AUTOMATED SYSTEMS FOR CHILD SUPPORT ENFORCEMENT:

A GUIDE FOR ELECTRONIC DOCUMENT MANAGEMENT

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U. S. DEPARTMENT OF HEALTH & HUMAN SERVICES

Administration for Children and Families
Office of Child Support Enforcement

PREFACE

The Administration for Children and Families (ACF), Office of Child Support Enforcement (OCSE), developed this *Guide for Electronic Document Management* to support States in increasing the efficiency of the Child Support Enforcement (CSE) systems.

The audience for this Guide includes State CSE technical, policy, and program operations staff and their contractors, and Federal OCSE technical assistance staff.

ACF continues to welcome additional comments and suggestions from users of this Guide and will incorporate changes where feasible. Comments and suggestions may be sent to:

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CHAPTER I: INTRODUCTION

Chapter I presents information pertaining to the collaborative Federal and State endeavor to enhance the level of automation in State Child Support Enforcement systems. Section A describes the mission and goal of the Office of Child Support Enforcement (OCSE). Section B discusses the initiative for Level of Automation Technical Assistance.

SECTION A: OCSE MISSION AND GOAL

OCSE Mission

The OCSE mission is to assure that assistance in obtaining support (both financial and medical) is available to children through locating parents, establishing paternity and support obligations, and enforcing those obligations.

The Child Support Enforcement Program is authorized and defined by Title IV-D of the Social Security Act. The purpose and the mission of the Program are derived from the Act.

Major Goal

The nation's Child Support Enforcement (CSE) Program is a Federal/State/local partnership to help families by promoting family self-sufficiency and child well-being.

About CSE

All States and territories run a CSE program, usually in the human services department, department of revenue, or the State Attorney General’s office, often with the help of prosecuting attorneys, district attorneys, other law enforcement agencies and officials of family or domestic relations courts. Native American Tribes, too, can operate culturally appropriate child support programs with Federal funding. Families seeking government child support services must apply directly through their State/local agency or one of the Tribes running the program**.** Services are available to a parent with custody of a child whose other parent is living outside the home. Services are provided automatically for families receiving assistance under the Temporary Assistance for Needy Families (TANF) program.

SECTION B: Level of Automation Technical Assistance

The U.S. Department of Health and Human Services (DHHS), Administration for Children and Families (ACF) provides national leadership and direction in planning, managing, and coordinating the nationwide administration and financing of a broad range of comprehensive and supportive programs for children and families including CSE.

State and local agencies in large part carry out the CSE program. ACF retains the responsibility to monitor and evaluate programs to ensure that they are being operated as intended by law and regulation and that the expenditure of Federal funds is made in accordance with Federal regulation.

Level of Automation Technical Assistance is an OCSE initiative with the objective to encourage and support States to enhance the functionality and efficiency of their CSE automated systems. It serves as a mechanism for OCSE to provide direction and share knowledge among States regarding technically-based strategies for addressing business challenges, proven automated solutions, and promising new technologies. Most importantly, technical assistance seeks to ensure that CSE systems effectively meet business user needs, as defined in the ACF publication *Automated Systems for Child Support Enforcement: A Guide for States. Updated in IM 07-07 May 2007.* http://www.acf.hhs.gov/programs/cse/stsys/dsts_cert_guide.html

Federal OCSE staff work in close collaboration with State CSE technical, policy, and program operations staff and together focus on improving system performance. Technical assistance subject areas are derived from OIG evaluations, CSE conferences, and State input. Regular Federal Financial Participation (FFP) at the 66 percent rate is available for enhancing the level of system automation.

OCSE provides guidance documents such as this Guide for Electronic Document Management to facilitate the technical assistance process. As part of its technical assistance process, States and territories may request OCSE to conduct site visits to observe the State system and interview State personnel. OCSE and State personnel discuss and document their findings and recommendations for further State system automation. Additionally, State personnel are encouraged to share documentation and lessons learned that OCSE can disseminate to other States.

In the future, OCSE may schedule collaborative sessions with State personnel and use this Guide to consolidate and document knowledge of the current level of CSE system automation and to identify further opportunities for automation.

CHAPTER II: ELECTRONIC DOCUMENT MANAGEMENT

OVERVIEW

Chapter II describes Electronic Document Management (EDM). Section A presents a brief description of the technology. Section B addresses the advantages and disadvantages of EDM. Section C discusses the technologies and components of EDM in detail.

SECTION A: EDM TECHNOLOGY BRIEF

Document imaging and document management technologies are today collectively referred to as EDM. Document imaging refers to creating a digital representation of a paper document through the use of an input device, such as a scanner. Document management refers to the storage and retrieval of both static digital images and dynamic documents with a digital source such as Microsoft® Office documents. The incredible benefit of EDM over paper or conventional folder-based digital file storage is the ability to manage millions of documents and retrieve a specific document in just seconds.

At a higher level, Records Management is a subset of EDM. This refers to the life-cycle management of documents with respect to policies, rules, and regulations. Not all EDM systems support records management functionality.

EDM has several component functions. An EDM system must have a method of converting documents into digital form (capture), applying look-up information to the digital files (metadata or index fields), and storing images in a database on digital media. An EDM system must also include the ability to search for documents (full text or index search), security features, and provide output (view, email, fax, print). Workflow, or routing of files, is an additional feature of many EDM systems. These features, and many more, will be discussed in greater detail in Section C of this chapter.

SECTION B: ADVANTAGES AND DISADVANTAGES OF EDM

Advantages of EDM

There are many benefits of EDM as compared to both paper files and microfilm imaging.

The seven primary benefits are:

- Provide a central repository for corporate knowledge
- Assist in meeting compliance mandates
- Cost containment purposes
- Security enhancement
- Data integrity enhancement
- Disaster recovery
- Customer satisfaction

1. EDM as a central repository

- Allows file access from regionally dispersed office groups
- Central system can serve multiple locations
- Enables access to documents 24 hours per day, 7 days per week
- Facilitates Freedom of Information Act requests by allowing much more self-service than possible with paper file management
- File sharing and collaboration

2. Meeting compliance mandates

- **State Regulations**
  - State-specific records management regulations
  - CSE regulations
  - Other regulations

- **The Child Support Performance and Incentive Act of 1998**
  - OCSE-157 requirements
  - Efficiency gains contribute to both cost avoidance and improved performance
  - Other requirements

- **Government Paperwork Elimination Act** (Pub. L. No. 105-277)
  - Federal agencies must accept information from the public electronically; authenticity, reliability, and digital signatures are key issues
  - If an agency anticipates receiving more than 50,000 submittals of a particular form, multiple electronic methods must be in place
  - EDM can help manage the flow of electronic forms and support the legal standing of electronic signatures

- **Paperwork Reduction Act of 1995** (44 U.S.C. 3501-3520)
  - The main purpose is to reduce recordkeeping and reporting burden imposed by agencies on the public
  - Requires government agencies to share information collected from the public

  - Provides direction to agencies on managing information electronically
  - Some of this information attains the status of Federal records, so EDM may be needed to manage these records appropriately

- **Government Performance and Results Act** (Pub. L. No. 103-62)
  - No specific requirements for EDM, but *does* require agencies to eliminate "waste and inefficiency," and to "improve internal management"

- **Presidential Decision Directive 63,** "Critical Infrastructure Protection"
  - Federal government increasingly depends upon networked information systems
  - Security of vital business information in electronic records is a key component in defining and protecting critical infrastructure
  - Electronic records are a significant asset and EDM can and should be an important part of an agency's business continuity, contingency, and disaster recovery plan

- **Electronic Freedom of Information Act** (5 U.S.C. 552(a)(2)(D))
  - Requires agencies to provide electronic access to government records for the public as long as it is practical to do so
  - When records that have been released to any person are likely to become the subject of subsequent requests, an agency must make the records available by electronic means for records created on or after November 1996
  - EDM can assist in tracking and managing the original records, redacted versions, and requests for access

3. Cost containment

- Incredible gains in efficiency reducing labor requirements and freeing up caseworkers to manage casework rather than files
- Save file storage space
- Decrease in copying and printing
- Reduction in courier expenses
- Scalability: expansion possible without incurring undue expense

4. Security enhancement

- Facilitates restricted access
- Varying levels of user rights permit access without exposing information unnecessarily
- Full audit trail of activity
- Electronic data encryption
- Redaction (blacking out information) allows for declassification of confidential documents

5. **Integrity enhancement**

    - Digital images provide exact representation of original paper documents
    - Administrative controls restrict modification, deletion, importing or exporting of documents, reducing lost, misplaced, or damaged files
    - Simultaneous multi-user access allows a single document to be used by multiple parties at once
    - Certain image file formats are unalterable
    - Certain storage media are unalterable

6. **Disaster recovery**

    - Backup capabilities, unlike paper file storage
    - Backups can be stored off site or in a fireproof safe
    - Data redundancy for continuity of operations
    - System component redundancy for reliability
    - Full system redundancy (clustered architecture) for uninterrupted operations

7. **Customer satisfaction**

    - Efficiency gains result in much more timely customer service
    - Files are readily accessible to the user from the desktop once put into the system
    - Facilitates immediate attention to customer needs
    - Decentralized files (digitally available) allow for customer service from multiple branch offices
    - Simple document look-up capabilities allow any caseworker to attend to a customer need
    - Workflow and document routing allow for tracking and expedite work completion

Disadvantages and Risks

Though EDM and document imaging offer great potential for efficiency gains, the technology, and more importantly, the imaging process, can have some drawbacks if not designed and implemented properly. Some of the possible areas of concern include:

- Potential poor quality images
- Incorrectly indexed documents
- Time investment for document preparation, capture and indexing
- Capital investment for technology
- Changing technology standards
- Training of personnel
- Risk associated with poorly planned implementation
- Security and confidentiality compromises

All of these risk factors can be minimized by using industry-accepted best practices during the analysis, design, and implementation phases of the EDM project. With proper planning and execution, all the benefits of EDM can be realized with minimal risk.

One way to minimize the pitfalls is to benefit from the expertise of a Computer Trade Industry Association (CompTIA) Certified Document Imaging Architect (CDIA+). CompTIA is a leading association representing the technology industry, which developed the CDIA+ exam. The CompTIA CDIA+ certification is the first global standard of competency and professionalism in the document imaging/document management industry. Supported by a network of worldwide industry leaders, it validates a professional's level of expertise in the technologies and best practices used to plan, design, and specify a document imaging system. CDIA+ signifies the highest level of professionalism and competency in the industry.

SECTION C: EDM TECHNOLOGIES AND PRACTICES

Capture

Capture, often referred to as conversion, consists of creating a digital image from a non-digital source, such as paper or microfilm. The most common capture device for paper-to-digital conversion is a scanner. The scanned document is converted into a computer-readable file type, commonly Tagged Image File Format (TIFF) or Portable Document Format (PDF). TIFF, a standard format that dates to 1981, has been the de-facto standard for years; however, PDF, a proprietary format of Adobe Systems Inc., has become increasingly used in recent years.

Another form of capture is using a fax server. Rather than physically scanning paper faxes, the digital information contained in the fax is converted into an image and uploaded into the EDM system. This process skips the time-consuming intermediate step of handling paper.

Some EDM systems are also designed for digital-to-digital conversion, or creating an unalterable image of an electronic document. This is commonly referred to as “print” to PDF, because the process often takes the output of the print driver (e.g., Printer Control Language, or PCL) and converts it into a format acceptable for image archival and records management. By converting an editable (or other format) document to PDF, the intermediate step of printing and scanning is eliminated. An added benefit is that the document contents can be fully searched for text strings, without the inaccuracies associated with printing and Optical Character Recognition (OCR) processing. This digital-to-digital conversion needs no OCR due to the fact that the source document is digital at creation. Actually, no interpretation is necessary at all, as the simple act of printing to PDF yields a file that is fully text searchable. OCR is discussed further in the section on Image Indexing later in this chapter.

Scanners

Scanners are the most common method for converting a paper document to a digital image. There are several features to consider when selecting a scanner. The most common scanner types and features include:

Automatic Document Feeder (ADF) functions as a repository for input documents, feeding sheets one by one into the scanner. The capacity of the ADF is easily as important as the scanner throughput rate in a production scanning environment. **Flat-bed** scanners, on the other hand, are loaded manually and are limited by how fast the operator can load the documents. **Graphics** scanners are typically flat-bed devices, designed to capture high-quality color photographs.

Duplex scanners scan both sides of the document (as opposed to **simplex**, meaning one-sided); therefore, two images are created for every page of the document (an important consideration when calculating storage volume).

Bitonal refers to exclusively black and white images, whereas **grayscale** captures up to 256 shades of gray. All black and white scanners can scan in both bitonal and grayscale modes.

The **connection type** is another important consideration. A **video** connection is the ideal choice for high volume scanning (greater than 100 pages per minute). Video connections can handle large volumes of data effortlessly. The drawback is cost; cards for the personal computer (PC) and the scanner are typically over $1,000. A **Small Computer Standard Interface (SCSI)** is the most common connection for both scanners and storage devices, suitable for rates less than 100 pages per minute. Most production scanners include a built-in SCSI connector. A PC card costing on the order of $100 is required. **Firewire (IEEE 1394)**, also called **High Performance Serial Bus**, can connect up to 63 devices at 400 megabits per second (Mbps). Both the scanner and the PC need this port to communicate. The cost is on the order of $50 for a card and a cable. **Universal Serial Bus 2.0 (USB2)** is fast becoming available to connect up to 127 devices at connection speeds of up to 480 Mbps, making it a solid choice for mid-range scanning (speeds to 100 pages per minute). Also, a "standard" **Universal Serial Bus 1.0 or 1.1 (USB1)** can connect 127 devices and transfer data in speeds up to 12 Mbps. While this is suitable for home use or low production (less than 20 pages per minute), it is not recommended for a business environment. All that is needed for either USB1 or USB2 is a cable costing around $10. **Parallel** connections are not suitable for imaging.

Software connections come in two standards, **TWAIN** and **Image and Scanner Interface Specification (ISIS)**. TWAIN is an application program interface that facilitates image capture from a variety of sources. The standard provides a common interface for manufacturers to use so that proprietary drivers do not need to be developed. TWAIN is suitable for slower speed scanners and is widely accepted. ISIS, developed by Pixel Translations (subsequently EMC® Captiva), facilitates additional capabilities such as image viewing, rotation, additional file formats, and intelligent communications

between the scanner and the imaging application. ISIS is the more frequent interface of choice for production scanning.

Another important consideration often overlooked in the production environment is **scanner maintenance**. Cleanings, maintenance checks, and replacement of wear items are all vital for the consistent capture of quality images and to prolong the life of the investment. Production units may be more expensive up front; however, they are designed to be serviced and maintained and parts will likely remain available for years to come. The **duty cycle** is the manufacturer's suggestion of the volume the unit can handle over a given period of time. Duty cycle is a recommendation for reliability, not a capability.

Multi-Function Products

Multi-Function Products (MFPs) are digital copiers with scanning, printing, and fax capabilities. Many newer MFPs allow for indexing and routing via touch screen at the unit during scanning, and are also designed to integrate seamlessly with many of the popular imaging software products. The units are not necessarily designed for production scanning (such as backfile conversion), but can be used by an office group for scanning newly generated files if imaging volumes are not too great. Their primary limitation is a smaller ADF, often 100 pages or less. Their attraction for imaging is obvious: most office groups own a digital copier. Using the unit for its other existing capabilities is certainly worth exploring before purchasing a scanner.

Image Quality

Image quality significantly affects all other aspects of the document imaging process. Poor quality images do not compress well, result in larger file sizes, transmit more slowly across the network, are slower to fax, print, or email, and just do not look good to end users. Proper document preparation methods and scanner maintenance are vital for generating quality images.

Image enhancement is another means of improving image quality. Some image-enhancement methods include:

- De-skewing or justifying – straightening images that scanned crookedly
- Filtering – image enhancement such as changes to brightness and contrast or hole punch removal
- De-speckling – removing background noise or "specks" on the image
- Black border removal – removing the unwanted black edges of a scanned document
- Cropping – selecting the image area and "cutting" off the edges
- Adaptive thresholding – dynamically changing contrast one line at a time

Resolution

The clarity of an image is its resolution. As a document passes through a scanner, the resolution is created according to settings in the capture software. A resolution of 200 dots per inch (DPI) means there are 200 black and white dots per linear inch both horizontally and vertically. The more dots, the finer the detail, much like a painter using a finer brush. For document imaging, 200 DPI is sufficient for capturing a high quality image for display on a monitor. However, 300 DPI is recommended for optical character recognition (OCR) processing. Higher settings are possible if even finer detail is required; however, the drawback is file size. Each increase in resolution yields a substantially larger file size.

Color and Grayscale

Scanning in black and white (bitonal) is suitable for most business documents. However, for some applications, documents need to be scanned in grayscale or color. Color scanning requires the purchase of a color scanner. Color and grayscale scanning result in images that are significantly larger than standard bitonal images. These images, even compressed, can pose a burden to the network during transmission and can result in a dramatic increase in storage requirements. Color and grayscale images may sometimes be more appropriately stored in other file formats, such as JPEG (Joint Photographic Experts Group) format, especially for non-text images such as photographs. Color and grayscale images of this type may be optimally created with lower resolution settings, of 100-150 DPI, for display only. Higher resolution is necessary for printing or if detail (zooming in) is a requirement. Color and grayscale scanning should be reserved for documents that must be preserved in original form as a business or legal requirement, such as photographs.

Compression

Following capture, the images are compressed to reduce file storage volume, reduce data transmission times, and decrease the burden to the network. Since image files can be quite large (approximately 457 kilobytes for an 8.5 by 11 inch document scanned at 200 DPI resolution bitonal and 1 megabyte at 300 DPI), compression is important. With data compression, algorithms are applied to the files enabling tremendous reductions in file size. Most EDM systems use International Telegraph and Telephone Consultative Committee (CCITT) Group 4 compression protocols (for TIFF) resulting in a 20 to 1 file compression. Joint Photographic Experts Group (JPEG) format is the accepted standard for grayscale and color compression resulting in a file compression ratio as high as 100 to 1. PDF compression ratios are variable. Some proprietary PDF compression products can provide compression ratios even greater than the Group 4 and JPEG compression algorithms, depending on whether the file has text or comments/annotations. Actual testing is the only reliable way to predict PDF compression.

Compression methods can be lossy or lossless. Lossy is often used for image files, such as photographs or drawings, where the displayed or retrieved file is sufficiently similar to

the original for practical use. Lossless is preferred for text and data files, where it allows the exact original data to be reconstructed from the compressed data file. Lossless compression is recommended -- and sometimes required -- for archival, records management, and legal (courtroom) document presentation, storage, and exchange.

Image Indexing

Once pages are scanned, images are stored according to reference criteria that are manually or automatically entered into a database. This process is called indexing. These criteria can be referred to as index values, key indexes, key fields, or look-up fields. Index fields are selected that are intuitive so that users can easily find the files in the future, such as case number, participant number, social security number, client name, etc. Typically, one to four fields are used per document. The index values become the look-up fields that users use to query the images. Indexing can be done manually by keying in the appropriate look-up fields while looking at the images on screen (called heads-up indexing) or by looking at the original documents (called heads-down indexing).

Full-text indexing is another option. Optical Character Recognition (OCR) software recognizes the text within the document. The text is then stored in a database. This enables future searching of the content within the document rather than just the metadata (index values). OCR can also be used for indexing as discussed below. Accuracy can be expected to be between 90 and 99 percent depending on the software, scan resolution, the document type (font size and print resolution), and the document condition. Advances in OCR technologies continue to improve accuracy every year. Intelligent Character Recognition (ICR) is technology capable of reading hand-printed text. Accuracy of ICR is far less than OCR because it depends heavily on the legibility of the text.

Many EDM systems today support some form of **automated indexing**. Some systems support capturing index fields through the use of zonal OCR, or OCR just for a specifically defined area of the document. This method is effective for repeated documents, such as forms. If a certain field of the form is for the case number, then that zone can be programmed to be scanned via OCR and the data can automatically populate one of the index values.

A **match and merge** process can be used to populate the remaining index fields. An example of a match and merge is where a unique identifier field (such as case number) is indexed in the EDM system and a search is performed in a separate database (in the IV-D system) to find an exact match. If a match is found, a merge occurs by pulling data from the IV-D database to populate the remaining fields in the EDM system, such as noncustodial parent (NCP) information, custodial parent (CP) information, etc. This process greatly reduces manual indexing and allows for many index fields to be used in the EDM system, facilitating multiple ways to access images during retrieval.

Another method for automated indexing is the use of **barcodes**. A barcode sheet can be placed prior to a document indicating that the document is of a certain type, automatically indexing the “document type” field, for example. Multiple fields can be indexed using

barcode sheets. Barcode sheets can also be used as document delimiters, or batch pages, indicating that the page following the barcode is the beginning of a new document (as opposed to scanning an entire batch as one multi-page document). In this way, the indexing technician can simply scroll to the first page of the document and manually index it based on the content visible on the first page of the scanned image. With these methods, the barcode sheets can often be removed and reused following scanning.

With some systems, documents can be indexed prior to scanning and barcodes printed out. The barcodes can either be applied to the first page of a document (if a sticker) or a barcode sheet can be placed prior to the document before scanning. Once scanned, a match and merge can run. Another method is to import a database of index values and print out barcodes. Again, a match and merge can run following scanning.

Lastly, internally generated documents (such as applications) can be printed with barcodes on them. When they are returned, the EDM system will automatically recognize the document type and index that field. Barcode sheets are also commonly used for document delimiters, which separate documents. During scanning, several documents of varying lengths can be scanned in a batch with document delimiters separating each individual document and the system will save the documents as separate documents automatically.

Forms Processing

Forms processing describes the capturing of information from high-volume paper forms. Software is often “trained” to scan a certain field and OCR/ICR reads the field and collects the data in a database, often for indexing. Barcodes can be used to prompt the capture software of the document type and the software refers to a programmed template to search the correct fields. Additionally, Optical Mark Recognition (OMR) is used to identify and interpret marks such as checkboxes. Selections can prompt the forms recognition software to extract indexing data from particular fields or define an index value based on the recognized mark. These features allow for automatic indexing, as described above.

Storage

Storage hardware and media have advanced considerably since the early days of EDM. Storage can be on-line, near-line, and far-line. On-line refers to a repository that is immediately and directly accessible for retrieval. Near-line is a technology that allows the media to be automatically loaded for use when queried. Loading of the media can take several seconds. A jukebox is an example of a near-line device. Far-line (sometimes referred to as off-line) is a library of media in storage. The document management system will prompt the manual loading of the correct media; therefore, the index information is in the system, yet the media is not connected to the system. This is suitable for a long-term archive only. The most common storage media are listed below:

- **Optical Hardware** - In terms of image storage, magneto-optical (MO) technology is the mainstay. Used since the mid 1970's, the process of writing files using a combination of heat (laser) and magnetism (magneto) is highly trusted. MO media are loaded into a stand-alone drive or an optical jukebox. The latter houses many discs, and can have a capacity in the terabytes. Main advantages include the ability to transport large quantities of data easily by virtue of the discs being ejected from the jukebox and the reliability of files if Write Once Read Many (WORM) discs are used. WORM writes the files permanently to disc restricting deletion or modification. This also substantiates the integrity of the files if challenged in a court of law. Costs have also dropped in recent years.

- **Tape Hardware** – Tape hardware is relatively inexpensive and can accommodate very large storage capacities, but it does not permit random access of data. Digital Linear Tape (DLT) is considered the de facto standard for magnetic tape used for computer data storage. A drawback for this and all magnetic storage is that it can be altered or erased.

- **Magnetic Hardware** – This hardware magnetically stores data on a stack of rotating disks called platters. Magnetic devices include computer hard drives, zip drives, and floppy drives. Magnetic hard drives offer near-instant (less than 150 milliseconds) access with rapid storage and retrieval. Cost is continually decreasing while capacity is increasing, making magnetic storage the leading technology for most newer EDM systems.

- **RAID Hardware** – A type of magnetic storage, RAID (Redundant Array of Independent or Inexpensive Disks or Drives), is a disk subsystem that is used to increase performance and provide fault tolerance. RAID is a set of two or more ordinary hard disks and a specialized disk controller that contains the RAID functionality. There are seven RAID levels ("RAID 0" to "RAID 6") with RAID 5 being the most common for EDM systems. With RAID 5, a railed drive is "hot swappable," meaning a drive can be replaced on a live system without shutting it down or losing access to files. A combination of parity, mirroring, and striping ensures that all stored data is duplicated and available in the event a hard disk fails. Many RAID servers contain redundant components, such as processors, cooling fans, power supplies, etc. This facilitates maximum reliability and often components can be replaced with the equipment running, never losing access to data.

The tremendous benefits and plummeting costs of magnetic storage have caused this media to become the standard. Older technologies such as optical disks and jukeboxes are still in use, but are becoming less common for document management; they remain in use for archival and records management purposes.

Legal Acceptance

The benefit of some media, such as WORM discs, or the other media that can only be written to once, is that it ensures that the files can't be altered or erased in any way. For this reason, WORM discs earned great legal acceptance as the media of choice during the earlier years of imaging, and are still widely accepted. Before adopting any media, be sure to review State regulations regarding the legal defensibility of data on various storage media as well as the legal defensibility of file formats.

One of the most important aspects for the legal defensibility of an EDM and records management system is the integrity of the business process. Establishing guidelines or policies and abiding by those guidelines can be more important than the technology selected. Ultimately, the EDM system must abide by all the records management policies set forth by the organization, such as retention schedules. Internal records management personnel are an excellent source of information when selecting or developing the proper EDM solution.

Records Management

A record is any information created, received, or stored that serves as evidence of business or organizational activities. Records management constitutes:

- Establishing and enforcing policies including retention rules and indexing schema
- Developing standard operating procedures
- Creating a storage plan
- Ensuring compliance with all local, State, and Federal regulations

Today, Electronic Records Management (ERM) software, which is a subset of EDM, is a preferred way to manage records. The benefit of ERM is that many standard operating procedures (SOPs), policies, and rules can be automated, ensuring consistency and compliance. ERM can also be used to monitor and track file access while administrative controls regulate the management of files stored on any media. Retention policies and record migration can be fully automated based on many possible criteria, per the records management policies.

Not all EDM systems are records management applications. Working files, such as draft documents, do not necessarily constitute records. Likewise, some documents are unofficial and would not be admissible as evidence in court. These documents would not be saved as records and could simply be managed using an EDM application. ERM applications allow users to "declare" the image or file as a record rendering the file unalterable and subject to pre-established disposition rules. This feature is not included in all Commercial Off-the-Shelf (COTS) EDM applications, but only those that are also designed for records management.

The National Archives and Records Administration (NARA) has endorsed *Design Criteria Standard for Electronic Records Management Software Applications, DOD 5015.2-STD.* For a tool-kit with many links and resources specific to electronic records

management for Federal agencies, visit http://toolkit.archives.gov/pls/htmldb/f?p=102:13:18272429504357946847::NO::LTOOLID:181.

Computer Output to Laser Disc and Enterprise Reports Management

Computer Output to Laser Disc (COLD) is the process of redirecting print-stream data (such as green-bar reports) from a host to a PC running an application that will use each word as an automatic index. The indexed data resides on a laser disc. This eliminates scanning, OCR, and the inaccuracy associated with OCR. Enterprise Reports Management is the same technology, except it may use any storage medium, like a RAID unit.

Image Retrieval

Once images and metadata are stored in the system, documents can be searched for and retrieved for viewing, collaboration (document sharing), manipulation, or output via email, facsimile, or printing. EDM systems can be designed with many different search options. The most basic search option is to perform an **index search**. By typing the index value in the proper field, all images with that particular value will appear on a selection (or "hit") list. Then the user simply selects the image for viewing or other action. One challenge with relying on this method as the sole source of document retrieval is that if the search term does not match the index value exactly, the desired document will not appear on the hit list for selection. A solution to this is to use other types of searches, such as wildcards, Boolean, proximity, or fuzzy logic.

A **wildcard search** is searching for a partial term and putting an asterisk or a question mark to allow variability in case of misspelling. An example would be looking for a client named Marshall. You may type mar* to get hits for Marshal, Marshall, and Marchel etc. A **Boolean search** is using operators such as AND, OR, and NOT to limit the search criteria. This is most commonly used for full-text (searching all words within the document) indexing to minimize false hits. **Proximity searches** are designed to find multiple search terms within a certain distance in text, again for full-text indexing. **Fuzzy logic** is designed to compensate for the inherent inaccuracies associated with OCR. Fuzzy logic will recognize that "Lndiana" is really "Indiana" and register "apen" for a search for the word "open." With all full-text search methods, it is good practice for the system to highlight the search terms in the text of the image so that users can quickly determine if the document is the specific document sought. Some EDM systems also have a visual file storage hierarchy for browsing for images, much like Microsoft® Explorer. This feature allows users to search for documents in a way that is familiar to them.

Viewers and Converters

A **viewer** is a client-side (desktop) application, commonly using ActiveX® plug-ins, that allows for display of various file types. Typically, no server-side rendering is necessary for ensuring faster viewing. Viewers often also allow for thumbnail views to navigate

through pages before selecting an image. Some common viewer features are: zoom in/out, rotate, scroll through thumbnails, etc. **Converters** are used to reformat file types for display or other output functions.

If a client-side viewer is not loaded, the image or file retrieved will simply launch the native application or the Windows® default application for the specific file type. For TIFF, the most common image file type, the appearance of the displayed image will vary depending on what application launches if a common client-side viewer is not installed on all computers. For PDF files, the free viewer Acrobat® Reader® is available for download. For other file types, such as Microsoft® Office documents, the document will launch the Office application in which it was created.

Document Management

Document management describes the administration and manipulation of images and other electronic files uploaded in the system. Document management, as opposed to simply document imaging, also allows for the upload and management of application files, such as Microsoft® Office documents. Some common document management features include **check in/check out** and **version control**. Check in/check out is EDM software functionality to allow a modifiable document to be checked out and then back into a document repository, keeping security and document integrity intact. Typically this allows one user at a time to work on (and possibly modify) a document. While the document is 'checked out,' other users may see an icon or some other designation in the EDM system indicating who has the document, or may simply see a read-only rendition of the document. Version control means that, if anyone alters the document, the system automatically assigns a new version number, ensuring that the original is still intact.

Some other document management features that can also apply to static images are **annotation** and **redaction**. Annotation is the adding of information like highlighting, notes, or comments to an image. The annotations themselves are simply a layer and in no way alter the actual image. In this way, the image can still serve as a legal record. Redaction is the blacking out of classified information. Redaction can be presented as a layer, retaining the unaltered original image. It is also used to generate separate redacted files (image or text based), in which the proprietary or confidential material has been fully removed, for appropriate distribution.

Electronic Document Workflow

EDM Workflow is an advanced EDM feature that offers incredible efficiency gains. Imaging alone allows workers to perform many business functions at their workstations because the documents necessary for their duties are now available on screen. However, workflow features take this to the next level. EDM workflow allows for the automation of repeatable business activities involving electronic documents, such as sending a voluntary affidavit for paternity to the establishment team once it is scanned. Documents can be sent to the workers automatically and they can be notified of pending duties using task lists and/or email notifications. When the duties are completed, they can send the

document on to the next reviewer or simply close out the process. Their supervisors and co-workers will be able to see that the task has been completed. Additionally, a workflow system allows a supervisor to monitor workloads and assign tasks. Supervisors can also monitor productivity. When someone calls in sick, the work can be digitally reassigned. Workflows can be either ad-hoc, which means on-the-fly, or production, which means predefined. Many COTS workflow applications provide graphically intuitive wizards and drag-and-drop canvasses to make workflow setup easy.

Data Migration

Hierarchical Storage Management (HSM) software applies metrics, or predefined criteria, to each file in a storage array. Those that match will be migrated to another location (or device) to make room for more files. The criteria may be how long the file has been on the server, the date the file was generated, the size of the file, or the last time the file was accessed. Files are migrated to a less expensive (and slower) storage, such as from RAID to a jukebox. Pre-fetch software can move an entire folder to faster (and more expensive) storage when a single file is called up. This way, if another file is called up from that folder, there will not be a retrieval delay inherent with jukeboxes. Once the files are pulled up, they will fall under the normal rules of the HSM software once again. Media management software manages all media and "knows" the location of each disc and the corresponding files on each disk. It is the jukebox "traffic cop."

Graphical User Interface

One easily overlooked aspect of a successful EDM system is an intuitive Graphical User Interface (GUI). It is vital for the acceptance and adoption of an EDM system that the users are comfortable with the look and feel of the EDM software. EDM is a significant departure from paper file management; therefore, it is imperative to develop or purchase software that is intuitive or similar to existing applications. It is also common practice to image-enable an existing application that users are familiar with so they maintain a consistent desktop. This means that a launch button or menu is added to an existing application and search screens are windows that pop up when searches are conducted. While integration can be challenging, user acceptance is greatly enhanced.

Architecture

EDM systems started off as mainframe-based applications with a client/server thick-client model. With the advance in Web technology and decentralization of the workforce (or centralization of operations), Web or browser-based thin-client applications are becoming more common. Some EDM applications support UNIX® as well as Linux platforms; however, Windows® is the most common platform. All applications support Windows® desktops and standard Web browsers. Microsoft® Internet Information Server (IIS) and IBM WebSphere® are the most common Web servers used. Many products support the popular database applications such as Microsoft® SQL Server, Oracle®, and Sybase® (among others), while some products come with a proprietary database. Hypertext Transfer Protocol (HTTP) or Transfer Control Protocol/Internet

Protocol (TCP/IP) is typically used for communications between the server and the workstations. Lightweight Directory Access Protocol (LDAP) enables users to use a single login and password for several disparate systems, even directories running over TCP/IP.

Scalability and **distributed computing** are also important characteristics to incorporate in an EDM system design. Scalability is important to accommodate many users, keep up with the document production of the organization, store data on multiple files, servers, and databases, and integrate with other applications. Distributed computing architecture is simply as the name implies, distributing the computing across several servers across the network. Distributed computing can dramatically reduce the burden to the network, speed up image retrieval, and prevent file integrity compromise by having database searches and indexing conducted by the server side while having compression and decompression of images conducted on the client side.

A **clustered server** architecture provides failover support for applications and services that require high availability and reliability. With clustering, applications and data remain available on multiple servers linked together in a cluster configuration. This, combined with network and component load balancing, offers protection against application failure, hardware failure, and site failure caused by disaster or power outage.

EDM Hosting

EDM hosting, or Software as a Service (SaaS), is becoming popular with many organizations. This arrangement allows firms to enjoy the benefits of EDM without the capital expense of hardware and EDM software. Instead, the organization pays a monthly fee for the service. The arrangement also eliminates the burden of a complex installation or development effort as well as the challenges of maintaining and supporting a proprietary or COTS system on internally-owned hardware. The drawback to SaaS is diminished control of the application and reduced opportunity for customization.

Document Security and Access

Electronic documents being accessed via a Local Area Network (LAN) or the Internet run the inherent risk of unauthorized access to digital assets. While this is really not different from unauthorized access to a central filing location in a building, users are sometimes skeptical of having corporate (sensitive) information attached to the LAN or the Internet.

Specific precautions can be taken to minimize these risks. Below is a list of security technologies, and a brief explanation of each:

- **HTTPS and SSL -** The most fundamental way of allowing access, without compromising security, is through *data encryption* and *user-authentication* (logon, password, even IP address). This is accomplished by using Hyper-text Transfer Protocol Secure (HTTPS) and Secure Sockets Layer (SSL). This adds an additional

layer of security to the transmission. HTTPS is the language the data will be transmitted in. This is a high-level language, not easily compromised. With SSL added, the data is effectively secured down to each packet being transmitted.

- **Private Key Infrastructure -** Private Key Infrastructure (PKI) uses two keys—one public, and one private. The public key is software that scrambles or encrypts a file. The *private* key unscrambles or decrypts data. It works like this: the requesting computer sends its *public* key to the host, it encrypts the file, and then only *your* private key can decrypt the file.
    - At no point is the private key ever sent across the network, thereby reducing the risk of decryption. It is virtually impossible to deduce the private key even if one knows the public key.
    - PKI will also invalidate a digital signature if tampered with.

- **Virtual Private Network** - In addition to the previous security measures, if the data is extremely confidential, a Virtual Private Network (VPN) can be added that also uses SSL to allow the data to travel on public lines, but in a virtual private tunnel. In a sense, a direct point-to-point line of communication develops that only the authorized user can access. A combination of hardware and software is needed on both ends to accomplish this level of security.

User Access Rights

EDM systems are designed to limit usage rights to electronic images and files. The network administrator or document workflow administrator sets these rights. They consist of: group-level, user-level, folder-level, and even document-level. At the group-level, users inherit all rights assigned to the group. For example, in an accounting department, the basic rights to all accounting files are inherited by all members, i.e., all in the department can access f:\finance. Then, at a user-level, certain users are assigned more rights, i.e., Joanne also sees f:\finance\payroll. At the final level, rights to individual documents can even be restricted, i.e., rights to access someone else's document can be withdrawn (Joanne can't see Fred's spreadsheet).

Some examples of group, user, folder, or document-defined rights are access, view, download, print, fax, email, edit, delete, add a file, create a folder, and supervisor or administrator, which can do anything, including setting other users' rights.

Managing Network Traffic

The potential disruption to network bandwidth (capacity) by passing large scanned images can be avoided if the system is designed and implemented properly. A system architect with CDIA+ certification can identify present network capacity, existing components that can be used, and areas of concern during the needs assessment. Different methods can be used to minimize disruption to the network.

One way to minimize interference with the network is to use a bridge or router to divert image traffic around areas of the network. This is suitable to handle the capture process, or divert data flow from the capture station to the storage media, but does not mitigate the data flow to the desktop users who will be retrieving the images. Therefore, the system must be designed to both accommodate transmission during imaging and the increase in network traffic resulting from routine image retrieval and output (email, fax, print, etc). It is best to assess network bandwidth during peak use to ensure that the network can handle the additional traffic that accompanies an EDM system.

With some systems, once the correct image is located, it is downloaded for viewing in the native application loaded on the desktop; with other EDM systems a thumbnail of the image is viewable using an ActiveX® plug in, allowing the user to navigate through pages without having to download every single image. The latter clearly has less impact on the network. This also reduces the burden on the network by reducing some unnecessary traffic.

Communications

Many EDM systems today are Web-based. This requires an external communication channel that can accommodate the increase in data transmission. The most common communication options are Digital Subscriber Line (DSL), and T1. DSL is 384 kilobits per second (Kbps) and T1 is 1.544 Mbps. If the available communications connection speed is not sufficient for both routine business needs and image uploading to a remote server, then images may be cached locally during processing and uploaded during off-peak hours.

Scanning Logistics

Institutions will have to determine what their exact business needs are and factor in resource availability and cost when deciding how to proceed with production imaging. The three options for implementing an imaging program are scanning all documents (backfile conversion), scanning all future cases (day-forward conversion), or scanning all cases as retrieved (scan-on-demand conversion), or a combination of methods. All three methods have their drawbacks and benefits.

- **Backfile Conversion -** A full backfile conversion is the most time-consuming and therefore, most expensive (up front). Backfile conversion ensures that all documents will be available digitally, freeing up the most floor space for paper file storage. A full backfile conversion also eliminates the necessity of maintaining (and training for) a dual-process organization, that is, a digital and a paper workflow. The greatest challenge is that, if not planned and executed properly, backfile conversion can result in a lot of unnecessary files being scanned. This results in a large amount of digital storage that may not be necessary and can result in keeping documents beyond their retention period. A thorough planning process and weeding out of unnecessary duplicate, or old (past the retention period) files

can greatly reduce these negative consequences. The other important consideration is who will do the scanning, and how fast.

A phased approach, based on document priority (or other metric) can allow for internal personnel to complete the document preparation and scanning. A rapid conversion will most likely necessitate the use of an outside scanning bureau. The benefits of using a professional scanning bureau are timeliness and, potentially, quality. The down side can include reduced privacy and security, and cost, if the agency does not consider internal labor as an expense. However, using an outside firm does not eliminate the requirement of internal staff to prioritize and prepare the documents for scanning (document preparation is described later in this Guide). Document preparation alone is still time-consuming. The agency will also need to ensure the scanning service quality of the scanning bureau.

- **Day-forward Conversion -** Day-forward conversion in the CSE arena could consist of scanning any new case files during intake. This is much less labor-intensive than a full backfile conversion. However, it would necessitate a permanent dual-track work process, a digital document workflow, and a paper document workflow. This would mean that the level of customer service would be variable depending on client intake date, because “digital cases” could be managed from any office and questions answered real-time while “paper cases” will require more manual effort by the caseworker. Day-forward conversion will also not result in freeing up floor space, and all the other added benefits of EDM for the pre-existing caseload.

- **On-demand Conversion -** Combined day-forward and on-demand conversion ensures that the dual-track process will not be permanent. This is accomplished by scanning all documents in case files as they are pulled during routine business. This means that all regularly reviewed documents are entered into the EDM system. Before too long, most documents are scanned. On-demand does not result in a fully digital process nearly as quickly as backfile conversion, but can be far less demanding on personnel. This option can likely result in the purchase of more affordable capture equipment, machines with far less capacity. The drawback is that the agency will not receive all of the benefits of EDM as soon.

Document Preparation

Document preparation (doc prep) describes the process of getting the paper files ready for scanning. Doc prep begins with sorting through the paper files and separating and organizing the documents to be scanned. All fasteners (staples, clips etc.) need to be removed. Bound documents need to be unbound. Exception documents such as onion skin, fragile, card stock, photographs, color (if the production run is exclusively bitonal), or any other characteristics requiring special handling need to be removed. Barcode separators and barcodes for indexing can be placed for automated indexing. Doc prep is a manual process that can easily take as much or more effort than scanning itself. Doc prep is often done by personnel familiar with the documents and the objectives of the imaging

project to ensure that they are prepared properly. Regardless of who is responsible for doc prep, clear written procedures and training are necessary.

Quality Assurance/Quality Control

There are several Quality Assurance/Quality Control (QA/QC) steps associated with document imaging. QA/QC of scanned images is normally conducted during capture at a proximate workstation. In this way, ADF adjustments or cleanings can be done in real-time, avoiding time-consuming (and costly) repeated batch scanning. Image enhancement can be done automatically with software such as Kofax® VirtualReScan® on an individual image-by-image basis at scan time, or in a batch mode using dedicated enhancement software such as TMS Sequoia ScanFix™.

All indexes should be verified by an independent reviewer, or at a minimum, quality audits (spot checks) should be done on scan batches. There should be verification that indexes correctly apply to the proper images during the QA/QC process. If the images are indexed with a single index field without full text search, dual-track indexing is recommended. This means that they are indexed by two technicians independently. An automated cross-check of the databases can flag any differences in index values. In this way, documents will not be lost as a result of an inability to locate them because of an incorrect index.

Training

An EDM system must be rolled out with a carefully planned training program. Before implementation (during the planning phase), user skill assessments should be conducted to develop the training program. User training and the establishment of a help desk should be completed during and immediately subsequent to implementation.

Acceptance will be enhanced if users are trained and understand the fundamentals of EDM prior to roll-out. There are several low-cost EDM training programs available. It is recommended that reputable vendors with quality materials be sought. Proper training will also facilitate a more effective transition to a digital workflow. Once the system is in place, all users should receive hands-on operational training as well, to become familiar with the EDM system.

Trade Associations

There are several trade associations relevant to the EDM industry. They offer many valuable resources for industry professionals. A few of the leading associations are highlighted below. This list does not constitute an endorsement, but rather serves as a starting point for learning more about the EDM industry.

- **AIIM** – source: http://www.aiim.org/article-aiim.asp?ID=18274

  "AIIM is the international authority on Enterprise Content Management (ECM) -- the tools and technologies used to capture, manage, store, preserve, and deliver content and

documents related to organizational processes. ECM enables four key business drivers: Continuity, Collaboration, Compliance, and Costs.

For over 60 years, AIIM has been the leading non-profit organization focused on helping users to understand the challenges associated with managing documents, content, records, and business processes. Today, AIIM is international in scope, independent, implementation-focused, and, as the representative of the entire ECM industry -- including users, suppliers, and the channel -- acts as the industry's intermediary."

- **CompTIA** – source: http://www.comptia.org/about/default.aspx

  "CompTIA is the leading association representing the international technology community. Its goal is to provide a unified voice, global advocacy and leadership, and to advance industry growth through standards, professional competence, education and business solutions. In order to most efficiently serve the industry and its members, CompTIA has developed specialized initiatives and programs dedicated to major areas within the IT industry. They include convergence technology, e-commerce, IT training, software services, certification, public policy and workforce development."

- **TAWPI** – source: http://www.tawpi.org/about.html

  "TAWPI, The Association for Work Process Improvement is an international, not-for-profit membership organization whose primary focus is on education. We are dedicated to helping end users sharpen their management skills, improve productivity and performance of their organizations and maximize their value as professionals.

  The focus of TAWPI's educational products and services is the future: what new technologies are available, how they should be implemented and managed and why they are important to the strategic direction of Fortune 1000 companies such as financial services, insurance, banking, government agencies and service bureaus, and utilities."

- **ARMA** – source: http://www.arma.org/about/overview/index.cfm

  "ARMA International is a not-for-profit professional association and the authority on managing records and information – paper and electronic. The association was established in 1955. Its approximately 11,000 members include records managers, archivists, corporate librarians, imaging specialists, legal professionals, IT managers, consultants, and educators, all of whom work in a wide variety of industries, including government, legal, healthcare, financial services, and petroleum in the United States, Canada, and 30-plus other countries."

Digital Signatures

Digital signature is a technology that is not necessarily EDM–specific, but can be leveraged in an EDM enterprise when document validity and integrity are important. Digital signatures can be used to validate and authenticate any digital transmission, and not exclusively electronic documents.

A digital signature is a digital equivalent to a handwritten signature. A digital signature offers proof that a particular individual has seen and approved a digital document. A digital signature ensures that only an approved user can sign a digital document and verifies that the signature truly belongs to the identified user. A digital signature enables "authentication" of a digital document, assuring the recipient of a digital document of both the identity of the sender and the integrity of the document. A more thorough treatment of this technology is included as Appendix C of this Guide.

CHAPTER III: EDM IMPLEMENTATION

Chapter III discusses the EDM implementation methodology in detail. This section of the Guide was developed to provide States with a road map to developing and implementing an EDM solution. With this information, States interested in implementing EDM solutions will be better equipped to be successful. Section A presents an implementation strategy including questions that should be asked during requirements analysis. Section B provides a summary of good ideas, suggestions, and considerations identified during the reviews of the EDM systems and practices in Washington (WA), Butler County Ohio (OH), Rhode Island (RI) and Illinois (IL). Section C includes a State-by-State comparison of the four EDM solutions reviewed.

SECTION A. Implementation Strategy

EDM Implementation Overview

EDM systems are not just technology. They are business solutions that must be planned and executed properly to minimize interference with on-going business functions. For this reason, careful planning and a phased approach are recommended. The following are generally accepted management practices for implementing an EDM solution:

1. Establish an oversight committee
2. Assign a project manager
3. Perform a requirements analysis
4. Perform a cost-benefit analysis
5. Conduct a make-or-buy analysis
6. System design
7. Project planning
8. Prepare the training plan
9. Phased implementation
10. System support
11. Feedback and measures

Establish an Oversight Committee

Establishing a committee for the project is an important first step. All stakeholders should be represented in the EDM committee. The committee will provide input for all aspects of project planning and design to ensure that all stakeholder interests are represented in the final product. Failure to involve all stakeholders in product planning and development could result in a solution that ultimately does not meet business, functional, and technical requirements and potentially results in poor user acceptance.

Assign a Project Manager

A Project Manager is necessary to develop estimates, assemble and manage the project team, prepare the project plan, manage implementation, and control the scope, budget, and schedule. A competent, experienced Project Manager should be assigned to a project of this magnitude. The Project Manager will ultimately prepare the project plan and oversee the system design which will be submitted for approval by the committee.

Perform Requirements Analysis

In order to design an EDM solution, the system requirements must be accurately assessed. This is most often accomplished by a third-party consultant completing an EDM needs assessment. The consultant will interview stakeholders and develop a unique solution based on the information provided. One benefit of professional review is to obtain an unbiased perspective for applying optimal technology to address business needs. Another is that a consulting firm will most often possess more experience with EDM as a business solution than the average Information Technology (IT) department.

This section offers guidance on the information gathering techniques, types of questions to ask, and the specific data necessary to design an EDM solution. However, this section is not intended to be exhaustive, but rather is meant to serve as guidance. There is no substitute for experience. Therefore, it is recommended that the support of a professional services firm be sought if in-house EDM expertise is not available.

A summary table detailing specific questions to be answered and information needs is presented following a brief narrative of the requirements analysis components.

- **Business Requirements -** The high-level requirements are to support efforts to achieve goals developed and published in the National Child Support Enforcement 2005-2009 Strategic Plan. EDM specifically addresses Goal 5, Objective A: *To operate an efficient program* and Goal 5, Objective B: *To operate a responsive program.*

  More specifically, the EDM initiative will support the eight Federal objectives within CSE:

  - Case Initiation: Activities associated with initial support case opening.
  - Locate: Activities associated with locating a non-custodial parent (NCP) (including assets and other information).
  - Establishment: Establishing the legal obligation to support. Activities related to determining the NCP’s legal obligation to support his or her dependent children, including paternity determination when necessary. Activities related to determining an NCP's ability to provide support. Establishment of the amount of support. Activities related to determining an NCP's child support obligation, including methods and terms of payment.

- Enforcement: Activities to enforce collection of support, including income withholding and other available enforcement techniques.
- Case Management: Activities to direct the case to the appropriate functions (e.g. locate, paternity establishment, and initiating the appropriate case action).
- Financial Management: Activities related to monitoring payment activities and collections.
- Reporting
- Security and Privacy

Some more general discussion points for identifying business objectives are noted below in the summary table.

- **Functional Requirements** - The functional requirements may vary slightly from State to State (or by county in some States). However, the overall functionality of the EDM system, by CSE function, will be relatively consistent.

  The objective of EDM is automation. With automation, results are reproducible and the gain is efficiency. Developing processes that minimize human intervention and leverage available technologies is the ultimate goal. In order to maximize automation, the reviewer must first map the current workflow (on paper). Once the current workflow is understood, an automated enterprise can be conceptualized. The goal is not just to deliver the current functionality, but also to streamline the process by eliminating redundant or unnecessary steps and apply technology to maximize automation. To do this, the reviewer must be familiar with available technologies and have experience with optimizing business processes. For this reason, it is recommended that an experienced professional qualified as a Certified Document Imaging Architect (CDIA+) be retained for this activity.

- **Technical Requirements** - The business and functional requirements are somewhat universal from State to State. However, the technical requirements will be very specific to the local infrastructure and decisions made concerning in-house development versus outsourcing.

  Once the technical requirements are known, an imaging professional qualified as CDIA+ will analyze the data and develop a solution. This will involve evaluating available Commercial Off-the-Shelf (COTS) products and narrowing the options down to one or two products. If an in-house development or custom application is preferred, the CDIA+ qualified staff will design these solutions. However, before selecting a solution, a cost-benefit analysis and make-or-buy analysis should be performed.

Perform a Cost-Benefit Analysis

A Cost-Benefit Analysis (CBA) is performed in order to demonstrate the viability of the project. The information collected and calculated during the CBA will also be used to calculate a Return-on-Investment (ROI). Presented below in the requirements analysis summary table are some data requirements for determining both the value of the EDM

benefits as well as the total-loaded costs of an EDM system implementation. The information should be obtained during the on-site needs assessment.

Some direct costs to consider when estimating the cost of conventional paper document management are labor, space, and supplies. Some indirect costs are the cost of poor client satisfaction, lost funding due to missing Federal requirements, and the costs of failed audits, lost documents, and employee turnover, etc.

Some EDM system direct costs are the system requirements analysis, system design and implementation, hardware, software, and training. Some other costs to consider are the labor time during training and implementation. Likewise, the initial inefficiencies associated with conducting operations with new and unfamiliar technology are also hidden costs. These factors go away quickly if personnel are properly trained.

It is ideal to collect the necessary information for completing the CBA during requirements analysis. With the information in the table below, a relatively detailed cost can be estimated for the CBA. The next step in performing a CBA is to calculate the cost of the EDM. EDM cost factors are also presented in the table below.

For more information concerning CBA and for web links and guidance documents on how they are being conducted by other agencies, visit http://www.archives.gov/records-mgmt/policy/prod8.html.

With the savings potential identified by looking at the annual paper file management costs, and identifying the anticipated cost of installing and operating the EDM system, an ROI can then be calculated.

Requirements Analysis Summary Table

Requirements Category	Questions	Elaboration
Business Requirements:	What are the primary objectives of implementing EDM technology?	Cope with increasing volumes and/or static or decreasing staff levels
		Improve performance for achieving Federal goals (increased collections, increased location, increased establishment, etc.)
		Disaster preparedness
		Internal goals or initiatives (paperless, centralized case management, etc.)
		Improve customer service
		Improve auditing and reporting capabilities Security

Requirements Category	Questions	Elaboration
		Integrity of the business process
		Ease of case administration
		Increase employee satisfaction
		Records management
		Avoid losing or misplacing documents
		Regulatory compliance
	Is this initiative being sponsored by management?	
	Who is the sponsor?	
	Is funding appropriated?	
	Is this a priority project?	
	What are the drivers?	
	Why now?	
	Why is this initiative a priority?	
Functional Requirements (current paper workflow):	Where do documents come from?	Mail, fax, email, scanner, host system
	Who needs the documents?	Caseworkers, county clerks, clients, other
	What is done with the documents?	Approvals
		Collect information for decisions
		Collect information for a separate database
		Process information for an action
	What are the time constraints on the document-related actions?	Federal guidelines for payment processing
		Other Federal mandates
		State laws
		Internal policies or objectives

Requirements Category	Questions	Elaboration
	What criteria do you use to search for documents?	Client information
		Custodial Parent (CP) information
		NCP information
		Social security numbers
		Addresses
		Dates
		Document types
	What do you do with the documents when they are not in use?	File cabinet in central filing
		Files in offices or cubicles
		Microfilm imaging
		Digital imaging
	How frequently are they accessed?	Daily, weekly, annually, hardly ever
	What are the document security considerations?	Restricted access, privacy considerations, public records
	Are there any other regulatory requirements concerning your documents?	Records management laws, auditing consideration, privacy laws
	How are documents routed and shared?	
	How long do you retain them?	Several years according to an established protocol or indefinitely
	How do you dispose of the documents?	Manually purge, dumpster, shredding, do not purge outdated documents
	What are the document types and volumes?	Backfile and on-going
Functional Requirements (proposed EDM workflow):	Can the document source be changed to a digital source?	Fax server instead of printed faxes
		Emailed instead of mailed
		Scanned and uploaded by third parties (county clerks, etc.)
		Save outgoing documents as an image instead of printing
		On-line forms for direct database entry

Requirements Category	Questions	Elaboration
	Do the documents associated with all business functions need to be available digitally?	Must prioritize for implementation, to scope within budget, to meet objectives and due to resource limitations
	What application is the primary tool used by caseworkers?	
	Do you wish to have EDM integrated with the existing system?	Will this application be linked to the EDM system
		Will the systems require a common login and password
	What is the total user count and how many users will need to access images at the same time?	Critical for network bandwidth sizing
		Important when considering COTS systems with different licensing arrangements: unlimited user, concurrent user, and named user.
	Do users need remote (web-based) access?	Internet or Intranet access
	Will a centralized system be supporting use outside the network?	
	Would the ability to search for content within the documents significantly improve productivity?	Full text search or Optical Character Recognition (OCR) needed if yes
		This capability adds value, but also expense: higher resolution scanning, additional software, and additional storage required.
Training and Support Considerations:	Who supports?	Help desk, administration
	Who trains?	Train the trainer or vendor/consultant provided training
	User skill assessment	
	User acceptance considerations/cultural change management	
	Who will own/operate system: doc prep, scan, and host?	
Implementation Considerations:	Determine ideal way to phase in the installation	Start small (departmental) and scale to enterprise

Requirements Category	Questions	Elaboration
Technical Requirements:	What is the network capacity to support image capture and routine image retrieval?	Capture demands a lot of bandwidth. However, images can be cached (temporarily stored at a local machine) and migrated to the final destination drive during off peak hours or be routed/bridged directly to storage to reduce interference with network traffic.
		Do not forget to consider that many users may need to pull up images at the same time. The network must have adequate bandwidth to support the anticipated volumes.
	What is the corporate access speed, i.e., Digital Subscriber Line (DSL), T1, fractional T1?	Incoming and outgoing
	What is the document count, size, and paper type?	Requisite information to size and specify input sub-system
		Consider: duplex, color, photos, heavy or light stock, small or large sizes, etc.
		Design for the normal documents but be mindful of how you will handle exception documents.
	Local Area Network (LAN) environment: Where will the EDM environment be installed?	
	What protocol will be used?	
	Is Internet connectivity available for thin-client access and image repository?	
	Will all servers and workstations be on the same subnet and domain?	

Requirements Category	Questions	Elaboration
	Will additional network drops and Internet Protocol (IP) addresses be available, if needed?	
	Is the network Dynamic Host Configuration Protocol (DHCP) or static?	
	LAN security: Secure Sockets Layer (SSL) available?	Firewall considerations
	Can users download ActiveX® viewers if necessary?	
	Remote access	Virtual Private Network (VPN), dial-in, or Citrix®
	What browser used?	Microsoft® Explorer, Netscape®, etc.
	User workstation details	Total count, operating system, Central Processing Unit (CPU) speed, Random Access Memory (RAM), display, anti-virus software, etc.
Cost-benefit Information (cost of the current paper-based system):	Dedicated clerical workers	How many Pay grade Time filing Time retrieving Time searching for lost files Time faxing, mailing, and copying files Time delivering documents Time traveling to conduct any of the above activities
	General office workers (caseworkers, etc.)	How many Pay grade Time filing Time retrieving Time searching for lost files Time faxing, mailing, and copying files Time delivering documents Time traveling to conduct any of the above activities

Requirements Category	Questions	Elaboration
	Executives and Management	How many Pay grade Time filing Time retrieving Time searching for lost files Time faxing, mailing, and copying files
	Postage	
	Courier expenses	
	Vehicle expenses	
	Space expenses	Square footage used for file cabinets
		Cost per square foot
	Output expenses	Number of pages printed
		Total loaded cost per page (amortized hardware, toner, paper, etc.)
		Number of facsimile pages printed
		Total loaded cost per page (amortized hardware, toner, paper, etc.)
		Outgoing fax charges
		Number of pages photocopied
		Total loaded cost per copy page (amortized hardware, toner, paper, etc.)
	Efficiency expenses	Cost of funding as a result of unmet goals
		Cost of funding as a result of failed audits
		Fines
	Turnover expenses if they can be attributed to document-related challenges	Cost of hiring a new employee
		Cost of training
		Cost of inefficiency related to hiring a new employee
Cost-benefit Information (cost of the proposed EDM system):	Planning and assessment labor (or consulting) costs	
	Product evaluation and selection and/or solution design	
	Hardware costs	
	Software costs	

Requirements Category	Questions	Elaboration
	Maintenance costs	
	Installation	Labor and vendor costs
	Training	Labor and vendor costs
	Ramp up time	Labor time for efficiency loss directly following installation
	Labor estimates for EDM input	Backfile conversion and day-forward
	Document preparation	Purging and preparation and possibly re-filing
	Scanning	
	Indexing	
	Labor estimates for EDM help desk support	

Conduct a Make-or-Buy Analysis

With any IT-related project, the Project Manager and EDM Committee need to determine whether or not the project (or components of the project) should be executed by internal resources or outsourced to vendors. This is called a make-or-buy analysis. There are many details to consider when performing this analysis. Some highlights of the benefits of both in-house and outsourced approaches for the main EDM project activities are presented in the following table:

Activity for Make-or-Buy Consideration	Benefits for Performing In-house	Benefits for Outsourcing
EDM Needs Assessment	In-house personnel have intimate knowledge of the needs, making data gathering easier to coordinate and accomplish. Cost savings.	A true EDM consultant (not a software vendor) will lack bias. Consultant will have expertise, professional credibility, and certification. Outsourcing this activity is strongly recommended.
Design	In-house personnel have intimate knowledge of the needs. Cost savings.	Consultant will lack bias and offer expertise, professional credibility, and certification.

Activity for Make-or-Buy Consideration	Benefits for Performing In-house	Benefits for Outsourcing
Imaging software	Cost savings possible. No licensing or on-going maintenance (support) costs (besides the cost of the internal help desk). No *required* upgrades. No unnecessary features — solution can be limited to exactly what the business needs are. Agencies can more easily support a product developed in house.	There is no need for in-house programming and software development expertise if a consultant is retained or COTS application purchased. Quicker. Less demanding on internal staff. COTS products have many functions and refinement beyond the capabilities of an internally created product.
EDM software	Cost savings possible. No licensing or on-going maintenance (support) fees. No *required* upgrades. No unnecessary features — solution can be limited to exactly what the business needs are. Agencies can more easily support a product developed in house.	There is no need for in-house programming and software development expertise if a consultant is retained or COTS application purchased. Quicker. Less demanding on internal staff. COTS products have many functions and refinement beyond the capabilities of an internally created product.
Implementation	Implementation by in-house staff will result in tremendous learning and on-the-job training. Cost savings possible if done internally. Internal staff will have a greater familiarity with the internal business processes and equipment.	If a consultant is retained, the installation will be less demanding on internal personnel. A consultant offers more expertise and experience implementing EDM solutions.

Activity for Make-or-Buy Consideration	Benefits for Performing In-house	Benefits for Outsourcing
Training	Conducting training internally can save money. Internal training forces the help desk and support team to really learn the system functionality.	A reputable training vendor can prepare users for EDM operation a lot quicker due to greater knowledge and experience. Outsourced training can provide general EDM knowledge, beyond just EDM functional knowledge, greatly enhancing user acceptance.
Document preparation	Familiarity of documents. Cost savings possible for an efficient, properly trained workgroup. Proximity is a plus eliminating the need for shipping documents and privacy and security.	A scanning service bureau has established procedures and a trained staff for document preparation and scanning in a production environment.
Scanning	If properly trained, cost savings possible for an efficient, properly trained workgroup. Proximity is a plus eliminating the need for shipping documents. Documents do not need to leave the customer location, making them available for use in the event they are needed and privacy and security.	A scanning service bureau has established procedures and a trained staff for document preparation and scanning in a production environment. Outsourcing scanning can eliminate the necessity to purchase production equipment. Experience.

In the event funding is a challenge or in-house technical expertise is not available to implement an EDM enterprise, EDM hosting, or Software as a Service (SaaS) could be a viable option. By using a hosting service, there is no hardware or software to install besides the scanning stations. Images are simply uploaded to the hosting service's server and users can log in via browser. Several options are commercially available offering a range from basic services to some of the most advanced solutions available. The SaaS option puts EDM in reach for those agencies with the smallest of budgets. The greatest challenge with the SaaS option is that customization is not always possible because the software is often a fixed service.

System Design

The system design will most likely need to be conducted by the party that conducted the requirements analysis (or needs assessment). It is recommended that a Computer Trade

Industry Association (CompTIA) Certified Document Imaging Architect (CDIA+) perform this activity. The design will be the basis for the scope document in the project plan. The design should detail all the technical specifics necessary to meet the business and functional requirements of the product. Some considerations include:

- The input (capture) architecture (maximize automation by designing a process with minimal intervention, such as automatic indexing and batch scanning)
- Storage subsystem
- Database configuration
- System backup
- System redundancy and disaster recovery
- Network considerations
- Communications
- Workflow
- Graphical User Interface (GUI)
- Ease of use
- Search characteristics (full-text or just index)
- Security
- Administration and rights/restrictions
- Integration with other applications
- Desktop clients (viewers and database clients)
- Output (print, fax, email)
- Audit trails
- Records management (audit trails, migration and purging)
- Other features (redaction, notes, reporting, etc.)

Project Planning

Proper project planning is essential for the success of any imaging or EDM project. Once the requirements analysis has been completed and the project is initiated (approved), the project plan needs to be developed. The project plan may be developed by the State's project manager or the integrator, depending on whether or not a custom solution will be developed or a COTS application will be used.

Discussion of the generally accepted project management practices is beyond the scope of this Guide. The Project Management Institute (PMI) and CompTIA both offer project management certification programs; the latter being more applicable for the IT industry. Training and certification is recommended for in-house implementations. Visit the websites below for more details.

- PMI - http://www.pmi.org/info/PDC_CertificationsOverview.asp?nav=0401
- CompTIA - http://www.comptia.org/certification/project/default.aspx

The project plan should include:

- The project charter (initiation or approval document)

- The scope document (based on the design)
- Work Breakdown Structure (WBS)
- Budget
- Schedule
- Full implementation plan, including: change, risk, quality, resource, procurement, and communications management

Training Plan

Prior to or immediately subsequent to implementation, the training plan needs to be developed. Training is a vital component of any EDM implementation, and should not be overlooked. If you are not familiar with developing a training plan or do not have staff suitable for conducting EDM training, it is recommended that you seek support from a reputable professional EDM training firm.

Super-user training is necessary for the administrator and internal help desk. These individuals may, in turn, be trainers for the end-users. Super-users typically receive manufacturer's training as well as training from EDM and imaging professionals. Scanner operators, document preparation technicians, and end-users can receive any combination of training from the super-users, manufacturers, and EDM professional trainers.

Manufacturer and EDM professional training should be conducted prior to or concurrent with implementation. End-user training for document preparation can also be completed prior to implementation. Scanning and EDM user training should be conducted immediately subsequent to implementation.

The training plan should address the following requirements:

- Super-user training for the Administrator and help desk
- Document preparation
- Scanning
- End-user
- Workflow (if feature exists)
- Records management

Phased Implementation

Regardless of the size and scope of the EDM project, careful consideration needs to be given to how the project should be implemented. The system itself may have been assessed and designed flawlessly; however, if implemented improperly, the system development process can significantly disrupt on-going operations. Again, competent project management skills are necessary. A phased implementation or pilot test is recommended for all but the very smallest of installations.

This may involve beginning with a single work or office group, and only for select documents at first. Implementing conservatively ensures that business will not cease to be

conducted as usual. The drawback of a phased implementation is that there will be parallel processes until all paper processes and paper-centric departments are phased into the EDM paradigm. However, the lessons learned during the phased implementation will iteratively improve subsequent implementation and training activities.

Once a suitable pilot test area/function is identified, the conceptual system design is laid out and the equipment is installed. When the proof of concept is approved, an enterprise-wide implementation is possible. Following these basic protocols will prevent the EDM system from negatively impacting the network and possibly avoid down time. For more detailed information and guidance concerning pilot testing, visit www.archives.gov/records-mgmt/policy/pilot-guidance.html#top.

The first step for full installation is to understand the network infrastructure and identify the best placement of equipment. This is identified during requirements analysis. Then the hardware can be installed and all the components set up. After operating systems and drivers are operational, hardware functionality and network communications can be checked. Then the EDM software can be loaded and tested. Lastly, all communications and security challenges can be identified and resolved.

System Support

During implementation, a help desk needs to be established to support users and possibly facilitate training of future users (new hires and transfers). An employee within the IT department commonly serves in this role. The help desk should receive super-user training and have sufficient redundancy to ensure that support is available at all times.

Feedback and Measures

Following system implementation, it is important to follow up with users and stakeholders to ensure that the business, functional, and technical requirements are indeed accounted for in the final installation. It is also advised that input be sought from users for recommendations on both technology and business process changes. Often, minor adjustments and features can be incorporated at minimal expense to greatly enhance user adoption and productivity improvement.

SECTION B: Good Ideas, Suggestions, and Considerations

The good ideas summary will be helpful for IV-D Directors, System Administrators, Business Analysts, and System Designers with responsibility for various phases of the EDM project. The practices highlighted below were implemented successfully by one or more of the States evaluated and proved to be beneficial to the overall success of the project. The four States evaluated were Washington (WA), Rhode Island (RI), Illinois (IL), and Ohio, specifically Butler County (OH).

Good Idea Summary

Topic	Good Idea
1) Project Planning and Oversight	A committee was formed to oversee the project (OH, IL, WA, RI). Project manager was assigned on both the business side and the technical side (IL). Stakeholder input was solicited (WA, OH, IL, RI). A document workflow analysis was completed (WA, OH). A requirements analysis was conducted (WA, OH, IL). Vendor demonstrations and informational meetings were used to gain an understanding of the technology prior to going forward (RI, WA, IL). A cost-benefit analysis was performed (WA). A make-or-buy analysis was done (OH). A consultant was solicited and COTS application used due to a lack of internal skills for development, integration, and support (RI, IL). User input was solicited for feedback following initial implementation or pilot testing (WA, OH). A clear plan was established with a firm deadline and real-time progress tracking for backfile conversion (OH, WA). Procedures were established for backfile conversion (WA, OH, IL). **Suggestion:** Become familiar with how the technology works by taking a tour with an organization that employs the technology (WA). **Suggestion:** Get management buy-in early in the process (WA). **Suggestion:** "Think big but start small." Consider all the possibilities, but implement in steps with a scalable, standards-based, and open architecture solution (IL). **Suggestion:** Treat the project as a business solution, not a technical solution (IL).
2) Design Features	A standards-based, open architecture design was developed which facilitates future upgrades, support, and migration (WA and RI are COTS systems, OH is not COTS system).

Topic	Good Idea
	The scan resolution was optimized allowing for reduced file size (WA, RI, IL).
	Barcode recognition was used for automated indexing (WA, RI and IL — document delimiters only).
	Duplex scanners with auto-detect or an application with blank page omission were used. Either method works to avoid missing images of duplex documents and prevent wasting storage space for blank pages. The auto-detect feature allows for faster scanner throughput (WA, OH, IL).
	Dual track (double-key blind) indexing was used for maximum accuracy (IL).
	A fax server was used for direct digital upload (WA).
	Forms generation (with barcodes) was used for outgoing documents so they could be indexed automatically upon return to the agency (WA).
	Highlighting of zones was done for efficient location of index information on images during indexing (IL).
	Centralized mail was used (WA, IL, RI).
	Imaging workflow was set up for maximum efficiency (WA).
	A batch scanning process was used for efficiency (WA, RI, IL).
	RAID 5 storage with tape backup was used (WA, OH, RI).
	A clustered server architecture was used to provide protection against application or system failure (WA).
	An application was developed with full records management capabilities: audit trails, compliance, and retention schedules (WA, OH, RI — COTS system).
	Notes and bookmarks or document suppression features were used for easy reference and highlighting (or removal from lists) of documents. In this way, important documents could be easily queried and obtained (WA, OH).
	A system was developed for automated payment processing (WA).
	A system was implemented with digital-to-digital capabilities for internally generated documents, avoiding the need to print and scan (WA, IL).

Topic	Good Idea
	The system included integration with IV-D case management application for index sharing. This allowed for automatic index field population which minimized manual indexing (WA, RI).
	The system included integration with IV-D case management application for index sharing. This allowed for automatic index field population which minimized manual indexing (WA, RI).
	The system used a route box workflow system allowing for very efficient workflow and minimal supervisor intervention (WA).
	The system was browser based for remote access outside the network (WA).
	The EDM application main screen view was simply a small box in the corner of the screen minimizing interference with other desktop applications (OH).
	A single log-in was used for authentication (OH).
	Attorneys could access images from the court rooms via their laptop computers (OH).
	There was an entirely digital workflow. Documents were scanned immediately and workers performed tasks viewing the image. This made documents available to all with access to the system immediately and facilitated extreme efficiency with "route boxes." Two monitors were required for this capability to be ergonomic since multiple applications must be used concurrently (WA).
	Administrative rights capabilities were available to restrict access and rights of users and user groups. These rights were controlled by select "super users" (WA, OH, RI, IL).
	Suggestion: House clustered servers in geographically separated facilities for disaster preparedness (WA).
	Suggestion: Look for business process improvement opportunities. Do not limit EDM to a direct replacement of paper processes. Optimize workflows at the same time (WA).
	Suggestion: Separate documents by document type prior to scanning for simpler indexing and to prioritize imaging by document type (RI, WA).
3) Testing	Pilot tests were conducted prior to full implementation allowing for learning and improvements (WA, OH, IL).

Topic	Good Idea
	Users were solicited for feedback and enhancements were made. A mechanism or communication structure was put in place to get feedback for product improvements (OH, IL). **Suggestion:** Pilot test for several months and incorporate feedback and lessons learned in the design before full implementation to contribute to a more successful rollout (OH).
4) Development / Implementation	Skilled workers developed the applications: either in-house, outsourced, or COTS. Design and development teams included certified imaging and programming professionals (OH). Development was outsourced to professional programmers (WA). A COTS application used since the development skillset was not available in house (RI, IL). The development and implementation was conducted in a phased approach (WA, OH, IL). Backfile conversion was completed per a reasonable timetable while day-forward and on-demand documents were scanned as part of the routine workflow (WA, OH). For the backfile conversion, documents were not individually indexed for the sake of efficiency. Rather, documents were ordered by date and grouped for indexing (one to three main categories) (WA, OH). Paper documents were staged only temporarily to allow time to catch mistakes and rescan; then documents were destroyed (WA and IL-30 days, OH-90 days). All documents were routed to caseworkers immediately after scanning and indexing. They viewed the images and were responsible for notifying the scanning department (mailroom) if the document needed to be rescanned. This was an innovative quality assurance method that eliminated an intermediate QA procedure while ensuring quality imaging (WA). Incorporated management tools into the design to change information on-the-fly because not everything was always input correctly (OH). **Suggestion:** Pay special attention to backup design and procedures. Backup requirements can be costly and time-consuming if not carefully thought out (OH). **Suggestion:** A system designed for single-page TIFFs (rather than multiple page TIFFs) aids in system performance,

Topic	Good Idea
	desktop performance, and document corrections, and reduces LAN/WAN impact (WA). **Suggestion:** Design a workflow that promotes scanning immediately and work processes that use the digital image rather than the hard copy (OH, WA). **Suggestions:** Cut the corners off stapled documents to save time and reduce paper jams (WA). **Consideration:** Storage needs are always more than projected (OH). **Consideration:** Inter-network or inter-application communication can be challenging and requires cooperation and joint effort between operational groups/agencies (WA, OH).
5) Training	Training needs were minimized by soliciting a lot of user input during planning and development (OH). Training was conducted by those involved in planning, development, and implementation. (WA, OH, RI — consulting firm used, a Training Unit was responsible for training in IL). Clear guidance documents were drafted for training procedures and the workflow (WA, RI, IL). Written procedures were developed for backfile conversion and document preparation (WA, OH, IL). Product-specific training was provided (Oracle, etc.) for developer/implementer (OH, IL — training provided for IT help desk). Administrative staff were repurposed and retrained for more productive duties. No one was dismissed as a result of imaging. However, positions have not been refilled following attrition losses (WA, OH). **Consideration:** Users were very skeptical and intimidated by the change during implementation but quickly became staunch advocates of the technology after adoption (WA, OH). **Consideration:** There was less user adoption with long-time employees than with new hires (RI).

SECTION C: State by State Comparison of EDM

Function or process Description	Washington	Butler County, Ohio	Rhode Island	Illinois
PLANNING				
Established a formal EDM committee	Yes	Yes	Yes	Yes
Assigned a project manager/team leader	Yes	Yes	Yes	Yes
Cost benefit analysis performed	Partial, for court order documents	Yes	No	Yes
Make or buy analysis performed	No, existing and trained IT staff were not available	Yes	NA, no internal resources available	NA, no internal resources available
Prepared a formal project plan	Yes	No	No, however, prepared a detailed RFP	Yes, general and detail design
Performed a risk assessment	Yes	No	No	Unknown
Performed a workflow analysis	Yes	Yes	No	No
Business process improvement evaluated	Yes	No	No	No
FEATURES				
Production scanners	Yes (Kodak® i610 and Canon® DR-3080CII among others)	Yes (Canon® DR-3080CII)	Yes (Fujitsu® M4097D VRS®)	Yes (Böwe Bell and Howell® 8100 and Kodak® 1260)
Duplex	Yes	Yes	Yes	Yes
Image processing/enhancement	Yes	No	Yes, Kofax® VRS®	No, however preset setting for darkness variability
Resolution	200/300 DPI	300 DPI	200 DPI	200 DPI
Barcode capabilities	Yes	No	Document delimiters only	Document delimiters only
Automated indexing	Yes	No	No	No
Digital workflow	Yes	No	No	No
Records management	Yes	Yes	Yes	No
Produce return forms with barcodes	Yes	No	No	No
Fax server	Yes	No	No	No

Function or process Description	Washington	Butler County, Ohio	Rhode Island	Illinois
File format	Single page Tagged Image File Format (TIFF) G4	Multi page TIFF G4	Multi page TIFF G4	TIFF and IBM® ImagePlus MO:DCA Image Object Content Architecture (IOCA)
Viewer	Leadtools® and freeware	Global 360®	OnBase®	IBM® CM viewer
Thumbnail	Yes	Yes	Yes	Yes
Digital-to-digital input (routed print stream to imaging rather than print and scan)	Yes	No	No	Yes, Xenos Incorporated
Application type	Thin and thick client	Thick client only	Thin and thick client	Thick client
Application development	COTS (with customization)	Custom (in-house developed)	COTS (with customization)	COTS (with customization)
Requirements analysis and design	In-house with consultant/vendor input	In-house	In-house with consultant input	In-house with consultant input
Indexing	Automated and heads up (from digital)	Heads down (from hard copy)	Manual, heads up or heads down	Manual, heads up
Integrated with IV-D application	Yes (for index sharing and image viewing)	No	Yes (for index sharing)	Yes, just for a QA/QC validation check
Index fields	Many, auto populated	Few, manually populated	Many, auto populated	Few, manually populated
Method to simplify document location from hit lists	Suppress documents that would have normally been discarded after initial delivery to caseworkers in the old paper system	Bookmark important documents	No	No
Server/storage	Redundant Array of Independent or Inexpensive Disks (RAID) RAID 5	RAID 5	RAID 5	Jukebox/Write Once Read Many (WORM)
Clustered	Yes	No	No	No

Function or process Description	Washington	Butler County, Ohio	Rhode Island	Illinois
Backed up	Digital Linear Tape (DLT) stored off-site	Linear Tape Open LTO-2 stored off-site	Super DLT (SDLT) stored in safe on-site	Duplicate platters stored off-site
Images cached	Yes	No	No	Unknown
Database	Microsoft® MS SQL	Oracle® 9i	Microsoft® MS SQL	IBM® DB2
Database type	Disparate for images and indexes	Binary Large Object (BLOB)	Unknown	Disparate for images and indexes
Driver	Image and Scanner Interface Specification (ISIS)	TWAIN	ISIS	TWAIN
OCR	Yes	No	No	No, however fields located for easy indexing
Platform	Windows®	Windows®	Windows®	Windows®
Desktop OS	Windows XP Pro®	Windows XP Pro®	Variable	Variable
Display	Two 17", 19" or 21" monitors	17" monitor	Variable	Variable
DEVELOPMENT and IMPLEMENTATION				
Phased implementation	Developed departmentally (by function) over the course of years	Application launched all at once. However, the user group was just 100 people.	Application launched all at once. Integration with InRhodes at a later date.	Launched in central office first, then Chicago, then statewide
Pilot test conducted	EDM launched at a single office before going statewide	One month pilot test conducted	No	Yes, test run of documents
Backfile conversion	Documents sorted into three main categories. Documents weeded out, ordered by date, and scanned as a single document per category. Barcodes used.	Documents weeded out, ordered by date, and scanned as a single document with one-level indexing besides case number.	No	Partial. Same process used for backfile conversion as for day-forward scanning
Closed cases	Scanned	Not scanned	Not scanned	Not scanned

Function or process Description	Washington	Butler County, Ohio	Rhode Island	Illinois
Archive	Digital	Microfilm	No	Microfilm, paper, and digital
Paper retention	30 days	90 days	3 years	30 days for most documents and 100 years for official records
Solicited feedback from users for upgrades	Yes	Yes	No	Yes
TRAINING				
Training plan documented	Yes	No	Yes	Yes
Backfile conversion procedures established	Yes	Yes	No	Yes, procedures for all scanning
Train the trainer model	Yes	No	For new hires only	Yes
Developer/designer performed training	Yes	Yes	No	Yes, a specific Training Unit performed most of the training
External trainers used for end users	No	No	Yes	A specific Training Unit performed most of the training
External training used for developers	No	Yes	No	Vendor developed. Vendor used for help-desk training

APPENDIX A: EDM Case Studies

Washington, Rhode Island, Ohio (specifically Butler County), and Illinois were selected for evaluation because of their advances in Electronic Data Management (EDM) technologies. The four States have developed or implemented EDM technologies to meet specific objectives within their respective agencies.

State of Washington Case Study

The Washington Division of Child Support (DCS) is part of the Washington Department of Social and Health Services (DSHS), with the mission to administer the Title IV-D Child Support Enforcement (CSE) program. The Washington program provides the full range of IV-D services.

Profile

DCS has 1,150 full time employees (FTEs) and 350 additional FTEs supporting prosecuting attorney actions. DCS covers 39 counties serviced by 10 field offices and headquarters. The program is State-administered. In 2005, DCS managed a caseload of 350,000 cases and collected $647 million in child support. Within the program, cases are handled “cradle-to-grave.” This means that a single caseworker manages all aspects of assigned cases. Cases are assigned alphabetically and distributed evenly; each caseworker manages approximately 600 to 700 cases. Payment processing is handled independently.

Background

The EDM project began to take shape as far back as 1988, with an effort to centralize payment processing and eliminate growth barriers. A State law requiring payments to be processed in 24 hours and existing auditing challenges helped push the initiative forward. Poor processing time, increases in caseloads and payment volumes, diminishing resources, decreased funding, and compliance challenges all served as an impetus for imaging technologies. The EDM system implementation was paced over the course of several years primarily due to funding constraints and wavering leadership support. The coordinated EDM project was initiated in 1995, with locally developed EDM systems installed in field offices for payment processing. In 1997, a more robust centralized payment processing imaging enterprise was developed by Data-Image Systems Corporation (DISC) out of Sacramento, California. DISC has since been purchased by IKON Office Solutions. The system was named the Financial Management Imaging System (FMIS: product name is technically called DISC FS) and was installed for payment processing in the Headquarters Unit. In 1998, the field offices were upgraded to leverage the FMIS application. In 1999, they began the prototype for court orders with non-IV-D cases and imaged the archive files. In 2000, they expanded the imaging to include several other documents. In 2001, a successful pilot for incoming and outgoing (prospective) mail that normally was stored in paper case files after delivery to the

caseworkers was implemented in the Fife field office. Shortly thereafter, a backfile conversion was completed with all documents in the Fife field office's paper case files scanned and stored in the imaging system. In 2002, DCS began phasing in the scanning of prospective mail for the remaining nine field offices while simultaneously centralizing the receipt of case file mail. A backfile conversion of all documents residing in the open paper case files statewide was initiated and completed in 2003. The backfile conversion for closed (archive) cases was completed in 2005.

Statute

Washington has enacted legislation concerning the use of electronic imaging systems for managing public records, specifically, Chapter 434-663 of the Washington Administrative Code (WAC), entitled *Imaging systems, standards for accuracy and durability*. These regulations cover image quality, system requirements, retention, scheduling, disposition of records, and provision for continued access. The EDM solution at DCS does comply with these standards.

Business Process

The eight objectives identified by OCSE are:

1. Case Initiation
2. Locate
3. Establishment
4. Enforcement
5. Case Management
6. Financial Management
7. Reporting
8. Security and Privacy

DCS is set up with two primary core processes that benefit directly from the EDM system: case management and payment processing. Since caseworkers are generalists, and manage most aspects of their respective cases, they each individually partake in the first five of the eight objectives identified by OCSE: Case Initiation, Locate, Establishment, Enforcement, and Case Management. However, they work all five objectives as one seamless process using their Title IV-D automated system, the "Support Enforcement Management System" (SEMS).

Financial Management, specifically concerning payment processing, is automated using the FMIS. Whereas, Reporting, Security and Privacy are only indirectly influenced by the imaging process.

EDM is used for all DCS case files. All court orders, correspondence, records, legal documents, referrals, and numerous forms are all scanned and hosted in the EDM system. All documents are stored electronically and are accessible remotely on their Intranet via web browser or within SEMS itself.

This case study will primarily describe how the DCS processes and workflow operate as of 2005, and not according to the timeline of implementation.

Document Workflow and Imaging Process

Refer to the Imaging workflow diagram presented as **WA Exhibit A** for details. All documents and payments are received by the DCS Central Services Unit. "All regions" mail is received at approximately 7 AM. Headquarters mail is received at both 9 AM and 1 PM. A team of approximately 40 personnel prepare, scan, and upload roughly 650,000 images per month.

Sorting

As mail is received, it is sorted into streams. Returned mail is set aside to be opened at the end of the mail opening process. Large envelopes are put into an "open by hand" bin to be manually processed. Mail addressed to a specific "cash" Post Office (PO) Box is given to the Payment Supervisor for the payments stream. Non-case-related administrative mail addressed to specific personnel or departments within headquarters is sorted for the designated area within headquarters; this correspondence is not imaged, although there are plans to do so. The remaining mail is processed as discussed in the following sections.

Case Management Mail

All case management mail (non-payments and not addressed to specific headquarters employees) is processed through the OPEX automatic envelope slicer while the larger envelopes are processed manually. The OPEX unit cuts envelopes open and spreads the envelopes so that the contents can be easily removed. Mail is then separated into the following categories:

- Correspondence
- Referrals
- Legal
- Forms
- Other agency
- Pre-indexed barcode

Barcode sheets are affixed to all of the documents by document type except forms that were originally generated by DCS for return. These documents were originally printed through the SEMS system to include barcodes with specific index information. As these forms are returned to DCS, the embedded barcodes allow the forms to be indexed and routed automatically.

Following sorting, mail is batched, with stacks of approximately one inch of common forms clipped together. All documents are scanned in batches. The Document Type index field is applied automatically through the use of the affixed barcode sheet.

Documents are then available to processors in batches for indexing. Images are viewed on screen with the indexing screen open. The index fields are:

- Case number (master/unique key)
- Document type (auto filled)
- Document specific
- Date received (auto filled)
- NCP last name (master)
- NCP first name (master)
- NCP middle name (master)
- NCP SSN (master)
- NCP I number (master), Individual number which is unique
- CP last name (master)
- CP first name (master)
- CP middle name (master)
- CP SSN (master)
- CP I number (master), Individual number which is unique
- RSEO number (master), caseworker
- FOC (master), Field Office Code identifies which field office manages the case
- CSEO number (master), attorney

The imaging database was built on a master record/detail concept. The index fields notated as master (see above) were exported out of the statewide automated system (SEMS) and then imported into the imaging database. To accomplish this, a comprehensive one-time export and import was completed. On an ongoing basis, changes are updated through daily and quarterly processes. On a daily basis, a routine import process ensures that changes and new record information are exported and imported automatically. A quarterly synchronization export/import is done to ensure ongoing integrity of data.

The case number is the "unique key" index field. Entering the case number automatically populates the master index fields. The RSEO, CSEO, and FOC are used for routing. In addition, documents can be routed to customized groups or individuals based on document type. An example of this would be public disclosure requests which require special handling.

With the general document category (document type) and date received auto filled, the mailroom processor views the document on screen and selects the specific document type from the pick menu. When the index operator inputs the case number, the remaining index fields (master) are populated by the DISC Image software. The index operator must actively confirm that the information matches the document. The document is then indexed and routed to the caseworker (RSEO). If the case is in hearings, a CSEO (attorney) is also assigned, and the document routes to the CSEO as well. The indexing process is very efficient as a result of information sharing between the EDM application and the case management database.

For routine case management (initiate, locate, establish, case management, and enforcement), caseworkers begin the work process by accessing a list of documents in a route box in the DISC Image application. Then they open an image in one of two desktop monitors, and use a second monitor to perform whatever process is needed using SEMS and other tools. Having two desktop monitors enables users to concurrently work with document images and other applications to perform the necessary steps to locate, initiate — and so on — as part of their routine case management duties.

All case files are available digitally. Therefore, as long as a user has been granted the system rights, a user anywhere in the State has access to all the information available to assist a custodial or noncustodial parent. This supports the DSHS "No Wrong Door" initiative to improve case management.

Case management activities also produce a lot of outgoing correspondence from DCS. Most of the letters DCS issues are generated digitally by the SEMS application. Images are automatically created for those, but some documents where a "file" copy of the signature is necessary must be printed, signed, and scanned to be included in the same repository as the other imaged documents. The capability exists to import all electronic documents (such as Microsoft® Word or Excel), but procedures have not been worked out fully to implement this.

Court Orders

Court orders are received by Central Services through various means. Most of the 39 counties are equipped to scan the orders and upload them directly into the EDM system. Others fax the court orders, which are received by the EDM system through the fax server without ever having to be printed on hard copy. Still others submit the orders as an email attachment; these files are also uploaded into the EDM system. Lastly, there are still a few counties that submit the orders via mail. These orders are received by the Central Services mail room and imaged as per the process described above.

Once orders are captured into the EDM system, the electronic documents are routed to members of a workgroup for case setup or other action.

Returned Checks

Returned checks are processed independently from all other mail. For returned checks, both the check and envelope are scanned. The envelope is scanned to document why the parcel was returned. The barcode on the check identifies it and the image is automatically indexed and routed to the appropriate case manager. The operator updates the status and then exports the data to SEMS. The paper check is destroyed. This entire process facilitates excellent tracking and auditing.

Payments Process

All payments are received at a designated PO Box. Thick envelopes are opened by hand and thin envelopes are jogged and processed by one of four OPEX mail handlers. The payments are then sorted according to the following criteria:

- Check position relative to the stub
- Check size
- Number of pages of back-up

The batches are then scanned using Canon® scanners with endorsers. The batches are then counted and the number of documents is balanced to a control tape generated manually with a table-top calculator. The batch is then count-matched in FMIS (DISC FS). The attendant inputs the check amounts from the image on the screen and populates the fields to ensure that the count matches the total dollar amount on the control tape. If there is a discrepancy, the figures are double checked until the error is found. The digital batch is then sent to a customized deposit program. A detailed paper deposit listing is created and sent with the physical checks via an armored car service to the bank for deposit. A digital copy of the deposit listing is automatically created and stored on the network for fiscal accountants to perform bank reconciliation activities.

Once the deposit is completed, the concept of batches goes away and the individual receipts (one receipt per negotiable) are released for posting. Posting involves determining distribution down to the individual payor (NCP) level.

The FMIS posting program receives data from the indexing program, including receipt amount and related information. Posting operators access the FMIS posting program and retrieve receipts for posting on a first-come first-serve basis. To process a receipt, the posting operator first enters a “modeling key” for the receipt. Developed by the operations staff to assist in identifying unique negotiable attributes, the modeling key is tailored to the specific type of check or receipt. Many times, the modeling key is simply the bank account information located in the Magnetic Ink Character Recognition (MICR) information on the check. Modeling key types and instructions are published for all posting operators to use.

When the modeling key is entered, the system displays a historical view of how the receipt has been distributed in the past. The operator simply selects the appropriate distribution model, and the information needed to process the payment populates the distribution fields. The operator accepts the information, which successfully posts the receipt, and the next available receipt appears for posting.

Sometimes, a modeling key is associated with a receipt that represents an employer “multiple.” A multiple is a check from an employer that includes wage withholding payments for multiple NCPs. For this type of receipt, the posting operator must check the modeling key list carefully against the current receipt, ensure that there is a match or make any necessary adjustments, and then complete the posting.

Sometimes, the system cannot match a modeling key to a historical distribution. In this case, the operator looks to see if there is sufficient information on the check to identify the payor (i.e., Social Security Number or SEMS Individual Number). If there is sufficient information, the operator posts the payment and a distribution model is simultaneously created for use when subsequent payments are received. If there is insufficient information on the check to post the payment, the operator "passes on" or routes the receipt to another set of users with higher system rights, who perform a cross-reference in SEMS to find the Individual Number for the payor. If none can be found, the payment is put into suspense until it is either refunded as appropriate or a case is set up on SEMS.

Once the posting is completed, the receipt becomes eligible for export to SEMS. At the end of the day, the FMIS export program is initiated and all receipts successfully posted up to that moment are exported to a file. A SEMS import program then picks up the detail of the receipts in this file for distribution within SEMS down to the case level. Once imported into SEMS, the SEMS application applies an algorithm that distributes the amount the NCP paid between all cases and debts within cases where the NCP has obligations.

Major Benefits

This "modeling" feature is responsible for most of the efficiencies realized in FMIS. While the excellent internal controls are important and necessary, the productivity gains from the modeling feature contribute to timely processing with reduced costs.

Using modeling to automatically populate distribution data is in and of itself an efficient way of entering data. However, one key benefit of modeling is to minimize the staff time needed to perform cross-reference functions to adequately identify payors, both for individual receipts and as members of "multiples" from employers.

On an ongoing basis, 30-35 percent of all payments do not contain sufficient information to identify the payors. Many of these payments recur month after month. Prior to FMIS, each of these payments needed to be researched, each and every month. Using modeling, the payment can be researched once and the model can be used thereafter.

A similar efficiency applies in the case of "multiples" checks submitted by employers. Prior to FMIS, operators had to retype the same payors contained in "multiples" every month the "multiples" were received. As the number of payors included in a "multiple" check can be quite large, the staff time involved is important. Using modeling, the list can be entered once, and the model can be used thereafter.

A second key benefit is the development of the "workflow" model. Imbedded in the FMIS are reports and status indicators that, beyond system functionality, are used to monitor, assess, and analyze the activity of operators and the volume of the work at different stages of the operation. Reports are available that indicate to managers when staff may be redeployed to other activities because the flow of the work has progressed.

For example, when the volume of checks ready to be indexed is very high and the receipts to post are very low, staff may be re-assigned to the indexing work until the volume shifts. Individual performance statistics are also captured throughout the system; this allows for an hour-by-hour view of individual operator performance. While these numbers can be useful in many ways, for DCS they have performed a major role in identifying which staff require additional training or focus on a specific task. The design of the imaging system has completely transformed the operational management for payment processing and has allowed management to be more proactive in assessing staffing needs.

A third key benefit of FMIS is the ability of a caseworker to instantly see images of checks. Prior to FMIS, a caseworker needed to send a request to DCS Headquarters, where someone would make a copy of the check from microfilm, and then mail the copy to the requestor. This process could take a few weeks, in and of itself. Also, the checks could not be deposited until the end of the process, after the microfilming had been completed. Using FMIS allows DCS to comply fully with the State's deposit timeframes.

Quality Assurance

The final quality check for the case file and court order images is actually done by the caseworkers. All corrections are sent to a central route box where errors can be categorized and used for further training or system realignment. If a caseworker identifies a problem with a case file or court order image, he or she notifies the mail room and the image is rescanned. Check images are viewed when payments are applied. If the image is poor, a request is made at that time to rescan it.

Paper Retention

All imaged documents are retained in storage in a room proximate to the processing floor for 30 days and then purged. This provides enough time for the quality assurance process to be completed by the caseworker or payment processor.

Backfile Conversion

DCS conducted backfile conversion in several phases. First, archive files and non-IV-D orders were scanned. Then all IV-D orders were processed. Finally, all case files were converted.

A document entitled *Instructions & Best Practices for Backfile Conversion* is provided as **WA Exhibit B**. It offers some pertinent guidance on purging and document preparation procedures as conducted by DCS. There are also many helpful hints on special handling and exception processes.

One important area covered in this guidance document is purging all unnecessary documents, duplicates, and documents containing redundant information. This can

dramatically reduce imaging effort and the necessary storage space. This can also make searching for a single document an easier process.

A second vital area covered in the guidance is proper preparation of the documents for scanning. All fasteners must be removed. It takes far longer to clear a jam than it does to thoroughly prepare the documents for scanning. The guidance also suggests cutting off stapled corners rather than extracting the staples, to minimize paper jams. Additional recommendations include taping down smaller documents, copying the larger documents to reduced size, and photocopying all documents that will not scan well, such as dark paper or documents with light text.

The guidance also covers organizing a backfile for indexing and scanning. Once the backfile documents are prepared, the documents can be sorted from most recent to oldest, with the most recent put in front. In this way, a single generic "backfile conversion" barcode sheet can be applied, and the complete backfile can be scanned as a single, multi-page document. This drastically reduces the amount of effort necessary for indexing. On the other hand, the guidance notes that this methodology makes retrieving a specific backfile document a little more challenging.

WA Exhibit C contains sample backfile conversion progress reports, as additional illustrations of the DCS backfile conversion process.

EDM System Details

The system consists of a COTS application (DISC Image and DISC FS) that was incrementally customized by Data Image Systems Corporation (DISC). DISC was purchased by IKON Office Solutions in December 1996. Today the product is supported through IKON BSS West located in Sacramento, California. The suite is open architecture and is designed to work integrally with other applications, such as the Washington CSE system, SEMS. In operation, DISC pulls index values from the SEMS database. Images in DISC can also be accessed from links within SEMS.

The images are stored on several RAID (Redundant Array of Independent or Inexpensive Disks or Drives) servers. The complete RAID array is also mirrored via on-site hardware. Indexes are stored in a Microsoft® SQL database. All images and indexes are backed up using Digital Linear Tape (DLT) and redundant failover servers. Backup copies are securely stored both on and off site. The RAID (for image storage) has four 1 TB SCSI drives. Windows 2000® is the operating system. The Payment processing images are stored separately from the case management images. During imaging, images are transmitted to a temporary "scan drive" server. Then, the images are processed through a *copy, verify,* and *delete* routine. The entire temporary server is also mirrored. There are a series of servers for IBM WebSphere®, the Microsoft® SQL database (for indexes), and the fax server.

The Document Control Manager (DCM) module manages the rules for the EDM (auto indexing, barcode rules, import conversions, routing, and much more).

To enter DISC, the user must enter a login and password to use the system's full capabilities, such as view, print, and other document management functionality, depending upon user rights. The application retains a full audit trail of document activity.

The client environment consists of systems running Windows 2000® or Windows XP Professional®. All users have two large (17-inch or 19-inch) LCD monitors. Because they spend all day processing images, staff members in the Central Services Unit in Headquarters use two 21-inch monitors at each desktop. This configuration allows users to efficiently use both the EDM application and SEMS at the same time. Many case management functions require the use of other applications as well. Therefore, the dual monitors were deemed absolutely necessary for caseworkers to conduct their duties efficiently.

There are a total of 1,300 users of the EDM system, 1,100 of whom remotely access the images through their Intranet via web browser. The viewer used is produced by LeadTools® (www.leadtools.com). User rights are managed by the administrators (supervisors) and the Information Technology (IT) department. Rights are assigned by document, document type, user, and group. Workflow capabilities are present by the use of route boxes. Upon completion of a process (indexing for example), the document is placed in a route box. Workers whose duties involve the specific document type or case will see a link to the particular document in their personal route box in some cases or in a shared box in other cases.

The imaging capture hardware consists of Kodak® i610, Fujitsu® 3099, and Kodak® 3520 scanners. The financial process uses Canon® DR-3080CII scanners with ED500 endorsers. All case files and checks are scanned at 200 dots per inch (DPI). Forms with barcodes and other specific documents such as the U. S. Postal Service change of address cards (referred to as 70-cent cards) are scanned at 300 DPI resolution to improve barcode reading accuracy.

There is also a "Paternity Establishment" imaging module available in the DISC Image software, but DCS has not activated it.

Performance/Results

As a result of implementing the EDM solution, DCS has achieved significant gains in performance. In fact, prior to imaging, DCS struggled to comply with State and Federal laws concerning the timeliness of payment processing. Performance monitoring results indicate that the system has delivered sound results. For example, the volume of incoming mail has increased by 32 percent over the last three years. Yet, DCS has continued to meet its target of processing all mail within two days. The number of days required for payment processing decreased by 22 percent during 2005. Payments were processed and disbursed within two business days 96 percent of the time during the latter half of 2005. The number of days to process non-assistance applications has been consistently below two days (the Federal requirement is 20 days) in spite of increasing volumes. The number of orders has also been steadily increasing to approximately 250

per day. In 2005, 99.76 percent of all orders were processed within two days. Interstate and foster care referrals are also being processed in less than two days. DCS has shown steady or improving performance in spite of increasing volumes and a steady or decreasing workforce. There was an estimated reduction of 72,000 labor hours as a result of implementing FMIS alone. The labor savings for processing court orders and case files have not been fully tabulated. Postage has also been reduced. These results would not have been possible without the introduction of EDM technologies.

Intangible Benefits

The caseworkers interviewed were very pleased with the system. They stated that they were intimidated and reluctant at first, but really appreciated the efficiencies and productivity gains after using the system. Caseworkers no longer need to physically search for documents. Everything is available at their desk top. They stated that they no longer have to deal with lost files. In fact, during imaging and indexing, many lost files emerged that had simply been misfiled. Others were pleased to have gained cubicle space, for they used to store up to 700 case files.

The caseworkers also complained about how files were often misplaced or lost when cases were redistributed and transferred between caseworkers to even the workload, prior to implementation of EDM. Before EDM, paper files were moved from cubicle to cubicle and were often lost or misplaced. With EDM, caseworker assignments are simply changed in the system and all case file documents are delivered to the appropriate caseworker as well as being available to all caseworkers. EDM also eliminated the need for archiving paper files.

The system immediately allowed DCS to achieve its “no wrong door” objective for case management. With all case files stored digitally and remotely accessible, any caseworker at any field office can manage any case. This greatly improves customer service. Further, caseworkers can quickly and easily look up information on screen when clients call with questions or concerns. In fact, following imaging, the massive numbers of complaints for late or misapplied child support payments have been reduced to a negligible number.

The EDM system also allows for convenient auditing and reporting. Many performance metrics (some discussed above) are tracked by the system. DISC Image also tracks who accesses the system and all of their actions within the system. Also, DCS has data available as to how much and what type of mail is being received and processed by the organization. This data is used by management to assist in deciding how best to use the resources of the organization.

Another benefit was the reduced risk from biological threats because paper mail is handled far less than it was prior to imaging.

Mail can also be delivered in a non-linear way. Just like email, documents can be delivered and retrieved by multiple recipients simultaneously. The linear limitations and burdens of paper have been lifted.

EDM System Implementation Strategy

This EDM system was phased in over the course of a decade due to funding constraints and the need to obtain leadership buy-in. The implementation was phased in by starting with financial processes, closed cases, court orders, the City of Fife office prospective mail, statewide prospective mail, paper files (open cases), and then the remaining paper files for cases closed since the statewide prospective mail implementation. A sample cost-benefit analysis for outfitting county clerks with scanners in lieu of facsimile machines is provided as **WA Exhibit D**.

The financial system (FMIS) was the first significant EDM project. The entire project started with a small group of visionary employees who recognized the potential benefits of EDM and pressed leadership to consider it. Other related initiatives and high profile issues such as Y2K (Year 2000) compliance and audit concerns provided the funding and urgency to press forward.

The first step was the centralization of payment processing. Select offices were outfitted with local scanners. A small team, which included an operations and system manager, was assembled and drafted a requirements document. The imaging team leader researched available technologies and provided a requirements document for an outside vendor to use to prepare a design. The requirements document specified all system functionality. Ultimately, DISC was selected to perform the work.

First, the system was installed for use by Central Services only. Later, the field offices became users. The next step was the development of a prototype for court orders. A single office (Fife) was designed to be the first “paperless” office. Based on this pilot test, information was gathered to be leveraged for developing an implementation plan for the entire DCS. As other factors and drivers emerged, specifications were detailed and the vendor enhanced system functionality. Over the course of the next several years, the system functionality was expanded and the types of files imaged expanded. The scanning of the entire backfile was completed in 2003 for open cases and in 2005 for closed cases. All case files, archived files, and payment documents are imaged.

Training

Because of the phased implementation, training was also conducted in phases. Initially, the project group members self-trained by simply using the equipment and developing processes through trial and error. Once they became familiar with the process, they trained select managers so they could become familiar enough to train and support staff and to provide manuals for both the FMIS and DISC Image (centralized mail processing) components.

Lessons Learned

The development of the EDM system at Washington DCS presented many learning opportunities worth sharing. One suggestion presented from the team members for other agencies to consider, prior to EDM design, is to perform a business process improvement study prior to requirements analysis. They suggested this so a system is not designed to simply emulate the existing processes with automation. Such a study may identify redundant or unnecessary processes that may not have to be designed into the final solution. Doing this allows the EDM to enhance the efficiencies possible through business process streamlining.

They also recommended getting across-the-board leadership commitment. In the early years, a minority of the management staff were supportive of this project. Ultimately, there were some high-profile audit issues and the "no wrong door" policy that aided in getting the project through. A high-impact initiative such as EDM will be much more successful when the champions of the project obtain leadership support from all levels.

One challenge that emerged was associated with using an external vendor to provide and customize the EDM application. IT department staff developed the case management package, SEMS, as an in-house effort and was uneasy with using an outside vendor for this separate application. This also later posed a challenge when it became necessary to integrate DISC with SEMS. The team recommended that IT department staff be involved early in the EDM planning process when an external vendor is involved.

It is also important that the EDM project team leadership be allowed to travel for site visits and to attend industry tradeshows. The DCS project manager was not granted an exception to the out-of-state travel restrictions that were in effect for most of life of the imaging project. The one exception was an approval granted to visit a couple of sites in California in 1996, but for the next 10 years all subsequent travel requests were denied. This deprived DCS of the benefits of learning from the expertise of those in the industry and other organizations who have attempted similar document management projects.

Unanticipated exception process volumes were another frustration shared during the review. While the main documents and processes were accounted for adequately in the design, exceptions had materialized at far greater volumes than anticipated. The team felt that this could be mitigated by conducting a thorough EDM needs assessment prior to design, while remaining firm on a commitment to not allow unnecessary exceptions to the process. The team also felt that if standards and procedures were decided by "consensus," the result would be too many exceptions, which would not allow the benefits of the system to be maximized. Each exception had its own cost. This was especially true during the early stages of implementation when most users were not accustomed to working in the new environment and were too quick to conclude that exceptions were necessary.

It is recommended that any agency considering EDM should become familiar with the technology by visiting a more advanced agency and doing research. Likewise, long

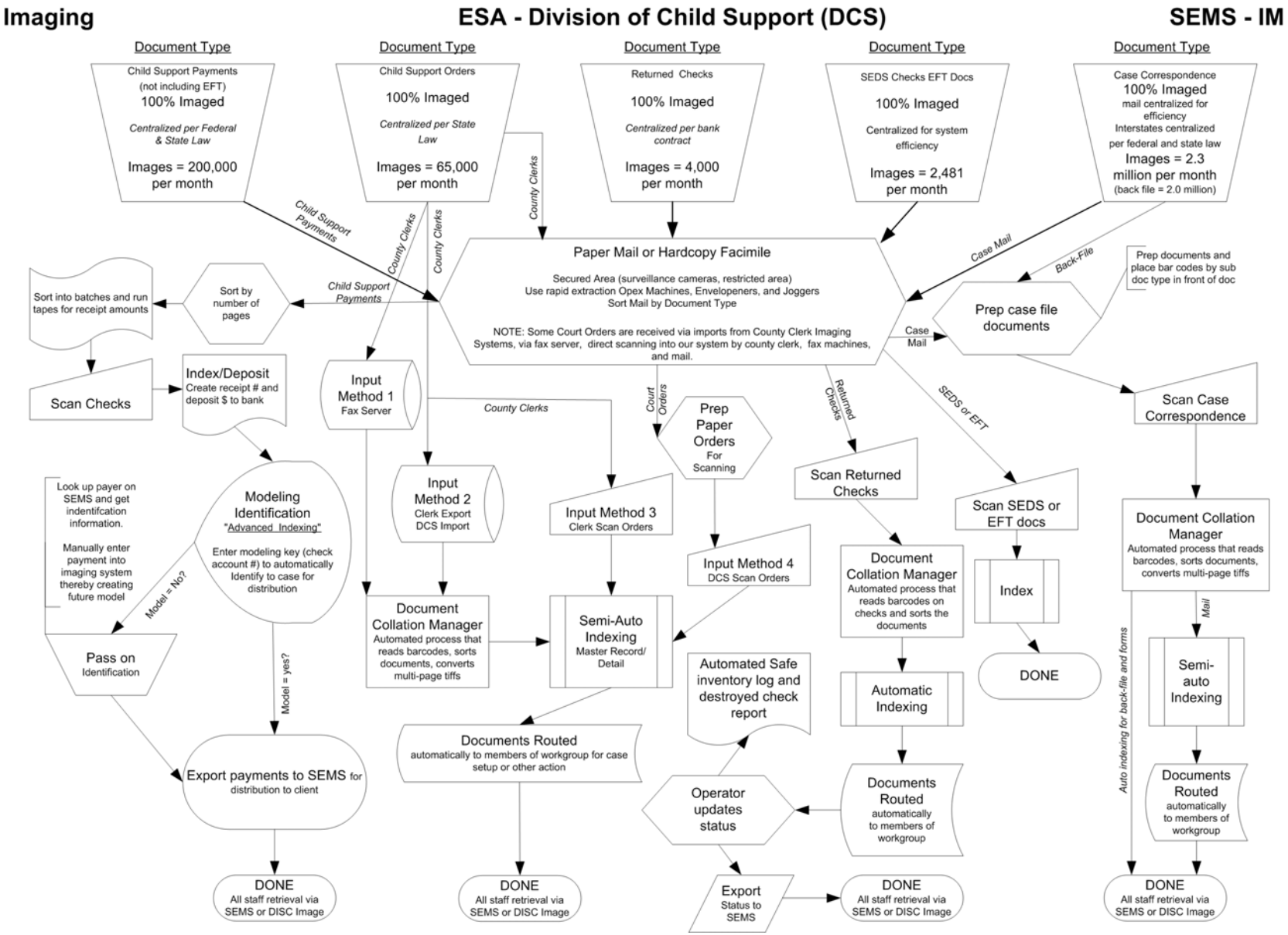
before design, the present workflow should be mapped with special attention given to how paper documents are used in the work process. Document count and origin should also be analyzed. Before backfile conversion (if all files are scanned), the files should be sorted and purged, to reduce the burden during the imaging process. It is also recommended that a small-scale pilot test system be thoroughly tested by users for at least 3-6 months before implementation.

A disaster recovery plan is also essential. DCS experienced a major earthquake in 2001 at the location where the imaging system core components are located. Fortunately, DCS had an adequate disaster recovery plan and, as a result, suffered no imaging system access problems nor loss of images even though much of the building where the system is located suffered from damages and was temporarily deemed unsafe to occupy.

Exhibits

The State of Washington Case Study includes four exhibits:

WA Exhibit A. Document Imaging Workflow
WA Exhibit B. Backfile Conversion Instructions & Best Practices
WA Exhibit C. Sample Backfile Conversion Progress Reports
WA Exhibit D. Cost-Benefit Analysis for Outfitting County Clerks with Scanners in Lieu of Facsimile Machines



WA Exhibit A. Document Imaging Workflow

INSTRUCTIONS & BEST PRACTICES FOR BACKFILE CONVERSION

- Purge the file (really purge it – get rid of those duplicate orders). ***And get rid of those CC & CH screens, RCWs & WACs.***
- Put the file into three sections
  1. Legal
  2. Correspondence
  3. Referrals
- Put each of those sections into chronological order with the newest on top.
- Remove ALL the staples (sometimes you can just cut the corner off). Also remove any metal brads, paperclips etc. Make sure to smooth the corners where the staples were and straighten any dog-eared corners or wrinkles.
- Separate documents so that everything is a single page.
- Take off all sticky notes. If you leave a sticky note, make sure it isn't covering up any pertinent information.
- Tape any small pieces of paper onto an 8 ½ x 11 inch sheet of paper. If it is a small two-sided letter, you have to photocopy the back side; otherwise, if you tape it down, only the front-side will image.
- If there are any dark pieces of paper, they have to be copied onto white paper.
- Any light documents need to be copied onto white paper. ***Green hi-liter scans as a blackout so copy those docs as well.***
  Examples:
  1. Fax paper (the slick kind)
  2. Dot Matrix prints
  3. Anything in pencil
  4. Onion skin
  5. Documents that are very light
- Remove photos – they don't image well.
- Any documents larger than 8 ½ x 14 inches will need to be reduced in size to no larger than 8 ½ x 14 inches (legal size).
- Any document that is legal size 8 ½ x 14 inches should have a Post-It note on the first page protruding from the document so we can ensure it is opened out during the scanning.

The following suggestions were obtained by surveying Central Services staff who did considerable scanning of the Back File Conversion for Fife. Their recommendations are as follows:

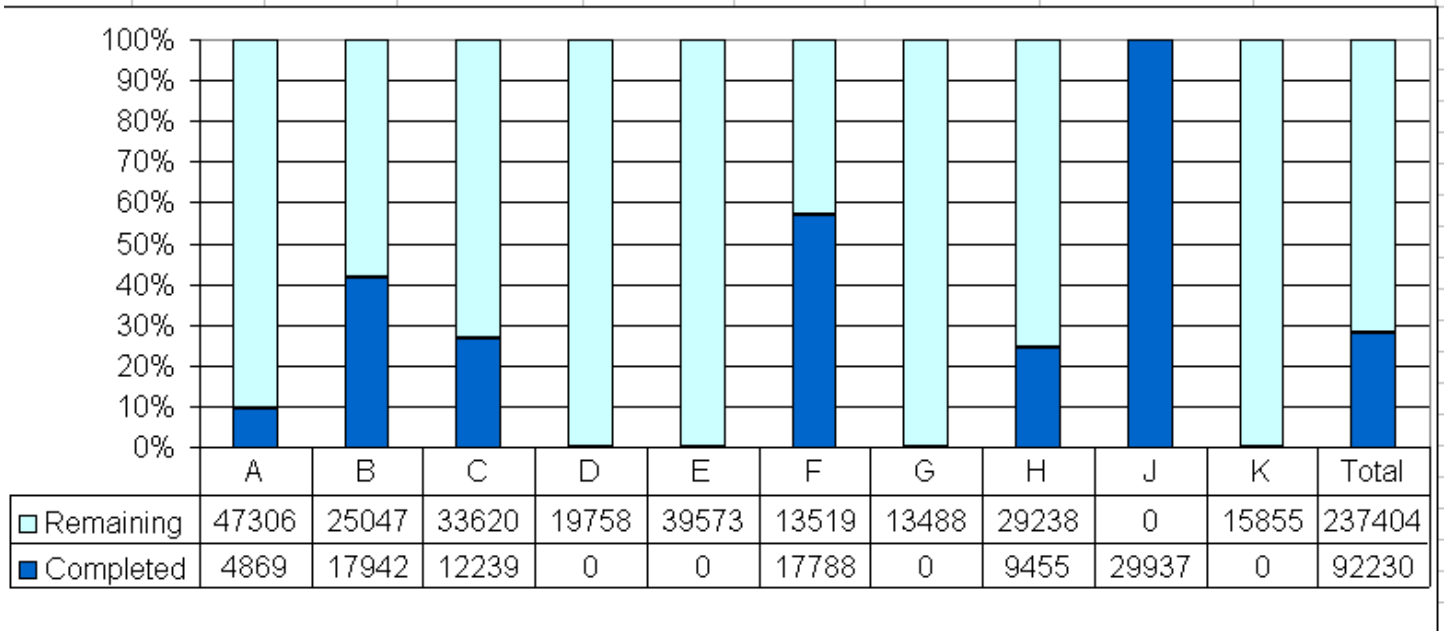
1. "The legal-sized Public Assistance Assignments were the biggest problem to scan. They are very common and they jammed the machine or the output tray time after time."
2. "Anything legal-sized should be purged if at all possible or reduced in size."
3. "Purging should be aggressive."
4. "The Fife SEOs did a marvelous job prepping the files (i.e., removing staples, etc). For every few seconds it takes the SEO to remove the staple up front or to flatten out a piece of paper, it takes several times that time to un-jam the

scanner and rescan the documents. It can take 5-10 minutes to work your way out of a paper jam and paper mix-ups caused by a single staple or public assistance assignment problem."

5. "How about imaging just the signed forms instead of all the rest of the document?"
6. "Pink paper sometimes scans too dark."
7. "Yellow highlighter sometimes doesn't scan well."
8. "Why keep all the forms that are on SEMS and returns that are marked all unknown?"
9. "Suggest cutting the corners instead of pulling staples out because it is so much easier to scan."

DCS Back File Conversion Progress as of 12/13/02

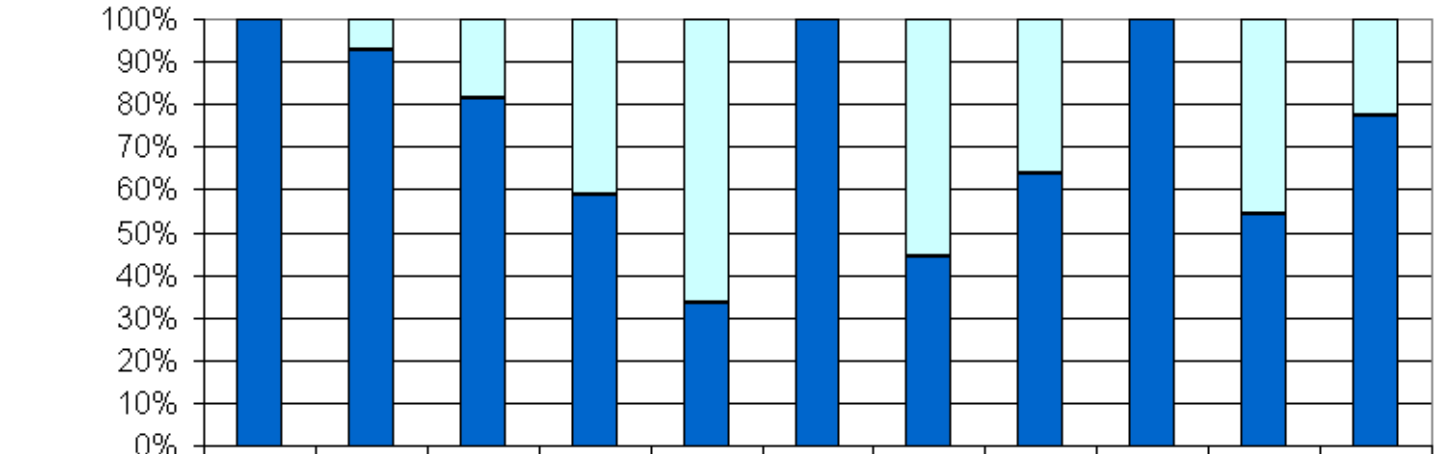
Office	Completed	Remaining	Total Cases	% Completed	Install Date	End Date	Days Elapsed	Days Remaining
A	4869	47306	52175	9.33%	12/5/2002	2/7/2003	1335	-1271
B	17942	25047	42989	41.74%	10/15/2002	1/24/2003	1386	-1285
C	12239	33620	45859	26.69%	11/8/2002	2/27/2003	1362	-1251
D	0	19758	19758	0.00%	12/18/2002	2/4/2003	1322	-1274
E	0	39573	39573	0.00%	1/7/2003	4/7/2003	1302	-1212
F	17788	13519	31307	56.82%	10/4/2002	12/23/2002	1397	-1317
G	0	13488	13488	0.00%	2/11/2003	3/13/2003	1267	-1237
H	9455	29238	38693	24.44%	10/24/2002	1/28/2003	1377	-1281
J	29937	0	29937	100.00%	12/1/2001	7/25/2002	1704	0
K	0	15855	15855	0.00%	1/21/2003	2/25/2003	1288	-1253
Total	92230	237404	329634	27.98%				



WA Exhibit C. Sample Backfile Conversion Progress Reports

DCS Back File Conversion Progress through 3/11/03

Office	Completed	Remaining	Total Cases	% Completed	Install Date
A	49412	0	49412	100.00%	12/5/2002
B	34300	2634	36934	92.87%	10/15/2002
C	34384	7782	42166	81.54%	11/8/2002
D	10935	7687	18622	58.72%	12/18/2002
E	12267	24356	36623	33.50%	1/7/2003
F	28428	0	28428	100.00%	10/4/2002
G	5500	6922	12422	44.28%	2/11/2003
H	22557	12849	35406	63.71%	10/24/2002
J	29937	0	29937	100.00%	12/1/2001
K	7850	6659	14509	54.10%	1/21/2003
Total	235570	68889	304459	77.37%	

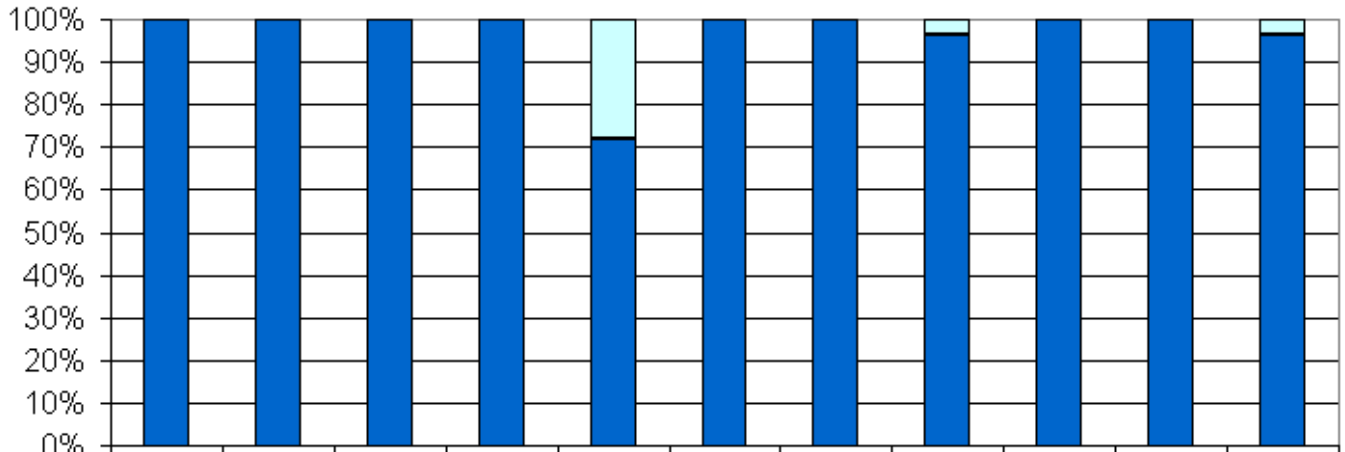


	A	B	C	D	E	F	G	H	J	K	Total
Remaining	0	2634	7782	7687	24356	0	6922	12849	0	6659	68889
Completed	49412	34300	34384	10935	12267	28428	5500	22557	29937	7850	235570

WA Exhibit C. Sample Backfile Conversion Progress Reports

DCS Back File Conversion Progress through 5/02/03

Office	Completed	Remaining	Total Cases	% Completed	Install Date
A	49412	0	49412	100.00%	12/5/2002
B	36934	0	36934	100.00%	10/15/2002
C	42166	0	42166	100.00%	11/8/2002
D	18622	0	18622	100.00%	12/18/2002
E	26321	10302	36623	71.87%	1/7/2003
F	28428	0	28428	100.00%	10/4/2002
G	12422	0	12422	100.00%	2/11/2003
H	34185	1221	35406	96.55%	10/24/2002
J	29937	0	29937	100.00%	12/1/2001
K	14509	0	14509	100.00%	1/21/2003
Total	292936	11523	304459	96.22%	

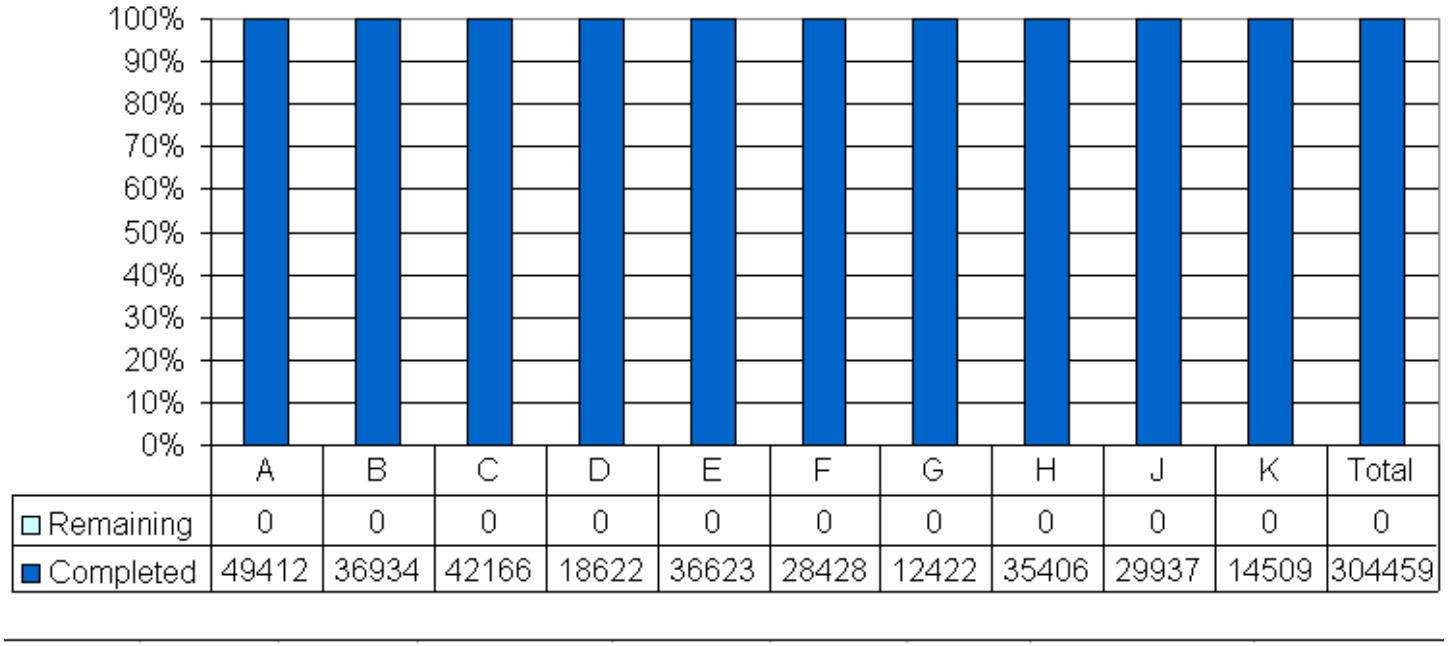


	A	B	C	D	E	F	G	H	J	K	Total
Remaining	0	0	0	0	10302	0	0	1221	0	0	11523
Completed	49412	36934	42166	18622	26321	28428	12422	34185	29937	14509	292936

WA Exhibit C. Sample Backfile Conversion Progress Reports

DCS Back File Conversion Progress through 6/16/03

Office	Completed	Remaining	Total Cases	% Completed	Install Date
A	49412	0	49412	100.00%	12/5/2002
B	36934	0	36934	100.00%	10/15/2002
C	42166	0	42166	100.00%	11/8/2002
D	18622	0	18622	100.00%	12/18/2002
E	36623	0	36623	100.00%	1/7/2003
F	28428	0	28428	100.00%	10/4/2002
G	12422	0	12422	100.00%	2/11/2003
H	35406	0	35406	100.00%	10/24/2002
J	29937	0	29937	100.00%	12/1/2001
K	14509	0	14509	100.00%	1/21/2003
Total	304459	0	304459	100.00%	



WA Exhibit C. Sample Backfile Conversion Progress Reports

Sample Cost-Benefit Analysis for Court Orders (1999)

Phase 3 & 4 - County Clerk/DCS Central Services

Assumptions:

All counties transmitting via fax machines changed to DCS provided scanning hardware and software. Existing DCS provided or subsidized fax machines removed.
There were FTE savings of 3 (1 in DCS Central Services and 2 in the counties).
Five-year amortization cost on scanners is $640 per year per scanner.
Phase 3 and 4 techniques will result in faster delivery of court orders and speedier case set-up and other support enforcement actions.

First Year	
Misc Savings (see attachments)	$ 57,978
3 FTEs (Salary and benefits)	150,000
less scanner hardware (18)(3,200ea)	-57,600
less software licenses (18)(300ea)	- 5,400
Total 1st Year Savings	$144,978
Misc Second Year Savings	$ 57,978
3 FTEs	150,000
less scanner hardware	-00,000
less scanner licenses	- 0,000
Total 2nd Year Savings	$ 207,978
Misc Third Year Savings	$ 57,978
3 FTEs	150,000
less scanner hardware	-00,000
less scanner licenses	- 0,000
Total 3rd Year Savings	$ 207,978
Misc Fourth Year Savings	$ 57,978
3 FTEs	150,000
less scanner hardware	-00,000
less scanner licenses	- 0,000
Total 4th Year Savings	$ 207,978
Five Year Cumulative Misc Savings	$ 289,890
3 FTEs	750,000
less scanner hardware	-57,600
less scanner licenses	- 5,400
Total Five Year Savings	$ 976,890

Butler County, Ohio Case Study

The Ohio Department of Jobs and Family Services (ODJFS), Office of Child Support is the State agency that provides guidance and oversight for the county child support program. The Butler County Child Support Enforcement Agency (CSEA) is an agency of the Butler County Board of Commissioners, with the mission to administer the Title IV-D Child Support Enforcement program in Butler County. The Butler County CSEA provides the full range of IV-D services.

Profile

Butler County CSEA has approximately 90 employees with 16 investigators. Butler County is the eighth largest of the 88 counties in Ohio. The State of Ohio has approximately 1,000,000 children eligible for child support. CSEA manages approximately 27,000 total cases (these are active enforcement, paternity and support cases) and collected approximately $57 million in child support in 2005. Within the program, cases are handled by function and by case. Butler County CSEA is organized by teams with specific functions and, within each team, cases are apportioned by supervisors alphabetically by noncustodial parent name. There is an intake team that builds the cases in the imaging system and forwards them to the pre- or post-order teams. There is a single pre-order team that handles establishment, paternity, and location and three post-order teams that handle location, enforcement, review and adjustment, and audit. Each investigator manages approximately 1,700 cases. Payment processing is handled independently by a third-party vendor.

Background

The main impetus for the Electronic Document Management (EDM) system was to reduce the space necessary for paper files. It was anticipated that as much as $50,000 was to be allocated for a new paper file storage system. As a result, digital file storage was evaluated as an alternative. Even though file space savings was the initial driver, it quickly became apparent that there were many other added benefits to electronic document management. Planning for the document EDM project began in May 2001.

Initially, an imaging committee was established to identify the business and functional requirements. The committee consisted of a records manager, who also served as the technical lead, an assistant supervisor, two line staff from audit and intake, a director, and two supervisors. Information Services (IS) was not represented on the committee for this phase of the project; however, they were kept informed by the records manager, who was a Certified Document Imaging Architect (CDIA). The committee met routinely with the Butler County Records Center staff over the course of several months to design a system. The committee also served to keep the CSEA staff informed of the project progress. The committee had determined based on reviewing the costs and benefits of EDM systems installed in other counties that developing an in-house solution would be more cost-

effective for Butler County than purchasing a Commercial Off-the-Shelf (COTS) application since they had the expertise on staff to write the application.

Statute

The State of Ohio has enacted legislation concerning public records (including digital media), specifically Ohio Statute 149.43(A) and 149.43(B). These regulations are available at http://www.occaohio.com/PublicRecords/149.43.htm. The Ohio Records Committee has approved a guidance document on electronic records entitled, *Ohio Electronic Records Guidelines*. This document is available at http://www.ohiojunction.net.erc/RMGuide/ERGuidelines.htm.

Business Process

The eight objectives identified by OCSE are:

1. Case Initiation
2. Locate
3. Establishment
4. Enforcement
5. Case Management
6. Financial Management
7. Reporting
8. Security and Privacy

Butler County CSEA uses EDM primarily for file management. All documents are scanned and indexed and immediately reside in the EDM system for future retrieval: viewing, printing, or forwarding. The system also allows for compliance with records management policies, specifically compliance with the Health Insurance Portability and Accountability Act of 1996 (HIPPA) and adherence to special handling of Internal Revenue Service (IRS) documentation. Further, the system improves records security (confidential caseload layer) and auditing capabilities (vast reservoirs of metadata are collected behind the scenes).

Since the system is primarily a file/records management tool, it indirectly benefits the case management objectives of case initiation, locate, establishment, enforcement, and case management processes through efficiency and customer service improvements. However, the system has been leveraged for greater benefit for legal proceedings by allowing attorneys to access documents from the courtrooms. With some minor workflow upgrades, the system could be integrated into the case management business process more completely. Financial management, reporting, and security and privacy are not directly benefited through use of the system.

Document Workflow and Imaging Process

Refer to the Butler County workflow diagram provided as **Butler County Exhibit A**. Approximately 40,000 pages a month are being processed. Butler County CSEA mail is centrally received and is manually sorted into five main groups:

1. Legal
2. Pre-order
3. Post-order
4. Administrative hearings
5. Intake and collections

This mail is physically routed to the department supervisors. The department supervisors distribute the mail to groups and team members for processing.

All documents are sent to CSEA via mail in paper form. All outgoing documents are generated in paper and sent to recipients via mail.

Case Management Mail

When caseworkers receive mail, they immediately use the document to perform whatever duty is prompted by the correspondence. Most of the actual case work is conducted through the use of the statewide Support Enforcement Tracking System (SETS). Once the necessary work is completed, the documents are then prepped, scanned, and indexed.

Documents are not batched, but rather scanned one at a time. Each document is also indexed by referring to the actual paper document for field data (heads-down indexing). No automation methods are being used to capture index information. The index fields are:

1. Document type or category (displays as a folder in the application)
2. SETS number (SETS#)
3. Participant number (Participant#)
4. Name
5. Social Security Number (SSN)

Once indexed, the images are routed to the department supervisors via the EDM application. The department supervisor then alerts assigned staff members of any additional actions that must take place as a result of the document.

All users with rights can query and access images to perform any of their work activities. They go to the search screen and type in search criteria (name, SETS#, SSN, or Participant#) and pick from the resulting hit list. Once the document is pulled up, the first page is in full view with thumbnail views of the following pages. In this way, users can scroll through the document and simply select the page they wish to view by clicking on

it. Then users can zoom in, print, email, etc, depending on rights. The retention for these documents is 5 years.

Legal Documents

Legal documents are received via mail much like case management documents. One subtle difference is that several documents (e.g. new orders, new applications, possible case closures, results of administrative hearings) are scanned prior to executing the work processes resulting from the correspondence.

Another unique aspect to the workflow in the legal department is that a paper file is still maintained. These files contain just those documents that attorneys anticipate may be requested during hearings or in court such as copies of audits, pay records, genetic testing, and affidavit of default. In this way, the attorneys have the needed documents readily available. All other documents are available digitally in the court room through the EDM system. This is possible because all attorneys are outfitted with laptop computers for hearings and court appearances and the facilities are hardwired to the State network.

Quality Assurance

Quality assurance consists of on-screen viewing of the document during the scanning process. If images are skewed or image quality is poor, the document is rescanned. Most documents are routed to management personnel and are visually inspected before routing to a worker to take action. This process coincides with the workflow that existed prior to imaging and allows for further quality assurance in the normal course of business. No automated or digital image enhancement features are used. Paper documents are kept for 90 days for rescan in the event a poor quality image is discovered. Also, the EDM application has management features that allow for the editing of information within the application in the event data (or index fields) are populated incorrectly.

Paper Retention

Once scanned, documents are boxed and labeled with the name of the person who scanned the document and the scanning date. The documents are then retained for 90 days prior to disposal (except select legal documents as discussed in the prior section).

Backfile Conversion

Backfile conversion was conducted by CSEA personnel according to a 24-month schedule. The document imaging committee determined that if each member of the CSEA staff prepped and scanned a single case file every work day, the entire active case load would be scanned in two years. The scanning was done by clerks and summer interns within the agency. The case files were estimated to take 45 minutes to prep and scan on average. Ultimately, the active caseload was scanned ahead of schedule by two

months. Inactive cases have not all been imaged to date. These files are being destroyed according to the retention plan.

Backfile conversion preparation consisted of ensuring that the case was open in SETS, sorting documents by document type, removing all duplicate and unnecessary documents, removing fasteners, arranging the documents by date from most recent to oldest, and batch scanning. In this way, each document type resulted in a single multi-page Tagged Image File Format (TIFF) document entitled "legacy" that was ordered by date, from most recent to oldest. The document categories were intake, narrative, correspondence, audit, legal, and legal correspondence. There are presently 37,000 cases in the EDM system, 27,000 of which are active. A total of 4.2 million images reside in the EDM system.

EDM System Details

The server consists of a Dell Power Edge® 6600 series server with dual 2.8 GHz processors and 8 GB of RAM). All data volumes are configured in a RAID 5 configuration on a fiber channel storage array. The EDM application is a thick-client application accessed through the State of Ohio Novell® Network that connects through a State router to the county's network. Protocol is TCP/IP. The Oracle® database, in continuous archive mode, is also backed up to tape weekly and stored off-site on a 6-week rotation.

The original EDM system input sub-system consisted of eight Canon® DR-3060 duplex scanners. These are TWAIN-compliant scanners with a throughput rating of up to 86 pages per minute. They also have a very small footprint. A SCSI card (Small Computer Standard Interface card) is required per unit. The current input infrastructure consists of two of the original Canon® DR-3060 scanners and three Canon® DR-3080CII (USB 2.0) scanners. Images are scanned as multi-page TIFF Group 4 at a resolution of 300 dots per inch (DPI). Upgrades are in process to image documents in JPEG (Joint Photographic Experts Group) and GIF (Graphic Interchange Format) formats for capturing color photos. All images are written to microfilm with a Kodak® Archive writer. There are plans to discontinue microfilm imaging in the future.

Existing user workstations were used for the EDM system. The approximately 90 workstations in use during implementation had Intel® Pentium® III processors, a speed of 900GHz, 256 MB of Random Access Memory (RAM) and a 17-inch monitor. The workstations have since been upgraded to Intel® Pentium 4® processors, a speed of 2.8 GHz, and 512 MB RAM. Workstations are running Windows XP Professional®. Each workstation required the installation of the database client software; Global 360® controls were also needed when the workstations were upgraded. The controls include image edit controls, thumbnail controls, and image admin controls. Kodak® Imaging was the viewer used prior to the system upgrade (it came with the Windows operating systems prior to XP). Several laptops were purchased as part of the EDM system for legal staff to access case documents from the courtroom during proceedings. The total initial hardware cost was under $60,000.

The EDM application itself is built on an Oracle® 9i database and is also compatible with Microsoft® SQL Server. The application was written in Microsoft® Visual Basic 6 and supplemented with Active-X® controls (Kodak® viewer and later Global 360® controls). Images and metadata are stored in a common database. Paper documents are scanned as multi-page digital documents. The application does not link to any external databases or applications. Users must log into their workstation to use the EDM system. The system uses a CSEA Netware login user ID to authenticate. There are additional security features within the application such as user rights, group rights, and case level rights. Supervisors can also see whether or not a caseworker has viewed an image.

Performance/Results

The most obvious gain with EDM was the accomplishment of the original goal of the system, gaining file space for other uses. A substantial amount of file space was recovered upon completion of the backfile conversion. As shown in the photographs in **Butler County Exhibit B**, some of the gained space was repurposed. The CSEA plans not to renew a lease for some of their current vacant space for a total savings of $107,000 annually going forward.

Other benefits include the reduction of lost files, improved customer service, increased security of documents, audit and reporting capabilities, desktop access to documents, access to case documents from the courtroom for attorneys, and a substantial decrease in file management labor. In fact, the EDM system freed up six former file room employees for redeployment in other capacities. The staff was not reduced as a result of the EDM system; however positions have not been refilled in response to attrition losses. The CSEA estimates that the productivity gains by reducing paper handling are approximately $250,000 annually.

CSEA also estimates that microfilm archiving directly from paper documents at the current volumes would have cost about $35,000 annually as compared to the current cost of $3,000 per year for digitally “printing” to microfilm. As stated earlier, there are plans to discontinue microfilm imaging altogether.

One of the reporting features of the EDM system was used to track imaging efficiency during the backfile conversion. Still other reporting and audit features can be used to view document activity logs on an ongoing basis.

Another benefit that has emerged with the EDM system is the ability to have multiple parties access a common document. This had historically been an issue when attorneys needed to take the entire file for hearings or to court. Because the files were not available, caseworkers would be unable to answer questions or perform any work on the case until the files were returned.

Attorneys using the system have also been able to represent cases that were not intended to be heard that day (if someone showed up on the wrong date) because all the case files are accessible digitally from the courtrooms.

One event that occurred unexpectedly could have been avoided by using EDM. One day, all the sprinklers in the file room went off, soaking all the files. CSEA had to contract with a vendor to remove all the files and have them dried. The entire process was time-consuming and expensive.

An unexpected benefit to the State of Ohio was the replication of this system throughout Ohio. Butler County has since supported the implementation of 18 additional installations of this application with over 600 users. The installations have been in various government agencies and departments. Five of the additional installations are child support agencies with two additional child support agency implementations planned. The folders and index fields have varied, but the base application has remained intact. Butler County staff implement, train, and support installations at a reduced fee (approximately at cost) to enable other government agencies to benefit from the EDM application.

EDM System Implementation Strategy

As mentioned previously, the implementation began with the establishment of an imaging committee in May 2001 with the purpose of defining system requirements and ultimately forging the system design. The committee mapped the work processes, assessed the current hardware infrastructure, and evaluated the specific records management requirements. It was determined that a custom-developed application would be the most cost effective for the county, based on the high cost of similar EDM applications that were purchased as COTS applications in other counties. The system was designed per the basic functional requirements, with minimal features beyond those requirements. In this way, development time and cost were minimized.

The initial development took approximately 6 months (an estimated 240 hours labor), following several months of planning. After development, the system was pilot-tested for 30 days. Then feedback and comments were used to make system improvements. The full system was deployed and backfile conversion initiated in May 2002. The backfile conversion was completed in April 2004, ahead of schedule.

Since initial full deployment, several features have been added to facilitate better workflow. One such feature was the ability to bookmark digital documents for future review and the ability to add notes related to documents. This feature was added because attorneys found reviewing complete files on-screen cumbersome and regularly printed out the entire file for review. The feature enabled them to mark important documents so that they did not need to read through all of them just to get to the pertinent documents. Some other features that were added include the ability to mark a case as closed, case alerts, edit features, cross-referencing participants to other cases, HIPPA compliance, confidential case security, and IRS safeguarding procedures.

Training

The user training required for this EDM application was minimal because the application was specifically developed for CSEA use and a lot of input was solicited from the users

by the imaging committee during planning, development, and pilot testing. Supervisors said that it literally takes 5 minutes to familiarize someone with the application. This is done through a personal orientation. The initial roll-out training was done through larger group orientations. Super-user (administrator or "smart user") training was provided exclusively to the administrator. This user has the rights to set up other user rights and is responsible for training the other users.

For development, on the other hand, much training was required. One of the county employees received a lot of specific training to equip the county to develop the application autonomously. This training consisted of Oracle® Programming and Database Administration and SQL self-study. This individual already possessed a bachelor's degree in systems analysis and an associate's degree in computer science with programming experience, and was a Computer Trade Industry Association (CompTIA) CDIA. Therefore, considerable technical expertise was required for in-house product development. The training cost was roughly $16,000 to $20,000, not including the opportunity cost of being pulled away from other duties.

Lessons Learned

The EDM project was planned systematically, incorporated considerations from all stakeholders, and was implemented in a phased approach following a pilot test. These are the appropriate steps for a successful EDM implementation. However, the CSEA imaging team would recommend doing some things differently. Some challenges they had experienced are discussed below. For starters, they recommend having a longer pilot testing period.

One item that the IS group thought would have benefited from more attention during the planning phase was the backup system. Backup of the database is a critical part of the EDM process and can be both time-consuming and expensive. Therefore, careful planning and a thorough design process are recommended.

Another challenge with the existing system is facilitating manageable installation and updates. User workstations are loaded with components (Oracle® client side and controls) and require manual installation, which is time intensive. The CSEA imaging team in hindsight would have preferred to work with the State (keepers of the network) to enable an automated installation procedure.

There were many challenges associated with implementation as a result of the system being stored on county servers while on the State network. Coordination between the State and the county was necessary to allow shared TCP/IP connectivity through the firewall. A lot of coordination is required to maintain functionality during any change: change of the State network or change to the EDM application. The county developed an installation program that would be efficient enough to handle installing the application frequently, if needed.

Likewise, there were difficulties with getting the Oracle® database communications to route back through the State's Cisco® routers. The county had to install Oracle® Connection Manager to solve the problem.

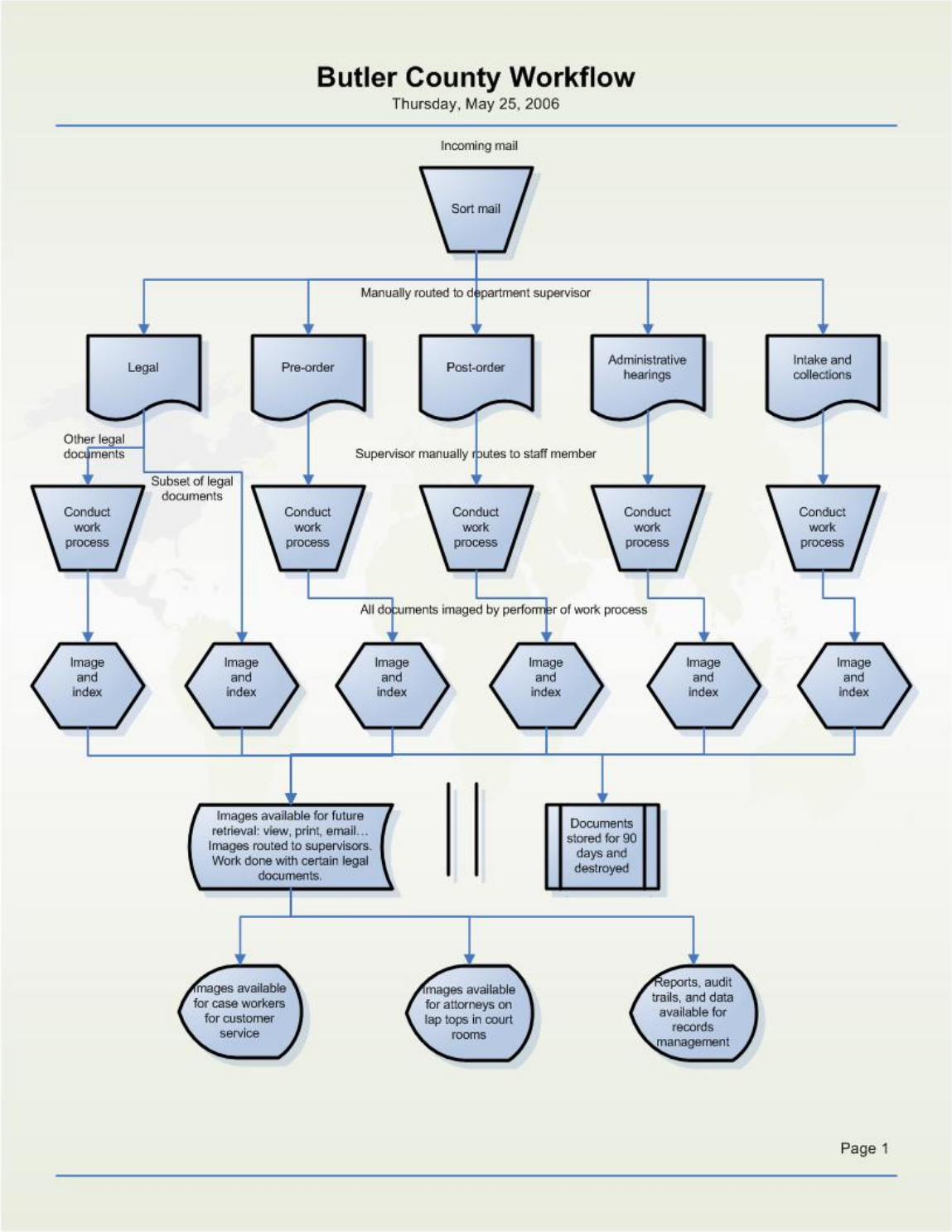
Some users of the current EDM system would prefer to leverage the workflow capabilities. Documents are mostly scanned after work when the hard-copy document is completed; therefore, the work process remains paper-based. They recommend setting up a process where the documents are imaged immediately and the work process is completed with the digital document rather than the hard copy. There is a personal pending workflow management tool included with the system which is under-used that could easily facilitate this process.

CSEA also believes that the project would have greatly benefited from the formation of an inter-county EDM board to share best practices prior to system planning. This is something that has been established in Butler County since the time of this installation.

Exhibits

The Butler County, Ohio, Case Study includes two exhibits:

Butler County Exhibit A. Butler County Workflow
Butler County Exhibit B. File Storage Space Savings



Butler County Exhibit A. Butler County Workflow

Butler County Exhibit B. File Storage Space Savings

State of Rhode Island Case Study

The Rhode Island Office of Child Support Services (OCSS) is an agency of the Rhode Island Department of Human Services, with the mission to administer the Title IV-D Child Support Enforcement program. The Rhode Island program provides the full range of IV-D services.

Profile

Rhode Island OCSS has approximately 96 employees, including 13 attorneys. Approximately 30 additional employees from Family Court also support the OCSS. The OCSS manages approximately 60,000 active cases and collected approximately $72 million in child support in 2005. Within the program, cases are handled by function and by case. The Rhode Island OCSS is organized by teams (or units) with employees responsible for specialized functions within each unit. For example, each of the four units has approximately 12 child support agents: four handle establishment, five are assigned to enforcement, and there are three for out-of-state. Cases are apportioned alphabetically by the noncustodial parent's (NCP) last name within each specialty. The Rhode Island Family Court is the OCSS State Disbursement Unit and handles all payment processing.

Background

The main impetus for the EDM system, initially, was to reduce the space necessary for paper files. The department was running out of room for paper files and desired a paperless work process. Imaging has become a critical part of the disaster recovery plan for the OCSS. The paper files (case documents) were weeded out and reorganized in 1999, having never been purged prior to that date. This purging reduced the backfile from 170,000 case files to fewer than 70,000. There is a 3-year record retention rule in place. The OCSS director and records manager still view document EDM as an excellent opportunity to keep the paper file (called "Masterfile" at the OCSS) from growing, by scanning incoming documents. Budget limitations would make full backfile conversion cost prohibitive.

OCSS researched EDM technology by attending demonstrations, visiting other installations, and attending other informative events. Once it was determined that the technology was appropriate for OCSS business needs, OCSS wrote a Request for Proposal (RFP) and AMS Imaging Inc. was awarded the contract. AMS Imaging implemented the current solution shortly after contract award.

Statute

The Rhode Island OCSS manages its case records according to OCSE Policy Interpretation Question (PIQ) 88-12, *Maintenance of Case Records via Electronic Means versus Hard Copy*.

Business Process

The eight objectives identified by OCSE are:

1. Case Initiation
2. Locate
3. Establishment
4. Enforcement
5. Case Management
6. Financial Management
7. Reporting
8. Security and Privacy

Rhode Island OCSS uses EDM primarily for file management. Scanning is not required for all documents. Documents produced through the OCSS automated system are tracked within that system, thereby not requiring scanning, and most incoming documents are scanned and indexed and reside in the EDM system for future retrieval: viewing, printing, or forwarding. The system also improves records security and auditing capabilities.

Since the system is primarily a file/records management tool, it indirectly benefits the case management objectives of case initiation, locate, establishment, enforcement, and case management processes through efficiency and customer service improvements. While a future enhancement of the OCSS scanning system will provide a module for financial documents (Federal reports, case financial adjustment documentation, and other financial records), financial management, reporting, and security and privacy are not directly benefited through use of the system.

Document Workflow and Imaging Process

Refer to the workflow diagram for incoming documents provided as **RI Exhibit A**. The system contains 37,000 documents with a total of 105,000 images.

All incoming documents are received by OCSS via mail or facsimile and all outgoing documents are generated in paper and sent to recipients via mail.

Case Management Documents

Rhode Island OCSS mail is centrally received and is manually sorted. Incoming mail, as well as documents received via facsimile, are put in mail slots and routed directly to the appropriate OCSS agent; the mail clerk simply queries the Rhode Island statewide case management system, Information Network of Rhode Island Services (InRhodes), to see who the correct agent is for a particular case.

When caseworkers receive mail, they immediately use the document to perform whatever duty is prompted by the correspondence. Most case management work is conducted using the InRhodes system. Once the necessary work is completed, the caseworker decides

whether the document is to be shredded, filed, or imaged. Documents that do not contain any vital information are simply shredded. The overarching policy is for the agent to decide whether or not the document or the information within the document, which was not produced by InRhodes, will be needed for case management or for court use in the future. Documents that have an element that cannot be captured by scanning (embossing, original signature, etc.) as well as birth certificates are retained in paper form. Documents that just contain information that is available in InRhodes are not imaged. All other documents are imaged. Staff is in the process of developing written policy on scanning and shredding of documents.

OCSS agents physically route documents to boxes labeled by document type located at Masterfile. The case number is hand-written on the top right hand corner of the document prior to depositing it in its respective box. In this way, imaging can be prioritized by document type and indexing is made simpler by scanning in batches of a common document type. The main indexing field, the case number, is also readily apparent for the indexer. The scanning technician simply places a document delimiter barcode sheet between each document. Documents can then be indexed by referring to the actual paper document for field data (heads-down indexing) or by looking at the image on screen (heads-up). No automation methods are being used to capture the initial index information.

Many document types are set up in the EDM system. This allows the scanning technician to simply select the document type by pull-down menu selections. The index fields are:

- Document type or category (pull-down menu)
- Case number (which is the NCP social security number)
- Suffix (which is the unique identifier for the NCP for a specific Custodial Parent, or CP, since some NCPs have multiple cases).

There is a weekly automated file download of all active InRhodes cases directly into the EDM system. All other fields on the indexing screen (NCP name, CP name, and court docket number) are automatically populated via the InRhodes system.

Once indexed, the images are reviewed for accuracy on screen and “committed” to the system. At that time they are part of the EDM permanent record and are available for retrieval.

All users with rights can query and access images to perform work activities. They simply go to the search screen, query a case number and suffix, and pick from the list of images, if any, that may be listed for that case. Once the document is pulled up, the first page of the document is in full view with thumbnail views of succeeding pages. In this way, users can scroll through the document and select what they wish to view by clicking on it. Users can zoom in, print, email, etc., depending on their rights. Digital images are maintained on a dedicated server and are never purged.

Representative Case Management Workflow

OCSS agents initiate most of their case management activities by being prompted by InRhodes via a daily work list (called a DAIL). This list is generated both by alerts from the InRhodes system (per Federal and State guidelines) and by supervisor requests. The agent then checks the DAIL screen to see what work is required for that case. An example of an activity prompted by the DAIL for establishment might be generating a paternity packet, a support packet, or a medical support packet. Each packet requires certain documents. The agent will then pull up the necessary documents from the EDM system, typically the birth certificate. The document will be printed out and the packet prepared.

For an initial paternity complaint, the agent will produce the packet and issue it to a constable for service of process to the client. The constable will then return the signed packet to the agent. The agent requests the original document from Masterfile. The agent pulls the birth certificate from OnBase®, their EDM system, and provides the original to the legal department for a signature with the birth certificate (the attorneys will not sign the document without a birth certificate). Once everyone has signed the document, it gets imaged. The agent then does a summons to the NCP with a copy of the paternity complaint. The constable delivers the paternity complaint and summons. The NCP has 20 days to sign; the clock is running on the DAIL within InRhodes. If signed, it gets imaged. If the NCP denies, legal sets up a DNA test. If the NCP agrees, summary judgment is entered; if the NCP does not respond, the case defaults as established paternity. If the paternity complaint and summons are not served for any reason, the agent can get the address, reprocess the paperwork, and print out the paternity complaint from the EDM system and repeat the process described above.

Quality Assurance

Quality assurance consists of on-screen viewing of the documents during the scanning process. If images are skewed or image quality is poor, the document is rescanned. No automated or digital image enhancement features are part of the process at present.

Paper Retention

Paper documents on closed files are kept for three years and are stored in boxes marked by date in case a document needs to be rescanned. After the 3-year period, the case file and its contents are destroyed.

Backfile Conversion

Backfile conversion was not conducted by Rhode Island OCSS because of budget limitations. Instead, OCSS adopted a limited day-forward imaging protocol. They simply scan documents that contain data that can’t be obtained from within the InRhodes application. This protocol keeps imaging volumes relatively low. This is a requirement for Rhode Island OCSS due to limited human resources and budget constraints.

EDM System Details

The server consists of a Hewlett Packard® (HP) ProLiant ML370 G3 Server with Intel® Xeon® processor and a RAID (Redundant Array of Independent or Inexpensive Disks or Drives) controller. The EDM application is OnBase® by Hyland Software®. OnBase® is a thin-client application; however, at OCSS, the security is set up so it can only be accessed through the local network. OnBase® is a feature-rich Commercial Off-the-Shelf (COTS) application. Some advanced features (some as separate modules) include: Optical Character Recognition (OCR) and full-text search, redaction, overlays, workflow, thumbnail views, the use of barcode sheets as document delimiters, and check in/check out/version control. OCSS is exclusively using OnBase® for basic imaging: scanning, manual indexing, and image retrieval. The application also has multiple levels of user rights and restrictions. General users access the system through log-on and password and then have rights to view, email, and print images. At a higher level, system administrator rights are also available. The EDM system uses Microsoft® SQL Server™ for the database. The system is backed up using Super Digital Linear Tape (SDLT). Ten concurrent user retrieval licenses, Microsoft® SQL Server™ 2000 licenses, and three scan licenses were purchased.

The OnBase® system was also loosely integrated with the InRhodes system. The InRhodes system creates a file of the current roster of available cases weekly and makes that roster available to OnBase®. OnBase® uploads the roster which serves as the active case directory in the OnBase® system. The entire process is fully automated and occurs on Sunday. On Monday morning, the systems administrator verifies that the upload has occurred successfully. On Monday evening, the OnBase® system searches all images applied to temporary ("dummy") case numbers and applies them to the correct, updated case numbers. The file sharing also includes all the index values that correspond to each particular case number and suffix combination. This information sharing facilitates two things:

1. It prevents scanning images to an inactive or unavailable case. The scanning technician can still scan images, but would be forced to create a temporary "dummy" case number.
2. It allows for auto-indexing for all index values simply by applying the first two index fields, that is, the case number, and the suffix.

The "dummy" case number allowance becomes useful for voluntary affidavits of paternity. These documents are often signed by fathers during birth, prior to the establishing of a child support case. Inasmuch as there is not an active case in the system at the time of scanning, these documents may become very important in the future for establishment of paternity. Social security numbers and names will be associated with the images for future retrieval in the event a case is established.

The imaging input sub-system consists of a single Fujitsu® M4097D duplex scanner with Kofax® VirtualRescan® processing. This is a TWAIN and Image and Scanner Interface

Specification (ISIS) compliant scanner with a throughput rating of up to 50 pages per minute in simplex mode and 90 images per minute in duplex mode. The unit uses a Kofax® Adrenaline® SCSI (Small Computer System Interface) board. Images are scanned as multi-page TIFF (Tagged Image File Format) with Group 4 compression at a resolution of 200 dots per inch (DPI).

One of the system requirements was compatibility with the many Windows® operating systems: 95, 98, 2000, NT, and XP, since existing user workstations were to remain in use with the EDM system. The total initial system cost for software licensing and hardware was approximately $71,000. This fee included implementation, training, and a year of support. Ongoing support is approximately $6,000 per year.

Future Plans

Another EDM system is in the development phase and may be used by OCSS to either complement or possibly replace the OnBase® EDM system. The Rhode Island Department of Human Services (DHS), the parent organization of OCSS and administrators of InRhodes, is expanding InRhodes capabilities to include imaging. A phased approach is proposed. Initially, the system will simply allow for image access from the InRhodes system. The program will be a browser-based mainframe application. At first, the system will limit access to images that are specific to the page that is being viewed. For example, if the page being viewed is the employment data screen, only employment documents such as place of employment, pay stubs, and applications will be viewable. In later phases, a stand-alone system called Common Image System (CIS) will be developed. More advanced features such as image enhancement, multi-member scanning and selection, and more workflow integration will be developed. The ultimate objective of the system is workflow integration to improve the cycle time for case management. Imaging features within InRhodes will also allow multiple departments within DHS to access common documents.

Performance/Results

There are many tangible benefits of the EDM system, including the reduction of lost files, improved customer service, increased security of imaged documents, audit and reporting capabilities, and desktop access to select documents. These were not the primary drivers or business objectives; however, these benefits have been realized nonetheless.

Although the EDM system has not eliminated the paper files or paper processes, the system has reduced the growth rate of the file room. This is not because of the technology or the design, but rather a result of the implementation strategy of scanning only select day-forward documents. Due to budget constraints, a full backfile conversion was not possible, limiting the amount of paper imaged.

The EDM system has made preparing for and managing State and Federal audits much easier. Historically, documents were sometimes difficult to locate and collect in the preparation of audits. With EDM, imaged documents are simple to pull up and print.

Before the EDM system, workers had to leave their desks, submit a document request form to the file room clerk, and wait while a file was pulled. With EDM, OCSS agents can simply perform a query in InRhodes to see what documents are available and pull up OnBase® to actually view and even print the documents. This is a far more efficient process. For example, it takes between 5 and 30 minutes to locate a paper file. Within the EDM application, it only takes seconds to retrieve the same document.

Likewise, agents are not limited by the logistical issue of there being one copy of each paper document. If attorneys had a particular file out for a hearing or court appearance, agents would not have access to the documents. With EDM, all digital documents are available all the time. Likewise, if something was misfiled, it could have been lost indefinitely. With OnBase®, documents cannot be lost or misfiled.

Another benefit that has emerged with the EDM system is the ability to scan and catalog voluntary affidavits of paternity, as mentioned previously. Shortly after the time of birth, hospitals provide these documents to unwed fathers who wish to acknowledge paternity. Hospitals also provide these documents to OCSS. At this time, there is no child support enforcement case. However, these documents constitute a presumption of paternity and contain pertinent information that can be useful if a future case arises. Prior to imaging, these documents were saved but not filed in a way that made them easily accessible. With imaging, names, birth dates, and social security numbers are indexed, and these documents can be queried in one of many different ways, even if no case number is currently applied.

EDM System Implementation Strategy

As mentioned previously, OCSS recognized a need to organize the paper files in 1999. The files were weeded out and purged and a new and more efficient file organization system was established. As part of the organization effort, OCSS met with several EDM vendors and attended informational seminars to learn how EDM could help them with their file storage challenges. Following two years of research and due diligence, OCSS sought funding and wrote the RFP and AMS Imaging, Inc. (AMS) was awarded the contract.

Once AMS was awarded the project, a committee was created, including a minimum of one person from each unit, to establish the file naming protocol and indexing structure. The committee met for several months. Their findings and recommendations were incorporated in the final solution. AMS performed the design (with input from the committee), procurement, installation, integration (with help from the InRhodes developer), and training. AMS also prepared the training manual. The entire implementation was completed in approximately 12 months, including the custom integration and customized index structure.

Training

The initial user training for this EDM application involved a 90-minute session taught by AMS. A brief training guide was also prepared for end users. New employees are given a one-on-one orientation by the records manager/imaging project manager. The actual scanning and indexing is only done by a small group (just two employees) of fileroom clerks. They receive training for scanning and indexing. The general population of users (such as OCSS agents) receives end user training only. Just two employees (the associate director and the records manager) have administrative (super user) rights. They are capable of setting up new users in the system.

Lessons Learned and Challenges

For Rhode Island OCSS, there was no question whether or not the solution would be developed in-house or outsourced. Since it is a small State and lacks the professional resources with programming expertise, an outside firm was solicited. Other States or counties may find themselves in this same situation. Likewise, a full backfile conversion was also not an option due to resource constraints. There was not enough money to outsource full conversion and not enough human resources to do it internally.

This leads to another challenge. OCSS has found it very difficult to keep the scanning technician positions (fileroom clerks) filled. This is because it is a low paying entry-level State position. Once employed with the State and in the union, employees have options to move to other State jobs and rarely stay in the position very long. This has been a perpetual problem. The repetitious nature of the role has also made it difficult to keep workers interested for very long.

System adoption has also been a challenge with veteran employees. Employees that have been accustomed to performing work in a particular way for years have not used the system nearly as much as the leadership would like to see. New employees, on the other hand, use the OnBase® EDM system regularly to perform their duties. This is likely a greater problem in Rhode Island than in the other States reviewed thus far because the backfile was not scanned.

There were no noteworthy problems with the actual technology or the equipment. However, one thing that was recognized early in the implementation was the need to have the OnBase® system collect index values and case information from the InRhodes mainframe system to make indexing more automated. Because InRhodes is the primary case management application containing all the vital case management information, it was deemed very important to have the two systems communicate. This link saves a lot of effort because the scanning technician only needs to populate the case number and possibly the suffix, and all the other index values self-populate. This feature required custom programming and is not a COTS feature of OnBase®.

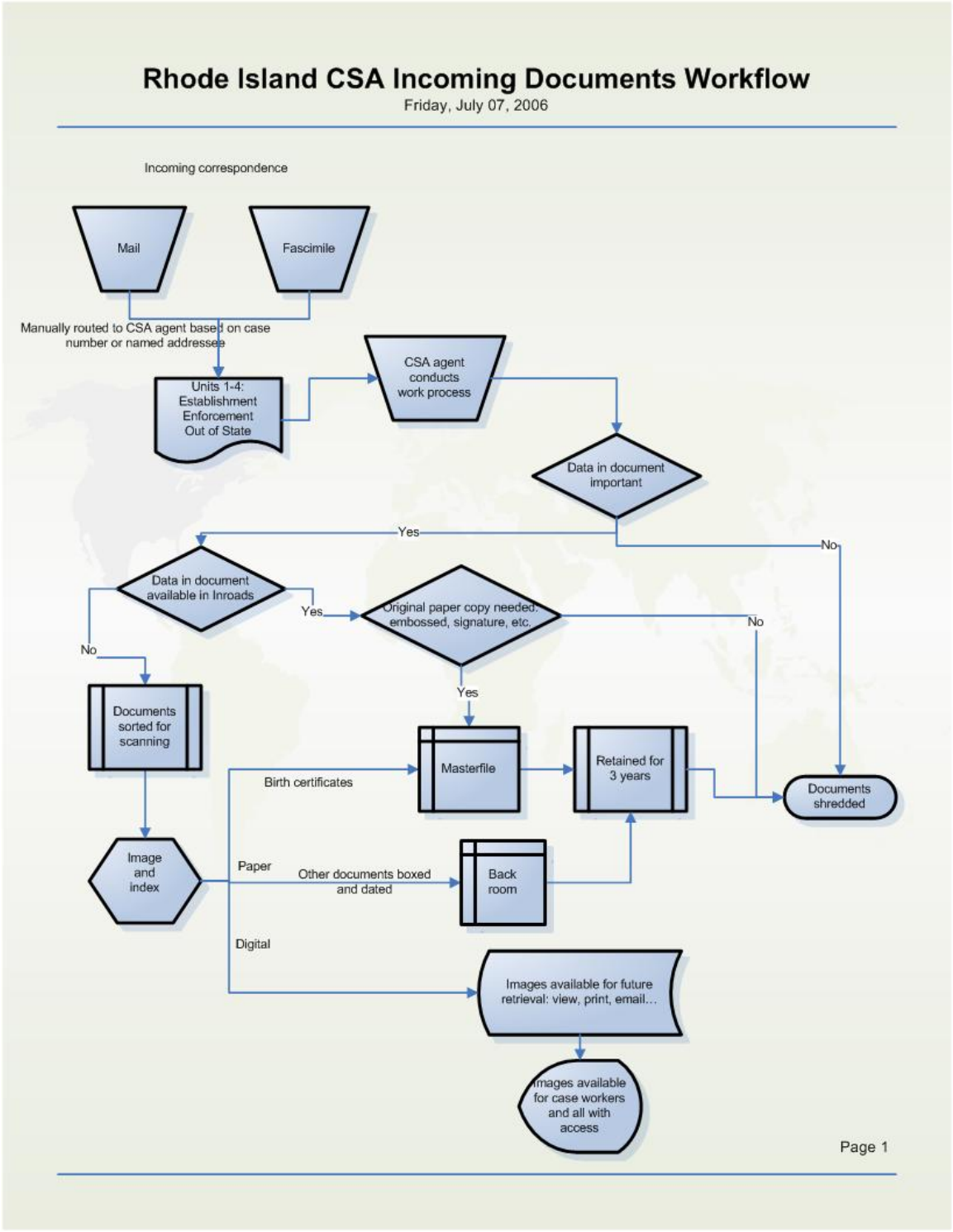
Rhode Island OCSS solicited technology information from outside vendors due to a lack of in-house programming and imaging expertise. This is a wise course of action. The staff

took advantage of the fact that vendors are very interested in demonstrating their product capabilities in an effort to secure a sale. The staff became familiar enough with the technology to be able to prepare the RFP.

Exhibits

The State of Rhode Island Case Study includes one exhibit:

RI Exhibit A. Rhode Island CSA Incoming Documents Workflow



RI Exhibit A. Rhode Island CSA Incoming Documents Workflow

State of Illinois Case Study

The Illinois Division of Child Support Enforcement (DCSE) is part of the Department of Healthcare and Family Services, with the mission to administer the Title IV-D Child Support Enforcement program. The DCSE program provides the full range of IV-D services.

Profile

DCSE has approximately 850 employees with approximately 550 case managers using the Electronic Document Management (EDM) system. Approximately 1,200 users have access to the EDM system within and outside of DCSE. Other users include the attorney general's office and other inter-governmental partners. DCSE had a record $1.14 billion in collections for fiscal year 2006. DCSE manages approximately 650,000 cases. Within DCSE, establishment is a judicial process; however, it is shifting to a partially administrative process.

DCSE operations are separated into field and central operations. There are regional offices, satellite offices, and some part-time offices throughout the State. Within the program, cases are handled by function and by region. Some regional case management responsibilities include: intake, paternity and support establishment, judicial referrals, and accounting remedies. Some centrally managed duties are: payment processing (contracted service), customer service, administrative enforcement, location, interstate, and mail processing and scanning.

Background

One of the main drivers for the EDM system was the goal of migrating to a better archive system than the former microfilm process. The microfilm process was inefficient for both capture and retrieval. Access to microfilm documents was manual and slow. With microfilm, remote access is not technically feasible. Statewide availability of documents is also not possible. Other drivers included the need for duplication of storage, customer service improvement, document maintenance improvement, and avoiding the misrouting, misfiling, and loss of documents.

Initially, an imaging committee was established to identify the requirements. The committee consisted of program staff, Information Technology (IT) staff, and DCSE managers. Input and feedback was solicited from throughout the agency. All stakeholders participated in the planning and development process.

The system was originally planned and designed in the early 1990s. Implementation occurred in 1995. The system was upgraded in 2000. An entirely new and updated system is in the planning phases.

Statute

The State of Illinois has enacted legislation concerning the retention of administrative records. Specific records must be retained for either 100 years or 37 years, depending on the record.

Business Process

The eight objectives identified by OCSE are:

1. Case Initiation
2. Locate
3. Establishment
4. Enforcement
5. Case Management
6. Financial Management
7. Reporting
8. Security and Privacy

Illinois DCSE uses EDM primarily for file management. Incoming documents are scanned and indexed and reside in the EDM system for future retrieval: viewing, printing, or forwarding. The system also allows for compliance with records management policies and improves records security and auditing capabilities.

Since the system is primarily a file/records management tool, it indirectly benefits the case management objectives of case initiation, locate, establishment, enforcement, and case management processes through efficiency and customer service improvements. Financial management, reporting, and security and privacy are not directly benefited through use of the system.

Document Workflow and Imaging Process

Refer to the Illinois document workflow diagram provided as **IL Exhibit A**. At the time of the case study, approximately 20,000 pages a week were being processed. DCSE mail is centrally received and is manually sorted by team. The functional teams are:

- Intake (by region)
- Paternity establishment (by region)
- Support order establishment (by region)
- Judicial referrals (by region)
- Accounting remedies (by region)
- Payment processing (central)
- Customer service (central)
- Administrative enforcement (central)
- Locate and interstate (central)
- All scanning (central)

This mail is physically routed to the teams and the documents are distributed to workers within the teams: family support specialists, caseworkers, accountants, etc. The DCSE workers then proceed to complete whatever tasks are prompted by the documents. Oftentimes, the document request is initiated by the DCSE worker.

Most documents are sent to DCSE via mail in paper form. Outgoing documents are generated on paper and sent to recipients via mail. Some documents are received from intergovernment agencies via microfilm and on Compact Disc (CD). These documents are stored in whatever media they are received.

Case Management Mail

When caseworkers receive mail, they immediately use the document to perform whatever duty is prompted by the correspondence. Most of the actual casework is conducted through the use of the statewide IV-D system, Key Information Delivery System (KIDS). Once the necessary work is completed, the documents are marked for scanning if that document type is supposed to be imaged according to the pre-established guidelines. The documents are then sent to the scanning department via intra-office mail.

When documents are received in the scanning department, the first step is to separate the documents into batches by document properties or characteristics, such as simplex, duplex, multi-page, landscape, etc. A document delimiter, called a patch page, is placed in front of each document. These patch pages are reused for future scanning jobs after scanning is complete. Once the separating is done, the stacks are counted to make 30-page batches and the cover sheets are affixed to the stack. The document count, preparation technician's initials, and date are filled in on the cover sheet.

During initial conversion, documents were also separated by document type. The preparation cover page also has information for document type batching. However, as noted above, the ongoing procedure is to batch documents by property or characteristic. The batches of documents (by characteristics) are then placed in queue for scanning. The backlog of prepped documents is about 6 months.

Before scanning, the scanner operator sets the batch class properties. Based on the scanner properties, the application will know to remove batch pages, rotate images, scan light or dark, and identify pre-defined zones on certain forms for more efficient heads-up indexing. Index fields are not automatically populated during batch set up.

Following scanning, the documents go through a series of steps for both indexing and quality control. The first step is validation. This step consists of "heads-up" indexing. Based on the document type, certain fields of the document are highlighted (zone boxes) and the indexer simply inputs the data in the highlighted area into the EDM screen. Once the cursor is put on the field for data entry in the EDM indexing screen, the correct region on the form is highlighted, making finding the data very easy. The indexer then moves on to the next indexing field until all are populated. The indexing criteria include the following:

- Case number (KIDS number)
- NCPRIN (non-custodial parent recipient identification number)
- CPRIN (custodial parent recipient identification number)
- Document type
- Document date
- FSIS number if available (the old case number prior to KIDS)

Once indexed, the images are routed to the next step in the process, verification. Four of the six fields are rekeyed (in the industry this method is referred to as dual-track or double-key blind indexing). In this way, two sets of eyes verify every document. The system will notify the operator if there is a discrepancy between the validation and verification index steps.

Once validation and all Quality Assurance/Quality Control (QA/QC) is complete, users with rights can query and access images to perform any of their work activities. They go to the search screen and query images according to any of the index criteria. When the document is pulled up, the first page of the document is in full view with thumbnail views of the following pages. In this way, users can scroll through the document and simply select the page they wish to view by clicking on it. Then users can zoom in, print, pan, etc., depending on their rights.

Legal Workflow

Attorneys use the EDM system regularly for their work. Prior to the system, attorneys had to make a request for dockets to be faxed and ask CSE for necessary documents. This process could take anywhere from a day to as much as several weeks. With EDM, for most counties, attorneys can view the dockets online at the county court web sites. The activity description informs the attorney what documents were generated during proceedings. The attorney then accesses the KIDS system and obtains the KIDS number for the case. Then the attorney queries the EDM system by the KIDS number and accesses images of the needed documents. This process is fast, efficient, and can be completed entirely from the desktop.

Quality Assurance

Quality assurance is very comprehensive. The first step is a document count during batching. The scanning operator confirms that the scan count matches the batch count. The operator also views the images on-screen during the scanning process. The validation and verification steps were discussed above. The final QA/QC step is a daily automated cross-check of the index values versus the KIDS system data. Discrepancies are flagged for further investigation and correction as necessary.

Paper Retention

Most paper documents are kept for approximately 30 days and then destroyed. The exceptions are Voluntary Acknowledgements of Paternity (VAP) and administrative orders. For these documents, DCSE is the official record keeper and must comply with State records management rules which require the maintenance of these records for 100 years in original paper form. As a result of this requirement, DCSE has purchased and maintains hundreds of fireproof file cabinets at the central office in Springfield.

Backfile Conversion

A partial backfile conversion was conducted by DCSE personnel during the initial implementation. Approximately 3 million pages were scanned in a 6-month period. The documents were scanned in the following order of priority: orders, paternity documents, and tax-sensitive documents. The EDM program uses a day-forward conversion process. Backfile conversion procedures were similar to the current scanning and indexing procedures. There are approximately 15 million images in the system.

EDM System Details

The EDM input subsystem consists of a Böwe Bell & Howell® 8100 scanner at the central facility and Kodak® i260 scanners used in the regional offices for scanning VAP. Kofax® Ascent Capture® 4.0 is the capture software. A data stream transformation and repurposing application from Xenos Incorporated is used for digital-to-digital image conversion for documents created by the KIDS system to be mailed to recipients. Images are saved as both Tagged Image File Format (TIFF) Group IV and MO:DCA/IOCA (Image Object Content Architecture), a proprietary file format developed by IBM®.

The EDM application is IBM® Content Manager using IBM® DB2 database for the images and index data. It is set up as a thick-client application with some Citrix® users for remote access. A desktop client (called “View Print”) is installed at the workstations. A Microsoft® Access database is used to log tax documentation destruction. The network platform consists of Windows® 2000 Server and Netware® 6.5 Server. They are licensed for 20 scan/index stations and 100 concurrent View Print stations. About 1,260 users are granted access to the system. Images are routed around the network via routers.

Storage hardware consists of optical jukeboxes with WORM (Write Once Read Many) discs. Duplicate platters are generated and stored off site for backup.

Illinois is in the design and procurement phase of updating the entire EDM infrastructure. The new system will consist of a solution developed by Novanis™ using RAID (Redundant Array of Independent or Inexpensive Disks or Drives) storage. The system will use match and merge to auto-populate 32 index fields. The system will use standard formats (TIFF), be scalable, and leverage open architecture for more integration with the KIDS system. The proposed system will allow for much simpler retrieval and queries, whereas the current system offers excellent storage capabilities with somewhat

challenging retrieval capabilities. The new system will also be used to store and retrieve editable documents with a digital source such as Microsoft® Office documents.

The system is accessed through a separate log-on and password via a desktop icon. There are group level rights only, and not document level rights. With the current system (different capabilities proposed with new system), all View Print users have access to all images. Rights and use are governed by an administration console. The four levels of rights are:

- View Print
- Indexing and scanning
- Level 1 administration, which allows for adding and deleting users and documents
- Level 2 administration, which allows for any changes

Central Management Services, the keeper of all State hardware, has exclusive Level 2 administrative rights.

Performance/Results

The primary and most substantial benefit DCSE has gained as a result of the EDM system is productivity and efficiency. What used to take days to weeks now can occur in just minutes from user desktops. The system has allowed DCSE staff to simply log in and print needed documents rather than submit requests to the official keeper of the record. In Illinois, when documents were needed for completing a task, a formal request would be made to the official keeper of the record. That means that even though documents may be stored somewhere in the building in someone's personal file or a file room for one of the other units within DCSE, an official record would still be requested. In some cases, multiple requests would be made for the same record for various reasons. This resulted in excessive burden on the records management agency (the courts, vital records, other units, etc.) and added time and expense to the process. With EDM, records can simply be called up as needed with no third party correspondence or hassle.

Another benefit is the elimination of microfilm as an archival medium. With EDM, all documents are stored digitally except for the official records (VAPs and administrative orders). These remain in paper for the duration of the retention period. The system also eliminates a lot of duplication of hard copies. Because the system is readily available to many stakeholders, fewer copies are being made.

Likewise, with imaging, all the data on documents are available. For example: when a document is received, the information is input into the proper notes sections of the KIDS system for future reference. However, there may be a note on the document stating that a social security claim is pending. This information will only be available by viewing the actual document or an image of the document.

The EDM system also minimizes misrouted, misfiled, and lost documents. The comprehensive QA/QC process for indexing ensures that documents will be available to users upon query.

Actual performance improvement statistics were not available as a result of the system implementation having been completed such a long time ago.

EDM System Implementation Strategy

An EDM committee was established by the appointment of staff by the IV-D Director and the Chief Information Officer. The Implementation began with establishing a committee of program staff, IT staff, and DCSE managers. A project manager was assigned on both the IT side and the DCSE side. All stakeholders were included in the requirements analysis process. Stakeholders included key managers from IT and DCSE, vendors, task level staff, and staff from throughout the agency.

DCSE contracted with an outside vendor for the implementation and design since in-house expertise was not available for the project when it was implemented. A pilot study was completed with sample documents and the EDM system was operated concurrently with the microfilm system to compare performance and as a fail-safe. Ultimately the microfilm archiving process was phased out.

At first, the central office was outfitted with a scanner and two View Print licenses. Then, Chicago was outfitted with the same set-up. Then, the system was rolled out regionally. In 2000, several system enhancements were made, including Y2K (Year 2000) compliance and updated hardware, software, connectivity, and storage. Complete system replacement with more advanced technology is underway.

Training

Illinois DCSE has an extremely organized training program. All training is conducted by the Training Unit. The EDM training started with preparing a comprehensive training/user's guide. All scanning personnel received a manual, an instructional session, and hands-on training. Hands-on training was initiated with the scanning department, 3 to 4 people at a time. They were trained on the job by function (batch, scan, validate, verify).

View Print training also started with the issuance of the user manual. The Training Unit then conducted a one-hour session for a class of approximately 20 students. From there, users were guided along with help desk support.

There are three levels of help desk support. The first level is trained by the Training Unit. There are as many as 50 advanced users that can guide users through system operation. The second level is the Technical Services Unit. They have some more advanced capabilities such as system administration. They are trained by the Training Unit and the

equipment vendors. The third level is a true call-in help desk at Central Management Services. They literally take a ticket number and provide support services.

Lessons Learned

One thing that was not recognized at the outset of the imaging project was the full breadth of the potential benefits of EDM. As a result, the system that was developed was designed exclusively with certain objectives in mind, primarily archiving. The resultant system was a great improvement over the microfilm it replaced, but was weak in the area of DCSE caseworker document retrieval ease of use. Since implementation, the technology in the industry as a whole has improved tremendously, and today, the full advantage of EDM is more apparent. Illinois DCSE suggests including all stakeholders in the design process to uncover all the potential uses and advantages of the technology.

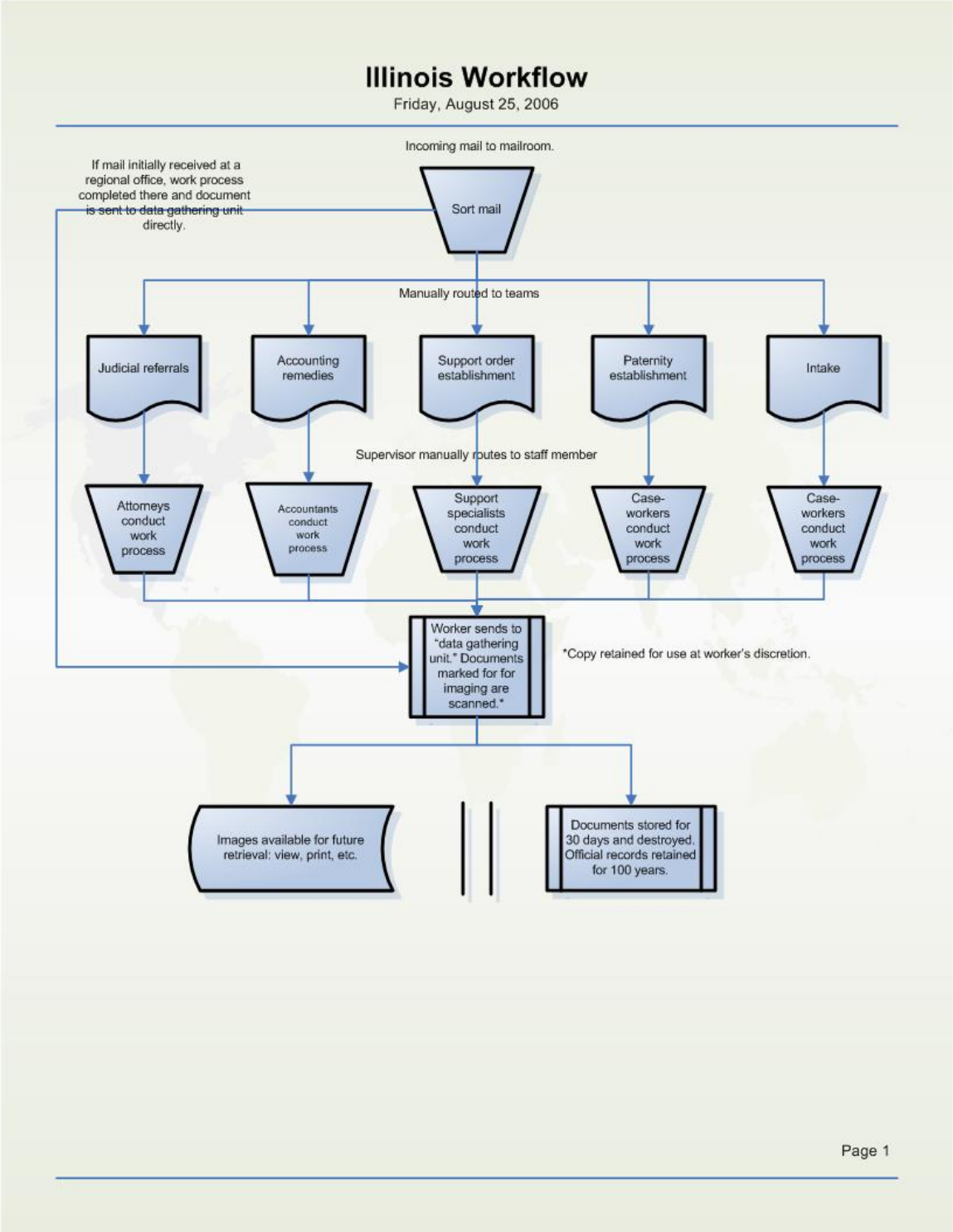
Another item they wish they had considered earlier on in the planning process was the use of accepted standards rather than proprietary formats. Scalability and integration potential (open architecture) are also highly recommended. These features are integral for a growing enterprise and dynamic rules and business processes present in the child support environment.

Illinois DCSE also stated that the system expense was much more than had been anticipated. The EDM annual operating expense and maintenance cost is $733,000. This was more than they had anticipated at the outset of implementing the technology.

Exhibit

The State of Illinois Case Study includes one exhibit:

IL Exhibit A. Illinois Document Workflow



IL Exhibit A. Illinois Document Workflow

APPENDIX B: Glossary of Terms

Access - The right, opportunity, means of finding, using, or retrieving information.

Archive – To store copies of computer programs and data to ensure against loss in the event that the original materials are deleted or damaged. Archived files can be sent to tape, to floppy or optical disks, or to another computer system.

Archiving – Long-term storage of material with the possible need of future use.

Audit trail - Data which allows the reconstruction of a previous activity, or which enables attributes of a change (date, time, operator) to be stored, so that a sequence of events can be reconstructed; may be used to identify unauthorized actions.

Authentication - In computer security, authentication is the process of attempting to verify the digital identity of the sender of a communication such as a request to log in, or the source of data, such as a digital signature. The sender being authenticated may be a person using a computer, a computer itself or a computer program.

Backup - Copies of programs, database, other files, etc., made with the purpose of restoring information to a previous state or condition, or as assurance against loss of master data; the process of producing a backup copy.

Bandwidth - The range of frequencies that can be passed through a channel. A channel carrying digital information has a data rate proportional to its bandwidth.

Barcode - A pattern of bars of various widths and with varying spaces between them, printed on paper or similar material for recognition by a laser beam or an optical scanner, and which corresponds to a record in a database. As a component of imaging software, this feature is designed to increase the speed with which documents can be archived.

Barcode recognition - A technique for auto-indexing that will automatically find the barcode on a document and at any angle on the page.

Batch scanning - Sequential scanning of multiple originals using previously-defined settings.

Bit - Smallest unit of data a computer can process**; s**ingle position in base 2 arithmetic, either on (1) or off (0); the binary code with which digital computers work.

Bi-tonal - Black and white only, one bit per pixel. A bi-tonal image is created by a thresholding process from a grayscale input, either during or subsequent to scanning. Thresholding is an irreversible process that defines whether a scanned pixel should be considered black or white.

Browsing - Searching through storage to locate or acquire information, without necessarily knowing of the existence or the format of the data being sought.

Browser - Software designed to navigate a local network or the world wide web, view information resources and, when used interactively, exchange information. See **Web browser.**

Byte - A group of 8 bits used to define a standard set of 256 letters, numbers, and special characters used in many text editors and word processors. KB (kilobyte) is a thousand bytes (actually 2 to the 10^{th} power or 1,024 bytes). MB (megabyte) is a million bytes (actually 2 to the 20^{th} power or 1,024 KB or 1,048,576 bytes). GB (gigabyte) is a billion bytes (actually 2 to the 30^{th} power or 1,024 MB or 1,072,741,824 bytes). TB (terabyte) is a trillion bytes (actually 2 to the 40^{th} power or 1,024 GB or 1,099,511,627,776 bytes).

Cache - A dedicated, high speed portion of computer memory used for the temporary storage of data that must be accessed quickly. Cache is usually an area of random access memory that holds frequently-used data from a hard disk. This minimizes having to constantly access the data from disk or tape storage.

CCITT (Consultative Committee International Telegraphy & Telephony) – an organizational component of the International Telecommunications Union (ITU), a United Nations agency responsible for adopting international treaties, regulations and standards governing telecommunications. Although the CCITT no longer exists as a separate entity, it defined important standards for data communications, including the definition of CCITT Group 3 and Group 4 fax protocols that included data compression and decompression. CCITT Group 4 protocol remains the international standard that defines how two systems (fax machine or computer) send and receive a variety of file types (e-mail, pictures, etc.).

CD-ROM (Compact Disc Read-Only Memory). See **Optical Disk.**

CD-R (Compact Disc – Recordable). See **Optical Disk**.

CD-RW (Compact Disc – ReWritable). See **Optical Disk.**

Character - A single letter, numeric digit or punctuation mark as defined in the American Standard Code for Information Interchange (ASCII) or Extended Binary Coded Decimal Interchange Code (EBCDIC). One character requires 1 byte of storage.

Client - A computer that interacts with another computer, usually referred to as a server, using a client program. Email is an example; an email client connects to an email server to send and receive messages.

Client/Server - A networked computer architecture that connects numerous clients to one or more server computers. In an electronic document management system, personal computer (PC) or workstation clients are used for viewing, editing, image processing, etc.

Servers hold the index database and manage the image files. With client/server architecture, computer intensive processes (such as searching and indexing) are completed on the server, while image viewing and optical character recognition occur on the client. Client/server applications reduce network data traffic and insulate the database from workstation interruptions.

COTS (Commercial Off-the-Shelf) – A commercially available product, ready-made and available for public purchase, as opposed to a custom integrated product.

Compression - Means of reducing image file sizes so they occupy less storage space and can be transmitted faster and easier; also used for program and data files in order to increase disk capacity. Decompression is the process which restores files to their original state. Compression generally eliminates redundant information and/or predicts where changes will occur. Also see **Lossless** and **Lossy.**

Decompression - The opposite of compression, i.e., the expansion of a compressed data file to its original size.

DLT (Digital Linear Tape) - A type of magnetic tape storage device originally developed by DEC® and now marketed by several companies. DLTs are ½-inch wide and the cartridges come in several sizes ranging from 20 to over 40 GB. DLT drives are faster than most other types of tape drives, achieving transfer rates of 2.5 MBps. Super DLT (SDLT) technology provides enhanced storage and speed characteristics.

De-speckle - Image enhancement technique which allows minor imperfections or speckles in bit-map images to be erased.

DPI (Dots per inch) - A measure of the image resolution and quality, in horizontal and vertical dimensions, of printers, scanners and monitors. The more dots per inch, the higher the resolution: 600 dpi would mean 600 dots per inch both horizontally and vertically.

DSL (Digital Subscriber Line) – A family of digital telecommunications protocols designed to allow high speed data communication over the existing copper telephone lines between end-users and telephone companies. A DSL line is continuously connected and can carry both data and voice signals simultaneously. There are a variety of types of DSL in use. ADSL (Asymmetric DSL) is generally used for Internet access, where fast downstream is required, but slow upstream is acceptable. A common configuration of ADSL allows downloads at speeds of up to 1.544 megabits per second, and uploads at speeds of 128 kilobits per second. Symmetric DSL (SDSL, HDSL) is designed for shorter connections that require high speeds in both directions.

Dynamic document - A document including hot links to other objects (spreadsheets, databases, etc.).

Encryption - The coding of messages to increase security and make transmission only readable by recipients with the ability to decode only by using the same algorithms.

Endorser - A small printer in a scanner that adds a document-control number to each scanned sheet. Some forms control processing software can control this printer.

FAX (Facsimile) - The technology used to transmit documents by scanning them to digital, compressing, converting to analog, transmitting over phone lines and reversing the process at the other end for printing out or storing. The fax compression algorithms are used in most document imaging systems.

FAX server - A network server with fax boards to allow all network users to export files as faxes and to receive faxes directly. See **Server.**

File server –A network server dedicated to storing and providing access to user files. See **Server.**

Firewall – A combination of hardware and software that separates a local area network into two or more parts for security purposes.

Full text search/retrieval - An indexing and searching capability whereby documents are indexed automatically by all the significant words they contain. Searches may be made for documents containing specific words, numbers and/or patterns of characters.

GB (Gigabyte) – One billion bytes, actually 2 to the 30th power (1,073,741,824) bytes. One gigabyte is equal to 1,024 megabytes. See **Byte.**

GIF (Graphics Interchange Format) - An 8-bit-per-pixel digital image format introduced in 1987 that is widely used due to its wide support and portability. GIF allows a palette of up to 256 distinct colors, a limitation that makes the format unsuitable for reproducing color photographs and other images with continuous color, but is well-suited for more simple images such as graphics or logos with solid areas of color.

Grayscale, grayscale range - All scanner data, including binary data, starts as grayscale. Grayscale images have a number which describes how light or dark each pixel is: 4 bits of data per pixel allows 16 levels of gray, 8 bits per pixel allows 256 different levels of grey. Grayscale range is the spectrum of shades of gray that scanners and printers can recognize and reproduce. A scanner that can see a gray scale of 16 will not produce as accurate an image as one that distinguishes a gray scale of 256.

GUI (Graphical User Interface) - A visually appealing user-friendly interface that simplifies use by the end-user. Enables computer users to select applications and functions by selecting on-screen picture buttons (icons) using a mouse or similar pointing device.

Host - A computer connected to a network that offers services to one or more users.

HTTP (Hyper Text Transfer Protocol) – The set of rules for exchanging files (text, graphic images, sound, video, and other multimedia) across the Internet. Requires an HTTP client program on one end, and an HTTP server program on the other end. HTTP defines how messages are formatted and transmitted, and what actions Web servers and browsers should take in response to various commands, e.g., entering a web address into a browser actually sends an HTTP command to the Web server directing it to fetch and transmit the requested Web page.

HTTPS (Hyper Text Transfer Protocol Secure) – Strictly speaking, **HTTPS** is not a separate protocol, but refers to the combination of a normal HTTP interaction over an encrypted Secure Sockets Layer (SSL) or Transport Layer Security (TLS) transport mechanism. Properly implemented, HTTPS ensures reasonable protection from eavesdroppers and man-in-the-middle attacks.

ICR (Intelligent Character Recognition) – The recognition of scanned characters that are unclear (bar codes, patterns of bits, or handwritten text). Involves advanced techniques such as feature analysis and artificial intelligence. Able to recognize a wider range of type styles and sizes than Optical Character Recognition. See also **OCR.**

Internet - A worldwide computer network containing a broad array of services and information available to any individual with a personal computer and an internet connection. The Internet is not so much a network of computers but a network of networks.

Intranet - A restricted access network, essentially a private internet. An intranet makes use of the same technology as the internet but is used to establish a network that is private to a company, organization, or agency.

JPEG (Joint Photographic Experts Group) - Group associated with International Telecommunications Union (ITU) and International Standards Organization (ISO) which has defined a compression-decompression standard for color and grayscale still image applications. JPEG format divides the image area into cells to condense information based on content analysis.

Jukebox - A machine which allows a large number of optical discs to be held near-line. It consists of disc racks with space for one or more disc drives and one or more robotic pick-and-place mechanisms. The robotic mechanism retrieves the specified disc from the rack, loads it, correctly oriented, into a disc drive, and/or returns the last disc read to the storage rack position.

KB (Kilobyte) – One thousand bytes, actually 2 to the 10^{th} power (1,024 bytes). See **Byte.**

KBps (Kilobytes per second) - Thousand bytes per second. A measure of the rate of information transfer.

LAN (Local Area Network) - A computer-based communications and data exchange system created by physically connecting two or more computers. A LAN affords high-speed transmission of data over twisted pair, coaxial cables or fiber optic cables that connect computers and peripherals for distances up to one mile, typically within a local area such as an office or building. Larger networks, called wide area networks (WANs), use long-distance communication media including telephone lines and satellite communications to link computers.

Lossless – Compression algorithms that store data in a more efficient format that does not cause any data loss in the compression process.

Lossy - Compression algorithms that assume some of the data in an image file is unnecessary and can be eliminated without affecting the perceived image quality.

MB (Megabyte) – One million bytes, actually 2 to the 20^{th} power (1,048,576 bytes) or 1,024 kilobytes. See **Byte.**

MBps (Megabits per second) – A measure of the rate of information transfer.

Metadata – Data associated with files to provide information on content, context and use. In document management, metadata describes information about an image or document that is not contained in the document itself, such as file format, language, author, date created, when it has been accessed or changed, etc. Metadata enables the querying of an image without opening the image.

MICR (Magnetic Ink Character Recognition) - A technique for the automatic recognition of stylized characters printed with magnetic ink; recognition system used on bank checks; for automatic reading.

Microfiche – Sheet of microfilm containing an array of micro-images arranged in accordance with a standard grid, e.g., 7 rows and 14 columns, and usually including an eye-legible title along the top edge.

Microfilm – High-resolution photographic film suitable for recording micro-images of documents. Often used to refer to microfilm in roll format, e.g., 16mm microfilm.

Migration - Act of moving records from one system to another, while maintaining the authenticity, integrity, reliability, and usability of the records.

Near-line – Storage classification enabling users relatively fast access to information, e.g., information stored on a disk within a jukebox under control of the program. See **Off-line, On-line.**

OCR (Optical Character Recognition) - Technique for analyzing images to recognize and translate the alphanumeric characters into machine-readable text. See also **ICR**.

Off-line - Storage classification for optical disks, compact disks, or magnetic tapes that are not connected or installed in a computer, but instead require human intervention to be accessed. Thus, information stored on a magnetic tape or disk not directly accessible by a computer is considered to be off-line.

On-line - Storage classification for storage directly accessible by program, without manual intervention. Thus, information stored on a hard disk is considered to be online.

Optical Disk - An electronic data storage medium from which data is read and to which it is written by low-powered laser beams. Optical disk is a random access storage medium; information can be easily read from any point on the disk. Optical media can store much more data -- up to 6 gigabytes (6 billion bytes) -- than most portable magnetic media, such as floppies. Storage capacity increases with each new generation of optical media. (One emerging standard offers up to 27 gigabytes on a single-sided 12-centimeter optical disc.) Optical media are inexpensive to manufacture and data stored on them is relatively impervious to most environmental threats, such as power surges, or magnetic disturbances.

There are three basic types of optical discs:

> **CD-ROM -** *CD-Read Only Memory*. Like audio CDs, CD-ROMs come with data already encoded onto them. The data is permanent and can be read any number of times, but CD-ROMs cannot be modified. Legally accepted and written on a single side.
> **CD-R –** *CD-Recordable***,** or **WORM -** *Write-Once, Read -Many*. Data can be written onto a CD-R or WORM disc only once. After that, the disc behaves just like a CD-ROM.
> **CD-RW –** *CD-ReWritable*. Optical discs that can be erased and loaded with new data, just like magnetic discs.

PCL (Printer Command Language) – a page description language developed by Hewlett Packard® as a printer protocol. Originally developed in 1984 for early dot matrix and inkjet printers, it became a de facto industry standard over time, providing page- and job-level control for a variety of thermal, matrix printer, and page printers.

PCL is a command based language. PCL includes control sequences to initiate printer functions (line feeds, etc.), printer features (paper size, etc.), vector graphics functions (select pen number n, etc.), and job-level functions (change printer language between jobs, etc.). PCL data streams can be generated by a print driver through use of commercial off-the-shelf software such as Microsoft® Office. PCL can also be generated by custom applications, including Electronic Document Management.

Pixel - Abbreviation of Picture Element. The smallest element (or dot) on a display or image. The closer the spacing of the pixels, the higher the resolution and the sharper the image.

Print server – A computer on a network devoted to accepting and storing print data and routing it to one or more printers. See **Server.**

Proximity searching - In a full-text retrieval system, the ability to locate a word or item within a specified distance of another word or item, i.e., find "local" within 5 words of "area."

RAM (Random Access Memory) - The working memory of the computer. RAM is the memory used for storing data temporarily while working on it, running application programs, etc. RAM storage allows the stored data to be accessed in any order and without the physical movement of the storage medium or a physical reading head. Most types of RAM lose their data when the computer powers down.

ROI (Return on Investment) – The ability to show to what degree and when an investment will regain the monies spent on it.

Scalability - The capacity of a system to expand without requiring major reconfiguration or re-entry of data; a system allowing multiple servers or additional storage to be added easily.

SCSI (Small Computer Systems Interface) - A parallel interface standard for attaching peripheral devices, such as external disk drives and scanners, to a computer. SCSI interfaces provide for faster data transmission rates than standard serial and parallel ports.

Server - In a local area network, a computer that provides specific services to network users, e.g., a print server provides printing facilities to the network, a file server stores and provides access to user files, an image server stores image files or software, a database server manages and provides access to shared database(s).

SQL (Structured Query Language) - A method of searching and retrieving information from database systems; initially defined with the objective of creating a common means of accessing data from different databases and of transferring data between databases.

SSL (Secure Sockets Layer) - A protocol to enable encrypted, authenticated communications across the Internet.

Super-user or superuser - A class of user with much greater access to files and system utilities than regular system users are allowed. For reasons of security, this level of access should be granted to the minimum number of staff needed to perform system administration duties.

TB (Terabyte) – A trillion bytes, actually 2 to the 40^{th} power or 1,099,511,627,776 bytes, or 1,024 GB. See **Byte.**

TCP/IP (Transmission Control Protocol/Internet Protocol) - Protocols developed by the Defense Advanced Research Projects Agency (DARPA) to enable communication

between different types of computers and computer networks. TCP is connection-oriented and provides reliable communication and multiplexing. IP is a connectionless protocol which provides packet routing.

TIFF (Tagged Image File Format) - A graphics file format that was developed by Aldus® and Microsoft® for storing scanned images. TIFF is a flexible and adaptable file format. It can handle multiple images and data in a single file through the inclusion of "tags" in the file header. Tags can indicate the basic geometry of the image, such as its size, or define how the image data is arranged and whether various image compression options are used. TIFF can be used with black and white, grayscale, 8-bit color, and 24-bit color images, and transfers well between different platforms.

Thin/Thick Client – A client is a computer or desktop in client-server architecture networks. A thin client is a desktop application that has little or no application logic, so it has to rely on the central server for processing activities. Thin clients are normally browser-based applications.

A thick client is a desktop application that does as much processing as possible at the client-side (user workstation) and passes only data required for communications and archival storage to the server.

Thumbnail – A small version of an image used for quick overviews or to provide a general idea of what an image looks like.

Web browser, web-based browser - Software designed to navigate a local network or the world wide web, view information resources and, when used interactively, exchange information. Text and images on a Web page can contain hyperlinks to other Web pages at the same or different website. Web browsers allow a user to quickly and easily access information provided on many Web pages at many websites by traversing these links. Technically, a browser is a client program that uses HTTP (Hyper Text Transfer Protocol) to make requests of Web servers throughout the Internet on behalf of the browser user.

WORM (Write Once, Read Many) - See **Optical Disk.**

Zone – An area of an image file that is selected for specialized processing. Zone OCR is a feature of imaging software that reads certain zones or regions of a document or form, then places resulting text into a document index.

Zoom - To enlarge a portion of an image to view it more clearly.

APPENDIX C: Digital Signatures

Purpose:

The purpose of this White Paper is to provide a summary overview of the technology of digital signatures. The intent of this document is to encourage the audience to consider the implementation of digital signatures in concert with EDM technology in their respective child support enforcement environments.

Definitions:

Definitions were obtained or summarized from the Uniform Electronic Transactions Act (UETA), *The X.509 Certificate Policy for the U.S. Federal PKI Common Policy Framework* (http://www.cio.gov/ficc/documents/CommonPolicy.pdf), *Records Management Guidance for Agencies Implementing Electronic Signature Technologies* (http://www.archives.gov/records-mgmt/policy/electronic-signature-technology.html) and other public reference resources.

Biometric A physical characteristic of a human being, including a photograph for visual identification. For the purposes of this document, biometrics does not include handwritten signatures.

Certificate Authority (CA) An authority trusted by one or more users to issue and manage X.509 Public Key Certificates and certificate revocation lists.

Digital Certificate A digital representation of information which at least (1) identifies the CA issuing it, (2) names or identifies its subscriber, (3) contains the subscriber's public key, (4) identifies its operational period, and (5) is digitally signed by the CA issuing it.

Digital Signature The result of a transformation of a message by means of a cryptographic system using keys such that a relying party can determine (1) whether the transformation was created using the private key that corresponds to the public key in the signer's digital certificate and (2) whether the message has been altered since the transformation was made.

Electronic Signature (1) A technologically neutral term indicating various methods of signing an electronic message that (a) identify and authenticate a particular person as the source of the electronic message; and (b) indicate such person's approval of the information contained in the electronic message (definition from GPEA, Pub.L. 105-277). Examples of electronic signature technologies include PINs, user identifications and passwords, digital signatures, digitized signatures, and hardware and biometric tokens. (2) An electronic sound, symbol, or process attached to or logically associated with a record and executed or adopted by a person with the intent to sign the record.

Hash Function (or *hash algorithm*) A reproducible method of turning data (usually a message or a file) into a number suitable to be handled by a computer. These functions provide a way of creating a small digital "fingerprint" from any kind of data. The function chops and mixes (i.e., substitutes or transposes) the data to create the fingerprint, often called a *hash value* or message digest.

Message Digest see *hash function*

Private Key (1) The key of a signature key pair used to create a digital signature. (2) The key of an encryption key pair used to decrypt confidential information. In both cases, this key must be kept secret.

Public Key (1) The key of a signature key pair used to validate a digital signature. (2) The key of an encryption key pair used to encrypt confidential information. In both cases, this key is made publicly available, normally in the form of a digital certificate.

Public Key Infrastructure (PKI) A set of policies, processes, server platforms, software, and workstations used for the purpose of administering certificates and public-private key pairs, including the ability to issue, maintain, and revoke public key certificates.

Smart Card A microprocessor card of credit card dimensions with various tamper-resistant properties (e.g., a secure crypto-processor, secure file system, human-readable features) that is capable of providing security services (e.g., confidentiality of information in the memory).

Token A physical device that an authorized user of computer services is given to aid in authentication or storing cryptographic keys.

X.509 The International Telecommunications Union (ITU) standard for public key infrastructure (PKI) that specifies standard formats for digital certificates.

What is a digital signature?

Digital signatures use cryptographic technology for authenticating, validating, and ensuring non-repudiation of a digital document, much like a written signature on a paper document. Authentication and validation constitute verification of the document source and the document integrity. Non-repudiation is substantiating the signer’s approval of the document such that it can be trusted to serve as an official document with little opportunity for contest.

Digital signatures use a *digital certificate* issued by a trusted agent (called a *Certificate Authority*) to link a *public key* to an identity. Digital signatures are typically associated with a *Public Key Infrastructure* (PKI), which uses asymmetric encryption to definitively associate the user with the document (and can also allow for secure encrypted transmission). A check performed by the recipient verifies the identity of the sender and authenticity of the document.

Electronic signatures, on the other hand, as defined in the ESIGN Act (Electronic Signatures in Global and National Commerce Act of 2000) and UETA (Uniform Electronic Transactions Act), refer to any electronic sound, symbol, or process, attached to or logically associated with a contract or other record and executed or adopted by a person with the intent to sign the record. Therefore, digital signatures are restricted to cryptographic technology, whereas electronic signatures refer to any form of electronic approval. A few examples of electronic signatures are email messages, fax transmissions, and telegraph—anything that indicates the user's identity and approval of the document. Electronic signatures are subject to repudiation, unlike digital signatures; however, the courts have upheld the enforceability of many forms of electronic signatures in case law.

How digital signatures work (for an example, refer to Figure 1):

Joe, a CSE case manager, has been issued a digital certificate by a trusted third party called a Certificate Authority (CA). The digital certificate authenticates Joe's identity and associates his identity to a public/private key pair. This can be compared to an embassy authenticating the identity of an individual and issuing a passport.

Now Joe has an official document that needs to be sent to the courts. He opens the document and software calculates a *message digest* (also known as a hash value) using a one-way *hash function*. The message digest is encrypted using Joe's *private key*—this encrypted digest is Joe's digital signature. The digital signature (encrypted message digest) and original document are sent to the court officer, Lisa, accompanied by Joe's digital certificate, which contains his *public key*, ID, and digital signature from the CA.

At the recipient side, Lisa's machine receives the unencrypted document, encrypted message digest, and digital certificate and verifies that the digital certificate is valid with the CA. Lisa's machine then decrypts the message digest with Joe's public key. Another message digest is independently calculated for the original document with the same one-way hash function. If the value calculated for the original message is exactly identical to the value for the one decrypted with Joe's public key, then Lisa knows that Joe sent the document. She knows this because only Joe possesses the private key used to encrypt the message digest; likewise, she knows that the document has not been tampered with during transit if the decrypted digest is identical to the digest created using the unencrypted plaintext message.

Now under normal circumstances, the digital signature is applied using a security device such as a token or smart card or simply typing a username and password. On the recipient side, software will prompt some form of verification check. All of the steps explained above are actually conducted by software and the users simply see the results, which are a valid signature or an invalid signature.

Likewise, note that during this scenario the original document is sent unencrypted. Digital signatures are not designed for document privacy. Digital signatures are exclusively for validating document integrity and sender identity. During an encrypted transmission, the actual document is encrypted with Lisa's public key at Joe's machine

and decrypted using Lisa's private key at her machine. The encryption/decryption also uses PKI; however, the process is independent of digital signature authentication.

Why use digital signatures?

There are several reasons to utilize digital signatures. The most obvious benefit is to leverage a more efficient digital workflow while maintaining document authenticity and non-repudiation. EDM offers incredible productivity gains over conventional paper-centric business processes. However, at many junctures in a business workflow, approvals and signatures, or simply verification that the document is an official record or from an official source, are necessary. In an EDM paradigm without digital signatures, electronic documents must first be printed, then signed, and then rescanned for storage and archival. Also, the electronic representation of the pen-and-paper signature can't necessarily be verified as authentic.

Within the child support enforcement environment, official copies of records are often required. Whether the process is administrative or judicial, official copies of birth records, affidavits of paternity, and other various documents (paternity complaints, motions for support, motions to show cause for not paying child support, UIFSA petitions, case audits, review and adjustment summary sheets, birthing costs summary sheets, etc.) are required for CSE case management activities. With digital signatures, digital equivalents of official paper documents can be utilized to fulfill the requirements of their paper counterparts. The use of digital signatures allows business units to use public or secure digital communication channels for both collaboration and document transmission. As you can imagine, these capabilities could have a dramatic impact on the cycle times of case management activities.

Let's look at an example. As part of contempt of court action, the CSE office prepares a Contempt Application and a Contempt Order. In a normal paper enterprise (see Figure 2 for reference), the Contempt Application is signed by the CSE attorney and the case worker and submitted via courier or mail to the court clerk accompanied by the unsigned Contempt Order. Upon receipt, the court clerk makes photocopies of the document: one for the docket and one to serve the Contemnor. The Contempt Order is reviewed and signed by the judge. The court clerk then makes copies for the docket, the Contemnor, and possibly one to send to CSE for their file. All copies are distributed via mail or courier. The scheduled hearing is held, and additional documents are prepared and issued as required by the case.

In a digital paradigm (see Figure 3), the Contempt Application would have been digitally signed by the CSE attorney and case worker. The court clerk would have received the document via email, or through secure access to the CSE EDM system. The digital signatures would be authenticated upon accessing the document, validating the document and verifying the sender identities. Likewise, the Contempt Order would also be submitted to the court clerk digitally. The clerk would route the digital document to the judge for review, and the judge would apply a digital signature following approval. The

court clerk would then issue all copies digitally and simply print a hard copy to serve the Contemnor.

During every step of the process, the document recipients are able to validate both the content of the document and the sender's identity through the use of digital signatures. Likewise, all paper handling, copying, mailing, and courier services (besides serving the Contemnor) would be eliminated. Final copies of the documents would simply be archived digitally.

Another driver for adopting digital signature technologies is compliance with Federal and State regulations. Several Federal and State regulations have been enacted that either mandate, and/or govern, the use of paperless technologies, when practicable. For example:

- The Electronic Signatures in Global and National Commerce Act (E-SIGN)
  - An official memorandum concerning E-SIGN can be viewed at the following site: http://www.whitehouse.gov/omb/memoranda/esign-guidance.pdf
- Uniform Electronic Transactions Act (UETA)
  - Information concerning UETA can be obtained at the following site: http://www.ncsl.org/programs/lis/CIP/ueta.htm
- The Government Paperwork Elimination Act (GPEA)
  - More information concerning GPEA is available at the following website: http://www.whitehouse.gov/omb/fedreg/gpea2.html

E-SIGN and UETA ensure that digital documents maintain the full legal standing of the paper equivalent. GPEA requires Federal agencies to minimize paperwork, where practicable.

What are the disadvantages?

With all the potential benefits of utilizing digital signatures, there still are some challenges to consider. The most significant disadvantage is that the digital signing of a document only validates and authenticates the document at the time of signing. This can create a challenge if the document was prepared by parties other than the sender in either paper or digital form. This occurs often when a document originates in paper and is signed in paper form, scanned, uploaded into the EDM system, and later retrieved by the CSE case manager before transmission, with digital signature. The digital signature only validates the fact that the CSE case manager attested to the authenticity of the digital document that was retrieved and sent. The digital signature does not attest to the fact that the digital document was not tampered with or forged prior to retrieval and submittal. The entire process relies on other EDM technologies and practices to uphold such non-repudiation.

For example, a customer applies for services and signs the paper document with a pen. The signature is witnessed according to policy accompanied by state-issued photo

identification. The paper document is routed to the imaging group and scanned to TIFF and indexed according to standard operating procedures. The electronic document is then hosted within the secure electronic document repository following quality control review. Audit trails and accessibility restrictions (read-only capabilities) safeguard the document. The TIFF format is likewise unalterable. The document is then retrieved by the case worker with confidence about the document's authenticity. Therefore, it is these procedures and corresponding policy that form the basis of non-repudiation. Without these, the digital signature guarantees little.

Another challenge for digital signatures is the requirement for all users to possess digital certificates. This immediately restricts the technology to official use, and renders it impracticable for use by the general public.

Another disadvantage is cost. Insomuch as the technology is not very expensive if a PKI service is utilized, the cost of developing procedures, implementation, and training staff can be significant, depending on the size of the enterprise. The cost of maintaining digital certificates and the digital signature software (and possibly hardware) and accompanying training will result in limiting use to those who require the technology to complete their duties.

Likewise, oftentimes in public sector implementations, in-house developed and managed solutions are preferred for enhanced security and control. Such a solution will most likely require much more planning, design, implementation, and on-going management effort. In the Federal government, the Shared Services Provider (SSP) program was developed to reduce costs of PKI implementations while enhancing security. The program sets security standards for both private and public PKI solutions providers. The list of approved service providers is listed in the resources section of this document.

Another obvious challenge is interdepartmental and interagency acceptance and compatibility. Software is needed on both the sender's and receiver's systems for the technology to work. The sender needs a user license for applying a digital signature and needs to possess a digital certificate. The receiver needs a validation license only (which typically has no cost associated with it). Using products that leverage open standards-based architecture minimizes challenges with system interoperability (one vendor's digital signature application can apply the digital signature while another vendor's verification piece can be utilized).

What is needed for it to work?

For digital signatures to work, the supporting infrastructure and policy are needed. The infrastructure consists of a Public Key Infrastructure, certificate standards, quality encryption algorithms, hash functions, and methods of ensuring the secrecy of the private key. With all these in place, digital signatures function as per design.

First, a Public Key Infrastructure (PKI) is necessary. A PKI is a system in which a known and trusted entity (a Certificate Authority) vouches for user identities, binding public

keys to user identities through the use of digital certificates. The digital certificates contain a digital signature from the actual Certificate Authority (CA) that cannot be forged. The PKI maintains hardware and software at central and distributed locations to authenticate and verify certificates and user identities. PKI management can be vendor outsourced or for enterprises requiring more control, implemented in-house. However, if implemented in house, the PKI should be designed and installed by professionals with security expertise.

Digital certificates are electronic files that are used to identify entities (individuals, organizations, or even servers) digitally. For interagency and interdepartmental systems to communicate, common standards are needed. The most widely accepted standard for digital certificates is X.509, introduced by the International Telecommunications Union (ITU). The X.509 standard (now on Version 3) details the contents and structure of a digital certificate. The contents include the following:

- Certificate
    - Version
    - Serial Number
    - Algorithm ID
    - Issuer
    - Validity
        - Start date
        - Expiration date
    - Subject (certificate owner's name)
    - Subject Public Key Info
        - Public Key Algorithm
        - Subject Public Key
- Certificate Signature Algorithm
- Certificate Signature (from Certificate Authority)

Another necessary component for a digital signature to work is the hash function. This is a mathematical function that produces a message digest or *hash value*, an abridged—of fixed length—unintelligible version of the original message. The message digest is unique to the combination of the original document and hash function. Any change to the document whatsoever—even a single character—will result in an entirely different message digest when calculated with the same hash function.

Likewise, asymmetric encryption algorithms are needed. Asymmetric means they are one-way algorithms. For example, if you encrypt a document with a public key, you can't decrypt the document with the same public key; the corresponding private key is necessary for decryption. With digital signatures, the message digest is encrypted with

the sender's private key and decrypted with the corresponding public key. Likewise, you can't determine what the private key is even if you have the public key.

Private key privacy/security is another necessity for non-repudiation to stand. Several techniques and technologies have been utilized to ensure private key privacy. Security measures typically involve specific hardware devices or logon and password authentication. Some examples of hardware devices are smart cards, tokens or biometric readers. All of these technologies have their advantages and disadvantages.

Logon (User ID) and password alone is insufficient for providing non-repudiation. Logon and password authentication or PIN access render the digital signature security only as good as the private key access security. For example, a 2,048 bit encrypted digital signature can be compromised simply by cracking a four digit PIN if a second form of authentication is not used. For this reason, Two-factor authentication (T-FA) is a much more secure solution. T-FA is combining something you know, such as PIN or password, with something you possess, such as a smart card or token or a biometric. With T-FA, hackers must first gain access to the hardware device containing the private key in order to compromise it by cracking the PIN or logon and password. Two-factor authentication has become widely accepted by the banking and healthcare industries; for example, consider an ATM card.

The Federal government has widely accepted and implemented the use of smart cards. Again, the accepted practice has been using T-FA. Smart cards are relatively inexpensive, making them suitable solutions for large enterprises. Some disadvantages to smart cards are the shorter useful life due to the friction associated with card-reading (like a credit card) and the need for special input devices (card-readers). However, some smart card solutions use portable USB readers and don't require a separate reader.

Another common private key security device is a token. A token is a small hardware device that plugs into an available port, typically a USB port. Some token solutions use patented technology for temporary or one-time passwords and even biometrics. Many are small enough to attach to a key ring while others have complete on-board key pads for PIN entry.

Some biometric methods include fingerprints, retina scan, iris scan, facial geometry, and hand geometry. Of these methods, fingerprint and retina scans are considered more unique and are more widely accepted. All biometric methods require specialized readers/input devices.

All of these methods for maintaining private key secrecy have their limitations, be it cost, ease of implementation, or security integrity. However, all are considered superior to key storage on a local PC protected by a password.

Whatever key protection method is employed, keys and digital certificates will need to be managed with tremendous care and security for non-repudiation to stand. Development

and adherence to sound policy and protocol will ensure that the selected technologies will function as designed.

Resources:

Standards:

- RSA Labs developed the digital signature standard PKCS#7. It is available at http://www.rsasecurity.com/rsalabs/node.asp?id=2129.
- The *Digital Signature Algorithm* (DSA) is the Federal Government standard for digital signatures. It was proposed by the National Institute of Standards and Technology (NIST) in August 1991 and has undergone numerous revisions since. The current standard can be seen at csrc.nist.gov/publications/fips/fips186-2/fips186-2-change1.pdf.
- The Worldwide Web Consortium (W3C) has published an XML digital signature standard. The standard can be viewed at http://www.w3.org/Signature/.

Other Resources and Links:

- The Federal Identity Credentialing Committee website offers several applicable resource links including a list of Federal certified providers. http://www.cio.gov/ficc/
- The following document contains current PKI policy for the Federal government. http://www.cio.gov/ficc/documents/CommonPolicy.pdf
- The National Archives and Records Administration guidance document for records management with digital signatures can be accessed at http://www.archives.gov/records-mgmt/policy/pki.html.
- The following document is the National Archives and Records Administration guidance document for implementation of GPEA with electronic (or digital) signatures. http://www.archives.gov/records-mgmt/policy/electronic-signature-technology.html
- Chief Information Officers (CIO) Council http://www.cio.gov/
- e-Authentication Federation http://www.cio.gov/eauthentication/
- Federal Bridge Certification Authority (GSA managed/shared CA) http://www.cio.gov/fbca/
- Federal Public Key Infrastructure Steering Committee http://www.cio.gov/fpkisc/
- The Government Smart Card Interagency Advisory Board http://www.smart.gov/iab/
- Smart card standards and interoperability. The site includes a handbook on implementing smart card solutions. http://www.smart.gov/
- Personal Identity Verification Project http://csrc.nist.gov/piv-program/ and http://csrc.nist.gov/npivp/

Figure 1: Digital Signature Illustration

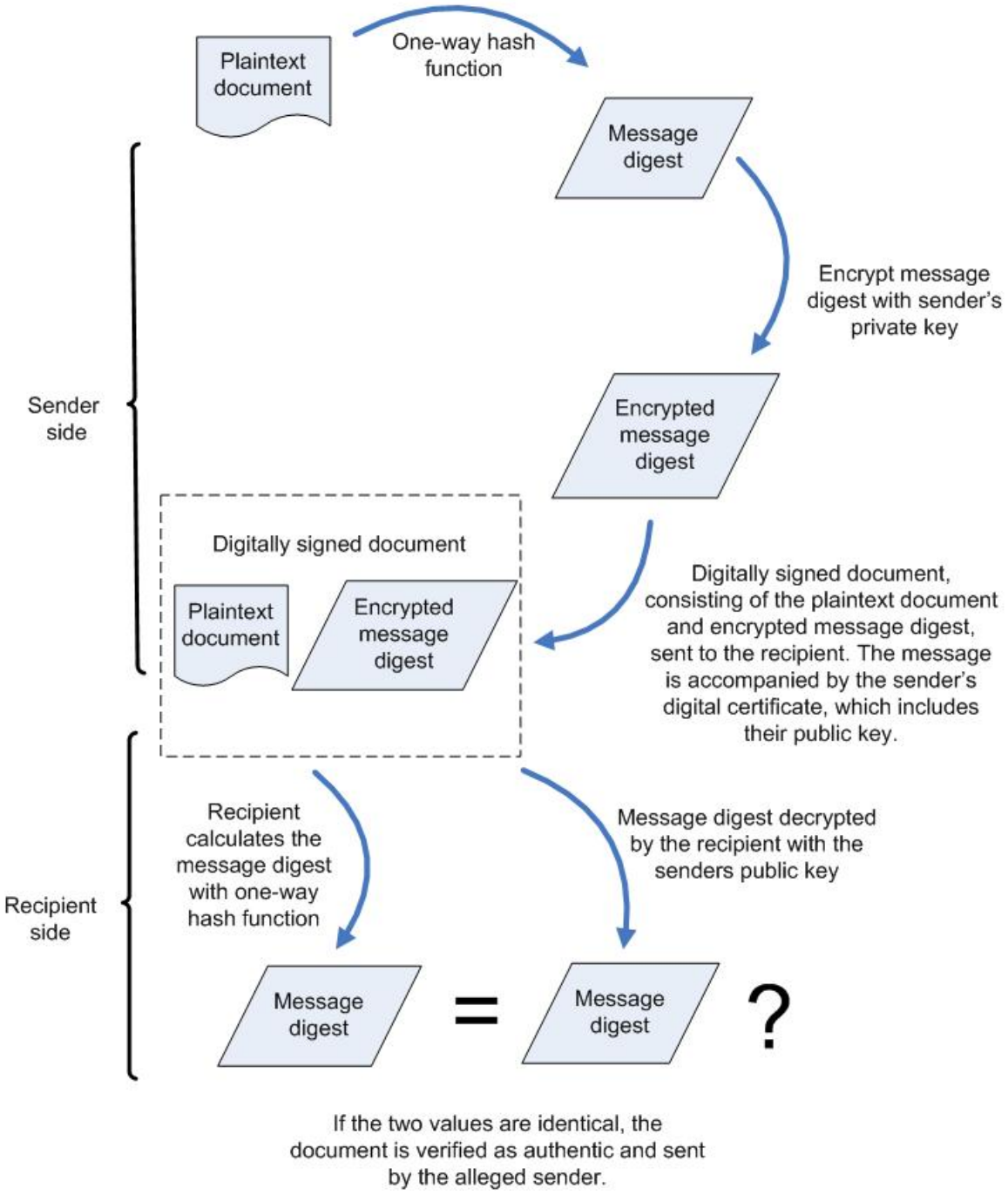


Figure 2: Contempt of Court Action – Current Workflow

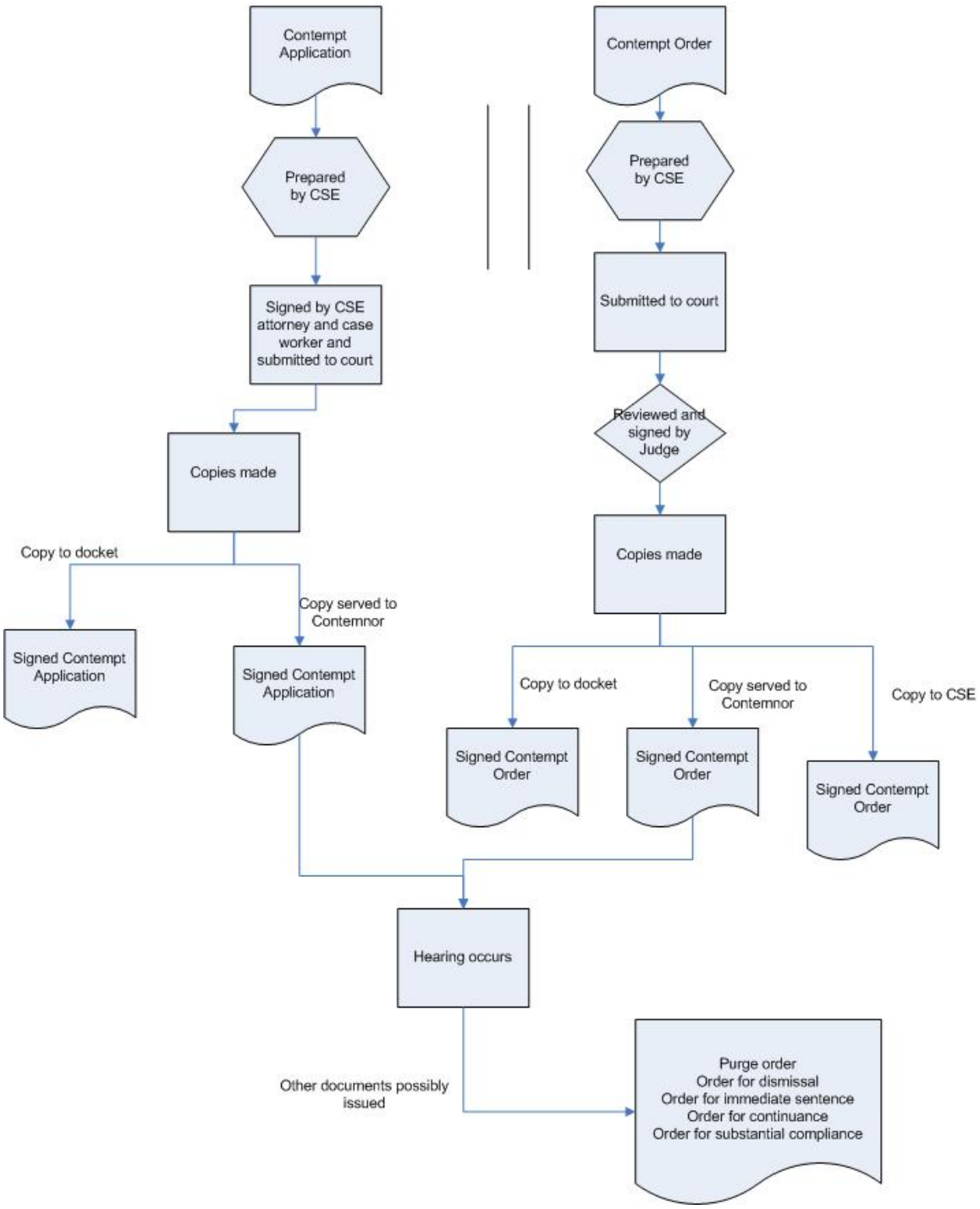


Figure 3: Contempt of Court Action – Digital Workflow