The Changing Landscape

Records and Information Management in the 21st Century

By Linda Shave
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The digital revolution and the rate that new technology is rapidly evolving is impacting our workplace. Cloud computing, big data, machine to machine, mobile devices such as tablets, smart-phones, wearable devices, and social networks are disrupting our traditional ways of working.

Organisations large and small are considering the transition from traditional ‘analogue’ approaches for creating, capturing, storing, managing and preserving their business information to cloud-based solutions, the hyper-connected world of ‘digital’ and the internet of things (IoT). Interconnection between people, mobile technologies, anytime, anywhere and any place.

As this dynamic world unfolds, records and information professionals like organisations face a stark reality – change or perish. Digital born documents, mobile content management and virtual information asset management are new and evolving areas. A new world is unfolding for the next generation record and information management professional.

The 21st century records and information professional must adapt, they will need to transition from the analogue world and go on a journey of discovery exploring evolving trends, challenges and opportunities of the digital era.
About this book

This book is a must-read for all records and information professionals, managers, consultants, entrepreneurs, and students who have been discussing, reading or studying digital recordkeeping and who are interested in knowing how they can capitalise on the next wave of business information management innovation.

‘New tools, new rules’ - few concepts have transformed business more profoundly than the digital revolution. The 21st century records and information professional is being forced to re-examine traditional record and information management approaches and develop innovative strategies that are agile to continuous change.

Opinions, views and statements given in this book represent the authors views only and have been based on articles, presentations, discussion forums and workshops that I have written, delivered and participated in over the last ten years. They are not necessarily endorsed by records and information management professional associations.

This book ‘The Changing Landscape - Records and Information Management in the 21st Century’ is divided into 6 chapters.
Chapter 1

The birth of the records management profession

- The evolution of the records management profession
- Reflecting on the timeline of changes
- Snapshot of events

**The evolution of the records management profession**

The human need for textual based information is as old as the art and science of writing things down. The invention of the printing press made possible the production of multiple copies of documents possible. The copying of business letters, reports and correspondences were hand written. Such hand written documents needed to be catalogued, filed and stored for future reference so that the information they contained would not be lost.

From 1867, a technology revolution arrived in the form of the ‘typewriter’ and typed written textual documents began to be created. Typed textual documents that everyone could read and with carbon paper copies could be made. Copies were generally filed in hard copy folders and placed in filing cabinets. Security was easy. Different colour folders for different classifications were placed into locked or unlocked filing cabinets. For the highest security, folders were placed into filing cabinets inside a locked secured room. Archiving was simple. When the folder was no longer needed, full or the filing cabinet was running out of space, we boxed them and had the boxes moved to a prescribed storage area.

The typewriter produced skilled secretaries, typist, typing pools and clerks whose entire career was based on the creation, storage and retrieval of textual documents but not necessarily the management of hard copy folders or boxes between the filing cabinet and storage area. The combination of these people, the typewriter, carbon paper, shorthand notebooks, correction fluid, eraser pencils and filing cabinets could be said to have set the first generation blue print for a document and records management system for business and government.

The birth of the records manager evolved at the end of World War II to resolve the chaos of managing the mountains of hard copy documents, folders and storage boxes.
The records manager and records management team (in simplistic terms) sat between the filing cabinet and storage area. Their primary role was to pick up storage boxes, catalogue, track, protect, archive and return hard copy folders and storage boxes on request. In 1969, the Records Management Association of Australia was formed and this marked the dawn of professional records managers and records management in Australia.

- Reflecting on the time line of changes

Reflecting on the time line of changes marks the start of a changing landscape for record managers. One of these changes goes back as far as 1961 with the introduction of the IBM 7090. It allowed users at different terminals to log into the computer and transfer files they were using onto the computer’s central hard disk thereby effectively using the operating system as a mail box. The sending of text-based messages between computers in this way therefore predates the existence of the world wide web and the internet.

In 1985, we saw the introduction of the first Microsoft Windows PC’s and word processing packages. This was the start of the explosion of hard copy printed documents and the gradual demise of typing pools, the typewriter and carbon paper became a memory of the past.

In 1995, the first ‘webmail’ (known today as email) programs were demonstrated, such as Microsoft’s Outlook. IT and business embraced the adoption of webmail as a business communication tool, and the printing out and filing of business related emails commenced.

During this period the records manager and the records management team’s role and tasks remained primarily the same. Although volumes of hard copy documents had grown the records manager and the records management team still sat between filing cabinets and storage area and their role still included picking up storage boxes cataloguing, tracking, protecting, archiving and returning hard copy folders and storage boxes on request.

In 1995, as previously mention, webmail tools such as Microsoft Outlook became a must business tool. The combination of word-processing and email had an adverse impact on records managers and the records management team. This technology phenomenon contributed to a range of record management deliberations by industry professionals. Outcomes of these ponderings was to provide theories, frameworks, standards, policies and guidelines on how to manage and preserve the volume growth of printed hard copy documents and the associated record management challenges.
The 1990’s also saw the expansion of capture, digital storage, scanning, Optical Character Recognition (OCR), Intelligent Character Recognition (ICR) and business software applications such as EDRM (electronic document and records management). It should be noted that from the mid-1960’s OCR was being used by companies for tasks such as bill payments and sorting mail. It was possible to connect OCR systems directly to computers, thus producing data as electronic files. ICR for data extraction from handwritten and textual documents started to emerge as a business tool in about 1993.

By 1995, 34 years had passed since OCR and Omni-font were available. PC’s were now embedded into the daily business routine with documents not only being printed but also saved onto network drives, floppy disks, USB and other storage devices. It would be another couple of years before digital scanning of hard copy records was to be considered as an IT solution to the growing hard copy document problem. This IT initiative was possibly the next change on the landscape for records managers and the records management team with IT taking control of ‘information and data’ management functions.

**Snapshot of events**

The term Cloud was introduced back in 1997. The concept is to provide cost effective and efficient network connectivity. The first Smartphone was introduced in 1997 with Web 2.0 applications arriving in 2003 and Twitter in 2006.

In about 1899 telegraph industry operators were ‘twittering’ to each other via Morse code and these messages were recorded on punch cards. Wireless transmission was used via mobile packs and phones for example in the field during the Second World War and as far back as the mid 1970’s telex machines and punch tapes were being used for overseas communications and languages such as IBM GML were used to format and print documents from mainframes.

Moreover, in 1969 the first concept of resource sharing computer networks which was named ARPANET (Advanced Research Projects Agency Network) connected four Universities; the University of California, Los Angeles, University of California, Santa Barbara, the University of Utah and the Stanford Research Institute. The first electronic mail was sent and the introduction of file transfer protocol (FTP) was used to transfer files between these Universities. ARPANET and the concept of resource sharing could be considered to be the predecessor of Cloud hosted services of today.

Big Data is a repercussion of the data explosion, not a new technology. Business are capturing terabytes or petabytes of fast changing data. A petabyte is approximately 1,000 terabytes or one million gigabytes.
The IT department and business are now struggling to manage data sets that are too large and too unstructured for analysis using traditional relational database techniques and tools. The IT and business departments are now facing Big Data problems in much the same way as the hard copy document invasion experienced in post-World War II era and again by records managers by the introduction of word processing, email, technology and business applications from the 1990’s.

The impacts of Big Data and Cloud are dissolving old business models by melting down traditional boundaries between business units, agencies, partners, customers and the citizen. There are new rules, new tools and new opportunities for records and information professionals in the shifting world of information and records management as the game and the landscape is once again changing.
Chapter 2

Understanding the business

- Business processes and workflow forming the foundation for collaborated processes
- Simple workflow lifecycle
- Understanding workflow and business process management
- Characteristics of different workflow models

• **Business processes and workflow - forming the foundation for collaborated processes**

Business savvy is thinking holistic not silo. Virtual information asset management is like a large case folder with real time transactions happening across multiple applications in single or multiple clouds. This necessitates a new way of thinking. Business processes and workflows form the foundation for collaborated processes and the link between people, data, business applications and technology Figure 1.

*Figure 1 – Sample collaborated process linking people, processes, workflows, data, business applications and technology.*
### Simple workflow lifecycle

The future record and information professional will require a better understanding of the organisation, business applications and technologies they use. They will need to understand virtual information and records lifecycles, what triggers an event, what business rules to use, how to manage the process, what closes an event, what data and information assets should be expected, where the data and information links are stored, who is involved, when are they involved and where they are located. Figure 2 - Sample workflow life cycle reflects a helicopter view.

![Diagram showing the life cycle of a simple workflow with inputs, decision process, manage process, completion process, and information and records life cycle.]

*Figure 2 – Sample workflow life cycle*

Records and information professional will require sound skills and ability in the areas of business processes, workflows and risk management. These skills form the basis for the new centre of knowledge and will go a long way to meeting the challenges ahead. Adopting a risk management strategy for business systems and Cloud Digital Records Management may help identify Moderate to Major risks (Table 1).
Table 1 – Sample risk management framework approach

- **Understanding workflow and business process management**

Workflow models are not new. As early as 1999 and 2002, the author presented at a number of conferences on topics such as ‘Out of the Fog into the Mist’ and ‘Bridging the Gap’. These presentations focussed on demystifying the various workflow and business process management (BPM) models for managing information and record assets into the future. In recent times the concept of using workflows and business process modelling has seen the introduction of new terms such as Social BPM.

Figure 3, reflects three workflow models; Ad Hoc, Transaction, and Knowledge Based. Suffice to say Knowledge-based (process centric) modelling will be the foundation for Cloud hosted workflow, Social BPM, and future virtual information asset management models.
Knowledge-based (process centric) modelling and business prefix-driven taxonomies will not only trigger workflow events but enable multiple intelligent tagging at the birth of the asset regardless of its object type (e.g. data, record, document, audio, GIS, video, social medial, messaging etc.). As records and information professionals we do not need to be UML modellers or even Java script writers.

We do need to understand how to capture, document and communicate the high level functions, activities and tasks as well as identify the touch points between business systems and what information assets we need. We need to know what to expect, what to capture, what to manage, archive and preserve regardless of locations. This knowledge will contribute to both technology and business innovation programs by adding value to the process.

- **Characteristics of Different Workflow Models**
  - **Ad Hoc Workflow**
    - normally uses e-mail for transmitting workflow documents.
    - is normally used by dynamic workgroups that execute individual processes for each document or object.
    - tasks can include spreadsheets, word processing and electronic forms (eForms).
    - is best suited to environments that follow the same process for approval e.g. travel claims, hiring staff, marketing a product etc.
- **Transaction-based Workflow**
  - normally requires a high level of customisation.
  - processes are usually lengthy and complex and can involve various departments.
  - is normally used in high-volume transaction or production based environments with very little change.
  - is best suited to complex environments with financial exposure and audit requirements e.g. loan processing, insurance underwriting and claims processing.

- **Knowledge-based Workflow**
  - Knowledge-based workflow currently falls into three process models:
    - **Mail centric**
      - normally uses existing modes of messaging and delivery service such as e-mail.
      - normally forms-based utilities that provide screen definition of forms for a variety of uses such as routing and approvals
      - uses intelligent agents that perform tasks when the user responsible is unavailable.
    - **Document centric**
      - focus is on the document as the unifying object in a workflow process.
      - documents are associated with owners, applications, rules, routing and processing.
      - document centric products provide facilities for document management such as annotation, check-in and check-out.
    - **Process centric**
      - used by high-end workflow applications.
      - usually rely on databases to store workflow data and definitions.
      - requires extensive programming facilities for scripting workflow applications.
      - requires extensive knowledge and understanding of business requirements, policies, procedures, legislations and business processes from front to back office and the boundaries that they cross.
Workflow Structures/Layers

- There are five structured layers:
  - Processes
  - Cases
  - Folders
  - Documents - Data
  - Rules/Applications

- Processes
  - Contains a series of ‘tasks’ and ‘rules’ that must be defined in the workflow system for each process that takes place.
    - For example - An accounts payable process has tasks such as invoices. Invoices over a certain dollar amount may require a higher level of approval hence each task and its associated rules must be defined.

- Cases
  - Every time an individual occurrence or instance of the process model is invoked a new ‘case’ is created.
    - For example - The processing of a single invoice for payment could be considered a ‘case’ in an account payable process.

- Folders
  - Folders contain a logical group of documents that can include text, image, video and data from many sources.
    - For example - The folder for accounts payable could contain the purchase order, invoice and financial information from an accounting system.

- Documents - Data
  - Data is represented by a single or collection of documents or objects which are enclosed within a folder and in turn controlled by a case.
    - In workflow the document represents not only ‘data’ but also the formatting, processing and presentation of the data.
      - For example - An invoice may require viewing a purchase order. The workflow system must be able to invoke and integrate the presentation of documents.
Rules/Applications

Rules define the specific processing activities involved in routing workflow documents. Rules consist of:
- Roles
- Routing
- Sequential routing
- Parallel routing
- Conditional routing

- Roles
  ✓ each participant has established roles which are set as part of the workflow definition.
  ✓ participants are described in terms of location, job function, supervisor and security level.
  ✓ participants may be an ‘individual’ or part of a workgroup or workgroups.
  ✓ workgroups can consist of individuals, departments or groups of individuals sharing the same job function.
  ✓ role definition allows for workload balancing and distribution to appropriate individuals based on skill levels.

- Routing
  ✓ Routing controls how documents or objects move from point to point in the workflow. There are three types:
    • Sequential
    • Parallel
    • Conditional

- Sequential routing
  • is clearly defined with little variation.
  • one task must be completed before the work is routed to the next point.

- Parallel routing
  • Parallel Routing - Allows multiple tasks to take place at the same time. Multiple processing of the same document can occur and be brought together at a ‘meeting’ point. When all processing is complete the next task will be initiated.
- **Parallel Workflow** - Routes may be completed at different times whilst concurrent workflow are completed at the same time. Although both may meet at the same point the parallel process may include ‘pend time’ along one of its routes.

- **Conditional routing**
  
  - conditional routing is determined by conditions that occur dynamically in the process.
  
  - workflow systems must determine the appropriate route based upon information received.

  - For example - an approval process where an invoice over $5,000 must go to the Finance Director the workflow system would automatically route invoices >$5,000 to the Finance Director.
Chapter 3

Cloud computing

- Cloud computing is not new
- What are Cloud offerings?
- Cloud deployment models
- Cloud security
- Cloud compliance
- Cloud location
- A Cloud process centric workflow sample

• **Cloud computing is not new**

Cloud computing is not new the term ‘Cloud’ was introduced back in 1997. The concept is to provide a cloud-based platform that brings disparate groups of people, internal, external customers and partners together in order to collaborate, share resources, data, information, workflows and processes. Cloud adoption is about maximising the value from shared resources, storage and data in order to create new value chains, products and services.

What is new about Cloud is that governments not only in Australia but around the world are mandating that agencies consider cloud first ready solutions as part of their Digital Strategies and Cloud First Policies. This trend can be traced back to the UK G-Cloud programme which has at its heart, ‘the CloudStore’. The CloudStore is an online marketplace from which public sector buyers can source pre-certified public cloud offerings. In Australia, government agencies need to demonstrate why they cannot use a cloud first solution.

Further, the rise of mobile, social, and cloud computing technology is driving other changes such as the move from the 2nd platform which has focused on decentralised computing LAN/Internets and client-server systems to what has been dubbed by IDC as the 3rd platform which will deliver the next generation of competitive advantage apps and services. The 3rd Platform will continue to expand beyond smartphones, tablets, and PCs to the Internet of Things (IoT) and to Web 4.0 which will provide the foundation for an Information-Centric Government eGov 4.0. Therefore, cloud computing is here to stay and as record and information professionals we need to embrace this change and become cloud savvy.
**What are Cloud offerings**

Cloud offerings (sometimes referred to as Cloud Service Models) come in the form of three main types (Table 2):

- Infrastructure-as-a-service (IaaS)
- Platform as a Service (PaaS)
- Software as a Service (SaaS)

<table>
<thead>
<tr>
<th>Cloud Software as a Service (SaaS)</th>
<th>The capability provided to the consumer is the use of the provider's applications running on a cloud infrastructure and accessible through a thin-client interface such as a web browser. E.g Gmail, Salesforce.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>- SaaS is often referred to as ‘on demand’ software.</td>
</tr>
<tr>
<td></td>
<td>- Software and its associated content are hosted centrally rather than in-house.</td>
</tr>
<tr>
<td></td>
<td>- Accessed by users through their internet browser.</td>
</tr>
<tr>
<td>Cloud Platform as a Service (PaaS)</td>
<td>The capability provided to the consumer is deployment onto the cloud infrastructure consumer-created applications.</td>
</tr>
<tr>
<td></td>
<td>- Provides both a platform and its solution stack as a service.</td>
</tr>
<tr>
<td></td>
<td>- PaaS facilitates developing an application that you will be using in the cloud. This means the application can be developed or customised without the cost and administration of having to buy the hardware and software in-house.</td>
</tr>
<tr>
<td>Cloud Infrastructure as a Service (IaaS)</td>
<td>IaaS can sometimes be referred to as Hardware as a Service (Haas). This is the capability provided to the consumer is the provision of processing, storage, networks and other computing resources.</td>
</tr>
<tr>
<td></td>
<td>- IaaS is a cost effective solution for a company’s computer systems infrastructure</td>
</tr>
<tr>
<td></td>
<td>- Some IaaS vendors offer large ‘full data centre’ style infrastructure (e.g. IBM).</td>
</tr>
<tr>
<td></td>
<td>- Other IaaS vendors offer a more ‘user centric’ service providing simple data storage capabilities such as Dropbox, Objective-Connect etc.</td>
</tr>
</tbody>
</table>

*Table 2 - Cloud offerings*
• **Cloud deployment models**

Cloud deployment models come in the form of four main types (see Table 3):

<table>
<thead>
<tr>
<th>Cloud Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Private Cloud</strong></td>
<td>A private cloud (also sometimes referred to as an internal or corporate cloud) is cloud infrastructure operated for a single organization and is managed internally or by a third-party, and hosted internally or externally.</td>
</tr>
<tr>
<td><strong>Community Cloud</strong></td>
<td>The cloud infrastructure is shared by several organisations and supports a specific community/communities.</td>
</tr>
<tr>
<td><strong>Public Cloud</strong></td>
<td>Most people associate cloud computing entirely with the public cloud. A public cloud consists of a service provider offering resources, such as applications and infrastructure (server, operating system, network connectivity, storage, etc.) to an organization, a group of organizations and/or individuals or the general public over the Internet.</td>
</tr>
<tr>
<td><strong>Hybrid Cloud</strong></td>
<td>A hybrid cloud environment can combine private or public clouds as well as on-premise implementations that are connected together to deliver the benefits of multiple deployment models.</td>
</tr>
</tbody>
</table>

*Table 3 - Cloud deployment models*

• **Cloud security**

Moving to cloud can result in an organisation relinquishing control over its information/data.

Organisations should develop and implement sound policies in relation to cloud hosted products and services. For example, organisations need to ask some simple but important questions like where is the data is to be located? how will data be accessed in the cloud? how will it be used? how it will be managed? how it will be returned, controlled and/or deleted?. Organisations need to verify whether any third parties will be accessing the organisation’s data, compliance requirements and the location of the hosted products and services.

Due diligence around security and its location needs to be scrutinised from three angles:
- Firstly – while the data is in remote storage.
- Secondly – while data is in transit.
- Thirdly – how data will be accessed, used in cloud, controlled, managed and returned.

**Cloud compliance**

The role that compliance plays in determining which cloud deployment model to adopt depends on a number of factors such as regulatory mandates, industry standards, audit requirements, geographic location and the capabilities and limitations of existing ICT infrastructure.

For government agencies/businesses that operate in a heavily regulated industry sector - it may be a requirement that for example your ‘ECM’ application and specific types of information remains ‘on-premise’ behind the company firewall rather than in the cloud.

In this type of scenario or instance, a ‘hybrid cloud’ ECM option could provide business benefits for managing unstructured content and the need to store certain data in the ECM on-premise application.

**Cloud location**

The location of where your cloud provider servers are geographically located, how information is stored and secured, how you will get your data back is a fundamental consideration in acquiring Cloud offerings, selecting provider(s), and deployment models.

It is important to determine if cloud providers can explicitly control all data to government, business and/or agency Security and Privacy requirements, regardless of where cloud offerings, servers, products or services are located.

Where the cloud service involves the disclosure of personal information across borders, the agency Security and Privacy requirements impose an obligation to ensure, that before information is disclosed to an overseas recipient, the organisation takes reasonable steps that the recipient will not breach Security and Privacy requirements.

Therefore, it can be assumed that business and agencies need to make certain that they do not export data/information to countries that do not have adequate data protection laws.
A Cloud process centric workflow sample

The sample Cloud workflow at Figure 4 is a simplistic view and for demonstration only. Its aim is to reflect on the activities, tasks and touch points between business systems and what information assets you might need to expect, capture, use, manage, archive and preserve regardless of location. It looks at an invoice scanning process.

Preparation, scanning and registering of invoices into an EDRM/ECM system remain much the same as any internal scanning of paper documents. In this example we will utilise OCR/ICR technology for the automated data extraction and FTP to push the metadata into the financial system. The metadata updates the financial system and then triggers the financials systems own internal ‘approval’ transactional workflow.

This financial transactional ‘approval’ process’ is subject to a number of business rules and checks confirming if the invoice is able to be paid. If the ‘approval’ process meets all business rules and checks, it will automatically escalate to the next step, which is the ‘approval to pay’ in Accounts Payable Cloud.

The Accounts Payable in the Cloud has a secured dynamic link to the EDRM/ECM system to view the invoice and other supporting documentation. If the invoice is cleared for payment, the Accounts Payable in the Cloud workflow will trigger the ‘approved for payment’ process. The ‘approved for payment’ workflow will then escalate to the Payment Transaction in the Cloud. Once the payment transaction is complete, a notification is automatically sent to the Supplier in the Cloud.

Figure 4 – A simplistic accounts payable process and workflow in the Cloud.
Chapter 4
Cloud open source records management

- Cloud open source ISO: 16175-2 compliant records management software model
- Meeting the challenges of open source records management
- Time for collaboration
- Can the Digital Recordkeeping Framework (ADRF) be adapted for Cloud open source records management?

- Cloud open source ISO: 16175-2 compliant records management software model

There has been much talk about cloud computing and benefits of cloud-based platforms in providing business with tools and cost effective solutions for managing mobile workforces, the big data explosion, virtual information asset management and the growing need for mobile content management. Many enterprises are still expressing concerns around risks such as security and privacy issues. They are asking questions in relation to intellectual property, location and ownership of data and information assets in the cloud.

Records and information management professionals are asking similar questions including what will be the impact of cloud open source and outsourced solutions on traditional recordkeeping and record management practices? What will open source records management as a service look like? What steps might they take in addressing the big data and the digital explosion? What tools might they use to embark on the journey?

Open source records management software is interesting because, to date, document/content management and records management software have had very different goals. Records management is based on ‘compliance’ (transparency) and is primarily based on regulated standards, file attributes, hierarchical structures and business classification schemas that have worked very well in classifying, tracking and managing analogue records in the physical (paper) world, but have been struggling since the digital explosion.

By contrast, databases and document/ content management systems are not based on regulated standards, but on best practices, business rules and processes with an outcome focus of mining data and
information in order to improve efficiencies, decision making and collaboration.

**Enterprise content management (ECM) suites** that combine document management, imaging, web content management, records management, workflows and document-centric collaboration are not new. So what is new? In open source software solutions it is the concept of enterprise information-centric approaches, metadata management, business processes and workflow modeling.

**Cloud open source ISO: 16175-2 compliant records management software model** was built on specifications as defined by the International Council of Archives (ICA) 2008 Guidelines and in collaboration with the Council of Australasian Archives and Records Authorities (CARA). These guidelines specifically address the Australian (ADRI) and New Zealand (PRA) records management requirements and four functional areas of the Australasian Digital Recordkeeping Framework (ADRF): making/managing digital records, keeping digital records, transferring digital records and using digital records.

- **Meeting the challenges of open source records management**

  Can open source software add value to future records management practices and meet the challenges of the big data and digital explosion? I believe it can, but care needs to be taken. As previously suggested, there has been a fundamental difference between past record management approaches and database, document/content management methodologies.

  There needs to be a balance between operational expectations, business rules, governance and compliance obligations. To date much of the focus has been on the long-term archiving aspect of records management, leading to some excellent standards for historic preservation, but these are failing to stand up to the current needs of records and information managers in meeting the day-to-day operational requirements.

  Open source records management has great potential. However, replicating contemporary problems that are already struggling, such as using metadata as a file attribute applied at the end of the document lifecycle, manually applying a business classification schema and inheriting security/access permissions from the folder into an open source record management solution will not solve current problems. It will only move them.

  Any transition to open source solutions for managing all information assets must take a holistic view of the entire life cycle of big data and
digital-born assets. This will require moving to information-centric and business taxonomy driven solutions that include recordkeeping as a fundamental underpinning element of the business process workflow. In other words, building solutions for the business with the business, as technology alone is not the panacea for all enterprise solutions. Adoption and change will come from understanding the underlying business requirements, the value of information assets, drivers, governance, current and future strategies.

- **Time for collaboration**

As businesses move to any open source and/or cloud hosted solution, record and information professionals need to become more agile in delivering information governance and recordkeeping as a process.

Scopeing and functional requirements, which are often trivialised and/or skipped is fundamental to a successful design and implementation of any open source software solutions now and into the future. Migration to open source solutions must have more substance to it than simply dumping data and objects indiscriminately. There is a need to work collaboratively with business stakeholders, IT and Record and Information professionals to ensure that the information assets being migrated are cleansed, have quality metadata and are complete and accurate.

Metadata is not new, it has been around since the 1960s and used in libraries for classifying and categorising materials. In an electronic document record management (EDRM) system, metadata has been traditionally applied at the end of the document life cycle as a file attribute. It has relied on the business knowing what classification/terms to use, how to title the ‘record’ and where to file the ‘record’ based on folder structures to organise agency/business information. Coupled with this, security/access permissions are customarily inherited from the folder in which the ‘record’ resides. This approach is silo in focus, inflexible and restrictive and generally relies on ‘records’ residing in a single location.

In open source solutions metadata management, processes and workflows will form the foundation for information asset management and be the link between people, data, applications and technology. Digital born information assets will inherit the appropriate recordkeeping retention rules, access and security permissions at birth from its metadata. Recordkeeping retention rules, permissions and security controls could automatically change based on who is using the information, its location and status e.g. draft, review, approved and its stage within a particular workflow.

To this end, record and information professionals need to be part of the IT project team, for open source solutions as they can contribute a
wealth of knowledge in the development, design, delivery and on-going monitoring of open source record management solutions. Such solutions should include a cultural transition program to intertwine and complement ongoing and evolving record management, recordkeeping and virtual information asset management needs. The new records and information professional with need open source record management skills to move forward with. This will be challenging, given the speed at which technology moves.

- **Can the ADRF framework be adapted for cloud open source record management?**

Yes. ISO: 16175-2 is a compliant records management open source software module built on specifications as defined by the International Council of Archives (ICA) 2008 Guidelines and the four functional areas of the ADRF. In its original format it might not be apparent how record and information professionals might be able to apply the ADRF framework as a valuable planning tool as business consider cloud strategies for open source opportunities for managing virtual information assets regardless of their type and location.

By adopting the BizWyse® colour matrix approach to the ADRF framework (Table 4) and extending it to include an information-centric approach that includes metadata management and Business Process Management (BPM), the matrix becomes a viable tool. The matrix uses a five colour palette of blue, yellow, green, pink and purple.

<table>
<thead>
<tr>
<th>Step 1</th>
<th>Functional requirements, process models, BPM including Social BPM, semantic web, metadata management and interoperability.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 2</td>
<td>Inter-relationships between functional requirements for creating accurate and reliable records, long-term formats, preservation, security, metadata management, risk management, information governance, expunging and migrations.</td>
</tr>
<tr>
<td>Step 3</td>
<td>Inter-relationships between preservation treatment and ongoing (cloud vault) storage and presentation.</td>
</tr>
<tr>
<td>Step 4</td>
<td>Inter-relationship between business functional classifications/taxonomies, metadata management, BPM including Social BPM, migration strategies and automatic transfer of records/metadata.</td>
</tr>
<tr>
<td>Step 5</td>
<td>Technology specifications, eGov3 Information Centric, Semantic Web, open source procurement and managing changing technology to sustain business/government over time.</td>
</tr>
</tbody>
</table>

*Table 4 – BizWyse® colour coded steps for use with the ADRF framework.*
The colour coding highlights the relationships between each of the four functional areas and provides a simple colour chart to follow. Extended features highlighted in italic text, provide an holistic view of how to map it across platforms including cloud. (Table 5).

**Four functional areas of the ADRF framework**

<table>
<thead>
<tr>
<th>1. Making and managing digital records</th>
<th>2. Keeping digital records (both in the agencies and in the archives)</th>
<th>3. Transferring digital records to archives</th>
<th>4. Using digital records and archives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Creating accurate and reliable records</td>
<td>Preferred data formats for long-term preservation</td>
<td>Preferred data formats and methods for transferring records to archival custody.</td>
<td>Legal provisions affecting access to archives in digital form</td>
</tr>
<tr>
<td><em>Metadata management, Semantic tagging, risk management, information governance</em></td>
<td><em>Metadata management, Semantic tagging</em></td>
<td><em>Metadata management, Semantic tagging and interoperability.</em></td>
<td></td>
</tr>
<tr>
<td>Classification and control metadata for records</td>
<td>XML-based approaches to digital preservation</td>
<td>Methods for automatic transfer of recordkeeping metadata</td>
<td>Expunging of sensitive data from public access copies</td>
</tr>
<tr>
<td><em>Metadata management, Semantic tagging, SaaS</em></td>
<td><em>on-going strategies to be built into solutions and monitored</em></td>
<td><em>Metadata management, Semantic tagging, BPM including Social BPM, SaaS</em></td>
<td><em>Metadata management, Semantic tagging and risk management, information governance</em></td>
</tr>
<tr>
<td>Technology-specific issues for records (eg email; encryption; web-based resources)</td>
<td>Migration paths for long-term digital records</td>
<td>Maintenance of provenance and authenticity</td>
<td>Storage and presentation of preserved data formats</td>
</tr>
<tr>
<td><em>SaaS</em></td>
<td><em>Metadata management, Semantic tagging, BPM including Social BPM, SaaS</em></td>
<td><em>Metadata management, Semantic tagging</em></td>
<td><em>Cloud vaults, IaaS</em></td>
</tr>
<tr>
<td>Functional requirements for recordkeeping systems.</td>
<td>Preservation treatment of specific data formats (eg database-derived records; web-based materials)</td>
<td></td>
<td>Certification of provenance and authenticity</td>
</tr>
<tr>
<td><em>SaaS, Semantic web, metadata management and interoperability.</em></td>
<td><em>Active preservation, watermarking</em></td>
<td></td>
<td><em>Metadata management, Semantic tagging</em></td>
</tr>
</tbody>
</table>
| Model procurement specifications  
IaaS, PaaS, HaaS, SaaS | Process models for preservation of digital records in agency custody  
**BPM including Social BPM, SaaS** | Fraud prevention  
**Metadata management, Semantic tagging, risk management, information governance, mobile device management** |
|---|---|---|
| Compliance assessment and/or self-diagnosis  
**Policies, procedures, contracts** | Dealing with changes in the machinery of government over time  
IaaS, HaaS, PaaS | Data re-formatting and presentation (eg databases)  
**Active preservation, migration** |
| | Process models and recommendations for retrieval of records from defunct systems or media  
**BPM including Social BPM, SaaS** | Searching and discovery mechanisms  
**Metadata management, semantic web (tagging)** |

*Table 5 – Four functional areas of the ADRF framework*  
Chapter 5

New cloud ready content management solutions

- New cloud ready content management solutions
- A holistic approach to Cloud Information Management
- Registering and capturing metadata at birth of digital record
- Linking up with ISO 30300
- An example of interoperability between ECM, service categories and modules
- An example of hypothetical workflow scenario for managing a vehicle defect

New cloud ready content management solutions reflect the move towards an ‘information centric’ approach. One that can utilise process centric workflow modelling and the concept of ‘virtual information asset’ management. It provides the ability to interact from any mobile device such as tablets, smart phones, laptops and PC’s. It not only allows one to quickly retrieve data from any mobile device, it enables a user to view and navigate screens, documents, content and more importantly a user can now capture and submit new data, documents, images, voice and video content.

Other noticeable areas of change in cloud ready content management solutions are:

- being able to automatically collect appropriate metadata at the birth of the digital document/record enabling information assets to be effectively managed and workflow enabled
- providing a single place to store, profile, retrieve, view and secure documents ‘anywhere, anytime and on any device’ and
- moving towards providing an holistic approach and interoperability between different modules/service categories.
A holistic approach to Cloud Information Management

In today’s business world agility is everything. Cloud information management provides a useable setting for the contemporary working environment. It enables mobile working as it only requires a web browser interface and is breaking down the barriers of traditional records management activities that depended on the business knowing how to register documents into a records management system.

Figure 5 below is an example of providing an holistic approach and interoperability between different modules/service categories. The following examples is based on TechnologyOne Cloud and Ci Anywhere software as a service offering.
It shows cases that ECM is the nucleus between the TechnologyOne’s ten service categories. Eight of these service categories are to be found within the inner circle. The other two Business Intelligence and Performance Planning sit outside the inner circle as they provide the tools for business analytics, dashboards and reporting across the enterprise.

- **Registering and capturing metadata at birth of digital record**

  Tagging content at the birth of the digital record at data/document capture process fulfills the ‘appraisal’ activity and the proposed new requirements for ISO 15489-1 which identifies ‘appraisal’ as being the key upfront activity for the creation, management and disposition of records. A single view is achieved through metadata capture, the use of profiles, standardised naming conventions and multiple indexes to link data/documents across all service categories, thus applying appropriate business rules for addressing accessibility, security, changing business rules, policies and governance mandates.

- **Linking up with ISO 30300**

  From a strategic level cloud ECM solutions go a long way in supporting drivers for agencies to meet the ‘management system for records standards governance framework’ in accordance with ISO 30300 (see Table 6).

  The primary focus of the ISO 30300 is aimed at executives/management to provide leadership in achieving benefit realisation from its data, information and record assets in real time especially in areas of evidence-based processes, risk, compliance, security, quality etc. Moreover, ISO 30300 promotes the need for executives/management to enable tight integration between business processes, technology, systems and provide a disciplined approach to the creation, capture, control and management of data, information and record assets. Finally, whilst not spelt out in so many words, the ISO 30300 framework should be transportable to cater for the 21st century evolution as the landscape will continue to evolve.
Table 6 - Management systems for records standards (MSR) - Governance Framework ISO 30300

- An example of interoperability between ECM, service categories and modules

Cloud content management software as a service offerings aims are to provide the tools to automate and streamline the entire lifecycle of a business activity. Further, it aims to provide a single, integrated enterprise solution that generate efficiencies, experience the benefit of mobile working and deliver the foundation for business to meet global competition.

Figure 6, provides an example of interoperability between ECM, service categories and modules that have be used in my hypothetical workflow scenario ‘taking a staff request for a vehicle head light to be fixed (see Figure 8). The key drivers are Business Process Automation and Governance/ Compliance, they are the glue between the front and back office providing the business rules, security, workflows, profiles, links and single holistic view between each service category and module. The service categories identified for the hypothetical workflow scenario are Asset Management, Supply Chain and Financials.
Related modules are Work Management, Asset Management, Procure to Pay and Accounts Payable. Figure 6 reflects the use of AS/NZS ISO 16175 principles and functional requirements for records in business systems.

Figure 6 - Example of Interoperability between ECM Service Categories and Modules

- **An example of hypothetical workflow scenario for managing a vehicle defect**

  In Table 7, we list six steps. These steps represent a high level overview of the workflow for managing a vehicle defect. This workflow is based on a staff member phoning in to request a vehicle head light to be fixed. This is translated into a workflow model see Figure 8.
<table>
<thead>
<tr>
<th>STEP</th>
<th>PROCESS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>The process starts with the customer service who takes the details and generates the customer request. A record is automatically generated in ECM and appraisal of the record is generated based on the work request type and an initial retention period is applied.</td>
</tr>
<tr>
<td>2</td>
<td>The customer request is escalated to the asset manager. A work order number is created. A stock check of item is undertaken, there is no stock. A requisition is raised to purchase new stock. Requisition is approved. A purchase order is raised and sent to supplier. Stock is received. Asset register is updated, eDocket and Invoice checked and forwarded to Accounts Payable for payment. Maintenance schedule created. Staff member notified.</td>
</tr>
<tr>
<td>3</td>
<td>Account manager receives requisition to purchase stock and approves request.</td>
</tr>
<tr>
<td>4</td>
<td>Accounts Payable receive eDocket and approved invoice to pay supplier.</td>
</tr>
<tr>
<td>6</td>
<td>ECM record closed. Along the way any documents have been automatically captured in PDF and saved against the record. All metadata is collected and wrapped around record and appraisal of record reassessed. New retention updated.</td>
</tr>
</tbody>
</table>

Table 7 - Hypothetical workflow scenario high level steps

In Figure 8, we are presented with a process centric view of my hypothetical workflow scenario along with touch points, systems and people involved in each step. Figure 8 also reflects the use of ISO/TR 26122:2008 MOD - Information and documentation – Work process analysis for recordkeeping.
Figure 8 - Workflow lifecycle and ECM
The aim of Figure 8, is to encapsulate the ECM solution by showing a digital born record being captured at birth with automatic appraisal applied via profiles and links to the work request type. The business process Governance/Compliance layer is providing the business rules, security, workflows, profiles, links and a single holistic view between each service category and module.

Other than the Supplier (as this process crosses the boundaries), you can see that ‘Metadata’ is being captured and/or applied as the process goes through each step. From the Asset Manager we have a number of documents being created or received and there are three end points. One is Accounts Payable, once payment is made their role in the process ends. The Maintenance process ends once the vehicle is fixed and the asset register is updated, work order and customer request are closed. The final end point is the closing of the customer request. Prior to closing the record all ‘Metadata’ is wrapped around the ‘record’ or ‘object’. The original appraisal is re-assessed and validated against the metadata life cycle and a new retention is applied as needed and the record is closed.
Evolution of the ‘intelligent web’

- Web 3.0, semantic tagging, findability and wrappers
- Changing Platforms
- Government is changing
- Mobile Content Management

**Web 3.0, semantic tagging, findability and wrappers**

Web 3.0 semantic web marks the evolution of the ‘intelligent web’. Web 3.0 will continue to build the connectivity of devices to build the ‘internet of things’ as web 3.0 tools and techniques become an integral part of the business process. Web 3.0 will introduce a new information age for business as semantic technologies add meaning to linked data and open up access to data sources, information and combine information from disparate sources.

Web 3.0 will introduce new techniques and tools to make it possible to collect, interpret and use data in ways that can add meaning and structure to information.

Semantic tagging is often interchanged with semantic indexing in the context of ‘findability’. Semantic tagging can be defined as tagging for the semantic web with a primary focus of tagging the document as a whole.

Findability is about making information easier to find. Semantic tagging documents/records at birth and collecting data during its life cycle enable one to reassess the retention period at the end of the document lifecycle and apply a ‘wrapper’. Wrappers encase the total life cycle of a document/record it provides the basis for active preservation, creating a header and other information and then packages the ‘block of data’ for storage and providing the relevant information on how to unwrap and use the information for the future.
• **Changing Platforms**

IDC in 2013 identified The rise of mobile, social, and cloud computing — and the shift to what IDC calls the "3rd Platform".

The first platform, focused on centralised computing on mainframes and terminals. The second platform, focused on decentralised computing LAN/Internets and client-server systems. The third platform will deliver the next generation of competitive advantage apps and services that will significantly disrupt market leaders in virtually every industry.

Finally, the 3rd Platform will continue to expand beyond smartphones, tablets, and PCs to the Internet of Things (IoT).

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**Figure 9 - IDC - The Third Platform**

• **Government is changing**

Governments are transitioning from eGov2.0 to eGov3.0. eGov3.0 will be the new digital and mobile information centric model for government products and services. Bridging the current barriers that exist between Australia’s three levels of government, the citizen and private enterprises. Figure 10 reflects a time line for government delivery channels.
Government 1.0 emerged in about 1996 and placed the efficiency of government as the core value, providing one-way service delivery and requiring citizens to make personal visits to various government agencies/offices.

Government 2.0, arrived around 2006 (10 years later) leading to the introduction of public services based on two-way communication. The internet played an important role in connecting the government with citizen, with on line information, smartforms and on-line payment for some services 24x7.

From 2013 we began to see the gradual transition to eGov3.0 ‘connecting knowledge’. Services are being personalised to individual citizens. Gov3.0 services that are information centric are being pushed out to mobile devices such as smartphones and tablets. It is providing customised services through semantic tagging, connecting knowledge by sharing, communicating and collaborating between government agencies.

Government 4.0 will be the next generation government services ‘connecting intelligence’ – The Internet of Things. Pervasive computing, wearable computing, smart dust communication devices, machine-to-machine.. etc. The author believes that this transition from eGov3.0 to eGov4.0 will commence as soon as 2015/2016 and will continue to evolve.

*Figure 10 - Government Delivery Channels*
Mobile Content Management

Mobile content management (MCM) is an emerging trend. MCM is becoming more important as a platform for enterprises as mobility. Bring Your Own Device (BYOD) provide the technology framework for today’s workforce, e.g. mobile content management solutions pushes ‘documents/information’ that you have rights to direct to the mobile user when they need it. Providing end-users a way to access, annotate, and share documents. How will current on premises ECM solutions meet these new drivers?

When moving to mobile content management one must consider the following features:

▪ End-user access and management of corporate documents
▪ Ability to selectively wipe documents when an end-user or device falls out of compliance
▪ Secure email attachments
▪ Secure end-user access to content with administrative control of mobile policies
▪ Automatically push important documents and media to a end-user’s device
▪ Enable secure web browsing full advantage of their mobile devices for secure enterprise content and collaboration.

Becoming business savvy

The virtual world will be fast changing. The new records and information professional will need to have new skills in the areas of open source solutions, business processes, workflows and risk management. These skills will form the basis for the new centre of knowledge and go a long way to meeting the challenges and opportunities ahead.
The Changing Landscape

Records and Information Management in the 21st Century

This book is a must-read for all information managers, consultants, entrepreneurs, and students who have been discussing, reading or studying digital recordkeeping and who are interested in knowing how they can capitalise on the next wave of business information management innovation.

Linda Shave, BizWyse®, 2015