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Digital Asset Management for the Hong Kong Maritime Museum

Andrew James Cunningham
Worcester Polytechnic Institute

Gregory J. Mollnow
Worcester Polytechnic Institute

Rebecca Marie Rollinson
Worcester Polytechnic Institute

Wyatt Brewster Gray
Worcester Polytechnic Institute

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DIGITAL ASSET MANAGEMENT FOR THE HONG KONG MARITIME MUSEUM

By
Andrew Cunningham
Wyatt Gray
Greg Mollnow
Rebecca Rollinson
Date: March 2, 2012

Digital Asset Management for the Hong Kong Maritime Museum

An Interactive Qualifying Project Report
Submitted to the faculty of the WORCESTER POLYTECHNIC INSTITUTE
In partial fulfillment of the requirements for the Degree of Bachelor of Science
In cooperation with the HONG KONG MARITIME MUSEUM
On March 2, 2012

Submitted by:

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Andrew Cunningham (RBE/ECE)

_

Wyatt Gray (IMGD)

_

Greg Mollnow (CE)

_

Rebecca Rollinson (ChE)

Submitted to:

_

Prof. Chrysanthe Demetry, Advisor

_

Prof. Richard Vaz, Advisor

ABSTRACT

The Hong Kong Maritime Museum is moving to a larger facility and lacks a system to manage images, video and other digital assets. Our goal was to recommend a strategy for improved digital asset management. Through interviews with staff and research into available systems, we identified solutions to the museum's challenges. We proposed two potential solutions for the museum along with standardized cataloguing and keywording systems. We also captured and produced media that could be used to bolster the museum's upcoming website.

ACKNOWLEDGEMENTS

AUTHORSHIP

Throughout our report's development, we attempted to establish a functional work flow to draft and revise each iteration of our paper. Each of us had personal preferences and comfort levels regarding each method, and we were able to arrive at a solution that fit well with all of our writing styles.

The strategy we established for the writing process included multiple stages of revision each time we created new content. The following chart shows the steps we followed for new content creation:

1. Break up new material into sections based on individual interests and knowlege

2. Generate new "raw" material individually

3. Trade sections and review each other's sections objectively

4. Compile document on a big screen and read through entire draft as a group from start to finish
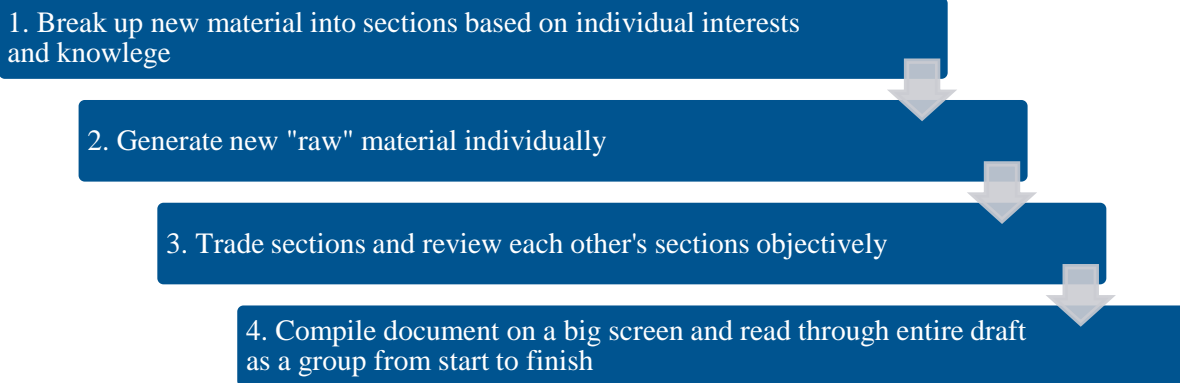
We found that this was an effective strategy to incorporate the strengths of each writer. Both Andrew and Wyatt were the primary researchers in the DAM selection process. Therefore, they were the primary writers of the original content on the DAM selection sections and the technical aspects of the paper. Gregory took the lead role in writing the sections about the creation of video content (The Sea Matters to Me). Rebecca took the leading role in researching and writing content for the metadata and keywording systems.

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EXECUTIVE SUMMARY

The Hong Kong Maritime Museum (2010) was established in 2005 to "place Hong Kong's maritime story into its local, regional and international context" (p. 1). The museum is moving to Central Pier 8, and the staff are now beginning to plan the new facility's exhibits. This move to Pier 8 poses a two-fold challenge. The staff must design fifteen new galleries, and the design process for these galleries will depend on reliable and efficient access of the museum's images, video, and other digital assets. The museum will also benefit from a presence in the public while it is closed from March 2012 to January 2013. The move to Central Pier 8 presents an exciting opportunity for the museum, but these challenges must be addressed for the museum to have a successful transition.

Project Goal and Objectives

The goal of this project was to assist the Hong Kong Maritime Museum (HKMM) during and after its move to Pier 8 through recommendation of a Digital Asset Management (DAM) system, a secure centralized repository that allows for selective access to all of an organization's digital assets (word documents, images, videos, and sounds). To achieve that goal, we pursued the following three objectives:

- ***Create digital content that will help the HKMM maintain a public presence during its move to Pier 8.*** In order to maintain the museum's public presence, we participated in the development of video content for the HKMM website.   We helped create storylines to portray the local population interacting with the sea. We also captured photos and film of Hong Kong maritime-related subjects, and put them into suitable forms for future use.

- ***Recommend a digital asset manager for the HKMM, based upon the requirements set forth by the museum and its staff.*** To reach this objective, we first determined the needs of the staff when dealing with digital assets through interviews and background research. From these needs and with logistical considerations, we created a list of requirements and a list of additional criteria for a DAM. The requirements were those features by which we could eliminate possible DAMs, whereas additional criteria were those features by which we could compare DAMs that met all of the requirements. Next, we identified candidate DAM systems through background research and through our and HKMM consultant Robert Trio's previous experience. We compared the ten systems we identified with our requirements and criteria. After narrowing our search to four final candidates, we held web meetings with their providers to determine in detail how well each met the museum's needs.

- ***Determine a comprehensive, standardized system for metadata (information about assets) and keywording within the digital asset management system.*** To identify possible systems, we researched industry standards in metadata structuring and keywording with the help of HKMM librarian Kitty But. To determine a suitable metadata system, we further analyzed our HKMM staff interviews to develop a list of information required for all assets. We used these informational requirements to compare metadata structures. To determine a suitable keyword list, we developed and distributed a keyword survey to staff members. We analyzed their responses to find similarities and differences among staff members when keywording and used this to generalize the types of keywords the staff use. We compared standardized keyword lists with these keywording needs.

The Case for a DAM

The current system for managing digital assets at the HKMM is limited in many ways, especially in searching for and sharing assets with out-of-house designers. The shared drive, used by most staff members to store files, is organized with a folder system that can only be searched by file and folder names and cannot be accessed by anyone outside of the museum. The assets uploaded to the Flickr and YouTube accounts are reduced in quality upon upload, so they cannot be readily used in exhibit creation. A DAM is a special-purpose database that can hold and organize all of an organization's digital assets (such as photos, videos, and word documents) in a central repository, while allowing users to attach relevant information (metadata) and keywords to each asset, making the assets easy to find. DAMs are also web-based for easy sharing in any location and feature powerful project management tools to help users work with the files stored in them. Users are able to group digital assets and readily share these groups with others, such as the exhibit design team. These features combined create a comprehensive suite of tools for controlling, sharing, and using assets amongst groups of users.

A Presence during the Move to Pier 8

To promote the museum's public presence throughout its move to Pier 8, we created storylines and contributed media for a video mini-series, "The Sea Matters to Me", that will be posted on the museum's new website while the museum is closed for its move. The storylines we developed were focused on the Star Ferry, underwater archaeology, dolphin conservation, local shipyards, and fish markets. The photos and film we collected and curated correspond to four main themes that connect Hong Kong people to the sea: commerce, food, fun, and transportation. These themes will be incorporated into the introduction of the web-series by Robert Trio, a consultant for HKMM.

A Digital Asset Management (DAM) System for the Hong Kong Maritime Museum

The requirements we used to eliminate DAM systems within our research and the additional criteria we compared systems with are shown in Table 1.

TABLE 1: REQUIREMENTS AND ADDITIONAL CRITERIA USED TO SELECT A DAM SYSTEM

Requirements	Additional Criteria
Support for all file types	Retrievable, extractable metadata
Support for Traditional Chinese characters	Multi-user capabilities
A web-based solution	Accessibility for designers
Secure asset storage	A powerful search engine
The ability to set user permissions	Technical support
Standardized organizational system	Intuitive icons
Operating system compatibility	Asset storage space
	The ability to integrate with current system
	Upfront and recurring costs

From our comparison of DAM systems based upon these requirements and criteria, we identified Canto Cumulus and ResourceSpace as viable DAM solutions for the museum.

TABLE 2: HIGHLIGHTING DIFFERENCES AMONG CUMULUS, RESOURCESPACE, AND THE CURRENT SYSTEM

	Canto Cumulus	ResourceSpace as stand alone open source application	ResourceSpace with Third Party Host (Montala)	Current System
Chinese Charicter Support	✓	✓	✓	
Centralized Repository of Data	✓	✓	✓	
Retrievable/extractable metadata	✓	✓	✓	N/A
Easily accessible to designer	✓	✓	✓	
Web Based	✓	✓	✓	
Comprehensive search system	✓	✓	✓	Flickr Only
Related items search	✓	✓	✓	
Third Party Maintance	✓		✓	
Suport for Setup/Instelation	✓		✓	
Extensive user/tech support	✓		✓	
Public Access Module	✓			
Customizable Metadata	✓		✓	
Cloud hosting	✓		✓	
Integration with current system	✓	Limited Flickr Integration	✓	N/A
Full Version Control	✓			
Project Mannagement Tools	✓			
Upfront Cost in HKD	$202,572	$0	$9,891	N/A
Yearly Cost in HKD	~$2000 with private cloud	$780 for 100GB	$24,717	$0

In Table 2, we compare Cumulus, a basic version of ResourceSpace, a customized version of ResourceSpace, and the current system. The table explores the aforementioned requirements and criteria that differed among the systems.

Cumulus involves a large initial investment, but meets all of the requirements and criteria. ResourceSpace involves no upfront costs, but must be customized to meet most of the additional criteria. However, we believe that any of the three options we have listed above would be an improvement for the museum.

Metadata and Keywording Systems for the Digital Asset Management System

Use of a DAM requires selection of a metadata structure and keywording list. A metadata system specifies and standardizes information that must be attached to each asset. A keyword list is a controlled vocabulary that ensures uploaders and users use the same words to describe assets, which allow assets in the DAM to be easily found again. We recommend the **Dublin Core metadata system**, because it consists of only 15 broad informational categories, allowing for quick information population, and can adapt to fit all file types. Furthermore, we recommend the **Library of Congress Subject Headings keyword system**, because it covers a wide range of subjects to represent nearly any type of document. This system includes a thorough maritime hierarchy that would represent the content and general context of all of HKMM's assets.

Applications of the DAM for the Pier 8 Transition

The functions of this DAM can allow better communication between staff members as well as out-of house contractors, who must work together to design the museum. During the transition, we encourage the museum to:

- begin populating the DAM with only assets related to the transition for the sake of saving time;
- use the DAM to manage gallery development by sharing ideas and files with out-of-house designers; and
- use the DAM as a collaboration tool within the museum for creating web content, such as "The Sea Matters to Me" videos series.

If the DAM is acquired, maintained, and merged with the current system, the staff will be able to create the fifteen new galleries more easily. Further functionalities of the DAM can continue to benefit the museum after the move to Pier 8.

More details on all of these recommendations and findings are outlined in Chapters 4-7 of the report. While adoption of any of these recommendations will require additional discussion and refinement by the museum staff, we hope our research has provided a framework on which the Hong Kong Maritime Museum can build an effective plan to manage its digital information and take full advantage of its new home on Pier 8.

1 INTRODUCTION

The mission of museums is to collect, educate, conserve, and exhibit information to engage an audience. Museums use computer technology and multimedia to facilitate this mission. Staff members can use digital assets, such as videos, sounds, and images to convey information to the world. Museum staff can access digital assets more readily if they develop systems to organize and maintain their collections. When digital assets are stored in a single central repository, they become easier to access and reuse for website development, exhibit development, and marketing plans.

The Hong Kong Maritime Museum (2010) was established in 2005 to "place Hong Kong's maritime story into its local, regional and international context" (p. 1). In 2012 and 2013, the museum is moving from Murray House in Stanley to Central Pier 8, and the staff are now beginning to plan the new facility, which will have fifteen galleries as opposed to the current two galleries. This move to Pier 8 poses a two-fold challenge. The staff must create fifteen new galleries, and they are in need of a management system for their digital information in order to communicate with the designers and streamline the design process. The museum must also maintain a presence with the public while it is closed from March 2012 to January 2013. The museum hopes to use this transition to Central Pier 8 to expand its audience from the tourists of Stanley to the local Hong Kong populace. While the move to Central Pier 8 offers many opportunities to the museum, these challenges must be overcome for the museum to transition successfully.

The Hong Kong Maritime Museum currently has a digital system for organizing its physical collection. However, there is no similar system in place for managing the museum's digital assets. The current approach, consisting of a shared drive, Flickr account, and YouTube account, scatters the assets, which makes them difficult to find. Without a single system for storing and managing these digital assets, it is unlikely that they will be fully utilized. Also, the current system does not facilitate collaborative work flows, making the exhibit design process more difficult for the staff. Furthermore, while the museum is closed, it must rely upon the digital content of its website to maintain a public presence. Without a central repository for digital assets that facilitates collaborative work flow, it is challenging to create this digital content.

There are many software solutions available to assist the museum staff in digital asset and project management. Generally, these software solutions consist of server space to store the assets; a workspace for organizing, viewing, and editing assets; and user and permissions management to ensure the safety of the assets. The workspace is customizable so users can view and organize assets according to their preferences. These organizational features could help the museum better keep track of and use its digital assets, which are an integral part of exhibit design. Additionally, these software solutions allow assets to be grouped into projects and shared with other users for collaborative work. Within the project, users can comment on, add, edit, and remove assets. These project management features could facilitate collaborative work in

designing the new exhibits for the Pier 8 site and in creating digital content to maintain a public presence for the museum. However, research has not yet been conducted to determine which software solution, if any, would best suit the museum during and after their transition to Pier 8.

The goal of this project was to propose a system for digital asset management to assist the Hong Kong Maritime Museum's transition to Central Pier 8. First, we developed storylines for the "The Sea Matters to Me" web series, as well as captured videos, sounds, and photographs which will be useful for maintaining a public presence during the move. Next, we identified the needs of museum staff for using and managing digital assets in their daily work, as well as for the move to Pier 8. We also identified a variety of cataloguing systems and controlled keyword lists that the museum could use to keep its digital collection accessible and organized. Through the creation of relevant video content to be shown on the website and the identification of a well-organized digital asset management system, we hope to help facilitate the Hong Kong Maritime Museum's move to its new home on Central Pier 8.

2 BACKGROUND

In this chapter, we provide background information on digital curation at museums and on the current system for digital asset management at the HKMM, and present the case for an improvement in this system. We conclude this section by explaining important logistics that are involved in the implementation of a DAM.

2.1 DIGITAL CURATION AT MUSEUMS

In a time when digital information is proliferating, management of that information presents increasing challenges to organizations. Museums are no exception to this rule, as they often deal with digital images, sounds, files and video which they use to convey messages to the public. In this section, we first explain what digital curation is. Then, we show the lifecycle of digital assets in a museum. Finally, we describe the benefits of digital curation for project management.

2.1.1 DIGITAL CURATION DEFINITION

In 2007, Pennock stated "Digital curation, broadly interpreted, is about maintaining and adding value to, a trusted body of digital information for current and future use" (p. 1). In terms of museums, digital curation is a process that maintains or increases the value of a collection of digital assets over time. A well-curated collection of digital assets allows a museum to fully utilize these assets.

Classically, curation in museum work is a process directed towards building a themed collection based upon an organization's physical objects (Beagrie, 2006). This process is performed by curators, who rely upon their expertise in order to maximize the value of the collection. The term "digital curation" is believed to have been coined at the "Digital Curation: digital archives, libraries and e-science" seminar held in London on October 19, 2001, to convey the idea of refocusing the concepts of classical curation towards digital content, as well as outlining the key differences between curation of digital as opposed to physical collections (p. 4).

2.1.2 THE DIGITAL CURATION LIFECYCLE FOR MUSEUMS

In an interview with the Digital Curation Center (2008), Neil Thomson, Head of Data and Digital Systems at the Natural History Museum in London, stated that digital curation for a museum is a process that involves both the storage of data according to pre-determined requirements, as well as its maintenance within the system. Essentially, the digital curation lifecycle of a museum's assets involves the access, use, reuse, transformation, creation, addition, and appraisal of data, as well as preservation of this data, via

organization and preservative action. This process is portrayed in Figure 1, which shows the cyclic process of digital curation.
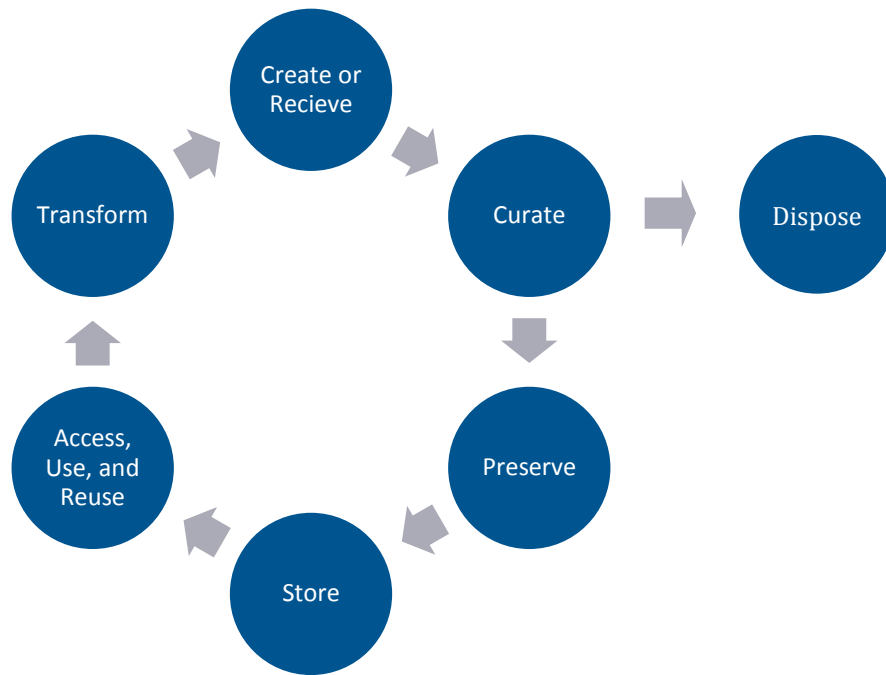
FIGURE 1: DIGITAL CURATION LIFECYCLE

Removing unwanted data is a useful yet often overlooked facet of digital curation. Yakel (2011) described the growing number of assets produced on a daily basis can be overwhelming, and storing these data efficiently can often be tedious, difficult, and time-consuming. By removing these data from the system, the process of finding relevant information is expedited, and the risk of utilizing obsolete data is reduced.

In addition to storing and removing data from a database, digital curation also involves the periodic checking and updating of information within a database. When asked about why digital curation was undertaken, Neil Thomson, stated that he formed the museum's Digital Preservation Group because "there needed to be active management of current data in order to fulfill the aim of ensuring that the data will be continuously available into the indefinite future" (Digital Curation Center, 2008).

2.1.3 BENEFITS OF DIGITAL CURATION IN PROJECT MANAGEMENT

As technology surrounding and involving museums change, so must their methods for using digital assets to create new content. While traditional print and online information already prove difficult for curators and designers to manage, new technologies and data types continue to be created, increasing the difficulty of such a task (Kollmorgen, 2005). In a 2008 article about how managing assets can save time and money, Krishna explained that as relevant digitized content

4

floods organizations, it becomes necessary to organize and manage it for the sake of time and money. The project process flow can easily be interrupted or slowed down by ineffective digital asset management. Krishna continued to explain that material can get lost or mistranslated between the people in the project supply chain, resulting in the unnecessary recreation of the material. Inefficient data management and data transfer can lead to long searches for particular data, lax process control and quality assurance, longer project times, and higher costs (Leland, 2000; Korvacs, 2004; Kollmorgen, 2005).

Digital curation can improve the project management process in many ways. Accessing data through digital means is almost always faster and easier than sifting through filing cabinets and folders. Web-based asset managers can be used as collaborative platforms for inter- and intra-organizational interactions, which enable cooperation, team-building, and information exchange on a global level (Kovacs, 2004; North Plains, 2010). Some specific advantages of digital curation systems are:

- less time spent searching for data;
- less time and resources spent recreating lost data;
- more reuse of data;
- better tracking of assets; and
- more consistency among workers.

In an interview with Leland in 2000, the Gistics Company stated that those who employ a digital curation strategy "will spend 36% less time transferring files, 28% less time reorganizing files, 14% less time locating files, and 13% less time tracking multiple-version files" (p. 1). Cost savings can be associated with all of these advantages, from eliminating flash drives for information transfer to avoiding photography costs through image reuse (Kollmorgen, 2005; North Plains, 2010). Korvacs (2004) argues that digital curation can result in "shorter project cycles, lower costs, process quality assurance and control, improvement of cooperation and communication" (p. 5). Digital curation serves to help curators and designers find the data they need, work together to complete projects, and produce content more efficiently.

2.2 STATUS OF DIGITAL CURATION AT THE HONG KONG MARITIME MUSEUM (HKMM)

This section describes current processes for digital curation at the Hong Kong Maritime Museum. We provide a brief history of the museum, as well as its plans for the future, primarily its move to a new location on Central Pier 8. We then focus specifically on the digital asset management process in place at the museum, concluding with the limitations of such a system for project management and the move to Central Pier 8.

2.2.1 INTRODUCTION TO THE HKMM AND ITS MOVE TO PIER 8

The Hong Kong Maritime Museum (2010) was created in 2005 "to become the maritime museum showcasing Hong Kong and China's maritime connection to the world focused on the Pearl River Delta and the emergence and development of Hong Kong as a port and international shipping center" (p. 2). The museum is pictured in Figure 2 at its current location in Stanley, where it only accounts for the ground floor of the Murray House building.

FIGURE 2: HONG KONG MARITIME MUSEUM AT ITS CURRENT LOCATION IN STANLEY

SOURCE: HONG KONG MARITIME MUSEUM, 2012, ABOUT US

In 2010, the museum released a report entitled Hong Kong Maritime Museum Corporate Briefing Paper that articulated a vision for the museum's future. Citing visitor feedback that indicated limitations due to size and location, the report makes the case for a move to a larger and more accessible location (p. 5).

The museum's size poses a challenge in trying to educate a large audience. Currently, the museum only has two galleries to display their objects and stores most of their collection in an off-site storage room. Although HKMM (2010) has welcomed over 200,000 visitors, it would like to reach a larger audience. The HKMM is roughly 15 times smaller than average maritime museums in equivalent port cities (namely China Maritime Museum, Hamburg International Maritime Museum, Barcelona Maritime Museum, Australian National Maritime Museum, German Maritime Museum Bremerhaven, and Rotterdam Maritime Museum) with approximately 14 times less gallery space. With added space, the museum would be able to display their physical collection, which has grown from 650 pieces to 3000 pieces, and their library collection, which has grown from 20 to 2000 items (p. 5).

Location is also an important factor in a museum's success or failure. The HKMM's (2010) current location is a detriment in two ways. First, this location is not accessible via the Mass Transit Railway (MTR). This makes it hard for visitors to get to the museum, as it is almost 18 kilometers away from the nearest MTR station. The museum is only accessible by bus (which can take almost an hour), taxi, or personal vehicle. The second detriment is that Stanley is a tourist-oriented area that is not regularly visited by the majority of Hong Kong residents. While the museum is a currently oriented for tourists, the goal of the museum is shifting to expand their audience to connect with the locals of Hong Kong.

In order to grow and reach a larger audience, the HKMM (2011) will be relocating to Central Pier 8 (p. 7). Pier 8 is a repurposed pier adjacent to a working Star Ferry Pier, as pictured in Figure 3. This location is a central, more accessible site for the museum, and it will allow a larger and more diverse audience to immerse itself in the maritime history of Hong Kong. In Figure 3, the new museum is the building pictured on the left with the working Star Ferry Pier on the right.

FIGURE 3: PROPOSED LOOK OF REPURPOSED PIER (LEFT) FOR THE NEW HKMM

SOURCE: HONG KONG MARITIME MUSEUM, 2010, P. 16

With the move to Pier 8, the gallery space in the museum will increase from two galleries to fifteen galleries (Robert Trio, personal communication, 12/1/2011). Therefore, the museum will be able to showcase more artifacts from its collection, providing a more complete maritime overview. However, this move means that the museum will be closed for almost one year, from March 2012 to January 2013, leaving the museum's website as its only public outreach.

2.2.2 HKMM'S CURRENT SYSTEM FOR MANAGING DIGITAL ASSETS

This section outlines the basic structure of the current resources used to manage digital assets at HKMM. We will briefly describe each system's capabilities, as well as its limitations. We explain how these systems will not adequately meet the needs of the museum during the move to Pier 8 and are not a viable long-term solution.

Shared Drive: The HKMM's shared drive has the capability to store and categorize any type of file. The museum staff currently use this drive to store and share information, office files, media, and miscellaneous files. The data is organized into folders, mostly pertaining to where the asset came from or what the asset should be used for. Within each broad folder are subfolders separating different types of media, such as documents and images.

The shared drive can be accessed through the computer of any staff member that is directly connected with the drive. However, it is inaccessible to anyone outside of the museum offices, and is shut down when the work day is over. This forces the staff to share assets with outsiders using email attachments, flash drives, and CDs. Also, the drive is not searchable, except for by file name (which consists of the date the files were uploaded and the number in the series they were uploaded) and folder name. With a system like this, there is no way to tag assets with information, such as description, copyright, and file type. This means that staff members must know the file names of assets or manually search the system to find them.

This system relies heavily on the staff's memories to find assets stored in the shared drive. If the user knows the origin of a digital asset or was the original uploader, the file may be easy to find. However, staff report that as time passes, it becomes increasingly difficult to locate valuable assets or even to know that they exist. Furthermore, someone who is unfamiliar with the location of files within the shared drive will have no frame of reference for where to begin searching.

Flickr: The HKMM's account on the image hosting website, Flickr, has the primary function of sharing photos both with the public and among members of the staff. This information is stored not by the museum but by Yahoo! and can be accessed through an internet browser. Flickr has strong search capabilities. Keywords and descriptions can be assigned to pictures and collections of pictures very easily, allowing for fast and convenient finding of photos. However, Flickr is only capable of managing image files (with some limited video capabilities) and reduces the image quality upon upload. This renders Flickr an unviable solution for sharing high quality photos with designers for exhibit creation.

YouTube: The museum currently uses the video sharing website YouTube as a means to publish and share video. YouTube is a reliable and searchable means of distributing video and is accessible to the public. Users are able to tag videos with keywords and descriptions, making them easy to find. However, like Flickr, files are modified upon upload to meet with YouTube's standards for file size. This means that YouTube may lower the quality of the museum's film

content, making it an impractical method for transferring to designers the high quality video that is necessary for exhibit creation.

2.3 THE CASE FOR A DIGITAL ASSET MANAGEMENT (DAM) SYSTEM AT THE HKMM

This section presents an argument for the implementation of a digital asset management (DAM) system at the HKMM. First, we define what a DAM is. We then present the ways in which work flow can be improved through the use of a DAM, supplemented by specific scenarios the museum staff face in which a DAM system would be beneficial.

2.3.1 WHAT IS A DAM SYSTEM?

A DAM is a special-purpose database that:

- can hold all types of digital assets (such as photos, videos, and word documents) in a central repository;
- helps with organizing these files by letting users attach relevant information (metadata) and keywords to each asset, making the assets easy to find;
- features powerful project management tools to help users work with the files stored in them—users are able to group digital assets and readily share these groups with others (such as the exhibit design team);
- has the ability to track particular assets through their entire life cycle, which allows users to use assets in a more informed way: knowing where the asset has been used, where it is currently being used, and which version is the most recent; and
- is web-based, so contents are accessible by all kinds of computers, allowing Apple and PCs computers to work together through the system.

Combined, these features create a comprehensive suite of tools for controlling, sharing, and using assets amongst groups of people.

On the following page, Figure 4 shows a simplified example of the sharing and editing processes involved in exhibition development using a DAM. This diagram portrays the processes of initial discovery and upload of an asset, editing of an asset, checking the asset's copyright, and submitting the asset to the designer for use in an exhibit. The diagram demonstrates how a DAM is a central communication and storage tool through each step of this process and highlights the most basic functions of a DAM—to organize and store files and to improve project management.
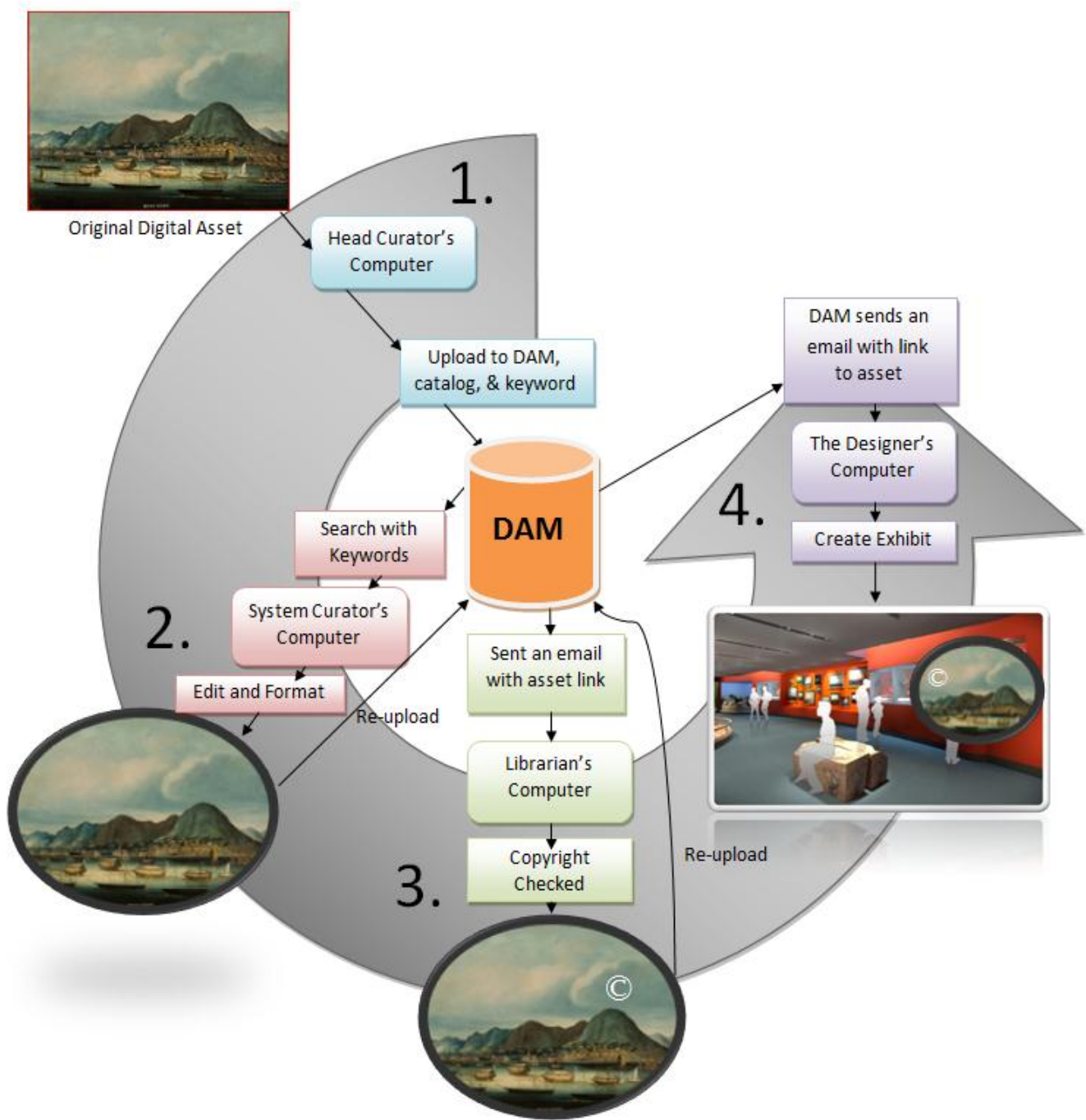
FIGURE 4: ILLUSTRATION OF A DAM SYSTEM BEING USED FOR COLLABORATIVE WORK

2.3.2 SEARCHABILITY

Searchability refers to the efficiency with which a system can find assets using the metadata and keywords attached to them. Generally, a weak search engine can only search for data using file and folder names. A digital collection with poor searchability:

- requires users to spend more time searching for files;
- relies on the memory of users to locate assets;
- creates obstacles for outside users who need to locate assets within the system; and
- obstructs the use and reuse of assets, due to loss.

DAMs feature powerful search engines that are designed to make locating assets easier. These search engines rely upon two key aspects: the *metadata* attached to each asset, such as description, creator, and copyright holder, and *keywords*, which provide associative terms to classify or label each asset. A system with strong searchability:

- proves much faster than manually searching through folders;
- makes assets easy and intuitive to find;
- prevents the neglect of forgotten and underutilized assets; and
- promotes work with outside sources, such as contractors.

The limited searchability of the HKMM's shared drive poses a challenge to the success of the museum in its move to Pier 8. Without prior knowledge of the whereabouts or name of a file, staff members spend time searching the shared drive or waiting for another staff member's help to find what they are looking for. A centralized, well organized database paired with a powerful search engine will improve the ability of the museum staff as well as out-of-house designers to efficiently utilize the museum's digital assets.

2.3.3 SHAREABILITY

Shareability is the extent to which information is easy to share between different individuals without loss of fidelity. In terms of the HKMM's digital assets, shareability is the ability of staff members to share assets with each other and work collectively on the same files, as well as to share their assets with outside sources. A system that relies on external storage devices (such as flash drives, email attachments, and CDs) to transfer large files, such as high quality photos for exhibits and video files, has low levels of shareability because it:

- inhibits the sharing of large and/or high quality assets;
- hinders collaborative work; and
- relies upon staff members to frequently deliver files to each other.

A system that has strong shareability provides multiple users with access to assets through a private network. A system with strong shareability:

- preserves the full quality of assets by eliminating the need for asset transfer;
- allows multiple users to work on the same asset or project at the same time; and
- makes assets available to all permitted users at all times via the internet.

HKMM staff members currently transfer assets using external storage devices or by sending each other emails with the file's name and location. As the staff begin to design exhibits for Pier 8, they are further realizing the need to be able to easily deliver high-quality assets to outside contractors around the world. The current system of copying the assets to discs and sending them through the mail is time-consuming and inefficient.

2.3.4 VERSION CONTROL

Version control is the ability to track assets in a way that retains previous versions and avoids loss of information. A system with no or poor version control would leave staff members with:

- the inability to reliably find the correct version of an asset causing the use of incorrect or outdated versions;
- the possibility of redundant efforts to create assets that already exist; and
- the possibility of overwriting previous versions of an asset, causing need to recreate or re-license assets.

A system with the ability to track and control asset versions would allow staff to avoid these problems, which can save staff a significant amount of time. A system with version control would:

- provide users with all versions of any uploaded assets;
- manage assets in situations where multiple users are making changes to a single asset;
- store previous versions of assets so they never need to be recreated or re-licensed; and
- greatly reduce the potential for staff to use the wrong version of an asset.

Although the HKMM staff did not identify version control as a problem that they face regularly, they did mention the frustration that accompanies a system reliant upon their memory. The staff members must keep track of assets without the aid of a synchronized system. A system that includes version control and tracking of assets can reduce the occurrence of repeated asset creation, as well as save the staff time searching for the right version of an asset.

2.4 DAM IMPLEMENTATION CONSIDERATIONS

Before implementing a DAM system, the museum must identify a location to store its assets and a system by which to organize and standardize the information attached to these assets. In this section, we discuss how these choices can affect the long-term sustainability of the system.

2.4.1 CLOUD VS. LOCAL HOSTING

When implementing a DAM system, there are two choices for storing the system: cloud and local hosting. Cloud hosting is when a software package is stored on one or more servers owned by an outside company. For example, the museum's Flickr account is hosted "on the cloud," because Yahoo! uses multiple servers to store the museum's photos. Local hosting is when an organization installs a software package on its own server, which the organization runs and maintains independently.

Each of these storage options has advantages and disadvantages. Table 3 shows the advantages and disadvantages of cloud hosting, while Table 4 shows this for local hosting.

TABLE 3: ADVANTAGES AND DISADVANTAGES OF CLOUD HOSTING

Cloud Hosting	
Advantages	**Disadvantages**
No server or software maintenance is required from museum staff.	There are recurring costs for renting the cloud space.
The server is regularly updated with improvements developed by service provider.	Sharing in-house is slower than through a locally-hosted server.
There is almost no risk of the system becoming obsolete in the future.	
A cloud server is not susceptible to power outages, server issues, or hardware damage.	

TABLE 4: ADVANTAGES AND DISADVANTAGES OF LOCAL HOSTING

Local Hosting	
Advantages	**Disadvantages**
Security of investment—the museum has control over its own digital assets.	Server must be maintained by museum staff.
There are no recurring payments. Once the system is installed, running costs are minimal.	Files must be backed up regularly to avoid data loss.
Sharing assets in-house is quicker, because they are not being downloaded from the cloud.	

2.4.2 METADATA SYSTEMS IN DAMS

A digital asset manager must be organized in a manner that allows information to be shared easily among employees and outside users, without compromising the work flow of the museum. If an internet developer, marketing team, or exhibit designer needs a specific asset from the DAM, they would need some way of finding the asset in the database. This is where a metadata system becomes useful.

Evans (2002) describes metadata as "information used to describe other information—typically a digital asset or file", meaning that metadata can be used to label assets in a way that allows other users to find it effectively and independently (p. 1). For example, when uploading an image of a modern junk to a DAM, a curator would attach metadata that would include a description of the junk, copyright information, and information on the creator and source of the image. The curator would also attach some keywords that describe the subject of the image and its historical significance. This would make it easier for users to find the image, and would provide them with the information needed to properly use the image in the context of their work.

Several systems of standardized metadata and keywording structures exist. They are most often employed in libraries, but can be applied to other collections in need of organization. Standardized systems of metadata specify what information is attached to each asset, while allowing this information to be shared with other organizations easily. By using a standardized system, organizations all around the world can easily share assets. In addition to metadata structures, a standardized controlled keyword list is needed for organization. A standardized keyword list provides specific terminology to make tagging and finding assets more objective and consistent. With an industry-standard metadata system and keyword list, information about assets can be easily shared among organizations throughout the world.

3 METHODOLOGY

The goal of this project was to assist the Hong Kong Maritime Museum during its move to Pier 8 through digital asset management. This was accomplished by creating a plan for improved data accessibility during and after the transition. We completed this through the following three main objectives:

- collecting digital content that can be used to create videos to help the HKMM maintain a public presence during its move to Pier 8;
- recommending a digital asset management solution for HKMM, based upon the needs and goals of the museum staff; and
- determining a comprehensive, standardized system for metadata within the digital asset management system.

The methods used to complete these objectives are explained in the following sections.

3.1 CREATING DIGITAL MEDIA CONTENT

Digital video content and still images can be used in multiple ways to help the museum both during and after its move. This content will be especially useful toward the creation of a video web series entitled "The Sea Matters to Me" that is planned to be available on the HMMM website during the museum's closed period from March 2012 to January 2013. In this section, we detail the processes we followed for the creation of storylines for this web series, as well as our methods for capturing and curating content associated with the series.

3.1.1 CHOOSING AND CAPTURING VIDEO CONTENT

Robert Trio, a consultant to the HKMM, has planned a video series that will feature interviews with local Hong Kong people who have strong connections to the sea. Our team conceptualized the storylines for these interviews, with each storyline tied to one of the galleries that will be present at the museum's new location. We discussed potential topics with Trio and decided to focus on the Star Ferry, underwater archaeology, dolphin conservation, local shipyards, and local fish markets. Interview candidates to support each of these topics were chosen by the museum's intern, Fiona Mak, and we developed a set of questions for each topic that could be used to stimulate conversation during the interviews (see Appendix A). Recording the interviews and creating videos for the storylines were outside the scope of this project, but will be collected and created by Trio and Mak in the future.

We also captured footage and still images to create the introduction for each video in the series. In order to capture material that broadly encompassed the relation of Hong Kong people to the sea, we traveled throughout Hong Kong, focusing upon four themes the museum has chosen to highlight: commerce, food, fun, and transportation. Two members of the team captured video

footage, while the other two documented information about the locations and took still images. This division of work allowed us to capture multiple angles of ongoing events, while also recording relevant information for the cataloguing of the video content.

3.1.2 EDITING THE VIDEOS

Once the raw footage had been recorded, we were responsible for curating this footage so that only useful content would be delivered to the museum for the introduction segments. We developed a protocol to systematically delete video content that was unusable, by going through video clips as a team and recording the reasons we deleted a video clip or image each time we did so. The standards for deleting footage included:

- unsteady or unfocused shot;
- poor angles, lighting, or background aesthetics;
- lack of relevant content; and
- less than five seconds of content free of the above problems.

The standard for deleting still images was the same, with the exception of the last criterion. Having established these protocols, we split the remaining content amongst ourselves to finish the editing process.

After sifting through the footage and still images and removing material that did not meet our criteria, we worked with Robert Trio to select appropriate content for the beginning of the video. These videos and photos were edited (using Windows Movie Maker) into a reel that Trio could use to see all assets collected and select those that he felt were most suitable.

3.2 SELECTING A DIGITAL ASSET MANAGEMENT SYSTEM FOR THE HKMM

The second objective in our project was to select a digital asset management system for the HKMM. First, we sought to identify the current usage and management system of digital assets at the HKMM by interviewing the museum staff. Next, we created a list of requirements and criteria by which to compare several digital asset management (DAM) systems. Finally, after narrowing down our list of DAM systems, using these criteria, we held conferences with technical and sales representatives from the DAM software companies and tested the systems with the assets we collected in section 3.1.

3.2.1 HKMM STAFF REQUIREMENTS FOR A DAM

In order to determine the ways in which the museum staff use and manage digital assets, we held interviews with four members of the museum's curatorial staff and the museum's librarian.

Interview Process

The interviews aimed to answer the following research questions:

- How do the HKMM staff handle data and media resources, and does this system need modification?
- What are the needs of HKMM in the area of content and digital information management, and how can this be catered to during the museum's move to Pier 8?

We chose to conduct individual interviews because we believed we could get more information from the staff on an individual basis than in a group setting. The interviews consisted of three key sections. They were as follows:

- ***The roles of the museum staff.*** Learning about the roles of each member would allow us to gain a better understanding for the requirements of a DAM system for the museum staff. This also served as an icebreaker, allowing the interviewees to contribute something they were very familiar with and stimulating further conversation.

- ***Familiarity with technology.*** We inquired about the familiarity of the staff with computers and software in order to discern the user-friendliness required of the DAM system we would recommend. We estimated the technological capabilities of the staff based on what software they use and how frequently they use it.

- ***Digital asset usage in daily work.*** Here, we sought to determine how the staff upload information, search for information, and use the current digital storage system in their daily work. Through this, we were able to determine which staff members use digital assets more often than others, as well as how and where they use these assets. We also inquired about the strengths and weaknesses of the current system. Furthermore, we were able to determine the type of information the staff need to know about the assets when using them.

A single member of the team carried out each interview, while a second member of the team took notes on the proceedings. The interviews were carried out by following the interview protocol located in Appendix B, which allowed different members of our team to learn the same types of information from the staff. The full transcripts from the interviews may be found in Appendix C.

Analyzing the Staff's Responses

To create a list of requirements and criteria for a DAM system that would suit the needs of the museum staff, we analyzed their responses individually and collectively. First, we took each interview and created individual lists of phrases mentioned in each interview that related to digital asset use or technological aptitude. We then combined these five lists and deleted duplicate responses, noting how many times they were repeated. Next, we sorted this list into groups of:

- basic functionalities;
- asset sharing;
- asset searching;
- language accommodation; and
- system user-friendliness.

Finally, we extrapolated more specific DAM criteria from their responses. For example, if several staff member mentioned that they share digital assets with researchers throughout the world, we deduced that a web-based DAM would be able to accommodate that.

The staff's responses were also analyzed to determine the informational and organizational requirements the staff have for each asset. We accomplished this by reviewing the list of phrases drawn from our interviews, noting only the phrases which related directly to metadata or searching for assets. We then created a list of all of the information that staff required of their assets. This knowledge was integral in comparing metadata structures, which are further explained in section 3.3.

One challenge we recognized while interviewing the staff, which we considered when analyzing their responses, was that most of the staff had not used any database software apart from their physical collection curation software, PastPerfect. Often, the comments they made about system strengths and weaknesses were about PastPerfect, not the shared drive, Flickr account, and YouTube account. We were still able to use PastPerfect's strengths and weaknesses to identify important criteria for DAM selection, but the differences in managing physical objects and digital assets were considered. Furthermore, most of the curatorial staff are not involved in the exhibit creation process, but in the preservation of the physical collection. Therefore, the information we received on the needs of the designers during the exhibit creation process came exclusively from Dr. Stephen Davies, the head historian, and Robert Trio, the museum's consultant.

3.2.2 COMPARING DAM SYSTEMS

To compare DAM systems in an objective manner, we followed two steps. First, we created a complete list of requirements and additional criteria by which to eliminate and compare the systems. Next, we researched DAM software packages which are used by notable companies, museums, and other institutions, creating a list of ten possible DAM solutions, including the current system. We compared the DAM solutions against the requirements, and then against the additional criteria to determine how well-suited each system was for the museum.

Creating the Requirements and Criteria Lists

In order to select a suitable DAM system, we first created a list of requirements and criteria by which to rule out and compare possible DAM systems, respectively. To create these lists, we combined the information collected through our staff interviews and discussions with Robert Trio with other factors that should be considered when making an investment in a software package. These factors included:

- up-front and recurring costs;
- operating system compatibility (Windows, Mac, Linux);
- the availability of technical support;
- the ability to integrate with current systems, such as Flickr and YouTube; and
- data storage capabilities—local hosting and cloud hosting.

Further explanations of these criteria are located in Appendix D. From here, we split the list into requirements and additional criteria. The requirements were those features by which we could eliminate possible DAMs, whereas additional criteria were those features by which we could compare DAMs that met all of the requirements. For example, if a DAM system had many of the additional criteria, but lacked one of the requirements, it would be eliminated from our research.

Identifying Possible DAM Systems for Comparison

To identify DAM systems to be compared against our requirements and criteria, we first needed to identify what DAM systems were available. Our research was based on the following research questions:

- What DAM systems are targeted toward museum use, and are there other suitable systems that are not museum specific?
- What are the capabilities and limitations of available DAM systems, as well as their pricing structures?

Our research revealed several of the most popular and highly-rated DAM systems in the global market according to a business software consulting firm, Capterra (2012). Additionally, DAM

software solutions that Robert Trio and our team members have had experience with were considered. The ten systems we researched were:

- Access (Microsoft, 2012) with Sharepoint (Microsoft, 2011);
- Cumulus (Canto, 2011);
- FileMaker Pro (2012);
- FileZilla (2012);
- ImageFolio (2011);

- Lookat.ME (Media Equation, 2012);
- QuickBase (Intuit, 2012);
- ResourceSpace (Montala, 2012b);
- WebDAM (2012); and
- the existing system.

For some systems, we were able to get free trial versions of the software, while for others, we emailed the companies, asking specific questions about the systems' functionalities, prices, and ease of use. As mentioned earlier, we used the required features list to narrow down our search, removing all systems that did not meet these requirements.

With four systems remaining, we held web conferences with sales representatives and technical support staff from Canto Cumulus, Lookat.ME, and WebDAM, who answered our questions on the additional criteria for a DAM. These web conferences also included a guided demonstration of the company's system, which allowed us to see all the functionalities of each system. ResourceSpace, the fourth system, is a free software package that is not owned by a company and therefore has no sales or technical staff. Therefore, we conducted further research of this system by reading its user manual.

3.2.3 POPULATING AND TESTING THE DATABASE

In order to determine a suitable solution for the museum, we acquired trial versions of the final four DAM systems. We then tested them to determine their functionalities as compared to our additional criteria list along with the usability of the system. These tests helped us rank the systems in order of their ability to meet our criteria. This allowed us to make an educated final decision as to which DAM would be best-suited for the museum.

We used the video collected for the "The Sea Matters to Me" series described in Section 3.1 (Creating Digital Video Content) to run manual tests on the final four DAM systems. As videos are the most complex form of data that will be uploaded into the system, we used our raw video to test the performance of the DAM system and its ability to characterize and work with video. We carried out the following three tasks when testing the system:

- *Uploading materials.* We each uploaded a file to make sure that the procedure was intuitive enough to use. We also determined whether the metadata and keywording systems were comprehensive enough or customizable enough to meet the needs of the staff, by comparing the metadata fields that are available upon upload with the information requirements the staff specified in their interviews.

- ***Searching for materials.*** We took turns searching the system to see which metadata fields were searchable, to test how simple or complex searches could be, and to determine if traditional Chinese characters could be found by the search engine.

- ***Downloading materials.*** We then tried to download these assets from the DAM. This showed us how easy or difficult it was to obtain assets from the system.

We determined that these three tests would be adequate measurements of DAM functionality, because they will be the procedures most commonly used by staff members in their daily work. When describing their jobs in their interviews, the staff members explained how they use digital assets in their everyday work.

While testing the systems, we realized that the staff may not have the same standards of intuitiveness as we do when using new technology. To take these limitations into account, we compared the symbols used in the system to symbols commonly used in Microsoft products, which all of the staff use regularly. We also took into account the amount of technical support available for each of the systems, as trained technical staff would be able to more easily help users than help menus and user manuals.

3.3 CHOOSING A METADATA SYSTEM AND KEYWORD LIST

This section outlines our procedure for choosing an effective, user-friendly metadata system and keyword list to organize information about the assets within the DAM. A metadata system specifies an overall organizational structure for information attached to digital assets, and a standardized keyword list allows assets to be tagged and searched in an objective and consistent manner. We compared two industry-standard metadata systems based upon criteria identified through interviews with the staff. Furthermore, we compared two industry-standard keyword lists based upon criteria developed from a keyword survey.

3.3.1 CHOOSING A METADATA SYSTEM

A standardized metadata system ensures all necessary information is attached to digital assets and shareable with organizations world-wide. To determine an adequate metadata system for the museum staff and for the museum's digital assets, we followed three major steps.

- ***Determine the information needs of the staff.*** We interviewed the staff and discussed with the museum consultant, Robert Trio, to develop a list of informational requirements for each asset. The staff interviews and analysis are described in Section 3.2.1, HKMM Staff Requirements for a DAM. The resulting list of requirements also included logistical criteria, such as the time commitment needed to fill out each information requirement, and the ability of the system to adapt to all file types.

- ***Research metadata systems.*** With the help of Kitty But, the HKMM's librarian, we researched widely-accepted metadata standards, finding few that were tailored toward digital assets of all file types. We decided to focus on two metadata standards: Dublin Core (the system used in the HKMM library) and International Press Telecommunications Council (IPTC) Photo Metadata standard (a system automatically included in some of the DAM systems we investigated). We created lists of the fields that were included within each system with descriptions of what information each field incorporates.

- ***Determine the best-suited metadata system.*** We compared the list of the staff's informational requirements and logistical considerations to the abilities of each metadata structure. The informational requirements and logistical criteria were all weighed equally in this comparison. Furthermore, we considered that the HKMM using Dublin Core in their library and that IPTC coming standard in some DAMs were advantages for each.

The metadata system that will be best-suited for the museum will contain fields for all of the staff's informational requirements, be flexible enough to adapt to all asset types, and concise enough as to not disrupt work flow.

3.3.2 CHOOSING A CONTROLLED KEYWORD LIST

Controlled keywording lists ensure that users are describing and searching for their assets using the same terminology. While it is possible for the museum to create its own keyword list from scratch, or from a combination of established keyword lists, this undertaking is out of the scope of our project. Additionally, the use of a widely-accepted standardized keywording list makes the assets more accessible and searchable to outside users. Here, we will describe how we chose one well-established keyword list to be incorporated into the museum's DAM. We followed four major steps to choose a useful and comprehensive keyword list.

- ***Distribute a keyword survey.*** As part of the staff interviews described in Section 3.2.1, we determined the keywording habits of the museum staff by distributing a keyword survey to them, in which the staff were asked to choose up to five keywords for each of four photos of maritime origin. The keyword survey can be found in Appendix E. The images were pulled from the museum's Flickr account and consisted of digital images of: a ceramic cup, a black and white photo, a wooden boat model, and a painting of Vietnam refugees. These photos were chosen because their content and physical natures varied widely, while keeping with the theme of maritime history. Robert Trio and Fiona Mak also participated in this survey, giving us the perspective of those who are not as familiar with the museum's work flow.

- *Analyze the responses.* We then analyzed their responses to discover any keywording patterns. The goal of the survey was to determine the ways in which the varied staff members at the museum describe assets. We looked for similarities and differences between the responses of the survey takers, focusing on what exactly the keywords were describing about the images, such as the background information of an asset, or what the asset is showing on a more basic level. In determining how the staff members describe assets with their keywords, we were prepared to choose a keywording list that could meet these requirements.

- *Research standardized lists.* With the help of Kitty But, we researched various well-established keywording lists, but found none that were specifically maritime-related and fewer that were non-specific enough to describe maritime-related assets adequately. Two well-established keywording lists that we researched in-depth were: Library of Congress Subject Headings and Getty Thesaurus. They were chosen for their non-specific nature and their association with museums, respectively. We determined the structure, content, and breadth of each list by exploring and testing them with the video and images we described in Section 3.1, Creating Digital Media Content. We attached keywords to these assets to see how accurately the assets could be described within the systems, recording the results for a wide variety of media types and subject matters.

- *Determine best-suited standardized list.* To determine the best-suited keywording system for the HKMM's DAM, we compared the standardized keyword lists to the keywording habits of the staff in respect to the types of assets that the HKMM holds—maritime assets. A well-suited keywording list needed to be able to describe maritime history, affairs, and objects. It also needed to describe these maritime assets in the same manner that the staff members did in their surveys. Both of these criteria were weighed equally when comparing the keywording lists.

4 VIDEO CONTENT TO PROMOTE THE HKMM MUSEUM

This chapter presents a description of video content we created to help maintain a public presence for the HKMM while the physical museum is closed during its move to Pier 8. The main outlet for this public presence will be "The Sea Matters to Me" video series, hosted on the museum's new website. In this chapter, we first give a description of the general format of these videos and the components that are included in each video. We then detail the content featured in the introduction to the museum's "The Sea Matters to Me" video series. The chapter will conclude with a review of the applicability of these videos to the main galleries at the new museum on Central Pier 8.

4.1 LOGISTICS OF VIDEO CONTENT

Each video follows a formula decided upon by Robert Trio, the museum's consultant.

- *Introductory Montage:* The beginning of each episode has the same title screen, followed by a montage depicting various scenes from four public uses of water: commerce, food, fun, and transportation.

- *Interview:* The main body of the video will begin, showing the interview, and mixing it with footage of the interviewee working or playing and other content related to the storyline.

- *Informational Segment:* This segment describes a specific aspect of the interview in detail, in order to educate the viewer on a specific task or action the interviewee had talked about.

- *Conclusion:* The interview will conclude with the interviewee saying, "The Sea Matters to Me!"

- *Ending:* The videos will all finish with details about the new museum on Pier 8, as well as advising viewers to visit the HKMM website.

These videos will be approximately 8 minutes long in order to convey an appropriate amount of information, while not overwhelming the viewer.

4.2 INTRODUCTION FOR "THE SEA MATTERS TO ME" VIDEO SERIES

The introduction for "The Sea Matters to Me" video series contains various still images and video footage of common sea-related activities around Hong Kong. The introduction will be a combination of the script written by Robert Trio and the media we have collected. The curated content contained in the introduction is approximately 30 seconds long and depicts the four major themes of maritime matters: commerce, food, fun, and transportation. The images in Figure 5 are frames of video footage included in the final "Sea Matters to Me" introductory montage video.

1. **Title slide**	2. **A man fishing on his boat**

3. **Docking the Star Ferry**	4. **The Star Ferry in Victoria Harbor**
	 We are dependent on the ocean for food,

5. **Lobster at a fish market in Sai Kung**	6. **A man swimming in Deep Water Bay**
 commerce, transportation and as a place to have fun.	 The Hong Kong Maritime Museum

7. **Pleasure boating in Stanley Bay**

FIGURE 5: EXCERPTS FROM THE INTRODUCTION TO "THE SEA MATTERS TO ME" VIDEO SERIES

The video footage shown during the introduction covers a wide range of maritime affairs, and relates to the new galleries in the museum at Central Pier 8. The footage of pleasure boats and people swimming relate to the Fun on the Water gallery. The clips of the Star Ferry relate to the gallery based around transporting people via the sea. The clips of the fish markets and the man fishing relate to many galleries, from the Victoria Harbor gallery to the Underwater World gallery. The introduction not only gives the viewer a preview of the type of content to expect in "The Sea Matters to Me" web series, but also a preview of the type of content that will featured in the new museum.

5 DIGITAL ASSET MANAGEMENT FOR THE HKMM

This chapter details the findings of our DAM research and the conclusions we drew from those findings. We begin by explaining requirements and additional criteria of digital asset management systems that will meet the needs of the Hong Kong Maritime Museum. We also describe the results from a comparative study of several DAM systems that hold potential as replacements for the HKMM's current system for managing digital assets. Finally, we recommend two systems that differ in some ways, but both could improve asset and project management during the move to Pier 8.

5.1 SYSTEM REQUIREMENTS FOR A DAM SYSTEM AT HKMM

In this section, we state the requirements and criteria of the HKMM's proposed new DAM system. These requirements and criteria were based upon staff input, our research, and our understanding of the immediate and long-term needs of the museum. They also included the technical and logistical aspects of implementing a DAM. A complete table of the staff's input and the DAM criteria they were associated with is located at the end of this section in Table 5.

Of all the criteria we developed from the staff interviews and from logistical considerations, we identified six that were most important to meet the needs of the museum. We determined that these were requirements that each system must meet to be a viable solution. The requirements were:

- *Support for multimedia:* The system must support all file types, and files must be accessible in a single centralized repository. This means that all file types are stored in one location, unlike the current system which stores assets on a Flickr account, YouTube account, and shared drive.

- *A web-based solution:* The system must be web-based, allowing for communication through the internet. A web-based solution allows multiple users to have access and work collaboratively on an asset.

- *Security for assets:* It is important for a museum to have a protected repository for its assets. This means that assets are stored in a safe and secure manner, where they are less likely to be lost due to human or computer error.

- *Permission control:* A DAM system that is accessible by multiple users needs the ability to set permissions for those users. With permission levels set, out-of-house designers can gain access to only the parts of the system they will need for creation and not to all of the museum's digital assets.

- *Unicode compatible:* In order to facilitate the needs of the staff, the system needs to support Traditional Chinese and English characters. A majority of the staff read and write in Traditional Chinese characters, and as the museum grows and tries to connect with the local audience, Traditional Chinese will become just as important as English when displaying and categorizing information.

- *Support for standardized informational systems:* A DAM system that is capable of supporting standardized metadata and keywording systems promotes informational organization that is both objective and consistent. These systems eliminate confusion and miscommunication in searching and tagging, which allows the database to remain useful for all members of the staff and out-of-house designers.

- *Operating system compatibility*: Due to the fact that multiple users need to access the DAM, it would be helpful to the museum if its DAM system could operate on both Macs and PCs. While the museum staff currently use PCs, they do not know what operating systems their out-of-house designers use. A DAM that encompasses both operating systems will accommodate working with these designers.

Furthermore, we identified additional criteria about purchasing and operating a DAM system that the staff did not mention. While we do not classify these as requirements, they are important factors in decision making. These criteria include:

- *Server hosting (cloud vs. local):* The museum currently has no storage space to host a DAM. However, the museum is looking to attain a server that could house a DAM system. An alternative option to local hosting is to rent cloud space on a server owned and maintained by a third party.

- *Upfront cost:* The initial costs of setting up a DAM can be high. These include software and user licenses, setup, and administrative costs. A locally hosted server will also have an initial cost.

- *Recurring cost:* With either storage option (cloud or local), there will be recurring costs. Locally-hosted DAM system will have costs for software updates and tech support. Cloud-hosted DAM system will have a recurring cost for renting the cloud space. Additionally, some DAM systems require an annual renewal of the software subscription.

- *Integration abilities with current system*: A DAM system that can integrate with the existing data structure will be beneficial to the museum. With this function, material uploaded in the existing structures will also be stored in the DAM, and vice versa. Some DAM systems come with complete and automatic integration capabilities, while others require manual integration of the two systems.

TABLE 5: MAPPING STAFF PREFERENCES INTO DAM SYSTEM REQUIREMENTS

Mentioned by Staff	Requirement of DAM
Basic Functionality	
Enter images, e-books, video, archives	Must support all file types
Helpful to store all digital assets in one place	Centralized repository of data
Must back up files every few months	Ability to store data safely and securely
Must limit access for security purposes	Ability to set user permissions
Retrieve data for reports about various objects	Retrievable/extractable metadata
Record information and details about assets	
Risks taken with copyrighted material	
Must denote number, description, and condition of items	
Shareability	
Phoebe, Stephen, Fiona, Catalina, Jamie are all users, potential clients too	Multi-user capabilities
Share information with potential clients, conservators, researchers, and museum staff, locally and internationally	Web-based
Send out links to staff and designers to distribute pictures	Make assets easily accessible
No in-house designer to develop pamphlets, etc.	
No real knowledge attached to assets	Retrievable/extractable metadata
Searchability	
More and more documents means cannot rely on memory to find again	Comprehensive search system
Important to have a standard form for searching	
Everyone needs to know the standards and guidelines	
Search using description details	
Find assets through objects	Related items search
Find related images, need connections for stories	
Use keywords to find things	Standardized keywording system
Search specific words to find images	
Mistakes made when inputting data, typing errors, incorrect data	
Language	
Cannot print Chinese characters	Unicode compatible
Can't search for objects in Chinese	
English as primary language	
User-Friendliness	
Tech support is bad in PastPerfect	Extensive user/tech support
Equations and formulas are confusing in Microsoft Access	Icons need to be intuitive

5.2 COMPARISON OF DAM SYSTEMS

In this section, we present the results of our investigations of the features of various DAM options with respect to the requirements and criteria that have been presented. We then present our narrowed list of candidates based on these findings and share the results of our closer inspection of the final four DAMs.

5.2.1 DAM TECHNICAL RESEARCH

We selected nine systems to evaluate based upon recommendations from museum staff as well as our own background research. A list and brief description of these systems can be found below, in Table 6.

TABLE 6: SUITABLE DAM SYSTEMS FOR THE HKMM

Name	Qualitative System Description
Access (Microsoft, 2012) + Sharepoint (Microsoft, 2011)	Sharepoint is a simple solution used by many corporations. It is a Microsoft product, so it would integrate well with the museum's platforms. Used with Access, the database system included in Microsoft Office, they can be used as a custom DAM system.
Cumulus (Canto, 2011)	Cumulus is a complex data management and organizational system. This has extensive sharing and project management tools.
FileMaker Pro (2012)	FileMaker Pro is tailored to managing inventories of organizations. It contains many of the core work-flow functionalities helpful in DAMs.
FileZilla (2012)	FileZilla is a relatively complex file transfer system. It offers many of the same features as other DAM systems, but is not user-friendly.
ImageFolio (2011)	ImageFolio allows for the sale of digital assets and showcases much of the same DAM capabilities as Cumulus.
Lookat.ME (Media Equation, 2012)	Lookat.ME is a museum-specific system. The system is geared toward displaying information to the public and is used primarily for image and film presentation.
QuickBase (Intuit, 2012)	QuickBase is an online data management site, offering many of the features of a DAM. However, this system has limited shareability features.
ResourceSpace (Montala, 2012b)	ResourceSpace is an open-source DAM solution. The software is free, but has no maintenance staff or setup team. Customization by a third party is available.
WebDAM (2012)	WebDAM is a DAM system that is fully integrated into the cloud. This software holds a leading market share in the database industry and can be customized to meet the needs of individual organizations (Capterra, 2012).

As shown below, Table 7 represents a comprehensive list of all of the requirements and criteria we have defined in Section 5.1, as well as a list of the above systems and how each system meets these requirements and criteria.

TABLE 7: DAM FUNCTIONALITY MATRIX

		Access+Sharepoint	Cumulus	FileMakerPro	FileZilla	ImageFolio	Lookat.ME	QuickBase	ResourceSpace	WebDAM	Current System
Requirements	Supports all file types	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	Ability to store data securely		✓	✓		✓	✓	✓	✓	✓	✓
	Ability to set user permissions		✓			✓	✓		✓	✓	✓
	Web-based	✓	✓	✓		✓	✓	✓	✓	✓	
	Standardized keyworking systems		✓				✓		✓	✓	
	Unicode compatible	✓	✓				✓		✓	✓	
	OS compatibility		✓	✓		✓	✓	✓	✓	✓	✓
Criteria	Centralized repository of data	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	Retrievable/extractable metadata		✓			✓	✓		✓	✓	
	Multi-user capabilities	✓	✓	✓		✓	✓		✓	✓	✓
	Easily accessible by designer		✓			✓	✓	✓	✓	✓	
	Comprehensive search system	✓	✓	✓		✓	✓	✓	✓	✓	
	Related items search		✓		✓	✓	✓		✓	✓	
	Technical support	✓	✓	✓	✓	✓	✓	✓		✓	
	Intuitive icons		✓	✓			✓		✓	✓	
	Cloud hosting	✓	✓	✓		✓	✓	✓	✓	✓	✓
	Integration with current system		✓			✓	✓		✓	✓	■
	No upfront Cost					✓			✓		✓
	No recurring cost	✓									

After comparing these ten systems against our requirements and criteria, we decided to eliminate six from further investigation, leaving us with the following four systems:

- Canto Cumulus;
- WebDAM;
- Lookat.ME; and
- ResourceSpace.

 We decided to further research these top four DAM systems, because each met all of the requirements and were supplemented by some additional criteria. It is important to note that

WebDAM, despite having Unicode capabilities, was later found to be incapable of searching for Traditional Chinese characters.

5.2.2 DAM SYSTEM TEST RESULTS

This section presents a summary of each DAM we considered in detail and identifies the strengths and weaknesses of each system. Shown below, Table 8 gives an overview comparison of our top-rated systems. We explain the extent to which each system meets specified criteria.

TABLE 8: FURTHER COMPARISON OF THE CUMULUS, LOOKAT.ME, RESOURCESPACE, AND WEBDAM

System Name	Cumulus	Lookat.ME	ResourceSpace as stand alone open source application	ResourceSpace with third-party host (Montala)	WebDAM
Centralized Repository of	Yes	Yes	Yes	Yes	Yes
Retrievable/ extractable metadata	All Metadata Extractable	All Metadata Extractable	All Metadata Extractable	All Metadata Extractable	All Metadata Extractable
Multi-user capabilities	Max of 4 Simultaneous Editors	Unlimited	Unlimited	Unlimited	Unlimited
Easily accessible to Designer	Direct login to system	Direct login to system	Direct login to system	Direct login to system	Direct login to system
Comprehensive search system	Yes	Not easy to search all media types	Yes	Yes	Yes
Related Items Search	Yes	Yes	Yes	Yes	Yes
Technical support	Yes, satellite company exists in Australia	Yes, Australia based	No	Yes, though not full support	Yes, in California
Intuitive Icons	Yes, easy to navigate	Yes, easy to navigate	Yes, easy to navigate	Yes, easy to navigate	Yes, easy to navigate
Cloud Hosting	Must use museum's cloud space	Yes	No	Yes	Yes
Integration with Current System	Uses API, would recommend uploading all pictures in batch	Can Integrate with Flickr for an additional $35,000 HKD	Plug in available for limited Flickr integration	Yes, with customization	Has extensive API, never integrated with Flickr
Upfront Cost	$202,572	$42,000	$0	$9, 891	$112,000
Recurring Cost HKD (yearly)	$0 (~2000with private cloud)	$45,000 for support and 100GB, $84,000	$0 (~2000with private cloud)	$24,717	$70,000 Min

All information on our top four systems came from their respective websites, from personal communications with sales and technical staff from the companies, and from personal interactions with trial systems.

Canto Cumulus

After several web conferences with sales and technical staff from Canto and the population and testing of a trial version of the system, we have made the following conclusions. The main strengths of Canto Cumulus (2011) are:

- *Feature-rich:* Cumulus features a comprehensive suite of features, including editing tools for in-house development, a project management workspace called the Collection Basket, and a tiered filtering system for assets.
- *Full technical support:* Cumulus offers a yearly subscription to its Australia-based technical support service.
- *No recurring cost:* Once purchased, there are no mandatory recurring costs for Cumulus.
- *Searchable Chinese Characters:* Cumulus' search engine is capable of locating assets containing Traditional Chinese characters.
- *Flickr Solution:* Canto frequently integrates Cumulus with Flickr for organizations that request it.

Cumulus' weaknesses include:

- *No cloud space:* Canto does not provide cloud space, but instead requires organizations to acquire their own cloud provider. Users must work with a separate third party to set up and maintain the storage system.
- *Large upfront costs:* As seen in Table 8, Cumulus has a higher initial price than other DAMs. This is mitigated by the permanent ownership of the license.
- *Complicated setup:* The acquisition of a third-party cloud vendor means Cumulus will take longer to set up than other DAMs.
- *Low Customizability:* Although Cumulus is extremely customizable through its menus, the functionality of this software cannot be altered or added to by third party developers.

Lookat.ME

Contact with technical and sales employees as well as a full system examination has led us to the following analysis of Lookat.ME (Media Equation, 2012). Its strengths include its:

- *Tailoring to museums*: Lookat.ME was designed for museum use and, therefore, accommodates many of the typical needs of a museum.
- *Full technical support:* Lookat.ME offers full technical support for a yearly fee.
- *Uncluttered interface:* Lookat.ME features a simple and easy-to-use interface designed with museum staff in mind.

- *Ability to accommodate cloud and local hosting:* Lookat.ME allows the museum to pursue either a local or cloud-based approach to its hosting.

Lookat.ME's weaknesses include:

- *High recurring and setup costs:* Lookat.ME presents a large monetary investment (see Table 8) for the museum, both in the short term and the future.
- *Poor Chinese character support:* Although it supports Unicode, Lookat.ME is unable to successfully locate assets containing Traditional Chinese characters. As the museum's exhibits and website are bi-lingual, the metadata stored about the assets should be bilingual and searchable in both languages.
- *Limited Sharing options:* While Lookat.ME is an excellent tool for curation and public presentation, its features tend to focus on public presentation rather than facilitating project management.
- *Low Customizability:* Although Lookat.ME is extremely customizable through its menus, the functionality of this software cannot be altered or added to by third party developers.

<div align="center">

ResourceSpace

</div>

After investigation and testing, we have come to the following analysis of ResourceSpace (Montala, 2012b). Its major strengths include:

- **Low cost, low risk:** ResourceSpace represents the least financial investment (see Table 8) on the part of the museum. Therefore, it provides an opportunity to test the usefulness of a DAM in the workflow of the museum with minimal risk.
- *Searchable Chinese characters:* ResourceSpace is capable of storing Unicode characters in metadata fields, as well as locating assets containing these characters.
- *Designed for customization:* The system consists of open-source software, which mean it can be modified by a third party to provide the HKMM with the specific features it desires.

ResourceSpace's weaknesses include:

- *Third party reliance:* The HKMM will be required to work with a third party vendor to set up, customize, and host ResourceSpace. This will require a knowledgeable individual on the museum's end to facilitate these processes.
- *Less out-of-the-box functionality:* ResourceSpace has the least immediate functionality of the four candidate systems. Without customization, it does not have the tools required to be a powerful long-term solution for the museum. Customization will be costly for the museum, as it must be programmed manually by an out-of-house development firm.
- *No technical support:* ResourceSpace does not have a technical support staff. The museum must rely upon its own ability to find answers to technical problems.

WebDAM

After holding a web conference with WebDAM staff and testing the system, we developed the following conclusions. The main strengths of WebDAM (2012) are:

- *Intuitive user interface:* The WebDAM user interface is easy to comprehend and navigate, because it is uncluttered. This makes it easy to find features and work with the system.
- *Full technical support:* WebDAM is provides technical support for customers as part of its recurring cost.
- *Financial security:* As the world's most popular DAM system, WebDAM is the most financially secure DAM provider and is unlikely stop supporting its product (Capterra, 2012).
- *Streamlined setup and integration:* WebDAM features a streamlined process for setting up and tailoring the product for their customers. This alleviates the logistical stresses of a system transition.
- *Feature-rich:* WebDAM features a robust selection of tools such as a project workspace called Lightbox, editing tools for quick changes, and drag-and-drop file uploading.

WebDAM's weaknesses include:

- *No local hosting option:* WebDAM does not support a local server option. Should the museum desire to use its own server, it would be unable to continue using WebDAM.
- *Poor Chinese character support*: WebDAM can store Unicode characters in metadata fields, but cannot successfully locate assets containing these characters. As the museum's exhibits and website are bilingual, the metadata stored about the assets should be bilingual and searchable in both languages.
- *Major recurring costs*: WebDAM is a continuously large investment for the museum (see Table 8).
- *Distant time zone*: The WebDAM headquarters are located in California and will not be available to provide technical support throughout the HKMM's Work Day (from 9:30 to 18:00 HKT).
- *Low Customizability:* Although WebDAM is extremely customizable through menus, the functionality of this software cannot be altered or added to by third party developers.

5.3 DAM RECOMMENDATIONS

The DAM systems we have identified as viable solutions are Canto Cumulus and ResourceSpace. These two options offer different approaches to meeting the needs of the museum. Canto Cumulus meets all the specific needs of the museum and will facilitate all of the staff's requirements, but at a higher cost. ResourceSpace is a low-cost alternative that is highly customizable but initially lacks some of the important functionalities of Cumulus. In this section, we explain the features, drawbacks, and time and monetary costs of each system followed by a brief assessment of each. Screen shots of each system's interface can be found in Appendix G.

5.3.1 CANTO CUMULUS

Based on the analysis in Section 5.2 (Comparison of DAM Systems), we conclude that Cumulus is the DAM that most completely meets the needs of the HKMM. This system meets all of the requirements and criteria that we had listed. There were two major factors that made Cumulus stand out: **no recurring costs for the licenses** and the ability to use **Chinese characters as keywords**.

Canto Cumulus has one up-front cost and leaves the acquisition of a cloud-space provider to the customer. This means:

- The only recurring cost to use the system is for renting third-party storage space—no payments to Canto. The advantage of cloud space renting is that no maintenance is required, and there are many providers of these services to choose from.
- If the museum acquired and maintained its own server, the storage costs would be eliminated. However, this option requires the service of a trained staff member to manage the server.

Cumulus was also one of the only systems in which Chinese words were usable as searchable keywords, which was a major point in favor of this DAM. In WebDAM and Lookat.ME, two of the other DAM systems we considered, the characters could not be found via the built-in search functions.

Cumulus also has the extra capability of being able to integrate with the existing data structure of the museum through its extensive application programming interface (API). This will allow the museum to continue to use Flickr to share photos with the public, as well as integrate the DAM into the structure of the museum's new website. Cumulus also has an interface called Sites, which would allow the museum to display selected digital assets to the public in a format that matches the current website and is easily searchable and user friendly. A statement of work that details these features was provided by Canto and can be found in Appendix H.

The limiting factor of Cumulus as an option for the HKMM is the large investment required to purchase and install the system. In total, the setup of Cumulus will cost approximately HK

$203,000. While Cumulus would provide a long term solution to the museum's digital asset management needs, if it does not fit within the current budget of the museum, it is not a viable solution.

5.3.2 RESOURCESPACE

ResourceSpace is an open-source solution capable of meeting the basic needs of the museum. Open-source software refers to software that provides full access to its code. This means that ResourceSpace is a free software package that has no upfront costs for licensing or installation fees. Its code can also be customized by programmers to meet the needs of the museum. However, ResourceSpace has two primary drawbacks: no formal tech support and low initial functionality.

ResourceSpace must be installed on a server by someone at the museum such as a staff member or technical consultant, and can only be edited by programmers. However, there is a company called Montala (2012a) that offers storage space and installation support for ResourceSpace. Montala will also keep the software up to date, functional, and maintained; however, Montala does not offer technical support for ResourceSpace. We suggest that the museum consider training or acquiring an employee to manage and troubleshoot for ResourceSpace should they choose the system.

Furthermore, ResourceSpace does not innately have all of the functionalities of Cumulus, specifically:

- no way to display specified assets directly to the public;
- no API for integration with Flickr or HKMM website;
- the limited ability to set permissions for users;
- no customizable metadata fields; and
- the inability to follow recommended organizational system.

Due to ResourceSpace's open-source nature, it is possible to customize ResourceSpace to include these functionalities. Should the museum choose ResourceSpace, we recommend that the museum hires Montala to tailor the system to meet their needs. A document detailing the set-up process that Montala would need to follow can be seen in Appendix I. We recommend that the museum use this document to move forward with the development of ResourceSpace if this system is chosen. This approach allows the museum to use a DAM system with minimal investment during the transition to Pier 8 and to decide at a later time whether adding further functionalities would be helpful for the museum.

5.3.3 SUMMARY

In this subsection, we directly compare the options we recommend to the museum and the current system. On the following page, Table 9 summarizes each system for easy comparison.

We believe that any of the three options in the table would be a large step forward for the museum. Should the museum feel prepared to make a large investment, Canto Cumulus will provide the quickest and most powerful transition. Should the museum not feel prepared to make a large investment, unmodified ResourceSpace allows the museum to try a DAM for under HK $1000 a year. If the museum wishes, it can further invest in ResourceSpace for additional functionalities and technical support.

TABLE 9: COMPARISON OF CUMULUS, UNMODIFIED AND MODIFIED RESOURCESPACE, AND THE CURRENT SYSTEM

	Canto Cumulus	ResourceSpace as stand alone open source application	ResourceSpace with Third Party Host (Montala)	Current System
Chinese Charicter Support	✓	✓	✓	
Centralized Repository of Data	✓	✓	✓	
Retrievable/extractable metadata	✓	✓	✓	N/A
Easily accessible to designer	✓	✓	✓	
Web Based	✓	✓	✓	
Comprehensive search system	✓	✓	✓	Flickr Only
Related items search	✓	✓	✓	
Third Party Maintance	✓		✓	
Suport for Setup/Instelation	✓		✓	
Extensive user/tech support	✓		✓	
Public Access Module	✓			
Customizable Metadata	✓		✓	
Cloud hosting	✓		✓	
Integration with current system	✓	Limited Flickr Integration	✓	N/A
Full Version Control	✓			
Project Mannagement Tools	✓			
Upfront Cost in HKD	$202,572	$0	$9,891	N/A
Yearly Cost in HKD	~$2000 with private cloud	$780 for 100GB	$24,717	$0

Pricing structures for these systems were estimated for us by Canto (2011) and Montala (2012a), in addition to estimated cloud space prices based on market averages.

6 A METADATA SYSTEM FOR THE DAM SYSTEM

This chapter first describes the similarities and differences between two standardized metadata systems and two controlled keyword lists. All four systems are recognized world-wide and have areas of strength that can be beneficial to the museum. They also have areas of weakness, which will be examined as well. The chapter concludes with our recommendation as to which metadata system and keyword list should be used to organize the HKMM's digital assets.

6.1 ANALYSIS OF METADATA AND KEYWORD ALTERNATIVES

This section gives an overview of characteristics of two metadata systems and two controlled keyword lists. Dublin Core and International Press Telecommunications Council (IPTC) Photo Metadata standard are the two metadata systems being compared. The staff's requirements of a keywording list, as made clear by the keyword survey, are also discussed in this chapter. Library of Congress Subject Headings (LCSH) and the Getty Thesaurus are the two keywording lists that are analyzed to determine which list could be used to compile a keyword list that would best suit the needs of the museum.

6.1.1 METADATA SYSTEMS

The two metadata systems that we identified as suitable options to use in the museum's database are Dublin Core and International Press Telecommunications Council (IPTC) Photo Metadata standard. These systems each provide a list of data requirements that are filled in for each asset by the user. In this way, the systems set forth a standard for information that is collected and used to label assets. The systems were examined and compared for their:

- *Adaptability*: The system needs to be able to collect information for a variety of file types—text, video, and image.

- *Suitability*: From interviews with the staff, we determined staff and designers need to know, at bare minimum, the context, digital nature, and rights to assets when incorporating assets into projects.

- *Ease of use*: The museum has thousands of assets that need metadata added to them; the metadata system should be simple and quick to work with.

Table 10 compares the Dublin Core and IPTC against these criteria. Adaptability is represented by "file type" and "ability to modify". Suitability is represented by "fields to give context", "fields to give digital nature", "fields to give copyright information", and fields giving file logistics". Ease of use is represented by "number of fields" and "ability to be modified".

TABLE 10: COMPARISON OF METADATA SYSTEMS

	Dublin Core (DCMI, 2010)	IPTC (IPTC Core, 2005)
File type	All file types, primarily text	All file types, primarily images
Number of fields	15	>50
Fields to give *context* of an asset	Title, Subjects, Description, Relation, Coverage	Location shown in Image, Description, Headline, Keywords, Sublocation, Title, Artwork or Object in Image, Organization in Image, Person in Image, Event
Fields to give *digital nature* of asset	Format	Max Avail height, Max avail width
Fields to give *copyright information*	Source, Creator, Publisher, Contributor, Rights	Copyright notice, Creator, Creator's contact information, Creator's job title, Rights usage terms, Source, Image supplier, Copyright owner, Licensor, Image creator
Fields giving *file logistics*	Resource type, Date, ID, Language	Date created, Instructions, Job ID, Model information, Location created
Ability to be modified	Can duplicate and remove fields as necessary	Can duplicate and remove fields as necessary

These two systems are similar in some ways (the ability to adapt to different file types and to be modified), but they differ greatly in the specificity of each field. Dublin Core asks the user for information in a broad way, whereas IPTC asks for very specific information in each field. This means that IPTC uses a greater number of specific fields than Dublin Core to amass the same amount of information. Based on the sheer volume of fields, Dublin Core is quicker to use. However, the user is not prompted for individual details as in IPTC, which means that the thoroughness of data collection is entirely up to the user in Dublin Core. Full descriptions of these metadata systems may be found in Appendix J.

6.1.2 KEYWORDING REQUIREMENTS OF THE STAFF AT HKMM

In this section, we describe the preferences of the staff when using keywords to search for assets as specified by their answers to the keyword survey. From our survey, three categories of keywords emerged: content of the asset, context of the asset, and physical form of the asset. Figure 6 shows the usage of keywords by the staff to describe the images, by the types we determined in our pattern analysis.
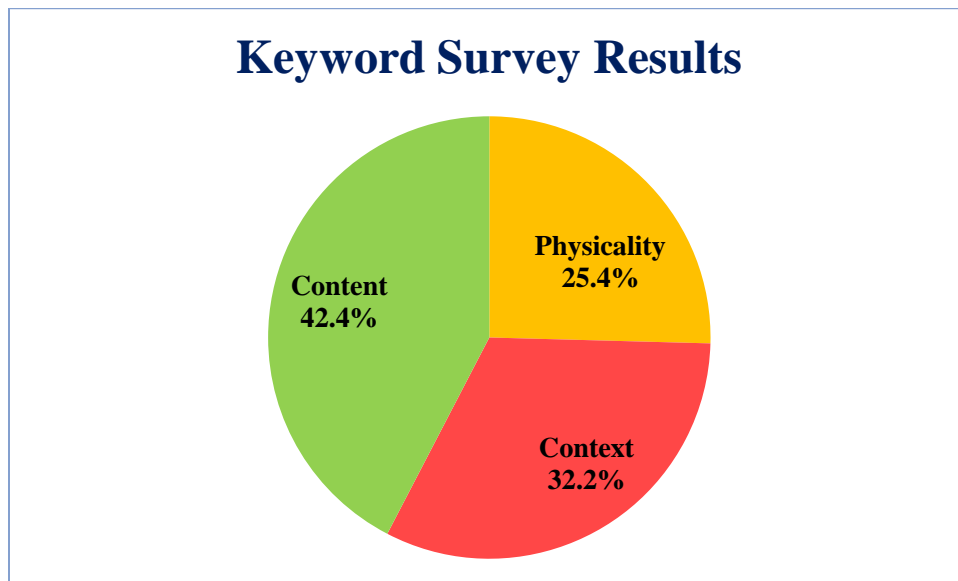
FIGURE 6: TYPES OF IMAGE KEYWORDS SUGGESTED BY STAFF

These keyword survey results suggested that the staff use three types of keywords—content, context, and physicality—when applying keywords to assets and searching for assets. For example, a painting of a boat may be keyworded by one staff member using the location of the boat or the war in which the boat was used, while another staff member may only keyword the painting with what is easily apparent in the painting—a boat and sailors. Still another staff member may add keywords describing the physical nature of the painting—that it is a painting, oil on canvas, etc. The complete list of survey responses can be found in Appendix F.

The results of this keywording survey suggested that all three types of keywords are important for the staff's keywording processes and to ensure that the staff may find the assets again in an intuitive way. In choosing a controlled keyword list for the museum staff, we considered these results to find a keyword list that encompassed these aspects.

6.1.3 CONTROLLED KEYWORD CAPABILITIES AND COMPARISON

The two controlled keywording lists that we investigated were the Library of Congress Subject Headings (LCSH) and the Getty Thesaurus. Both systems are used extensively throughout the world, and they both are made up of comprehensive hierarchies of subjects to be used as

keywords when tagging assets. The following section compares the two lists based upon the keywording requirements specified by the museum staff and the lists' ability to describe the museum's assets. As mentioned before, the three categories of keywords that the museum staff use to describe are:

- *Content*: what is in the asset, such as objects or people.
- *Context*: the relevance of the asset and any stories that might go along with it.
- *Physicality*: the physical nature of the object, as in what it is made of.

Additionally, the keyword list needs to have an extensive maritime vocabulary, so that it may describe the content, context, and physicality of maritime-related assets.

TABLE 11: COMPARISON OF KEYWORD LISTS

	Getty Thesaurus A standardized vocabulary to characterize art, architecture, and the concepts related to art and architecture (J. Paul Getty Trust, 2012).		**Library of Congress Subject Headings** Hierarchies of vocabulary to describe every document or artifact located in the United States Library of Congress (Library of Congress, 2012).	
	Strength	**Weakness**	**Strength**	**Weakness**
Maritime Content	Can accurately describe art and artifacts within images	Cannot describe written texts	Can characterize any content in a general way	Sometimes lacks detailed words or phrases to describe content
Maritime Context	Vocabulary encompasses geographic locations	Contains no history terms unless they are related to important art	Vocabulary encompasses history, law, and all other related concepts with specific phrases for important events	
Maritime Physicality	Can describe the physical nature and all associated concepts of that form in detail		Can characterize physicality in a general way	May not contain phrases to describe primarily Chinese art forms

Table 11 provides a brief description of the two systems and compares them based upon the criteria mentioned earlier—the vocabulary's ability to cover maritime content, maritime context, and maritime physicality. Full descriptions of the two systems may be found in Appendix K.

As is described in Table 11, the Getty Thesaurus is particularly strong at describing the physical nature of objects, but is weak at describing the context of assets and the content of written documents. LCSH is comprehensive and broad enough to describe content and context of assets, of maritime relation or of any other subject. Its weakest area is in describing physicality, as the terms for art, crafting, photography, etc. do not get very specific without tying the physicality to a specific time period or person.

6.2 RECOMMENDATION FOR A METADATA STRUCTURE FOR THE HKMM'S DAM

Through our research and comparative analysis, we decided that Dublin Core and Library of Congress Subject Headings (LCSH) were the most suitable metadata system and keyword list (respectively) for the museum.

- ***Dublin Core*** is the simpler of the two cataloging systems, containing a standard fifteen categories. The fifteen categories are broad enough that they can be manipulated to describe any type of file. They are not as in depth as International Press Telecommunications Council (IPTC) Photo Metadata standard's fields, which include information that the museum may not require, such as information on models. These extra fields would slow the process of uploading assets and would most likely not be beneficial to the museum staff.

- ***The Library of Congress Subject Headings (LCSH)*** list proved to be a more useful system than Getty Thesaurus. The Getty Thesaurus is an art-based vocabulary system and is better suited at only describing the physical nature of each asset, such as an old photograph, or of the objects within the asset, such as a picture of a wooden model boat. LCSH has hierarchies on nearly any imaginable subject, including maritime matters and Chinese history. The vocabulary is broad enough that it will be able to describe the content of each asset, the context of each asset, and the physical nature of each asset using just one vocabulary list. It is possible for the museum to develop its own list of keywords using LCSH, but the list as is, is just as useful.

By using these two systems within the DAM, the museum's digital assets should remain accessible and organized. In Cumulus, setting up Dublin Core is easy, because Cumulus has very customizable metadata fields. Cumulus also allows for LCSH to be integrated into the system. On the other hand, ResourceSpace requires a programmer to set-up specific metadata structures within the DAM, and without extensive programming, is incapable of integrating a keyword list.

7 RECOMMENDATIONS

In order to improve the project management and organization of assets at the Hong Kong Maritime Museum, we recommend the use of a DAM system. We also suggest how the DAM system can be maintained, used during the transition to Pier 8, and used after this transition.

7.1 ADVANTAGES OF A DAM FOR THE HKMM

The museum staff can improve their efficiency and project management by using a digital asset management system. Here, we recap the functionalities of a DAM as pertaining to the HKMM.

- Shareable collections will greatly facilitate the task of working with designers to create 15 new galleries, by sharing feedback faster and easier, giving approval faster and reaching deadlines sooner.
- Providing designers with 24-7 online access to digital assets avoids the need to email files or burn and mail files on CD.
- A searchable database reduces time wasted searching for the right file. Users can type in a keyword, hit search, and get all the files they're looking for quickly.
- There is no longer a need to rely upon others to locate digital assets, freeing up both parties' time for more important tasks.
- Online access to the museum's digital assets allows designers to collaborate in the exhibit design process, suggesting pictures, videos, and text that they cannot currently access.
- The DAM provides staff with all versions of an uploaded asset, which facilitates a search for the desired version (original, most recently updated, etc.).
- Customizable cataloging fields let users attach important information about an asset, which is useful for both staff and out-of-house designers.
- A centralized location for assets means no more need to search the shared drive, YouTube account, and Flickr account for a desired file, as well as no more need to decide which ones they should be stored in.
- Well-organized files will be easy to track and find, so nothing ever becomes lost. An organized, centralized location for all files eliminates the need to recreate lost files.
- The ability to attach important information to files (such as resolution and copyright information) saves staff the effort of searching for this information each time they wish to use the asset.
- A web-based system means users are able to log in and use all of the above features from any internet-connected computer.

These functions would allow the staff to work more effectively and efficiently.

7.2 SUGGESTED USE OF THE SYSTEM

The usefulness of a DAM is diminished unless it is used and maintained in a careful manner. To fully utilize the system, we suggest that the museum staff follow a single set of guidelines, which include:

- regular upload of all relevant digital assets to the system;
- complete use of the metadata system and keyword vocabulary for each uploaded item;
- regular maintenance of user accounts, permissions, and administrative tasks;
- continuous digital curation to eliminate old or inapplicable files; and
- conformity to recommended organizational structure.

By following these guidelines, the museum can avoid many of the pitfalls that can occur over the course of a DAM's lifetime. These pitfalls include:

- decreased searchability, because metadata structures are not being followed; and
- decreased shareability, because permissions are not being managed.

To ensure these guidelines are followed, we recommend the director appoint Dr. Stephen Davies and Kitty But as system administrators. Dr. Davies could oversee the user and permissions management, as well as ensure the quality of descriptions for the assets. If his knowledge of current assets is incorporated into the DAM during set-up, the staff will be able to rely on the DAM in the future rather than Dr. Davies for information. Kitty But would oversee the correct classification and organization of the assets, as well as enforce proper metadata and keywording procedures from staff members. This will ensure the system remains searchable and useful.

7.3 DAM DURING THE MOVE

The functions of a DAM system can allow better communication between staff members and out-of house designers, who must work together to create the museum's new galleries. During the move to Pier 8, we recommend the staff take full advantage of the DAM's functionalities. Time and project management are valuable, since the new building will house fifteen galleries that must be created before the museum can open in January 2013. During the transition, we encourage the museum to:

- populate the DAM with all relevant assets, so they are readily accessible;
- use the DAM to share ideas and files with out-of-house designers; and
- use the DAM as a collaboration tool within the museum for creating web content like the "The Sea Matters to Me" video series.

We recommend that the DAM be thought of as an information hub that allows users to efficiently give and receive information for all projects concerning the move. We hope that communication between the museum and the designers will improve, resulting in faster gallery design and

creation. It is also our hope that the DAM system will prove to be a valuable tool in the transition to Pier 8.

7.4 DAM AFTER THE MOVE

The DAM system can continue to be a valuable resource to the museum after the transition to Pier 8. If the DAM is maintained and merged with the current system, further functionalities of the DAM can be incorporated into the way the museum functions. The DAM can be used to:

- implement a web-based interface for sharing the museum's digital assets with the public;
- support an online shop for the museum to sell prints and permissions of digital assets;
- facilitate research between maritime colleagues by assigning people and institutions the permissions to view assets; and
- facilitate future projects at the museum, like the creation of brochures and posters.

The aims of these functionalities are to improve communication between the museum and the public. Although we have not fully investigated these functionalities, we believe that they could be valuable resources for the museum and merit further research.

It is our hope that the Hong Kong Maritime Museum will take full advantage of the wide range of functionalities offered by a DAM system and that the museum will benefit as a result from more collaborative exhibit design, improved publicity, and expanded online capabilities. Our greatest hope is that a DAM system will allow the museum to prosper and keep pace with a modernizing world.

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APPENDIX A: "THE SEA MATTERS TO ME" INTERVIEW TEMPLATES

To gather logistical information from the interviewees of the "The Sea Matters to Me" video series, we created a simple informational chart. This chart is shown in Table 12.

TABLE 12: INFORMATION SHEET FOR "THE SEA MATTERS TO ME" INTERVIEWEES

Name:	
Address:	
Phone Number:	
Email address:	
Occupation:	
Location of Interview:	
Date:	

The following are interview protocols to use during the various interviews conducted around Hong Kong for the "The Sea Matters to Me" video series.

Interview at the Aberdeen Seafood Market

- Where do your fish come from?
- How successful is your business? How many people/restaurants/stores buy from you?
- When did you first start fishing?
- What is your favorite thing about fishing and selling your fish at such a big marketplace?
- How do you think you and the organization affect the people of Hong Kong?
- How important is the sea to you and your business?

Interview for Hong Kong Underwater Archaeology Society

- What do you view as the goal of the Underwater Archaeology Society?
- What types of projects has the society worked on in the past?

- What are the current projects or objectives of the Hong Kong Underwater Archaeology Society?
- Can you describe your role in the Underwater Archaeology Society? What types of work do you with the society?
- Do you have any interesting stories or anecdotes from working with the society?
- How is the Underwater Archaeology Society important for documenting and preserving the maritime history of Hong Kong?

Interview for Hong Kong Dolphin Conservation Society

- How long have you been working for the Dolphin Conservation Society?
- What drove you to work for this organization and this cause?
- What is the organization doing to help the dolphins and whales?
- What is your favorite aspect of working here?
- How can the people of Hong Kong assist your organization in helping the dolphins and whales?
- How does this sea matter to you and your job?
- Do you have and good video footage or images of the dolphins that we could use in our documentary?

Interview for Cheoy Lee Shipyard

- How long have you been working on boats?
- What drove you to become a boat maintainer?
- How has shipbuilding and ship maintenance changed since you've been in the industry?
- What is the most interesting facet of your job?
- What is your favorite kind of boat to work on?
- What is your favorite kind of boat that you'd like to own one day?
- How important is the sea to you and your job?

Interview for Star Ferry

- How long have you been working for the star ferry?
- Can you walk us through/describe a typical work day?
- How has the star ferry changed in the time you have been working here?
- Do you have any interesting stories to tell about you experiences at the star ferry?
- How important do you feel the sea is to Hong Kong's heritage?

- How important is the sea to you and your job?

APPENDIX B: INTERVIEW PROTOCOL FOR HKMM STAFF

The following interview protocol was used during interviews with five members of the Hong Kong Maritime Museum staff. One group member conducted the interview, while another took notes on its proceedings.

Questions to be asked:

1) What is your role in the museum?
2) How would you describe your computer skills?
   a. How often do you use computers?
   b. What kind of computers do you use?
   c. What kind of software do you use regularly?
3) In what ways do you use digital assets in your job at the museum?
   a. What kind of assets do you use?
   b. Where do you use them?
   c. How do you use them?
4) How do you find the assets you use?
   a. Have you ever had any trouble locating assets?
   b. If you could change anything about the system, what would you change?
5) Do you have any experience with digital asset management systems?
   a. If so, which systems have you used and how did you use them?
   b. What are some advantages and disadvantages of these systems?
6) Is there any information that you could provide that may help us in creating a DAM?

APPENDIX C: STAFF INTERVIEWS

<u>Moody Tang (full transcript)</u>

What is your role at museum?

I am the registrar.

What do you do?

I handle all objects in the museum—including books before, but right now Kitty handles books—and I handle objects and images, like printed/digital images.

How would you describe your computer skills, generally?

I use a PC everyday to check email, access the server, data, images, and documents, and I use a program called Past Perfect for collection management.

How does that work? What you use it for?

Entering images, books, and archives and to retrieve data for reports about various objects.

What kind of server is used?

Internal, not online.

When you're interacting with assets, you're on the upload side?

No, both. I use Past Perfect [PP] to enter data of objects. The asset creator can access the PP info, but for security purpose I limit access. I have full security access. I save some images on the server for my colleagues to use.

Say you need to find an image in the database, and someone else uploaded it a few years ago. How would you find it?

Good question. As an example: I would save the image in a place and say where it's saved in an email that I'd send to everyone, so people know where it is. They want a picture of Keying; they search Keying using the OS's built-in search function. We only save data of physical objects in PP.

Do you keep all your images in one place or spread them out?

We back up every few months, I backup data in a hard drive and send it to another office, and we keep one here [at the museum].

Do you have any experience with DAM systems?

When I volunteered at another museum, they used Access and Excel. We are the only ones using PP in HK at the moment.

How did it work?

You'd click the link in the file, and it would open up the file.

Do you like Past Perfect?

It's not perfect, but it is good.

In what ways is it not perfect?

It's an English platform, and it can't print Chinese characters. We contacted PP, and they said they support only English right now. It's not good, since we are a bilingual museum.

What works well in Past Perfect? Compared to Access? (For your job)

I didn't work well with Access, though I didn't take much time to learn how to use it. PP is quite user friendly. If we have new [software], I show the staff how to use it. People know what the icons mean. Excel is easy, but with Access you have to know about the database and the formulas and equations. For us, Access isn't user-friendly enough. With PP, I can generate a report, I can save an image with data, and I can enter video, but it's so large that we never do that.

Any other information you could provide that might help us with our project?

I think our museum is becoming large now, and PP is the way to handle the physical archive. First, we scan an image and add it to PP. But we have many archives (like documents) from before 2008, so we didn't put a lot of time and effort into how we'd manage archives, because we spent so much time on managing the physical objects. By archives, I mean documents.

Do you ever have trouble finding archives or documents you are looking for?

I know where things are, because there aren't many archives. Right now, we are getting more and more documents so we have to think about how to manage that.

Do people ask you how to find things in PP sometimes? Do you ever have to send information to other people?

If someone like a researcher or academic asks for info, we copy/paste info to them, but not the whole report because there is classified info in there.

Do other people work on Past Perfect with you?

Phoebe, Stephen, and Fiona help to update some data, and Catalina and Jamie sometimes, but not very often. I'm the one who uses it every day.

If you could choose a system, would you choose Chinese first and English second? From the standpoint of putting in keywords?

English first, because more terms are in English. The West has studied more about boats than Chinese, so English first. Chinese characters are difficult in PP, and our researcher is an Englishman.

Do you think Past Perfect will be able to keep supporting the collection as you move?

Yes, the only problem is the Chinese. I try to persuade them. I say that we will change unless they support a Chinese platform, it's a huge market.

Do you talk to other museums?

Yes

What collection systems do they use?

None. I try to recommend products to them, but they want a Chinese system.

Past Perfect isn't expensive, only 1000 bucks, but their support is bad. Only we use Past Perfect in Hong Kong, maybe all of Asia.

Kitty But (full transcript)

What is your role at the museum?

I am a librarian; I keep track of information for the museum

How would you describe your computer skills?

Very good, I am familiar with Microsoft, but not very familiar with Mac.

How often do you use computers?

Every day, I use Microsoft PC's

In what ways do you use digital assets at the HKMM?

I do not believe we have a system at this stage to access any digital assets, but we do have a repository. This works like the museum software [Past Perfect], to gather the information.

Could you describe the software better so we have an understanding of…

It is similar to when you are using an online catalog or open system in a library. It is mainly designed for the museum to gather and house data for the exhibits, different objects and photographs. The system we have in place is called PastPerfect and it is designed for small museums. It also has a modulus for archives and libraries.

The problem is that it does not follow a universal standard. It has the functionality to follow a specific cataloging method; however it is not fully utilized. The software developer recommended that we should not follow that standard.

Do you ever use this system to find digital assets, such as e-books?

We do not have methods to find assets like e-books at this stage. However, it is something I would like to look into, because there are currently (as I have heard) hundreds of PDFs and e-books stored on someone's portable hard drive. Gathering this information into a cataloging system where any member of the staff could find this information would be a challenge.

If you had to find a certain e-book, how would you do it?

We have no access to these e-books at this stage; they are on a single hard drive in a single location.

So you would need to locate the person with the hard drive in order to retrieve the file?

That's right.

Do you have experience with any digital asset management systems?

Not particularly. I have used something similar called digital library in my past jobs

Could you describe/elaborate on that?

I had the experience of having a group of students create a repository using digital library for my past organization, which housed digital Asian art materials. We were hoping that that the system would have collect documents in PDF, Power Point, or even scanned manuscript into a central unit to be available via a link to our website. However, it did now work out well because digital library is open source—so, the students could not tailor the system to match the requirements of the archive. The system used Unicode for metadata; however, the library backend did not follow any metadata standard. This system was created by a work development company using something similar to Microsoft Access. After the project concluded, we decided that the system might not be the path for the archive to follow at that stage. That was at least five years ago, but it might change now.

Is there any other information you could provide that may help our research?

Well yes, I think the staff of the museum does not have the habit of sharing information apart from putting stuff in a shared folder seeing that they don't have the mindset of classification. They don't understand why an individual document has to be housed a certain way. It might be because they did not use this system (PastPerfect) in the past. I believe it will be difficult to make the staff understand the concept. On the other hand, if the system is built well enough with enough training, the staff will be able to get acquainted with it and enjoy having a new system to house internal documentations.

Is there anything specific as a librarian, you would like to get out of the system?

I have a lot of expectation from this project and from this system, because I have no way to house the E-books and make it available for the entire staff to search. That would be one of the major tasks. Secondly, I am hoping that once I am familiar with the system, maybe we can use it to be a museum archive system. We have never had any system to house our museum archives. For example, we have plenty of plans for the new site and we have documentation about building the new site. I believe they are very important for the history of the museum. I need something to electronically preserve all this documentation. I think that it would be very useful for searching images, because if we are cataloging individual images of our internal collections, staff would be able to find what they want much more easily than just going through different drives and into different folders. Only maybe one or two people in the whole museum know where these things are.

Overall, we are trying to address whether it is necessary to build a new DAM system. What are you opinions- is it necessary, is it not necessary and why?

It is important to have DAMs because, as I mentioned, it can be used as a central repository. One of my concerns is Unicode issues, but I will not need to worry about it if the DAM is web based. This is good because we will not have a language problem. Only the Chinese scripts can be available for viewing on the Chinese windows. The western colleges will not be able to access it or use it fully. With a web- based system like the DAM all would be able to have access to the system. We can share the resources with potential consultants, locally and internationally. However it is a very long term and difficult process to make people use the system, and my other worry is how to maintain the system. Who is going to look after it? Who will make sure everyone will use it based on the procedures and guidelines?

Do you have any ideas how to make the staff follow the guidelines for calcification?

I think one person will have to monitor the usage of the system very closely for a year or two. For the first year or two, this person will have to monitor the usage very closely, and make sure everyone is on the same page and follow all the guidelines. If they are not, then it will become another challenge just like our current server layout- which is something I don't want to see as a librarian.

Who would use the new system?

Everyone in the museum would be the potential clients/users. The two assistant curators Phoebe and Moody are the potential users as well because they have to help out with the new museum development. They are also the primary data creators in the museum. If they do not know the guidelines and if they do not use the system, there is no point in having the system. The second layer of usage would be the director, Mr. Wesley and even the curator (Catalina Chor) herself. They are not the creators but they are the users of the system.

Dr. Stephen Davies Interview (outline and key points)

How would you describe your computer prowess?

- Have been using computers for more than 50 years
- Have maintained familiarity with computes throughout that time

What programs are you most familiar with?

- Adobe
- Word

How do you use digital assets?

- Writing storylines
    - used to write whole storyline and raid database for images on topic
    - Uses Past Perfect to get items identity

When you look for assets and don't have object ID how would you find assets?

- L drive categorized by year
- Hunting internet all the time for graphics/video clips
- I have the most knowledge of how the collection is structured, and rely on my own memory
- I know where most of the pictures are and I type 'Victoria harbor', whiz down to where I see photograph, find 2007, wrong image, look again

Have you ever had difficulty locating files?

Yes, because Past Perfect was put together by people using a 2nd language.

Hong Kong / Chinese researchers use different area of brain to process writing

Colleagues don't see spelling mistakes, they use 99% Chinese and type English every once in a while but they don't spot spelling mistakes.

People shoving in stuff quickly with typing errors, causes problems

Colleagues don't think the same way as me

Things categorized in ways that don't make sense

I have a solid background in maritime history, and know what an asset is when I first see it.

To the staff, a sextant is just a word, they have no understanding of what it is and they have no reason to because of their roles at the museum.

Do you think there is a way to fix these problems?

- Adoption of Chinese language in system

We need a system to handle Chinese characters properly (Past Perfect cannot)

There's a chance that PP will grow with us because they need to appeal to China

- Must Retain English as primary language

In Chinese, there is no literature/poetry/art about maritime history. Because of this, no words have been developed for specific maritime terms. Therefore, English will always need to be part of the system

What is contained within PP?

Museums are going through a revolution. We think of ourselves as artifact repositories, you can count, sell, buy, move anything in our collection. What we've done with Past Perfect is created a means of keeping track of real items digitally. We don't think of digital objects as collection items, so Past Perfect will not work as a DAM. We've got a lot of images that have never been cataloged because nobody ever thought of it as a digital artifact.

Would you find it impotent if documents, PDFs and videos were also contained in a concise database?

YES, no question. Would I find it useful personally? Questionable. If I can use my brains instead of a system, I'll use my brains.

I wrote an article this Christmas about an interesting painting. I knew what I wanted to say. I can go into my own database, my own library, my own brain! Hard disks, Google desktop, doesn't need systematic stuff, just know keywords! It's great!

Want image of a ship? oldshipphotos.com has thousands of ship pictures. It's better than using our collection. This guy is a real boat nerd! This is what he does! It's a great resource, I use.

How do you deal with copyright restrictions?

I have been married to 2 librarians in my life, I know about copyright. I look for the owners, and it takes time to get permissions. We're not for profit, so we generally do not have a problem getting these rights.

What do you view as the advantages and disadvantages of the current system?

Advantages

- Simple, it works and the staff are used to the system.

Disadvantages:

- Works crankily, sometimes frustrating
- Major disadvantage: if I walk out of the office, museum loses its biggest resource. I'm the only guy who knows anything about maritime history. My brain is the museum's repository. You can't download that. We need to try though! Eventually I will have to enter all of this information onto something like a DAM.

If you could change anything about the current system, what would it be?

I would put EVERYTHING (scattered around because of locations, no server) on a centralized server, properly organized so things go in the right spot. I am untidy, Richard is untidy! But we know WHERE things are within our own space. I rely on my own memory. I lean on it a lot.

Currently, if someone brand new came in: Would they be able to use system easily? Would you have to sit with them and train them how you think? This is not acceptable. If you know nothing about the subject, you will be crippled! If you don't know port from starboard, you won't know how to find anything! Even with a list it won't help because you don't know WHAT IT MEANS.

If someone comes in with maritime knowledge could they use the PP?

Yes, keyword search is keyword searching.

It should have better sensitivity to keywords, but you need better understanding of maritime to create better with keywords.

Phoebe Tong (full transcript)

What is your job?

Assistant researcher. I mostly search for and enter info and details into the PP system. Moody handles the physical objects on the other hand.

How often do you use computers in your job?

Actually when I research an object I have to enter information like details into the PP system because my focus is about research. I just use the computer for doing research and finding information on internet, very simple things.

Do you find new objects for museum or just research current?

Both

Do you use Past Perfect often?

Quite often, yes.

Do you use any other digital assets in your job?

I use photos to see all of our assets, because we have a storage location in Chai Wan. Moody will bring them here if needed, but I've never used video.

When you get photos where do you put them?

We will save them into our server and put some of them into PP for backup purposes.

Do you ever have to find photos again later?

We may use the photos for an exhibition or other project, and get them from the server.

When you're looking for a photo or object how do you find it?

I just search in Past Perfect because everything has its own ID number. Past Perfect has most objects so I search for the object ID in Past Perfect and find it in the server.

You know all the ID numbers?

No, I don't remember all them, so I use Past Perfect to help me find the ID. I can search PP for the object by entering description details of the asset.

Ever had trouble finding something specific?

Yes, some of the details of objects in Past Perfect are wrong or have similar details and can make it mess up. This can make things difficult to find, because sometimes the details of an object are Chinese, but PP does not have capabilities to search for Chinese.

If you could fix anything about it to make it easier, what would you fix?

It's okay. It meets the current needs of the museum.

Have you used any other kind of file manager systems, like excel?

Yes, excel.

Would it be useful if we put all the photos and documents and checklists and email archives all into one place to search for things?

Yes, it would be more convenient and helpful if everyone could access them.

Do you have a set way of putting objects into Past Perfect? Do you have a set way of filling out a description?

Actually Past Perfect has fields for us to fill in and I just fill those out.

Do you think if there was a standard for descriptions, searching would be easier? Would it be helpful?

Yes, I think it would be important to have a standard form.

Do you ever have trouble with Chinese vs. English words? Mixing?

Actually Past Perfect cannot always show Chinese words. It's one of the difficulties of the system, and we haven't found a good solution.

Would you prefer putting things in Chinese or English?

We prefer English first but some are very Chinese related, so we need to put in a Chinese description. In order to do this we'll put Chinese description into a Word file and put that file into the PP system.

Is there any other info you could tell us about how you use assets for your job or how things you'd like improved or changed?

No, it's okay for me because my duty is focused on the documentary level. Very simple and basic computer skills are enough for me.

Do you just put things in Past Perfect or do you have other filing locations?

We create another folder on computers for backup.

<u>Catalina Chor (outline and key points)</u>

What is your role in the museum?

I would describe myself as the Executive Manager and Curator.

I am also an expert in porcelain and pottery conservation

Can you describe this?

Number, description, and conditions of items and tell people how to repair the item. If a piece of the object is missing other material can be used to create the piece. The curator can also decide to show how the piece is missing and what it should look like.

The museum currently has no designer and no one in-house can develop pamphlets or publications.

I hired Candy as shop keeper, to manage digital assets for shop, E-shop (35 to 40 items)

I like having Fiona here to help entering material into PP.

What kind of media assets do you use?

I mostly use images, no sound, but I would like to use more sounds in the future.

For example, if there is an abnormality with a part of delivery, we take an image to make sure everyone is aware when unpacking. We will also, show this to the insurance company or to the Board of Directors. We can then ask the shipping company why this happened.

Where do you use them?

I generally use these to communicate with the conservator.

How do you use them?

I use media assets to give huge amounts of information conservator. This is done so that they can fix it, by marking images where it needs to be fixed

Where and how do you find the media you use?

Assets are kept on the shared drive, so all can use them. I pull assets from PP and collection folder (S-drive).

Have you ever had any trouble tracking or locating assets?

So far it's been ok, but it relies heavily on the human memory.

If you could change anything about the system, what would you change?

The system needs a searchable database. With Past Perfect, if you use correct words, you can find the photo.

How would you see a DAM being used at the museum?

I believe a DAM system would help to pool all of the assets to share with team, where everyone contributes to keep everything up to date.

You could use assets to show the public about exhibits if they have inquiries. These assets give good details of our artifacts in our collection.

What are some limitations of the current system?

The system needs a keywording system. I only have limited information when I put data into the system. We need terms to use later to find the information. The current system can't accommodate Chinese characters that well either. The system allows you to type in the characters, but the Chinese characters do not work well inside system.

How often do you use computers?

Every minute on site in the museum

What kind of computers do you use?

I have never used an Apple computer, I believe all of the staff are unfamiliar and that may slow down processes. I feel more comfortable with current computers

What kind of software do you use regularly?

My computer does not have windows 7 or picture manager. The computers in the office allow for limited users of this software, just like Past Perfect. I cannot use Past Perfect, Photoshop, or Power Point on my computer.

How do you learn to use new software*?*

I learn from a manual, and I encourage others to learn the same way.

Do you have any experience with digital asset management systems?

Yes, I feel that the strongest feature of a DAM is the support of Chinese characters.

Is there any information that you could provide that may help us in creating a DAM?

I would want a searchable, keywording system in the DAM.

I would also like to send designers links to find images, which would be easier than delivery by mail or in person. Since they do not have access, we must burn it to a disk and give it to them, or we have to find links to give to them. Finding links over and over again becomes frustrating. Our current computer system will not be adequate when the museum is larger.

Edited by Catalina

3.06.2012

APPENDIX D: LIST OF DESIRED SYSTEM REQUIREMENTS

Table 13 gives detailed descriptions of each of the requirements and additional criteria considered during the DAM selection process.

TABLE 13: DETAILED DESCRIPTION OF MATRIX REQUIREMENT FIELDS

Functionality	Description
Supports all file types	A selected system must be capable of storing and organizing all file types. This is essential for the museum's organizational structure and will give the staff the flexibility of working with any type of media.
Centralized repository of data	The system should provide a single location where data can be stored. This will allow for easy usage and management of the assets.
Ability to store data securely	The system should have secure logins, which give the users permissions to access the system and make changes.
Ability to set user permissions	Different users should be able to have different levels of access. For example, a curator at the museum should be able to upload and edit files, while a public user should only be able to see limited publicly-available files.
Retrievable/ extractable metadata	When uploading files to the system, the system should be capable of reusing the files existing metadata rather than forcing the user to rewrite all of the fields.
Multi-user capabilities	At any given point, multiple users must be able to access the system. This will help improve work flow.
Web-based	A web-based system is accessed through a browser and can be used anywhere, from any platform.
Easily accessible to designer	To be easily accessible to the designer, the system must be capable of allowing the designer access, as well as allowing for collaborative work in the system.
Comprehensive search system	The search system should be modifiable and simple to use. An ideal system would have both a fast keyword search and a customizable advanced search.
Related items search	The search engine should be able to identify groups of items that are related to each other. An example of this is on YouTube, where similar films are presented when viewing an individual film.
Standardized keywording system	A standardized keywording system will give users the ability to select pre-existing keywords that are defined and will encourage users to use the same keywords when tagging and searching for assets.
Unicode compatible	Unicode capability is important, because it would allow the system to store Traditional Chinese characters. This would allow future users to write descriptions and perform searches in Traditional Chinese characters.
Technical support	Comprehensive technical support should be readily available to the staff to help the staff deal with the types of issues that may arise when working with the system.

Intuitive icons	This is a subjective field dealing with the icons of the system. English is not the first language of many of the museums employees, so a suitable system would have icons that visually convey their functionalities.
Operating system compatibility	Due to the fact that this system should be accessible to multiple parties, it is mandatory that it be compatible with multiple platforms. A web-based system would be an example of a multi-platform system.
Cloud hosting	The ability of the system to host its server on the cloud is essential in the initial stages of the DAM's development. While the museum is transitioning to a new location, it will not have a permanent location to setup a dedicated server.
Integration with current system	A system should have the ability to work with the museum's existing shared drive and integrate seamlessly with Flickr. This will ease the transition to the new system.
Upfront costs	The upfront costs of a system include the setup, installation, and consultant fees associated with the integration of a new DAM. This could also include software licensing fees.
Recurring costs	Recurring costs exist when the system requires cloud hosting, technical support, or software updates.

APPENDIX E: KEYWORD SURVEY

This is the protocol for a survey to determine keywording patterns. This survey consists of four pictures and will be handed to the interviewee at the end of the HKMM staff interviews. The interviewee will be asked to describe each picture in five phrases or less. Figure 7 depicts the four images that were used in the keyword survey.
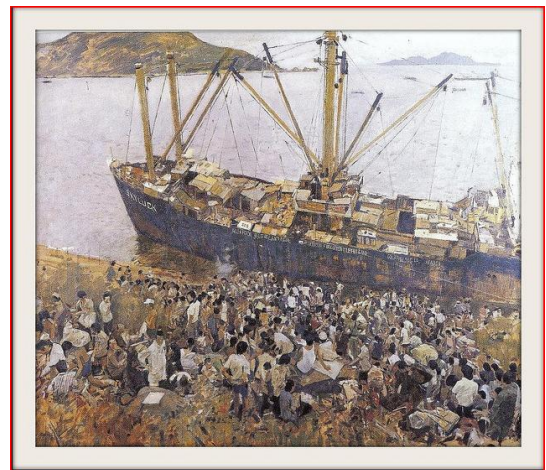

FIGURE 7: IMAGES INCLUDED IN THE KEYWORD SURVEY

Photo	Stephen Davies — Wordsmith	Kitty But — Librarian	Moody Tang — Registrar	Phoebe Tong — Curator	Fiona Mak — Intern	Robert Trio — Consultant	Catalina Chor — Curator	Totals
Item 1 (cup)	Gothenburg; Wreck; Export ceramics; cup; sancai	ceramic; china cup; shipwreck	porcelain; cup; China trade; ship wreck	porcelain; Chinese; cup; decoration	white cup; small drinking cup; tea cup; cup with green and red decoration; cup with no handle	cup; barnacle; ceramic; flower	porcelain; enamel; wreck cargo	7; 8; 12 — 27
Item 2 (photo)	piracy; 1930s; Haixing; Royal Navy; China Seas	seamen; rescue; crime	ship; sailors; crew; Chinese; pirate; Black and White photo	Photo; black and white; sailor; ship	sailors; ship; Asian people on ship; ship picture; sea; passenger	photo; group; sailor; pirate	crew on ship; Chinese crew	5; 12; 13 — 30
Item 3 (carving)	bamboo; river boat; sampan; carving; objecft d'art; Chinese export trade	vessels; fishing; China; Wood craves	wooden sculpture; antique; ship; Chinese	Chinese; ship; wood; model	craft boat object; wood boat model; Chinese boat; people on boat; artifact	boat; model; bamboo; figures	bamboo carving; boat-shaped; Qing dynasty	14; 8; 8 — 30
Item 4 (painting)	refugees; Skyluck; next port of call; duty of seafarers; Vietnam	Refugees; Vietnam War; Cargoes; Hong Kong	Hong Kong; Vietnam; ship; cargo ship; refugee; Boat People; Isalnd	painting; skyluck; vietnam	ship painting; cargo ship; ship at sea; painting with people; sea	boat; people; painting; cranes	refugees; vietnam; waiting to board	4; 10; 17 — 31
					Total:			118

Total: 38 / 50 / 30 → 32% / 42% / 25%

Key:
- Physicality (yellow)
- Context (pink)
- Content (green)

APPENDIX F: KEYWORD SURVEY RESPONSES AND RESULTS

Table 14 shows the results to our keyword survey, detailing the keywords each member of the staff assigned to each picture. Their keywords are categorized, as denoted by color, into categories of physicality—describing the physical nature of the asset, context—describing background information on the asset, and content—describing only what is easily apparent in the image. Figure 8 shows the breakdown of these responses by type, denoting how often each keyword type was used compared to the other two keyword types.
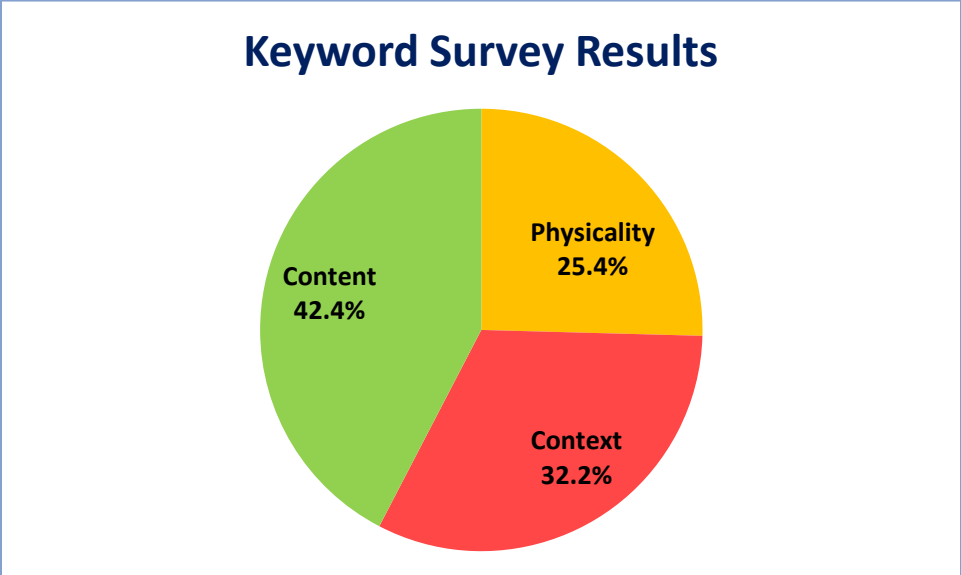
FIGURE 8: THE RESULTS OF THE KEYWORD SURVEY CATEGORIZED BY TYPE

APPENDIX G: RELEVANT SOFTWARE INTERFACES

Canto Cumulus, ResourceSpace, and the current system all have interfaces that differ in functionality and usability. These are the parts of the system that the staff and the public would interact with daily and are important for the efficiency and use of the system. The below images depict the most relevant user interfaces and give a brief explanation of each.
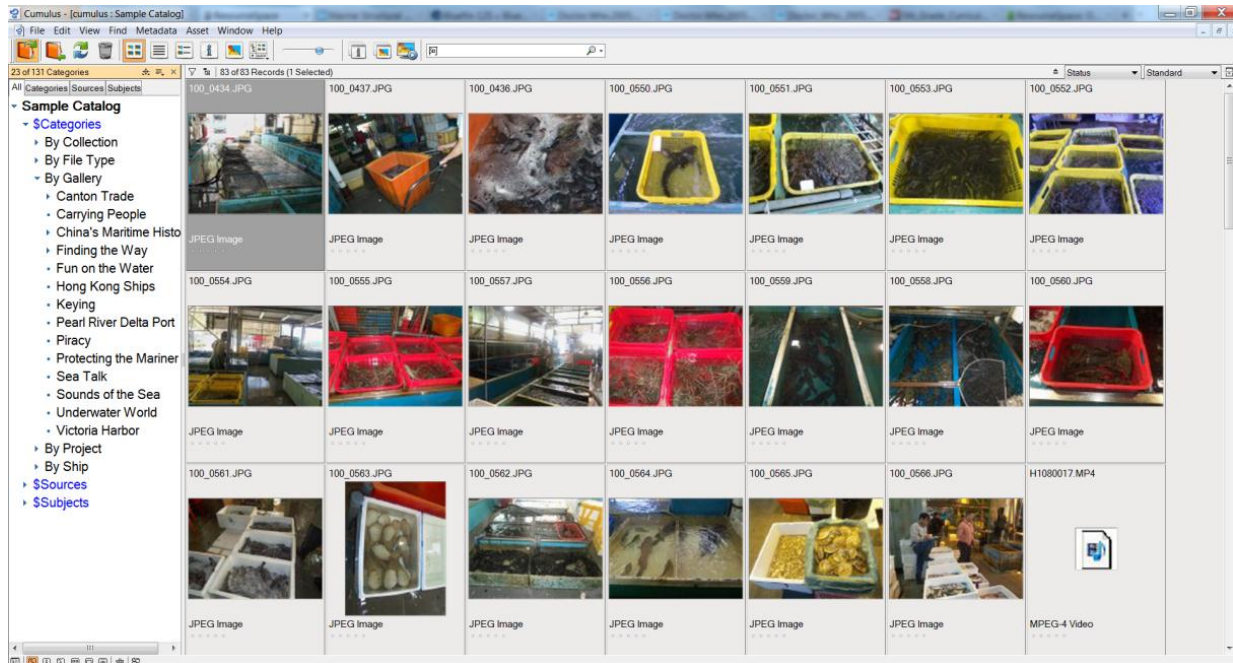
FIGURE 9: SCREENSHOT OF CUMULUS CLIENT

Cumulus Client, pictured in Figure 9 is the interface that would be most commonly used by the staff to upload, manage, organize, and find assets.

Figure 10 shows Cumulus Sites, which is the tool that can be used by the out of house designers as well as the public. If a user logs in to this system, it is possible to edit and upload new assets that the user has access to.

ResourceSpace's interface, pictured in Figure 11, is in a single application. The image is an example of the upload process of a new asset.

The museum's shared drive, pictured in Figure 12, contains files and photographs organized by date entered into the shared drive.

The museums Flickr account provides an intuitive and appealing method for sharing photos with the public. The interface for this system can be seen in Figure 13.
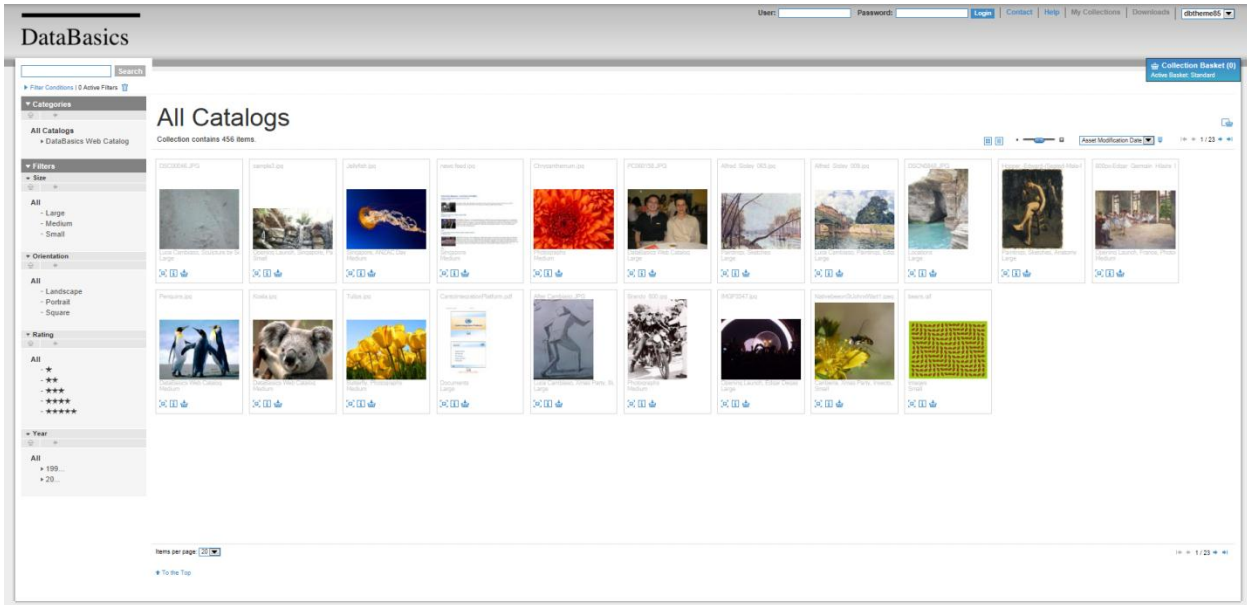
FIGURE 10: SCREENSHOT OF CUMULUS SITES INTERFACE
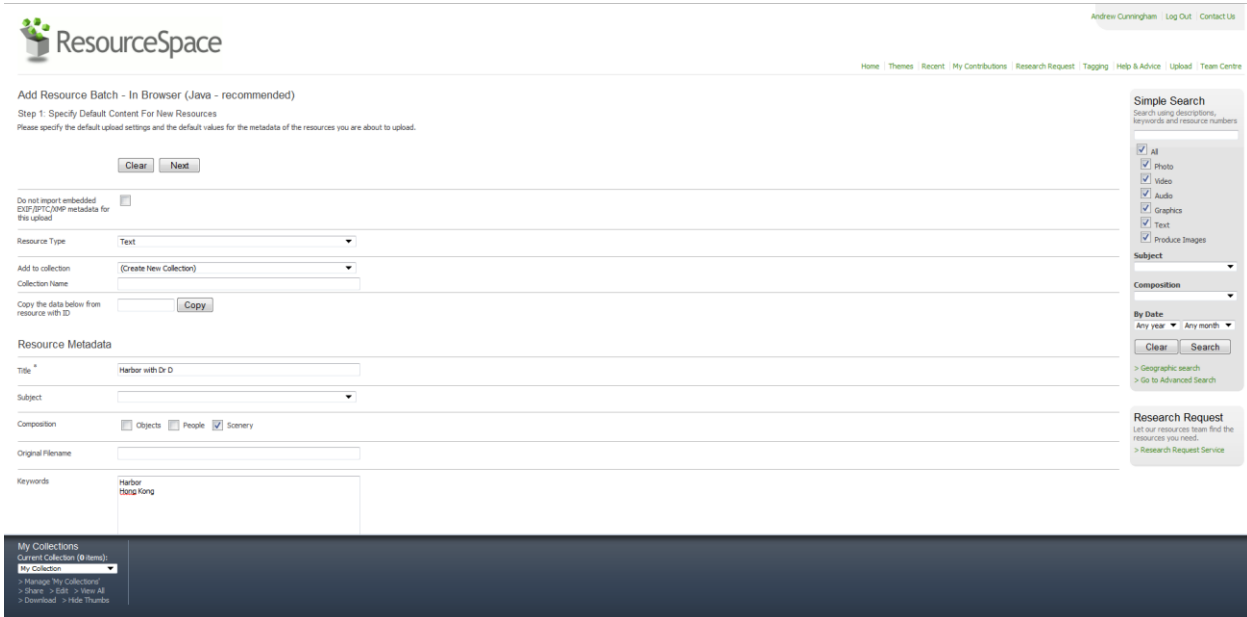
FIGURE 11: SCREENSHOT OF RESOURCESPACE
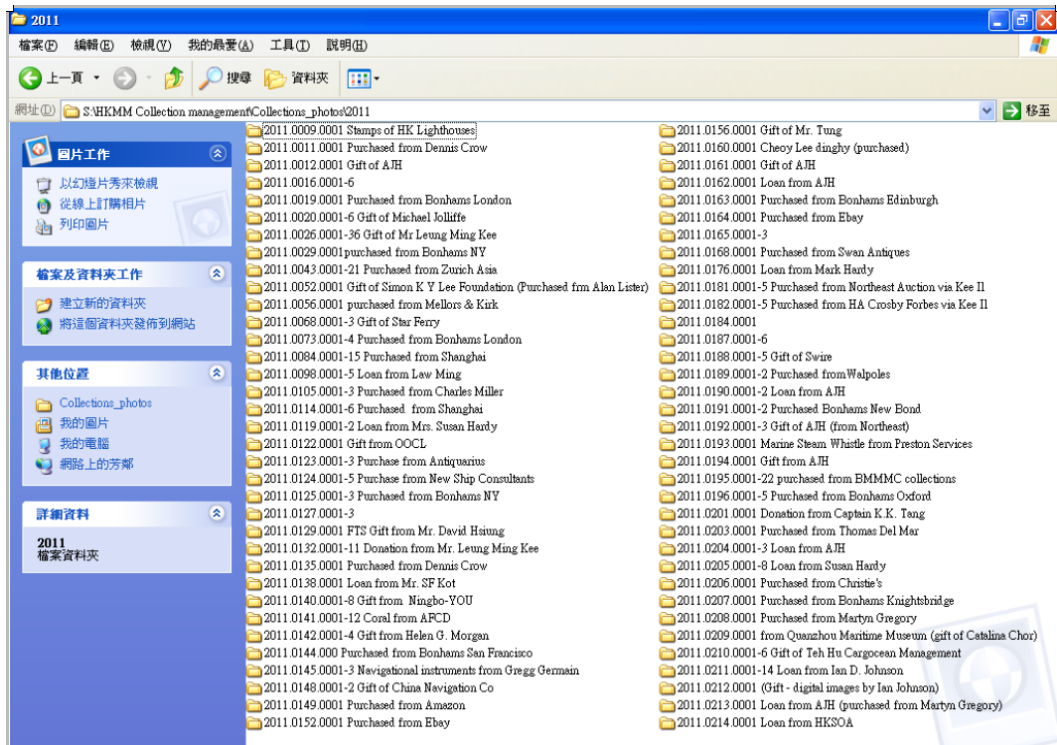
FIGURE 12: SCREENSHOT OF THE MUSEUM'S SHARED DRIVE
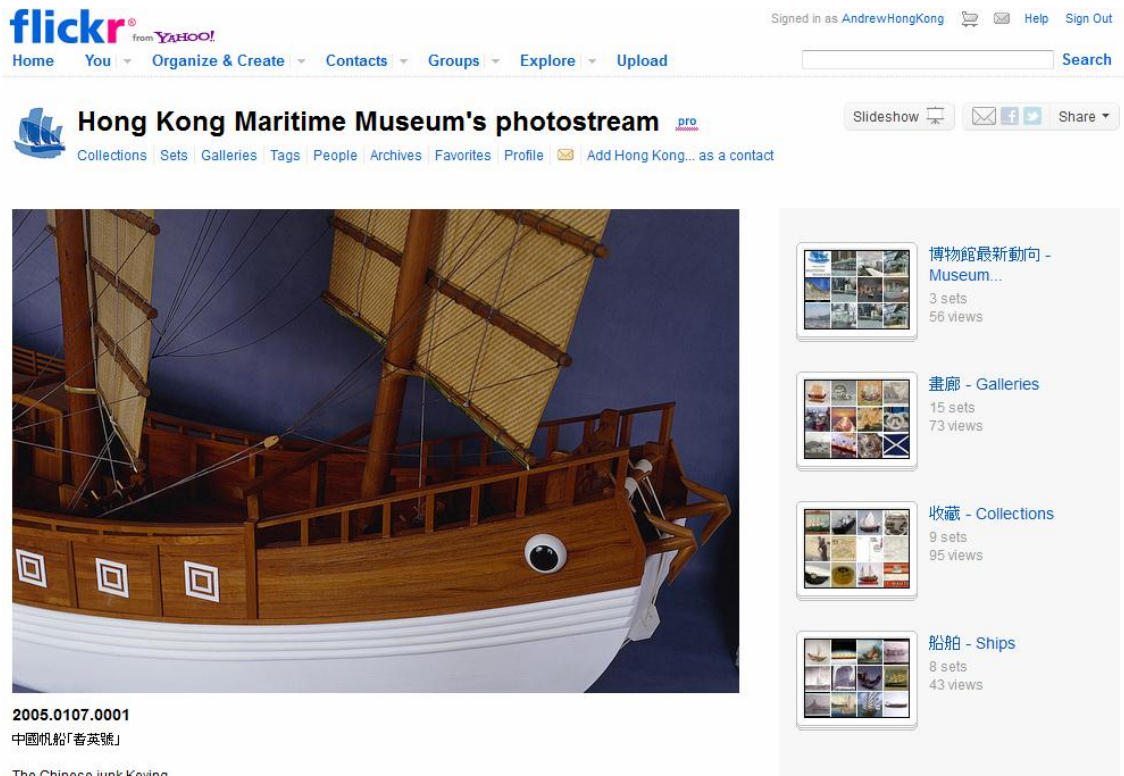
FIGURE 13: SCREENSHOT OF THE MUSEUM'S FLICKR ACCOUNT

APPENDIX H: STATEMENT OF WORK PROVIDED BY CANTO CUMULUS

This is a modified statement of work provided by DataBasics, a branch of the Canto Company, which provides setup and support for the cumulus product. If the museum wishes to pursue Canto Cumulus as an investment, this document outlines the timeline and details the features we recommend.

Statement of Work

Cumulus implementation for Hong Kong Maritime Museum

DataBasics Pty Ltd, Feb 16, 2012
Robert Krause (Technical Services Manager) Version:
1.0

Introduction

DataBasics has been approached by Andrew Cunningham to provide a solution for handling digital assets. The desired outcome is a turnkey solution that is being operated by existing and potential new staff members of the museum as well as external designers.

Project Scope

1. Included in SOW
   a. Implementation of a DAM system to allow for the immediate need of being able to find and exchange digital assets online and to establish a collaboration workflow
   b. Provision of appropriate consulting that is necessary for system setup
   c. Cataloging of initial 3000 images
   d. Provision of appropriate training in order to perform the workflows
2. Optional later phases (not included in SOW)
   a. The option to communicate with PastPerfect and/or Flickr.
3. Not included in SOW
   a. Metadata tagging of initial 3000 images
   b. Cumulus Admin training
   c. Provision of hardware

All services are to be provided remotely.

Project schedule

Upon receipt of purchase order remote work can be scheduled within a timeframe of 4 weeks.

System Requirements / Recommendations

Official minimum system requirements can be found here:

http://crc.canto.com/A/All+Files/4560?encoding=UTF-8

Our recommendations are:

Dedicated server (virtualised environment works for most of our customers)
2.5Ghz Dual Core or higher
3GB RAM (or 4/8 GB for 64bit systems)

100GB of free space on the C drive after installation of the operating system Windows operating system (easy remote access to perform the work needed) enough additional storage space to host all your files (i.e. 3000 images + videos)

For storage space it is recommended to determine how much space current assets use. Doubling that number will provide a buffer for future expansion. Ideally Storage space is directly available on the Cumulus server.

Key solution requirements

-Support for English and Chinese characters
-Support for multiple file formats (includes images/video/documents)
-Search and retrieve assets based on metadata stored with assets
-Collaboration between designers (sending link to photos, storylines)
-Self service system for designers to select available imagery

Project requirements

DataBasics requires one dedicated point of contact/project manager (e.g. Robert Trio) for all communication with regards to the design of the system. Therefore it is important that this contact is familiar with the needs of the users of the system.

It is also a requirement to have full admin access to the future Cumulus server in order to perform the tasks required to setup the system.

Ongoing Workflows

<u>Uploading assets</u>

Either staff of the museum or external designers will upload assets and enter corresponding metadata via i-AssetContributor (iAC).

iAC has been optimized to handle large files being uploaded to remote sites and is used in many installations for this purpose

<u>Searching and retrieving</u>

Staff will login to Cumulus Sites to browse the contents of catalogs or use the quick search for metadata based retrieval of assets.

Individual assets can be downloaded at any time and multiple assets can be downloaded from any basket.

<u>Collaboration</u>

After assets have been uploaded or found they can be added to a collection basket. Multiple collection baskets can be created and saved under a user's login.

Staff will communicate the contents of their collection baskets to designers using the Send Collection Link feature in the collection basket window.

This generates an email to nominated list of recipients with download links to files in the basket.

The link can either allow for a converted version of the file to be downloaded or the original asset itself.

Implementation Plan

<u>Meeting with Stakeholders</u>

- Discuss agenda
- Determine time allocations for workshops/training etc.

<u>Basic installation</u>

- Server inspection
- Installation of Cumulus solution components on server
- Basic configuration of Cumulus solution components
- Licensing of Cumulus server and iAC

- Creation of catalog(s)
- Creation of categories
- Configuration of record fields
- Configuration of metadata templates
- Configuration of asset handling sets
- Configuration of record view sets

Workshop – with project manager

- Introduction to Cumulus
- Explanation of Cumulus Architecture
- Explanation of Metadata classifications
- Explanation of Cumulus specific field types
- Determine required record fields
- Determine required metadata
- Determine record view sets
- Determine user groups
- Decide on number of catalogs
- Determine Category structure

Best practice setup

- Setup 1A_usersettings user and configure
- Apply user settings from "1A_usersettings" user
- Create "2A_Template_Users" for easy user creation
- Setup Sites system users
- Setup daily/weekly backup scheme

Initial ingestion of assets

- Upload of assets to server
- Cataloging of initial 3000 images

Advanced Setup

- Setup Backup
- Configuration Email Settings Cumulus Server
- Creation of Actions, Print Templates
- Configuration of Cumulus Vault
- Setup user templates and define permissions

<u>Basic Sites configuration</u>

- Incorporation of Logos and custom start screen image
- Configuration of contacts pages
- Creation of clean and simple interface

<u>i-AssetContributor (iAC)</u>

- Installation of iAC
- Basic configuration of iAC
- Definition of upload mask
- Change of logo

<u>Preparation for end user training</u>

- Preparation training end users
- Configure sample system for training purposes

<u>Training end users</u> (remote session)

- Workflow specific training, details to be determined

<u>Testing/Troubleshooting</u>

- Functional testing of all components
- Testing of all workflows
- Testing of User Permissions

<u>Documentation</u>

- Documentation of workflows
- Documentation of new user creation

APPENDIX I: RESOURCESPACE DEVELOPMENT DETAILS FOR FUTURE CUSTOMIZATION

This is a stand-alone document that can be provided to a development company (Montala or other) to describe the needs of the museum and the features required in a customized ResourceSpace.

RESOURCESPACE DEVELOPMENT DETAILS

BRIEF OUTLINE OF THE RESOURCESPACE DEVELOPMENT REQUIREMENTS AND PREFERENCES OF THE HONG KONG MARITIME MUSEUM

Hong Kong Maritime Museum WPI Student Team:

Andrew Cunningham, Wyatt Gray

Greg Mollnow, Rebecca Rollinson

Museum Background

The Hong Kong Maritime Museum (HKMM) was created in 2005, and has been growing quickly ever since. The museum displays physical assets, such as models, artifacts, and paintings to convey its message. However, it is currently developing new content through digital media and video creation. In the next year, the museum will transition to a new site in central Hong Kong, where it will host more than five times the current number of galleries.

CURRENT LOCATION OF THE MUSEUM
MURRAY HOUSE, STANLEY

Project Description

The Hong Kong Maritime Museum (2010) was established in 2005 to "place Hong Kong's maritime story into its local, regional and international context" (p. 1). In 2012 and 2013, the museum is moving from Murray House in Stanley to Central Pier 8, and the staff are now beginning to plan the new facility, which will have fifteen galleries as opposed to the current two galleries. This move to Pier 8 poses a two-fold challenge. The staff must create fifteen new galleries, and they are in need of a management system for their digital information in order to communicate with the designers and streamline the design process. The museum must also maintain a presence with the public while it is closed from March 2012 to January 2013. The museum hopes to use this transition to Central Pier 8 to expand its audience from the tourists of Stanley to the local Hong Kong populace. While the move to Central Pier 8 offers many opportunities to the museum, these challenges must be overcome for the museum to transition successfully.

These challenges will be overcome by using a digital asset management (DAM) system, such as ResourceSpace, to organize, share, and collaborate on digital photos, videos, and documents used during the transition. The DAM will be especially important when collaborating with out-of-house designers for the Pier 8 project and will require substantial project management and version control tools.

ResourceSpace Development Requirements

Although ResourceSpace is currently an effective tool for storing and managing digital assets, the needs of the Hong Kong Maritime Museum would be better met through customization of the system. The following sections outline the areas of customization and setup that the museum requires.

Branding Information

The museum is developing a new website as part of the transition to Pier 8, due to this it is important for the new DAM system to integrate well into the museum's web presence. This calls for professional-level branding of the system's interface, including color schemes and logo incorporation. The following are logos for the museum in two separate formats:

Please contact the museum directly if a larger version of the logo is needed. The color scheme of the museum is depicted in the logos, but a template of the new website's style can also be provided.

The system should also include the scrolling images that default on the home page of the ResourceSpace site. The scrolling images should be stored in a file that is easily accessible to the staff, allowing for the images to be easily updated as relevant topics and galleries change.

These customizations should be possible with the use of the Colorthemer tool, which is available from the open source development community, however full customization may require some additional setup.

Selected Plugins and Modules

We have selected a list of desired plugins that exist currently in the ResourceSpace SVN. These can be easily added during the setup of ResourceSpace. They include:

Flickr Theme Publishing

Resource ID: 94

Publisher: Dan Huby

This plugin allows for the automatic publishing of photographs to the HKMM Flickr account (http://www.flickr.com/photos/hkmm/).

This is an open-source plugin and can be modified directly through ResourceSpace's SVN. The museum has stored most of its photos and their associated metadata on Flickr, so the following additional functionalities should be added to this plugin:

- Assets co-existing in Flickr and ResourceSpace must share metadata.
- Assets existing on ResourceSpace should have the option of being available to the public on Flickr, but should not be published by default.
- If a file is deleted, modified, or added to one of the two systems, the same modification should be made in the other system.
- All information on the existing Flickr account, as well as organizational structure and metadata, should be imported into the DAM.

Due to the fact that the Flickr API structure currently exists, we foresee this as being a significant, but not unreasonable, feature requirement.

Embed Video

Resource ID: 14

Publisher: Dan Huby

This will allow for videos to be embedded easily into museum's site and other public sites. This tool can be added during setup without any additional modification.

Video_splice

Resource ID: NA

Publisher: NA

Available on earlier builds of "plugins=array.", this will allow the museum to edit videos easily within the DAM.

Videojs

Resource ID: NA

Publisher: NA

Available with Video_Splice, this will allow ResourceSpace to play videos within the system using HTML5.

Customized Features

To meet the collaboration needs of Pier 8's development, several project management and version control features will be needed. A brief description and user stories are provided:

Version Control

To facilitate proper workflow and to manage assets properly, a version control system is needed beyond the current capabilities of ResourceSpace. For example, if a museum user uses an image of a ship and adds promotional text to the picture, the original asset should be preserved and this new asset should be linked to the original asset in an organized way. The files should be linked numerically, and should share metadata upon upload.

Actors: User and System

> *Download User Story*

User should be able download the file as an original asset or version of an asset, save the file on their local computer, and make changes.

> *Upload User Story*

User should be able to upload file and be presented with the option to create a new version of an existing file. The user then should be able to select the file originally used to create the new asset. The system should link the new file to the original asset.

Important note: original asset could also be linked to another asset, making more than two versions of the same file possible.

Project Management

To help the museum work with exhibit designers during the development of Pier 8, the museum requires the development of proper project management tools. These tools should allow museum curators to create collections of assets for use in a particular exhibit, and then share these and

associated text with the exhibit designers. The designers should be able to comment on these images and respond to the collection with feedback through their user login.

Actors: Curator, Designer, and System

Collection Sharing

The Curator should log into the system and search for images relevant for use in a specific exhibit. The Curator should be able to collect these images (existing collection basket feature) and add relevant text to the images, associated with the collection but isolated from metadata. He should then have the ability to share these images with an existing user.

Collection Viewing and Feedback

The out-of-house designer should receive an email notification that a new collection has been shared which prompts him to login to the system. The designer should be able to view the assets, as well as all associated text and pre-existing metadata. If assets are inadequate, in need of editing, or not understood, the designer should be able to comment on the assets. This should facilitate a collaborative process within the collection.

Metadata Fields

The ResourceSpace metadata fields must be modified to meet the needs of the museum. We selected the Dublin Core metadata structure, and identified 15 fields that should be available upon upload. These desired fields are listed below:

- **Title--**name given to the resource;
- **Subject**—keywords;
- **Description**—an account of the content of the resource, such as abstract, or table of contents;
- **Resource Type**—nature or genre of the content of the resource;
- **Source**—reference to resource from which present resource is derived;
- **Relation**—reference to related sources;
- **Coverage**—extent or scope of the content of the resource, spatial location, temporal period, or jurisdiction;
- **Creator**—entity responsible for making the content of the resource;
- **Publisher**—entity responsible for making the resource available;
- **Contributor**—entity responsible for making contributions to the content of the resource;
- **Rights**—information on rights held in and over the resource;
- **Date**—date associated with an event in the life cycle of the resource, such as the creation or availability dates;

- **Format**—physical or digital manifestation of the resource, media type, dimensions, such as size or duration;
- **Identifier**—formal ID number for the specific system; and
- **Language**—language of the content.

Note: A checkbox giving the option of publishing photos on museum's Flickr should be available in metadata. This should be unchecked by default.

Technical Infrastructure Requirements

The system should be integrated onto an online cloud server. This space should be at least 150GB to start, but should have the option of expanding as the storage needs of the museum grow. The choice of the exact space is up to developer discretion. Once uploaded onto the cloud system, all information on how to maintain and administrate the server should be provided to the museum.

If a local server is acquired, the museum should also be able to easily download the system without the loss of functionality or digital assets.

The digital assets must be backed up and secure on whatever cloud server is selected. This backup can be handled by the server provider or done by the museum if it can be automated.

Estimated Project Duration and Timeline

As the museum is quickly moving towards its transition to Pier 8, the setup of this system onto a cloud server must be done as a first priority. The development of new plugins and system functionalities can be done in a more relaxed time frame once the system is in place. These new functionalities should be fully operational before the museum completes its transition to Pier 8.

Assumptions and Agreements

The museum understands the difficulties involved in the development of open-source software. The developer will not be responsible for any instability or difficulties associated with building on an open platform.

The developer is responsible for delivering the product in a timely manner and for meeting the requirements specified in this document unless an alternative agreement is reached.

APPENDIX J: METADATA SYSTEMS SPECIFICATIONS

This appendix describes in detail the specifics of Dublin Core metadata system and IPTC Photo Metadata system.

Dublin Core

Dublin Core is a useful system for cataloging a variety of assets, because it focuses on 15 main data components that can be manipulated to fit the type of asset being catalogued. According to DCMI Usage Board of Dublin Core (2010), These 15 fields are:

- **Title--**name given to the resource;
- **Subject**—keywords;
- **Description**—an account of the content of the resource, such as abstract, or table of contents;
- **Resource Type**—nature or genre of the content of the resource;
- **Source**—reference to resource from which present resource is derived;
- **Relation**—reference to related sources;
- **Coverage**—extent or scope of the content of the resource, spatial location, temporal period, or jurisdiction;
- **Creator**—entity responsible for making the content of the resource;
- **Publisher**—entity responsible for making the resource available;
- **Contributor**—entity responsible for making contributions to the content of the resource;
- **Rights**—information on rights held in and over the resource;
- **Date**—date associated with an event in the life cycle of the resource, such as the creation or availability dates;
- **Format**—physical or digital manifestation of the resource, media type, dimensions, such as size or duration;
- **Identifier**—formal ID number for the specific system; and
- **Language**—language of the content.

All of the fields are optional or can be duplicated to fit the scope of the information being attached to an asset. The museum's assets contain all types of files, from video to text documents, so it is important to have a system that is generic enough that it can be easily customized to each asset. A system with more specific fields requires the user to switch to a different set of metadata requirements for each file type. Using Dublin Core, an uploader would be able to tag a video and a text document using the same generic fields, but interpreted differently for each file type. It will be easier on users who are not familiar with metadata systems to only need to learn one system, instead of several. This makes learning how to use the system quick and easy with little training required.

International Press Telecommunications Council (IPTC) Photo Metadata standard

The IPTC Photo Metadata standard is a much narrower, specific system of cataloguing data for an asset. The system is catered toward an application to digital images, but it can be applied to all media types with some modification. There are over 20 suggested fields for each asset when using the IPTC Photo Metadata standard. According to IPTC (2010), these fields include:

- **Description**—text explaining an item's content;
- **Headline**—a brief synopsis of the caption;
- **Intellectual genre**—describes natural, intellectual, artistic, or journalistic characteristics of an item;
- **Keywords**—express subject of the content;
- **Province or state**—sub-region of a country that the content is focusing on;
- **Scene code**—describes scene using IPTC "Scene-NewsCodes";
- **Subject code**—specifies one or more subjects from the IPTC subject-NewsCodes for categorization;
- **Sublocation**—exact name of sublocation that content is focused on;
- **Date created**;
- **Description writer**—name of the person involved in writing the description;
- **Instructions**—any instructions that should be followed when using the asset;
- **Job ID**—for the purpose of improved workflow handling;
- **Title**—shorthand reference for the item;
- **Copyright notice**;
- **Creator**—name of person who made the asset;
- **Creator's contact information**;
- **Creator's job title**;
- **Credit line**—designates who must be asked to use the image;
- **Rights usage terms**—licensing parameters;
- **Source**—the original owner of the copyright;
- **Location shown in asset**; and
- **Location asset was created**.

There are also many other fields that describe the nature of digital images—specifying everything from pixel height and width to the names and ages of models in images. For digital images, fields specifying the maximum pixel width and height would be extremely helpful to a designer, however, such fields would need to be removed for text documents and sound clips. This system has much narrower fields that specify only one aspect of each piece of data attached to an object. For example, the location of an asset is split into separate fields for what the asset shows and where the asset was created, as well as sublocation to further specify the location of

each of these. While this system is much more thorough and specific, it has many fields, so it would take users longer to upload assets and correctly fill out the metadata fields.

APPENDIX K: KEYWORDING SYSTEMS SPECIFICATIONS

This section describes the Getty Thesaurus and Library of Congress Subject Headings controlled vocabulary lists. Each description ends with a comment on their applicability to the keywording needs of the museum staff and their ability to describe the types of assets that the museum will be housing.

Getty Thesaurus

According to The J. Paul Getty Trust (2012), the Getty Thesaurus primarily focuses on and specifies four areas of terminology.

- **Art and Architecture** specifies vocabulary and descriptions for generic art and architecture concepts.
- **Geographic Names** is a list of names of places that are important to art and architecture.
- **Cultural Objects Name Authority** designates which names are used for famous art pieces.
- **Union List of Artist Names** specifies which names should be used for famous artists.

The content of these lists are further broken down into aspects of art that need to be addressed when describing art. These aspects include:

- **associated concepts**—concepts related to human thought and activity which relate to art;
- **physical attributes**—attributes and properties, such as shape, texture, or smell;
- **styles and periods**—commonly used words to describe different artistic periods;
- **agents**—people, organizations, and living organisms associated with an art object;
- **activities**—processes and techniques used when creating art;
- **materials**—what the art object is made of, such as wood, clay, or ivory; and
- **objects**—hierarchies of object groupings and systems related to the physical artistic creations; this includes all physical art objects created by artists and architects.

This type of keywording system would be able to represent the art, sculptures, and models of the maritime museum and their associated digital representations very well. However, it would struggle in trying to describe the content of assets, especially text assets, of which the museum has many. Also, it focuses primarily on the physical nature of assets, not providing terms to explain adequately the content of an asset or the context of an asset.

Library of Congress Subject Headings

The Library of Congress Subject Headings is most often applied to text libraries, and it covers a wide range of subjects to represent nearly any document available. The system is comprised of hierarchies of subjects that are broken down, and specified into a single, specific idea. According

to The University of North Carolina at Chapel Hill (2002) and the Library of Congress (2012), any subject term or phrase in LCSH can be broken down to clarify:

- geographical specification;
- what the subject is used for;
- broader topics;
- related topics;
- terms and phrases that could also be investigated;
- narrower topics; and
- subdivisions of the subject.

This system contains hierarchies of keywords on every subject from Chinese history to boating and fishing to maritime law. The hierarchies can easily be manipulated in order to describe nearly any subject, which would adequately represent the content and general context of all of HKMM's assets. These subject lists are updated regularly to reflect the changing needs of libraries (Library of Congress, 2012). The breadth of the system would also allow it to adequately represent assets of non-maritime subject, as well, including the physical nature of the asset, such as wooden model or painting. The only issues that may arise when using this system to keyword assets is that a system made in the United States may not contain all of the specific words used in British English or Chinese, resulting in the use of a broader term, not the specific word needed.

APPENDIX L: SUMMATIVE TEAM ASSESSMENT

Over the course of our project, our team had little trouble functioning cohesively. This was primarily due to a relaxed and friendly work atmosphere supplemented by a willingness to think critically about our teamwork and make changes based on our observations. In this assessment, we give examples of how we were able to continuously monitor our teamwork and refine our team's work flow. We also document the strategies we employed that produced effective team outcomes, as well as ways we can further improve for future teamwork experiences.

Throughout the past two terms, we have made a habit of reflecting openly about our team's strengths and weaknesses. We have continuously identified and implemented methods for improving our work processes, along with establishing group norms and expectations. Over the course of writing our report, we continuously put great thought into the process by which we produced, compiled, and edited new content. Our initial process involved breaking the content into parts, producing content individually, and compiling it on a single computer. We soon realized that our work was inconsistent, and began developing a better writing process. By the conclusion of our project, we followed a process in which we created new content individually, switched sections for editing, compiled it on a single computer and reviewed all of it together as a team. We were also able to implement solutions to avoid unwanted scenarios, such as subscribing to a service called Grammarly after an incident in which material was not cited and paraphrased properly. Throughout the term, we have also developed and refined our team's norms and expectations. A prime example of a norm we developed was rooted in the fact that our relaxed work ethic lead to an inefficient use of time. We determined that we would rather spend extra time every night working on the project than destroying this relaxed atmosphere. As such, it became a group norm that we would spend several extra hours each day together working on our project.

Although our team characterizes itself as having a relaxed and friendly atmosphere, we resolved to retain a willingness to analyze our team in an objective and critical way. This can be seen in the way we were able to identify our presentation skills as a team weakness and focus upon improving our slideshows and devoting significantly more time to practicing our presentations as a group. We feel this has led to a vast improvement in not only our presentation quality but also in the way we learn and develop presentations. The strategy we feel contributed most to an effective project outcome was the creation of a friendly and relaxed working environment. This environment helped us throughout our project to critique each other's work in comfort and share ideas without fear of embarrassment. It also facilitated collaborative work, as we trusted in each other's ability to create quality content and make positive changes to the report. The incorporation of bits of humor and free-time into our working atmosphere significantly combated workday stress and prolonged our ability to continue working past typical hours.

We also discovered the value of tailoring each teammate's strengths towards completing our project goals. Utilizing individuals' various talents and interests allowed us to contribute to all aspects of the project while 'specializing' in a few particular aspects: for example, Rebecca was our team's resident metadata expert.

We also recognize areas of future improvement for our teamwork. Our teamwork could be improved in the future through better planning (schedules for the day) as well as developing a

method for reducing distractions and down-time. While it benefited us greatly to have a friendly and relaxed atmosphere, it often created difficulties such as meeting promptly at predetermined times and avoiding internet distractions and side conversations.

Overall, our group was able to function efficiently to meet our project goals. We learned a great deal from our experiences in Hong Kong—skills we will continue to improve and rely upon in team settings for the rest of our careers.