. Because the sensor size is so large with the new cameras (four times bigger than a 2/3 inch HD camera sensor, and 30 percent bigger than the 35mm film frame!), tiny details suddenly cause a world of trouble. Samples from a standard image were used to demonstrate the results of problems such as laser damage, dirt on the rear lens filter, and a pixel-wide scratch.

ACCESS, SEMANTICS, INDEXING

Metadata was of course a common thread throughout the symposium, and a few presentations on Saturday highlighted some of the new methods being explored for automated indexing and extraction of descriptive information. The first of these was an introduction to a new European Union–funded project called MEMORIES, which is researching automatic indexing of audio to improve acquisition and retrieval. The project also hopes to define an open exchange format. Later, Christophe Kummer, of NOA Audio Solutions in Austria, presented their work on automatic speech recognition, which can handle German, French, English, Spanish, Arabic, and Portuguese speakers. Next, James Turner from the University of Montreal presented his work on using existing texts, such as audio description for the blind, to index shots. The results were compared to indexers' terms for stock shots, and found that many terms were indeed the same. All of these projects were fascinating, and are making important strides toward creating automated tools for descriptive metadata creation. However, it was clear from the conclusions of all three that manual description will still be necessary for some time.

CONCLUSION

JTS 2007 offered a unique look into the current technical thinking for AV preservation. The speakers and attendees of this symposium clearly recognize both the challenges and value of moving toward digital preservation. However, as technology and practice continue to change at a rapid pace, many of the solutions presented during the symposium will also quickly evolve. Storage costs are dropping, yet management needs are increasing. Many of the technologies, solutions, and projects discussed at JTS 2007 are still in very early stages of development and implementation. It will be interesting to see what lessons they will have learned by the next JTS.

Digital Asset Symposium

Museum of Modern Art, New York City, April 25, 2008

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The term *digital asset management* is one that has hovered on the periphery of the moving image archiving profession for over a decade. The term has generally been reserved for studios and other commercial entities that have had a greater financial incentive than their public sector counterparts to invest in the management of digital assets. As we continue to move into the twenty-first century, it is becoming increasingly apparent that digital assets are playing as vital a role as traditional physical assets in the success of any moving image archive. Digitization methods have become more affordable and prevalent, allowing archives to provide increased access to their collections. At the same time, born digital

moving images have continued to proliferate and work their way into the collections of many public sector archives. It is not uncommon to find archives budgeting for increased bandwidth and server space in addition to physical vault space. For these reasons, it is important for members of the archival community to share ideas and to discuss the challenges of managing digital assets throughout their entire life cycle. The Association of Moving Image Archivists (AMIA) Digital Asset Symposium was established for just such a purpose.

The 2008 Digital Asset Symposium allowed over one hundred members of the community to converge on New York's Museum of Modern Art for a daylong session of case studies presented by an extremely varied group that ran the gamut from major media conglomerates to grassroots news organizations. Both the number of attendees and the variety of presenters are testament to the importance of digital asset management to the profession. Cochairs Linda Tadic from New York University's Moving Image Archiving and Preservation Program and Tom Regal from NBC Universal organized the symposium into five presentations, split between two parts, one focusing on metadata and its prominent contribution to the life cycle of digital assets, and the other on the functional means of capturing, preserving, cataloging, and providing access to digital assets.

After a brief welcome, the audience was treated to a digital screening of Robert Benchley's 1933 short film, *Your Technocracy and Mine*. In the film, humorist Benchley bluffs his way through a presentation on the importance of technology to society, concocting imaginary statistics and pointing to nonsensical charts to illustrate his point, or lack thereof. Opening the symposium with this film was appropriate on several levels. Not only did it give those in attendance a firsthand view of one of Universal's digital assets, but it showed, in a humorous context, just how difficult it can be to present such information to an audience without the risk of becoming bogged down with technical jargon. I thought back to Benchley's charts more than once during the presentations as we were shown images of labyrinthine flowcharts outlining the path that digital assets and their accompanying metadata take through the various organizations. Unlike Benchley, however, each presenter did a terrific job in justifying the need for such charts when constructing a digital asset management work flow.

Following the Benchley program, Peter Kaufman, president and CEO of Intelligent Television, provided a formal introduction to the symposium. Kaufman's introduction focused on the concept of commons-based peer production and the ever-transforming modes of distribution available for digital moving images. Of particular interest was the notion that, due to the increase of legal peer-to-peer file-sharing networks and digital open education initiatives, today's copyright laws may be unenforceable by the year 2010. The question then becomes: What role do moving image archives play in a society in which moving images are freely distributed and available for repurposing according to any given user's needs? Initiatives such as the Internet Archive have successfully proven that it is possible to provide free and open access to archival moving image content that actively engages the user in the description and distribution process. Kaufman discussed several other enterprises, including NYPL Labs, the WGBH Sandbox, and Intelligent Television's own Open Education Video Studio, which are actively engaged in researching the use of digital video as an effective teaching tool. He also emphasized the importance of partnerships within both private and public spheres to support a commons-based economic model that takes advantage of the ever-increasing value of public domain digital video and file-sharing technology. Kaufman's presentation served as the perfect introduction to the symposium by raising as many questions as it answered regarding the role of the moving image archive in today's YouTube-centric climate.

The first of the day's presentations, focusing on metadata, was a case study presented by NBC Universal's Chris Gianutsos and David Pugh. NBC Universal was by far the largest and most complex organization represented at this year's symposium, being that it is responsible for the distribution of two major media entities and, appropriately, the presentation dealt with the complexities inherent in effectively managing assets and metadata for

such a large corporation. Gianutsos explained how, in spite of the unique information management challenges faced by both the news and the entertainment divisions of the company, an enterprise metadata system was chosen, which would allow the information to move freely between the divisions and to travel with the digital assets during their entire life cycle. Gianutsos and Pugh took us through the steps of creating a system that would meet the needs of the various divisions, including normalizing the data by employing metadata standards such as MPEG7 and PBCore, obtaining feedback through a company-wide survey, and creating a glossary of over 1,100 metadata fields. NBC Universal is working with IBM's Enterprise Metadata Management (EMM) system to control the various layers as they feed into the company's operational data store, allowing for further streamlining of the information into a single schema. Such a monumental task is not enviable, but Gianutsos and Pugh succeeded in showing us that it is possible to implement such a complex system as long as there is built-in flexibility.

Eva-Lis Green presented the day's second case study related to metadata, providing in some ways a scaled-down version of the NBC Universal presentation. Like NBC Universal, Swedish Television is faced with the challenge of distributing digital content to multiple platforms, such as video on demand and mobile services. Green emphasized the importance of creating strategies that will account for all facets of digital asset management, from the files themselves to the descriptive and technical metadata to the associated rights. The most crucial aspect of Swedish Television's digital asset delivery strategy is quality control, for both the individual digital objects and what Green referred to as the "box," the package containing the object and all of its relevant metadata. Quality control also plays a large role in Swedish Television's current metadata delivery project, a two-year endeavor through which the organization hopes to standardize metadata schema, as well as quality criteria and selection policies. Green put forth various factors by which the quality will be evaluated, such as completeness, accuracy, and accessibility. Both NBC Universal and Swedish Television are in the implementation stage of their metadata strategy, thus neither organization was able to report on the relative success or failure of their current endeavors. Nonetheless, they both provided useful means for strengthening the quality of metadata within a digital asset management system.

Opening the "nuts and bolts" section of the symposium was a presentation from Democracy Now, which took a unique turn from the other presentations, based mainly on the character of the organization in relation to some of the other profit-driven companies that were represented at the symposium. Democracy Now's archivist David Rice and Mike Castleman, who is described in the symposium's program as the company's staff hacker, presented many of the open-source tools that allow them to catalog and provide access to their digital assets, while keeping in line with the organization's identity as a nonprofit, independent media outlet. Rice and Castleman outlined the five key functions for which they employed open-source software: recording, encoding, access, digital preservation, and metadata. For each of the five functions, the team listed several links to open-source resources that allow for the management of digital assets with minimal human intervention. At several points during the presentation, Rice and Castleman alluded to the fact that even while attending the symposium, they were able to ensure that their daily work tasks were being accomplished, thanks to the digital tools at their disposal. Though, at times, the amount of technical information presented during the Democracy Now case study may have seemed daunting, the resources mentioned would certainly be of great value for any nonprofit organization looking to establish their own open-source digital asset management system.

The next presenters were NYU's Kara Van Malssen and Thirteen/WNET's Jonathan Marmor, who discussed the ambitious Preserving Digital Public Television project. A joint venture between NYU, WNET/WGBH, PBS, and the Library of Congress, the project's primary goals include identifying at-risk born digital public television content and developing a life cycle management system that will allow for

David Rice and Mike Castleman's PowerPoint overview of open-source software tools to support digital asset management functions may be found at Castleman's Web site, http://mlcastle.net/.

the capture of metadata during the creation of the digital asset. Central to the project's mission is the creation of an Open Archival Information System (OAIS) to control metadata for the digital assets during the various steps of the process, which includes submission by producers, archival description, and dissemination to the public. As was the case with several of the projects covered during the symposium, the main challenge according to Van Malssen seems to be handling so many different file formats coming from various places at different times. Again standardization on the descriptive level, along with collaboration between the various parties involved in the project, seems to be the keys to success.

The day concluded with a presentation by three representatives from BBC Scotland—Noreen Adams (Head of Media Management), Lynne Hunt (Digital Library Applications Manager), and Vicky Plaine (Archive Manager)—who discussed the impact that relocating to a new facility, in Glasgow's Pacific Quay, has had on their digital asset management work flow. Both the radio and the television departments of BBC Scotland were represented and both shared similar goals for the integration of their production, archiving, and metadata systems. Like the other broadcasting agencies present at the symposium, BBC Scotland's greatest challenge comes from the sheer volume of digital content produced, along with the various technologies and suppliers responsible for each aspect of the organization's production output. Another challenge facing BBC Scotland seems to be the management of both legacy and digital archives while establishing priorities in regard to accessibility and storage demands. As an employee of the Library of Congress's Motion Picture section, I found this presentation particularly interesting in light of the recent relocation to our new facility in Culpeper and the impact that this has had on both our pre-established work flows and the establishment of new digital asset management work flows. Even more, I felt encouraged by BBC Scotland's relative success with their endeavor.

The 2008 Digital Asset Symposium succeeded in allowing its attendees access to the inner workings of a wide variety of institutions in regard to their approach to digital asset management. Though not all of the processes and work flows described by the presenters may be applicable or feasible for moving image archives working on a smaller scale, the broad range of topics that were addressed ensured that there was something of value to be attained by all of those in attendance. It is hoped that future symposia will include an even greater concentration of public sector organizations. In this regard, the 2008 symposium was a slight improvement over the inaugural West Coast conference, which was comprised almost entirely of representatives from the major studios. As the number of digital moving image files, along with the metadata and rights that accompany them, increases within moving image archives, the Digital Asset Symposium will continue to play a pivotal role in facilitating communication between archives on how best to take advantage of the cultural, historical, and educational value that is stored in all of those ones and zeros.