Department

of

Education

Go-Forward Design Solution

February 27, 2002

TABLE OF CONTENTS

TABLE OF FIGURES

Executive Summary

This document presents alternative approaches to implementing a Go-Forward Imaging Strategy for the U.S. Department of Education (the Department), Student Financial Assistance (SFA). The Go-Forward Design is required to support the SFA initiative to deploy an Electronic Records Management System (ERMS). Documents will be imaged upon receipt with the electronic documents available to SFA staff following their conversion. This document considers and evaluates the proposed benefits and risks associated with centralized, decentralized and hybrid approaches to go-forward processing. A review of decision drivers is also offered to aid in the decision making process.

The centralized solution simplifies system management and administration and allows for greater operational efficiency. Conversely, the decentralized alternative provides for increased flexibility in system configuration and improved document availability. The hybrid alternative simply combines the two approaches to form a more dynamic and extensible alternative.

The final deployed ERMS will perform records management functions for all electronic documents based upon the General Records Schedule and the Department of Education Records Schedule. Through the ERMS, authorized users will have the ability to search and retrieve these documents online. Documents will be filed and retrieved based upon established document classifications and indexes. The ERMS will also support searches on document content. The resulting ERMS will improve both document access and management control. The longer-term vision at SFA is to move away from paper-based processing by enabling web-based filing and other electronic transactions and thereby limit the requirements for go-forward processing.

1. Introduction

1.1 Purpose

The purpose of this document is to present a Go-Forward Imaging Strategy for continued conversion of new documents as they are received at SFA. The Go-Forward Imaging Strategy contained herein provides SFA with alternatives and issues to consider when implementing an imaging solution. This document will present the relative merits of various alternatives so as to enable SFA to make a carefully considered decision.

1.2 Project Description

This project addresses the SFA organizational need for managing electronic and paper documents. The Electronic Document Management/Electronic Records Management (EDMS/ERMS) solution provides functionality that will help SFA achieve their modernization goals of increased customer and employee satisfaction while reducing costs. The system will help eliminate SFA's dependency on paper documents, improve accessibility to SFA's information, and allow for more sophisticated means of requesting documents by attribute selection. This system is expected to improve job satisfaction within SFA by providing users with a more efficient and effective method of performing their jobs, such as providing more accurate responses to their customers more quickly and conducting trend analysis more efficiently.

Currently SFA is a paper-intensive operation, but it lacks an integrated solution for managing physical paper documents, both in the SFA organization itself, and between its student aid delivery systems. SFA has tasked Modernization Partner to develop an Electronic Records Management System to handle its electronic and paper document management needs. A crucial part of this effort consists of converting a large inventory of paper documents to digital format for input into the new system. As a precursor to a full ERMS, an EDMS will be implemented to allow the newly converted digital images to be accessible.

SFA is currently conducting a backfile conversion of existing paper-based case files in support of a DRCC pilot deployment. The remainder of this document is devoted to the process of implementing a Go-Forward Imaging Strategy that will enable SFA to transition to an EDMS/ERMS environment and minimize paper at SFA.

1.3 Document Organization

Executive Summary provides a high-level introduction to this document.

Section 1—Introduction describes the purpose of the document, includes a brief overview of the organization of the document, and lists key project references and acronyms used in the document.

Section 2—Go-Forward Processing Components provides a description of work processes necessary to convert incoming paper and files into digital media to be retrieved online.

Section 3—Go-Forward Design Alternatives provides a discussion of the alternative scanning solutions available and their relative merits.

Section 4—Decision Drivers provides a discussion on factors to consider when planning a go-forward imaging solution.

Section 5—Interim Go-Forward Design provides an overview of the interim design.

1.4 Points of Contact

The following individuals should be considered primary points of contact for questions and/or clarifications.

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Tim O'Connell	Mod Partner - EDS Senior Engineer	703-742-1603

1.5 References

The following documents were used as sources in the development of this document:

- Document Imaging, Strategy and Procedures for the Student Financial Assistance (SFA) Electronic Records Management System (ERMS), June 15, 2001
- Student Financial Assistance Imaging Procedures, Education Credit Management Corporation (ECMC), October 2001
- Implementing an Integrated Document Management Strategy, Gartner Group, February 20, 2001
- Document Imaging: An Implementation Workbook, The Rheinner Group, 1996

1.6 Acronyms

The following acronyms are used in this document:

DOD Department of Defense

DPI	Dots Per Inch
DRCC	Document Receipt and Control Center
ECMC	Education Credit Management Corporation
EDMS	Electronic Document Management System
EDS	Electronic Data System, Inc.
ERMS	Electronic Records Management System
LAN	Local Area Network
NARA	National Archives and Records Administration
OCR	Optical Character Recognition
SFA	Student Financial Assistance

2. Go-Forward Processing Components

The document imaging process involves a number of components, of which the scanning of paper materials is but one step. These components are necessary to ensure the integrity of the document conversion. These components are:

1. Document Receipt and Creation
2. Document Preparation
3. Indexing
4. Scanning
5. Quality Assurance
6. Verifying
7. Export/Release
8. Document Storage

The most critical aspect of the conversion process is indexing. Proper indexing is needed in order to locate the documents at some future point. Misfiled documents are a common occurrence when managing paper documents and can be expensive. Careful indexing during conversion prevents the misfiling of document and provides for quick and easy retrieval of information.

2.1 Document Receipt and Creation

While not a formal step in the conversion process per se, in order to be converted documents must first be created and received. The paper documents that are to be scanned will have two sources: incoming correspondence and documents generated by staff during the normal processing of files. The basic process for the conversion of documents will be the same regardless of source.

In order for an EDMS to be successfully implemented paper must be minimized. As such, incoming correspondence must be converted upon receipt. While conversion can take place after a file is closed, that practice violates the basic premise for having an EDMS. Paper that is internally generated during the processing of work should be converted at the earliest practical moment in the workflow. Otherwise, paper will have to be tracked along with electronic documents. Though various considerations in the scanning strategy often dictate that internally generated paper is scanned at the end of a workflow process.

2.2 Document Preparation

Prior to scanning, documents must be prepared. The two types of preparation activities that must be completed are: Physical preparation and Batch Preparation. Physical preparation involves locating documents, repairing torn pages, removing staples and dividers, and sorting these materials for subsequent batch processing. Batch processing requires documents to be grouped in some logical manner, most often by Document Type, and then subdivided into smaller subsets. Proper document preparation can save valuable time during scanning by reducing the opportunity for machine problems, interruptions in batch processing, and required rescanning. Cover sheets with bar code labels may be added to identify document types to increase indexing efficiency.

2.3 Indexing

Indexing is the most critical and time-consuming step in the conversion process. Done improperly, documents may be irretrievable using the proper search criteria and thereby lost in the system. Indexing requires the assignment of predefined metadata for the specified document image. When configuring an EDMS it is important to choose the metadata elements carefully. Care must be made to choose only those elements that are necessary for the quick and easy retrieval of documents along with metadata necessary to comply with records management regulations.

Indexing is a two-fold process. Prior to scanning, during the preparation of documents, metadata for the document must be identified and assigned. This can be accomplished through the use of cover sheets, barcodes, and highlights or marks on the actual document itself. Once the document is physically scanned, the metadata is attached to the scanned image. This metadata can be entered into the system through barcodes, optical character recognition (OCR), and manual typing.

Some metadata will be captured by the system automatically. This metadata will be typically of a system nature and include items such as: date entered into the system, user, and pre-set information.

2.4 Scanning

Scanners convert the physical image on a document into a digital representation that can be stored in a document repository. Scanning will should be conducted at 200 Dots Per Inch (DPI). High-speed scanners with sheet feeders are typically used in a production scanning environment. Though often a flatbed scanner must be also available to handle the imaging of non-standard sized or delicate materials.

Scanner operators will run prepared batches of documents through the scanner. At the scanning station basic metadata about the document will be captured. Depending upon the complexity of the metadata, all index entry may take place at the scanning station. In a typical scanning environment; however, some basic metadata is captured at the scanner with the balance of the metadata being entered during Quality Assurance.

2.5 Quality Assurance

Quality Assurance requires inspection of the document to ascertain if the image is of acceptable quality. The inspector must also determine whether the image document has been properly attributed to a given document type. If images contain blackened areas or are improperly, the document(s) will be rejected and rescanned. When more than one image is obscured, the scanning process needs to be halted in order to clean the equipment, readjust image quality, and/or perform further maintenance. Routine adjustments can be performed at quality control to despeckle images, adjust skewed images, or rotate documents to the proper orientation. The inspector may also be required check the page counts on a given batch of images to match the hand count for the batch. An internal control manager may also perform a random samples based on an established sampling rate.

During Quality Assurance, additional metadata may also be entered for the document. This occurs after the visual quality has been approved. These additional values were previously identified during the indexing stage and are simply entered here by the operator.

2.6 Verifying

Verification is a second step that is part of quality assurance. After the scanned images have gone through Quality Assurance, verification is done to ensure that document is properly indexed. Verification can take a number of forms. A common method is to use double-key entry. Double entry requires that the verifier enter the metadata a second time. However, the verifier does not see the original index values. The system compares the two values and if they do not match, the verifier must enter the correct index value. Other verification methods involve the use of lookups to external databases and simple visual inspection.

Different types of verification methods have different statistical assurance levels associated with them, and various methods can be combined to increase the level of assurance. A balance must be struck between the confidence level required and the cost needed to attain that confidence. These systems and process are highly reliable. A single verification is almost always sufficient to meet the required assurance level.

2.7 Export/Release

Document release is the last step in the document capture process. The images and index data are released in batches and uploaded to remote servers via the Ascent Capture Release Module. Until an ERMS is deployed and certified as NARA compliant, hardcopy documents must still be filed for permanent storage. The Release Module will generate summary statistics on batch numbers, document quantities, and export dates and times. Throughput times should be documented for a given batch to help in developing planning factors for completing the required steps.

2.8 Document Storage

While not part of the scanning process, document storage is an important consideration when architecting an EDMS. The two components that should be examined for document storage are media type and repository design.

A wide variety of storage media are available. These include magnetic storage, DVD, and optical platters. Consideration must be given to the requirements when choosing a storage media. In general, magnetic storage is the best media for online access. It is highly reliable, scalable, and allows for the final disposition of records to be properly performed. Other media are better suited to archiving and near line storage. Though many factors must be taken into consideration when choosing a storage medium.

While the goal of an EDMS is to have documents centrally managed and consistently available at everyone's workstation, the document repository itself need not be a single central repository. An EDMS allows for virtual repositories that act as a single seamless repository while in fact consisting of multiple repositories. These federated repositories would still be managed by the EDMS. In architecting a repository a number of factors must be taken into consideration. The factors considered include the geographic dispersal of the organization and network considerations. For example, in the case of a remote organizational unit whose materials not generally utilized by other units, it may be advisable to have the documents on a local file server. This would help reduce network traffic and increase response times.

3. Go-Forward Design Alternatives

This section will consider the relative benefits and risks associated with three basic alternatives or approaches to a go-forward imaging design. The alternatives, as summarized in Figure 3-1, consist of a centralized go-forward imaging process, a decentralized go-forward imaging process; and a hybrid process that takes advantage of select features from both of the primary approaches. A centralized imaging process provides for preparation and scanning of files by a single organization generally accessible to all participating organizations. A decentralized process is more flexible and offers preparation and scanning at multiple office locations as they receive and process incoming materials. The hybrid process, as the term implies, allows for certain activities to be conducted centrally and others to be located at the originating office. In deciding on an approach, SFA must consider the types of documents and records they manage and their internal business practices.

SFA processes a wide variety of documents and records including policy documents, financial records, school applications, student request forms, case files, audits and legal opinions. Individual offices within SFA have established specific business practices to more efficiently process these various documents and records. Each organization will need to consider their organizational structure, document types and processing requirements in deciding on a practical go-forward approach. In particular, organizations should account for those documents that require special handling or special circumstances that might affect the processing of a given document. These factors will be highlighted in the forthcoming discussion of each alternative.

3.1 Centralized Preparation and Scanning

3.1.1 Design Considerations

Selection of a centralized solution generally implies a commitment on the part of the organization to enterprise-wide document management. In making this commitment, the organization will need to implement or acquire access to a larger scale production imaging capability. Implementing a centralized go-forward approach requires that the majority of the organization's documents and records are easily discernable. That is, given some basic guidelines, an organization outside of the business area could quickly identify documents by type and define the required metadata for subsequent system entry. There will be exceptions of course. In this case, documents may need to be prescreened to identify those materials requiring special handling. One example might be a payment from a financial institution that might need to be deposited immediately. Other examples might include congressional correspondence or invoices requiring attention just prior top year-end processing. Given that these materials are the exception and not the rule, a centralized solution can be readily implemented. As a guide, exception processing should be limited to five percent of the overall volume. Where these volumes continue to grow, the organization should consider delivering those exceptional materials directly to the addressee and support a local scanning solution at their offices. This *hybrid* configuration will be discussed in more detail in Section 3.3.

Centralized Alternative - Centralized Processing and Scanning

Decentralized Alternative - Decentralized Processing and Decentralized Scanning

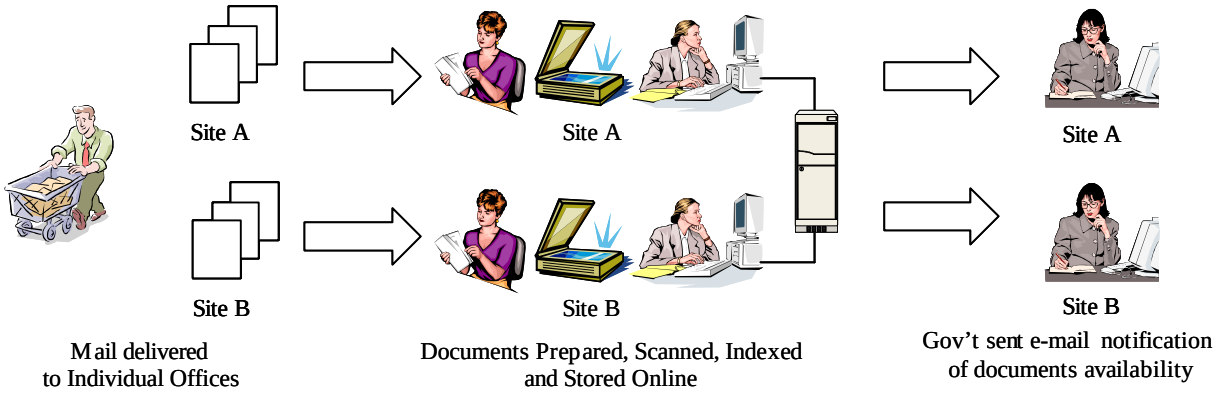

Figure 3-1: Go-Forward Design Alternatives

Selection of a centralized preparation and scanning facility is generally reserved for organizations receiving a fairly large number of new documents on a daily basis. In general, centralized solutions support a larger user base contributing to the volume of newly received documents. Casual imaging or ad hoc imaging requirements are typically supported using a decentralized go-forward approach. The higher volume and standardized processing associated with the centralized approach tends to provide a greater degree of efficiency and effectiveness. The centralized approach provides for more routine operations and a greater degree of control over the imaging process. As a result, these systems are considered more reliable than the more flexible decentralized alternative.

3.1.2 Benefits and Risks

As with most centralized business solutions, the primary benefits associated with an enterprise-wide, centralized, go-forward solution include:

1. Simpler system management and administration
2. Minimize risk associated with data management

3. Maintain a core set of standard business practices

4. Increase operational efficiency

5. Reduce costs for system integration, operation and training

The following sections explore the specific benefits associated with the centralized alternative and the inherent risks.

3.1.2.1 Simpler System Management and Administration

Benefits: A centralized go-forward solution greatly simplifies integration within the overall enterprise architecture. Given its central location, fewer persons are required to support system operations and maintenance. In addition, the organization is better able to manage adherence to corporate processing standards.

Risks: More difficult to accommodate individual office concerns.

3.1.2.2 Minimize Risk Associated with Data Management

Benefits: A centralized go-forward solution provides a far better approach to managing quality control standards. Certainly in either approach, management would want to establish specific metadata standards. Though with a centralized approach, the organization could exercise greater control over the application of these standards. Many data management processes would also be simplified by employing a central data repository. Redundant backup and recovery would be much easier to support. In addition, system security and document access controls could be more effectively managed.

Risks: A more disciplined data management program bears no additional risks to the organization.

3.1.2.3 Maintain Core Set of Standard Business Practices

Benefits: Using a centralized structure, organizations can more easily develop and apply standard document types and metadata to simplify file search and retrieval. This paradigm will also encourage the organization as a whole and individual business units to develop and refine their methods for assigning document types and metadata. Standard formats can be more easily introduced to streamline go-forward processing. Individual business units can add specific workflow solutions to streamline the routing of documents. By simplifying routing and management of documents, organizations will have more time to focus on the critical analytic tasks to be performed.

Risks: The primary concern with employing a centralized go-forward strategy is the inherent limits it places on the individual unit to conform to organizational standards. Sometimes these limitations on flexibility can constrain the individual units ability to respond quickly to change.

3.1.2.4 Increase Operational Efficiency

Benefits: In deploying a centralized go-forward capability, an organization of the size and breadth of SFA, will require a fairly robust solution. These production imaging solutions generally require a greater initial investment, but are far more efficient to operate. These capabilities offer more extensive capabilities for document-centric workflow automation. These higher-end scanning solutions also offer better imager processing technologies improving document quality and processing efficiency. By merging the previously mentioned potential for improvement in standard business practices with a more advanced scanning solution, organizations can take greater advantage of advanced extraction and verification process such as forms recognition, mark sense recognition, and image character recognition.

Risks: As previously stated, the centralized approach carries with it the issue of limited flexibility and difficulty reacting quickly to change.

3.1.2.5 Reduce Cost for System Integration, Operation and Training

Benefits: Organizations will encounter fewer system and network integration issues by establishing a centralized go-forward solution. By isolating the scanning and image processing on a separate subnetwork, enterprise network traffic is reduced. A centrally located solution is also easier to maintain than a distributed architecture. System administrators are co-located and their training can be more easily accommodated. For SFA Headquarters, a more centralized approach to data storage would support more efficient document access and retrieval.

Risks: Centralized go-forward processing naturally presents a risk to the organization as a single point of failure. Corporate resources, such as these must be carefully monitored to manage peak-processing requirements. If a centralized solution is adopted, management should consider employing a fully mirrored, redundant database server to mitigate the potential risk.

The other issue concerning centrally maintained corporate resources is response time. Decentralized solutions tend to offer improved response times if the database servers are deployed locally.

3.2 Decentralized Preparation and Scanning

3.2.1 Design Considerations

The decentralized go-forward imaging process offers the organization a more scalable and flexible capability. The organization can scale the scanning solution at each location to the expected document volume. Some locations could simply be equipped with a flatbed scanner and a connection to a central database repository. Other locations with somewhat larger document volumes may require a more robust scanning solution and their own remote server for local data storage.

Similarly, using the decentralized approach, the organization can choose to have the individual business units perform go-forward preparation and scanning or funnel all of their imaging

requirements through a single local imaging provider. In either case, a decentralized approach can dramatically reduce the time required to render paper files into electronic images. However, where imaging is performed within the business unit, the staff will obviously require significant training. The decentralized approach does tend to increase the requirements for training and quality control so as to maintain adequate standards throughout the organization.

Some decentralized go-forward implementations only require a limited amount of metadata to be assigned during the go-forward indexing process. The individual business unit, as part of a tailored document workflow, would enter those remaining metadata fields requiring more acute business acumen. This limited indexing construction would allow almost immediate access to scanned materials.

3.2.2 Benefits and Risks

The primary benefits for a decentralized approach are, as discussed, flexibility and availability. However, a variety of lesser benefits exist. For low volume operations, less expensive equipment, such as flatbed scanners and low-end servers may be sufficient. With less expensive equipment, technical obsolescence is not as great a concern. Lower cost technologies can be more easily upgraded or replaced without unduly impacting the organization.

As one would expect, many of the benefits of a centralized approach are recognized as risks under a decentralized approach. These concerns include: system management and administration, data management, quality control, system integration and training.

The following section describes these benefits in more detail:

1. Increased flexibility

2. Improved document availability

3. Reduced equipment costs and technical obsolescence

3.2.2.1 Increased Flexibility

Benefits: The decentralized approach offers a great deal more flexibility for lower volume scanning requirements. Special handling requirements or time sensitive materials generally require this type of approach. This requirement is based on a need to prescreen, identify, and index those items requiring immediate attention and exception processing. The volume of documents requiring this type of exception processing is generally small enough to leverage the existing administrative staff. Where this volume exceeds the capability of an internal staff, a modest-size scanning operation can be established at these decentralized locations.

Risks: A decentralized go-forward solution presents many technical complexities to properly configure and integrate disparate facilities into an efficient processing solution. While a decentralized construction can have benefits for the purpose of load balancing network access, the management and administration of such a solution is a far more difficult proposition. In

addition, the issue of maintained a cadre of trained personnel available at various geographically dispersed locations could present an even greater concern. Finally, establishing and enforcing quality control standards at any number of facilities requires careful planning and administration.

3.2.2.2 Improved Document Availability

Benefits: Under the decentralized alternative, document availability is greatly improved to the detriment of quality control. Document can be quickly scanned and presented to the user for profiling and subsequent business processing. There is a point, however, where an increasing volume of documents will require the organization to consider the increased efficiency of a centralized alternative. In addition, overuse of the decentralized solution will increasingly cause system outages and increased maintenance adversely affecting document availability.

Risks: The considered improvement to document availability carries several administrative burdens. As document volumes increase over time, system management and administration could become difficult for a small office to accommodate. The loss of data due to ineffective backup and recovery procedures could prove costly. In addition, data management may be of concern given limited oversight of various organizational practices concerning document access and control. Again, training and the establishment of processing standards are of paramount importance in maintaining a high degree of process integrity and quality control.

3.2.2.3 Reduced Equipment Costs and Technical Obsolescence

Benefits: Lower cost technologies can be more easily applied to a decentralized alternative since the volumes are much lower. Given that these volumes remain stable, system maintenance costs can also be constrained reducing the overall cost of go-forward processing. By applying these lower cost technologies, committing to a given technology is a less significant issue. As a result, organization's can be more engaged in automation.

Risks: The primary risk associated with employing a less sophisticated, lower-cost go-forward solution is the potential loss of data. It is essential that strong internal business practices be developed and taught before a decentralized solution is deployed.

3.3 Hybrid Alternative

3.3.1 Design Considerations

A hybrid alternative will typically be considered to augment a centralized solution and provide additional support for a specific business requirement or a variety of remote locations. The hybrid alternative generally offers the efficiency of centralized go-forward processing with the added flexibility of networked go-forward scanning facilities. In designing a hybrid solution, the organization must decide whether to have a central data store or support a more distributed architecture with multiple data repositories. The strength of a hybrid design is that it makes efficient use of current business processes. However, the same technical issues that manifest themselves in a decentralized solution still remain in a hybrid solution such as network infrastructure and administration concerns.

3.3.2 Benefits and Risks

Benefits: The hybrid approach combines the benefits of the centralized and decentralized approaches. Because this approach is typically applied to an existing centralized go-forward design, many of the risks associated with the decentralized approach are minimized. For example, as part of the centralized approach, the organization should already have corporate policies and standard business practices supporting go-forward processing.

Risks: The primary risk to employing a hybrid go-forward approach is the problem of inadequate network performance. The network architecture should be constructed so as to minimize the potential growth in network traffic, peak performance requirements, data storage capacity, existing Local Area Network (LAN) topologies, and any other bandwidth considerations. The other potential issue is the increase in network complexity.

3.4 Onsite and Off-site Document Imaging

Independent of the alternative chosen, Centralized, Decentralized, or Hybrid, a decision regarding who does the scanning must also be made. SFA can either scan document using its own resources and staff, or it can outsource the imaging of documents.

SFA is presently utilizing imaging vendors at off-site locations to complete a back-file conversion of approximately six million pages of school files maintained at the DRCC in Washington, DC. As subsequent organizations begin to adopt the EDMS, they will almost certainly continue the practice of off-site scanning for any large-scale conversion efforts.

In considering off-site scanning for a go-forward strategy, business needs and document volume need to be considered. When scanning volumes reach a certain level, off-site scanning becomes advantageous as vendors are scalable and can meet the required demand. In addition, vendors must remain competitive and are constantly modernizing. As a result, technological obsolescence is minimized. The burden of upgrading technology and infrastructure is shifted from SFA to its service provider.

These advantages are offset by giving up a measure of control and flexibility in the business process. SFA must be willing to part with documents for a period of time while they are being converted. Though service level agreements can be in place to handle exception processing and time sensitive material, documents that are processed off-site may not be as readily accessible.

4. Decision Drivers

In implementing a go-forward imaging solution a number of issues must be taken into account. Decisions must be made using a complex set of criteria that must be weighed against requirements. Those criteria fall into three general categories:

1. Operational Issues
2. Technology Concerns
3. Cost Drivers

4.1 Operational Issues

In making a decision, the first consideration should be what the business requirements are. These operational issues should be the overall driver in selecting a go-forward solution alternative. No solution is cost effective if it does not satisfy the explicit business requirements and needs of the organization.

In making decisions regarding scanning solutions, operational issues include:

- Staff training,
- Institutional standards,
- Workflow needs, and
- Special handling requirements

Central scanning has advantages in most of these areas. With central scanning, less people have to be trained, institutional standards can be better regulated, and the management of workflows is more tightly controlled. Central scanning is weaker at exception processing. Instances where there are special handling requirements are often better left to that entity with the specific business expertise.

4.2 Technology Concerns

After determining the business requirements, an examination of the technological issues must be made. The technological concerns to be considered include:

- Technological obsolescence
- Network infrastructure

Technology changes at a rapid pace. The solution must take into consideration that rate of change and the impact of that change on the proposed system. For this reason, outsourcing is often utilized when a large capital investment would be needed to implement a given solution. Through the use of a service provider, the risk of obsolescence is now passed onto the service provider. Service level agreements are utilized which then force a provider to stay technologically current in order to meet the predefined service requirements.

Whether a solution is performed in-house or outsourced, it will have an impact on the current infrastructure. As a result, when choosing a solution, careful consideration must be given to the potential impact of deployment on the existing system architecture. While a decentralized approach purports to employ lower cost technologies, deployment of the solution across multiple disparate locations may in fact greatly increase the cost of system management and administration.

4.3 Cost Drivers

Once the operational requirements and technical factors are weighed, cost must be analyzed. When examining cost considerations in scanning solutions, the primary factor is often volume. The volume of documents, workflows, and end users often dictates, in the end, the required solution alternative. Higher volumes lend themselves to outsourced solutions. Higher volumes also lend themselves to a more centralized approach. Decentralized methods are best left to low-volume exception processing situations.

Another cost driver is the increased bandwidth demands associated with the decentralized approach. SFA has expressed concern that deployment of the go-forward solution to remote locations would place significant stress on network performance.

5. Interim Go-Forward Design

5.1 Design Overview

This section represents the design of an Interim Go-Forward scanning process for the U.S. Department of Education (the Department), Student Financial Assistance (SFA) that is being utiltized by the Document Receipt and Control Center (DRCC).

The Interim Go-Forward Scanning process will involve the use of a central scanning facility. Documents will be imaged upon receipt with the electronic documents available to SFA staff upon conversion. Prior to an Electronic Record Management System (ERMS) being implemented, SFA will utilize the software application Optika Accorde, a workflow tool with limited electronic document management and electronic records management functionality.

The final ERMS will perform records management functions for all electronic documents based upon the General Records Schedule and the Department of Education Records Schedule. Through the ERMS, authorized users will have the ability to search and retrieve these documents online. Documents will be filed and retrieved based upon established document classifications and indexes. The ERMS will also support searches on document content. The resulting ERMS will improve both document access and management control.

5.2 Interim Go-Forward Design

The Interim Go-Forward Design consists of setting up the hardware and software that will temporarily service the Department of Education until the Final Go-Forward solution is in place, and the necessary staff is trained and educated properly. To implement the Interim Go-Forward process SFA should leverage any hardware any software components that they currently own. The Interim Design will be comprised of the following components:

- Image Repository
- Application Hosting
- On-Site Scanning
- Software

These components are detailed in the following sections and in Exhibit 1 “SFA Processing Setup.”

5.2.1 Image Repository

The image repository server is a centralized file server that stores all portable document format (PDF) files. The repository will connect to the Web Server and the Database Server through the Department of Education’s EDNET. The image repository requirements are as follows:

- Pentium III 1.0 Gigahertz (GHz) processor or higher

- 128 megabytes (MB) of random access memory (RAM) memory or higher
- 1024 x 768 super video graphic array (SVGA) display with 65 kilobytes (KB) colors
- Parallel port (required for hardware key)
- 3 terabytes (TB) for storing future images
- 2.75 TB for the 6 million converted images

5.2.2 Application Hosting

The Application Hosting configuration will include a Database Server and a Web Server. These will be two separate servers.

5.2.2.1 Database Server

The Database Server will be configured to host the database and it's software. It has been decided that this will be SQL Server 7.0. The Relational Database Management System (RDBMS) need not be installed on the same machine as Optika Acorde (it acts as a client to the RDBMS). The RDBMS server requirements are as follows:

- Transmission Control Protocol/Internet Protocol (TCP/IP) communications enabled
- Minimum number of user connections is five
- System administrator must have a login with permission to read and write to the RDBMS

A typical configuration for a database server is as follows:

- 256 MB RAM or higher preferred
- 40 gigabytes (GB) of hard drive space
- Growth factor of 2.5 GB per year

5.2.2.2 Web Server

The Web Server will be set up using Optika Acorde and the Internet Information Server (IIS) web server. The detailed web server requirements are as follows:

- 256 MB RAM or higher preferred
- 40 GB of hard drive space
- Administration servers – Port to be determined by remote site (default is 5328)
- Search & indexing servers – Port to be determined by remote site (default is 5327)
- Web Hypertext Transfer Protocol (HTTP) server – Port to be determined by remote site

A Web browser should be installed on both the server and on any machine that will be a client to Optika Acorde. The browser requirements are as follows:

- Navigator Version 4.5 or higher
- Internet Explorer Version 4.0 or higher

5.2.3 On-Site Scanning

The Scanning component includes the Ascent Capture Server, the Ascent Capture Clients and the Scanner. This component will allow for images to be scanned, where the metadata will then sent to the Database Server and at the same time the image will be stored in the Image repository.

5.2.3.1 Ascent Capture Server

The recommended hardware requirements for the Ascent Capture Server are as follows:

- Pentium III 1.0 GHz processor or higher
- 128 MB of RAM memory or higher
- 10 GB of disk space or higher for installation and working space during processing
- 1024 x 768 SVGA display with 65 KB colors
- Parallel port (required for hardware key)

The network operating system support is as follows:

- Windows NT Server Version 4.0 with Service Pack 4 or higher
- Windows 2000
- Novell NetWare Version 5.x or higher
- Any server platform that maps itself as a drive letter to a Microsoft (MS) Windows desktop

5.2.3.2 Ascent Capture Clients

The recommended hardware requirements for all Ascent Capture client workstations are as follows:

- Pentium III 1.0GHz processor or higher
- 128 MB of RAM memory or higher
- 20 GB of disk space or higher for installation and working space during processing
- 1024 x 768 SVGA display with 65 KB colors
- Parallel port (required for hardware key)

The recommended requirements for client desktop operating system support is as follows:

- MS Windows NT Version 4.0 Workstation with Service Pack 4 or higher

- MS Windows 2000
- MS Windows 98
- MS Windows 95 with Service Pack 1 or higher

5.2.3.3 Scanning Station

The typical scanning configuration used to support on-site scanning is:

- 90ipm/50ppm, SCSI, 11x17, Automatic Document Feeder, Duplex, Flatbed Scanner;
- Pentium III, 1.0 GHZ, 128MB RAM, 17in. Monitor, 40GB hard drive workstation;
- Kofax Ascent Capture Software; and
- Adrenaline 850, SCSI, PCI, Kofax Image Controller Card and 6' Cable HD50M-HD68M

5.2.4 Software

5.2.4.1 KOFAX Ascent Capture Version 4.1

Ascent Capture is designed to support both document and data capture in a single application. Both form and non-form documents can be scanned as single batches, and the system will process each batch based on characteristics that the system administrator has predefined. The definition process provides control over how documents are processed.

5.2.4.2 Adobe Acrobat Capture Version 3

Acrobat Capture is a production tool that integrates with the Ascent Capture imaging tool to convert volumes of paper documents into searchable PDF files. It provides accurate optical character recognition (OCR), advanced page and content recognition, and cleanup tools that turn paper-based information into electronic documents ready for publication via the Web.

5.2.4.3 Microsoft Visual Basic Version 6

The final task in the Ascent Capture process is to release the documents in a batch to long-term storage. Custom release scripts written in Visual Basic accomplish this task. Visual Basic is a development tool used particularly for database programming. A Visual Basic executable program will be distributed with the Ascent Capture's release module to upload the data and PDF files to long-term storage. This product is required to modify the release scripts for Ascent Capture.

5.2.4.4 Microsoft Access 2000

MS Access 2000 is a database tool used for creating, accessing, and maintaining databases. The Ascent Capture application has the capability to track user activity in four database tables. These

tables contain statistical records that are generated as the user creates and updates batches using the Ascent Capture application and opens/closes processing modules. The statistical records include information about users, documents, keystrokes, etc. The tables are stored in the STATS.MDB file, a proprietary Ascent Capture database, which resides in the Ascent Capture server root directory. The STATS.MDB file can only be opened using MS Access 2000. Queries and reports can be developed using any standard tool that works with MS Access. MS Access 2000 is used in creating the reports for the statistical reporting of the batches. MS Access 2000 is also used to repair the Stats.mdb file if it becomes corrupted.

5.2.4.5 Optika Acorde 2.0

Optika Acorde is a workflow tool with limited electronic document management and electronic records management functionality. It will be used for the search and retrieval of the electronic SFA images created by Ascent Capture from the image repository.

The Optika Acorde Workgroup offers high-volume production imaging, workflow and scalability to expand to any size system in the future.

This configuration allows for all Optika services to be housed on a single NT server. Acorde Workgroup is designed and tested to be operable in a small production environment. The configuration will support 10 concurrent connections, supporting a maximum of 20 clients.

Exhibit 1: SFA Processing Setup