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## Original Article

# Digital asset management case study – Museum Victoria

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since completing a Bachelor of Applied Science in Photography at the Royal Melbourne Institute of Technology in 1988, John Broomfield has worked in photography in the museum sector for 19 years. At Museum Victoria, the largest museum organization in Australasia, John manages the Media Production and Copyright department, delivering imaging services for exhibitions, publications and collection digitization. He has been at the forefront of Museum Victoria's transition from the analog to the digital age over the past two decades.

**ABSTRACT** Images and audio-visual material are an increasingly important communication tool in today's world. As part of the State Collection and in the wider organization, Museum Victoria has a diversity of uses for, and holders of, these assets. (Images and Audio-Visual Material – Final Report 6 April 2006).

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**Keywords:** DAM; museum; workflow; implementation; case study; integration

## INTRODUCTION

This case study discusses the approach Museum Victoria (MV) took to establish a framework for the development of consistent, interrelated systems to manage and preserve images and audio-visual material in its care, and provides an overview of the approach taken to the initial implementation of its Digital Asset Management System (DAMS).

## ABOUT MUSEUM VICTORIA

MV's origins date back to 1854 with the founding of the National Museum of Victoria and to the establishment of the Industrial and Technological Museum of Victoria in 1870. In 1983, these two institutions were amalgamated to form what is now known as Museum Victoria.

MV is Australia's largest public museum, and is responsible for the state's scientific and cultural collection. It provides public access through three museum campuses: Scienceworks, which explores science and technology through interactive displays; the Immigration Museum, which tells the stories of people from all over the world who have migrated to Victoria; and Melbourne Museum, exploring Victoria's natural environment, culture and history.

The museum is responsible for more than 16 million individual items, which are organized within three collection disciplines – Sciences, Indigenous Cultures and History and Technology. In addition the museum oversees a wide range of research and public programs, continues to develop and care for the state's collections, runs major education and research-based web sites, and is active in exhibition and publication development and production.

## PROJECT BACKGROUND

Throughout the 1990s, the museum was engaged in a number of major developments, including the construction of Scienceworks, the Immigration Museum and Melbourne Museum. Each development saw an increased need for the creation and use of image and audio-visual material, as it was becoming increasingly important in the display techniques MV was incorporating into its exhibitions. At a time when the World Wide Web was beginning to play a prominent role in the way museums engaged their audiences, this ever-increasing demand for image material in digital format, from a number of sources both internal and external to the organization, led to a definite need to develop new systems

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to deal with the management and use of digital images.

In 2003, an Image Strategy Working Group was established at the museum with representatives from the collection areas, other internal stakeholders with a vested interest in the use of images and staff from MV Studios. MV Studios is responsible for the project management and coordination of major exhibition developments. The department includes the Media Production and Copyright unit, who are responsible for high-end digitization and image management and copyright services for exhibitions and publications.

This group met on a monthly basis for over a year with the aim of establishing standardized approaches and procedures for the management and access of image and audio-visual material within MV's care. At the end of this period, some valuable background work had been completed; however, it became apparent that for any major progress to be made, more resources would need to be applied.

The group recommended to the museum's Executive Management Team (EMT) that an operational review of the management and use of the image and audio-visual material be undertaken.

## IMAGE AND AUDIO-VISUAL MATERIAL REVIEW

In February 2005, EMT endorsed the establishment of a team to undertake a comprehensive Image and Audio-visual Material Review (IAVR). The group included the heads of the collection and curatorial departments; relevant stakeholder groups including Public Relations, Information Management and Production; and an EMT sponsor, and was convened by the Head of MV Studios.

The team established milestones for the review, with recommendations presented to EMT at the end of an intensive 9-month period of investigation. A series of workshops, stakeholder interviews, audit and direct contact with people across the organization was conducted over this period, with submissions also being received from interested parties. As this was an issue facing many cultural

institutions worldwide, external networks and colleagues were also consulted.

The team established an 'Evidence folder' on a shared network drive to collate the results of the review. The folder included:

- The collated results of the comprehensive museum-wide survey
- Audit Documents
  - including every survey response, respondent and questions asked;
  - the results of previous strategic work conducted on the issue of images at MV;
  - Forms in use and other documentation.
- Brainstorm Session Results
  - including all of the participants in the Brainstorming Workshops, the issues identified and the priority 'votes' allocated to each issue.
- External Institutions and Resources
  - including all of the evidence, notes and resources gathered from other organizations that have similar issues, in particular the Digital Collections Survey Project Report.
- Interview Transcripts and Submitted Reports
  - including the notes taken at the interviews conducted and the reports received directly from interested parties.
- Feedback received on the draft Issues Paper
  - all staff who participated in the review were invited to provide feedback on the Issues Paper before its finalization.

Because of the myriad of processes involved in the collection, management and use of images and audio-visual material at MV, the Review team chose to focus on just one example for a SIPOC (Suppliers-Inputs-Processes-Outputs-Customers): It examined the process that occurs when an Image Request is made (see Figure 1).

The SIPOC was revealing as it demonstrated that there was no standardized, uniformed or consistent process in place at the museum for image requests, and as a result they were highly complex in nature.

Once the 'evidence' had been gathered through the review, an Issues Paper was developed and circulated to staff for comment and feedback. Once these comments were received a Final Paper focusing on solutions and recommendations was presented to the Executive.

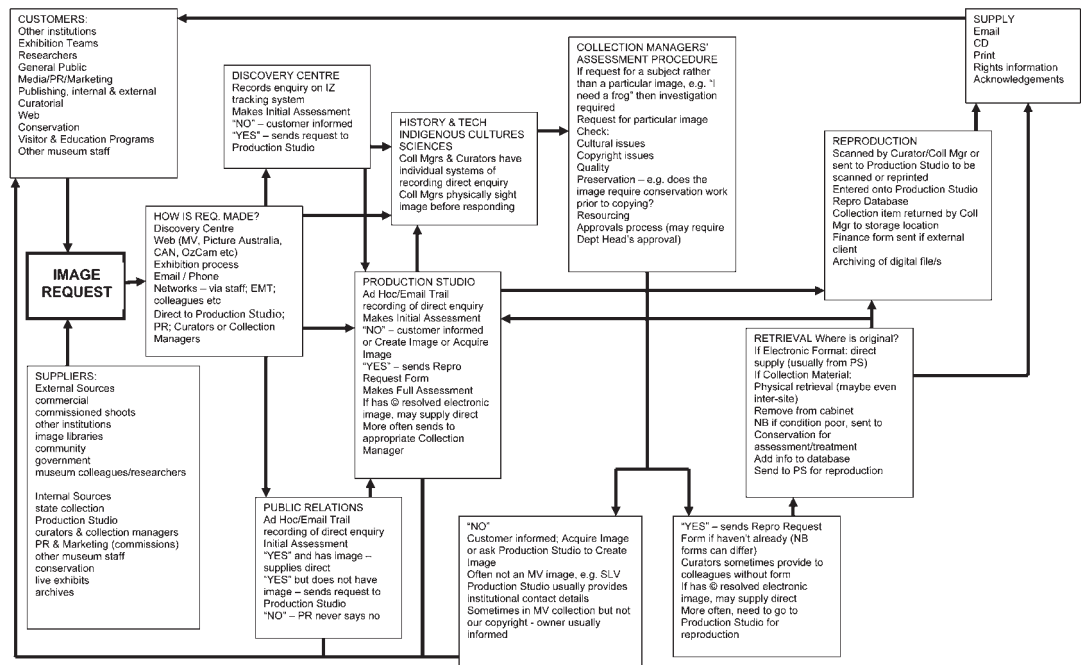


Figure 1: SIPOC diagram.

Note: The diagram represents the myriad of processes that were in place in 2005, at the time of review.

## REVIEW RECOMMENDATIONS

The final report presented five key recommendations that the review team thought would be achievable, and would establish a clear framework to enable the museum to deliver on its strategic objectives regarding image and audio-visual material:

1. Develop an MV policy and related procedures on the management of images and audio-visual material in the institution's care;
2. Adopt file naming, technical, metadata and archival standards;
3. Select and implement a DAMS (see Appendix for details);
4. Develop an MV Strategy for the preservation and archiving of images and audio-visual material; and,
5. Undertake a 12-month Digitization Pilot Project.

The Review Team stressed the interrelated nature of the first four recommendations and the need for these to be developed in parallel with each other. For example, the procedures

would be dependent on a DAMS; the preservation strategy would need established archival standards and so on.

## PROJECTED OUTCOMES

The endorsement and implementation of all these recommendations was predicted to give the following outcomes:

- Accountable, documented, integrated, streamlined and considered management of our images and audio-visual assets;
- Significantly increased efficiency and productivity gains;
- Establishment of a new revenue stream;
- An increase in both internal and public access to the museum's images; and,
- Preservation of these important collections for future generations.

The EMT received the Final Paper and all recommendations were endorsed and funding identified for the more critical elements, such as the initial implementation of a DAMS.

## TIMELINE AND RESOURCES

The IAVR Team presented this as a 5-year project with ongoing and continuous maintenance. A Steering Group was established to oversee the strategy's implementation and to ensure that milestones were met, and five project teams with project leaders were established to manage the implementation of each specific recommendation.

The strategy outlined the need to implement a DAMS. This system was seen as critical to the success of the other recommendations, and was therefore a priority for the first 18 months. The plan was to roll out the DAMS in MV Studios initially, with other departments to follow. This would provide access to a mass of production-quality images, and by piloting the system in the first year, it was projected that a greater understanding of the resource implications for the second year and beyond would be gained.

It was recognized that there would be additional costs during the implementation phase of the system, including those associated with customization, and that these costs would decrease over time as the system reached an operational phase, and users integrated the system into everyday work practice.

## DIGITAL ASSET MANAGEMENT SYSTEM (MV IMAGES)

Digital asset management (DAM) can be approached in a number of ways, from complete Business Enterprise Systems built from the ground up to stand-alone commercial, off-the-shelf products or a number of 'best of breed' solutions that can integrate with existing systems. During the review, a Software Solutions Sub-Group had been established to develop a set of functional requirements for a DAMS based on the Museum's needs.

Based on these requirements, existing systems at the museum and resource availability, the group decided that integration was the best option, and after a number of supplier demonstrations, the lookat.me™ DAM and integrated workflow solution provided by Media Equation Pty. Ltd. was selected.

The list of functional requirements for the integrated DAM solution was quite extensive, with key requirements including:

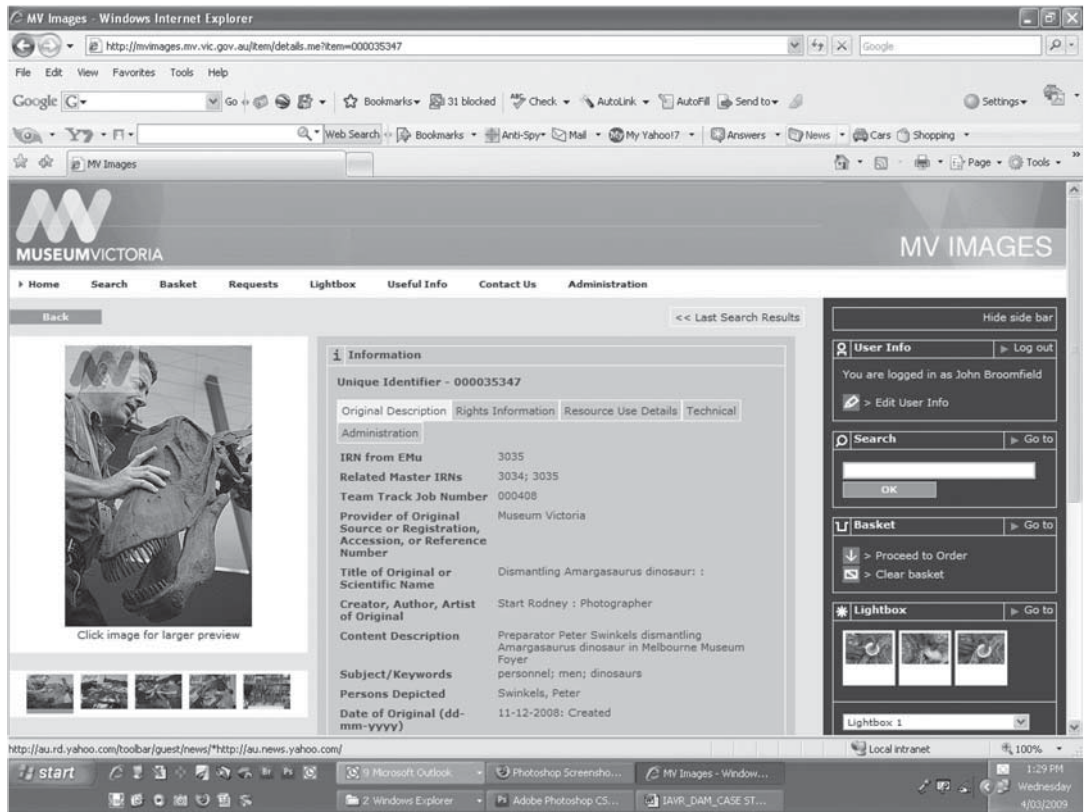
- User-friendly with a web-based interface for access;

- Controlled access to images based on user privileges;
- Include image and rights management and use history;
- A safe storage and retrieval system for the preservation of assets;
- Workflow integration with data-harvesting and embedding of metadata;
- A lightbox function providing a collaborative workspace to aid creative processes;
- E-commerce functionality;
- Integration with the Museum's existing collection management system (KE EMU).

A DAMS Implementation Steering Group was established and the project's ownership assigned to the Strategic Collection Management department, which also manages the implementation of other collection management systems. The first priority was to appoint a dedicated project manager, a need identified earlier by the Software Solutions Sub-Group, as the project would require extensive stakeholder negotiation, resource procurement and liaison and coordination between internal and external stakeholders. Apart from normal project management duties, the project manager needed to have an understanding of metadata requirements, migration and mapping of data, and various associated standards. This position has proved crucial to the overall success of the project.

The DAMS, known as *MV IMAGES*, has been developed by Media Equation from their standard lookat.me™ product, and includes additional fields identified by the Museum. Because of the number of fields, which conform to various standards, tabs were added to the interface to divide the types of data collected (see Figure 2). These tabs make navigating information and displaying the data easier. They can also be used to limit the type of data and information users have access to.

From a user perspective, *MV IMAGES* enables the organization of digital assets in logical or popular groupings via categories and mini-collections, which will allow various staff groups and the public to have easy access to certain images. These groupings can be restricted via permissions on the mini-collections or individual assets within the collection. The entire DAMS can be searched using a simple or advanced search feature, with the results returned limited by the permission level



**Figure 2:** MV IMAGES' tabbed interface.

*Note:* The tabbed interface presents information to the user in logical groupings such as Original Description, Right Information and Technical data.

set on the individual assets. Using this feature will enable external assets, perhaps acquired under strict license conditions, to be managed within the system.

Users of MV IMAGES have the ability to make their own asset groupings using the lightbox feature. This will allow project teams or individuals to share assets via email, and aid collaborative and creative processes. The system also supports e-commerce via a shopping basket. This feature enables usage information to be collected, and checks can then be made to ensure that the use is permitted according to the associated rights. In addition, the system allows the user to predetermine the image size, which is automatically generated for download once the order is approved.

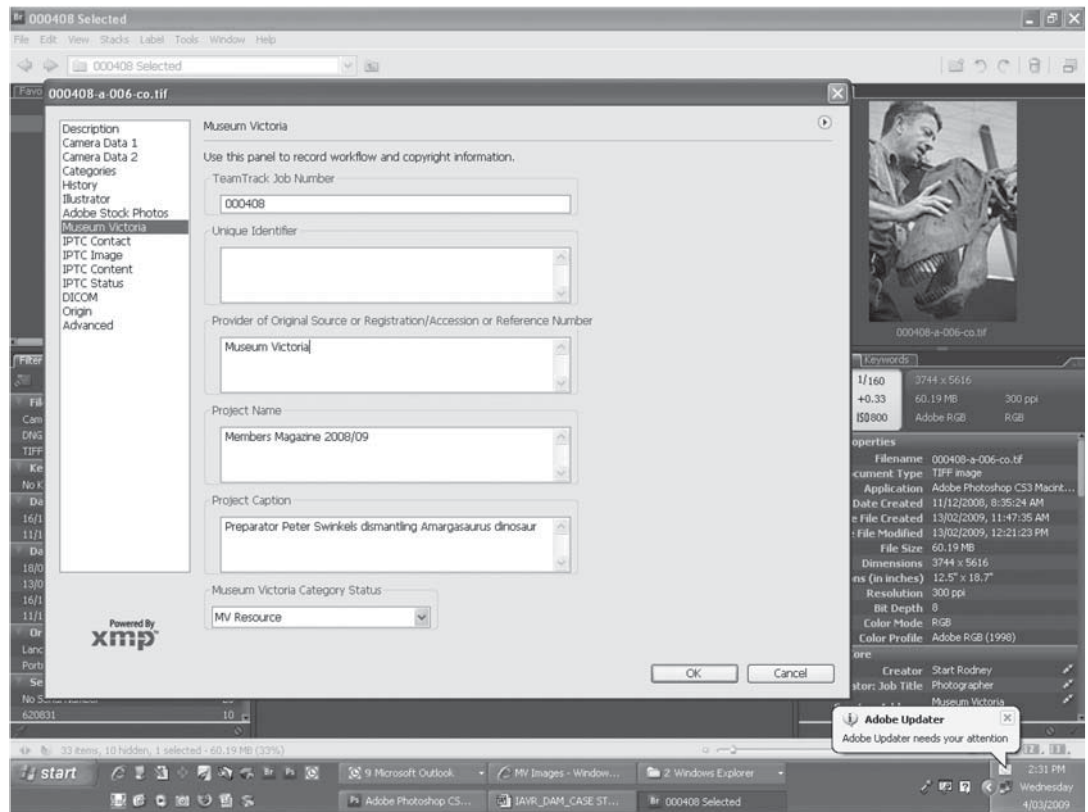
## SYSTEMS INTEGRATION

For digital assets to be of high value and remain accessible in the future, the input of relevant

data associated with the asset was seen as a vital task, particularly as data collection and input is one of the most resource-intensive aspects of implementing and maintaining a DAMS. The museum identified the need to use tools used during the creation and life cycle management of the assets, and to integrate the information obtained from these into MV IMAGES:

- Descriptive and technical data on the digital object/asset;
- Adobe Photoshop/Bridge (additional descriptive data);
- Serena<sup>®</sup> Business Mashups (descriptive, technical and workflow data);
- MV IMAGES (lookat.me<sup>™</sup>);
- KE EMu (the Museum's Collection Management System).

Where possible, data were captured automatically and propagated into MV IMAGES. The capture



**Figure 3:** XMP custom metadata tab.

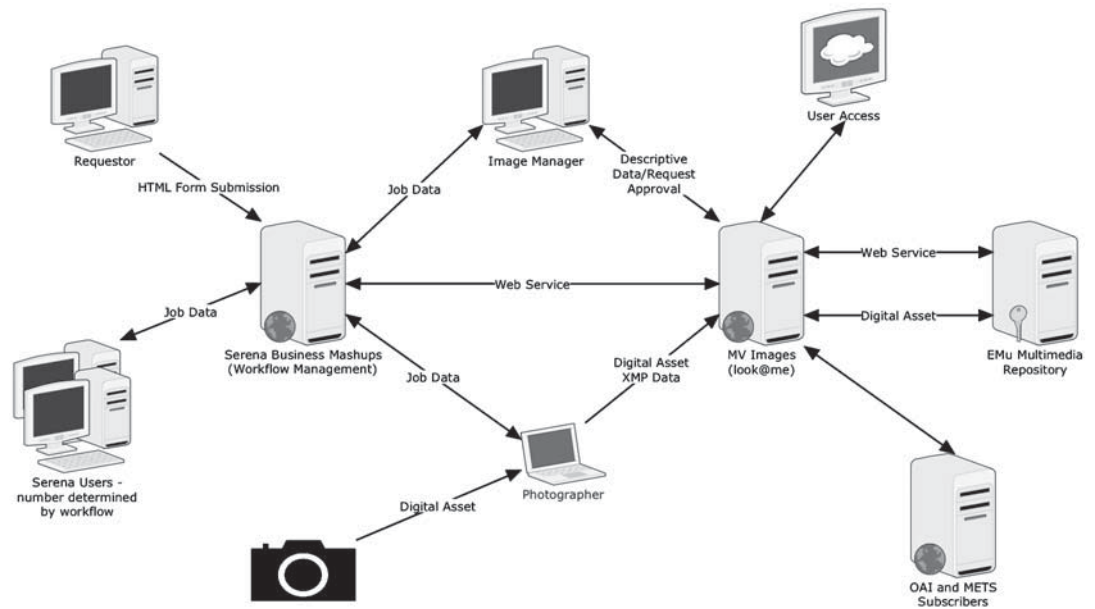
*Note:* The custom XMP tab developed by Media Equation Pty. Ltd. is available to image creators through Adobe Photoshop or Bridge to add metadata to the system.

devices and software used in asset-generation embed a great deal of technical data into the assets. These data are harvested and stored with the file after ingestion, as this was seen as important for the long-term preservation of the digital object.

We identified the need to integrate with the tools and software used across the museum and particularly in the production environment. For example, the Adobe® suite of software is a standard tool across the photography and design industries and in many government and private organizations. Therefore, it was seen as important to use Adobe's emerging Extensible Metadata Platform (XMP – an XML based language) for embedding, importing and exporting of data within the image files. Rights and other descriptive information can travel with the assets and be supplied to third-party users such as the media, whose own DAMS should be able to harvest this information.

Within Adobe Photoshop and Bridge, it is possible to add descriptive metadata to images using a series of predefined tabs; templates can be created for the batch-loading of data to a series of images, which creates a flexible and streamlined process for adding metadata via a common and independent tool. Part of our requirement for XMP was to pilot the use of a custom XMP metadata tab for data specific to MV's business requirements (see Figure 3). This would allow data to be shared among collaborators such as photographers, specialist staff (such as scientists involved in imaging projects), image managers, users of MV IMAGES and end-users such as designers.

The lookat.me™ product is integrated with Serena® Business Mashups software (Team Track®) to provide workflow management to the system. Team Track® is a business process management tool, and provided the opportunity to develop some quite complicated workflows



**Figure 4:** User and systems integration diagram.  
*Note:* The system is integrated so that information is gathered from various data sources and user inputs, consolidated in MV IMAGES and then available for access.

around our desired digitization processes, with the benefit that data generated along the way could be harvested by MV IMAGES at the time of ingestion.

MV already has an advanced collection management system in KE EMu. Integration with this system was important to limit data duplication, and this was achieved through using the EMu Multimedia Repository (MMR) as a shared storage location and linking it to MV IMAGES via web services. Assets within the MMR can now be flagged as External (MV IMAGES only), Internal (EMu only) or Shared (visible to both systems but editable in MV IMAGES). This approach would allow any assets related to the collections and their management to be linked to the collection database, while allowing the management of external assets and those with no relevance to the collections to be managed within MV IMAGES. Other developments for the real-time synchronization of data are currently being considered.

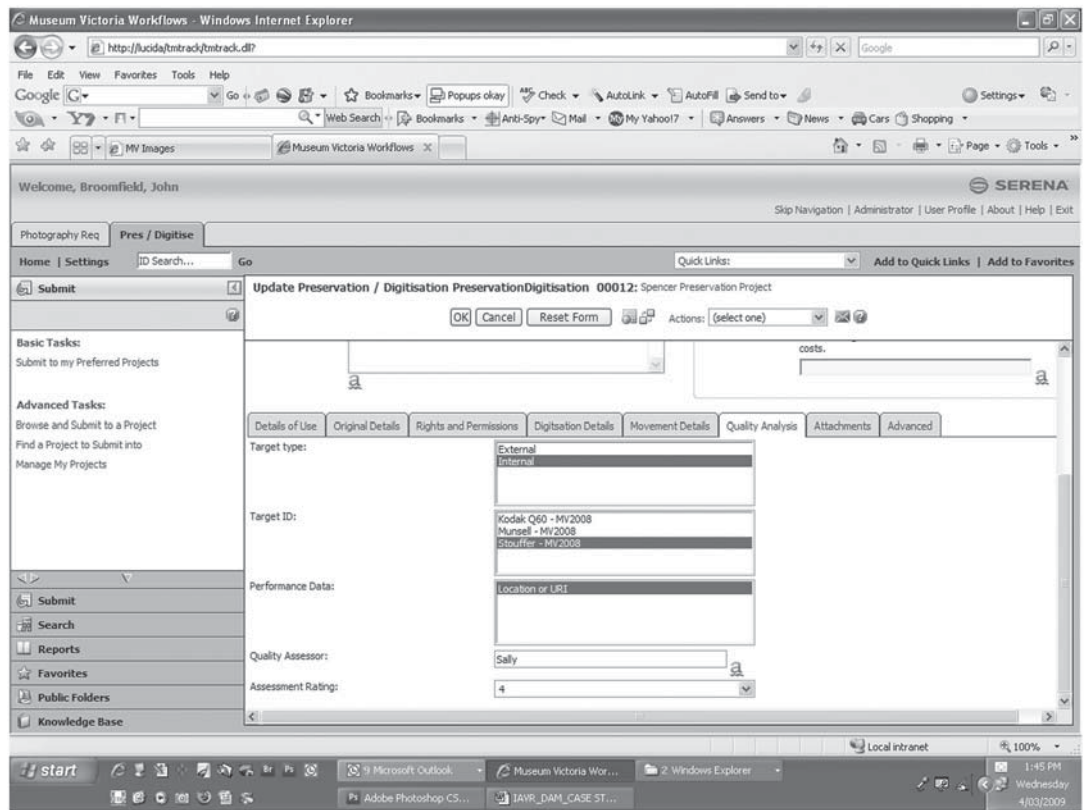
The overall systems integration for our DAMS implementation is represented in Figure 4, which also represents the various user inputs that will streamline data-gathering.

## WORKFLOW MANAGEMENT

The workflow management provided by Serena® Business Mashups (Team Track®) creates an auditable trail of events, with tasks assigned to different team members. Tasks can be reassigned if a team member is away, and notifications sent to team members or clients at various points in the workflow to let them know they have a task to action. One of the main benefits for us, however, is that from the point of the initial client request, we have established a data chain that is added to along the job cycle, culminating with selected fields in MV IMAGES being automatically propagated with data when the asset/s are ingested into the system.

Our initial implementation included the design and integration of two workflows. For these, we chose a simple process that represented a request for a photographer to cover an event, and for the second, we chose a more complex process for the preservation/digitization of collection material.

The production of preservation quality digital images from heritage material is a complex process involving a number of staff from different departments within the organization.



**Figure 5:** Quality analysis tab.

*Note:* The Quality Analysis tab built into the Preservation/Digitization workflow will allow preservation specific data to be automatically propagated to the DAMS.

For our Preservation/Digitization workflow, we have included roles such as collection manager, conservator, transportation staff, production manager, production staff and image manager.

We have also piloted the collection of information that will be used to form part of our preservation data for assets generated with this workflow. For example, the production manager can assign the correct digitization technique/equipment and location depending on the type of material being digitized, as well as target information using controlled lists (targets are charts or step wedges with known density values that can be used for quality assurance; see Figure 5). Selected elements of this information are then added to the technical metadata for the digital object.

## RESULTS

MV IMAGES was deployed (went 'live') in the Museum's production environment in early

2009, and is currently being piloted by staff. Part of the first stage of the implementation included the migration of approximately 30 000 records and associated digital files from our old image management database. We are currently in the process of data clean-up and entry and assigning appropriate privileges, after which the assets will gradually be exposed to the organization before going live on our web site.

Initial feedback on the web-based interface of MV IMAGES has been very positive, particularly as the previous database was only available within the department and to a few users across the museum. With the previous system, a great deal of staff time was spent on processing internal image requests; however, with the new DAMS there is an expectation that efficiency will be gained in this area. This is because of the DAMS enabling self-service selection of images, with only

limited assets requiring input for approvals or additional research.

The integration between Serena® Business Mashups and MV IMAGES has been successful in terms of our initial requirements, and has streamlined the collection of other relevant data. Data transfer is now occurring between systems, which removes the data duplication that previously occurred with the isolated systems used for job requesting and image management. During the next 12 months, the museum expects to undertake further refinement in this area as it beds in and uses the system, makes adjustments to current workflows, and develops and implements additional workflows.

The use of the shared repository in EMu's MMR has enabled us to have a single location for the storage, archiving and management of our high value digital assets. The function that allows images within the EMu MMR and

MV IMAGES to be shared has been tested, with data mapping from the MMR to the required fields in MV IMAGES. Again, we expect to make refinements and further develop this integration after a period of piloting and testing the system within MV Studios.

From a preservation perspective, with integrated workflow management, we have a tool that will assist in the management of accelerated digitization projects, and will streamline the collection of metadata required for digital object preservation.

## **ACKNOWLEDGMENTS**

I acknowledge all participants involved in the review and implementation process to date, particularly the review team who developed the internal unpublished review documents, which have formed the basis for a large part of this paper.

**Table A1:** Recommendation 3 systems

<i>Title</i>	Select and implement a Digital Asset Management (DAM) System.
<i>Issue</i>	A lack of appropriate software tools is a significant barrier to effective management of digital assets. This results in access problems for internal and external stakeholders and users, duplication, and inefficient management and control of digital assets including their associated rights.
<i>Recommendation</i>	Implement a DAM System to manage digital assets and their associated metadata, simplify access to images and enable web based e-commerce supply of images. Develop the EMu Multi Media Repository and/or applications to enable asset and/or metadata sharing between the DAM and EMu (see <i>Attachment REC3-2 Model Image Workflow Automation Tool</i> ). Develop a clear workflow, thereby enabling applications for harvesting and writing metadata and applying a new persistent identifier scheme to digital assets. (see <i>Attachment REC3-3 Digital Asset Management Overview</i> ). Standardization and maintenance of image editing software across all areas of Museum Victoria responsible for the generation of digital assets, assisting the process of consistent metadata application. Develop and adopt a new simplified fee structure for image sales to be implemented with the e-commerce function of the DAM System (to be approved by FARC). EMT to establish a DAM System Implementation Group to further examine workflow issues across the museum, finalize system specifications, develop tender documentation and supervise the DAM System implementation and development of procedures.
<i>Business case</i>	Clear efficiencies will be achieved through workflow enabling tools that automate many processes, such as harvesting and writing metadata to digital assets. There is a danger with the current proliferation of digital images that if not managed correctly and efficiently they can become lost and/or dissociated from their metadata rendering them a usage risk in terms of Copyright and/or Moral Rights legislation. Failure to link image with data also makes it highly likely that internal and external users of images will label the content incorrectly and spread misinformation that will harm Museum Victoria's credibility. Through online image sales, the DAM System would be the source of an income stream, which would increase over time as the digital image library expands. The initial implementation of the DAM would be across the Production Studio, enabling access to the main reserve of production quality images. After the initial implementation and testing phase, a review of procedures and resource requirements would be conducted and a strategy for roll out across the entire museum developed and appropriate funding secured.
<i>Timeline</i>	3–9 months for workflow documentation and tender development (timed with implementation of other review recommendations). 3–18 months for development of workflow enabling applications and image editing software standardization (timed with implementation of other review recommendations). 6–18 months for initial DAM implementation and development of procedures (timed with implementation of other review recommendations). 1.5–5 years for DAM roll out and further development of procedures.
<i>Communication</i>	We recommend a roll out involving presentations for all staff at General Staff Meetings, and specific training workshops for staff directly involved in working with images.
<i>Outcome</i>	Vast increase in online public access to appropriate images and audio-visual material. Provision of an e-commerce service linked to existing financial and business systems and would be expandable beyond digital assets to sales of other items such as publications and merchandise. Vast increase in staff access to appropriate images and audio-visual material on the intranet. Greatly improved workflows enabling staff to better capture, manage and access images on-demand. Controlled and user-friendly environment for access to the new Museum Victoria Visual Identity System. Fulfills all three Strategic Directions of <i>Enhance access, visibility and community engagement; Develop and maximize the value of our heritage collection; and Manage our resources.</i>