State of Colorado

Standards and Guidelines for Imaging Systems

Prepared by:
CIO Forum Imaging Task Force
January, 1998

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Introduction

Background

One of the duties facing the CIO Forum is to establish statewide IT standards in areas that will make statewide technology more efficient and provide interoperability opportunities in the future. The CIO Forum meets bimonthly and consists of individuals who are primarily Chief Information Officers (CIO) from state departments and agencies who collaborate on state technology issues to keep an open flow of communication. The CIO Forum undertook the task of establishing imaging standards and guidelines to help agencies within the state make good decisions about this technology and to assure that the state infrastructure would be aligned to take advantage of the opportunity to share information where and when feasible.

As part of the research to define imaging guidelines for state agencies, a CIO Forum Imaging Questionnaire was established by the Imaging Task Force and distributed in December 1997 to 44 agencies within the state of Colorado. This was done to find out what type of systems were currently in use, specifics about those systems, and to determine how many imaging systems are being considered in the future strategic plans of the various agencies. Ninety percent (90%) of the agencies responded. Reports of current imaging systems were analyzed. The data on present and future imaging systems is being stored in order to share this information with agencies that want additional contact information, such as type and size of existing systems, functional purposes, pitfalls etc. If you are interested in this data, you can call the IMC office at 303-866-3222 to request the information.

The following standards and guidelines were established as recommendations to help agencies define requirements for new imaging systems and position the state to share this information. Although the size and usage of an imaging system may determine the need to differ from these recommendations, it is important to note that the guidelines were established to help agencies:

- get started in researching imaging options
- become familiar with some imaging terms
- evaluate imaging needs and its impact to the current process
- acquire a system that will meet specific agency needs
- plan ahead, and
- alleviate some of the frustration experienced by state agencies. (See “Imaging Expectations” section under General Policies and Guidelines.)

Standards Approval Process

The process used to develop and approve these guidelines, along with the departments, agencies, and committee members who attributed to the approval of the initial version of these guidelines from November 1997 to March 1998 are listed below. (For more detailed information on some of the agencies listed in this document refer to the "Contact List" section under Attachments.)

CIO Forum: Identified the need to research imaging issues and development standards for state imaging systems. The CIO Forum member assigned to the task then formed an Imaging Task Force.

Imaging Task Force: Chaired by CIO Forum member Steve McNally. Including the chair, the Task Force includes ten members from seven different state agencies. The Task Force members performed research, consulted with outside consulting firms, developed a questionnaire, and analyzed the results. Members then agreed upon standards and guidelines and an imaging standards document was created and sent through the approval process. Task Force members were:

1. Penny.Adkins, Central Services, General Support Services (GSS)
2. Jacob Eker, Regulatory Agencies
3. Sue Gallagher, IMC staff, GSS
4. Bob Henry, Department of Labor and Employment
5. Diane Huling, Department of Natural Resources
6. Terry Ketlesen Office of State Archives, CITS/GSS
7. Cynthia Pacheco, IMC staff
8. Brent Voge, Gaming, Department of Revenue
9. James Yamane, IMC staff

State Archive Office: Terry Ketlesen supplied knowledge of archive procedures and served on the Imaging Task Force to develop guidelines that would adhere to and coincide with State Archive regulations and recommendations.

Central Services: Penny Adknis supplied knowledge of services provided by Central Services Imaging/Microfilm Unit and statutes regarding imaging personnel and printing within the six regions of the metro area, and served on the Imaging Task Force to develop guidelines and procedures that would adhere to and coincide with Central Services regulations and recommendations.

CIMA: (Colorado Information Mangers Association) Draft copy of these guidelines were handed out at the February 1998 CIMA meeting for participants' feedback and additional input before going to the IMC Policies and Standards Subcommittee for

approval.

IMC Policies and Standards Subcommittee met the last week in February 1998 to review this document and approve is as state imaging guidelines before going for final approval to the IMC. Subcommittee members assigned at this time were:

1. Elaine G. Callus-Williams, Chair
2. William Bernstein
3. Renny Fagan
4. Representative Ron May
5. Barbara A. McDonnell
6. Dan R. Morris
7. D. Richard Patch
8. Paul J. Quade

The Commission on Information Management in March 1998 reviewed the "Standards and Guidelines for Imaging Systems" and approved the recommendation by the Subcommittee to adopt this document as the state approved standards and guidelines for imaging system within state agencies. IMC members at this time were:

1. Dan Morris
2. Steve Adams
3. Elaine G. Callas-Williams
4. Representative Ron May
5. Andre N. Pettigrew
6. Senator William R. Schroeder, Jr.
7. Renny Fagan
8. Edward H. Freeman PhD.
9. Joe Garcia
10. Richard Patch
11. Steven V. Berson
12. William Bernstein
13. Barbara A. McDonnell
14. Paul J. Quade
15. Timothy Wolf

General Policy and Guidelines

Process Overview

Overview of an Imaging Design, Development, and Implementation Process:

1. _____ State agencies should include any imaging initiative in the Information Management Annual Plan (IMAP) as part of a strategic planning prior to proceeding with the requirements analysis phase.

2. _____ Prior to implementing an imaging system, agencies must conduct a requirements analysis using the following guidelines and advise the State Archive and Central Services agencies of your intentions to ensure no conflicts exist with statutory requirements and mode of storage for legal documents before proceeding. (See Imaging Requirements Analysis section and Contact List addendum.)

3. _____ All functional areas that will be affected by the proposed imaging system should participate in the requirements analysis development process, to the degree possible. Communication should be ongoing to keep all involved aware of the progress, to build consensus, and to gain support for the project, as well as insuring important requirements are not over looked.

4. _____ If the agency needs to construct an RFP or a bid be sure to send a copy to the IMC, State Archive and Central Services. The IMC will review the requirements through the approval process and work with the other agencies above to ensure no conflicts exist with statutory requirements and mode of storage for legal documents. (See "State Archive" and "Central Services" section under General Policy and Procedures for further clarification.)

5. _____ Once approved, an RFP or bid should be sent to a minimum of three vendors. (Agencies and vendors must be able to comply with the State of Colorado Information Systems Policies and Standards, State Procurement Rules or department budget rules, as well as follow the recommendations stated within these Imaging Guidelines.)

6. _____ The vendor responses should be evaluated using an Evaluation Matrix to assist the agency in the selection. (See Matrix section.)

7. _____ After selecting a vendor, a written agreement of the expectations of the system and a contract that the vendor is responsible for meeting the stated requirements should be agreed upon. (See Contract guidelines under Standards section.)

8. _____ Just prior to, but no later than 30 days after, the implementation of an imaging system, fill out a completed Imaging Implementation Form and send it to: IMC, 1525 Sherman St. #100, Denver, CO. 80203. (See Forms section listed under Attachments)

Standards and Guidelines

Some of the issues faced by a statewide technology plan are infrastructure match, operational fit, organization readiness, product integration and maturity, strategic direction, substitution technologies, vertical market support, user growth and access control, and security.

In order to diminish some of these issues, imaging standards and awareness must be communicated to assure that use of images occurs by planning for future environments and by avoiding creation of complex systems that do not support image access and sharing.

Before selecting a vendor, agencies should be aware of specific areas.
Such as:

- common interface standards with consistent scanner control dialogs
- optical sub-systems and conversion issues
- multi-function drives or single function for writing techniques
- writing techniques: Write Once Read Many (WORM) or re-write-able (which may produce legal and archive issues, if used)
- logical folder view or API level
- database structure and language
- file format or index structure level
- support software for optical drives
- application software compatibility
- hierarchical storage managers, and
- who supports the jukebox: the vendor, integrator, application software vendor, or distributor?

The possibility of shared imaging may eliminate redundant effort and storage duplication in the future. This section provides information that will address these areas of imaging by providing some standards, guidelines, and information to help address future imaging issues.

Storage

Preferred: CD-R, CD-ROM with WORM (Write Once, Read Many) and COLD (Computer Output to Laser Disk) - Archival storage of computer-generated data within an optical storage system; can also be used as a means to transfer data; download to database.

Image storage software must support the storage of images on intermediate storage devices (electronic media such as direct access storage device; DASD) and electronic imaging storage devices while providing backup, recovery and restart capabilities consistent with a database management system (DBMS) for both images and the index.

Agency Security

The agency must have in place a security strategy to ensure material exempted from disclosure is not made available. Imaging systems must include access restriction procedures and software controls to prevent the retrieval of images or index information by unauthorized personnel.
These include:

- control of data: handling, audit trails, network security
- network: host and dial up
- logical and data access controls: data and file encryption, network encryption, application security
- regularly changed passwords, and
- regular review of the user list and access privileges.

WEB Security

Secure sockets, access restrictions by server and directory with password protection must be in place.

Data Entry

Method is open, however index verification is required to prevent “lost” or “incorrect” data.

Image Compression-Decompression

ITU-TSS (…-Telecommunication Standards Sector) Group 4 with the ability to handle Group 3. Hardware and Software compression and decompression must be 100% compatible. Location is preferred at the host PC level by the scanning software or compression card.

User Interface

GUI support required for Windows

Communication

Network - utilize TCP/IP (Transmission Control Protocol/Internet Protocol) and WAN/LAN (Wide Area Network/Local Area Network)
Distribute Formats - Bitmap, Group 4 FAX, CCITT Group 3

Annotation

Support the ability to annotate an image without physically modifying the image.

Image Format

- Documents: TIFF (Tagged Image File Format)
- Photographs: JPEG (Joint Photographic Experts Group)
- TIFF file header standard with non-proprietary file header formats to label digital images

A detailed definition of the image file header label structure from the system provider/vendor is required.

Indexing

- Automatic and manual index creation capability for exporting
- ANSI (American National Standards Institute) SQL (Standard Query Language) DBMS (Data Base Management System) which can reside remote from the image storage location and be accessible and modifiable by user written code.

Capture

Bar-code recognition or OCR/ICR (Optical Character recognition/Intelligent Character Recognition), database export. OCR application recommendation is 12 PPM (pages per minute); 12 PPM raw image about 1 MB

Printer Memory Size

At least enough to hold the largest uncompressed page size.

Display H/W

19” screen for frequent users; minimum refresh rate - 70Hz; 1600 x 1280 resolution is adequate.

Operating System

UNIX or Windows preferred

Contract

Some guidelines to remember for vendor contracts: set deliverable (do not establish on a “time and material” basis), establish a timeline (date due), determine a realistic response

time that the vendor can meet, establish a dispute resolution process, vendor employee approval procedure, set 30, 60, 90 day enhancement award after date of implementation, and establish terms for vendor to partnership with project lead for knowledge transfer throughout project.

Data Base

Dynamic Data Exchange (DDE) compliant i.e., database and image; fourth generation language

Scanner

TWAIN (Technology Without An Important Name) device drivers so that any application that supports TWAIN can access the scanner, with ad hoc and batch scanning, 200 dpi (dots per inch) minimum for office documents; ICIS pixel.

Application

Compatibility of application software and support software for optical drivers and hierarchical storage managers is required. 32-bit Windows based is preferred since a client application executing on a mainframe application server requires terminal emulator and IPC (Inter-process Communication) middle ware.

Information Sharing

Capability to share images with other state agencies along with security set up to distinguish access to users should be addressed whether or not the data will be restricted. This is due to future changes that can occur within agencies and statues.

Archive and Records Management

Agency procedure and policy must be in place, with a copy supplied to the State Archive office before implementation. State Archive staff can request changes be made to the procedure as they deem necessary. A copy of the change request will be sent to the IMC for review.

COLD (Computer Output to Laser Disk) is the preferred method for an archival storage of computer-generated data within an optical storage system.

Interoperability

Easy to add users and application with backward, forward and sideways compatibility.

Document Management Standards

The need for greater efficiencies in handling business documents to meet customer expectations has fueled document management systems; DMS. Document management provides greater control over the production, storage and distribution of documents, yielding greater efficiencies in the ability to reuse information, to control a document through a workflow process, and to reduce product cycle times. Some of the available functions include: tracking, document identification, storage and retrieval, version control, workflow management and presentation. Two traditional classes of document management are 1) management of fixed images of pages and 2) management of editable documents. Systems supporting images focus on access, with input, indexing and retrieval as important factors, while systems supporting editable documents focus on creation, with joint authoring, workflow, and revision control at the center.

Some of the more prominent standards and initiatives within DMS (as of January 1997) follow.

ODMA (Open Document Management API) - allows applications to communicate with a DMS in a flexible manner without the need of a hard-coded link between the application and the DMS. This allows multiple applications to access the same DMS.

SHAMROCK - led by the Shamrock Coalition, specifies a software layer called "middleware" to be inserted between applications and documents servers, providing a common set of tools for document security, administration, and access. It essentially provides a gateway between applications and multiple, disparate document repositories. Where ODMA allows multiple applications to access the same DMS, Shamrock allows applications to access multiple DMS's.

DEN (Document-Enabled Network) creates middleware to make it easier for developers to create applications for networked document management.

OPENDOC is a "component software architecture" that provides interfaces allowing independently-written software to work together in a single document.

OLE (Object Linking and Embedding) allows objects in one application to be linked to objects in another, allowing applications to share data, as well as the functionality of the originating applications, such as updates to reflect changes.

OMA (Object Management Architecture) is a framework for specifying object-oriented environments, specifies a reference model that classifies the components, interfaces and protocols of an object-oriented system. Produced by Object Management Group industry.

Capacity Planning and Cost

One (1) document x kb, photo image x gb
3.5 HDD (hard disk drives) with data storage capacities up to 9 gb, can achieve data transfer rates of 10 mb per second or more.

Imaging Expectations

The following information results from the CIO Forum Imaging Questionnaire submitted to state agencies in December, 1997 and from case studies performed by the Gartner Group. If adhered to, the tactical guidelines listed here may help alleviate frustration and issues, since knowledge can be obtained from the past experience of others.

- Lack of early end-user buy-in will substantially raise total costs.

- Spend lots of time preparing and training staff, have regularly scheduled, frequent meetings between with in-house imaging team and vendor.

- Keep it simple. Understand OCR and indexing, study manpower costs related to OCR rejects, indexing, coding, data entry and history conversion.

- If doing an extensive backfile conversion, especially if files are being purged and organized, be sure to allow plenty of staff time and plenty of time to complete. It is a grueling and time consuming process.

- Planning and development make up 65% of document imaging implementation start up costs.

- Developing and using solutions to commonly faced issues of document imaging implementations will increase initial cost and timing projections, but will save money in the long term and increase the rate of return on investment.

- Components that comprise a solution are numerous and require commitment, effort and time.

- See a demo of the system before you sign a contract; have a pilot site prior to implementation to see how system works under full production workload stress.

- Negotiate in the contract some free upgrades and enhancements for the first 90 days of production; minor changes can be very costly.

- Do not expect instant results.

- Rely heavily on vendors that have varied experience in applications and with a variety of tools and products.

- Long term success of document imaging can be measured in multiple ways. Ask such questions as will productivity gains continue? How do original benefits compare to results? Are the benefits a result of the new system or several acquired systems?

- Using a known vendor is not always the best bet when installing an ad-hoc system comprised of many imaging components, using a new vendor provides a benchmark against known vendors and provides a potential migration path in the long term.

- Use a realistic sample of the media you plan to scan to test the imaging system before purchase. This will help identify and prepare for bottlenecks.

- Cross train staff to avoid burn-out and to alleviate or be prepared for turn over rate.

- Data capture requirements and detailed procedures for incoming (internal and external) imaging pieces must be firmly established and communicated to reduce heavy input (low match rate) at implementation start up.

- Purchase an open system that can potentially be compatible with other systems.

- Paper quality and ink colors should be addressed for new forms and backfile considerations; older, thin, fragile and faded documents will prove to be labor intensive since scanners will .

- Migration plan should also address the possibility of future changes to the hardware/software environment.

- Ensure that system is properly sized and that a detailed evaluation of document volumes, retrieval requirements, and retention schedules is completed.

- Specify open systems, DDE capability, require proof (pilot) before contract is complete, define infrastructure in detail, confirm ability to extract images and indexes from system, and determine method/ease of custom user interfaces.

Information for Imaging Readiness

This section provides information that will help each agency understand what to investigate and what questions to ask vendors in the research gathering stage. Also listed are some ways to help current imaging systems reduce network congestion.

Capture and transformation	Mass Storage	Folder Index	Output
Scan, Edit, Input, Accept, Commit, Repair	Film, Tape, Optical, DASD	Folder Document, Page Annotation	Process, Print

Work Flow Queues

Route	Fetch	Suspend	Store	Archive

User Environments

Object Handling	Data Entry Assist	Screen Manipulation	Mark Up	Local Workflow

Areas that will require IT tactical planning are:

- Connectivity
- Adequate bandwidth
- Standardized technology toward interoperability
- High-level imaging function isolation
- Understanding the trends and aspects of IDOM (… Distributed Object Managers) and address data types/objects

IT technical issues that each agency should be aware of:

- Network impact of imaging
- Scanner allocation to appropriate tasks and selection issues
- Version control and vendor support
- LAN and WAN transmission volume clogging communication links
- High user awareness will drive demand for hardware and infrastructure scanners, optical and local hard disk storage, LAN/WAN connectivity, bandwidth, printer acceleration, cards, higher resolution monitors, faster desktop systems

Questions that should be addressed for interoperability and cross utilization within departments and state agencies:

- Is the system scaleable; supports expansion
- Is there a level of backward compatibility from vendor
- Are the current systems compatible regarding media-format and file format
- Are there consistent scanner control dialogs

Ways to reduce the number of images that cross the WAN in a given period:

- Pre-fetch images and load to local storage when network usage is low
- Locate the source and users as close as possible on the network
- Separate ring or segment for scanner and indexer workstations will reduce congestion
- Research products that can create a new file that transform the image to a new format
- Seek out approaches that place the image on the network in smaller pieces (5kb at a time)
- Find options for internally generated paper (re-engineer) like Electronic forms (E-Forms)
- Determine value and benefit of document types and perhaps by-pass scanning
- Seek approaches that reduce the average network image size
- Isolate low end users on low-speed lines

Imaging Requirements Analysis

Requirements Analysis Outline

The following section sets forth a general outline for an imaging requirements analysis. It has been designed so that the resulting document can also be submitted to appropriate vendors as a request for proposal (RFP). Please note that prior to conducting an imaging requirements analysis, it is important to determine whether or not the application is really an imaging application. In very general terms, an application is an imaging application, rather than a data processing application, when the document is more critical to the process than the data it contains. The IMC staff can assist in making this determination. If data processing applications are the more mission critical, but there are also imaging applications, the data processing applications should be reliably functioning prior to integrating imaging with them.

Vendor Transmittal Letter

This letter should briefly explain the type of information requested from the vendor and should include time and/or budget constraints on the project. It should also include a due date for vendor proposals and name an information contact for the vendor to call with any questions.

Executive Summary

This section should contain a very high level overview of the information detailed throughout the requirements analysis. Typical components would include:

- A very short organizational mission statement
- A brief workflow overview and problem description
- Mention of existing systems and interfaces desired
- Overall volume and frequency information for system sizing
- A brief discussion of access requirements
- A short section describing the intended use of the imaging technology to solve the agency's business problem, including overall project objectives and performance benchmarks
- A brief summary of the agency's cost/benefit and risk analysis
- An agency organizational chart showing number of users in each unit.

Technical Requirements/ Operating Environment

This section should provide an overview of the architectural environment and standards the imaging system proposed must be compatible with. It should also describe any current equipment configuration installed and any interfaces desired with this system.

Typical components would include:

- Architecture Environment: Reinforce that all vendor proposals must comply with the Statewide architecture. Reference may be made to architectural requirements set forth in the department, federal, counties etc. that may consider requirements.

- Current Equipment Configuration: Describe any current equipment configuration and networking (such as an existing data processing installation) and plans to maintain, modify, upgrade, or replace it. It should include a clear statement to the vendor of whether or not the agency wishes him to use as much as possible of the existing equipment and networking in his proposed configuration.

- Systems Interface Requirements: If the agency plans to integrate imaging with its existing data processing system to maximize productivity gains (i.e., if an interface is planned to an existing application database, etc.) the type of interface desired should be fully described here so that the vendor understands the complexity of the system. In this case, it is particularly important to provide documentation of the current system, or to furnish a knowledgeable information contact.

Workflow Analysis/Functional Requirements

Prior to implementing any new system, it is important to re-examine current processes to see if they are necessary and carried out as efficiently as possible. This portion of the requirements analysis should provide documentation of: 1) the current flow of work throughout the organization as well as, current input from and output to other entities, and 2) the proposed workflow as the agency plans to modify it as a result or re-engineering their business processes through the use of imaging technology. In addition, functional requirements for the new imaging system should be documented here, as well as benefits and performance benchmarks for the new system. The later should be quantified so that success can be measured.

On convenient method of accomplishing this, is to visually illustrate work flows through charts/diagrams supplemented by narrative descriptions. Narrative descriptions for proposed work flows then include discussions of the functional requirements for the proposed system, benefits and benchmarks.
Regardless of the technique used, current and proposed input, processing, output/access, and storage requirements should be addressed in this section. Again, it is important to be as detailed as possible in describing requirements so as not to understate the complexity of the system. Typical components of the section using the approach described above could include:

Overview

This section is a high level perspective and should include communication links with external agencies/entities in terms of both inputs and outputs. It could be organized as follows:

- Current workflow Overview Chart and Narrative (Designate any current processes which must be maintained; i.e., statutory requirements, signature requirements, requirements for legal admissibility of documents, etc.)
- Proposed Workflow Overview Chart, Narrative, and General Functional Requirements

Input

In this section describe the volume, frequency and characteristics of the documents anticipated to be scanned into the imaging system to help the vendor propose the correct input device and size the system. (Complete for each major process and/or document type.)

Input should be described as it is envisioned being supplied to the imaging system. If the input workflow will be modified as a result of re-engineering processes through the use of imaging technology, both the current and proposed work flows and narratives would be included here a s ell as, how the process is to be streamlined, the benefits of this, and benchmarks for measuring

success. If backfile conversion is planned, these documents should be separately identified. A statement describing any projected growth in input requirements should also be included.

The section could consist of:

- Current Input Work Flow Chart and Narrative
    - Volume and Frequency of input
    - Physical Document Characteristics
- Proposed Input Work Flow Chart, Narrative and Functional Requirements
    - Volume and Frequency of input
    - Physical Document Characteristics
    - Backfile Conversion Planned
    - Anticipated Growth Requirements
- Benefits and Performance Benchmarks (Quantified to the degree possible)

In House Processing

This is a key section that should describe the work flow re-engineering that is anticipated with the imaging system. Both the current and proposed work flows should be included, and steps expected to be eliminated should be documented as well as, the benefits of streamlining the process and benchmarks for measuring success. Particular emphasis should be put on the functions required of the new imaging system to accomplish the improvements in work flow. Typical activities which could be eliminated or greatly reduced by an imaging system appear below.

This section may be organized as follows:

- Current In house Work Flow Chart and Narrative (including problems with the current work flow)

- Proposed In House Work Flow Chart, Narrative and Functional Requirements
    - Steps eliminated (i.e., file location, retrieval, re-filing, copying, folder maintenance, diminished travel and telephone time.)

    - Steps added (i.e., scanning and indexing documents. At a minimum, a full description of how these activities are accomplished, capabilities, etc., should be requested from the vendor. If specific requirements in this area are known, they should be stated as functional requirements.)
- Functional Requirements (Special functional requirements needed by a given agency will naturally vary. Examples of capabilities required could include.)

- A method of tracking which employee completed in-house processing steps on a given document
- A way of pin-pointing what point in the process a given document has reached, if it is necessary that it pass through several hands. Examples of this might be the use of status indicators or automatic document routing. (If a status indicator is needed, the number of indicators required should be specified.)
- The ability to automatically generate management statistics/productivity information
- The ability to confidentially annotate documents

– Benefits and Performance Benchmarks (The benefits of streamlining the workflow should be quantified to the degree possible to provide performance benchmarks.)

Output/Access

This section should provide full information on visual and printed output required from the imaging system as well as, access requirements. Important consideration regarding access requirements include the number of simultaneous sessions planned by type, i.e., the number of users who might wish to view, download, and/or print files at the same time by local, remote, or dial-up FAX-back connection. Visual output considerations such as split screen or multiple window capabilities would also be addressed here as well as, the contents of any reports required or desired.

Additional considerations would include such items as number of indices or key information needs to be retrieved by, and levels of sorting required. By describing both the current and proposed output processes, ways in which the output process can be streamlined can be identified and documented to insure the vendor can meet the functional requirements in this area. Benefits can be illustrated and performance benchmarks established.

An example of how an output access section could be organized follows:

– Current Output/Access Techniques Chart and Narrative (including problems, delays, etc. caused by current techniques) Examples:
  - Copies
  - Mail
  - Telephone Responses

– Proposed Output/Access Techniques Chart, Narrative, and Functional Requirements (Functional requirements should be described for each type of site with different needs.) Items that should be addressed are:
  - Vehicle for access i.e., internal network described in “Current Equipment and Operating Environment,” or other. Specify if dial-up FAX-back connections are required, compatibility and image resolution requirements.

- Capabilities i.e., sort, select, view download, and print image.
- Volume and frequency to indicate the number of personnel requiring the above capabilities, estimated frequency of access, and number of sessions of a given type of system, needs to support concurrently with other users on the network.
- Capabilities unique to a given group which should describe any unique functional requirements such as the ability to annotate images confidentially or any security restrictions on different classes of documents.
- Output screen appearance i.e., split screen capability, multiple windows and specify amounts, etc.
- Method of information retrieval noting indices required for document retrieval, including number and levels of keys required. If there is an interface with another system, describe how images and/or data need to be accessed from both; for display side by side in response to a single, integrated query.
- Reports required. Describe any output reports required for the system like management statistics such as workstation utilization, number of images viewed, scanned, printed and or annotated on a daily, weekly, monthly basis etc.
- Future access and growth requirements. Describe known and potential future expansion of access requirements, interagency use of the application via CIN wide area network connection, long term plans to make use of the Statewide backbone or simple increase in the number of users as imaging capabilities become known. Vendors should be asked to describe their expansion potential to address these needs.

– Benefits and Performance Benchmarks. The benefits of new access techniques available through the use of imaging technology and anticipated productivity gains should be included. Productivity increases expected should be quantified to the degree possible to provide performance benchmarks.

Storage

This section should describe current and proposed storage techniques. Any problems with current methods of storage should be noted. Vendors should be advised that record storage must meet the requirements set forth in established records retention and disposal schedules. These requirements should be indicated with the schedules themselves for clarification.

Storage requirements for the future imaging system should be thoroughly described and linked to the system inputs described in the “Input” section to assist the vendor in properly sizing the proposed imaging system. Projected growth in storage needs should be indicated. Any additional storage needs such as disk caching (maintaining a specified volume of records on hard disk for a given period of time to provide for faster access than is available with optical media) should be described. Back up disaster recovery requirements should also be addressed.

Efficiencies and other benefits of new storage techniques such as storage space requirement reductions, document integrity, enhanced security, etc., should be documented as well. As with other benefits, these should be quantified to the extent possible to provide performance benchmarks.

Storage needs are as various as the types of information stored, however some items that might be included are:

- Current Storage Techniques. Include problems with existing methodologies.
  - Current method of storing and organizing records on-site like alphabetical by a given key, in filing cabinets and/or on shelves. Specify duration of time that the records are stored in this manner.
  - Current method of storing records off-site and retrieving them. Specify duration of time records are maintained off site by record type.
  - Describe disaster recovery provisions.

- Proposed Storage Techniques
  - Note whether a period of parallel operations is planned where hard copy and automated records will both be maintained until system has been accepted and reliability proven.
  - Describe in general the type of storage methodology desired i.e., non-erasable optical media for most records, a disk cache for some frequently accessed records, etc.
  - Provide specific information about which record types will need to be maintained on non-erasable optical media, also clearly cross-referencing the input section for volume information or summarizing and stating how long theses records will need to be maintained on this type of media.
  - If applicable, provide specific information about which record types will need to be maintained in a disk cache, clearly cross-referencing the input section for volume information or summarizing and stating how long theses records will need to be maintained on this type of media. Information about access speed from a disk cache my be requested from the vendor here or in the "Access" section.
  - Explain how long and which type of records would need to be maintained on-site on electronic media (like optical disks) but not loaded on the system. Request information from vendors regarding any additional drive bays needed to allow for occasionally reloading additional disks without requiring current disks to be removed. Information about access speed from the optical media may be requested here or in the "Access" section.
  - Describe any procedures required for storing records on disk to facilitate retrieval. Ex. If a given group of records form a logical unit which would all need to be available for access together, the system should provide for storing these on the same, or a limited number of disks. Request information on how this can be accomplished.

- Provide known information about back-up and off-site storage requirements. Vendors should be requested to supply detailed information about how back-ups would be accomplished. As with any type of system, agencies should have a Disaster Recovery Plan in place with provisions for the new imaging system. Ask the vendor to describe any disaster recovery support available. Or, if specific disaster recovery requirements are known and included in the agency's plan, they should be articulated and vendors should be required to comply with them.
- Storage needs can be greatly affected by back-file conversion plans. If there are any plans to do back-file conversions, describe them detailed volume and duration of storage information and cross-referencing the "Input" section for physical document characteristics.
- Describe any projected growth in storage needs.

– Benefits and Performance Benchmarks. Benefits from the new storage technique and from performance benchmarks, should be quantified and measurable to the degree possible.

This concludes the Workflow Analysis portion of the Requirements Analysis. If desired benefits and performance benchmarks may be summarized here for ease of reference.

Support

This section should describe vendor support requirements and request that the vendor provide information about any start up and on-going agency support activities required to maintain the system proposed.

This section may be organized as follows:

Vendor Support Requirements

This section may reference the support services required with a statement that “these services shall be provided for the dollar amount quoted in response to this requirements analysis/RFP.” These may include general support as well as, unique support requirements or key provisions that the agency wishes to emphasize.

Agency Support Activities

Start Up
Full installation services are to be provided by the vendor. However, vendors should be requested to fully describe any agency participation anticipated during implementation, i.e., a knowledgeable agency person on hand to answer questions, etc.

Ongoing
In this section the vendor is requested to provide full information about the agency systems administration workload which the proposed solution will require. For example:

- Methods of performing back-ups, space management, etc.
- Level of training/experience necessary on the part of the agency systems administrator.
- Ease with which the agency systems administrator can customize the system and techniques for doing do.
- Systems interface the agency systems administrator will interact with, i.e., windows-type interface with pull down menus or command/character based.

Vendor Proposal

Vendor Proposal Format

This section is intended to insure that vendors respond to the requirements analysis/RFP in the same format to assist agencies in locating the information they need and in comparing vendor responses. It is typically in the same sequence as the Requirements Analysis for ease of cross-referencing agency requirements with vendor responses.

Sample Vendor Proposal Format

Vendors should structure their written responses to this document in the following format:

Transmittal Letter

The transmittal letter shall be written on the vendor's official business letterhead stationary. The letter is intended to transmit the proposal and shall identify all materials and enclosures being forwarded in response to the RFP. The transmittal letter shall be signed by an individual authorized for the company.

Title Page

The title page should include the subject of the proposal, name of the firm, local address (if one), telephone number, name of contact person, and the date.

Executive Summary

The executive summary should condense and highlight the contents of the vendor's proposal in such a way as to provide the agency with a good understanding of the entire proposal. This should be a concise overview summarizing how the proposed imaging system meets the administrative, technical, functional, support, and cost requirements of the agency as expressed in this requirements analysis/request for information or proposal.

Vendor References

Vendors will provide recent references (preferably within the last 3-5 years), specifically including any Colorado state agencies, of sites where they have installed imaging systems similar to the one they propose to meet the agency's imaging needs. Vendors will use the "References" form provided for this purpose, attaching additional sheets, as necessary. Three references are requested.

The vendor shall provide for each reference:

- Company/agency name
- Company/agency address (including current telephone number)
- Date of Implementation: type and total number of devices installed; software; services provided, to specifically include any training, installation and maintenance services; and imaging system cost
- Contact person's name (preferably project manager)

Table of Contents

Each section of the vendor's proposal shall cross-reference the page number and section title as it responds to this requirements analysis/RFP.

Body of Proposal

The body of the vendor's proposal shall be structured in the sequence and use the heading outlined below:

Administrative Requirements/Constraints

The vendor will include a statement of his ability to fully implement the imaging system within any time and budgetary constraints specified in the transmittal letter for this document.

- Time Constraint Statement
- Budgetary Constraint Statement
- General Project Plan and Schedule (if requested by agency)

Technical Requirements/Operating Environment

The vendor will describe in detail how he can meet the architectural environment standards and systems interface/utilization requirements described in this section.

- Architectural Environment Requirements
- Systems Interface/Utilization Requirements

Functional Requirements

This section of the vendor's proposal should explain in detail how the proposed system will meet the Agency's functional requirements as described in the Input, Processing, Output, and Storage sections of this requirements analysis/RFP. Specific subsections and requirements must be clearly cross-referenced.

- Input
- Processing
- Output
- Storage

In addition, this section of the proposal must include a full description of:

- The imaging configuration being proposed. Include meantime before failure (MTBF) for proposed imaging hardware, if available.
- Modularity of the proposed hardware/software solution
- Adherence to open systems standards by the vendor's proposed imaging hardware and software
- Any features of the vendor's proposed imaging solution which exceed the functional requirements expressed and any other services provided, i.e., management seminars, technology overviews, etc.
- Availability of imaging hardware and software being proposed on State Price Contract.

Support

Vendor Support Requirements

The vendor shall be required to provide full information on support services included in the proposal for the amount quoted, which must meet the agency requirements in "Support Requirements." The vendor shall also provide information on any consulting services (i.e., software customization, workflow analysis, etc.) necessary to implement a system which meets the agency's requirements. As with all other aspects of the proposed system necessary to meet the agency's requirements, these must be included in the vendor proposal for the dollar amount quoted.

Agency Support Activities

In order to assist the agency in gauging the level of effort and personnel requirements for both start-up and day-to-day operations of the imaging system proposed, vendors shall be required to describe in detail any systems administration activities anticipated for agency personnel to perform in the normal course of events to assist in implementation and to keep the proposed imaging system operational; the level of education/training recommended for agency personnel to perform theses functions; the ease in which the agency administrator can customize the proposed system to meet future agency needs and methods of doing so; and the nature of the proposed imaging systems interface with which the agency administrator would interact.

- Support Activities (itemize and describe)
- Level of Training/Experience Recommended
- Ease and Methods of Agency System Customization
- Interface

Sample instructions on preparation of cost proposals and forms which vendors may be required to use to insure consistency of cost information provided and facilitate comparison of different vendor's responses are provided in "Vendor Cost Proposal Format," following this section.

Vendor Cost Proposal Format

This section is intended to insure that vendor's responding to the requirements analysis/RFP include the same information in the cost section of their proposals. It is to be used with the hardware and software cost matrices following this section to structure vendor responses in the same format to facilitate comparison and insure important items are not overlooked. Matrices should be supplemental with narratives including any additional information requested here. A sample of this section follows:

Sample Vendor Cost Proposal Format

The vendor's imaging cost proposal will contain the following cost sub-categories:

1. Hardware Cost
   This summary will itemize the costs for the complete hardware configuration proposed and provide annualized maintenance fees for each of them.
2. Imaging Solution and Related Services Costs
   This summary will itemize the costs for all imaging software products proposed and any consulting services (i.e. software customization) required to meet the agency's requirements as outlined in this document. It will included:
   - Imaging Software
   - Imaging Software Maintenance - Annualized
   - Documentation - Vendor narrative describing technical equipment manuals, software manuals, reference guides, and other documentation required which describe the characteristics and/or operation of the proposed imaging system. The vendor should specify whether documentation is available in paper or electronic media versions, or both. Any related additional costs should be specified here. The number of units proposed should be adequate to supply the user's needs as described in this requirements analysis/RFP and the vendor should provide the rationale for the number cited.
   - Training Costs - Cost reflecting per seat, per day for on-site training to include all training and associated costs (i.e. per diem, and other travel expenses of the trainer/s as well as, any changeable training materials). The vendor will provide estimates of the number of days of training for a user and a system manager to successfully install and operate the system proposed and included any further explanation of this estimate in this section's narrative.
   - Installation Cost - Per hour cost reflecting all associated costs to enable the "turnkey" operation of the system. The vendor will include estimates of the number of hours to

successfully install and operate the system proposed and provide any further explanation of this estimate in this section's narrative.

- Consulting Services - Cost reflecting any up-front consulting services required to implement an imaging system which meets the agency's requirements as expressed in this requirements analysis/RFP, on a per hour basis, including:
  - Software Customization
  - General Consulting Services - Additional consulting services required up-front to meet agency's requirements (i.e., integration, planning, workflow analysis, re-engineering analysis, or any other services). The vendor must clearly identify and explain any costs included in this section.

The vendor shall include estimates of the number of hours to successfully implement the proposed system, (within any time constraints expressed by the agency as detailed in the transmittal letter for this requirements analysis/RFP) for each type of consulting service (software customization and general consulting.) The vendor will provide any further explanation of this estimate in this section's narrative.

For each service category listed (training, installation and consulting) "units" equal the actual number of hours or days projected. The vendor should clearly label the units.

Imaging Services/Training Catalog

A catalog of all services proposed to meet the agency's requirements (training, consulting, etc.) is to be included as an attachment to the vendor's response. The vendor shall include training catalogs of courses or services as appropriate. Each item should be identified with a brief description and associated cost.

Additional Information

In addition, the vendor will provide the agency with information regarding the following:

- Software Quantity Discounts (Describe any available.)
- Hardware Trade-up Values/Discounts (Describe any available.)

Matrix and Evaluation Forms

Hardware Cost

This matrix is intended to be used by the vendors to array the hardware costs in the vendor proposal. Use of a single format such as this one by all the vendors submitting proposals, facilitates cost comparison and insures that no items are left out. (For further reference, see detailed cost definitions in, "Vendor Cost Proposal Format.")

Sample Hardware Cost Matrix

Vendor: _____ Date: _____

Hardware Cost				
Equipment Type	# of Units	Unit Cost	Cost	Annualized Maintenance Cost
Total		$	$	$

Comments: (Attach additional sheets, if necessary.)

Imaging Solution and Related Services Cost

This matrix is intended to be used by the vendors in their proposals to array the costs for the remaining elements of their complete imaging solution and related services. As with the hardware costs, use of a single format such as this one by all the vendors submitting proposals, facilitates cost comparison and insures that no items are omitted. This section should also be supplemental with a narrative including any additional information requested here.

Sample Imaging Solution and Related Services Cost Matrix

Imaging Solution & Related Services			
Product	# of Units	Unit Cost	Cost
A. Imaging Software [1]			
B. Imaging Software Maintenance - Annualized			
C. Documentation (If Separate Costs)			
1. Hardware			
2. Software			
3. Other			
D. Training Costs (On-site / Seat / Day)			
1. System User			
2. System Manager			
3. Travel Cost			
E. Installation (Hours)			
F. Consulting Services			
1. Software Customization[2] (Hours)			
2. General Consulting -Specify/Hour			
G. Other (Specify)			
Total		$	$

Comments: (Attach additional sheets, if necessary.)

[1] Attach itemized list of software, showing cost and annualized maintenance for each item.
[2] Initial software customization required to meet functional requirements detailed in this document.

References

for

Vendor Name _____

Company Name _____
Address _____
_____

Contact Name _____
Phone _____
Purchased Amount _____
Completion Date _____

Company Name _____
Address _____
_____

Contact Name _____
Phone _____
Purchased Amount _____
Completion Date _____

Company Name _____
Address _____
_____

Contact Name _____
Phone _____
Purchased Amount _____
Completion Date _____

Vendor Comparison Checklist

This section of the requirements analysis provides a convenient method for comparing vendor responses and making a selection as well as, documentation of the reasons for making the final choice. It may be used in-house only or shared with the vendor as well.

Sample Vendor Comparison Checklist

The primary purpose of this checklist is for the convenience of reviewing RFP responses to assist in selecting a vendor based on, but not necessarily limited to, the requirements summarized in this section.

Summarize the requirements (sample listing below), then once the vendor response is received, compare and comment using a customized RFP checklist. (Cross-reference the vendor responses with the correlated section/s of the requirements analysis/RFP to see if the proposed system meets the stated requirements. Compare:

Administrative	*with*	Vendor Transmittal Letter and Vendor Proposal Format
Technical		Technical Requirements/Operating Environment
Functional		Inputs (major document types)
Processing		In-house Processing under Workflow Analysis
Output/Access		Output/Access under Workflow Analysis and Functional
Storage		Storage
Support	*with*	Support section of Requirements Analysis/RFP)

Requirement	Yes	No	Comments
Administrative			
Admin. Req. # 1 (Vendor references satisfactory?)			
Admin. Req. # 2 (Meet any time constraints?)			
Admin. Req. # 3 (Meet any budget constraints?)			
Technical			
Tech. Req. # 1 (Proposed system conforms to Architectural standards?)			
Tech. Req. #2 (Proposed system integrates with agency configuration and provides for future network connectivity?)			
Requirement	**Yes**	**No**	**Comments**
Functional			

Input Document Types			
Major document **Type # 1** i.e., Can accommodate?			
Maximum volume per year (If multi-page, state total number of sheets per year.)			
Fill in Method: i.e. – x% typed – x% written by hand in ink – x% computer generated, etc.			
Physical Doc. Characteristics, i.e., – Size – Orientation – Simplex or duplex – Paper Type (original/bond…) – Xerographic copy, multi-part carbonless form, etc.) – Color			
Major Document Type **# 2**			
Major Document Type **# 3** etc.			
Processing			
Functional Requirement **# 1** (Provides sound/easy method for agency personnel to know what internal steps a document has passed through?)			
Functional Requirement **# 2** (Provides sound/easy method for agency personnel to confidentially annotate images?)			
Functional Requirement **# 3** etc.			

Requirement	Yes	No	Comments
Output/Access			
Functional Requirement **# 1** (Is the proposed imaging solution capable of handling the volume of the required simultaneous sessions?)			
Functional Requirement **# 2** (Does the vendor state that the proposed system will accommodate access from future anticipated sites?)			
Functional Req. **# 3** etc.			
Storage			
Functional Requirement **# 1** (Vendor states proposed system capable of satisfactorily storing input volumes specified for the storage period required?)			
Functional Requirement **# 2** (Does the proposed system provide a method of copying related records to specified optical disks to facilitate retrieval?)			
Functional Requirement **# 3** etc.			
Support			
Support Requirement **# 1** (Does vendor state that all support services will be provided as detailed in the State Price Contract for the dollar amount quoted?)			
Support Requirement **# 2** (Does the vendor describe start-up and ongoing agency support responsibilities and are they manageable?)			
Support Requirement **# 3** etc.			

Attachments

Document Reference

The following documents referenced in this model are available to attach to agency's imaging requirements analysis/requests for information to provide further clarification to the vendor, or for agency information/reference. Source for documents are indicated.

Document Description	Source
Architectural Requirements	
Archival Requirements/Record Storage	
General Terms and Conditions	
Imaging Standards	

Contact List

The following list will assist in contacting agencies listed in this document to acquire additional information or answer specific questions not addressed in this document. The information contains the general phone for number for the department/agency and does not consist of specific names. For each contact number below ask to speak to the IT manager or to the person who can provide information on imaging projects.

Agency	Function	Phone	Location
Central Services	In-House Imaging / Approval	303-999-9999	51st - Denver
IMC	Project / Imaging Approval	303-866-3222	
State Archive	Historical Storage / Approval		13th & Sherman

Forms

Imaging Implementation Form

The following form is to be completed just prior to implementation, but no later than 30 days after the implementation of an imaging system. This data is stored for information sharing with other agencies who may be investigating the use of imaging technology and to acknowledge closure of the project for the IMC. Please be as accurate as possible. Provide any comments regarding your experience with the implementation of an imaging system which may supply useful information to those with future imaging expectations.

Imaging Implementation Form

State Department Name: _____ Date: _____

Name: _____ Phone number: _____
(Person filling out survey.)

Note: Please fill out the following information just prior to, but at least 30 days after, implementation of an Imaging system.

Instructions: Select desired response box and fill in blank areas with requested information. Return to the IMC office 1525 Sherman, Rm. 100.

1. Division Area or Line of Business (LOB) in which imaging system is utilized: _____

2. Functional Purpose for Imaging system? _____

What % will be (is) external and internal generated documents? External ___ % Internal ___ %
Feasibility Study performed? Yes ___ No ___
Was an RFP submitted? Yes ___ No ___
Business workflow re-design or BPR? Yes ___ No ___
Interfaces to other applications in place? Yes ___ No ___ Applic. Type/s: _____

3. Was there a history or document backfile scanned? Yes____ No___ Legacy conversion? Yes ___ No___
Backfile Source: _____

If Yes, please answer the following:
All backfiles _____ **- or -** Sort Selected _____ In-house _____ **- or -** Out-sourced _____

Total FTE/Contract Cost: _____ Storage Size: _____

Span Time: _____ (weeks) Total Number of Records Scanned: _____

4. Is there any data entry required after the scanning? Yes _____ No _____

Why or why not? _____ Is bar-coding being used? Yes___ No___

5. Do you use OCR (Optical Character Recognition) or ICR (Intelligent Character Recognition)? Yes __ No ___

If yes, which type: OCR _____ ICR _____ How is it being utilized? _____

What is the average match rate? _____

6. Estimated Average Daily Records scanned? _____

7. Is the scanned data being indexed? Yes ___ No ___

Type of image format that is used: _____ Number of header indexes (fields): _____
Please list the:
Capture and Retrieve Software: _____ Mfg's name: _____
Compression Type: _____

8. Scanners: Quantity: (per type) Type/Model: Mfg./s

_____ _____ _____

_____ _____ _____

_____ _____ _____

Imaging Implementation Form

9. What type/s of Storage do you use:

Type	Quantity	Size	Mfg./s	Total Capacity	Capacity In Use
Optical Disk					
System Hard Disk					
Local Hard Disk					
CD					
Other: (List type)					

10. Viewers or API's (Application programming interface): Total number: ____

Type	Quantity	Size	Mfg./s

11. Database: _____ Operating System: _____

Network O/S: _____

12. Please mark (x) component types:
Scan image, view & storage _____ Workflow _____ Work group ____ Document management ____
E-form ____ COLD ____ Information retrieval ____ Web-based ____ E-mail ____ FAX ____
Other: (please specify)_____

13. Communication protocol: _____ Is the current response time adequate? Yes ___ No ___
Network Speed: _____

Average Concurrent System users? _____ Response Time: _____ sec. (normal/average)
Concurrent users during peak times? _____ Response Time: _____ sec. (during peak time)

14. Is the system currently accessible (integrated within) the:
Division___ Department ____ Other State Agencies ___ Public ___ Internet ___ Other ___

Have you or will you consider sharing your images with other state departments? Yes ____ No____
Have you or will you consider sharing your images with the Public? Yes ____ No____
If **No** to either, please list the main objective/s or concern/s that hinder sharing considerations.

_____

_____

15. What was the original estimated ROI? _____ What is the current estimated ROI? _____
Based on a span time of (months): _____ Based on a span time of (months): _____

Total Start Up Cost: _____ Est. Annual Mx Cost: _____ Est. months for 100% ROI: _____

Note: Figure the ROI (return on investment) using total r*eturn over* total *cost* for the *same period* of months.
Return/Cost during same span of time = ROI 35,000/130,000 during first 12 month period = 26.9%

16. What would you do differently on the next imaging system (or what would you tell someone just starting one)?

Optional Comments: (Concerns, issues, problems encountered or future plans…)

Thank you for your effort and support in supplying this information..