Australian Library and
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Refereed Paper

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Biography

Nandu Thundatil is currently the ICT Business Manager with the Electronic Library Services Division of State Library of NSW. He is a professional member of the Australian Computer Society (ACS), Institute of Engineers (IEAust) and Association of Information and Image Management (AIIM).

Nandu Thundatil has more than 12 years of professional experience working in the Information Technology industry in various roles such as Technical Director, Architect and Senior Software Engineer with organisations such as IBM, Sapient, Keycorp and ERG. He has been involved in implementation of web-based enterprise solutions for both private and public sector organisations. He was involved in designing and developing enterprise portal solutions using web technologies such as J2EE and .NET for organisations like Sony Australia, Australian Tourism Corporation, Corporate Express and State Emergency Services and Telstra.

In his current role at the State Library of NSW Nandu Thundatil is responsible for implementing Enterprise Architecture which includes, technology standards, Information and Management Technology (IM&T) related Policies and Procedures, Information Security Management and Application Portfolio Management.

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Architecture for implementing a sustainable electronic delivery services platform – atmitchell.com case study

Abstract

In line with the NSW and federal Government's focus on Electronic Service Delivery, libraries today face the challenge to streamline and standardise their electronic services, and provide cost-effective access to their collections. To address this issue of Electronic Services Delivery, the State Library of NSW (SLNSW) launched an initiative called 'atmitchell.com' in mid-2004 to digitise and make available via the internet its unique and iconic collections. Early on in the atmitchell.com initiative, SLNSW identified the design and implementation of a sustainable technology platform as one of the critical factors for the overall success of the atmitchell.com initiative.

This paper focuses on the Information Technology aspect of the atmitchell.com initiative and will describe the following key aspects of the initiative:

- Key issues and challenges currently faced by SLNSW in the areas of archival collection management, data integration, storage, network infrastructure and digitisation
- Target Architecture Framework Model for atmitchell.com and how it aligns with the atmitchell.com project objectives
- Insight into the atmitchell.com technology evaluation and tender process

As part of describing the target architecture framework for atmitchell.com, this paper will focus on enterprise content management technologies including:

- Digital Asset Management (DAM)
- Web Content Management System(WCMS)

The DAM component along with the appropriate workflow technologies will help SLNSW automate and streamline its Original or Archival Collection Materials digitisation and cataloguing process. The WCMS component will help SLNSW to standardise and automate its enterprise content publishing process to different delivery channels such as internet, intranet, wireless devices (e.g. mobile phones and PDAs).

The overall purpose of atmitchell.com technology platform is to function as the eService delivery 'brand' and 'channel', for the State Library of NSW as an organisation. The Library's vision for 'atmitchell.com' is to digitise key iconic items in its collection and bring it to the world via the internet.

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Introduction

In July 2004 the State Library of NSW (SLNSW) launched an initiative called 'atmitchell.com' to digitise and make available via the internet its unique and iconic Australiana collections. Early on in the project, SLNSW adopted the strategy to implement the project in three main horizons or phases. Diagram 1 represents the concept of the three horizons.

Each horizon has specific objectives that once achieved will help build the foundation for the next horizon. Horizon 2 is the propagation phase of atmitchell.com and it builds upon the education or brand awareness phase of Horizon 1, and provides the sustainable business and technology platform for subsequent Horizon implementations.

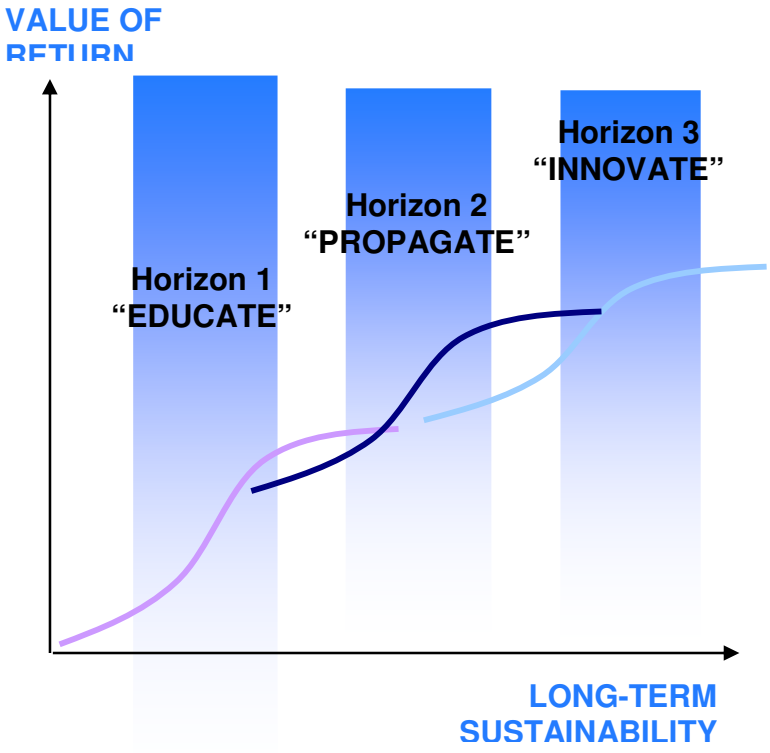

Figure 1: atmitchell.com Horizons

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This case study paper focuses on the Horizon 2 Information Technology aspect of the atmitchell.com initiative. The first section in this paper gives a background of the atmitchell.com initiative including some of the significant achievements in Horizon 1, and describes the Horizon 2 project objectives. The second section gives an overview of the unique and iconic Australiana collections in SLNSW. The third section describes some of the key issues and challenges that were identified as part of the enterprise architecture review undertaken in October 2004. The fourth section describes the target architecture model for atmitchell.com that was defined early on in Horizon 2 to address some of the key issues and challenges described in the earlier section. Using the target model as the basis for technology evaluation and selection, the last section in this paper gives an insight into the tendering process adopted by SLNSW to procure digitisation, technology solution and system integration services in order to implement a sustainable electronic services platform.

Background

The SLNSW has been digitising, managing and publishing content, including web content, for over a decade. However, the current manual processes, architecture and technology infrastructure that have been used will not support the SLNSW future electronic delivery services requirements.

In August 2004 the library launched five main strategic streams of work as part of the atmitchell.com initiative. The five main strategic streams include:

- **Enterprise Architecture Review** to review current state architecture and define a target state architecture model
- **Branding and Communication** strategy to market and promote the atmitchell.com brand
- **Partner Acquisition** stream to select prospective partner firms to assist the library in areas like, technology products, User experience and Hosting
- Define **User Experience** concepts and scope for atmitchell.com Horizon1 (H1) website including a website audit and development of a target Information Architecture (IA) sitemap
- Develop an Intellectual Property (IP) **Commercialisation** strategy to help identify potential and viable streams for revenue generation

As part of the Enterprise Architecture Review, some of the key issues and challenges faced by SLNSW were identified. These

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issues are described in detail later in this paper. As part of the User Experience stream, SLNSW developed a concept called 'Journeys'. Journeys link key iconic collection items and digitised material with curatorial knowledge and expertise, enabling an engaging client focused presentation or view on the web.

In March 2005, the library launched the atmitchell.com Horizon 1 website (SLNSW, 2005) with the online journeys Voyages of Discovery, Antarctica and Macquarie Era. Most of the design and development effort in building the Horizon 1 atmicthell.com website was focussed on user experience elements, such as graphic design, site look and feel, site navigation and interactive flash elements, in order to meet the Horizon 1 project objective i.e. promote the atmitchell.com online brand and educate the market on the 'Journeys' concept. The H1 website was implemented on SLNSW existing Cold Fusion and SQL platform with minimal backend functionality.

In September 2005, the atmitchell.com website won an international Standards of Excellence Web Award 2005 under the government website category (http://www.webaward.org/winner.asp?eid=4130). Since the March 2005 Horizon 1 launch, SLNSW have added new journeys Aviation in Australia sponsored by Qantas, Indigenous Australians sponsored by Rio Tinto, Cricket in Australia sponsored by Sir Ron Brierley and Temples of Commerce sponsored by Woodhead International.

Soon after the atmitchell.com H1 website launch, SLNSW defined the project objectives for Horizon 2 and started working with SLNSW business stakeholders to gather business and technical requirements for the Horizon 2. The main objectives of the atmitchell.com Horizon 2 project include:

- Accelerate transformation from a predominantly *physical* library to substantially increased *digital* library capabilities i.e. archival collections are to increasingly have digital sources of information and curatorial expertise and knowledge are to be increasingly available digitally.
- Increase the number of content journeys on the atmitchell.com website by increasing the ingestion of digital assets and web content by a significant factor and to implement streamlined business process from ingestion of digital assets through to publication of journey content to the web.
- Deliver a strategic and sustainable architecture and technology platform to support the business objectives and to implement a technology solution for the capture, management, and publication of atmitchell.com content.

SLNSW Collections

The SLNSW collections, with a particular focus on Australia and the Pacific, are a major national cultural

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asset valued at $1.9 billion. The main areas covered by the collections are Australian history, culture and literature, Indigenous and Torres Strait Islander studies, Antarctic exploration, family history and genealogy, business and management, social sciences, applied science, biography, health and law.

There are over five million items including monographs, pictures, posters, ephemera, sheet music, talking books, maps, CD-ROMs, newspapers, microfilm and fiche, films and videos, computer software, kits, sound recordings, photographs, objects, architectural plans, coins and postage stamps. The SLNSW has the following specialist collections:

- Mitchell Library and Sir William Dixson Research Library printed books collections
- Manuscript collections
- Pictorial collections
- Photographic collections
- Map collections
- Microform collections
- Oral history and sound recording collections
- Rare books and special collections
- Newspaper collection
- Online collections

Figure 2: Some of SLNSW archival collection items

Significant Items in the Collections

Below are some of the significant items in the SLNSW collections:

- Original accounts of the voyages of the great explorers Abel Tasman, James Cook, Bass and Flinders, and William Bligh including 9 of the 11 known journals of the First Fleet.
- Paintings and sketchbooks by great colonial artists John Glover, Conrad Martens, Eugene von Guerard, Tom Roberts.
- Literary papers of famous authors Patrick White, Elizabeth Jolley, James McAuley, Miles Franklin.
- Plans and Designs by leading architects Jørn Utzon, Harry Seidler, Glenn Murcutt.

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- Extensive collections of books, newspapers, maps, manuscripts, photographs, oral history, films and videos documenting all aspects of life in NSW.
- The first Australian newspaper, the *Sydney Gazette* and *New South Wales Advertiser* 5 March 1803.
- The oldest surviving Australian photograph, Daguerreotype of Dr. William Bland 14 January 1845.

Key Issues and Challenges

As part of the Enterprise Architecture review undertaken in Horizon 1, SLNSW defined a number of key issues and challenges. The issues were categorised into three main categories namely, data, process and network. The issues and challenges described below formed the basis for architecting the target architecture model for atmitchell.com.

Data

1. No metadata standard to represent archival collection items. The current archival collection management system, also known as PICMAN is built on a proprietary database system and does not use any standard metadata schema to describe the collection records. The collection records are stored in a raw text format and do not use open industry standards like XML to represent metadata. Also the collection objects digitised have no standard technical or administrative metadata associated with the individual digital object. SLNSW implemented the proprietary PICMAN database in 1992 because the Library Management System (Millennium) which supported only MARC records was not adequate to represent archival collection materials like, pictures and manuscripts.

2. No single view of SLNSW customers. Over time, business units within the SLNSW enterprise have implemented different types of customer management applications to capture and maintain their customer data. This has resulted in more than one customer database within the SLNSW IT infrastructure. For example, Foundation uses a customer database application called Raisers Edge to maintain Foundation members, the Education and Training division maintains its member details in Excel spreadsheets and Reader Services maintains all their client information in the Millennium library management system database. In order for SLNSW to deliver a consistent and efficient electronic service it is critical to have a single-view of all SLNSW customers and this will require integration and consolidation of the different customer databases within the enterprise.

3. No data integration between business critical applications. Currently there is very limited data integration between the four key SLNSW business critical applications namely, Millennium library management system, PICMAN archival collection management system, TRIM records management system

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and Oracle financial system. As a result of this most of the collection management processes are semi-manual and staff manually enter the same information in two different applications or systems.

Process/Function

1. Archival Collection Management is a semi-manual process.

The current business processes implemented in SLNSW to manage archival collection items i.e. from ingestion of digital objects through to cataloguing and publishing to web is a semi-manual process. For SLNSW to achieve one of its main atmitchell.com objectives i.e. to substantially increase the number of online Journeys, one of the main challenges will be to ramp-up and automate both the digitisation and metadata creation processes. Since the digitisation and metadata creation are two entirely different processes, it will be a challenge for SLNSW to reduce the gap between the two processes. Diagram 3 illustrates the gap that will remain between the two main archival collection processes.

With digitisation, most of the processes can be automated using today's scanning and imaging technologies. But with metadata creation for collection items, especially the creation and entry of descriptive metadata, it will always remain a semi-manual process as it involves highly intellectual curatorial and library staff time to research and create descriptive metadata for each collection item or original material.

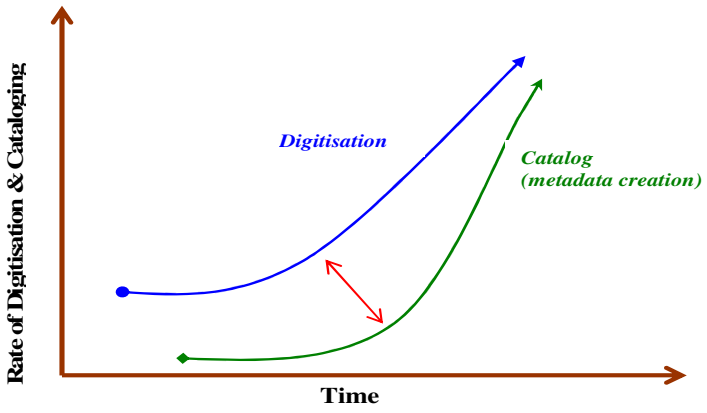

Figure 3: Gap between the rate of digitisation and metadata creation

2. No federated Search function across heterogenous repositories.

SLNSW currently maintains several data repositories namely, Millennium database for published material, PICMAN database for original or archival

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collection items, CD-ROM databases, Infokoori and Infoquick databases for newspaper collections. SLNSW also subscribes to 90 external electronic resources provided by 30 suppliers from Australia and overseas.

Currently the library provides its clients different search interfaces to search specific databases and online resources. Most of the search interfaces are native to the database system and usually provided by the database product vendor. For example, clients use the online catalogue interface to search the bibliographic records in the Millennium database and the Spydus search interface to search archival collection records in PICMAN. There is no single federated search interface available online for clients to search across the repositories.

3. Web content management is manual and not de-centralised.

Over the past decade, the total number of websites, both internet and intranet sites maintained and hosted by SLNSW has grown organically. Currently SLNSW IT division maintains in excess of 15 separate websites. The current content authoring model is not de-centralised and IT web developers have to often convert, format and publish content from business owners to one or more websites.

Network

1. No integrated and sustainable eServices delivery technology platform

Electronic services are currently implemented using different technology platforms includnig, Microsoft ASP, Cold Fusion and open source technologies. Some of the back office applications initially implemented for a smaller user group using technologies like MS Access have grown substantially in terms of both data and users. This has resulted in several point solutions and has made integration between applications very cumbersome. For SLNSW to deliver its current and future electronic services across different channels in an consistent and efficient manner it is critical to have a well integrated, robust and scalable sustainable technology platform.

2. Single points of failure in IT infrastructure

The SLNSW network and server infrastructure have grown substantially in the past 10 years with the implementation of several point solutions including websites and data repositories. The current infrastructure has single point of failures from the firewall layer through to application server and database layers.

3. Storage infrastructure is not scalable to support substantial increase in digitisation

With demand for storage increasing over the past few years, SLNSW has been scaling up its Storage Area Network (SAN) storage disks to meet storage needs

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from different business units for email, document and image file storage. Currently all digital images both working files and published images, are stored in SAN. Regular backups of digital images are stored off-site on tapes. The SAN infrastructure consists of a high-speed and low-speed SAN. Files are manually moved from high-speed to low-speed SAN without any version control. Archiving is a manual process and would benefit significantly from automation. The current storage infrastructure cannot support the atmitchell.com digitisation demands, which is approximately 30 terra bytes of digital objects estimated over the next three years.

Target Architecture Model

The Target Architecture Model for atmitchell.com was used as a framework to guide the SLNSW atmicthell.com Horizon 2 project team with the technology evaluation and selection process. From a broader perspective, the SLNSW enterprise architecture team will use this model as an enterprise content architecture to get maximum business value from existing content and help shape future content management technology choices.

The Target Architecture Model for atmitchell.com addresses most of the issues and challenges described in the previous section of this paper. A modular and service oriented approach was used to architect the target model for the atmitchell.com initiative. With the proposed target architecture model SLNSW envisage an information future in which serious scholars and the casually curious alike can easily isolate the cultural treasures they seek from the atmitchell.com website. The target model will also help SLNSW build a robust, scalable, sustainable IT environment. The challenge is to make sure the Archival Collection Management System and Digital Asset Management System forms a logical extension of the current Integrated Library Management System.

The proposed target architecture model is built around the principles of:

- **Availability** – the ability to make available 24x7 all the SLNSW electronic services by building redundancy across all layers of the IT architecture.
- **Interoperability** – the ability to gather and distribute components developed in one location with one set of tools on a platform in another location with a different set of tools or platform, the use of Metadata Standards facilitates interoperability.
- **Maintainability** – the ability to maintain and support the IT infrastructure using standard administration tools and systems and to seamlessly support any enhancements undertaken to fulfil future SLNSW electronic services requirements.
- **Scalability** – the ability to withstand changes in demand and technology without requiring re-design or re-coding.

The main aim of the atmitchell.com Target Architecture Model is to increase application portability and interoperability as well as reduce cost and complexity. This architecture model supports both the SLNSW enterprise and atmicthell.com business models and provides the technical foundation for effective IT strategies.

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The target architecture model described in Appendix 1 is not specific to any technologies or products.

Digital Asset Management

The term Digital Asset Management (DAM) arose from the printing and publishing industry, and its variant Media Asset Management (MAM) from the broadcast industry. DAM remained a niche market until recently, when several factors such as, availability of low-cost storage to hold rich-media assets, high-speed connectivity making transfer of digital files feasible coincided to drive it toward the mainstream.

DAM is an integrated suite of infrastructure components used to capture, catalogue, store, and manage digital assets, and to expose those assets to creative tools for producing video, audio, web, and print content. For the purpose of this paper, we do not consider the imaging and scanning technologies used to create digital assets as part of the DAM infrastructure.

Some of the main DAM elements include:

- Viewing assets as digital content plus the associated metadata that enables it to be identified
- The ability to group individual assets to form collections or packages of assets
- The ability to ingest, index, catalogue, navigate, transform, re-purpose, and publish to a wide range of digital formats while protecting integrity of the original assets
- Enterprise capability and linkage to technical infrastructure e.g. network, storage, database
- Ability to administer and control the flow of assets into and from the system, as well as the groups and individuals who have access to assets

The management of intellectual property rights will be a prerequisite for the widespread adoption of DAM. Most commercially available DAM products include workflow tools to help manage the flow of assets through the enterprise. Workflow tools will be important to streamline the archival collection business processes and will have to be integrated with Web Content Management workflows for efficiently publishing online journeys in the atmitchell.com website. SLNSW will use the DAM product workflows to implement its archival collection management processes.

Technology Evaluation and Selection Process

SLNSW undertook a two stage tendering process to evaluate and select appropriate technology solution and services for atmitchell.com Horizon 2 i.e. to

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establish a sustainable technology platform to deliver present and future electronic services, and to establish a single web presence. The timeline for implementing this two stage tender process is illustrated in Diagram 5 below.

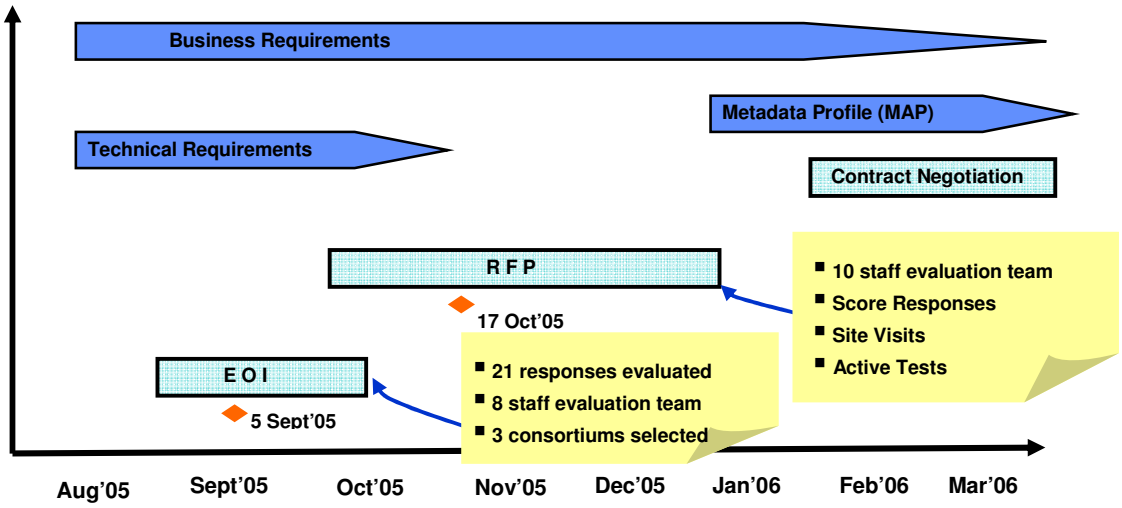

Figure 5: Timeline for the two stage atmitchell.com tender process

In August 2005, SLNSW made a decision to go ahead with a two stage tender process i.e. Stage 1: issue an Expression of Interest (EOI) and shortlist tenderers and Stage 2: issue a Request for Proposal (RFP) to the group of companies short listed in stage 1. Due to project time constraints SLNSW made a decision to issue a single EOI and RFP for the provision of digitisation services, technology products and system integration services.

A steering committee was established to oversee the tendering process, a project co-ordination team to manage it, and an evaluation team consisting of SLNSW staff representatives from both IT and business units to review and evaluate proposals from Tenderers.

The EOI provided high-level scope and requirements for atmitchell.com Horizon 2 and was issued on 6 September 2005, and closed on 26 September 2005. A total of twenty one (21) responses was received. Three respondents that provided all the services i.e. digitisation, technology solution and system integration services sought by the EOI were invited to participate in the RFP as the second stage of the tender process.

The RFP provided detailed scope of services and business requirements and was issued to the three consortia on 17 October 2005, and closed on 8 November 2005. The RFP sought solutions and services

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for the following eight business domains:

- Digitisation Services
- Digital Asset Management
- Archival Collection Management System
- Web Content Management System
- Federated Search
- Business Process Management / Workflow
- e-Commerce
- Systems Integration

The proposals from the three consortia were evaluated by the SLNSW evaluation team against the selection criteria outlined in the RFP. These included company background, proposed solution, statement of compliance, active test, site visit, referees and overall representation. As the selection criteria were not of equal importance, weightings were applied to ensure the assessment accurately reflected the priorities of the SLNSW.

The RFP evaluation was undertaken over a two month period i.e. from November 2005 to December 2005 and consisted of four stages: initial review of proposals, detailed evaluation, site visits and active tests, and financial viability. Throughout each stage of evaluation process the SLNSW evaluation team scored the Tenderers against the selection criteria. These scores were summed and averaged and weightings applied, and all criteria tallied to develop a total quality score. The consortium that offered the best value for money and the consortium with the highest quality score were recommended for consideration to the steering committee.

In the active tests, each consortium were required to digitise five collection items provided by SLNSW and demonstrate end-to-end process from ingestion of digital images into the DAM to content publishing using WCMS using a workflow tool. The active tests provided the evaluation team with an opportunity to evaluate suitability of technology solutions proposed by the Tenderers to the requirements of the SLNSW.

Conclusion

By adopting the strategy to phase the implementation of atmitchell.com into three major Horizons, SLNSW had a well defined roadmap for the next three years to progressively digitise iconic items in its Australiana collection and bring it to the world via the internet. In Horizon 1, we marketed 'atmitchell.com' as the SLNSW online brand and introduced the concept of Journeys with minimal changes to our existing technology infrastructure. And in Horizon 2, we established a target architecture model before selecting and implementing the sustainable technology platform and digitisation services. Hence we suggest organisations to adopt a phased approach and have a well defined project roadmap for each phase instead of adopting a big bang approach.

Our recommendations to organisations that are planning to embark in to similar strategic initiatives like, atmitchell.com is to

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undertake an enterprise architecture review and define a target information technology architecture model early on in the project before going to the market to procure technology solutions and services. For SLNSW, the target architecture model and the high level business requirements formed the basis for the Horizon 2 technology evaluation and tender process. Organisations should ensure that their tender evaluation process includes critical steps such as, site visits and active tests to evaluate suitability of technology products to their specific requirements.

References

Arms, WY, Blanchi, C. and Overly, EA. (1997) An Architecture for Information in Digital Libraries, *Corporation for National Research Initiatives, D-Lib Magazine*. Retrieved Sept. 20, 2006 from http://www.dlib.org/dlib/february97/cnri/02arms1.html

Fische, T. and Sauls, B. (2001). *DAMS: The advantages, justification, pitfalls and implementation*. Retrieved Sept. 20, 2006 from http://www.techexchange.com/thelibrary/DAM2.html

Kraffzig, D, Banke, K. and Slama, D. (2005). *Enterprise service oriented architecture*, Pearson Education Inc.

Linden, J, Martin, S, Masters, R. and Parker, R. (2005). *The large-scale archival storage of digital objects*, The British Library.

Lynn, C. (2002). *Digital asset management: The product landscape*. Retrieved Sept. 20, 2006 from http://www.cmswatch.com/Feature/76-DAM-Landscape

McCord, A. (2002). *Overview of digital asset management systems*, University of Michigan.

National Information Standards Organisation. (2004). *Understanding Metadat*a. 2004. Retrieved Sept. 20, 2006 from http://www.niso.org/standards/resources/UnderstandingMetadata.pdf

Open Text Corporation. (2005). *Livelink ECM White Paper.* Retrieved Sept. 20, 2006 from http://www.opentext.com.au/corporate/ECM_positioning.html

*Standford digital library initiativ*e. Retrieved Sept. 20, 2006 from http://www.artesia.com/pr/standford.html

State Library NSW (SLNSW). (2005). *Atmitchell.com*. Retrieved Sept. 20, 2006 from http://www.atmitchell.com/

WGBH DAM prototype, IDC eBusiness case study. Retrieved Sept. 20, 2006 from http://daminfo.wgbh.org/

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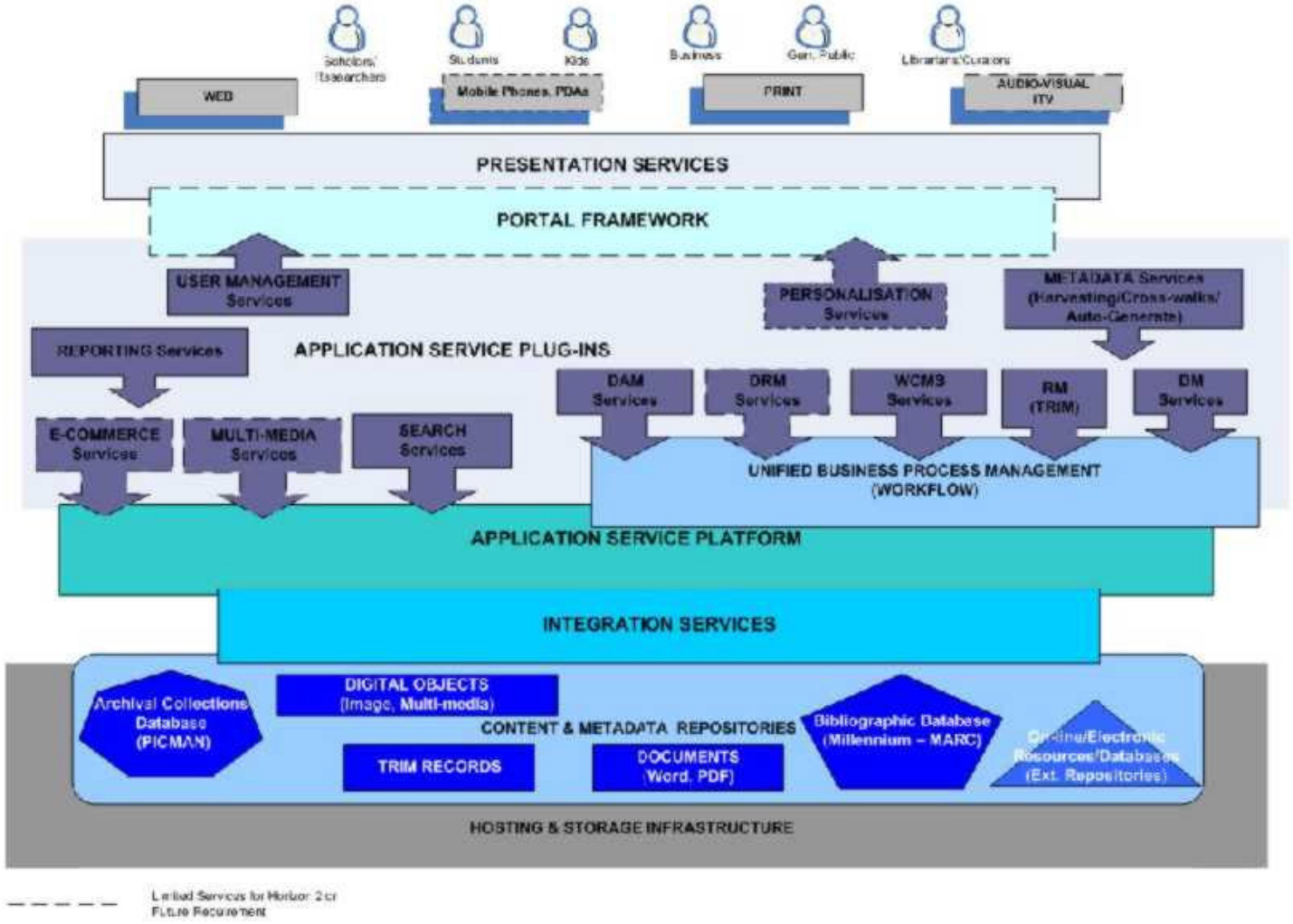
Appendix 1

Target Architecture Model for atmitchell.com



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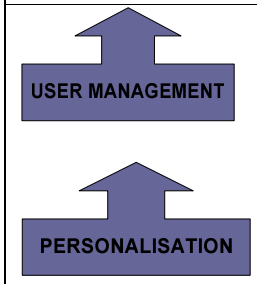
The architecture components (layers and application plug-in services) illustrated in the target model in Diagram 4 are described in a tabular format in Table 1 below:

Description of architecture components in atmitchell.com target model

Model Reference	Architecture Component/Service Description
	The presentation layer is required to render dynamic and static content across different types of delivery channels and devices. Typically, this layer is implemented using standard technologies like, xHTML, cHTML, XSLT, Flash, Java Applets on standard HTTP web server like, IIS, Apache.
	Portal framework will deliver personalised application services in a consistent and customised manner for both SLNSW clients and staff. A portal will enable SLNSW to implement single sign on functionality for public clients and SLNSW staff.
	User management and personalisation application plug-ins are required to implement user roles and to target content to specific user groups. Portal frameworks usually come bundled with user management and personalisation services. These services could be customised to implement specific SLNSW client and staff requirements.
	Scalable e-commerce service is required to implement library shop and membership functions online. These services will provide standard e-commerce functions like, shopping cart, online order creation, online payment processing and fulfilment.
	Federated Search services are required to implement a single search user interface for SLNSW clients to discover and retrieve information from heterogenous repositories and external electronic resources. Federated Search services typically provide translators to convert a client's search query to multiple queries specific to each database or resource. And

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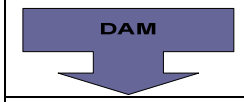
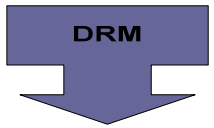
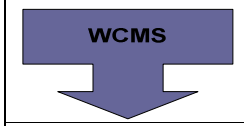
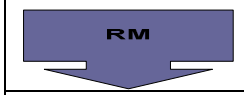
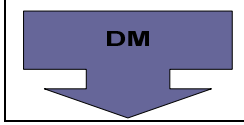
	to display the search results from different databases in a consistent manner to the user.
Model Reference	**Architecture Component/Service Description**
	Media services include functions like, streaming audio or video content and searching rich media assets. This will be required to manage and deliver digitised audio and video collection items e.g. oral history, video tapes collections.
	Digital Asset Management services are required to manage all types of digital assets created by digitisation of SLNSW collection items.
	The management of intellectual property rights will be a prerequisite for the widespread adoption of DAM. A Digital Rights Management (DRM) system would store the basic ownership information and process rules for assets e.g. price, duration of license, frequency of access, and ability to transfer to other users. The DRM system would encrypt assets where needed, and would process and track royalty payments associated with the use of assets by various constituent groups.
	Web Content Management System will enable SLNSW to move from a centralised authoring model to a de-centralised model for web publishing. WCMS will be mainly used by SLNSW staff to publish Journeys to the atmitchell.com website.
	Records Management services are required to manage corporate records. SLNSW currently uses a packaged software solution called TRIM from Tower for records management.
	Electronic Document Management (DM) services are required for versioning and managing all types of electronic documents within the SLNSW enterprise. Implementing a DM service will also help SLNSW better manage and control its back-office storage requirements.

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BUSINESS PROCESS MANAGEMENT (WORKFLOW)	A unified workflow engine is required to implement all the SLNSW business processes associated with digital asset management, archival collection management, web content management and electronic document management services.
APPLICATION SERVICE PLATFORM	All business logic and common application services like, security, session and transaction management, fail over will be implemented in this layer. The application service layer is typically implemented on a standards based .NET or J2EE application server.
Model Reference	**Architecture Component/Service Description**
INTEGRATION SERVICES	Integration services are typically either interfaces or adapters to connect the application layer to the different types of content repositories. Integration using web services will enable SLNSW to implement a standards based data integration between business critical applications.
CONTENT REPOSITORIES	The content repositories layer is a collection of all the different types of SLNSW repositories including catalogue records databases for published materials, archival collection item records and external electronic databases.
HOSTING & STORAGE INFRASTRUCTURE	Hosting and storage infrastructure is required for staging and production environments including servers, SAN, network devices and internet gateway. SLNSW will implement a Hierarchical Storage Management architecture to manage storage of approximately 30 terra bytes of digitised objects over the next 3 years. This service could be provided by ISPs with a secure, robust and scalable data centre facility.

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