

DigiCULT

Digital Asset Management Systems
for the Cultural and Scientific
Heritage Sector



Thematic Issue 2

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Digital Asset Management Systems for the Cultural and Scientific Heritage Sector

Thematic Issue 2

2

Guntram Geser
Introduction and Overview

Seamus Ross
Position Paper on DAMS for the Heritage Sector

Michael Moon
How Do Cultural Artefacts Become Digital Assets?

Interview with James Stevenson
Grab the Opportunity to Increase the Visibility of the Collection

Michael Steemson
DigiCULT Experts Unravel the Hype of Digital Asset Management Technology

Interview with Guy Hellier
DAMS Make Cultural Heritage More Accessible

Norbert Kanter
DAMS versus CMS?

Guntram Geser
Case Study: Octavo - Bringing the Capabilities of Advanced Digital Media to Rare Books and Manuscripts

Guntram Geser
Case Study: Courtauld Institute of Art - Art and Architecture Project

Selected Literature

The Essen Forum Participants

DigiCULT: Project Information

Imprint



25

27

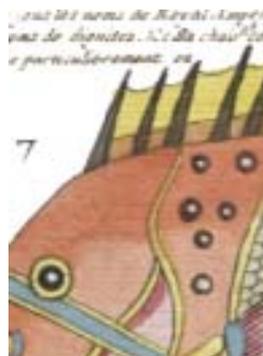
33

38

39

42

43





INTRODUCTION AND OVERVIEW

By Guntram Geser

FUNCTION AND FOCUS

DigiCULT, as a support measure within the Information Society Technologies Programme (IST), will for a period of 30 months provide a technology watch mechanism for the cultural and scientific heritage sector. Backed by a pool of over 50 experts, the project monitors, discusses and analyses the impact of new technological developments on the sector.

To promote the results and encourage early take-up of relevant technologies, DigiCULT will publish its results through a series of seven Thematic Issues, three in-depth Technology Watch Reports, as well as pushing out the e-journal DigiCULT.Info to a growing database of interested persons and organisations. All DigiCULT products available so far can be downloaded from the project Website www.digicult.info. The Website also provides the opportunity to subscribe to DigiCULT.Info, and to post interesting culture and technology events.

The Thematic Issues focus on the topics of the expert round tables organised by the DigiCULT Forum secretariat. They present and interpret the results of these workshops, and provide additional information and opinions in the form of articles, interviews, case studies, short descriptions of related projects, together with a selection of relevant literature. In comparison with the Technology Watch Reports, the Thematic Issues focus more on the organisational, policy, and economic aspects of the technologies under consideration. Ways of enhancing the adoption of new perspectives and approaches, e.g. new business models, as well as fostering co-operation between cultural heritage organisations,

industry players, researchers and other stakeholders, will certainly form a regular part of the Forum discussions and hence the Thematic Issues.

Following the DigiCULT Forums on 'Integrity and Authenticity of Digital Cultural Heritage Objects' (Barcelona, May 2002) and 'Digital Asset Management Systems' (Essen, September 2002), the next Forums will focus on 'XML: Towards an Interoperable Semantic Web for Heritage Resources' (Darmstadt, January 2003) and 'Learning Objects' (Amsterdam, June 2003). For updates, please consult www.digicult.info.

TOPIC AND CHALLENGE

This second Thematic Issue concentrates on the question of how cultural and scientific heritage organisations could enhance their mission-related activities by using a new breed of technologies called Digital Asset Management Systems. A DAMS, in short, is a set of coordinated technologies that allow the quick and efficient storage, retrieval, and reuse of digital files that are essential to an organisation. It provides the rules and processes needed to acquire, store, index, secure, search, export, transform and make accessible these assets (or derivatives of them) as well as their descriptive information.

In particular, what merits highlighting is the fact that a DAMS can increase enormously the value of digital assets by managing the metadata about the assets. It is the metadata that make them useful (and re-useful) to the organisation, by indicating, for example: Who created it? When? In what format? Are there other versions of it? What rights do we

have to this asset? For what purposes has it been used before in the organisation or by partners? These metadata are essential to heritage organisations whose functions are to collect, archive, preserve, and provide access to their collections for scholarly and educational communities.

Yet, today DAMS are not widely used in the heritage sector. One major area where they are beginning to bloom is that of larger-scale digitisation projects, like the Art and Architecture project at the Courtauld Institute of Art, described in this issue. Why DAMS enter the sector through this door, Czeslaw Jan Grycz, CEO and Publisher of Octavo, explained in an e-mail exchange with a fine metaphor: 'I've often admired the lowly sea urchin, in the sense that I see in its spiny structure a metaphor for the field in which I find myself. Any individual aspect of digital preservation (think of an individual spine of the sea urchin) seems able to be pursued in quite specialised detail. Ultimately, however, all the various subject areas (optics, scanning arrays, procedures, colour management, publishing, selection, conservation, file naming conventions, creation of derivatives, formats, standards, etc.) come down to a single point. Combined, all the subjects form the organism.'

The challenge for the many heritage organisations that today start digitising collections is really to form this 'organism', with highly efficient management systems which, in particular, also enable them to provide enhanced access to scholars and learners and to develop new marketing tools and revenue generators (e.g. through new products or licensing).

OVERVIEW

Seamus Ross from HATII, University of Glasgow, in his position paper highlights that in recent years an increasing amount of funding has been made available for digitisation projects; yet, due to current practices, only rarely have these projects led to renewable resources. He describes the main advantages DAMS provide, but also points to necessary prerequisites like budget, skills and technical infrastructure, and organisational 'buy-in'.

Michael Moon, President of Gistics Inc., who has carried out in-depth analysis of the DAMS market, gives a primer and examples of how heritage organisations could profit from adopting strategies that define successful eBusiness companies. These strategies, enabled by DAMS, include, for example, work-

flow automation, enhancing self-service satisfaction, and instant delivery of services and products. In particular, he highlights the fact that in the networked environment companies as well as heritage organisations need to become proficient e-publishers.

Two interviews, carried out by journalist Joost van Kasteren, illustrate the advantages of DAMS as seen from the perspective of an image collection of a major museum, James Stevenson from the Victoria and Albert Museum, and from a leading DAMS vendor, Guy Hellier from Artesia Technologies.

Michael Steemson from Caldeson Consultancy, New Zealand, who assists DigiCULT as scientific consultant, summarises the results of the Essen Forum. At the Forum, Mr Moon gave an introductory presentation of his view and key research findings about DAMS. The resultant discussion provides on the one hand an elaboration of issues Mr Moon could only hint at in his article. On the other hand, it shows where experts from the heritage institution's and vendor's side saw aspects in need of further discussion. These include, for example, issues of workflow re-design in institutions, or, even more intriguing, why not stick to the collection management system already in place?

To stimulate further discussion about the latter issue, we invited Norbert Kanter from zetcom AG, Berlin, to provide us with his view on 'DAMS versus CMS?'

Two case studies provide insight into the practical side of using DAMS to build high-quality digital resources for scholars, students, and lifelong learners:

The case study on Octavo describes how this innovative e-publishing and technology service company brings the capabilities of advanced digital media to rare and precious books and manuscripts. Besides the considerable background information we received, we in particular want to thank Octavo for the marvellous images they provided us with. They allow us to convey, in this Thematic Issue, an impression of the richness and artistic nature of the drawings and printings in the history of science.

The Art and Architecture project of the Courtauld Institute of Art, which is at present in month eleven of an initial two-year phase, provides an illustrative case of how a DAMS is supportive in building the central repository of a larger-scale digitisation project. Giles O'Bryen, Project Director of Art and Architecture, kindly provided us with the in-depth knowledge necessary to describe working steps such as schema development and cataloguing. The case study also includes a brief summary of what the project team has learnt so far about the benefits and challenges of using a DAM system.



POSITION PAPER ON DAMS FOR THE HERITAGE SECTOR

By Seamus Ross

INTRODUCTION

Institutions – from archives, libraries and museums to natural and environmental heritage bodies – are continually seeking new ways to expand their provision of services. The development of an infrastructure capable of handling dissemination and access to content in digital form has enabled the creation of a new platform to support the provision of content and services constructed to exploit and facilitate the use of that content. Over the past decade an increasing amount of funding has been

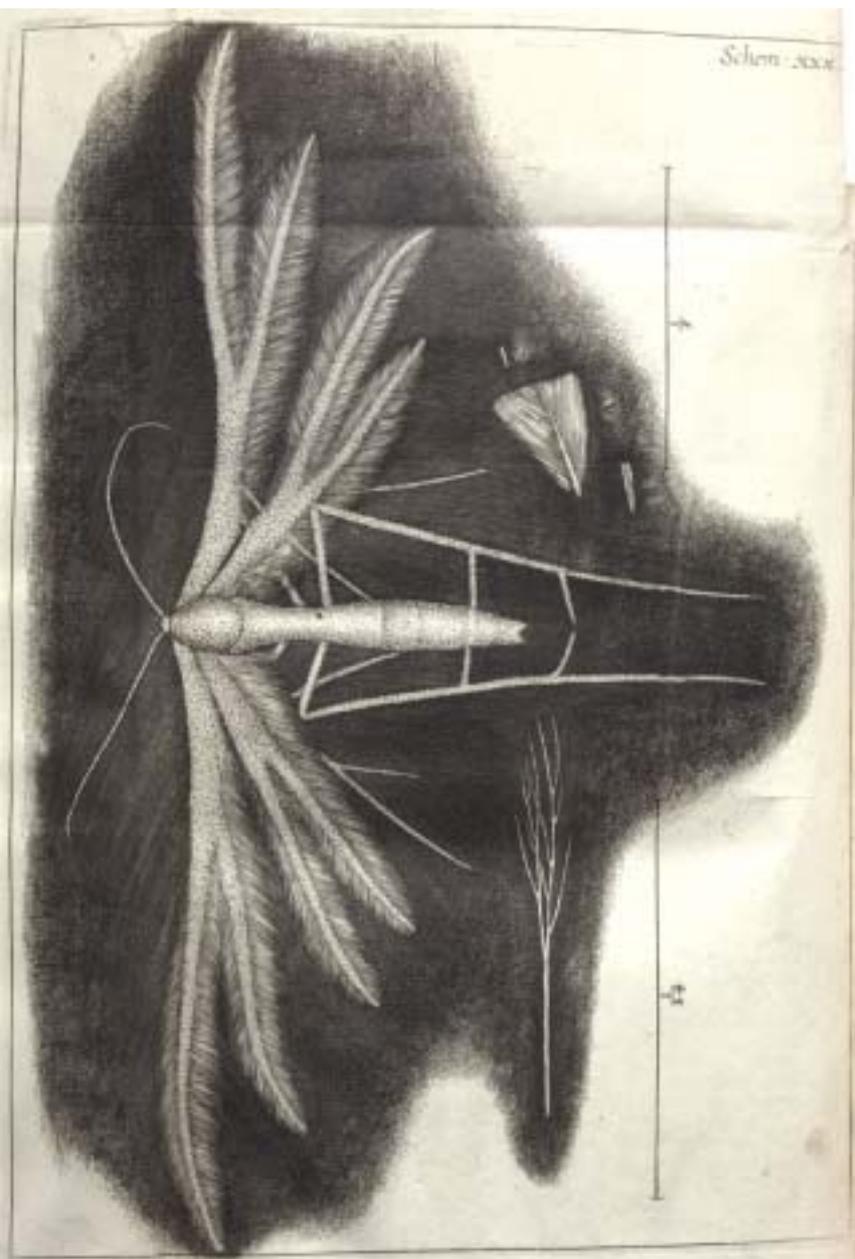
available at all levels, from revenue funding within institutions to grants from national and international funding bodies and charities, to support the creation of digital representations of analogue holdings such as paintings, prints, documents, photographs and audio recordings. Much of this work has proceeded as discrete institutional projects that have delivered their results as standalone Web pages or on CD-ROM. Rarely do heritage institutions have the technological infrastructure or the skills to manage these digital products as renewable resources. There is widespread recognition that current practices do not provide the most effective and powerful ways of managing and providing access to digital materials.

DEFINING DAMS

Digital assets have the very unique characteristic of being both product and asset. Some digital assets exist only in digital form while others are created through the digitisation of analogue materials such as text, still images, video and audio. Content has the same value to institutions as other assets such as facilities, products and know-how. Just as an organisation seeks to make efficient and effective use of its financial, human and natural resources, it will now wish to use its digital assets to their full potential without reducing their value.

Digital Asset Management Systems (DAMS) provide mechanisms to enable institutions to manage their digital resources. When associated with suitable policies, procedures and licensing arrangements, DAMS provide institutions with a way to facilitate the exploitation of their digital assets without depleting the value of the asset itself.

At a basic level Digital Asset Management systems use technology, such as commercial-off-the-shelf database management tools, to manage resources in ways that enable users to discover them and owners to track them. This may consist of either media catalogues with pointers to where the assets are stored or asset repositories, or a combination of both. These can be made accessible for use only in-house by staff in the content originating organisation, for restricted



use by others, or made more widely available to specific communities or the public through online access. Digital Asset Management involves the creation of a digital archive to hold resources, the provision of an infrastructure that will help to keep the entities from becoming obsolete, and a range of discovery and browsing tools to enable potential users to be able to identify, locate and retrieve the digital entities held by the DAMS

A DAMS can serve a range of functions including:

- providing support for content acquisition of born digital entities, and digitised materials such as text, still images, audio and video, and its cataloguing, management and storage can be enhanced through the use of DAMS;
- mechanisms to manage metadata associated with digital entities;
- a foundation for services to manage the delivery of digital content;
- the foundation for the storing, managing and migrating of digital entities across time. They provide the basic building blocks for long-term digital preservation systems.

Generally, when we think of a DAMS we consider it as managing the entire process from acquisition (ingest) of a digital entity through its retrieval, delivery and use to its long-term archiving. Commercial off-the-shelf DAMS such as Artesia's Teams, Blue Order (TechMath), Bulldog, eMotion, IBM Content Manager, Informix Media 360, or Oracle's Content Management System support these functions, although not all with the same degree of sophistication. For example, some DAMS are better able to handle time-based media (e.g. audio and moving image material) than others. Off-the-shelf packages, although often expensive, represent a lower risk for most organisations than writing software from scratch. In addition, they benefit from having other users and a support network. Most DAMS applications remain outside the financial resources of all but the largest of the heritage institutions. It is feasible to decompose the functionalities that DAMS support and to develop bespoke applications either completely from scratch or by integrating software products. These approaches tend to be higher risk.

DAMS provide facilities to manage digital assets from creation to publication and archiving. Systems can automatically take the data output by the digitising process (or ingested from another system), assign the entity a virtual space, and set management access, security and management attributes based on the metadata that the creator assigns to the entity; put simply, it can store a digital entity and its metadata in a database.

DAMS IN THE CULTURAL HERITAGE SECTOR:



DAMS bring many advantages for heritage institutions.

For example, they:

- support the centralisation of discovery and access;
- provide mechanisms to enable institutions to create coherent services from disparate projects;
- enable mechanisms for tracking the authenticity and integrity of digital entities;
- give organisations the ability to implement effective and easily manageable authorisation, security and tracking systems;
- support the implementation of organisation-wide mechanisms for managing intellectual property rights;
- can generate savings by reducing the duplication of effort and resources;
- produce time savings for the creators and users through organisational structure and centralisation of digital resources;
- enable institutions to put in place asset browsing and querying tools;
- provide organisations with the tools to monitor the types of entities they hold, how users discover and select entities, and what types or specific entities attract the most attention from users.

Introducing DAMS into the heritage sector is a crucial step if we are to ensure that we are creating renewable resources. One major area with which heritage institutions require assistance is with the difficulties associated with tracking use and managing rights. Any digital asset is only of value to an institution if the institution can manage the asset throughout its entire life-cycle – from creation through its multiple uses. For this reason, discussions of DAMS place great emphasis on the support they can offer in the area of rights management including assertion, protection and management. Protection comes in various forms, from managing access to the digital repository, to tracking users, controlling what versions of material users can access, and ensuring that IPR metadata are linked to the entity when it is delivered to the user. Of course, DAMS must be used in conjunction with licensing arrangements, entity and user authentication technologies, and digital asset tracking services. The problem facing heritage institutions in this regard is that, once they provide access to a digital asset, they have great difficulty monitoring its use and that it is only used by the licensee and for the purposes licensed. Individually, few heritage institutions have the financial or legal resources

to pursue those who misuse their digital assets.

The management of the large volume of material likely to be held in a DAMS and its long-term preservation depends upon a storage management system capable of moving media entities between online disk, near-line tape and offline tape, as required. But an organisation's ability to harvest, reuse and realise the value of its assets will only ever be as good as the mechanisms that it can put in place for storing and retrieving assets from the media vault. The DAMS must be able to handle a diversity of media types (e.g. structured documents, still images, moving images, audio, virtual reality objects, applications).

The current generation of DAMS is usually optimised for particular classes of digital entities and tends to fare less well at handling other classes.

There appear to be many difficulties when implementing the current generation of DAMS for use in heritage sector institutions. These include their generic nature, high cost, the complex technical infrastructure that an institution must have if it is to run a DAMS, their proprietary nature, and the difficulties of ensuring organisational 'buy-in' once a DAMS is introduced. Organisations need to assess both their need for DAMS and the impact that it could have on the way their organisation uses its information assets.

If you are thinking about introducing a DAMS, you might wish to ask the following questions before embarking on the investment:

- What new opportunities do you intend that a DAMS will enable your institution to create? How will you measure whether or not it has enabled your institution to achieve that objective?
 - What functions of DAMS are particularly well suited to the needs of your institution?
 - How will you ensure institutional buy-in to DAMS technology?
 - Have you established the cost-benefit ratio?
 - What procedures will you use to select, from the various DAMS technologies on the market, the one that best fits your institution's requirements? How will you document this process?
 - Different types of heritage institutions have different types of digital assets, different profiles of users and variable metadata requirements. Have you established that the target DAMS is optimised for the data types which your organisation handles, that it supports adequate user profiling, and that the metadata categories supported are adequate?
 - What impact do you anticipate the introduction of a DAMS will have on organisational thinking about, and use of, digital content?
 - If as a small or medium-sized heritage institution you find many DAMS are outside the financial range of your institution, what would the implications be of collaborating with other institutions to share a DAMS?
 - What obstacles do you anticipate encountering when you attempt to introduce DAMS technology, and how will you overcome these?
 - What metadata are required to support your institution's application of DAMS technology? How will the metadata be acquired and implemented?
 - DAMS are based on a combination of technologies and methods, including software applications and policies and procedures. Have you identified those elements that are software-based and those that are policies and procedures?
 - Have you established plans to develop, test, disseminate and validate the application of these policies and procedures?
 - Will a DAMS allow you to recognise the economic, educational or intellectual value of digital assets that have hitherto been overlooked?
 - Will a DAMS allow your institution to exploit the economic value of its digital content?
 - What risks to your institution's digital content are posed by the use of DAMS?
 - How will you integrate DAMS technology with your existing systems (e.g. digitisation systems)?
 - For most heritage institutions, protecting IPR is not possible and the assumption that a DAMS can help them to address this problem is erroneous. What are the IPR implications of establishing a DAMS for your institution?
 - As most DAMS are constructed from proprietary applications or code, they do necessarily provide institutions with an infrastructure that enables the long-term preservation of their digital assets. How will your organisation address the problem of long-term preservation?
- These questions should enable you to profile your institution's need for and likely benefit from DAMS technology. A key starting point is requirements analysis. Before embarking on any development effort it is essential that you define your requirements precisely so that you can determine whether or not (or how) the available technologies will meet your needs.

HOW DO CULTURAL ARTEFACTS BECOME DIGITAL ASSETS?

By Michael Moon,
President,
Gistics Inc., Emeryville,
California, USA

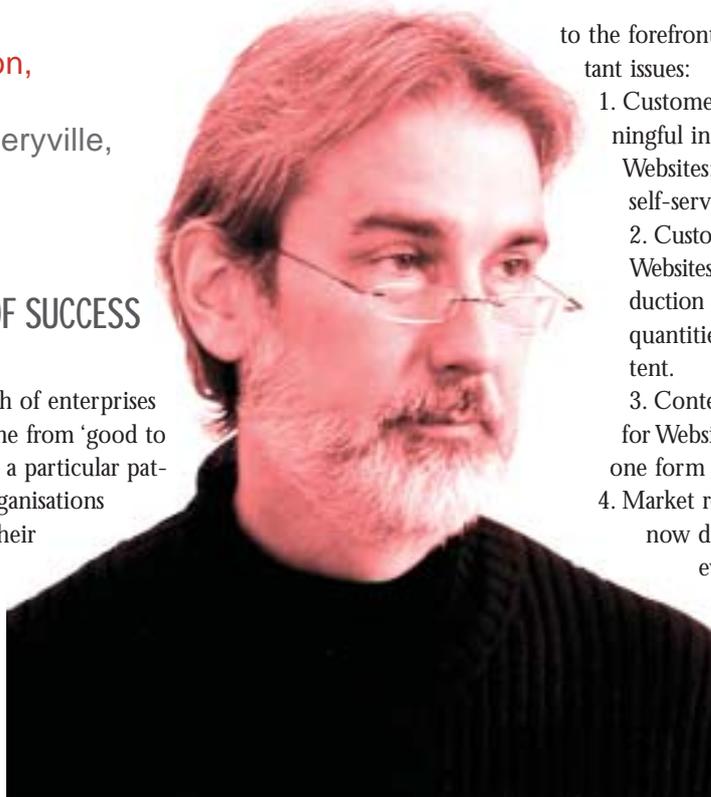
PATTERN OF SUCCESS

Recent research of enterprises that have gone from 'good to great' reveals a particular pattern of success. The organisations that continue to lead their industry in consistent growth of revenue, profit and share price tend to do only one or two things, with consistent brilliance and mastery. Mediocre firms, on the other hand, try to do many things, and none of them well.

Great firms deploy technology using the same pattern for success. They deploy only a handful of new technologies with one purpose in mind: how can this new system or tool help us find and satisfy customers, using profit as a measure of how well they have served a growing base of loyal customers. Great firms saw the Internet as an opportunity to do the same one or two things brilliantly, only faster and as a way to give their customers self-service satisfaction 24 hours a day. Mediocre firms used the Internet to experiment with new business models, commerce mechanisms, and new unproven technologies — the source of 'dot bomb'. The only New Economy firms that succeeded followed the pattern of success of the great firms of the old economy: Do one or two things well that truly satisfy customers (Amazon, eBay, E*Trade, Yahoo).

A survey of business practices today reveals that eBusiness has become business as usual; large and small firms have Websites and a growing portfolio of interactive services that support their basic mission (finding and serving customers).

The eBusiness part of doing business has brought



to the forefront several important issues:

1. Customers expect meaningful interactions at Websites; they expect self-service satisfaction.
2. Customer-oriented Websites require the production of tremendous quantities of new content.
3. Content production for Websites represents one form of publishing.
4. Market requirements now demand that every firm become a proficient publisher.
5. Workflow automation of publishing reduces cost and cycle time.

Many firms now recognise the need to automate their internal publishing workflows. This means deploying new technologies. These firms follow in the footsteps of media, entertainment, publishing and advertising firms that pioneered digital workflows in the late 1980s and early 1990s.

WORKFLOW AUTOMATION

My firm has studied digital media production and the automation of publishing workflows since 1991. Over this period we have witnessed the dramatic emergence of what we call enterprise publishing. Once relegated to the creative services or documentation department, customer demand for Web content and the soaring costs of doing eBusiness have made enterprise publishing a strategic issue for senior management. Executives from major firms worldwide want to know how they can leverage the Internet, doing the one or two things that they already do well even better (as measured by faster response mechanisms and lower costs in serving a customer).

In 1993 our research of digital media production uncovered a technology that would later frame a

crucial challenge in the exploitation of the Internet: the capability for reusing pre-existing media, text and other digital files. We uncovered case after case of firms that use multimedia databases to store and retrieve reusable media and text.

In their development of the 777 aeroplane, Boeing used a multimedia database of technical diagrams used in documentation to save 1400 engineering hours and over one million dollars in related expenses. In another instance, a small multimedia CD-ROM publisher convinced Disney to invest \$8 million dollars for 10 per cent of the firm (giving that small firm an \$80 million valuation – five full years before the wild valuation of the dot.com era). This small Wisconsin multimedia developer showed Disney how a database of 30,000 reusable media assets saved 13 weeks and \$70,000 in direct cost for the Lion King CD-ROM, and could do the same for other Disney titles.

In 1995 Apple Computer commissioned our firm to publish a series of white papers on best practice for digital media production. This included the seminal white paper on media asset management, soon thereafter renamed digital asset management.

faction) while still reducing the cost of content production for Websites?

Digital asset management consists of three basic functions: 1) a searchable repository of reusable media, text and other digital files; 2) automation of enterprise publishing workflows; 3) delivery of personalised or self-service satisfaction to any authorised user.

The functions combine to accelerate the process cycle time of a firm. This means that a firm can bring a product or service more quickly to market, especially across multiple geographies or languages.

It means that a firm can reduce the cost of serving customers, giving them ways to answer their own questions, or ask better or more informed questions of the right people. It also means that a firm can bring new 'digital products' (constructed from digital components or assets) to individual customers and charge them an appropriate price.

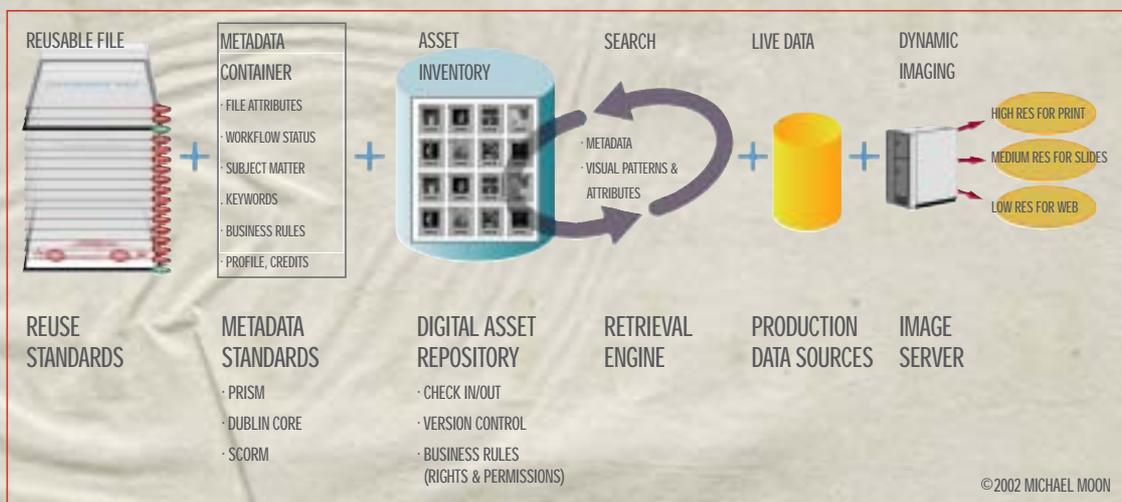
In short, digital asset management fuels the engines of commerce, the traditional offline and newer online parts of a firm. DAM enables great firms to use the Internet to do the same one or two things brilliantly, only faster, cheaper and better. DAM supports the automation of enterprise publishing and the codification of best practice for digital media production.

DIGITAL ASSET MANAGEMENT

What is digital asset management, or DAM for short? And how can cultural heritage institutions use DAM to better serve their stakeholders (the delivery of self-service satis-

HOW DAM AUTOMATES THE DELIVERY OF IMAGES TO AUTHORISED USERS

The figure below depicts the delivery of personalised or self-service satisfaction to a user of a DAM-enabled workflow.



HOW DAM HELPS A CULTURAL HERITAGE INSTITUTION

We start with reusable files, following a set of reuse standards. Many firms already have informal reuse standards. In the particular instance above, a reuse standard would specify where to place text or images in a multilayer illustration or digital photo file. Of course, an institution will possess tens of thousands or more physical artefacts in need of digitisation, and a sizeable number of undocumented digital files produced over the past 15 or so years that may or may not have a reuse value. In most cases, curators will need to determine the value of cataloguing these files, and place them into a DAM system.

The DAM system uses a detailed description of each asset to facilitate tracking and speedy retrieval. International committees have developed a number of standardised descriptions or 'metadata'; a good DAM system will incorporate them. Most DAM systems will ingest hundreds or thousands of files per hour, capturing a lot of descriptive metadata. This includes static images, engineering drawings and compound documents (with text, fonts, images, graphics), as well as video, animation, sound, voice and music.

The digital asset repository works like a library: patrons can check an asset. However, a repository also keeps track of any changes that the user may have made to an asset as well as applying a set of predetermined rights and permissions to a particular asset. This might include the need to sign a clearance contract or pay a royalty — more business rules.

DAM systems and Websites share a dirty little secret: If a user cannot find a desired object or page, two things happen. First, the user goes away empty-handed (and less inclined to come back). Second, the user spent precious time on unproductive work (for which somebody always pays). For these reasons, a robust and multi-mode search function remains critical for DAM and Websites. In the spirit of killing two or more birds with one stone, many firms now integrate the more robust, accurate and faster search function of their DAM system into their public Websites and corporate portals.

At the request of an individual user, the DAM system would locate the appropriate asset and extract the required layers of data that the Image Server (far right in the figure above) will transform into a high-, medium- or low-resolution image. The Image Server can also perform another piece of automated workflow magic: It can grab live production data from an accounting system, customer database, or another data source, and instantly stitch it into the graphic, image, photo or document.

Dynamic insertion of live data into a graphic, photo or illustration as a DAM system delivers it to an individual user has many profound and wide-ranging implications for commercial enterprises and cultural heritage institutions. The instant delivery of customised or personalised images to users of any Website around the world transforms a cultural artefact into a digital asset. An institution could connect its asset repository to a network of image centres in key metropolitan centres around the world. In effect, this would enable an institution to deliver a number of digital services to authorised end-users while maintaining full, centralised control of their digital assets.

Let's take a concrete example. The Vatican has almost two millennia of cultural artefacts that it wants to share with appropriate users. It might make some of its material available to any legitimate user simply for the asking. In effect, it does that already when it posts JPEGs and GIFs on its Website. Anyone can grab any image from a Web page. Nonetheless, it spends a lot of time in responding to requests from tens (if not hundreds) of thousands of people a year. This includes scholars from universities and seminaries, publi-



shers of books and magazines, producers of motion picture and television programmes, authors of journals and papers, members of the Church, and developers of Websites and CD-ROMs. Some of these potential users know precisely what they want, referencing an image from a book or other published material. Others have a general idea of what they want. Others have little or no idea, and need to browse large collections. Some users want to find a cultural artefact that expresses a particular abstraction or idea (love, authority, exultation). Others want to examine every image or drawing of a particular historical personage. Still others seek examples of a specific architecture or ornamental detail. Some users will pay handsomely for the perfect image. A corporate sponsor of an exhibition would gladly donate a

considerable sum for broader (though not unlimited) access to a large collection of digital artefacts, enabling their marketing teams to pick and choose items for promotional uses. A large publisher of books and related commercial art would pay a small annual subscription to access a digital archive and license individual items as the need arose.

The Church might provision local dioceses to offer limited seasonal access to sacred artefacts, giving individual parishioners the opportunity to create, download and print (at authorised imaging centres) personalised posters, calendars, postcards, etc. – at no cost or as a ‘thank you’ for donations of a certain level. Finally, the Church could provide a library of low-resolution

thumbnails that each of its local affiliates could post on their Websites with dynamic hyperlinks back to the licensing and dynamic imaging capability of the Church’s DAM system.

AUTOMATING CROSS-MEDIA PUBLISHING WORKFLOWS

DAM can also help institutions automate their internal, cross-media publishing workflows. This means that, with little extra effort, mostly planning, an institution can produce a magazine, newsletter, direct mailer, catalogue, Web page, poster, proposal, and presentation slide from the same set of digital assets.

Let’s use one example among dozens of what we call activity-task automation cells – the basic units of a workflow. Provided with a personal computer, software and network access, a Web content specialist will spend 15 minutes to complete one activity, performing the following tasks: logon to a corporate network, search for a digital image, retrieve several potentially useful files, open and inspect each one, edit the most useful one, save the changes, export or render the image to a specific format and size, place the image in a Web server, and verify if it looks okay when served from a Website.

A DAM system with a dynamic imaging system performs the same task, but in only 15 seconds. Typically, a Web content specialist working full-time will prepare and place an average of 24 graphics or images per day, 450 per month, or around 5,000 annually. What do you do with the 14-minute, 45-second time savings? How about producing 5,700 images in the span of 24 hours? Not only will this compress one year of labour into 24 hours; once placed on the Website, each image remains linked to the original asset. This means that any authorised user can pan, zoom, inspect, crop and download high-, medium- or low-resolution renditions, some paid for and others at no cost, 24 hours a day. In this way, DAM can extend a publishing workflow and set of automated activity tasks to any stakeholder: scholars, public officials, citizens, corporate sponsors, students, and any employee of the institution.

DAM provides a way to unlock the value of cultural artefacts without compromising their security, integrity, usability or accessibility. And, yes, in the course of all that, an institution can reduce its costs, become more efficient in the one or two things it does brilliantly, and expand the number of stakeholders it can serve.

Michael Moon, *GISTICS Incorporated*, www.gistics.com



reasonable access to sacred artefacts, giving individual parishioners the opportunity to create, download and print (at authorised imaging centres) personalised posters, calendars, postcards, etc. – at no cost or as a ‘thank you’ for donations of a certain level. Finally, the Church could provide a library of low-resolution

GRAB THE OPPORTUNITY TO INCREASE THE VISIBILITY OF THE COLLECTION

An Interview with James Stevenson, Victoria and Albert Museum London, United Kingdom

by
Joost van Kasteren

If we don't jump on the bandwagon as museums, we are going to miss a great opportunity to increase the visibility of our collections and ourselves as organisations. And that is going to cost us, both in terms of audience and, in the long run, in terms of money.' There is no need to convince James Stevenson, photographic manager of the Victoria and Albert Museum, of the benefits of a digital asset management system. With a small staff, he is responsible for expanding and maintaining the impressive image collection of the Victoria and Albert Museum for applied and decorative arts. The museum holds 4 million objects ranging from household objects like vacuum cleaners to a very fine collection of European, Asian and Islamic art. It even has a collection of comic book covers.

The V&A's picture collection started in 1856, the year the Museum was established, and now contains 1.5 million analogue and 50,000 digital pictures, made since 1995. The digital pictures are stored on 800 CDs in Stevenson's office. The analogue pictures are, according to Stevenson, 'slowly digitised' on a needs basis. When people need a picture digitised for a catalogue or for the Website, the digital picture is stored on CD.

A DAMS would be very helpful, if only from an administrative point of view. Stevenson: 'At the moment all requests for digital pictures go by way of my desk. I will praise the day when people themselves can get access to a repository that contains our digital images and digitised photographs. Reduction of workload and an increase in efficiency would in itself justify implementing a DAMS.'

But that is only part of the story he has to tell. Stevenson: 'More importantly, especially in the light of our public task, a DAMS would be instrumental in increasing our audience. At the moment we attract about two million visitors per year and the numbers are growing. By making our collection available on the Internet we could increase that number enor-

mously because it would be accessible worldwide. When I was in China last year, I noticed there was an enormous hunger for information on art and design. At the moment we have 2,000 pictures on our Website. With a DAMS we could easily publish 20,000 or 50,000 or eventually one and a half million pictures on the site.'

Some people consider a DAMS to be a type of collection management system. These were introduced in the early nineties and lots of museums now have one, including the V&A. Stevenson: 'There is a fundamental difference in the sense that a collection management system is purely focussed on the collection itself, the objects in the Museum. None of our pictures, from books in the National Art Library in the museum, or those pictures of the buildings and its activities, is included in our collection management system. But that is thirty per cent of our assets. Not only that, it is also the thirty per cent that is very important in shaping the image of the museum.'

The advantages of digital asset management are not only measured by numbers, be it visitors or pictures. Stevenson: 'It is also important that our customers get the pictures in the format they want. They are used internally for promotion of exhibitions and for accompanying catalogues. But also for presentations and for our educational worksheets. These worksheets are developed for use in schools, and also for adult education. Then, we sell pictures both to the general public and to companies, who use it for promotion, but also as a source of inspiration for product development and design. We have about a hundred licensees who actually make use of designs

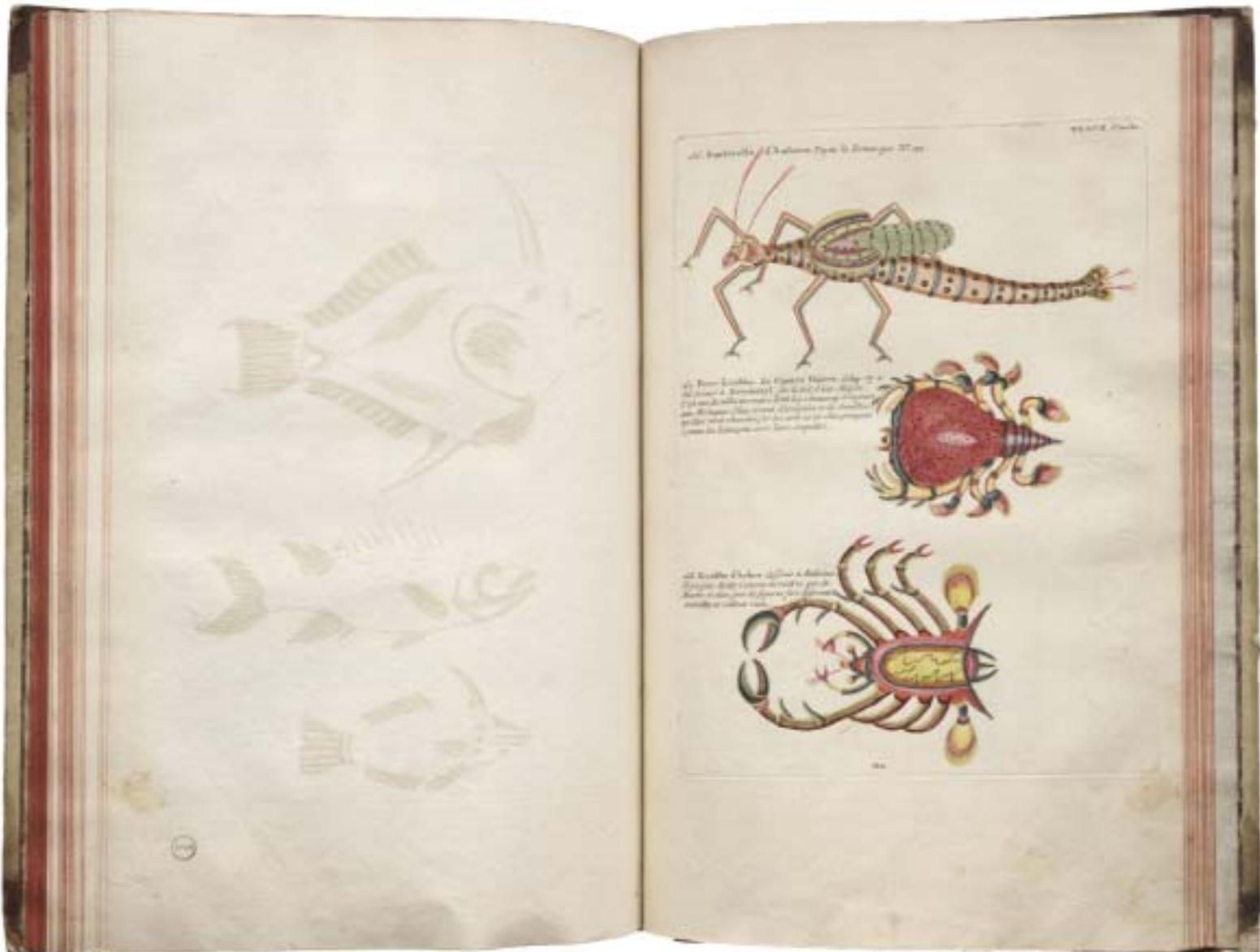


and patterns, for instance for printing textiles like bed linen and curtains. Sometimes even the furniture in our collection. For example, a chair from the famous Scottish designer Rennie Macintosh has been used for designing a new chair. A DAMS would help enormously in producing the right rendering for our users. At the same time it would help us in managing our rights.'

Although there seem to be a lot of advantages, museums are still hesitant when it comes down to procuring a DAMS. Partly because the director or senior curator is difficult to convince, says Stevenson. 'He or she is often not aware of the possibilities and tends to view a DAMS as yet another collection management system, as I mentioned before.' Apart

from lack of awareness there is also the problem of finance. Stevenson: 'A lot of museums have difficulties in making ends meet. Extra income from sponsors, for instance, is often linked to a certain collection or exhibition; you cannot use it for infrastructure. The budget itself often does not have room for this type of investment as it is in most museums determined on a yearly basis.'

Still, Stevenson thinks it is important to develop a management system for digital assets. 'It does not have to be a fully-fledged, all-in-one system, but we have to get started. It is too important to let it get stuck in between a rock and a hard place, i.e. the need for further development and the lack of funds.'



DIGICULT EXPERTS UNRAVEL THE HYPE OF DIGITAL ASSET MANAGEMENT TECHNOLOGY

By Michael Steemson

A cultural heritage organisation's ability to harvest, re-use and realise the value of its assets, the DigiCULT background paper postulated, 'will only ever be as good as the mechanisms that it can put in place for storing and retrieving assets from the media vault'.

Meeting that challenge was the task a dozen European experts set for themselves at the DigiCULT Forum in the modern north-west German city of Essen. They work at some of the largest



cultural institutions in Europe with huge assets. Some have digitised images of hundreds of thousands of these assets. The problem: How to exploit them?

Should they take a lesson from one-time Cockney costermonger, Sir Jack Cohen, who founded Britain's top Tesco supermarkets on his 1950s barrow-boy philosophy?: 'Pile it high, sell it cheap!' Should they, perhaps, take a tip from US oil baron J. Paul Getty's oft-quoted serendipity for success?: 'Rise early, work hard, strike oil.' Or, seriously now, could they find the Euro lodestone with the new millennium's Digital Asset Management Systems (DAMS) technology?

This seemed to provide the answer, and the Essen Twelve - scholars, museologists, engineers and technicians - met in a round-table workshop during the September 2002 European AIIM Conference to dissect the problem with one among them, the man who coined the term almost a decade ago, Michael Moon, President and Chief Executive of his Californian Silicon Valley research consultancy, Gistics Incorporated.

They were far from unanimous in their appreciation of the technology. One said positively: 'If we don't jump on the bandwagon, we are going to miss a great opportunity.' But, further round the table, another thought: 'When it comes to the curators, I am critical of a DAMS.' Next to him, another museum man anguished: 'Prices of DAMS I have seen are unaffordable.' Mr Moon had quite some convincing to do.

DEFINING THE SCOPE

Digits with commercial value

'The term digital assets implies that digital files have commercial value - that another party will pay to own or use them. These assets also have value as process agents that reduce process cycle times and external purchases while ultimately increasing revenue and profit per employee.'

Digital Asset Management Market Report 2002 brochure, Gistics Inc., Emeryville, CA. 2002
URL: www.gistics.com/

The forum was the second in a series of seven planned over two and a half years by DigiCULT, the European Union's technology watchdog for the cultural and scientific heritage sector.

The first forum, consisting of another nine Northern Hemisphere experts and held four months earlier in Barcelona, considered the *Integrity and Authenticity of*

Digital Cultural Heritage Objects. These experts thought much more needed to be done before the problems they had been set could be resolved.

In autumnal Essen, however, the subject of debate was more strategic. Moderator Michael Moon, scholarly in half-moon glasses, opened the debate with a key presentation defining the scope of the discussions.

He recalled finding the progenitor of DAMS - a small multimedia product by a company called Aldus that was subsequently bought by Adobe, he thought. 'We found that users were getting extraordinary productivity gains as a function of reusing media components', he told the forum. 'One particular project, on the Boeing 777, documented 1,470 engineering hours saved by being able to find and reuse pre-existing drawings for documentation.'

Mr Moon and his firm, publishers of executive best practice papers on the rapid deployment of technology, were gripped. As a user and student of technology, he said: 'I tend to have a very practical focus: What's in it for me, what kind of economic returns do we get for this?' Now he saw digital asset management at the core of companies' processes to 'find and serve customers and ultimately set up self-service satisfaction'.

THE 18-MONTH RULE

Next, a little lesson in bookkeeping practice: How to define an asset. Apply commonly held accountancy rules, said Mr Moon: 'Things that have real value meet the general accounting practice for what constitutes an asset ... this object has reuse for greater than eighteen months. If you can show reuse greater than eighteen months you can link the object to its development costs and re-express it as a revenue event, a sale, or a discrete cost saving.'

A question came from bearded James Stevenson, Manager of the Photographic Department at London's vast Victoria and Albert Museum. He doubted that the 18-months rule applied to cultural heritage institutions 'because we can go back 150 years and reuse things with a valued use for today'.

True, said Moderator Moon. There was obviously a gulf between commercial and heritage enterprise since any object that came into an institution became an artefact. He went on: 'It nonetheless has economic value and, while it may not necessarily be reflected in the balance sheets of the institution, the principle of unlocking value remains the same. Ultimately, it is about increasing sponsorship, licensing revenues, product sales and other sorts of academics that help in healthy revenue support.'

WHAT'S A DIGITAL ASSET?

So, that's an asset. Now, what digital assets do cultural heritage institutions have? Mainly, said Mr Moon:

- media assets such as photographs;
- editorial assets - text, in other words, and
- information assets in catalogue and marketing material, mailing lists and development of education curricula and learning objects.

What about knowledge assets?, asked Mr Yannis Ioannidis, professor in the Department of Informatics and Telecommunications at the University of Athens. Shouldn't they be among the main items, too?

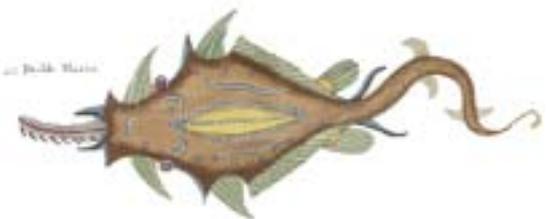
More difficult, said Mr Moon. One could make a case for capitalising knowledge assets, but it involved 'a particularly onerous, difficult and painful process called "activity based" accounting'. Most organisations were 'nowhere near that as an approach or discipline'.

Digital assets largely comprised metadata derived from capture and creation tools, business rights, commissions, accounting data, purchase and licence details, modification and use indicators. Mr Moon described an 'extraordinary' XML-based metadata standard platform from Adobe called XMP (eXtensible Metadata Platform) that stored metadata in the digital file header, allowing the transfer of file and metadata together from one user system to another. It had an 'aliasing' function allowing incompatible metadata fields to be synchronised between standards. He enthused: 'And as someone from the IT world will know, synchronisation of metadata is the rat-hole of the universe.'

Metadata to increase utility

'Metadata are becoming increasingly important in all types of publishing. Documents containing metadata can greatly increase the utility of managed assets in collaborative production workflows.'

Adobe Systems Inc., San Jose, California
www.adobe.com/products/xmp/



Within a digital asset could be many versions of an original 'digital master'. From a digitised picture would come renditions in low, medium and high resolution. Illustrators would use these in page designing, the medium resolution for placing and editing an image, the high resolution for printing, and the low resolution for the Web. Similarly, text versions could include documents in differing languages or a variety of wording, providing a file with multiple layers for automatic or dynamic renditions on Web displays or just-in-time print functions.

PICASSO AND MATISSE: AN EXAMPLE



How would cultural institutions use this? Mr Moon specified exhibition promotions, corporate sponsorship and sales. As an example, he went on: 'I was just at the Tate Modern in London: an exquisite, unbelievable exhibition of Picasso and Matisse. I saw the dialogue between Picasso and Matisse over a 30-year period. They didn't talk, they painted, and they would send each other paintings. You could see how each affected the other in profound and really startling ways, ways you cannot really appreciate until you see the paintings side by side.'

He said that a DAM system would allow the Tate Modern to print posters rendered dynamically. 'So I could simply go down into the gallery kiosk and say "give me one of those". It could be a straight print-out or it could be turned into a poster with the Tate Modern logo or maybe with a picture of yourself superimposed over a little corner.' The Web offered similar dynamic sales possibilities to individuals or authorised re-sellers with no need for huge stock inventories or physical logistical problems.

Some DAMS contained visual search technology, good for users who did not understand Boolean and search argument and for video or DVD searches. Workflow interfaces met the specific requirements of system managers, media creators and editors and, finally, the consumers.

Keep in mind 1.: Mr Moon reminded the experts that, at some time in the future, institutions may wish to outsource some of the DAMS capability such as meta-tagging, digitisation or dynamic image rendering. DAMS technical infrastructure should allow these and other possible process changes.

Keep in mind 2.: 'The biggest, most difficult part of digital asset management is change management. How do we facilitate the formation of new behaviours among individuals and, more importantly, in groups and institutions not necessarily warm and accommodating of change?' he warned.

PROBLEMS AND SOLUTIONS

More with Metadata

'An effective Digital Asset Management strategy can actually increase the value of your digital assets by capturing detailed information (metadata) about the asset. Assets are important, but the information about an asset makes it useful (and re-useful) to the organisation.'

What is DAM?, Artesia Technologies, Rockville, Maryland, US
www.artesia.com/what_dam.html

What connection do cultural institutions make between their collections and publishing? The question came from Guy Hellier, the London representative of Artesia Technology, a Rockville, Maryland, company that builds digital asset management systems.

The V&A's James Stevenson said the museum had been publishing since its foundation in 1856. Most British museums had well-established publishing departments. The real problem was how to decide what to digitise next for publication. 'We have thirteen departments and a collecting policy that goes from toys to vacuum cleaners and encompasses Renaissance art. Each one has national importance.'

Michael Moon recommended a Website survey to identify 'what gets you in the door' and 'an uncommon level of courage to sacrifice sacred cows' in order to find a single answer.

DINOSAUR ASSET MANAGEMENT

It's not as simple as that, said Graham Higley. He is the new (by only three months) head of IT and libraries in London's mighty Natural History Museum, a Mecca for all small boys fascinated by dinosaurs. The museum's life-size moving, breathing, roaring model of a *Cretaceous tyrannosaurus rex* makes the faint-hearted quail and timid tots shriek. The institution has 100 million other artefacts, including a million books and half a million art works, but has digitised only one per cent of them.

'We know precisely what gets people in the doors', said Mr Higley, 'Dinosaurs! We have done the dinosaurs. We have more rubber dinosaurs than you can shake a stick at. That's the one per cent. But our purpose is to expose the entire collection – by at least another ten to twenty per cent over the next five years.' The museum probably earned up to

£10,000 from its digital store and the pressure for more and more images and metadata was intense. 'But what there isn't is a mechanism for us to do that as an institution on a rational basis.'

Harking back to his earlier warning about the hazards of change management, Mr Moon said: 'Deployment of an asset management system is not about making the curator's job easier but deploying technology to move the institution forward.' One of a DAMS' attributes was analysis of asset usage. Activity data showed where users put the true value of the collection – information of interest to all an institution's stakeholders.

Friso Visser had another angle. He is a museologist working for the international management consultancy PriceWaterhouseCoopers in the cultural sector of the European Union's Information Society Technologies (IST) programme.

He said: 'Accountability is more and more an issue for cultural institutes: the amount of visitors coming through the door; the number of Web visitors; the exhibitions produced, or leaflets, brochures, school programmes, etc. – the "performance" of an institute. DAM systems can be used to confront these. I would think you are looking at something that increases the value of the assets within the institution.'

HIGH CULTURE, POPULAR CULTURE

It took a forthright Italian university IT academic and the Essen Forum's only woman member to cut to the bone of the issue. 'Museums are often not created for the visitor. They are created for the curators. Putting them in that end-user perspective is crucial', said Franca Garzotto, a multimedia authority at the electronics and information department of the Polytecnico di Milano, the largest engineering university in Europe.

She was troubled by the amounts of time and money spent by cultural institutions on classifying, cataloguing, digitising, preserving and storing. The Italian Government spent millions of euro on them, she said, adding: 'The issue, however, is making this content of value to the citizens and consumer. I think it is important to define and develop exploitation models for the digital content. Instead of trying to digitise everything, let's digitise those sections that can be useful for a broader audience.'

All of which underscored a deep, little-discussed issue, said Michael Moon: 'Most collections represent high culture, the patronage of kings, popes and bishops who commissioned most of these high culture things. On the other hand, we have a mass, popular,

entertainment-centred culture that is about producing products that sell. You create a product to sell and, if it doesn't sell, it sucks!

Compounding this was one other consideration: 'Senior executives are not motivated by opportunity but by risk aversion. So, the way to motivate directors to do the right thing is to have data that say here is what works; here is what doesn't work; here is what our customers want.'

PORTABILITY RISKS

Franca Garzotto hit the Forum with another 'provocative' question, this time to vendors: Why should a cultural institution switch from its familiar, general purpose system such as Oracle in favour of a system that may not survive? What would happen to the content?

Artesia's Guy Hellier reassured the experts that most products were based on commonly available database systems and should store metadata and related information in an open way.

Ms Garzotto pressed further: 'You are saying that there is no risk of portability problems in the case of evolution of technology - that these systems are open enough to be integrated and to be replaced by other software.'

Yes, said Mr Hellier. DAMS represented no more risk than basic level components. The risk equation had to be calculated against the cost of building and maintaining DAMS functions into basic components.

WORKFLOW FAILINGS

German vendor Stefan Schneider, from the research department of information system makers Tecmath AG, agreed: 'An ordinary database has no workflow support, such as browsing or a Web interface. You have to program all this yourself.' But he had a bigger problem. Did museums really know how to use workflow processes? His company's preliminary analyses often revealed weaknesses in museums' existing workflow practices. 'You cannot replace a bad analogue workflow with a digital one', he said. 'A DAMS could create more chaos than before.'

Mr Moon thought the problem existed across industry but DAMS technology offered much support. The problem unique to the cultural heritage sector was, perhaps, what he called the 'super users', the curators who required very specific retrieval

requirements and access privileges. These required careful study but could be met with standard data modelling processes.

COST OF DAM SYSTEMS

All of which raised the question of why, if they did not already have it, did museums need all that workflow functionality. Norbert Kanter, who works for the German branch of the Swiss system makers zetcom AG, wondered why existing collection management systems could not continue doing the job they had done for the past ten or 12 years.

Natural History Museum manager Graham Higley was 'struggling' with the same thought. Why not just strap a digitising 'carbuncle' on the side of an existing collection management system? It could be enough to tide a system over until DAMS technology had proved itself and become cheaper.

Franca Garzotto cut to the core again and asked bluntly: 'What does a DAMS cost?'

Michael Moon had the figures in his head:

- ° \$100 to \$5,000: Canto Cumulus¹, Extensis Portfolio² and Filemaker Pro³ all did excellent jobs for small projects.
- ° \$25,000 to \$50,000: 'A class of DAMS, which are basically internal systems. They are not really Webified.'
- ° \$100,000 to \$250,000: Artesia⁴ and Tecmath⁵ but 'two to three million dollars to get it fully distributed and replicated throughout the enterprise'.

Lower-cost systems were typically bought by departments in creative services using Quark, Illustrator, PhotoShop, etc., said Mr Moon, although he knew of a \$2 billion publishing firm that ran its entire business off Canto and Filemaker. Second-tier systems were usually found in the printing business. The top level was for complex systems that had to integrate with existing architecture.

Mr Stevenson asked which cultural institutions were already using DAM systems. Members mentioned the Male Clinic, US universities of Texas, Cornell and Stanford, the National Archives of the Netherlands, the Vatican, Sony Pictures, Boston broadcaster WGBH, the UK's Courtauld Institute, Readers Digest, NTT (Nippon Telegraph and Telephone Corporation), the US National Football League and New York multimedia publisher, Martha Stewart Living. Athenian Professor Ioannidis commented, dryly: 'I don't hear any museums in there!' Mr Hellier identified a US museum, the Freedom Forum's 'Newseum' (www.newseum.org), which had an archive on 'the progression of print'.



¹ Canto Cumulus, www.canto.com

² Extensis Portfolio, www.extensis.com/portfolio/

³ Filemaker Pro, www.filemaker.com/products/fm_home.html

⁴ Artesia Technologies, www.artesia.com

⁵ Tecmath AG, www.tecmath.de

Siam. *Mercur.* 37. 22. 26. 28. *Cochin.* 21. 22. 23. 24. 25. 26. 27. 28. 29. 30. 31. 32. 33. 34. 35. 36. 37. 38. 39. 40. 41. 42. 43. 44. 45. 46. 47. 48. 49. 50. 51. 52. 53. 54. 55. 56. 57. 58. 59. 60. 61. 62. 63. 64. 65. 66. 67. 68. 69. 70. 71. 72. 73. 74. 75. 76. 77. 78. 79. 80. 81. 82. 83. 84. 85. 86. 87. 88. 89. 90. 91. 92. 93. 94. 95. 96. 97. 98. 99. 100.

Ican Paring

67

Les Carreaux de Hollande ont de ces Icanus Paring dans leurs Cabinets. Ce lui-ci est de long de 8 pieds 7 pouces et avoit le goût de l'Anguillon.



69

Vaandraager ou l'Yndique Poisson très-agréable & divertissant dans les Reservoirs de Louven. Il nage ordinairement à la tête d'une troupe d'autres petits Poissons à fleur d'eau. L'étendant large & il est d'une familiarité égale à celle des Poissons, en sorte qu'il s'approche et mange hors la main de ceux qui l'apollent. Il y en a de trois, ou quatre sortes.

66



66

65
Geerp-Vaach. Prochet de Bantam de 8 pieds de long; dont la longueur est mesurée. Il a les arêtes vertes et ne vauf rien.



66. Vaandraager, alguifon. R. p. 1. n. 2. t. 1. fig. 6.
67. Jean Paring, R. p. 2. n. 2. t. 1. f. 2.

THE FUTURE OF CULTURAL ASSETS

DAMS Technology Reviews

Digital Asset Management: The Product Landscape

'Digital Asset Management has been around for a decade or more, but it is only in the last couple of years that mainstream IT analysts and reporters have paid much attention to it.'

CMS Watch, August 2002

www.cmswatch.com/Features/ProductWatch/FeaturedProduct/?feature_id=76

Refreshing Media Management: Coca-Cola Turns Archives Into Assets

'With a newly implemented DAM system, Coca-Cola's Archive Department is bringing the firm's rich collection of graphics, video, audio, and text to company desktops worldwide.'

Econtent magazine, May 2002

www.econtentmag.com/r7/2002/delancie5_02.html

Defining the DAM Thing: How Digital Asset Management Works

'I have a saying I use in consulting: "Where there's pain, there's gain". And nothing suggests pain like having users try to discuss storing and sharing digital information.'

Emedia Live, August 2001

www.emedialive.com/r2/2001/doering8_01.html

Papers and articles covering basic issues of digital asset management

EC2 Incubator Project, Annenberg Center for Communication, University of Southern California's Schools of Communications, Engineering and Cinema-Television.

www.ec2.edu/final/dccenter/dam/index.html

The BBC Archives

So, what are the prospects and perspectives for institutions and vendors?, Moderator Moon asked the Twelve. The Man from the BBC spoke first. Richard Wright, from the Corporation's multimedia archives, told the Forum that the institution had been working on the technology since 1995. It created, stored and distributed cultural artefacts with digital technology.

'So, DAMS is a kind of must-have and the rest is

strategy, implementation plans and budgets', said Mr Wright. 'We still have to operationally integrate our legacy metadata with the key frames, the proxies and the browser to the desktop. That will be the big jump for us.'

The Victoria and Albert Museum

Visibility is the major driver for the V&A, said James Stevenson. The museum hoped to get two million visitors through its door this year, up from 1.5 million last year. And there was a vast constituency of people who never entered the grand, cultural palace in London's Royal Borough of Kensington and Chelsea. Although his department had 50,000 digital images, only about 2,000 objects were on the institution's Website.

'I have spent three years writing papers trying to educate the senior management that DAM is something that we need as an institution', he said. 'It only comes home to them when you say I can't do this or that. I expect we will have a DAMS in the next eighteen months.'

The Natural History Museum

Graham Higley's priority was quickly to get large amounts of collection data with which, hopefully, to raise income. He greatly wanted to improve the museum's Website, which was already very popular and won awards, but was not properly structured.

He said: 'It needs a new content management system that will link into both the collections management system and a digital asset management system. So there is quite a big picture to paint there.' He added: 'There are quite a lot of other things that we aspire to which need those platforms in place, things like collaborative research and a virtual experience of the museum.'

zetcom AG

Vendor Norbert Kanter was curious to see how the first museum in Germany would combine a DAMS with the information systems it already had in place. 'Unsolved problems are still the awareness of these products within the cultural field and the knowledge of how they can assist institutions', he thought.

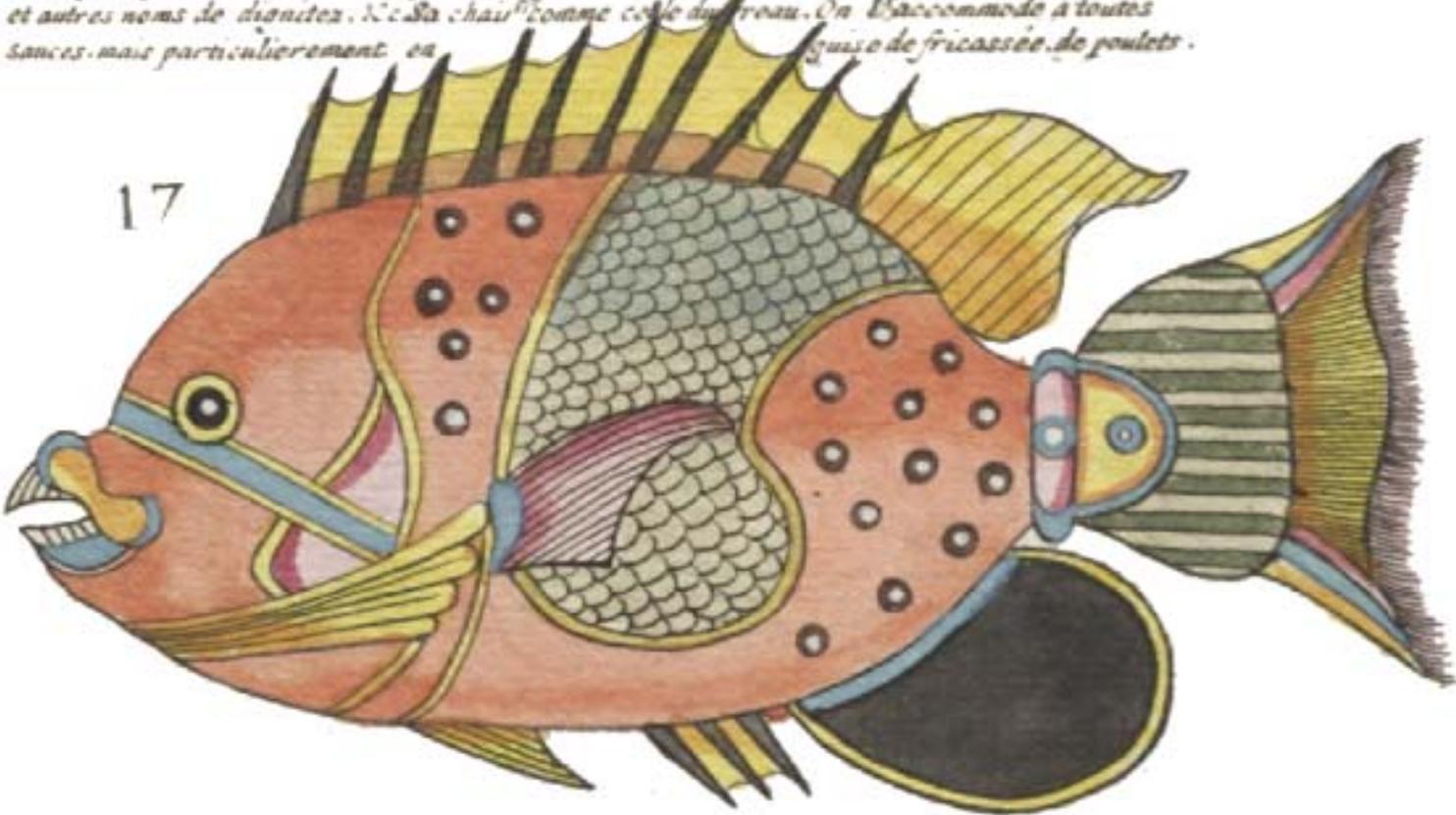
The Wildscreen Trust

Funding was a big issue for the Wildscreen Trust in its programme for digital TV recordings of all the world's endangered species, said digital archivist John Leedham. The project needed a DAMS, but it relied on annual funding and 'we cannot guarantee we will have any more money after 2003'.



Douwing-Admiral. C'est un prodige que la merveilleuse diversité et bizarrerie de cette espèce de poisson, dont on pêche plus de trente sortes différentes à Amboine, distinguées sous les noms de Royal, Imperial, Duc, Duchesse, Marquis, Comtes, Barons, et autres noms de dignitez. Le Sa Chau^l comme celle du broau. On l'accorde à toutes sauces, mais particulièrement en saque de fricassée de poulet.

17



Artesia Technologies

Guy Hellier, the London marketing chief for Artesia systems, was encouraged that DAMS appeared to be applicable to the cultural heritage arena. Once institutions found a way to apply them, DAMS would help organisations to reach their consumer base and give them greater exposure to the collections, and to the knowledge held by curators. He said: 'I am convinced that curators are the valuable people resource. You need to be finding ways to get them involved in reaching digital and physical visitor bases. DAMS will play a key part in creating products to help you do that.'

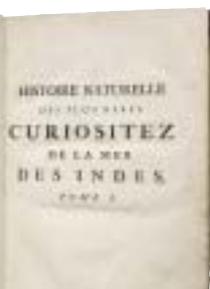
So, the DAMS workshop in the vast Messe Essen, the city's fine new convention centre, was over. The twelve experts went away, perhaps to the echoed words of Germany's great son, composer-conductor-meistersinger Richard Wagner, after a performance of his Ring Cycle opera *Die Götterdämmerung* (Twilight of the Gods) in the late 1800s.

The ageing maestro, now filled with honour, told his audience: 'Now you have seen what we can do. Now want it! And if you do, we will achieve an art.'

Michael Steemson,

The Caldeson Consultancy,

www.caldeson.com



Oici enfin un Ouvrage, attendu depuis longtems, & qui peut-être n'auroit pas encore vu le jour, sans le zele qui m'anime pour l'avancement de l'Histoire naturelle.

Mr. RENARD, qui en est l'Auteur, vint à mourir, lorsqu'il étoit sur le point de le publier: les circonstances qui accompagnent ordinairement la mort d'un Auteur, mettent souvent obstacle à l'exécution d'un dessein qui demande

DAMS MAKE CULTURAL HERITAGE MORE ACCESSIBLE

Digital Asset Management Systems (DAMS) can be of great value to the institutions that preserve our cultural heritage. They can help them in managing their collection in a structured way, but - and I think this is even more important - they offer new possibilities to reach a wider audience.' Although he is Director, European Professional Services, for Artesia Technologies, one of the twelve vendors that sell comprehensive DAMS, Guy Hellier is not your typical sales rep. Apart from being educated in engineering physics, he really believes that DAMS can increase the public's awareness of its cultural heritage and enhance the 'real' experience.

At the moment Artesia is implementing a DAMS at Courtauld Institute of Art, digitising its superb collection of art and architecture. Hellier still has a lot of converting to do. Often curators are afraid that making their collection available on the Internet will cost them 'real' visitors and hence money. Not only the fee the visitors pay, but also because the number of visitors is an important criterion for government or sponsor funding. According to Hellier, there is no need for cold feet. 'On the contrary, I think that making people aware via the Internet or other media can increase the number of visitors. By informing them, you can even make their visit more rewarding, so that they come back to you.'

Artesia Technologies started in 1999 as a management buy-out of The Thomson Corporation (Toronto). The DAMS that had been developed for internal use promised to have great potential for other companies and institutions dealing with rich media like images, maps, Web pages and streaming video. According to Hellier, building a DAM software company was not part of Thomson's core business, so the internal project was put up for sale. It was bought by the people who had developed it with venture backing from Warburg-Pincus. Hellier joined the company from its start in 1999 and at that time he became project leader of its 'launching' project, the Media Archive of General Motors. This was a three-quarters of a million dollar project where the largest chunk of money went into converting almost two terabyte of texts, images, both still and streaming, and sound into standard format.

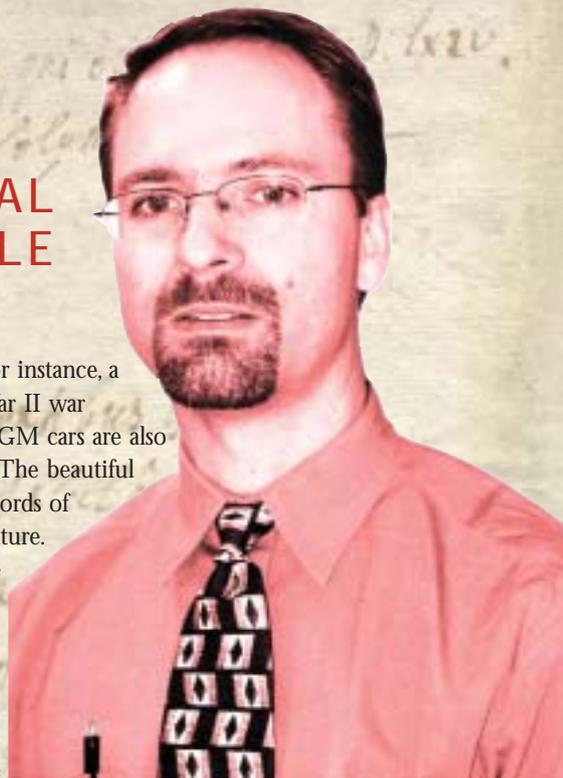
Hellier: 'GM has had, and still has, a tremendous impact on life in the US, which is far bigger than

just selling cars. They were, for instance, a large supplier of the World War II war machinery. For many people GM cars are also part of their personal history. The beautiful thing is that GM has kept records of its influence on American culture.

The company's media archive contains a wealth of cultural information that is now made available for internal and external use.' The images in the Media Archive are a real asset for GM in the sense that they also generate an annual income of several millions of dollars. Hellier: 'One of the external users is Mattel, the toy car producer. They have to have a licence to be able to use the images. So do other outside users. The DAMS that we implemented at GM can also be used for licences and rights management.'

One of the things that had to be solved was the accessibility of the GM heritage. Hellier: 'The people working in the media archive had developed their own vocabulary to categorise the images. A language of 40,000 to 50,000 words they use to describe not only the content of the image but also its atmosphere. For instance, the term "wow shot", which describes a real stunning picture. From this vocabulary of specialised users we developed a more generalised vocabulary for first-time users from outside the Media Archive.'

Hellier acknowledges that, even if the board is convinced of the usefulness of a DAMS, there is still the problem of funding. A comprehensive system like the ones Artesia implements can cost anything between a half and a few million euros. For public institutions like museums this might be quite a hurdle. Hellier: 'In the DigiCULT Forum in Essen last September someone suggested the creation of a user group for DAMS. I think that is a very good idea. A user group could help speed adoption, for instance by developing standards for information storage and exchange. That would certainly help the vendors. On the other hand, the institutions could cut their cost, for instance by using a common platform with personalised interfaces. Artesia has built such hosting platforms, for instance for Getty Images, that are used by a variety of customers.'



An interview
with Guy
Hellier,
Artesia
Technologies

by
Joost van
Kasteren



DAMS VERSUS CMS?

By Norbert Kanter

A changing environment, and new 'missions'

In the last ten to twelve years the responsibilities and core tasks of museums and other holders of cultural heritage collections have changed and expanded steadily. Their functioning has been transformed because of, for example, new financing models. Budgetary restrictions of the public hand have brought about changes in the ownership structures. Visitors and users expect ever more spectacular exhibitions or customised services and, of course, the use of computers and networks has brought about considerable changes in the working environment of cultural and scientific heritage institutions.

An ever tighter budgetary situation, coupled with rising expectations from sponsors and users, drives the need for more efficiency and productivity which could be enhanced using information technologies, networks and, in particular, the opportunities offered by the Internet. To cover the costs of preserving and making accessible public collections as well as related scholarly and educational tasks, the institutions will need to find new ways of marketing and valorising their assets. One indicator of the impact of these new 'missions' on the heritage organisations is the increasing deployment of databases in the management of collections as well as related information and products, which today include not only texts and images, but also multimedia objects.

From collection management to institutional manageware

At the beginning of the 1990s cultural heritage institutions that could afford IT systems used them mainly for the administration and scholarly documentation of their holdings. Today's collection management systems not only provide many more functionalities, but can also be used to interlink the work of many departments. By integrating the information produced and exchanged, the classical collection management systems are developing into systems for the management of the entire institution. They function as information tools for all departments that need to look up object descriptions, digital images, status reports of restoration, preservation, lendings, licensing, educational material, articles and other contextual material. Therefore, enhanced collection



management systems can become the most important and valuable 'asset' of a heritage institution, besides its collections.

Re-use, re-express, re-purpose

Today, major developers of collection

management systems in Europe (of which there are not more than half a dozen) are striving to adapt their systems to the networked working environment of their customers. They open up and enhance their systems in such a way that customers can create information values beyond the level of simple data entry fields.

The interlinking of previously isolated information supports in creating 'contexts' and the contexts themselves generate the kind of information that is needed to be able to provide knowledge. An example of this process is the linking of reference material to object descriptions, which enhances the documentary and scholarly value and makes the collection database also more interesting for educational uses.

Such rich, highly structured and interlinked information assets and digital objects foster re-use and re-purposing. Collection databases are already used to generate dynamic Websites from a pool of always up-to-date information. Integrated image archives allow for an efficient marketing of digitised objects, and classroom material is generated 'on demand' from databases as print or online versions.

Parallel worlds

While in recent years DAMS have been developed and primarily used in commercial areas such as the media and other industries, CMS have evolved 'in parallel' in the traditionally not-for-profit cultural heritage sector. Both systems manage digital assets and should lead to more efficiency, increased productivity, and a higher quality of products and services. Yet, the two lines of systems have different focus points. CMS are concerned with the management of

collections and all other work related to collection objects – which means almost all departments of a cultural heritage institution. In many cases, a CMS maps the complete institutional structure, i.e. supports executives, curators, registrars, restorators, library and educational staff and so forth.

In comparison, the potential application areas of a DAMS do not include all departments of a heritage institution, but are restricted to areas like media management and publishing. The strength of DAMS clearly lies in the management of digital assets (images, graphics, textual elements etc.), providing functions far beyond a classical CMS; worth noting, in particular, is the powerful workflow management that DAMS provide in publishing.

Of course, there have been proposals and attempts to develop CMS that allow for more enhanced workflow management in heritage institutions, but so far these attempts have not been successful in meeting the requirements of these institutions. It should also be highlighted that in comparison with, for example, industrial organisations they tend to be lacking in their definition and structuring of work processes.

In fact, there are some overlaps between DAMS and CMS, but nevertheless the differences are considerable. At present, and presumably in the future, if media management and publishing are key to an organisation, CMS cannot replace DAMS; but on the other hand it seems unlikely that DAMS will substitute for having a CMS in place. This is because DAMS support only some of the necessary functions of a CMS, and in ways that are not customised for the specific professional needs of museums.

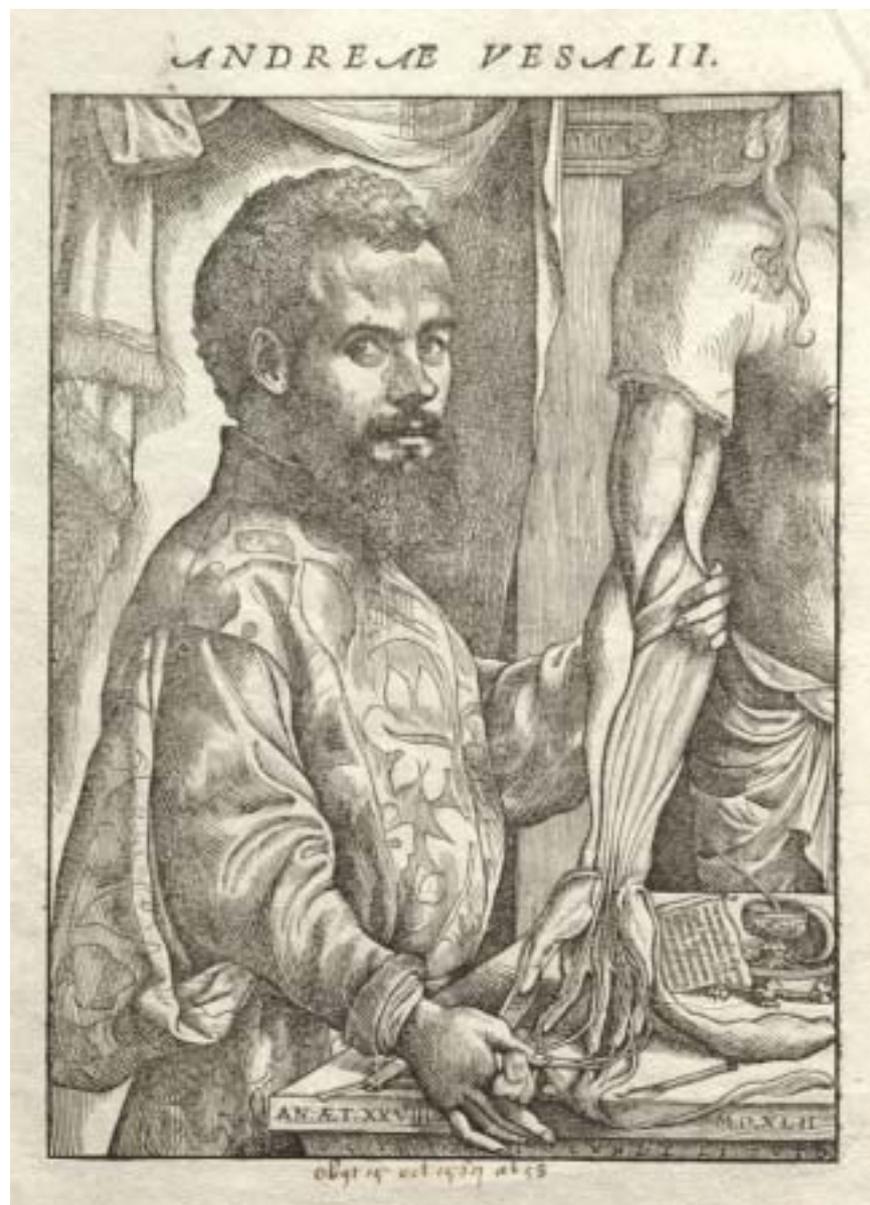
CMS + DAMS = MMS ?

Might the ideal management system for a museum be one that is a CMS as well as a DAMS? Will the ideal Museum Management System result from a combination of the two approaches? There are already examples in which sub-functions of DAMS have been integrated into museum systems. One actual example is the 'Museums-Dokumentation-System' project in which the existing CMS - 'MuseumPlus' - of the State Museums of Berlin is enhanced with asset management functions that allow for operating a commercial image archive. Its basis is the Bildarchiv Preußischer Kulturbesitz, and by integrating such new functions a high level of synergy is achieved as the digitised objects and related data sets can be interlinked with information in other databases (e.g. about artists) of the Stiftung Preußischer Kulturbesitz.

Finally, as always with museums, it rests with their individual strategies (often that of a single depart-

ment or even an individual) as to which IT systems are employed. In some cases it might even make sense to employ a DAMS alongside a typical museum CMS, and implement interfaces between the two systems to avoid redundancy of data. But what will also be decisive in the future regarding using a CMS, DAMS or both will be the size, the objectives and the available budget of a museum.

Norbert Kanter, zetcom AG, www.museumplus.com



CASE STUDY:



CTAVO

BRINGING THE CAPABILITIES OF ADVANCED DIGITAL MEDIA TO RARE BOOKS AND MANUSCRIPTS

By Guntram Geser

PRESERVATION AND ACCESS: COMING TO TERMS WITH CONFLICTING GOALS

Libraries, archives and museums that hold collections of rare books and manuscripts are facing a number of conflicting goals. They want to make their treasures accessible to scholars and students, and to use them in exhibitions and other educational programmes, while at the same time assuring their security and long-term preservation.

Regarding the competing requirements of preservation and access, digital technologies have opened up new opportunities for the cultural and scientific heritage institutions. Yet, the institutions themselves are often unsure about their technology commitments and how to achieve high-quality, reliable and cost-effective solutions. The many challenges they face in managing digital assets include for example: size of high-resolution image files and multitude of uses for derivatives, metadata and cataloguing information management, data storage and distribution systems, long-term preservation of digital assets, overall system management, search and retrieval systems, interfaces, and many more.

This case study describes how Octavo has managed



to solve key issues as it has partnered with leading libraries to digitise and make accessible collections of complex digital objects (i.e. book images) - and thereby has developed into a leading service provider in this field of competency (www.octavo.com).

The case study will look into Octavo's partnership model and technology services, in particular how they managed to put in place a high-performance Storage Area Network and DAM system.

PARTNERSHIPS FOR DIGITAL EDITIONS

Octavo was founded in 1997 by engineer-entrepreneur and avid book collector, John Warnock (co-founder and CEO of Adobe Systems). The company is based in Oakland, California, and has less than a dozen full-time employees, including editors, imaging specialists, production managers, and ICT experts. It is led by Czeslaw ('Chet') Jan Grycz, who joined Octavo as CEO and Publisher in February 2000.

In the span of a few years Octavo has gained prominence through its acclaimed series of Digital Editions on CD-ROM of rare books and manuscripts. The list of digital publications includes, to name just a few, William Shakespeare's *Comedies, Histories, & Tragedies* (First Folio, London, 1623) from the Folger Shakespeare Library; Andrea Palladio's *I Quattro Libri dell' Architettura* (Venice, 1570) from the Library of Congress; Andreas Vesalius' *De Humani Corporis Fabrica* (Basel, 1543) and Isaac Newton's *Opticks* (London, 1704) from the Warnock Library. A major just-completed project is the digitisation of the Library of Congress *Biblia Latina*, one of three perfect examples, known today, that were printed on vellum by Johannes Gutenberg.

For its Digital Editions, Octavo forms partnerships with cultural and scientific heritage institutions to make rare and highly valuable works affordable and accessible to scholars, students, libraries, educators, bibliophiles, as well as the everyday book lover. Prices for CD-ROM Digital Editions range from US\$ 19 to 75.

Octavo's Digital Editions come in both 'trade' and 'research' versions. The *trade editions* contain high-quality digital images of each and every page of a selected rare book. These editions are enhanced with authoritative editorial work, English translations (when appropriate), customised navigation features, and a variety of print capabilities. They are designed to help the general reader understand the value and importance of the rare volume that is featured in the edition. Octavo's trade editions are provided as either one PDF file or a set of interlinked PDF files, delivered on CD-ROM media. Some titles are also available with an option to download directly to the desktop. The editions present books from cover to cover, enabling users to read the text or zoom in to see fine details.

Octavo's *research editions* contain even higher-resolution images suitable for close magnification, enabling precise study and analysis. These special research editions are delivered in JPEG format and are shipped on multiple CD-ROMs. The file size per image is approximately 120 MB of uncompressed image data, 24-bit

(millions) colour, with embedded ICC colour profile information. When a trade edition is available it is shipped, gratis, to any purchaser of a research edition.

One of the techniques pioneered by Octavo is 'live text', an exhaustive species of metadata. 'Live text' is a complete electronic transcript of a work, invisibly embedded word-for-word 'behind' the images of the original. It allows readers to easily access and search the entire textual content without requiring the user to go back and forth between text and image.

Customers have access to and may purchase Octavo products via subscription, syndication, or pay-per-view. Through a royalty agreement, partner institutions enjoy new revenue streams by sharing in any profits generated by Octavo through products or subscriptions based on a participating library's original works. A set of the master source files is, as a matter of policy, given to the sponsoring library or institution. Octavo protects its master data for the future by regularly migrating and renewing storage media to ensure long life and stable source files.

In an Agreement with Ebrary, a content consolidation company selling access to collections of electronic titles, Octavo makes its entire collection available as a 'digital rare book room' which is offered on a subscription basis to libraries who sign up for Ebrary services.

In June 2001, Octavo and the Research Libraries Group (RLG) signed a Memorandum of Understanding under which RLG can receive a licence to distribute titles from the Octavo collection in its online Cultural Materials database, and RLG member libraries will enjoy cost savings on products and services provided by Octavo. RLG is a not-for-profit membership corporation of over 160 universities, libraries, archives, historical societies, and other cultural and scientific heritage institutions. With Octavo, it will also jointly investigate areas of common interest such as metadata standards, digital image identification and searching, digital asset management, and issues of intellectual property rights.

Octavo has another relationship with the UK firm, Alecto Historical Editions (the publishers of very high-quality print facsimile editions), and expects to establish a digitisation laboratory in Europe during 2003.

LEADERSHIP IN TECHNOLOGY SERVICE PROVISION

Octavo initially gained its position as a leading pioneer in the development of quality digital publishing systems through designing and implementing the most advanced and intriguing





new electronic presentation of digital images of rare books. In doing so, however, they had to develop appropriate and cost-effective imaging systems, suitable for a wide range of preservation activities. Octavo's Digital Imaging Laboratory (ODIL) is being installed at leading libraries around the world, including the US Library of Congress and The Folger Shakespeare Library. It is expected that work will be performed by Octavo in collaboration with collections at the British Library, and the Vatican Library. Under the auspices of the International Centre for Information Management, Systems, and Services (ICIMSS), which is interested in establishing a digitisation curriculum for librarians, perhaps such institutions as the Jagiellonian Library in Kraków, Poland, and other University and Municipal Libraries in Central and Eastern Europe can also benefit from Octavo technologies.

Octavo's Digital Imaging Laboratory

The ODIL is a customised capture and storage system, created to produce the high-quality master images appropriate for high-end digital preservation. Derivative images for an array of publishing purposes (both print and Web-based) can easily be prepared from such images. Octavo's imaging process is designed specifically for capturing images of rare books. Consideration is given to both their frailties and their unique aesthetic qualities. For example, custom-built book cradles and special full-spectrum and cool lighting enable the capture of fine details while protecting the books from unnecessary exposure to light or heat. In presenting the volumes for view, these processes result in an evenly lit and natural appearance inasmuch as the books are typically presented as open double-page spreads with untrimmed (uncropped) page edges visible.

The Laboratory includes:

- Wide-body digital camera with optics suitable for digital imaging
- Ultra high-resolution (10,500 x 12,600 pixels), tri-linear digital scanning system
- Cool full-spectrum, non-fluorescent lighting
- High-speed FireWire interface for camera system and local disk storage
- Multiprocessor Apple Power Macintosh G4 computer for rapid image processing and camera management
- 22-inch colour-managed LCD display
- Image-handling and management software called the 'Online Capture System' and other off-the-shelf software useful to the operator.

Optional customisation includes:

- Scale Eight Media Port router connections to secure, redundant storage
- Local 1400 dpi archival pigment colour inkjet proof printer
- Flexible copy stand, adjustable camera stand, and related furniture

Source: www.octavo.com/imaging/

Today, Octavo offers a comprehensive programme focussing on imaging, storage, access, and innovative digital solutions including:

- needs analysis and planning of solutions in digital preservation;
- state-of-the-art digital capture/imaging services, equipment, and expertise;
- digital editions of rare works;
- Web-based systems for the management and re-use of archival quality images and digital surrogates;
- electronic distribution services;
- educational seminars and training programmes with professional organisations and associations.

Octavo's services are available to client partners as part of an on-site laboratory or service relationship, or separately as an independent service. Their access services include an e-commerce infrastructure and Web-based database system that enables a range of options for the private or public display of images. Images need not be created using Octavo's Digital Imaging Laboratory but may also be produced using existing legacy systems. Pricing is based on storage needs (per gigabyte) as well as on usage.

Throughout, Octavo's guiding principle for selecting to work with partner libraries, however, is the quality and importance of the books in their special collections. These are Octavo's main focus and the area in which they have gained the most experience. Such volumes are also those that typically require the ultra-high treatment offered by Octavo's specialized equipment.

BUILDING A STORAGE NETWORK

While expanding its list of products and service relationships, producing an ever increasing number of high-resolution digital masters and derivatives, Octavo realised that they could no longer manage the heavy storage and digital asset management tasks. The digital masters, scanned at 10,500 by 12,600 pixels, are huge, consuming about 370 MB for two pages. Customers, in addition, also demand derivatives such as low-resolution thumbnails to post on Websites, close-up sections of images, and PDF files of products. Keeping track of all these growing derivatives became problematic. Simply storing images on CD-ROMs was not enough; it was clear that getting them on hard drives and providing access in-house as well as for partners would be a crucial next step.

Octavo first thought of building their own storage area network, looking at what independent analysts in the field valued as a minimum investment of \$500,000 for equipment and software licences, and the need for at least three new full-time employees to manage the system.¹ This forced Octavo to look outside for a strategic partner, which they found in Scale Eight, an innovative company in the area of high-performance networked storage services.

The global storage infrastructure solution offered by Scale Eight provided flexible and reliable management tools for approximately 80 per cent less than building and running a 'home-grown' system.

In May 2001, Octavo and Scale Eight signed an agreement in which Scale Eight will store and provide



de worldwide access to Octavo's growing library of digitised rare books and manuscripts (digital masters and derivatives); and Octavo will resell the Scale Eight service as the storage component of its Digital Imaging Laboratory, which is sold to heritage institutions in the United States and around the world.²

Scale Eight

Scale Eight provides file storage solutions based on Distributed Storage Software (DSS) technology. DSS technology is delivered via the Scale Eight Global Storage Service and is incorporated in a family of Network-Attached Storage (NAS) products.

Scale Eight is headquartered in San Francisco, with facilities in the United States, Japan, and the United Kingdom. Since its formation, the company has been

¹ Jade Boyd: Outsourced Storage Helps Save Past. In: *InternetWeek.com*, October 8, 2001, www.internetweek.com/enterprise/enterprise100801-1.htm
² Scale Eight: Octavo Chooses Scale Eight to Store and Protect Its Library of Priceless Documents. Press Release, San Francisco, May 21, 2001, www.scaleeight.com/news/pr_archives.php

honoured by a variety of leading IT organisations as a leader in innovative storage technology development and high-performance service provision. Scale Eight has been serving global enterprises since October 2000, including The Microsoft Network, Viacom, and Fujitsu's PFU Group. Red Herring named Scale Eight 'one of the 50 privately held companies most likely to change the world' in 2001 and in 2002, and Computerworld named Scale Eight a Top 100 Emerging Company for 2002.

Scale Eight's Global Storage Service enables companies to create a virtual storage repository for sharing and distributing terabytes of file content via the Wide Area Network. Its DSS technology is designed to run on industry standard hardware and operating system platforms, enabling the company to leverage the low costs and continual advances in industry standard processors, I/O systems, and disk drives.

Scale Eight also develops network-attached storage (NAS) solutions that enable the creation of highly scalable single-image NAS pools. The solutions consist of DSS software and standards-based hardware, pre-integrated and provided as a NAS system.

For more information, please visit www.s8.com.

Scale Eight's system is accessed via a device in the Octavo LAN called the Global Storage Port. Through this 'port' users at Octavo can save and access images as if they were on a hard drive in the LAN. By October 2001, Octavo had filled approximately three terabytes, paying for storage in 30-MB increments.

Authorised Octavo customers have access through a password-protected Web browser. If a library or museum uses Octavo's imaging system to digitise pages of a book, a manuscript or map the system will automatically save redundant and dynamically-mirrored copies in Scale Eight's data centres in Britain, Japan, Virginia or California. The customer is able to access the digital objects as if they were on his or her own local network, with the Scale Eight's service always providing a single system image to users, applications and administrators. Subsequently, when Octavo relocated its offices, it also built a redundant storage system for additional protection, augmenting the Scale Eight service even further.

streamlines image definition and image capture. The system is integrated with the camera and image processing software, so that much of the image capture, processing and archiving procedure is automated. The Online Capture System assists in organising and managing the workflow by enabling information about the project and the object to be recorded along with image descriptions that become a Views List.

Once the Views List is assembled, the camera operator is ready to begin imaging the object. The operator stages the book, sets up the camera and lighting, and checks the camera's settings. Next, an image from the Views List is chosen. The appropriate OCS application launches the camera software and automatically loads it with the proper image name. After verifying the settings, the operator activates the camera. Shortly thereafter, the new image appears on the computer display for inspection.

The image itself has been captured, sent to the remote storage facility and manipulated for quality, during which time JPEG thumbnails are prepared, sent to the Web server and displayed on the appropriate Online Capture System page. The user (digital camera operator) does not concern himself/herself with this circuitous route; they simply benefit from the responsiveness of the system in helping them manage the capture and management of numerous book and page images.

After the operator reviews an image for quality, he/she can accept it by pressing a single key. This begins another automated sequence that saves the uncompressed raw data along with a backup copy, and creates compressed versions for the online system. All data are cached locally, then uploaded to the remote storage system. Updated status information is sent to the online system. Finally, the system cues up the next image waiting to be captured.

While complex, this process takes less than a minute, during which time the operator can prepare the object for the next image. The operator continues in this way through the Views List, simply clicking capture and then inspecting and accepting each image as he/she progresses through the entire digitisation process.

The goal of the Online Capture System is both to simplify the challenging task of maintaining one's 'place' in the capture process. It also systematically encodes technical information along with the capture of images. 'Metadata' are so essential to the proper retrieval of images (especially those that look so alike visually) that its capture must be included in the normal workflow to the greatest extent possible. When incorporated in such a fashion, the metadata become immediately available for searching and retrieval, without necessitating additional labour or expense.



OCTAVO'S ONLINE CAPTURE SYSTEM

At the heart of Octavo's Digital Imaging Laboratory is its 'Online Capture System' (OCS). This is Web-based software suite that

SHARING AND EXPLOITING DIGITAL CONTENT

Octavo's Web-based Digital Asset Management System offers librarians and others involved with the project fast and reliable access to captured images and project information. This secure 'extranet area' (which is identified as a URL provided to the library) is populated with each imaging project, allowing authorised team members to review a proof of each image, and facilitates magnification to see increased detail. In addition, team members can add descriptions and annotations for each image, and organise cataloguing data.

The Asset Management System is XML-based, allowing custom mapping of descriptive data to the central database. Using XML facilitates sharing data with external systems. It can be used with images captured with the ODIL, as well as with digital assets imported from other sources.

Once digital content, including source image files, annotations, translations, cataloguing information or other metadata, is aggregated in the Asset Management System, it becomes the starting point for a wide variety of derivative products.

Octavo can facilitate preparation of content for a variety of distribution methods, both online and offline, incorporating electronic commerce if required. Online access can start with a simple Web gallery of images or a collection of downloadable PDF files. Great potential exists for academic, scholarly and other collaborative work with the addition of tools to create and share annotations, translations and commentary, along with indexing, and searching capabilities. Octavo is available to develop unique, customised solutions for analysing, exploring and sharing content, and is currently engaged in such projects with professors at the University of California at Berkeley, who include Octavo titles as primary resources for class reading requirements.

Digital content can be repurposed for a variety of other products. A few examples are multimedia CD-ROMs, video presentations, or printed facsimiles. If there is a demand for such, Octavo has developed a network of specialist consultants and firms who can readily use the original images as components in the development of such extended products.

TOWARDS THE DIGITAL FUTURE OF RARE BOOKS AND MANUSCRIPTS

An important area of research and experimentation for Octavo is faithful colour calibration and management. Colour controls begin at

the initial capture stage. Each of Octavo's cameras and scanning arrays is colour calibrated. Every book is imaged along with a standard Macbeth Gertag colour target. An ICC colour profile is embedded in each of the archival files that are delivered to library partners as well as to customers.

Given the dissemination of ICC colour standards throughout the printing and reprographics industries, it is now possible to anticipate that a file digitised in 2002 and printed out, say, in 2052 using yet-to-be-developed reproduction technologies might, in fact, bear close visual resemblance to the original.

Such a concept was unthinkable not too many years ago, yet now seems closer to reality, as the technological sophistication and understanding of colour becomes a more prominent feature in consumer products, digital cameras, software, and open standards.

On its own Website, Octavo has explored visualisation technologies through its 'book viewer', which permits one to browse easily through pages of a digitised volume. Their effort, in this, has been to provide easy navigation and quick-refresh images, while not eliminating the possibility of scanning thumbnail images or enlarged magnification of detailed images.

The browsing is provided as a convenience, though most users elect to purchase complete editions from the site which are burned onto CD-ROM media, and sent to them through the post. Downloading of some titles is also possible, although - given the size of the finished files - this is not always practical.

Octavo, then, seems to be slowly and methodically putting together the building-blocks of what promises to become an important collection of rare and precious volumes - volumes to which most people will not otherwise have easy access. In the doing, it is evolving a series of best-practices and management solutions from which there is much to learn.

The fact that Octavo understands (and wishes to understand better) the three-part aspect of digital image databases³, coupled with the fact that they are temperamentally attuned to the library and museum community, makes them a unique and interesting entrepreneurial enterprise: one that combines the best of altruism with a healthy dose of business grounding.

It also makes them an interesting potential partner for those libraries, archives and museums who possess rare and precious books, and who are considering outsourcing digital preservation activities rather than dealing with all the complexities themselves in-house.

³ The three-part aspect of digital image databases:

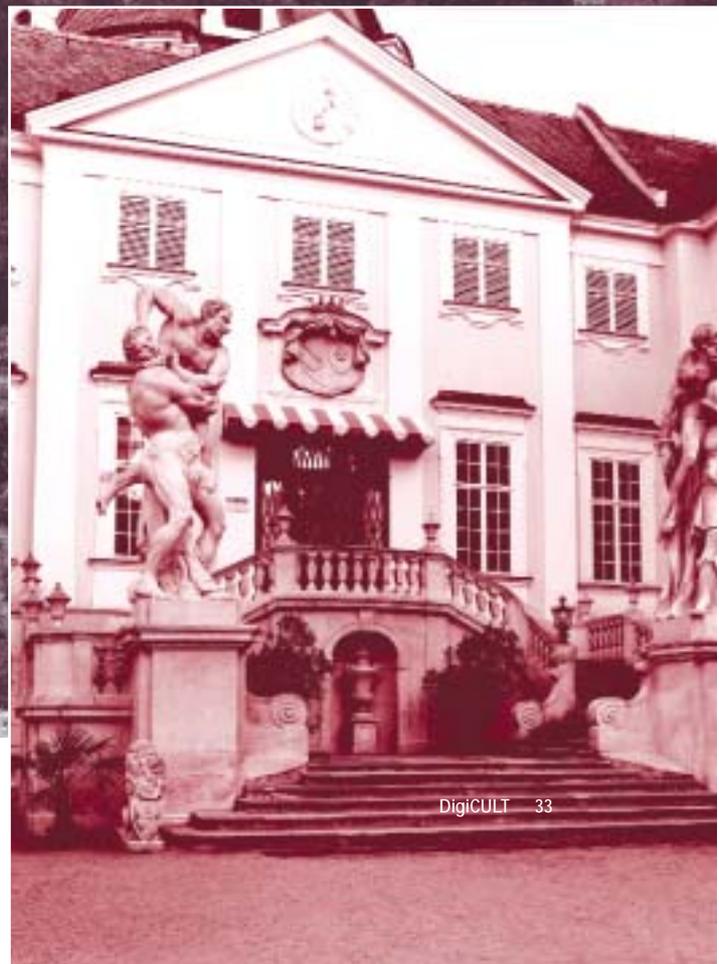
- (1) Ingest or capture of images, with all that entails concerning protection, authenticity, and faithfulness to the original printed works.
- (2) Digital Assets Management, with its complex relationship of 'parent' images to their derivative 'children', the necessary incorporation of metadata and textual identifier.
- (3) Output and publishing potentialities, with specific requirements for visualisation, colour management, and navigation.

CASE STUDY: COURTAULD INSTITUTE OF ART ART AND ARCHITECTURE PROJECT

By Guntram Geser

The aim of this case study is to illustrate the central role of a DAMS in building an online learning resource around collections of paintings, drawings and photographs held at the Courtauld Institute of Art. It builds on material provided by the Courtauld Institute on their Art and Architecture project, and gives an overview of the production process for the central repository of digital objects. At present, the Art and Architecture project is in month eleven of an initial two-year phase, and has been in full production mode for five months. For this step, we approached the project director, Giles O'Bryen, to provide the DigiCULT community with a summary of lessons learnt.

The images in this case study show the Vranov Castle in north east Slovakia, which serves as an example for the project's metadata schema for images from the Conway Library.



COURTAULD INSTITUTE OF ART

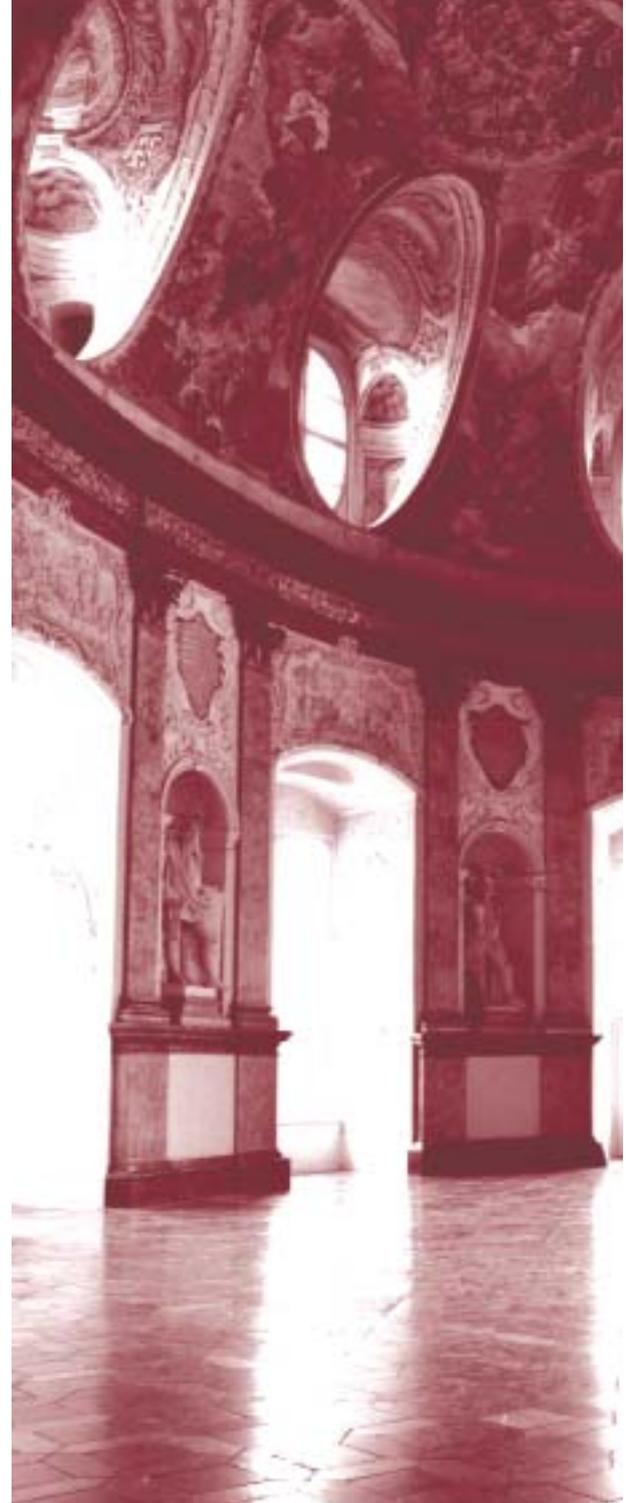
The Courtauld Institute of Art, founded in 1932, is the major centre in Britain for the study of the history of Western art, and is one of the premier art historical institutes in the world (www.courtauld.ac.uk).¹ Since 1990, the Courtauld Institute and its gallery have occupied the Strand block of Somerset House in London.² Highlights of the Institute are its world-renowned collection of Impressionist and Post-Impressionist paintings, and the Conway Photographic Library comprising over a million images of architecture, sculpture, medieval paintings, and architectural drawings and manuscripts. No other archive has a comparable documentation of the artistic heritage of the West over medium, time and place.

The Courtauld Institute is a College of the Federal University of London. It has a teaching staff of thirty (including six conservation teachers), who specialise in a broad spectrum of the arts and architecture of the Western world from classical antiquity to the present day. Approximately 400 art history students are currently at the Institute: one third are taking postgraduate courses, one third are engaged in research at PhD level, and one third are undergraduates. Following the retirement of Professor Eric Fernie at year's end 2002, the new Director will be James Cuno, Professor of History of Art and Architecture, Harvard University, and Director of the Harvard University Art Museums.³

THE ART AND ARCHITECTURE PROJECT

In June 2001, the New Opportunities Fund (NOF) (www.nof.org.uk) awarded the Courtauld Institute a one million pound grant for its Art and Architecture project.⁴ Of the 154 digitisation projects funded by NOF, the Courtauld's award is the largest made to a university, and the largest in support of the visual arts.⁵ The set-up phase of the project will run for two years; there is a commitment to keep the resulting online resources up and running for a further three years; and of course it is anticipated that Art and Architecture will become a permanent and essential feature of the Courtauld Institute's life as a centre for art historical studies. Art and Architecture employs seven full-time staff, with a further five on part-time secondment from the Institute. NOF supports the creation of digital learning resources for 'lifelong learners', who could be anyone from primary and secondary schoolchildren to students, teachers and academics, as well as people with a special passion for a par-

ticular subject. The stated aim of the Art and Architecture project is 'to stimulate and satisfy curiosity in the history of art amongst as wide an audience as possible'. The team will build a database with over 40,000 searchable images from the Courtauld Institute's collections and library holdings, and present them via a richly functional Web platform, which will be free to all users. The full feature set has yet to be defined in detail, but the site aims to encourage users by providing many different ways into and paths through the collections, including easy and precise search capabilities, subject keyword browsing and link traversal. As well as the images themselves, the platform will capture the expertise of Courtauld staff in the interpretation of art history, through stories and features, presentations and online debates. A further section of the site will concentrate on user-generated material, encouraging contributions from individuals, institutions, clubs and societies of all kinds.



BUILDING A CENTRAL DIGITAL REPOSITORY

Although the specific commitment to NOF is to produce a Web resource, it was clear to Project Director Giles O'Bryen, whose background is in content management for commercial book and magazine publishers, that this was an opportunity to take a broader view of the value of digitised content. 'The future of services delivered to desktop

¹ British Council: Courtauld Institute of Art - Overview of the institution (2000), www.britishcouncil.org/eis/profiles/ecs00108/

² See the Courtauld section in the Somerset House virtual tour: www.somerset-house.org.uk/virtual/courtauld.html

³ James Cuno ends 11-year tenure: HUAM director is appointed to Courtauld Institute. In: *Harvard University Gazette*, June 13, 2002. www.news.harvard.edu/gazette/2002/06.13/05-cuno.html

⁴ NOF: www.nof-digitise.org (see: Project grants)



computers via Web browsers is far from certain', he points out, 'but what we do know is that digital content is here to stay: content now has to be in bits and bytes before it can be deployed in any media, including print'. For that reason, a digital asset management system (DAMS) which allows for the creation, storage and management of objects and associated metadata independently of any media or platform on which they might subsequently be deployed seemed like a better long-term bet than a Web-oriented system. 'We knew that a Web content management system would deliver exactly what we wanted... but not much else. The DAMS gives us a powerful back-end infrastructure for all kinds of deployment and distribution. Whatever the digital future brings, the Courtauld will be ready for it.'

The Courtauld Institute uses a digital asset management

system, Artesia's TEAMS (www.artesia.com), allied to an Oracle database. TEAMS is widely used in the commercial media industry, but the Courtauld Institute is its first customer in the heritage sector (although it has also been chosen by the Freedom Forum for its 'Newseum' [www.newseum.org] to provide access to their vast journalism history archive and to develop interactive multimedia exhibits for their new museum building scheduled to open in Washington, DC, in 2006⁶). Other DAMS suppliers considered during the proposal phase for the Art and Architecture project were Bulldog (since bought up by Documentum) and Picdar. The cost of software licences, installation, configuration and training was in the order of £80,000. The key role of TEAMS is to support the creation (or

'ingest'), management, and ultimately export of the ever-growing repository of images and text.

Particularly critical to these processes is its flexible handling of metadata and links, and its ability to import a thesaurus to ensure the consistency and integrity of the cataloguing effort.

SCHEMA DEVELOPMENT

Images from the Conway Library have not been systematically catalogued before, so the first challenge was to develop a metadata schema capable of capturing precisely what appears in a Conway image. Given the range of material in the archive, this was an intellectually stimulating exercise, the subject of many long and sometimes heated discussions. A photograph might seem a relatively easy item to catalogue: not so. Consider the example of a set of images of Vranov Castle in north east Slovakia. It was originally constructed in the eleventh century, then re-built in the seventeenth. In the residential wing is a magnificent decorated room, The Hall of the Ancestors, created by the architect Johann Bernhard Fischer von Erlach, with decorations by the artist Johann Michael Rottmayr; it contains much fine sculpture, including The Statue of an Althan Family Ancestor by Tobias Kracker, completed c. 1795.⁷ It will be clear from even this brief description that Vranov Castle has to be catalogued for what it is: a complex portmanteau of architecture, sculpture and painting created and assembled over many centuries, which embraces many different kinds of relationships - for instance, the relationship between the castle and its various wings, the castle and its principal rooms, the rooms and the paintings that decorate them, and the items of sculpture that have been created or collected there. Conway images could naturally depict one or a number of these items, any of which could be the intended target of an online search, and all of which must therefore be individually catalogued.

Finally, the photograph may have many kinds of value in its own right: it may (and many Conway images do) show an object or building prior to restoration, or even destruction; it may be a nineteenth-century print, of particular interest to students of photography; it may, especially if it contains depictions of people, have value to the student of social history; and of course it may be a work of art in its own right.

The team at the Courtauld elected to make a distinction between objects and images of those objects, with specific items of information stored against each, and the two sets of records linked within the DAMS. This has the obvious but important benefit that a building is only ever catalogued once *as a building*, no matter how

⁵ Tom Bilson: Art and Architecture. In: *Courtauld Institute of Art Newsletter*, Issue no. 12, Autumn 2001, www.courtauld.ac.uk (see News)

⁶ Artesia: Freedom Forum Taps Artesia Technologies to Create Multimedia Library Showcasing the History of Journalism (April 8, 2002), www.artesia.com/pr/freedom_forum.html

⁷ Giles O'Bryen points out that the example of Vranov Castle was discovered by a search on the term 'oval' - the shape of The Hall of the Ancestors.

many images of it are included in the collection; and individual images can be catalogued further to indicate, for instance, that the specific features they depict have a different origin. To manage the relationships between objects, the cataloguers use the TEAMS function that allows links to be named: thus the link type 'Object contains object' indicates a specific relationship between, in this case, a great house and the works of sculpture it contains. By using a defined number of such links, the network of inter-relationships that constitute Vranov Castle, for instance, can be mapped out with some degree of precision. The cataloguers do not have to engage in gratuitous inner debate about whether an altar is part of a cathedral or an object in its own right: it is both, and the Courtauld schema allows it to be catalogued as such. That is not to say that every object slides neatly into place: cataloguing is a method of classification, and is inevitably full of tricky choices. But at least the intellectual effort that is going into the work reflects challenges thrown up by the nature of the images and objects themselves, and not by system limitations or an inappropriately restrictive schema.

Once the schema had been settled and agreed, the technical manager on the project implemented it within TEAMS as a set of forms and options for cataloguers to use. The project has separate schemas for Conway images and paintings and drawings from the Courtauld Gallery collections, which in structural terms are much simpler to catalogue. A strength of TEAMS, as indeed of any properly designed DAMS, is that configuration of the system to manage new kinds of digital assets is technically quite straightforward: this is a long way from the kind of system where one acquired a fixed set of fields and a text box to accommodate anything that did not quite fit.

THESAURI

Good quality cataloguing is always scrupulously faithful to the nature of the material being catalogued; it is also scrupulously consistent. Although search algorithms and associated lookup tables are now smart enough to handle most common variants in spelling and can truncate words to their grammatical routes efficiently enough, they cannot manage variations in the naming of fourteenth-century Italian artists, and are unlikely to appreciate that, where the term 'monastery' is entered as a search term, the user would like to see pictures of friaries too. The NOF team appreciated that, with such a wide range of material to catalogue and up to five people working at once, they needed a thesaurus to enforce consistency right from the start.

A key feature of TEAMS is the ability to import a

thesaurus and make it available to users as a method of ensuring consistency. Very few fields in the schema are keyed into directly by the cataloguers: most are selected by searching thesauri for the appropriate name, place or term. The Art and Architecture Team use the Getty originated Art and Architecture (AAT), Union List of Artists' Names (ULAN), and Thesaurus of Geographical Names (TGN) thesauri, supplemented by the Thesaurus of Graphical Materials and Library of Congress listings for proper names.

With specific targets set by the funding body, the cataloguing team does not have time to complete a scholarly record for every object in the collection, and many empty boxes are left for future initiatives. However, an important part of their work (as for any cataloguing of images) is the application of keywords to images. AAT and TGM between them offer extremely rich and comprehensive listings of keywords. The cataloguers use keywords to capture not so much historical and cultural information, but specifically visual elements that will likely have very broad recognition among the NOF user base. One of the most fascinating aspects of the project is that entering search terms such as 'serpent' or 'war' or 'school' is returning objects that cut right across the spectrum of available material. The ad hoc network of links between items that such searches yield has never been seen before, and indeed could not have been created by any other method. By 'cataloguing what they see' in an image (as well as what they know or can find out about it), the Art and Architecture team are adding a powerful and compelling new layer of meaning to the Conway archive.



IMAGE HANDLING

The schema was settled and the thesauri were installed by the end of June 2002, and asset record creation began in earnest the following month. There are two distinct workflows to cater for images generated internally and out of house.

The Gallery drawings collection is too valuable to leave the secured area of Somerset House, so an internal digital capture rig has been set up. The photogra-



pher works through the collection, storing high-resolution versions of each image on CD. Files are named using the unique accession number for each item, which allows the digital image to be married up with its pre-existing catalogue record. On import, TEAMS generates information about the

capture conditions, resolution, dimensions and format of the digital image, then creates three versions for use within the DAMS: a thumbnail, a medium-resolution JPEG for quick access, and a Portable Network Graphics (PNG) file for more detailed inspection. The cataloguers work through each image and record set, checking the information and adding new project-specific keywords.

Conway photographs are given a unique number, then sent to a third-party supplier (Ark Digital in London) for capture. The prints are returned along with the high-resolution digital file. Again, the digital image is imported and converted into the standard formats. Cataloguers work through folders of prints, check the number, locate the appropriate file and catalogue the image, sometimes creating an object record first if it does not already exist. The prints are then returned to the shelves.

The CD sets are currently being archived separately, although at a future date the budget may allow purchase of a high-volume CD reading unit, which would enable near-line storage of the original high-resolution files for internal use only: this would make it possible for users to access the original files from within TEAMS, albeit access times would be many times slower than for the JPEG and PNG versions.

CURRENT STATUS, AND LESSONS LEARNT

Giles O'Bryen always intended that the first year of the project should be used to install a robust technology infrastructure, build the right supplier relationships, and hire a team capable of at least meeting, and at best handsomely exceeding, the commitments to the funding body. The second year will be focussed on building a delivery platform capable of conveying the richness of the assets and their associated record sets to the target audience, and on integrating the

project with the wider activities of the Courtauld Institute. The first of these goals will build upon the ability of TEAMS to export pre-defined subsets of assets and metadata in an XML framework that will greatly simplify the business of delivering them online.

As for the second, one of the key reasons for investing in a DAMS has yet to be realised at the Courtauld. 'I know we can deliver the project this way', says Giles O'Bryen, 'but next year I hope to demonstrate to the Courtauld that the capability created by the project has a much wider application than that. Whenever anyone anywhere in the Institute creates a digital asset, whether a PhD thesis or a publicity shot of the gallery, it could be stored in TEAMS. And whenever anyone needs to find a Conway image or look at a drawing from the Gallery Collection, I hope that one day it will be second nature to search TEAMS first. For an institution that depends so entirely upon the availability of images and information about them, DAM is really a godsend, and in due course will be seen as an essential piece of good housekeeping for the Courtauld, and many other places like it.'

To conclude, below is a summary of what the Art and Architecture team has learnt so far about the benefits and challenges of using a DAM system:

Key benefits:

- Capable of handling assets in all media.
- Capable of storing assets independent of the platform on which they will be delivered.
- Full metadata handling, highly configurable for different asset types.
- Capable of importing a thesaurus and using it to drive selection of metadata values.
- Rich link handling, capable of expressing many different kinds of relationships.
- Browser client, minimises demands on the IT infrastructure in what is essentially a low-tech environment.
- Bulk import and automated metadata generation.
- Robust security features.

Key Challenges:

- Educating the Courtauld in the difference between standalone, desktop databases intended for private use and full-scale client-server databases intended for public access.
- Keeping innovative technology simple, and not straying far from out-of-the-box functionality.
- Developing schemata that truly reflect the assets, and are therefore capable of satisfying both academic and generalist lines of enquiry.
- Fostering an environment in which the use of digital assets is second nature (e.g. replacing slide caddies with Power-Point shows).
- Ensuring that interfaces to the DAM are always simple but effective.

SELECTED LITERATURE



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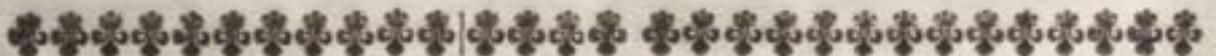
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THE ESSEN FORUM PARTICIPANTS



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Franca Garzotto is Associate Professor of Computer Science at the Department of Electronics and Information, Politecnico di Milano. She has a Degree in Mathematics from the University of Padova (Italy) and a PhD in Computer Science from Politecnico di Milano. Her research interests are hypermedia and Web design, usability, Web application quality, and context-aware applications, mainly in the domains of cultural heritage and eLearning. Since 1988, she has been involved in various European research projects in the above fields. She has been tutorial chair and/or member of the technical programme committee of several editions of many international conferences, including ACM Hypertext and Hypermedia, ACM Multimedia, ICHIM, WebNet. She has served as Programme Co-Chair of: the First International Workshop on 'Hypermedia Design' (Montpellier, France, June 1995), the First International Workshop on 'Evaluation and Quality Criteria for Multimedia Applications' (San Francisco, CA, November 1995), and ICHIM'01-International Conference on Informatics and Museums (Milan, Italy, September 2001). From 1997 to 1999, she was European Chair of SIG-WEB (the ACM Special Interest Group on Hypermedia & the Web).

Guy Hellier

Guy Hellier is the Director of European Operations for Artesia Technologies. He has been with Artesia Technologies since its inception in June 1999, starting as a Project Manager in the Professional Services organisation. One of Mr Hellier's first projects was the General Motors Media Archive project, which replaced GM's legacy asset repository with TEAMS. In this capacity, he was responsible for the business process requirements, architecture decisions, data conversion, and overall management of this effort to convert over 500,000 photographs into TEAMS.

Soon thereafter, Mr Hellier was chosen to open up Artesia's office in London and was promoted to Director, European Professional Services. In this capacity, he built their European business and led

project efforts in the UK, Germany, Norway, France and the Netherlands. His European customers include Cappalens in Norway, EMAP in France, Sony Music in Austria and Courtaulds Institute of Art in London. Prior to joining Artesia Technologies, Mr Hellier worked for The Harris Group as a technical consultant and later with Sallie Mae Servicing Corporation, where he served in numerous information technology positions culminating as Assistant Vice President of Quality Assurance.

Graham Higley

Graham Higley is Head of Information and Library Systems of the Natural History Museum in London. Before this position Mr Higley worked with The Carbon Trust (2001-2); was Director of Communications & Information at Investors in People UK (1999-2001); Operations Manager at BBC Information & Archives (1994-99), and Information Resource Centre Manager at British Telecom (1990-4). In these positions his various duties in particular revolved around developing new information systems and services, and change and process management, emphasising customer focus.

Yannis Ioannidis

Yannis Ioannidis is currently Professor at the Department of Informatics and Telecommunications of the University of Athens. He received his PhD degree in Computer Science from the University of California at Berkeley in 1986. He joined the faculty of the Computer Sciences Department of the University of Wisconsin at Madison in 1986, where he became Professor before leaving in 1999. His research interests include database and information systems, scientific systems, digital libraries and human-computer interaction - topics on which he has published over 50 articles in leading journals and conferences and holds two patents. Dr Ioannidis was the recipient of the Presidential Young Investigator (PYI) award in 1991, awarded by the President of the United States to the top young scientists in each field. He spoke on 'Next-Generation Experiment



Management' as the keynote speaker in the Conference on Statistical and Scientific Databases (July 2000), and on 'Databases and the Web' as the keynote speaker in the Workshop on Parallel and Distributed Processing (January 2000) and the Conference on Web Age Information Management (July 2001). He has been a principal investigator in approximately 20 research projects funded by various government agencies (USA, Europe, Greece) or private industry. Dr Ioannidis is currently Associate Editor of five journals (Information Systems, VLDB Journal, Journal of Digital Libraries, Journal of Intelligent Information Systems, and the electronic ACM Digital Symposium Collection), and has been a member of the programme committees of over 40 conferences, including three times as (co-)chair (VLDB, SSDBM and VDB). He has served on the review board for the Lawrence Berkeley Laboratories in Berkeley and on the Science Council of the NASA CESDIS Center for Excellence in Space Data and Information Sciences.

Norbert Kanter

Norbert Kanter holds an MA in Art History and Philosophy from the University of Bonn. In 1990, he started to work as a freelance at a museum software and database developer's. From 1991-1995 he was head of the IT department of the Federal Art and Exhibition Hall of Germany. Since 1996 he has been Project Manager for New Media at the same institution and works as consultant and Internet producer for different museums. Since July 2000 he has been head of zetcom AG in Berlin, a Swiss museum system developer with a broad installation basis for its Museum Management System 'MuseumPlus'. He was responsible for the awarded Website of the German Federal Art and Exhibition Hall as well as Websites for institutions like the Art Museum of the city of Bonn. Mr Kanter has participated in the production of cultural CD-ROMs and worked on several multimedia projects, such as co-founder of 'die lockere gesellschaft - TRANSFUSIONEN' (www.transfusionen.de). Since 1992 he has been a member of ICOM/CIDOC, has participated in different working groups and published on New Media

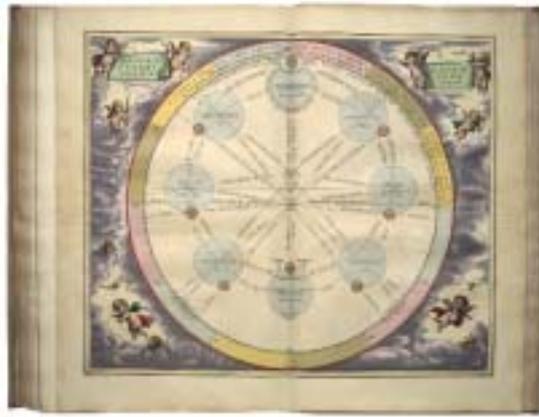
use in Museums. He is also an active member of the MCN (Museum Computer Network) and DMB (German Museum Association).

John Leedham

John Leedham is currently the IT Systems Engineer for the ARKive Project. Previously he was Computing Officer for the Oxford Text Archive, creating the Website and storage infrastructure for the distribution of the 2000+ XML and other electronic texts collected over the last 25 years. The ARKive project collects moving images, stills, structured text and audio to create representative species profiles, initially for 1500 species, but in the longer term to encompass all the 39,000 endangered species worldwide. ARKive assets are digitised and stored at high resolution, along with verbose structured metadata based on a variety of evolving standards. Personal interests currently include defining the ARKive approach to knowledge capture, which is part of the next phase of ARKive, and continuing to address the technical areas causing concern in the project. These include the deployment of the large-scale storage used by ARKive, and the construction of the Managed Media Vault. Other interests include restoring Minis.

Michael Moon

Mr Moon co-founded Gistics Incorporated in 1987, and currently serves as its CEO and president. An internationally recognised research and consulting firm, Gistics first identified digital asset management in 1994 and has maintained an ongoing survey of its key trends and developments. Present clients include Adobe, Accenture, Apple, IBM, HP, KPMG and Kodak. Prior to Gistics, Mr Moon worked at several prominent Silicon Valley market research and advertising firms including Electronic Trends Publications, Regis McKenna, and Lutat, Battey and Associates, and advised Altos Computer, Apple Computer, Hewlett-Packard, Intel, MicroFocus, Seagate Technology, Shugart Associates, SofTech Microsystems, and other technology companies. Mr Moon holds a degree in Religious Studies from the University of California, Santa Cruz.



Stephan Schneider

After receiving his Diploma in Electrical Engineering (1992) and a Master's Degree in Philosophy (1993) from the University of Stuttgart, Stephan Schneider joined the University of Cottbus in 1995. From 1995 to 2000 he set up and led a Multimedia Laboratory and was responsible for several international and EC-funded projects dealing with multimedia applications. He received his PhD degree in 2001 with a dissertation on the fractal coding of speech signals. He joined tecmath AG as a project manager in the Research Department in 2000, where he is responsible for the IST projects AMICITIA (IST1999-20215) and PRIMAVERA (IST1999-20408). Both projects deal with the archiving and retrieval of large collections of audiovisual assets.

James Stevenson

James Stevenson is the Photographic Manager at the Victoria and Albert Museum in London. He has responsibility for managing all image creation within the museum and the exploitation of those images via the V&A Picture Library. He is currently involved in installing an asset management system for all the museum's digital objects and a colour management system for controlling image creation and their subsequent re-use. He has participated in the ARTISTE, ARCO and SCULPTEUR EU-funded IST projects and the 'Moving Here' and 'People Play' UK-funded NOF projects. James Stevenson was previously Chief Photographer at the National Maritime Museum at Greenwich, London. He is also Chairman of the Association for Historical and Fine Art Photography: www.ahfap.org.uk.

Friso Visser

Friso Visser is senior consultant with PwC Consulting in The Hague. As a museologist with special interest and rich experience in (R&D of) ICT, his activities relate to policies and strategic development in the area of Cultural Heritage. His specific interest is with global and strategic developments of ICT and the role of public (sector) information, culture and cultural institutions. Friso is one of the team

members of the DigiCULT Forum project. He is project leader for the ICT benchmarking of museums on behalf of the Dutch government. During the past three years he has been seconded to the European Commission in Luxembourg, involved in policies and strategy development for the Cultural Heritage Applications part of Key Action 3 of the IST programme (under the Fifth Framework programme for RTD). Before that he worked at Museon in The Hague as head of the collections department and project leader for several European ICT museum projects.

Richard Wright

Richard Wright was educated at the University of Michigan, USA, and Southampton University, UK. He has the following University degrees: BSc in Engineering Science, 1967; MA in Computer Science, 1972; and PhD in Digital Signal Processing (Speech Synthesis), 1988. He has worked in acoustics, speech and signal processing for US and UK Government research laboratories (1968-76), University College London (1976-80, Research Fellow), and the Royal National Institute for the Deaf (1980-90, Senior Scientist). He was Chief Designer at Cirrus Research from 1990-94 (specialising in acoustical and audiometric instrumentation). Dr Wright has been Technology Manager, BBC Archives, since 1994.

Mirko Zimmer

Mirko Zimmer is employed as Consultant and Software Engineer for the Content Management Competence Center (CMCC) of Bertelsmann mediaSystems, focussing on Content Management and Digital Archiving Systems. Prior to Bertelsmann mediaSystems, Mirko Zimmer completed his studies at the Freie Universität Berlin, where he received a Master of Arts degree in Historical and Political Sciences. During his studies Mirko worked for the DFG project 'Dissertationen online' at the Humboldt Universität Berlin.

DIGICULT: PROJECT INFORMATION

DigiCULT is an IST Support Measure (IST-2001-34898) to establish a regular technology watch that monitors and analyses technological developments relevant to and in the cultural and scientific heritage sector over the period of 30 months (03/2002-08/2004).

In order to encourage early take up, DigiCULT produces seven Thematic Issues, three Technology Watch Reports, along with the newsletter DigiCULT.Info.

DigiCULT draws on the results of the strategic study 'Technological Landscapes for Tomorrow's Cultural Economy (DigiCULT)', that was initiated by the European Commission, DG Information Society (Unit D2: Cultural Heritage Applications) in 2000 and completed in 2001.

Copies of the DigiCULT Full Report and Executive Summary can be downloaded or ordered at www.digicult.info.

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DigiCULT Thematic Issue 1 builds on the first DigiCULT Forum on 'Integrity and Authenticity of Digital Cultural Heritage Objects' held in Barcelona on May 6th, 2002, in the context of the DLM-Conference 2002.

DigiCULT Thematic Issue 2 builds on the second DigiCULT Forum held in Essen, Germany, on September 3rd, 2002, in the context of the AIIM Conference @ DMS EXPO.

DigiCULT Thematic Issue 3 will follow the third DigiCULT Forum on 'XML: Towards an Interoperable Semantic Web for Heritage Resources', that will take place at Fraunhofer IPSI, Darmstadt, Germany on January 21st, 2003.



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