

Document Management Domain Team

EDMS White Paper

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Executive Overview

The Document Management Domain Team has been working for the past two years to develop a cohesive strategy for future deployment of Electronic Document Management System (EDMS) technologies within state government. As the discussions have progressed, it has become clear that the technology itself is not well defined within our context. The wide variance in perceptions has made it clear to the domain team that a common understanding of EDMS is necessary for this process to continue successfully. As a result, this document was created to provide a base of understanding of EDMS, its component technologies, its use within state government, as well as its current and future state.

An EDMS is a collection of technologies that are used to create, distribute, review, maintain and dispose of information assets. The major component technologies of an EDMS are:

- Imaging – creation of an electronic image of paper or system generated documents. Typically the first technology to be deployed by an organization.
- Document Management – technology developed initially to centrally manage the storage and retrieval of desktop documents in their native format. Now used to provide a centrally managed, community storage and retrieval system for information assets including desktop documents, images and other digital objects.
- Forms Processing/Eforms – Forms processing technology automates the recognition and capture of data from paper forms. Electronic forms reuse previously captured data, push data entry activity to the end user, validate collected data, and push data to business applications while storing required record copies to the EDMS.
- Enterprise Report Management (ERM) – Automates the capture, indexing, distribution and storage of system-generated information and documents.
- Workflow – Automates business processes and applications with user selected or system determined information.

Each of the technologies are complementary to the others. The result is a system that provides a combined functionality much greater than the sum of the individual components.

The Enterprise EDMS is a comprehensive solution available for deployment across state government. The technology solutions available have been tested and proven within our environment. Widespread adoption of the enterprise solution will provide a number of benefits.

These include:

- Improved access to information,
- Economy of scale,
- Increased abilities to share information,
- Reduction in maintenance expense,
- Reduction in training requirements,
- Reduction in hardware/software requirements,
- Sharing of infrastructure and information assets,
- Reduction in time required for deployment,
- Reduction in business application integration requirements, and
- Improved compliance.

The intent of the Enterprise EDMS is to provide all authorized users, internal and external, with access to the information they require to efficiently complete their responsibilities, regardless of physical location.

It is on these benefits that the Document Management Domain Team has focused its efforts and activities. The results of our efforts are the standards and recommendations provided to the Architectural Review Board.

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EDMS Technology

What is EDMS?

EDMS is a collection of technologies that work together to provide a comprehensive solution for managing the creation, capture, indexing, storage, retrieval, and disposition of records and information assets of the organization. Major components of an EDMS include imaging, document management, forms processing, eforms, ERM and workflow. The components of the system work together to provide users the tools to process work efficiently and effectively.

EDMS Component Technologies

- Imaging

Imaging is the process of creating an electronic copy of a document. While imaging can be accomplished via renditioning of an electronic document, the term today is nearly always used to denote the use of a scanner. During the scanning process, reflected light is “read” by a series of sensors and the pattern of light and dark captured as an electronic facsimile of the document. Depending on the application, documents can be scanned as bitonal (black and white), grayscale, or in color.

The primary use for imaging is to capture existing paper document collections or to capture incoming information from third parties. Scanning large volumes of existing files is called backfile scanning. In some cases, imaging is used to capture record copies of documents created internally. Most often imaging is used when signatures, seals or similar markings are required.

Imaging is typically the first of the EDMS technologies to be deployed. Individuals desire to be able to access documents obtained from external sources in the same manner they currently manage desktop documents, in their Windows directory. Small scanners are inexpensive, drive space is readily available and the process is short and simple.

As the number of documents, users and requirements increase, larger scanners and more sophisticated indexing systems are required to process documents. Image Capture Systems are used to process a large number of documents as a single batch. Capture systems use bar code and patch code recognition technologies to separate pages of the batch into individual documents. Batch header pages are used in the front of batches to select pre-configured scanner and job settings. As the documents are scanned and processed, the information on the inserted header and document separator pages is “read” and the pages are processed according to the referenced instructions.

Today most production imaging systems use EDMS document management technology as the storage repository for scanned images.

- Document Management

Document management technology provides the storage repository for an EDMS. The technology provides a secure location to store the electronic objects as well as an index to speed identification and retrieval of needed information.

A comparison can be made to the local public library. Information is stored in a variety of collections within the library. The collections are made up of similar materials; i.e. fiction, non-fiction, reference, and periodicals. Accessing the materials is best accomplished by using the card catalog. Each card in the card catalog contains a common set of information about the particular resource. Common indexing values include subject, title and author. By reviewing the information on the cards, the user can quickly identify a subset of items they need to peruse to find the information they are looking for. If the universe of information matching the index query is too large, more detail can be added to reduce the items matching the query. If it is too narrow, the query can be broadened to gather more possible matches. Many times the search results list will identify the exact resource needed without the need to actually look at the item.

Document management works in a similar fashion. Libraries are created to manage the document and information assets belonging to an organization. A standard set of indexing fields is created to simplify retrieval of needed documents. As documents are added to the library, indexing values are added. Many of the index values are automatically generated based on a lookup of a known index key.

In addition to standard indexing, text based and image documents with embedded text can be processed to enable full text search. The capability enables users to perform complex text searches across entire libraries or a smaller subset of records. Complex searches using relationships between words, proximity, Boolean operators and other context based search tools make it possible to efficiently search hundreds or thousands of pages with a single query.

- Forms Processing/Eforms

Forms processing automates form recognition and data extraction from paper forms. The process begins when the paper documents are scanned and the image stored for processing. During the scanning process, the image is enhanced using a variety of tools including automated cropping, black border removal, deskew, and speckle removal. In addition, characters on the document may be enhanced by use of sand and fill techniques.

The image is then processed by the system. The form is recognized by the system and matched to a data capture template by use of an Explicit ID such as a barcode or identity is forced by the user. After the form is identified, the system extracts information from predefined regions as identified by the template. Recognition zones are defined with the type and format of expected data. Recognition zone settings can be defined to expect hand or machine print, text or numbers, dates, or via a user defined templates. Recognition zones are then processed using OCR (Optical Character Recognition), ICR (Intelligent Character Recognition), OBR (Optical Bar Code Recognition) or MSR (Mark Sense Recognition). Results of automated reading are compared to data dictionaries and lookup tables for validation. Fields not meeting pre-defined confidence levels for accuracy are reviewed by staff and corrected if necessary.

In addition to traditional forms processing activities, the EDMS uses the technology for image capture. Templates are created to read needed indexing information from scanned images. The values are compared against lookup tables created from data previously stored in the business application and if a match is found, additional indexing information is associated with the document. Our goal is to require the user to identify no more than three index values and use those values to index an additional 5 to 10 index values which can be used for retrieval in the future. With proper planning and minimal form modifications, the system can successfully automate the entire indexing process without any keying of information by staff.

Eforms are a major advancement over paper forms. In addition to outsourcing the entire data entry process, eforms also provide significantly higher data accuracy. Incomplete or error filled form submissions are eliminated by use of form validations. Data entered by the user must conform to standards identified in the form template. Entries can be required, eliminating the need to contact the user to obtain information inadvertently left off of the form prior to submission. Form fields can be automatically formatted on entry. Data residing in a user profile or data base can be automatically downloaded to the form on open or in response to a specific value. Data from the forms can be ported to the appropriate business application. Record copies of the forms can be provided to the user and stored automatically in the EDMS for records retention purposes.

If the forms processing and eforms system are integrated, a single form template can be used for both paper and electronic forms. The single template can be used to support preprinted distributed forms as well as print and fill, fill and print, and fill and submit activities.

- Enterprise Report Management

Enterprise Report Management technology provides the ability to electronically capture, index, burst, distribute and store system-generated reports and documents. The software automatically processes reports and printouts from all types of systems.

The technology has evolved over time from two earlier technologies that were used to capture green bar printouts. Computer Output to Laser Disc (COLD) was a technology first introduced to transfer a copy of printouts to a compact disc (CD). The technology had several advantages over paper or the more traditional means of distribution, Computer Output Microfilm (COM). The CD used for distribution and storage was compact and very inexpensive to send via the mail. Information was stored on the CD in a data format making it very easy to access. In addition, the information could be easily copied and pasted into desktop applications for further study.

Based on a rules engine, the software can automatically parse reports into individual components, burst the report electronically, attach an overlay, and forward copies to a predefined distribution list. Additionally, index values can be extracted, and a record copy of the information retained in the EDMS.

- Workflow

Workflow is technology created to automate business processes. The technology has been in use for quite some time. Commercial applications of workflow were introduced in the early 1980's. Today workflow is used extensively to increase processing efficiency and automate decision making.

Several types of workflow are available. While the different types are similar in name, they are quite different in how they work. The different types of workflow are:

- Forms-based workflow – Provides automated and ad-hoc routing of forms and attached documents.
- Ad Hoc workflow – Commonly associated with collaboration and engineering applications. Permits users to specify how documents will be routed.
- Application based workflow – Workflow technology provided as an integral part of a business application. The workflow permits automation of activities within the application environment but has only limited access to other applications or systems.
- Production workflow – Workflow technology designed for high-volume, repeatable business processes across multiple business applications and environments.

Production workflows can consist of hundreds of decision points and commonly incorporate a rules engine that defines workflow object movement throughout the system.

Most organizations can benefit from the use of multiple workflow types. In many cases, one workflow system will hand off a workflow object to another workflow system for further processing. Having multiple solutions available ensures that users will have the tools they need to efficiently review and process work.

- **Additional Technologies**

A variety of additional technologies are used in conjunction with the EDMS system. They include desktop tools and specialized capture solutions. Additional tools may be added if business needs dictate.

Technology Interaction

For many years, the component technologies of an EDMS were marketed individually. Building an EDMS generally required purchasing and integrating solutions from a number of vendors. Many organizations were hesitant to make the investment required to put in a comprehensive solution.

Regulatory changes forced many organizations to rethink how they would manage records and have forced deployment of EDMS technology. HIPAA and Sarbanes-Oxley added significant new requirements and substantially increased penalties for non-compliance. At the same time, organizations began to realize that their costs of managing information were increasing at an alarming rate. Even worse, considerable investment was being made to create information that was inaccessible due to storage and identification practices.

At the same time, the maturing market for EDMS technologies resulted in changes of focus and to an entire new breed of solutions. Leaders in the market expanded their offerings by purchasing complementary technology solution companies. Others purchased their rivals and integrated the best of their technology and customer lists. The result was a consolidation of the market and introduction of “suites” of EDMS technologies. These suites leverage the power of individual solutions across a common platform allowing organizations to decrease time of deployment and ROI.

The individual technologies used in an EDMS are much more powerful and provide greater benefits when they are deployed together. The capabilities of one technology are enhanced by combining it with another. Implementing a combined set of technologies significantly improves the opportunities to automate activities and increase efficiency.

One example of this interaction is the capture, processing and routing of paper forms. In traditional imaging systems, the document was imaged after processing. As additional technologies are added, imaging of the form can take place when the form is received. The data from the image can be automatically captured using forms processing. The data can update the business application, provide index values for storage of the image in the document management repository and initiate a work object in the workflow system.

A second example offers similar processing advantages. An ERM system captures a report from a business application and stores it in the document management repository. During the

capture process, the report is parsed into documents to be sent out to businesses where they will be completed and returned. When the report is printed, a corresponding work object is created. The work object is in a wait condition looking for return of the document. If the document does not return, the workflow system automatically calls for a follow-up reminder from the business application and the ERM system repeats the process. If the document is returned, the document is imaged and processed by the forms processing system. The original work object can be automatically discarded or released to continue to the next step of the business process.

In both of these examples, the individual technologies would have been of limited benefit without the ability to work with the others. It is when they work together that the real power of an EDMS can be realized.

EDMS History

EDMS and its component technologies have been around for quite some time. The major components have been commercially installed for nearly thirty years. Beginning in the 1970's, industry innovators like Black and Veach, began to look at the potential to centrally store Computer Assisted Drafting & Design (CADD) drawings in an electronic format. The intent was to share the CADD produced documentation between engineers, designers and draftspersons as a means of increasing productivity. This activity was the basis for development of document management technology.

At the same time, imaging was developed as a means to store existing or externally produced drawings. These documents were historical originals created using linen or vellum or were copies created and stored using Mylar, vellum, or blueprint paper. The first commercially produced large-format scanners were introduced as the result of this activity. Storage space requirements for these early imaging systems were significant as few compression algorithms had been developed. In addition, systems were unique with proprietary formats and virtually no migration path to new technology.

Also in use at the time was a third technology, Document Control. Document Control was initially developed to manage paper records, microfilmed documents and other "hard copy" materials like x-rays and NDE (Non-Destructive Examination) materials for mega construction projects such as nuclear power stations.

Initial development of document management and imaging form management of electronic documents was done as separate, parallel activities. The result was two separate lines of products. Early image-based products like FileNet's Image Services, required that all documents be in image format for storage. Organizations with high volumes of paper documents adopted imaging platforms as their standard. Early document management systems were focused on a single format or a very limited format set. It was not until the large scale adoption of the personal computer and deployment of desktop applications that early leaders in document management, like Saros, released commercial document management applications.

The activities became known by the acronym EDMS. Originally defined as an Engineering Document Management System it was more descriptive of a management program than a technology. Deployment of these early systems was very expensive and limited to government

and large-scale engineering firms. As prices for computers, networks and storage decreased, the technology was introduced into other areas.

Today the line between the three technologies is blurred. Commercially, most document management systems today use functionality from imaging, document management and document control as part of their solution. The result is a powerful solution that can manage a wide variety of information in image or native format as well as associated paper or other hardcopy records and information.

With its broad abilities to manage information, some have referred to EDMS as Everybody's Document Management System. Solutions include enterprise class applications capable of supporting hundreds of thousands of users and a billion documents. Many EDMS providers focus on specialized solutions for a specific industry. Others have released personal EDMS solutions designed to be used by a single user.

North Dakota's EDMS

The enterprise EDMS was initially installed as a partnership between the Office of the State Tax Commissioner and the Information Technology Department (ITD). The solutions installed were selected based on competitive review, previous experience and an existing contractual agreement. Additional technologies were added as requested by users.

The current EDMS is used by nine agencies. The agencies are:

- Office of the State Tax Commissioner
- Department of Transportation
- Department of Commerce
- ND Public Employees Retirement System
- Department of Human Services
- Insurance Department
- Job Service North Dakota
- Office of the Secretary of State
- Information Technology Department

Planning is proceeding on deploying the technology to several other agencies and to additional applications within agencies currently using the enterprise EDMS. In addition, three agencies are planning to enable external partners to access the system via the web.

New technologies are also being researched and evaluated. Technologies of particular interest include:

- Alternative image compression tools to reduce storage requirements and improve ability to access information from remote locations.
- Technology to print 2D bar codes containing form data on printed paper forms. The technology would significantly speed data capture while enabling submission of payments and attachments.
- Annotation technology for alternative formats like PDF and DjVu.

The current user base is nearly 1,000 users. More than ten million documents are indexed and stored in the repository. Total storage requirement currently exceeds 1.2 TB. Storage requirements for the first five months of 2004 grew at an annual rate of more than thirty-five

percent. The rate of growth is expected to continue or increase as additional agencies and applications are added.

The Bottom Line

Use of an EDMS within the organization can provide significant benefits. State government runs on information. We create, collect, process, distribute, store, manage, retrieve, maintain and dispose of information as an integral part of every business process and activity of the organization. In an effort to increase our efficiency we have spent millions to create business applications and systems that can process vast volumes of information. Additionally, we have invested heavily in desktop technologies to provide access to applications, communication with others, and deliver productivity tools to the individual employee.

In spite of our investments, we still spend a considerable amount of each day manually processing or searching for information. In addition, the amount of information we must work with is increasing with at incredible rate. Until recently, the technologies available have been limited in functionality, interoperability, and by the reluctant acceptance of the legal and regulatory communities. New federal and state laws have virtually eliminated the legal and regulatory issues. The federal Electronic Signatures in Global and National Commerce Act (ESIGN) a companion state Uniform Electronic Transactions Act (UETA) provide broad authorization for electronic signatures and records. Development of new data standards and access tools have removed most of the technological hurdles. Combined with the move to suites of integrated solutions, EDMS technologies can now be deployed across organizations, delivering immediate value and increasing organizational efficiency and effectiveness.

The reasons for using EDMS are compelling. The technologies can:

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- Reduce queue time – information can be routed electronically using email or workflow eliminating mailing and transport activities.
- Minimize duplication – a single copy of a document can be made available to all authorized users, including those outside the agency.
- Decrease data keying requirements – forms processing and eforms can access current data via lookups and export form data directly to business applications.
- Outsource data entry – eform data entry is done by the individual filling the form.
- Reduce storage and retrieval expense – a single repository reduces the need to store multiple copies while standardized indexing and integration with business applications allows users to instantly access needed documents or other information.
- Improve access to records and information – authorized users can search across the unit, department or even access documents maintained by other agencies with a single search query. Workflow can automatically notify internal or external users when needed information has arrived or has been processed.
- Automate business processes – workflow can be used to move information from one step to another. Rules based routing can automatically determine needed activity and work steps. Work object or referenced data can automatically update business applications, create additional documents or workflows, and communicate with internal and external users.
- Improve customer service – retained or in-process information can be immediately accessed. Accessed information can be faxed or emailed to the customer from the desktop.

- Improve regulatory compliance – technologies can create audit trails of access and activity. Compliance with Records Retention Schedules can be automated and improved. Incoming documents can be automatically classified and stored in the system.
- Enable reuse of information – Previously processed information can be used to pre-populate forms or validate and standardize incoming data.
- Improve quality of data – use of automated filling and validation capabilities of eforms reduce the potential for missing or misplaced data. Features like auto-formatting, required fields, standardized selections, and dynamic form configuration validate data prior to submission reducing re-work and time-consuming correction processes.
- Share information with external entities – existing information collections can be directly accessed by authorized external user.
- Support external processing – external users can access the system, scanning, indexing storing, and retrieving documents in a central repository.
- Increased information security – documents and information stored in the EDMS is protected from unauthorized access by stringent security requirements. Backups provide vital records and disaster recovery protections. Protection by duplication is easily achieved using either offsite copies or system generated microfilm.

EDMS technologies can make a significant difference in the cost of government. The key is to review existing business processes; eliminate unnecessary steps and activities; implement technology wisely and leverage the whole power of the technology.

ND EDMS Technology

Following is a listing of the specific technology solutions deployed as part of the enterprise EDMS. Additional and alternative solutions are being continually evaluated for possible inclusion into our EDMS toolbox. Some of the technologies listed have been purchased but not yet deployed. Others are on the EDMS wish list with additional purchases likely to take place within the next several months. EDMS solutions currently installed or scheduled for deployment are:

FileNet Content Manager (October 2004)

The document management component of FileNet's P8 Enterprise Content Management (ECM) solution. One of a suite of integrated products that also include Web Content Manager (licensed), Business Process Manager, Image Manager, Records Manager, Eforms Manager, and Team Collaboration Manager. Java based, the components of the suite are accessed through FileNet's thin client interface Workplace. Seven level security expands user options and leverages ND's current Active Directory structure. Embedded Verity K2 content search engine allows content search across repositories.

http://www.filenet.com/English/Products/Content_Manager/Index.asp

FileNet Workplace (October 2004)

Thin client interface to FileNet P8 ECM components. Includes image viewer and annotation tools.

FileNet Content Services (current solution)

Used for storage of document, images and other objects for later retrieval. Information stored in the system is accessible via indexes or by full-text search (if enabled). Security for objects stored in the repository is applied at the system and object level. The FileNet Content Services repository is divided into individual libraries. Libraries are further divided into document classes. Libraries and classes are individually configured to meet the specific business needs of the users. Stored digital objects can be viewed using the FileNet IDM Viewer or can be opened using the associated business application. Version control is provided via a check out system that provides other users to continue to view documents while they are being revised.

http://www.filenet.com/english/products/all_products/023180020.asp

FileNet IDM Desktop (current solution)

The FileNet IDM Desktop is the standard viewer for accessing information stored in the FileNet system. The viewer has the ability to view nearly 250 file formats without access to the original software. The viewer also provides annotation tools for marking up TIF images. Annotations have their own security and are stored as a separate layer of information. Images can be printed with or without annotations. A thin client version of the IDM Viewer has also been deployed.

<http://www.filenet.com/english/products/datasheets/023250018.pdf>

FileNet Panagon – Image Services

FileNet's production imaging solution. Currently used only by Workforce Safety and Development for image management and workflow. Provides high speed processing and storage of images.

http://www.filenet.com/English/Products/All_Products/023190052.asp

FileNet Web Content Manager

Base component of FileNet's P8 Enterprise Content Management Suite. Base license purchased but not installed. Evaluation by ITD expected in future.

http://www.filenet.com/English/Products/Web_Content_Manager/

Verity TeleForm

Forms recognition and processing software that reads and extracts data from images of paper forms. Used extensively by the Tax Department. In addition to its use for forms processing, the State uses TeleForm as an imaging and indexing solution for agencies using FileNet. The software uses forms processing technology in conjunction with a variety of lookup tables containing data pulled from business applications. The capture process uses form recognition to identify documents and forms. After recognition, the system converts imaged information to data using Optical Recognition. The resulting values are validated and queried against lookup tables. If a match is found, corresponding values from the lookup tables are returned as additional index values. The process both reduces the amount of manual indexing required as well as improves the quality and consistency of the indexing information. Upon completion of validation and processing, data can be exported to business applications and a record copy of the form stored in the FileNet Content Services repository.

<http://www.verity.com/products/teleform/index.html>

Verity LiquidCapture (August 2004)

Web-based image and document capture solution. Provides platform for distributed scanning and indexing using patch codes, bar codes and traditional data entry. Thin client scanning/indexing using concurrent licensing enables a variety of internal and external users to access the capture system. Fully integrated with Verity TeleForm allowing remote scanning and local verification of form data.

<http://www.verity.com/products/liquidcapture/index.html>

Verity Mediclaim

Stand-alone claim processing system used for processing CMS1500 (HCFA) and UB-92 medical claim forms. Systems currently in use by the Department of Human Services and Workforce Safety and Insurance. Uses forms recognition to automatically identify medical claim forms. Application uses scanners to drop out forms templates leaving the data. After processing the form template is merged back with the form prior to storage in the FileNet system. Data read from the forms is validated using internal and external tables and lookups. DHS data is exported to the MMIS system on a weekly basis.

<http://www.verity.com/products/mediclaim/index.html>

Verity Liquid Office

Electronic forms solution providing the ability to complete, sign, route, process and store forms electronically. The application is available internally and externally via a secure server. Forms designed in Liquid Office can be accessed via a friendly URL or through the Liquid Office repository. Routing of forms can be configured based on a single destination or can be specified by the user. Forms created in Liquid Office can be published as HTML or PDF forms, depending on the needs of the users. Forms can be electronically signed and dated with selected data elements locked by the signature process.

<http://www.verity.com/products/liquidoffice/index.html>

Graham Process Charting Software

Business process charting software used to map existing and planned business processes. Software enables users to create a detailed diagram of the business process complete with time

and motion information as well as links and variables found in other processes. Completed business process diagrams can be used as tools for process improvement and automated generation of business procedures using Playscript.

<http://www.worksimp.com>

KnowledgeLake Pinnacle

Production workflow software used to automate work processes. Work objects are processed through the system via rules based routing and processing. Work objects are created as information is loaded into the FileNet Content Services repository or ad hoc by users.

<http://www.knowledgelake.com/products/pinnacle.htm>

KnowledgeLake Wappapello

COLD parser for indexing and storing system generated documents into FileNet. Text based print streams are processed using configured templates. The templates automatically parse print streams into individual documents, extracting indexing information, using lookups to retrieve additional indexing information and storing the documents. Overlays can be added as needed and the resulting file rendered and stored as a TIF or PDF.

<http://www.knowledgelake.com/products/wappapello.htm>

Knowledgelake CS Loader

Custom loader application used to load files and indexing information into the FileNet Content Services repository.

Knowledgelake Clearwater

Desktop tool allowing documents to be electronically printed on the desktop. Tool also provides user with the ability to email documents, capture screen prints from any Windows application, annotate images, and save print files in a variety of image-based formats including TIF and PDF. Clearwater also provides a scanning interface for TWAIN scanners. The tool is integrated with FileNet Content Services. A fax interface is available for users who have access to a Right Fax account.

<http://www.knowledgelake.com/products/clearwater.htm>

Open Scan Mail Scan

Exception remittance processing solution installed in the Department of Human Services, Child Support Enforcement Unit. Open Scan specializes in remittance processing of transactions that contain checks and supporting documentation of mixed sizes. Solution scans checks using check scanners. During the scanning process, the MICR coding is read, the check endorsed, and an audit trail of the transaction added to the back side of the check. Check images are processed using CAR/LAR technology. Supporting documentation is scanned either with the check or by using an integrated document scanner. Remittance lists and check skirts are processed using rope and zone OCR. Repeat submittals are matched against a library of stored templates based on MICR information. Remittal and payment information is validated against information maintained in the FACES application prior to update. Images and files relating to each transaction are bundled into a single tif document and passed to FileNet Content Services.

<http://www.openscantech.com/index.php>

Ultraforms Technology

Technology that enables a PDF 417 barcode generator to be embedded in a PDF file. The 2D barcode is generated by the form when the form is printed and contains all of the pickup points and associated data required by the application. The modified PDF file can be completed by

the standard Adobe Acrobat Reader available on most desktops. The 2D barcode can be scanned with either a handheld scanner or as part of the imaging process. The data can then be associated with the form for processing and subsequent update of the business application and EDMS.

<http://www.dataintro.com/>

Definitions

Business Process

A logical group of associated actions or activities necessary to complete a work activity. Actions and activities may be accomplished in parallel or in sequence.

Business Process Diagram

A graphical representation of a business process.

Capture

A system for automated scanning or processing of documents. Includes scanning/, indexing, quality assurance, and storage. Capture is typically associated with an EDMS.

Courtesy Amount Recognition (CAR)

Software based technology for reading the numeric value of a check.

CCITT

Abbreviation of *Comité Consultatif International Téléphonique et Télégraphique*, an organization that sets international communications standards. CCITT, now known as ITU (the parent organization) has defined standards for data communications.

Computer Output to Laser Disc (COLD)

Technology to automatically parse, index and store system generated documents.

Compression

A process of mathematically reducing the amount of space required to store or transmit data. Compression algorithms are considered lossless or lossy. Lossy compressions generally produce smaller file sizes but with a corresponding loss of image quality.

DjVu

A very highly compressed file format that uses multiple compression techniques to enable high resolution color or black and white documents to be saved at a very small file size. DjVu files are typically compressed at ratios of 300:1 to 1000:1 over corresponding TIF files. The format is most often used in conjunction with web applications or for storage and distribution of large documents.

Document Control

Technology developed to manage large collections of paper and microfilmed documents. Most commonly deployed in support of large scale, document intensive engineering and construction projects.

Document Management

Technology for managed storage and retrieval of system-generated documents or objects in their native format. Generally deployed as part of an EDMS.

Electronic Form (Eform)

An electronic data entry template used to systematically gather data or present it in a logical manner.

Electronic Document Management System (EDMS)

A collection of technologies used to create, index, capture, store, retrieve and manage electronic objects. Technologies generally included are document management, imaging, e-forms/forms processing, report management (COLD), and workflow.

Enterprise Report Management (ERM)

Technology to manage creation, distribution and storage of system-generated documents.

Electronic Signatures in Global and National Commerce Act (ESIGN)

Federal law giving legal status to electronic signatures and records. ESIGN applies to interstate and foreign commerce. (For intrastate commerce see: Uniform Electronic Transactions Act - UETA)

Forms Processing

Automated extraction of printed data from paper or facsimile forms via forms recognition and data extraction technologies including OCR, ICR, MSR and OBR.

Imaging

Process of creating an electronic picture of a document using a scanner or electronic process.

Intelligent Character Recognition (ICR)

Technology to convert handprint into ASCII text.

Legal Amount Recognition (LAR)

Software technology that reads cursive check amount.

Mark Sense Recognition (MSR)

Technology to read marked bubbles and convert the marks into ASCII text.

MICR

Magnetic Ink Character Recognition

Optical Barcode Recognition (OBR)

Technology to convert traditional and 2D barcodes into ASCII text.

Optical Character Recognition (OCR)

The process of transforming images of characters in a document to the equivalent ASCII code for those characters. (SAA – A Glossary for Archival and Records Terminology)

PDF 417

Open source, two dimensional, self correcting, barcode font.

Records Management

Field of management responsible for the efficient and systematic control of the creation, receipt, maintenance, use and disposition of records, including processes for capturing and maintaining evidence of and information about business activities and transactions in the form of records. (ISO 15489, Records Management)

Scanner

A device used to transform an analog image into a raster graphic. (SAA – A Glossary for Archival and Records Terminology)

Uniform Electronic Transactions Act (UETA)

State law giving legal status to electronic signatures and records. UETA applies to intrastate commerce. (For interstate and foreign commerce see: Electronic Signatures in Global and National Commerce Act - E-SIGN)

Workflow

Technology used to automate a business process.

Analyst Reports and Awards

A great deal of time is spent evaluating EDMS technologies prior to implementation. Solutions are selected only after using a team approach of previewing the product and checking with customers who are using the solution.

An additional source of information is industry analysts and professional publications. Sources for the information include subscription services used by ITD and a variety of IT focused periodicals. While an individual source of information can be suspect, a similar rating by several sources is generally a good indication of overall solution strength.

Several of the technology solutions used in the enterprise EDMS are considered best of class. Examples include:

- Gartner Magic Quadrant for Integrated Document Management, FileNet in Leader Quadrant, 2004
- Gartner Magic Quadrant for Business Process Analysis, FileNet in Leader Quadrant, 2004
- Gartner Magic Quadrant for Pure-Play BPM, FileNet listed as leader, 2004
- FileNet P8 Recognized as Innovative Application Software Product of the Year, AeA High-Tech Awards, 2004
- FileNet Wins Best of Show Award at AIIM 2004, Best Records Management Solution
- Verity, GCN Best New Technology Finalist, 2004
- Verity GTC Southwest 2004 Best Solution Award
- Verity K2, Transform Magazine Readers' Choice Award, 2003
- Gartner Magic Quadrant for Pure-Play BPM, FileNet listed as leader, 2003
- Verity LiquidOffice, Transform Magazine Readers' Choice Award, 2003
- Verity LiquidOffice, Transform Magazine "Value Leader" award, 2002
- Verity BPM Suite (TeleForm & LiquidOffice, Best of AIIM, 2002

Attachment 1 Return on Investment

Determining the ROI (Return on Investment) for business process improvement projects is sometimes difficult. Our tendency is to focus on a very small segment of the entire process and use that as our evaluation criteria. For example, we often concentrate on the initial expense to get into the technology rather than the benefits that result. A more comprehensive view is required.

Below are some examples from actual applications within state government.

Example 1: Implementing EDMS

An agency is capturing documents from an external electronic system at the rate of approximately 600 per day. Prior to the implementation of the EDMS the documents were worked from the original paper forms. Staff would spend about 1 minute per document to open, determine processing requirements, and file the documents on the shelf. About 250 documents daily require additional processing of 3 minutes each.

Today the information is picked up from an external file and processed by Wappapello. The file is parsed into individual documents, indexed, and automatically stored in FileNet. The 250 documents per day that need additional processing are automatically identified by the workflow system and routed to work queues. With the upcoming changes to the workflow, processing time for the documents requiring additional processing will be reduced to under 1 minute.

Activity Cost:

Activity	Paper Process	EDMS Process
Open and Sort (600 daily)	\$62,500	N/A
- Paper: 10 hrs/day x \$25 x 250 days		
- EDMS: N/A		
Process (250 daily)	\$78,125	\$26,250
- Paper: 12.5 hrs/day x \$25 x 250 days		
- EDMS: 4.2 hrs/day x \$25 x 250 days		
EDMS Investment:	N/A	\$142,020
- Software and Equipment Expenses.		
- Consulting (25 work processes)		
Storage and Access Expenses.	N/A	\$4080
- Storage: 600/day x 12 K x 250/days x \$5/GB/Month		
- Access: 15 @ \$22 x 12 months		
First Year Activity Cost:	\$140,625	\$172,350
Subsequent Year Activity Costs:	\$140,625	\$ 30,330

Bottom Line:

Payback Timeframe: 15 months

Gained Productivity: \$114,375 (18.3 hrs/day x \$25/hr x 250 days)

Subsequent Annual Savings: \$110,295

Three year impact of Change: \$531,990

Example 2: EDMS compared to Local/Shared Storage

A department develops a report for staff to review for each proposed project. The reports are reviewed, and comments forwarded to the originator for possible addition to the original document. The report typically exceeds forty pages with a number of the pages in color. Internal distribution is about forty copies. Each year, the department prints, distributes, files, and maintains three hundred of the reports. Estimated cost of printing and distribution is \$48,000 annually (480,000 pages@\$0.10/page)

To make the process more efficient we distribute the report electronically. Two distribution options are available. Option 1 uses the existing shared drive available to the agency. Distribution of the document will be as an attachment to email. Option 2 would be to use FileNet to store of a central, shared copy. An email link to the document will be distributed. File size for either option is estimated at 15 MB.

Option 1: An estimated 50% of reports are stored locally or on a shared drive. Indexing is limited to the file name originally assigned to the document and the folder the document is stored in. Each save requires about 15 seconds of labor by employees. An additional 15 seconds of labor is required to delete the reports. An estimated 90 percent of the copies are deleted annually. The first-year storage requirement is 175 GB. Storage for years two through four is estimated at 17.5 GB.

Option 2: Agency staff will have access to the FileNet system. The reports will be generated, indexed, and stored in FileNet. File size is still 15 MB. We will spend a minute to index the document. A link to the document will be distributed via email. Individuals will access the link to open the document. Future retrieval will be accomplished by searching the FileNet repository. Because the search structure is well defined and the document is readily available, there will be less of a tendency to print the report for the "file." The report will remain in the repository until its retention timeframe has ended.

Activity Cost:

<u>Activity</u>	<u>Local Storage</u>	<u>FileNet System</u>
Labor for storage of reports:	\$625	\$125
- Local: 15 sec/rpt x 6,000 rpts = 25 hrs/yr		
- FileNet: 1 min/rpt x 300/year = 5 hrs/year		
Storage expense Yr 1:	\$21,000	\$180
- Local: 175GB x 12 mo x \$10/GB		
- FileNet: 1.5GB x 12 mo x \$10		
Storage expense Yrs 2-4:	\$18,720	\$1620
- Local: 52 GB x 3 x 12 mo x \$10/GB		
- FileNet: 4.5 GB x 3 x 12 mo x \$10/GB		
Deletion of reports:	\$425	\$9
- Local: 15 sec/rpt x 5400 rpts = 22.5 hrs/year		
- FileNet: Annual purge = 20 min/yr		
FileNet Expense:	<u>N/A</u>	<u>\$21,560</u>
- Local: N/A		
- FileNet: Install + 40 users @ \$22/mo		
Annual Expense:	\$40,770	\$23,494
Gained productivity:	N/A	42 hrs/yr = \$1050

Net First Year Expense:	\$40,770	\$22,444
Future Year Expense:	\$40,770	\$11,444
Annual savings over current process:	\$7230	\$36,556

Example 3: Microfilm Replacement

A department was managing a large volume of long-term project files. Each year, project correspondence was generated and added to the file. Once per year, the added documents were microfilmed and jacketed to reduce storage requirements and simplify access. The decision was made to begin imaging the documents using Verity TeleForm and storing the images in the enterprise EDMS. The return on investment for this single project was less than ten months.

Cost of Microfilming

• Frames per roll of 16mm microfilm	3000
• Average frames per project	4
• Projects per roll of 16mm microfilm	750
• Cost of filming and developing roll of 16mm microfilm	\$82.70
• Project file filming expense	\$0.11
• Project file fiche charges	\$0.93
• Annual cost per project	\$1.04
• Estimated annual microfilming expense	\$26,192

Electronic Project File Expense (FileNet)

• First year investment/expense	\$20,825
• Second year expense	\$ 7,200
• Third year expense	\$ 7,500

ROI Estimates

• Break even at:	9.5 months
• First year savings	\$ 5,367
• Annual savings after investment and expenses over 36 months	\$43,051
• Continuing annual savings after amortization of system (less increase in storage expense)	\$21,992

Attachment 2

Current State

Current State A - EDMS

- Description
 - Current electronic document management systems do not utilize: single sign-on, single objects or version control.
 - There are multiple electronic document management systems within state government today; however, many agencies have not deployed any type of electronic document management solutions.
 - Standalone systems are administered by user agency without coordination across the enterprise.
 - There is a lack of awareness, participation, and training.
- Principle
 - Principle A - Promote Usability
 - Principle B - Support E-Services
 - Principle C - Address Record Retention
 - Principle D - Support Business Continuity

Current State B - Imaging

- Description
 - There is limited access to high speed or distributed scanning which limits sharing of resources among the agencies.
 - Current electronic record guidelines exist but need to be updated.
 - Nonstandard image formats and compressions are being used.
 - Some images may not be suitable for business/legal use.
- Principle
 - Principle A - Promote Usability
 - Principle B - Support E-Services
 - Principle C - Address Record Retention
 - Principle D - Support Business Continuity

Current State C - Document Management

- Description
 - There are limited document management functions across agencies which do not allow:
 - searching across multiple repositories,
 - enterprise taxonomy; or
 - viewing of documents because the required software may not be installed.
- Principle
 - Principle A - Promote Usability
 - Principle B - Support E-Services

- Principle C - Address Record Retention
- Principle D - Support Business Continuity

Current State D - E-Forms / Forms Processing

- Description
 - Currently we do not have:
 - a standardized electronic forms solution,
 - standards for form distribution or storage,
 - field name conventions for forms; or
 - a standardized workflow.
 - Existing forms do not support automated data capture.
 - There is also limited electronic submission of forms, limited character recognition, and low level use of electronic signatures.
- Principle
 - Principle A - Promote Usability
 - Principle B - Support E-Services
 - Principle D - Support Business Continuity

Current State E - Enterprise Report Management

- Description
 - Electronically generated reports are stored on a combination of:
 - COM
 - Paper
 - Electronic systems such as: on-demand, dispatch
 - These reports are not readily accessible. Some of the technologies are becoming obsolete, the viewing technology is outdated, and the information may not be reusable or easily migrated.
- Principle
 - Principle A - Promote Usability
 - Principle B - Support E-Services
 - Principle C - Address Record Retention
 - Principle D - Support Business Continuity

Current State F - Workflow

- Description
 - We currently have limited:
 - Deployment,
 - Ability to route within a department,
 - Integration with business applications
 - Existing policies restrict full implementation.
- Principle
 - Principle A - Promote Usability
 - Principle B - Support E-Services
 - Principle C - Address Record Retention

- Principle D - Support Business Continuity