ELECTRONIC DOCUMENT MANAGEMENT SYSTEMS

STUDY FOR THE ARIZONA COURTS

Prepared By

On-Target Information Technology Consulting

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1.1 Executive Summary

> *"The world turns faster than it used to. As recently as a decade ago, you could afford to ignore new technologies for a few years and let them mature . . . Now time is measured in Internet years, and new technologies can become standards before you even recognize their names."*
>
> - David A. Taylor in XML: A Manager's Guide

As never before, court systems in the United States and around the world are looking to technology to help them increase responsiveness to litigant's needs and to create effective and efficient organizations. Mirroring the trend in society at large, technological applications that were once considered mission-supportive have now become mission-critical for a modern, efficient court system. Given the significance of court processes and the fact that technology, once employed, becomes an integral part of the court processes, courts are giving careful consideration to what technology to use, how to use it and how to periodically transition to the next generation of technology without losing information and functionality.

The concept of the "less paper" court has been with us since the late 1970's when early visionary studies of court operations practices predicted such systems were just around the corner. As we enter the new millennium, the technologies are available to implement that vision. Given the success of imaging, electronic data interchange (EDI), the Internet and document management technologies in commercial and other government applications, the Arizona court system is seeking productivity gains and ways to improve accessibility to the courts through electronic records and through integration of data processing applications with electronic documents.

The study of electronic document technologies that is documented in this report was undertaken by On-Target Information Technology Consulting on behalf of the Arizona Supreme Court. The project's broad charter was to develop a conceptual framework for electronic document management systems in the Arizona courts and to recommend implementation guidelines and standards.

Business and technical requirements for electronic document management were developed based on site visits to representative trial and appellate courts, where the project team observed court operations and interviewed judicial officers, managers and staff. The project team applied these general requirements to the top ten commercial EDM software packages to determine how the current state of the art meets the needs of court EDM applications.

The commercially available EDM software has developed great sophistication in the past two years in response to the rapidly expanding use of the Internet in business and government. Emerging from relative obscurity as a departmentally-oriented technology, EDM software packages have blossomed into integrated software suites incorporating multiple technologies such as image capture, workflow management and

full-text search and retrieval. These new products are highly scalable to support thousands of users and large document repositories over high-speed networks, important characteristics for software that is suitable for a statewide implementation in the courts. Our assessment of existing commercial EDM packages shows that many of the available packages have the robustness and functionality to provide a good foundation for court EDM systems.

Located in rural areas without access to adequate local technical support and inadequately funded, many of Arizona's rural courts need the framework of a statewide system to successfully implement automation. The Arizona courts should build upon the success of the Arizona Court Automation Project (ACAP) to implement EDM systems through a voluntary Consortium of courts. Technical support for the EDM Consortium operations would be the responsibility of the Administrative Office of the Courts, which would manage a centralized document repository for the Consortium courts. The Consortium courts would access the document repositories using the existing Arizona Judicial Information Network (AJIN). Larger courts have requirements that are far more extensive than rural courts and their operations are on a vastly different scale. Some of the larger metropolitan courts may choose to develop their own EDM systems and maintain separate repositories. Technical compatibility is an important requirement to ensure that there are no "islands of isolation" with respect to EDM systems in the Arizona courts.

Public and justice agency access to the courts' electronic case files is an important requirement that must be met by any system. The Internet is the means by which the "outside world" can access the court's repositories, and eventually, it is the communications infrastructure through which the courts will receive electronic filings. A recommendation is made for a statewide electronic filing system to be made available through a Web site operated by the Supreme Court. Public and justice agency access to all court repositories, Consortium and non-Consortium alike would be through this Web site also.

The Joint Technology Committee of the Conference of State Court Administrators is developing standards for electronic pleadings. In the near future it will be possible for courts, using these standards, to receive and automatically docket electronic filings without ever having a paper copy of the document. Are courts ready for this "brave new world"? Judge Dale Ramerman, Jan Michels and Roger Winters of the King County Superior Court (Seattle, Washington) stated in a recent article in the Justice Systems Journal: "…the basic concept of an electronic court record is simple and easy to grasp . . . [but] the process of making that change in the medium in which the record is stored is complex and difficult." We might add that how to make such systems convenient and easy for users to use is still not adequately understood. A great deal of work remains to be done in that area.

The court personnel we met were enthusiastic about the benefits of EDM but sophisticated enough in their understanding of technology to know that it is not a simple, straightforward matter to implement a technology as complex as EDM. This is a relatively new technology for courts and those courts that are moving forward to implement it are still "early adopters". Other EDM pioneers in the court world have found that the benefits of the technology are worth the journey. Some of the most important benefits reported by other courts include:

- Reducing document processing and intake costs

- Using workflow features to reduce labor
- Reducing paper file maintenance and storage costs
- Reducing docketing costs due to automatic docketing
- Reducing archival storage costs through use of computer output microfilm.
- More convenient access to case files.
- The public uses self-service retrieval and printing capabilities
- Documents can be filed at any court in the county and are available at all locations without physically transporting files
- Workflow speeds the completion of many tasks
- Lost or misplaced files have been dramatically reduced
- The process of preparing cases for court has been streamlined or in some courts electronic case files are used in the courtroom

Because of the complexity of the technology, a pilot project is recommended to provide a learning experience, via a limited scope of work and investment of limited resources. The pilot project should test the fundamental capabilities of the EDM software, the technical architecture developed during this project, the hardware recommendations and network infrastructure. In addition the pilot should enable the Administrative Office of the Courts and the courts to learn how best to organize, plan and roll-out an EDM system. Implementation planning guidelines are provided in the last chapter of the report to assist the courts to plan well for implementing a technology that will clearly have a profound effect on the way courts do business in the coming years.

1.2 Report Summary

The Arizona state court system is considering the use of electronic document management software to reduce the use of paper in the courts and to improve workflow processes throughout the courts. Arizona Rules of Civil and Criminal Procedure now permit courts to maintain electronic court records as the "original". Several committees of the Judicial Council have made considerable progress in developing standards for electronic documents, including developing the recent Administrative Order 99-10, which established "standards for the use of imaging technology in the courts and to ensure the accessibility, transferability and retrievability of information stored on optical or other non-traditional media." In addition, a proposed rule governing electronic filing is in circulation for comments. This study was commissioned for the purposes of assisting the courts to establish guidelines and standards for the acquisition and implementation of EDM systems for use statewide.

The purpose of this summary is to provide a condensed version of the report using material excerpted from the report for those who have limited time but want to understand the subject matter and recommendations presented in more detail in the body of the report.

Chapter 2: Current Environment of The Arizona Courts

Established in the early 1900's, the Arizona state court system serves a statewide population of close to 5 million people. The state courts consist of two levels of appellate jurisdiction (the Supreme Court and the Court of Appeals), a general jurisdiction court in each county (the Superior Court) and two limited jurisdiction courts (the Justice of the peace courts in each county and the municipal Court in each incorporated town). The Juvenile Court is a division of the Superior Court and includes the Juvenile Probation Department. Adult Probation is a division of the Superior Court. The Chief Justice of the Supreme Court established the Judicial Council in 1990 to assist in managing the court system. Funding for the courts is provided by the State Legislature, counties, cities or towns and various grant funding sources for special purposes. Court revenue from fees, fines, and other sources is returned to the courts and also distributed to the state, counties and cities according to predetermined formulas.

The Administrative Office of the Courts (AOC) was established to assist the Chief Justice in administering the court system and to provide a wide range of administrative assistance and program support to the courts. The AOC manages the operation of several statewide automation systems, including ACAP, the trial court case management and financial management system, APETS, the Adult Probation probationer tracking system and JOLTS, the case management system for juvenile courts and probation offices. Statewide, the courts are connected through a private wide area network called AJIN, which provides e-mail communications for the ACAP courts and the backbone for running statewide data applications.

Arizona courts are custodians of the record and are responsible for observing proper records management practices and maintaining important state court records. The Supreme Court sets records retention and destruction schedules. Most Superior Court cases are retained permanently, while various lesser time frames are established for limited jurisdiction case records and appellate case records. The Arizona Judicial

Council and its Technology Committee actively encourage courts to adopt new technology. Electronic records technologies are of great interest to many Arizona Courts as storing and managing paper records becomes more difficult and expensive. Five Arizona courts have begun to use imaging systems to varying degrees. Most of the courts began imaging records with the intention of replacing microfilm and thus are focusing on limited post-disposition retrieval. One court started imaging as a pilot project to test the feasibility of imaging before deploying a system throughout the Clerk's Office. The Court of Appeals Division II had the most comprehensive goals and is now well along toward a system that will integrate imaging with the case management system and electronic filing and make documents available to the public over the Internet.

Chapter 3: Electronic Document Management Systems (EDMS)

Chapter 3 presents an overview of the development history, status, and probable future development trends for commercially available Electronic Document Management Systems (EDMS) packages. Electronic document management is best viewed as a grouping of convergent and complementary technologies, rather than as a single technology. While database management software is used to organize and maintain *structured* data, the evolving technology of electronic document management performs a similar function for *unstructured* and *semi-structured* data in documents. EDM system technologies, as with the computer industry generally, are constantly and dynamically changing. The rise of integrated electronic document management systems in the last 2 years has further changed the packaging of components.

The main components of commercial EDM system packages are document management, imaging, workflow, COLD and web support. Document management is a constellation of processes that manage and control the creation and distribution of documents. Imaging provides the ability to capture, store, index and retrieve document images from paper files. Workflow software enables organizations to define routing and processing schemes to automate the major document-based business processes of the organization. Computer Output to Laser Disk (COLD) is an EDMS module, which captures print streams to a disk file to incorporate financial records and other computerized reports into the document repository. Workflow products in particular are developing web integration features to connect suppliers and customers across the "supply chain." Publishing documents to the web is another aspect of web support.

Early EDM Systems were geared toward departmental or small workgroup use. More recently, EDM system vendors have re-engineered their products to provide support for large enterprise-wide deployments. New products use three-tier client server architecture and are designed to operate over the Internet or the organization's intranet. Web-based EDM applications can now support a very high volume of users and transactions. Advances in storage technology and storage management software, as well as improvements in networks and operating system environments have provided better platforms for distributed, enterprise EDM systems. Users need not know where documents are located because the EDM system provides transparent access across multiple document repositories.

The EDMS market is viewed by some analysts as a potentially multi-billion dollar market. In the future, intranet- and Internet-based EDMS will be vital to the success of e-commerce and business-to-business applications. Knowledge management, imaging, document management, records management, and workflow technologies will continue

to evolve into more unified, collaborative environments. Integrated EDMS will increasingly become the most cost-effective product of choice as stand-alone products decline in use. Web-related technologies will expand the deployment of EDMS solutions throughout organizations. Like many computer applications, EDMS promotes self-service access to documents; no longer will document management be the province of specialists. EDMS will specifically address the needs of geographically dispersed organizations by providing personnel with easier access to documents located in repositories throughout the organization. Veterans of the process warn that support for change within the organization and a willingness on the part of personnel to revise work habits and processes are required in order for an organization to benefit from the investment in electronic document management systems.

Chapter 4: Opportunities And Requirements For EDMS In Arizona Courts

Of the types of records maintained in the court system, the records series that are most appropriate for electronic document management systems are the following, shown below with the approximate yearly volume of records and pages.

Record Series	Number of Files	Number of Pages
Trial and Appellate Court Case Files (all types)	2,409,011	49,638,313
Juvenile Probation Files	8,057	2,014,000
Adult Probation Files	40,477	18,348,000
Pretrial Services Files	N/A	N/A
Marriage Licenses	37,785	75,576
Personnel Files	6,579	254,550
Case Management System Reports (financial and case-related)	N/A	N/A
Foster Care Review Board Case Files	3,966	716,600

N/A=Not Available

EDMS Benefits

The table below reviews some of the substantial benefits the courts can expect to reap from the use of EDM systems.

Problem/Issue	EDMS Impact
• Missing or lost files/documents.	• Electronic files, if indexed and backed-up properly, will not get lost.
• Documents take a long time to get into the file (loose documents).	• The documents will be linked to cases as soon as they are scanned and indexed. Available to users immediately.
• File available to only one user at a time.	• Electronic files are available to multiple users at the same time.
• Documents are copied to circulate.	• The need for extra copies will be eliminated.
• Pulling, transporting and re-shelving case files is labor-intensive.	• Electronic files could eliminate the labor, to the degree that judges and

Problem/Issue	EDMS Impact
	others are able to use the electronic file as a substitute.
• Records storage space is at a premium.	• To the extent that an EDMS would eliminate the need for hard copy to be kept on-site or at all, the amount of records storage would be reduced.
• Retrieving off-site records in larger courts can take from 1 to 3 days.	• Records stored in on-line and "near-line storage" should be accessible in from 1 to 5 seconds. Older case records must be found and loaded from off-line storage.
• File shelving, carts and supplies are costly.	• Elimination or reduction of cost of equipment and supplies to the degree that electronic documents replace hard copy records.
• A copy of the trial court record must be made for the appellate court when a case is appealed (labor-intensive and voluminous copying).	• If the appellate courts accept the trial court record in electronic form, the labor would be reduced and the copying eliminated.
• Using microfilm is cumbersome and time consuming.	• If user-friendly retrieval methods are built into the EDMS, retrieval should be far easier and faster. Integration of EDMS-CMS is critical.
• Distribution of notices and orders to court parties is time-consuming and paper-intensive.	• Automatic distribution of electronic documents to state and county agencies could be facilitated through an EDMS.
• The public and attorneys must phone for information or make a trip to the courthouse to view records.	• Access over the Internet would alleviate many trips and phone calls.
• Emergency orders may be delayed if a judge needs an old case file.	• On-line access to documents in disposed cases may allow for speedier action.

Court Business Requirements

Fifteen high-level business requirements related to document management, imaging and workflow and the features and functions of an EDMS software package that would fulfill those requirements were identified for the court system. These requirements and mandatory/optional functions and features are detailed in Chapter 4 and summarized briefly below. The technical environment the EDMS must support is also outlined below. In addition to the following, the courts expect to develop custom EDM applications and to integrate various court applications with the EDM system.

1. Convert hard copy documents to electronic form and store in an electronic document repository.

2. Accept documents into the repository through fax and electronic filing; automatic indexing of documents using forms-based data accompanying documents or embedded in XML documents.
3. Convert electronic documents (minute orders, opinions, orders, pre-sentence investigation reports, etc.) created by the court using word processing software to an approved file format before filing in the repository.
4. Store and manage other types of non-document electronic objects in the repository.
5. Create searchable text from images; provide full-text search and retrieval.
6. Organize and index electronic objects to permit later retrieval and viewing
7. Retrieve and view documents onscreen from court facility (court users) and over the Internet (public access).
8. Create annotations on documents without altering the documents. Annotations must be able to be viewed, deleted and printed.
9. Print page, document, case file and other document objects from the repository.
10. Create, modify and process work through workflow applications that distribute (route) files and documents electronically to other EDMS users at the same site or at remote sites (across WAN links).
11. Restrict access to viewing electronic objects that are sealed, expunged, or confidential.
12. Restrict the ability to add, modify, and delete documents in the repository to authorized users.
13. Provide an electronic approval process for electronic documents and store digital signatures in the repository.
14. Capture the print streams that produce various types of financial and case management documents and reports, calendars, notices, warrants and other types of documents produced by the court. Automatically index and store in the repository for convenient access to historical information.
15. Create and export a record on appeal in electronic form (standard TIFF files, no annotations or proprietary elements), which can be used by the appellate court without conversion or modification.
16. Technical Requirements
    - 32-bit software
    - 3-tiered architecture
    - Supports TCP/IP or network protocol independent
    - Runs on Microsoft NT
    - IBM-compatible PC desktop or laptop
    - Supports WIN 98/NT
    - Supports ANSI SQL DBMS for indexing (mandatory) Informix (preferred)
    - Supports multiple repositories and transparent access to documents across repositories – users need not know what physical repository the document resides in (within the Consortium, but not required between Consortium and non-Consortium repositories)
    - Suitable for use by thousands of users enterprise wide who will access and retrieve documents and conduct workflow processes in an intranet environment over WAN links
    - Must support access to a remote repository
    - Suitable for creation and management of document repositories up to 200 million pages
    - Unified systems administration for all EDMS modules (desirable)

- Fault-tolerant features such as automatic fail-over
- Import existing user groups from operating system (optional)
- Supports archiving based on user parameters (see Chapter 7)
- Supports cache and WORM storage media
- Output COM file (to microfilm)
- Supports web access to repository
- Developer's toolkit and Visual Basic for custom programming and integration

In this increasingly networked and Web-based world, many types of standards and standards-setting bodies have had an impact on the development and direction of the EDMS industry. Some standards are still in rudimentary form and their impact is largely theoretical at present. Others have had an impact in the past, but appear to be waning in importance as new standards overtake them. The main standards and standards-setting bodies are reviewed in Chapter 4 to help decision-makers to focus on important standards and those to watch for the future.

The Joint Technology Committee (JTC) of the Conference of State Court Administrators, the National Center for State Courts (NCSC) and the National Association of Court Managers (NACM) are developing a court XML namespace standard to allow electronic filing via the Internet. The JTC effort is supported by the Arizona Courts and will be the best prospect for integrating XML technology with the electronic document management systems the courts want to establish. The forthcoming version 1.0 of the proposed XML court filing standard will allow electronic filing via the Internet of documents in any format inside an XML formatted electronic envelope. There will be sufficient information to enable the filing to be processed by a CMS. Vendors of electronic filing, middleware, case management and document management systems are encouraged and allowed to add vendor-specific "value added" features.

Chapter 5: Evaluation of EDMS Software Packages

Chapter 5 presents a first-level assessment of ten of the leading integrated EDMS software packages. The packages were selected based on market share, requests by members of the project steering committee and reviews in industry publications. The packages reviewed are: Altris, Documentum, Eastman, FileNET, Hummingbird, Identitech, Keyfile, OIT, Open Text, and Optika. The assessment revealed four vendors that have products that appear to be particularly suitable for the courts. At least eight of the systems reviewed should be considered further during the actual procurement phase. Appendix 5 contains detailed vendor information about their products.

Chapter 6: Other Court EDM systems

Chapter 6 describes the experiences of five state courts that have implemented electronic court records systems. These systems represent a wide spectrum of possible approaches, uses and technologies.

- They incorporate different approaches to implementing electronic records – New Mexico Courts began with electronic filing over the Internet and did not back-scan existing files, while Seattle began with a massive paper-to-image conversion of existing files to lay the foundation for eventually accepting e-filings.

- The electronic file systems are in different stages in their life cycle. The Los Angeles Traffic Records Imaging system and the Orange County Probate System are the oldest and most mature applications. Both incorporate imaging of documents, workflow, integration with their respective case management systems and execution of processing steps within the EDMS application to supplement case management system functionality.

- The types of users also vary. Some applications are used by judicial officers (Orange County, Los Angeles), while some are not. For example, the Riverside system is not used by judges (despite the existence of a special module of the case management system built to integrate images onto the judge's desktop).

- The technologies also vary. Some use integrated document management packages, others use just image capture software.

The courts have drawn different lessons from their experiences. Some of the most important are:

- Divide the EDMS project into clear phases because it cannot be done whole.
- Use a "proof of concept" approach that will move the project forward after careful testing and experience.
- Maintain a good public relations program to keep people informed.
- Seek input broadly and gain the support of users through focus groups and design teams.
- Obtain the assistance of technical experts.
- Devise methods to help users navigate within an electronic folder.
- Commit sufficient resources in terms of technical and operational people to keep the project on track.
- A good case management system should be in place before implementing imaging.
- Sound network architecture is critical to success.
- Allow for contingencies through a reserve.
- Under-budgeting increases the risk of failure.
- Use a systems integration firm.
- Provide sufficient training for end-users and technical staff.
- Focus on project management skills.

Some of these courts have also experienced quantifiable benefits such as the following:

- Reducing document processing and intake costs
- Using workflow features to reduce labor
- Reducing paper file maintenance and storage costs
- Reducing docketing costs due to automatic docketing
- Reducing archival storage costs through use of computer output microfilm.
- More convenient access to case files.
- The public uses self-service retrieval and printing capabilities
- Documents can be filed at any court in the county and are available at all locations without physically transporting files

- Workflow speeds the completion of many tasks
- Lost or misplaced files have been dramatically reduced
- The process of preparing cases for court has been streamlined or in some courts electronic case files are used in the courtroom

Chapter 7: Conceptual Architecture

The architecture of an EDMS consists of hardware, software and a high-speed communications network. Chapter 7 describes all three elements and how they will be deployed in the Arizona courts as well as related strategic and architectural issues.

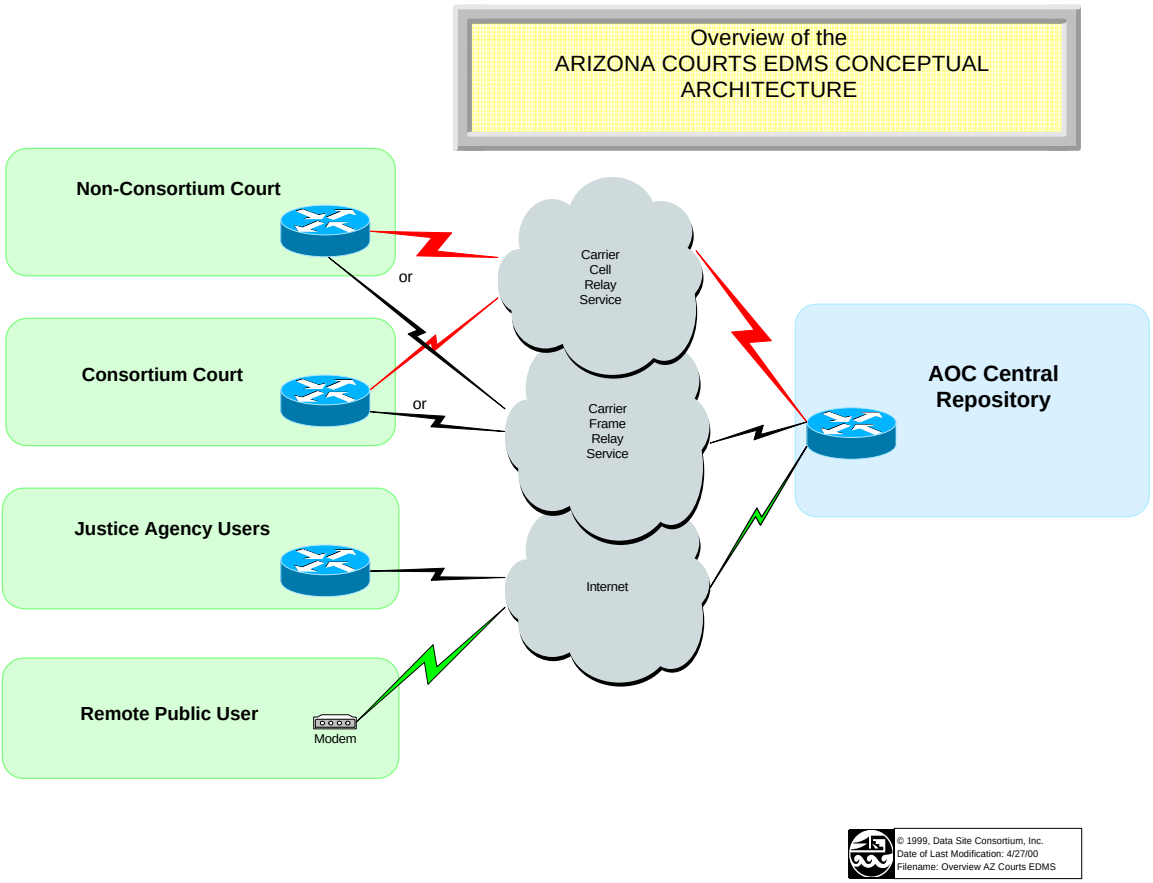
Statewide Consortium

As the Arizona Courts embark on the development of electronic document management and electronic filing in the courts, strategic decisions concerning the framework of electronic document management and e-filing are of paramount importance. The court system's existing automation strategy, as embodied in Administrative Order 94-37, is to promote common automation systems to use resources in the most efficient manner by eliminating "duplicative application systems and software support." Courts in the 13 "rural counties" have found statewide initiatives most appealing because these courts are often unable, with limited county funding and expertise, to develop and maintain systems of the quality that can be deployed in statewide initiatives.

It seems clear to the consultants that if the rural courts are going to be successful at implementing electronic document management systems, a statewide initiative will be needed. The stakes are very high in converting the court system to electronic case files. We believe that that can best be accomplished through a statewide Consortium effort. Spreading the cost among county, city and state funding will help to ensure the continued operation of EDM systems even during difficult economic times. Sharing technical platforms and software and pooling technical expertise will reduce cost and development time as well as help to ensure stability of the systems. This approach has worked with ACAP, and we believe it will work well with EDMS. Voluntary participation in the EDM Consortium is recommended.

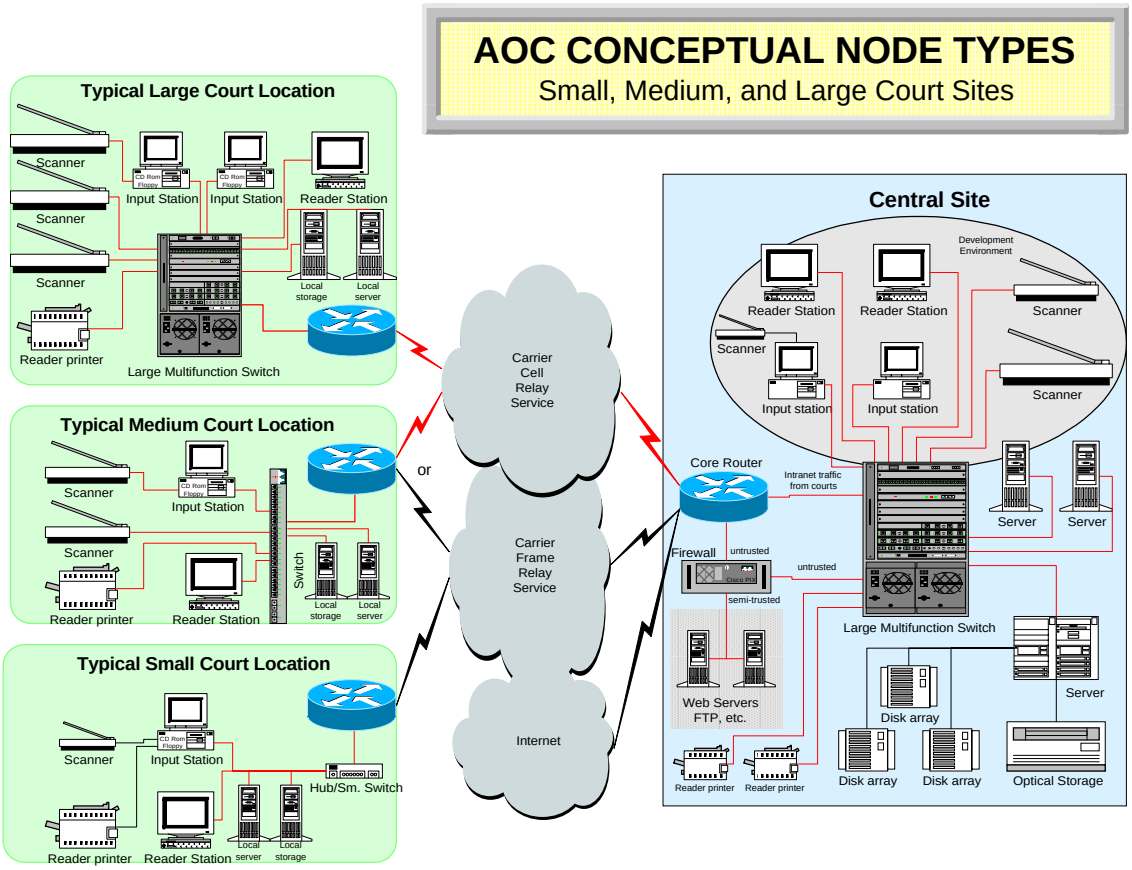
Overview of the Conceptual Architecture

The conceptual architecture of the Arizona Courts' EDM systems will be a highly distributed system with repositories and court users located around the state. All sites will be linked through AJIN, the courts' wide area network. The repositories, which will include independent court repositories as well as the Consortium's central repository, will be managed by EDMS software running on local servers with local document storage or at the central repository. Court personnel will access independent, local repositories via their LAN or county WAN and remote repositories will be accessible via AJIN and a court intranet. Public access to electronic documents will be via a statewide web site on the Internet. All users will be able to use commercially available browser software to access documents. An overview of the statewide architecture is presented in the figure below.



The figure below separates the equipment to be housed at the “Central Repository” (managed by the AOC) from the typical equipment configurations expected to be installed on-site for small, medium and large courts participating in the Consortium.

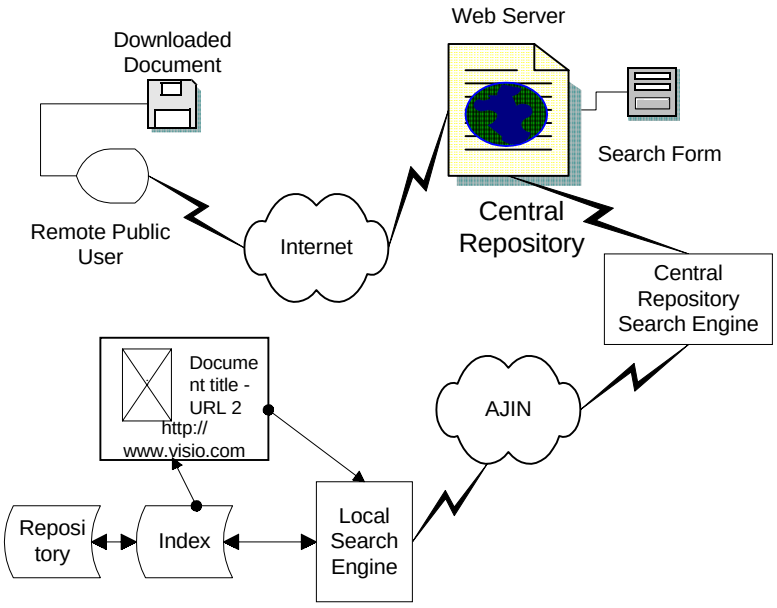
Any courts that do not plan to be part of the Statewide EDMS Consortium, but wish to plan an independent implementation can combine equipment shown for the court site with central repository equipment, and appropriate network configuration for connecting court sites within the county and through AJIN to the AOC’s repository.



Public and Court Access to Repositories

Regardless of where the courts' electronic document repositories are physically located and regardless of what court or Consortium manages the repositories, all electronic court records must be accessible statewide (with appropriate security and safeguards to limit access to certain types of documents). There must be no "islands of isolation" when it comes to court records. The definition of access as we are using it here is the ability of an authorized user to remotely search for, view and print electronic documents on-line using a commercially-available browser and any "plug" in viewer required. Remote, Internet access would be in addition to the availability of documents for viewing at the courthouse and the ability to get hard copy documents from the court in the usual manner. Court staff and judicial officers would access and display documents in their home repository or from any other court repository through the AJIN network via the courts' intranet if the access is from within a court facility.

Public Access Model



Document Repositories

The bulk of documents in the courts repositories will be images for now and the foreseeable future. Eventually, courts will receive electronic filings as Adobe PDF documents or XML documents. JPEG, MPEG, AVI and WAV electronic "objects" are also mentioned as standard types of electronic objects that will be accepted. Any type of electronic object, be it a photograph, sound file, streaming video, XML document or image must be managed by the EDMS electronic folder and served to the user on demand.

The creation and maintenance of appropriate indexes are critical to the operation of an EDM system. Indexes support the filing, retrieval and management of electronic documents. The indexes are usually stored in a database management system (DBMS) such as Oracle, Informix, or Microsoft SQL Server. EDM systems have involves several kinds of indexes:

Case File/Document Index: This index defines and uniquely identifies the electronic file folders that will replace the present paper folders and documents within them.

Full Text Index. Scanned images can be converted through optical character recognition (OCR) software to computer readable text, and each word in the text can be indexed.

Document location index. This is an internal index that the EDMS creates and uses to indicate and control the physical location of electronic objects on magnetic or optical disks.

Search Engine Index. This index would be stored and maintained locally at *each repository* for use by the local search engine to find requested documents.

Integration of Documents and Applications

One major requirement of the Arizona Courts' EDMS environment is to integrate the existing court software applications with the document management system. A case management system can be used as an index for locating and displaying documents. Image-enabling the CMS would link the electronic documents to the corresponding line item in the register of actions. The most logical case management screens on which to display document links are probably the public access screens, the register of actions and the calendar display screens.

Courts in other states have built special applications or new modules of existing CMS systems to serve special functions that involve retrieval and display of electronic documents. One notable example is the "Imaging on the Bench" application built for Riverside California judges as a special-purpose interface to the CMS installed in that court. The application does much more than serve up images – it organizes information about cases in a way that is more accessible to judges.

XML will eventually be the document format accepted by the Arizona courts for electronic filing. Because XML documents contain data as well as document content (the actual pleading), XML documents can be the messenger in another type of interface. The XML documents will transmit data that will be used to docket the documents in the case management system. The manner in which electronic filing will occur is a subject for further consideration by the Arizona court system; however, we anticipate that most or all electronic filings will come through a centrally-maintained statewide e-filing system. The documents will be transmitted to their "home" repository (either the statewide Consortium's central repository or an independent repository) based on routing information embedded in the XML document. From there, it is likely that the EDM system's workflow management module will play a role in accepting incoming documents, processing them and returning an acknowledgement of the electronic filing.

Repository Storage Management

Storage management involves hardware and software to store, move, copy, and purge (delete) documents on storage devices during the life cycle of the document. One of the lessons that many organizations have learned after using EDM systems for any length of time is that it is very important to have a storage management strategy and to make decisions about when to archive and purge as part of the initial plan. The recommended storage scenario for the courts has two stages:

On-Line Stage – Records in this stage are composed of active and disposed cases. Cases are kept on-line after disposition for a specified period of time to provide an easy and convenient means of accessing these records until they are no longer

required to be kept or, if they are permanent records, until they have reached an age where there is little need for access and off-line storage is sufficient.

Archive stage – Records in this stage are past their active life, but according to records retention standards, must still be accessible in case they are needed.

Cache (magnetic disk) and WORM are recommended storage media for on-line court records. WORM, CD-ROM and microfilm are three options for archival storage available at this time. No recommendation is made for a permanent archive medium because the first archives need not be made for at several years. By the time archiving must begin, there will be new choices available that may be better than existing ones.

Every EDM system has storage management software to manage documents and the physical devices on which documents are stored. The storage management system moves documents from one platform to another based on move, delete and copy queues set up by the systems administrator. Documents can be moved into and out of queues manually or by automatic "triggers" issued by the case management system. When the CMS passes the trigger event and date on which the event occurred to the storage management system, the storage management system schedules the affected documents in the appropriate queues, for a specific future date. Documents stored in cache will go to the delete queue (if not being archived) or to the move queues to create archive disks.

An important step in the storage management planning process is to determine how long to store each type of record on-line. The second step is to determine which records may be deleted after the on-line period expires and which must be kept permanently. The proposed time periods for case files to be maintained on-line and available for retrieval from the EDM system and the "trigger" event that would cause them to be archived is presented in detail in Chapter 7.

Network Bandwidth

The network bandwidth estimates were developed using the repository size estimates for Consortium courts and the estimated pages of retrieval for Consortium and non-Consortium courts in Year 3 of operation. The required bandwidth to support EDMS in the rural counties ranges from a single 56 Kbps link in Apache, Graham, Greenlee, La Paz, North-Gila, South-Pinal, and Santa Cruz Counties to fractional T-1 bandwidths in Cochise, Coconino, Mohave, Navajo, South-Gila, North-Pinal, Yavapai, and Yuma Counties.

The estimated EDMS bandwidth requirements for the AZ metropolitan counties are estimated to be approximately 0.5 Mbps link to Pima County and a one-Mbps link to Maricopa County. Excepting Mohave and La Paz, the existing network bandwidths are likely to absorb the EDMS traffic through year 3.

Equipment and Software Configurations, Specifications and Costs

The end-user equipment and repository hardware specifications, configurations and costs for small, medium and large courts and the central Consortium repository are presented in Chapter 7. EDMS software costs are estimated for three of the leading packages based on vendor pricing information.

Pilot Project

The purpose of a pilot project is to provide a learning experience via a limited scope of work and investment of resources. A pilot project should test the fundamental building blocks of the EDM system, including the technical architecture, the hardware and the EDMS software capabilities. In addition, the pilot should enable the AOC and court staff to learn how best to organize, plan, develop and roll-out an EDMS application.

The recommended pilot project is a municipal court that will be a member of the statewide Consortium. The Peoria Municipal Court has volunteered to be a test site for an EDMS implementation. The parameters of the application are displayed in the table below.

Court and Application Profile	**Peoria Municipal Court**
Case types and caseloads included in pilot project	All -- CV-Traffic: 10,358; CR-Traffic: 2,089; Misdemeanors: 2,787; NC-Ordinance: 315; Protection Orders: 167; Injunctions & Harassment: 116
Pages/Yr.	228,143
Internal Users	2 judges, 1 ct. administrator, 1 judicial assistant supervisor, 6 judicial assistants
CMS	ACAP
Integration W/ACAP application desired	Yes; desirable
Implementation Sequence	New cases day one forward and existing cases as they come on the calendar. Phase I: Establish Consortium repository Phase II: Integrate w/ACAP Phase III: Scan, index, retrieve all case types in Clerk's Office, chambers, public counter Phase IV: Courtroom access Phase V: Web access Phase VI: Evaluation
Duration of project	18 months
Hardware/Software Cost (Estimated)	$270,400[1]

[1] Estimated costs do not include systems integrator mark-up (up to 30% on hardware and software), DBMS licenses, search engine software for web server, EDMS software maintenance costs, travel, facilities modifications, custom programming or systems integrator services.

Chapter 8: Planning And Implementation Guidelines

A planning guide for courts planning to implement EDM systems is provided in Chapter 8. The guidelines will help courts with their planning efforts during the pre-RFP stage when they are assessing the need for an EDM system and to determine what information the court must have before it issues an RFP. Later sections of this chapter cover other implementation issues such as conversion, implementation sequences, quality assurance and testing, training and re-engineering.

1. Organize the project and appoint the project leadership.
2. Define the problem statement, alternative solutions and the goals and objectives of the project.
3. Conduct a feasibility study to develop a preliminary project plan.
    a. Determine the scope and phases of the EDMS.
    b. Gather detailed information about each records series to be converted to electronic form and develop a "profile" of each records series.
    c. Collect and document quantitative information about the volume of records in each series.
    d. Describe the current operational environment and business requirements.
    e. Describe the current technical environment and technical requirements.
    f. Develop an overview of the operations of the court/clerk's office under the desired system and estimate the impacts of the new system on operations, staffing, physical space, workflow and the technical environment.
    g. Develop a plan for how to handle exceptions.
    h. Define access and security requirements.
    i. Define systems availability requirements.
    j. Develop a "strawman" technical architecture for the new system.
    k. Prepare a preliminary facilities modification plan.
    l. Develop a preliminary training and documentation plan.
    m. Develop a court staffing plan and define the role of the systems integrator.
    n. Develop a project schedule, budget and funding plan.

Re-engineering Considerations

Re-engineering is the process of reconfiguring operational procedures. The flow of work is changed from its present series of steps to another, generally more streamlined workflow. In the context of a new EDMS, the focus of any re-engineering effort is likely to be on document-based workflow, that is, any processing steps that involve the retrieval, use, production and circulation of documents. Despite similarities in processing, each court has its own workflow and procedures that may vary somewhat from other courts. For this reason, re-engineering must always be specific to a court site if it is to be effective.

Most document workflows within the Clerk's Office are relatively short, that is, there are few steps in the process. Many processes are composed of only two to three steps at any one time. The process of scanning documents and routing them to indexing/docketing and quality control involves a form of workflow routing. Docket clerks should be able to take work from a "universal in-box", docket it and pass it to the quality

control desk. Once the work has been checked for accuracy, the documents may be committed to disk.

We would expect some aspects of the workflow to change dramatically when electronic filing is implemented. Because electronic filing using XML documents will perform many of the initial filing steps automatically, the filing, case initiation and docketing steps (and possibly other steps like judge assignment) will no longer be performed by staff – they will be automatic processes that use the data in incoming XML documents to perform automatic, logical operations. Records management is an area where the workflow will eventually be changed dramatically – but not until the use of paper records has been phased out. Eventually in later phases of implementing an EDM system, the courts may wish to automate the distribution of documents such as minute orders. This re-engineering effort would involve transforming the current communication between the courts' EDM systems and other law and justice agencies.

Implementation Sequences

The first decision a court must make is what types of records to convert to EDMS. The key to this decision rests on how the court is organized. If the court is large and has clearly defined division of responsibilities, it might be possible to pick a case type such as juvenile or criminal and convert just those case types. But if court operation is more integrated and people work on many types of cases, it probably would be inefficient to separate them out. Once these decisions are reached, the court should decide whether to begin scanning at a given point (day forward strategy) or convert old files as well (back file conversion strategy).

Several conversion scenarios are outlined below:

Option 1: Choose a start-up (cut-over) date. Scan all new case files as they are created after that date. Do not scan case files in existence before the start up date. Do not scan documents to be filed in case files created prior to that date. Do not scan inactive files (backfile).

Option 2: Choose a start-up date. Scan all new case files as they are created after that date. Also scan all active case files even if created before that date, at the time the case comes onto a calendar or another milestone. Scan all documents filed in active case files. Do not scan inactive case files. This is more expensive than Option 1.

Option 3: Same as option 2, except also scan inactive files that have long term or permanent retention. This is more expensive than option 1 or 2.

Of the above options, On-Target favors Option 1 or option 2 for most case files. Option 1 is the simplest and least costly and may be favored by courts that lack the resources to do Option 2. It may also be the most applicable to limited jurisdiction courts where cases have short lives and short retention periods.

Quality Assurance

Once the vendor begins installing the system a series of tests should be conducted at every step:

- Hardware component or unit tests

- Input
- Software component or unit test
- Applications testing
- Simulated live operations

Quality Assurance (QA) procedures implemented as part of on-going operations should cover all aspects of EDMS operations, from document reception to archiving and final disposition of documents. The QA program should include systems, procedures and training for scanning, indexing and docketing.

Documentation Supporting Legality and Admissibility

Since courts will be breaking new ground by converting from paper to electronic records there could be challenges. The documentation suggested below could provide courts some "insurance".

- Statement of Intent and Purpose
- Security Systems and Procedures
- Work Procedures
- Job Descriptions
- Training Program
- Outside Audits
- ISO 9000 quality assurance certification

Training

The development and implementation of an EDM system requires the participation of employees and judicial officers in a number of roles. Because this is a new endeavor for most people and the technology is quite new to most courts, specialized training will be needed to enable both end-users and technical staff to perform new aspects of their jobs.

End-users may be differentiated by their job functions and the specified functions of the software they will be using to access documents on-line or to perform data entry. The subject of the training should be tailored to the audience and the manner in which a specific group will use the software. The method of training may also differ for various audiences. Generally, end-user training falls into three groups that need separate training-- data entry clerks; users who will primarily be using the EDMS for retrieval and judges and chambers staff. Running an EDM system requires technical expertise of several varieties, including network management, database administration, EDM systems administration and storage management for the EDM system. Depending upon the skills and experience of the incumbent technical staff, training may be required in any of these areas.

1.3 Formal Recommendations Presented in the Report

Chapter 4: Opportunities and Requirements for EDMS in Arizona Courts

4.2 Records

1. Court case files and the record on appeal, adult and juvenile probation files (except field books), personnel files, case-related financial records, marriage licenses and the Foster Care Review Board's case files are good candidates for an EDMS system.

4.4 Business and Technical Requirements for EDMS Software

1. The Arizona Courts should purchase an integrated EDMS package from a leading vendor with imaging, workflow, document management, optical character recognition and full-text retrieval, COLD and web support.

2. The scanning density standard should be set at 200 dpi rather than 300. Three hundred should be used when it will create a readable document where one cannot be created at 200 dpi. Tests in courts have shown that 200 dpi is sufficient for most documents and that there is little discernable difference to users between the two. Three hundred dpi requires considerably more storage space. Handwritten documents may require higher dpi or image enhancement.

3. Fingerprints should be imaged at 600 dots per inch.

4. Photographs, light originals, oversized documents, color documents and documents that do not produce a legible image when scanned should be stored in hard copy. The document should be stamped "Original on File" before imaging or an index record should be created, indicating that the original is in a hard copy file, not on the EDMS.

5. Amend the proposed Rule 124, Electronic Filing of Documents to name specific file types that will be accepted for electronic filing because the EDMS viewer must be able to recognize the file format to be viewed or played.

4.5 EDMS Technical Standards

1. The Arizona Courts should not require vendors to adhere to the DMA, ODMA or WebDAV standards for any near-term procurement.

2. The Arizona Courts should watch the development and adoption patterns of the WebDav protocol, and in conjunction with their EDMS vendor, determine the appropriate role for this protocol in future web-based court applications.

3. The Arizona Courts should not require that an EDMS product conform to the WfMC Interoperability standards at this time.

4. The Arizona Courts should select EDMS software that is compatible with the network operating system adopted, provides developers with access to modern, object-oriented development tools and is built on scalable technology.

5. The Arizona Courts should continue working with the Joint Technology Committee's Judicial Namespace initiative to develop XML for use in electronic filing.

6. A complete list of the recommended network-related standards is found in Appendix 4.

Chapter 7: Conceptual Architecture

7.2 EDMS Approach

1. The Arizona Court System should adopt a statewide approach to the procurement, development, and on-going operation and maintenance of an electronic document management system by creating an EDMS Consortium.

2. Participation in the statewide Consortium system should be voluntary on a county-by-county basis, consistent with AO 94-37.

3. To facilitate planning efforts, the Supreme Court should require counties to state their intentions of opting in or out of a statewide Consortium for a particular time period. Counties that initially opt out (or decide not to implement an EDMS initially) may opt to participate in the Consortium later.

4. A county may be permitted to participate in procurement of hardware and software, even if the county elects not to join in a statewide EDMS implementation.

5. The responsibility for implementing the statewide EDM Consortium should be given to the AOC. Participating trial courts should have a significant role in the procurement, planning and design of the EDMS.

6. As one option, the AOC may consider out-sourcing some of the Consortium operations to a qualified service bureau (e.g., to house servers and perform routine maintenance, etc.).

7.3 Electronic Filing

1. To assure a uniform implementation of e-filing, Arizona courts should implement one statewide e-filing system.

2. The statewide e-filing system should be mandatory for any court that permits e-filing, unless the court applies to and receives approval from the Commission on Technology to use an alternative e-filing method.

3. Assisted by representative courts through the state, the AOC should have the responsibility for implementing a statewide e-filing system.

7.4 Public and Court Access to Repositories

1. The Supreme Court should require the statewide Consortium and each court that maintains an independent electronic document repository to provide access to viewing public documents over the Internet via a Supreme Court web site.

2. Access by court personnel from within court facilities should be via an intranet through the AJIN network.

3. All EDMS software used by Arizona courts should permit access to electronic documents using commercially available, standard browser software. EDM systems that require users to have proprietary client software should not be used and "plug-ins" or viewers should be available for download free of charge.

7.6 Repository Storage Management

1. Maintain court documents on-line and archive permanent cases according to the schedule in Table 7-1.

2. Use cache (magnetic disk storage) to store on-line records.

3. Back up the cached documents to WORM disks stored on-line in a jukebox.

4. Utilize the case management system to produce a "trigger" event to cause the storage management system to schedule records for archiving or deletion.

5. When documents are archived from on-line storage, copy to WORM, CD-ROM or microfilm those records that must be retained permanently. The archive technology should be selected at a later date nearer the time the first archives will be created to take advantage of technology advances.

6. Archive permanent cases whole, without purging.

7. If access to viewing documents is via a case management system, synchronize the archiving schedule for the CMS with the document repository retention schedule. If the CMS case information is archived on a different schedule, maintain a skeleton docket record in the CMS to permit documents still on-line to be accessed.

7.9 Hardware Specifications

1. Equipment that uses standard, non-proprietary parts which can be repaired (e.g., standard power supplies) is recommended. Products that are proprietary in nature, while excellent, may not be on future state contracts.

2. The courts should maintain similar manufacturer lines, model numbers and sizing to minimize the inventory of spare accessories, repair components and user training/familiarization.

3. The courts should plan to replace end-user workstations on a 3-year replacement cycle.

Chapter 8: Planning and Implementation Guidelines

8.4 Re-Engineering Considerations

1. Consider bar coding citations to reduce manual data entry.

8.6 Quality Assurance Procedures

1. The courts and the AOC should learn more about ISO 9000 quality assurance certification and use the information to improve document management procedures.

2. The AOC, in cooperation with a statewide committee appointed by the Supreme Court, should established model procedures and operational standards to ensure that courts safely maintain and preserve electronic records.

8.7 Training

1. For EDMS Consortium courts, end-user training in use of the EDMS should be a joint responsibility of the ACAP training unit of the Arizona AOC and individual courts. Training should be conducted by live instructors (via satellite or on-site) rather than using video or CBT (computer-based training) methods.

2. Courts not participating in the EDMS Consortium should appoint a training committee composed of key operational staff to develop training plans and documentation and to conduct end-user training.

3. Individual courts not participating in the Consortium and the AOC Information Technology Division should assess the skills of incumbent technical staff to determine whether they have appropriate experience and skills in administration of the network O/S and the database management system selected. Technical staff should attend network management or database administration training programs, as needed.

4. Technical staff of the AOC's Information Technology Division and technical staff from non-Consortium courts should attend vendor-supplied EDM systems administration training programs.

5. The systems integrators hired to build an EDMS for Consortium or non-Consortium courts should provide both technical training and some end-user training to testers and training coordinators.