BANK OF AMERICA, CREDIT OPERATIONS
PHOENIX, ARIZONA

NORTH AMERICAN EXCELLENCE AWARD: IMAGING, GOLD

EXECUTIVE SUMMARY

Each day, swamped with credit card applications, Bank of America's Bankcard Division channeled over 14,000 mailings to outside vendors in order to process them within 72 hours service center agreement. As outsourcing costs skyrocketed, the nation's third largest bank battled to keep its processing costs competitive. Today, after weaving sophisticated handwriting recognition and innovative Neural Robots into imaging and workflow processing, Bankcard now performs all its own processing, cruising through applications at three times its previous speed while achieving a 47 percent decrease in operating costs.

IMPACT TO THE COMPANY

Increased competition, federal regulatory constraints, and changing business rules forced Bankcard's Credit Operations department to evaluate alternative ways to improve productivity and reduce overall operating costs. In early 1996, Bankcard selected a FileNet imaging platform and challenged the Image Consulting Group (ICG) to develop a premium processing implementation. The resulting system positioned Bankcard with a unique competitive advantage in the marketplace by:

- Increasing processing volume by 300 percent to 20,000 documents per day.
- Improving operator efficiency by 60 percent
- Reducing Quality Control staffing by improving overall quality and data integrity.
- Reducing data entry training time by 14 days to one day by automating decision processing
- Quickening customer service response time by reducing data retrieval from days to seconds
- Improving user ergonomics "100 percent" by eliminating screen-desk-screen eye movement

These efficiency gains translated into specific dollar impact to Bank of America that:

- Reduced outside processing costs by $500,000 per year,
- Eliminated over $200,000 annually in microfiche processing equipment, services and space,

· Eliminated over $150,000 in quality control staffing.

INNOVATION

The 110-workstation system achieves productivity and cost reductions by successfully weaving together an arrangement of technologies to process over 25,000,000 annual pages of documentation. As a result, the Bankcard application is:

· The largest credit card operation in the country to successfully deploy handwriting recognition technology to capture all application information.

· The only banking operation to link Neural-based Robots in processing sequence to automate and improve processing streams.

· One of a handful of large-scale operations that need to coordinate processing among a variety of state and regulatory restrictions.

The result of this successful introduction of innovative technologies is a showpiece imaging system that exceeds Bank of America's expectations and fostered excitement throughout the organization.

IMPLEMENTATION

Bankcard's implementation involved not only the installation of the technology, but also the complete training and PC familiarization of the Bankcard operators:

· The FileNet based, multi-platform, client-server imaging system uses High speed Kodak scanners and a customized scanning module to capture many different types of documents. Once captured, Intelligent Character Recognition (ICR) Robots extract data from handwritten applications. Meanwhile, data entry operators use Customized data entry screens to index non-application documents based on document type, and set a priority for processing.

· Once indexed, a series of Neural-Based Robots update themselves as they "learn" about the process for managing the documents through the workflow: An automated Workflow Robot routes images and data to queues for processing and contains an automated exception handling and routing module. A Smart Robot audits the data entered or extracted for logical integrity and adherence to the defined business rules.

· Training data entry operators involved several steps: familiarization with computers, training on Windows software and educating them on the use of the application. This required significant cooperation among Bankcard, FileNet and ICG, but contributed to a high level of appreciation and support for the project

· Special tools were provided to system administrators and users. A set of customized administrative tools gives the system administrators control over system management, security, workflow and scalability. A customized system-monitoring tool provides real-

time productivity data while a customized supervisor module permits users with authorization to review and handle exceptions. Customized button controls lets users manually route documents to be rescanned or reviewed by their supervisor.

The implementation of a state-of-the-art, FileNet based, multi-platform, client server imaging system allowed Bankcard's Credit Operations to experience increase productivity and reduced costs. It incorporates innovate use of handwriting recognition and Neural-based Robots. As a result, it has become a model for other organizations that in turn created excitement throughout Bank of America.

WHAT IS THE SYSTEM USED FOR?

The Credit Operations Imaging System is used for processing high volumes of credit card applications and attachment documents. Attachment documents may consist of supporting information for proof of identity, proof of class status, in the case of students, and any other verification information required by Bank of America. The system fuses together ten distinctive workflow steps listed below:

1) Scanning
2) Automated Data Entry (ICR)
3) Manual Data Entry
4) Rekey
5) Exception Processing
6) Supervisor Validation
7) Data Validation
8) Host Entry
9) Storage and Retrieval
10) MIS Reporting

Who are the users?

The end users for the system are located throughout the Bankcard division. They include:

- Scanning Operators
- Data Entry Operators
- Data Entry Supervisors
- Fraud Department Personnel
- Quality Control Department Personnel

- Customer Service Department Personnel
- Document Retrieval Personnel
- Auditing Department Personnel

WHAT DOES THE JOB ENTAIL?

Document Preparation

Applications arrive daily in the mailroom where they are bundled and delivered to the Credit Operations department. When the mail is received, document preparation personnel prepare the applications for a pass through an electronic mail opener. Then, the personnel prepare the documents for scanning. Prior to the electronic mail opening process, the mail room personnel were responsible for opening the envelopes manually, sorting and counting the applications by their type, and bundling them for delivery to credit operations. This was an extremely slow process that increased the life cycle time by almost two hours each day.

Today, the sorting and counting activity has been reduced because the documents can now be grouped by general document categories instead of being sorted by application type. The sorting by application type activity is now performed electronically with a simple selection made by the data entry operators. This process has a positive impact on both the Credit Operations department and the mailroom. Credit Operations can now receive the mail faster and the mailroom can reduce its staff while increasing production time.

Scanning

Two high speed Kodak 923 scanners with add-on-image-enhancement boards were integrated with two Compaq-Prolinea-133-scanning workstations. The workstations are running a customized Visual Basic (VB) scanning application, written by the Image Consulting Group (ICG) and FileNet's WorkFlo Scan software on top of a Windows 95 operating system.

Scanning operators sign on to the system using their authorized user name and password. Once logged into the system, they launch the scanning application that in turn automatically starts the FileNet interface. Then, the application prompts the user for their initials, information about the batch size, document category, processing priority and whether the batch is made up of single or multiple pages. Once the operator has completed entering the batch information, the documents are placed in the feed tray, and the scanning process is started.

During the scanning process, a scan identification number (Scan-ID) is printed on each page. The Scan-ID is used to find the original paper document if the need arises. Occasionally, documents may need to be rescanned for various reasons and the Scan-ID is the data used to locate the original.

In addition to the Scan-ID, a document identification (Doc-ID) number is computer generated for each document. Because some documents are composed of multiple pages, the inventive use of an electronically generated and stored Doc-ID merges these pages together. By merging pages together, credit applications and their attachments are moved amongst the varied workflow activities as one. The Doc-ID then becomes the main reference for all of the internal-system-workflow processing.

Routing

Once the documents are scanned, they become committed as images to optical media, and their associated Doc-Ids are recorded in a *Distributor queue*. A state-of-the-art W*orkflow robot* polls the Distributor queue and routes any entries to their respective beginning position in the process. For example, some documents are sent to the ICR queue while others are sent to the Heads-Up-Data-Entry (HUDE) queue.

The Workflow robot handles each movement in the process by evaluating a complex set of business rules that are numerically represented by *binary-status flags* and *work-level values* embedded in the software. The routing software is unique because it flawlessly and invisibly handles a complex set of computations and tasks that were previously being handled by human beings. This imaginative use of machine-based technology has replaced the manual labor once required to carry out the same tasks, and it has also removed the workflow routing errors and time delays inherent in human-based processing.

Workflow Transaction Tracking

During the routing process, a complex audit trail is built to track the movements of each document that passes through the system. Every time a document is passed from one step to another, called a *workflow transaction*, the workflow robot records tracking information in a *Process-Audit table*. Examples of some of the information captured in this table are:

- Doc-ID
- The current queue, sometimes called “the from” queue.
- The next queue, sometimes called the to queue.
- Transaction date and time stamp.
- The operator’s name who last worked on the document.
- The total time the document spent in the last step.
- Document Status
- Error Messages
- Processing Notes

Workflow Transaction Tracking Continued

With the information contained in the Process-Audit table, it is easy to find out where a particular document is in the process or exactly the steps it went through for processing. In addition, productivity data is collected, analyzed and reported from information contained in of this table and used in measuring overall system performance.

Data Entry

Data entry is the main focus of the whole system for it is this area that holds the promise of realizing enormous productivity gains for Bank of America. By applying contemporary technology to the business, the Credit Operations department has opened the doors for unlimited possibilities and spawned a new feeling of stimulation in an otherwise mundane activity.

Intelligent Character Recognition (ICR)

- The most encouraging and rewarding technological advances are associated with the system's ability to read and convert handwritten data. Most of the applications that are sent through the system can now be passed through an ICR engine that electronically extracts and converts handwriting to text. The implementation of the ICR process boosted productivity by 60 percent. While this process is extremely complex, the end result is worth the effort. The software involved in the ICR extraction has to be trained to recognize the unique features of each document. Templates are used to train the system and set up hundreds of parameters required to achieve high accuracy read rates. Because new application types are being added to the portfolio and the existing applications are changing each quarter, the ICR training process will be ongoing. To reduce the ICR training time overall, a coordinated effort between the Marketing department and Credit Operations is producing ICR friendly forms that are easier to train and read. That effort has impacted the organization by bringing together two departments that had traditionally been separated by the proverbial organizational walls.

Heads Up Data Entry

Switching from an antiquated, text-based (VT100) user interface to a graphical-based interface created excitement as well as anxiety in the Credit Operations department. While some operators had had experience with graphics and the use of a mouse, most data entry operators had never used one. One of the most creative solutions for gently transforming their skills and paradigms for the new system was the idea of game playing. Before the system went into production, operators were permitted to play computer games using their mouse, during breaks and at lunch time. When the time came to view images on the screen and

enter data, the operators had already become familiar with the graphical interface and the use of a mouse. This familiarity instilled a higher level of confidence in all of the operators and resulted in greater acceptance by everyone involved.

The HUDE module got its name from the idea that data entry operators no longer had to move their heads from the document to the monitor to enter data. They could now keep their *heads up* and view the documents alongside the data entry screen.

In addition to being ergonomically superior to the old system, a customized data entry interface designed by ICG, dramatically improved the underlying data entry process. Prior to the new system, operators were forced to navigate from field to field in a very specific order using their tab key. The new interface enabled the operators to navigate according to the natural flow of information presented on the document.

Another major breakthrough in productivity occurred when the decision-making and specialized coding responsibilities were placed on the system and removed from the individual operators. The business rules and conditions are now standardized to produces consistent decisions. Also, the complex coding schemes that operators had to memorize have been taken over by the computer.

The monumental impact that the HUDE module had on the department is described as follows:

- Data entry time for manually entered applications was reduced from 2.5 minutes per application to less than 1.5 minutes on average.
- Operators navigate the screens according to the natural flow of the document.
- Operators no longer have stop and think about what they are entering— they enter what they see on the screen and let the computer handle the decisions and coding responsibilities.
- The coding process is error free and any decisions that need to be made are consistently carried out.

Indexing

The indexing application is used to enter information for attachment documents that arrive after the original application is processed in system. For example, a person may be required to submit a tax return to verify their income. The submitted tax return is indexed using information such as the applicant's social security number, first name, last name, and an application identification number.

Rekey

Some of the information on applications is so critical that a second data entry activity is performed to ensure accuracy. Information such as a persons last name and or their social security number is used to index their application so it is imperative to have it entered correctly.

To handle this, a customized Rekey application, developed by ICG, enables operators to double key certain information. Any discrepancy from the initial entry triggers a dialog window that prompts the user for an evaluation of the entered data and allows them to choose the correct values.

Exception Processing

Another key feature of the system that exemplifies innovation and creativity is the *Smart robot*. After Rekey, the data associated with an application is sent to a *Validation queue* and processed by a *Smart robot* that performs the following tasks:

- Checks for the minimum required data.
- Checks the data for logical integrity.
- Automatically populates specific fields of data.
- Converts data entry values to numeric codes.

If an error occurs during any of these steps the document is flagged and routed to an *Exception queue* with an explanation of the error. Designated personnel who fix the problems and reroute the documents back into the Validation queue handle the Exception *queue*.

Supervisor Validation

The customized Supervisor Validation module was written to give key personnel the ability to manually fix exception documents and reroute them into workflow. The module's function is to act much like a data entry terminal e having more flexibility, access to additional information, and control over the workflow process. For example, documents can be sent back to the scanning department if the it is determined that the image is too hard to read or skewed beyond the acceptable limits.

Rescan

When documents need to be rescanned, they may exist in the system as a simple image with just a few index fields or as documents that have completed several steps of the workflow process. This means that an audit trail and data may be present in the database for this document. To eliminate the chance of duplicating database information and document images, the *Rescan module* was designed by ICG to clean up the system and separate rescanned documents from production documents.

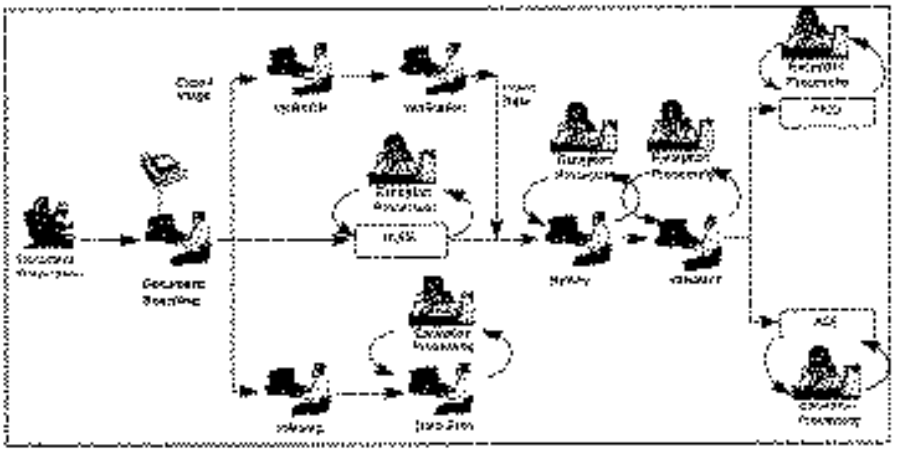
Because images are permanently burned into the optical disks, rescanning documents and associating them with the correct data can be tricky. However, with the right ideas and an innovative approach to problem solving, rescanning can be made to appear relatively easy and ensure consistent results every time.

The rescan application is specifically designed to empower operators to process rescan documents and their trailing information in the cleanest and fastest way possible. When a document is sent back to be rescanned, the first step is to find the original paper. Which is easy to do using the document's Scan-ID. Then, the document is rescanned and the old image is permanently detached from the database while its data is permanently erased. This process ensures a clean start for the rescanned document and eliminates the possibility of duplication.

Host Entry

Host entry is the final step in the workflow process and is handled by another state-of-the-art robot. The Host-Entry robot ;manages the process of passing information from a client-server-midrange platform to a high-end-mainframe platform. This self-monitoring robot keeps track of its own productivity and is able to learn new instructions for some tasks—independent of human programming. This is a tremendously ingenious innovation that has provided an invisible and flawless tool for the Credit Operations department.

Figure —Workflow at Bank of America



THE KEY MOTIVATIONS

Simply stated, the key motivations for installing the new system centered on idea of replacing the existing yet antiquated system that had limited production capacity and unnecessarily high operating costs. In addition, a gap was continuing to grow between the highly skilled worker required to do the job and associated low skill wage.

With limited production capacity and the constraint of a 72-hour processing limit mandated by the federal government, Credit Operations was forced to become increasingly dependent on outside vendors who could process the excess applications—driving up the costs of production. Reducing this dependence and associated costs became a major motivational factor for installing the new system.

With the old system, it took three weeks for an operator to learn and reach production level performance for one particular type of application. Complex numeric coding and business rules had to be memorized, and decision making was frequently vague or dependent on the circumstances. This created an environment of specialization that indirectly increased costs for the operation—when specialized resources are in demand and the supply is low, costs for obtaining and retaining those resources increases. By simplifying the skill set for data entry operators, the resource supply became plentiful which dropped the costs for obtaining those new resources.

In summary, replacing an antiquated system with new technology allowed Credit Operations department to increase their productivity and at the same time reduce their overall costs. They accomplished this by eliminating their dependence on outside vendors, and at the same time, simplified the skill set required by data entry operators and removed the trend of specialization.

BANK OF AMERICA, CREDIT OPERATIONS

SYSTEM CONFIGURATION DESCRIPTION

Hardware Components

TYPE	QUANTITY	DESCRIPTION
Robots	14	Compaq Prolinea 133 Personal Computers 133 MHz, 24 MB RAM, 1.2 GB Hard Drives
File Servers	1	Compaq Prolinea 166 Personal Computer 166 MHz, 64 MB RAM, 3 GB Hard Drive
Workstations	90	Compaq Prolinea 133 Personal Computers 133 MHz, 16 MB RAM, 1.2 GB Hard Drives
Monitors	90	Cornerstone High Resolution 21" Monochrome, 2 MB IDE Video Ram
Scanners	2	Kodak 923 High Speed Scanners
IMS Server	1	International Business Machines (IBM) RS6000 40 GB Level 5 RAID DASD
Jukebox (OSAR)	1	FileNet 90 Platter Large Format,630 GB
Printers	2	Hewlett-Packard 4Si

Software Components

DESCRIPTION	NUMBER OF LICENSES
FileNet WorkFlo Scan	4
FileNet Workforce Desktop	110
Microsoft Visual Basic 4.0	5
Microsoft Access	5
Microsoft NT Server	1
Microsoft NT Client	30
Microsoft Windows 95	30
Micro Technologies OCR For Forms	1
Micro Technologies OCR For Forms Verify Station	30
Oracle	1
UNIX	1

Number Of Users On The System

Type of User	Current	Planned
Data Entry Operators	36	60
Scanning Operators	2	2
System Administrators	3	3
Credit Agents	46	71
Developers	4	4
Management	5	12

IMPACT ANALYSIS

With the installation of the system, Bank of America processes 20,000 documents per day. Exception items are processed using imaging and Workflow. As Bank of America continues to focus on making credit application OCR/ICR friendly, automatic processing will improve efficiency further. Currently, Bank of America projects cost reduction of half a million dollars annually through the elimination of outside vendor processing.

A key ingredient necessary to achieving these results was the adoption of the system by users. FileNet and ICG utilized data entry personnel as "system design experts." By holding user development sessions to incorporate user perspectives and ideas into the development of the system, users assumed "ownership" of the system. Employing this approach throughout the project simplified production rollout of the system in December 1996. In fact, it was credit personnel involved in the development process who presented the final system rollout plan and functionality to the credit operations staff at large. Without active attention to user requirements and ideas, the system success would have been postponed or possibly unattainable.

COST SAVINGS

Bank of America anticipates over $1.0 million annual savings by better managing credit operations data entry, exception handling, and storage and retrieval discrepancies through the use of the new Bank of America imaging system.

PRODUCTIVITY IMPROVEMENTS

The new imaging system has provided Bank of America with several opportunities for productivity improvement, including:

More Balanced Workflow: The imaging system dynamically monitors workload among credit application processors and balances workload by routing documents to available resources. Unlike manual work allocation, this processing approach eliminated "processor downtime" by providing a steady stream of work allowing the credit operations department

to process up to 300 percent more invoices. The system presents work to application processors in priority and date order, thus insuring that the most important and oldest invoices are processed first.

Quicker Processing and Exception Resolution: Because "clean" application can be processed automatically with the new imaging system, these invoices are handled immediately. Consequently, data is more readily available for the Customer Service and Fraud departments. Exception invoices are processed quicker through the use of automatic routing and AutoPend Robots that monitor data collection for exception application cases. Swift resolution on exception items has significant impact on credit approval made by Bank of America. Faster resolution of exception invoices provides the opportunity to maintain quick turnaround and customer service levels.

PROJECT IMPLEMENTATION

Bank of America's approach combined user feedback with design analysis to determine system requirements and impact on employees. In addition, Bank of America validated appropriate hardware and software platform selections and determined feasible and cost effective uses for the proposed technologies. Elements of (1) Building a Project Team, (2) Managing Change and (3) Addressing Reengineering were contained within the overall implementation seven-stage methodology which Bank of America adopted:

STAGE 1: Project Initiation and Management (Project Team/Change Management)

During Stage I, Bank of America launched two initiatives that were critical to the success of the final Bank of America system: An Imaging Project Team and an Active User Education/ Training Program to help manage change.

Project Team:

From the beginning, Bank of America established an Imaging Project Team consisting of Bank of America imaging and user personnel, as well as integration consultants. Bank of America established a Project Executive Sponsor to sign-off on project activities, a Project Manager to coordinate and control activities, Project Analysts, Project Design Personnel and a Project/System Administrator to participate in these activities. Each integrator working with Bank of America was expected to mirror this structure with its own personnel. In this way, Bank of America constructed a comprehensive management and delivery structure that could handle all project concerns, from implementation to funding and managing project change orders, including issue escalation and resolution. User involvement as analysts and sponsors was critical because it provided a practical business orientation throughout the phases.

Active User Education/Training Program (Change Management):

The Bank of America Project Team launched an active campaign to educate Bank of America personnel on imaging and workflow technologies and implementation strategies. This educational campaign was coordinated with Training and Education (Stage 5) to provide a comprehensive Change Management Program for each Bank of America implementation phase. It continued throughout all project phases and helped involve users while controlling their expectations.

Image/Workflow Project Education:

During the initial phases, Bank of America staff gained knowledge and experience through joint participation with ICG and FileNet consultants in the delivery of the Phase I and Phase II system. The approach transferred reengineering principles and system development techniques to Bank of America project members. In later phases, Bank of America built an internal Project Team with in-depth knowledge to iteratively continue development with Bank of America systems personnel and processors. ICG participated in an advisory role.

Technology Education:

As the implementation progressed, it was important to communicate the capabilities of emerging technologies that the Bank of America users could exploit once the system was installed. This was accomplished through formal presentations.

Post Implementation Review:

To address unanticipated exceptions and issues that appeared after installation, Bank of America setup a review group composed of users, system personnel and integrators. Together, this team identified and provisioned for the exceptions. The involvement of decision making staff from all area's made resolution effective and timely. As issues were resolved, meetings were reduced; however, the group still met as required to discuss problems and share solutions.

STAGE 2: Project Analysis (Reengineering)

In Stage 2 of all Bank of America project phases, Bank of America performs Project Analysis to determine the appropriateness and cost-effectiveness of implementing new imaging/workflow technologies to support their business objectives:

Imaging Application Study:

In the first phase of the project, the Bank of America Project Team identified how the Bank of America workflows would benefit from imaging and workflow technology. The Project Team produced a Cost-Benefit Analysis that profiled costs to support these high-level flows and the resulting benefits. The Project Team also determined intangible business and system strategies, guidelines and standards that would evolve from the project.

Process Reengineering:

As the costs of the technologies were justified, Bank of America proceeded with formal reengineering of business sub-processes within the targeted Bank of America area. Reengineering took a more exact look at the profiled revised flows created in the Imaging Application Study and included the following steps:

- Developing a thorough understanding of the current processing flows and their rationale
- Dividing workflow and goals into processes
- Subdividing processes into tasks
- Identifying essential tasks and prioritizing these tasks
- Rebuilding processes with priority tasks while leveraging imaging / workflow technologies
- Formalizing revised workflows
- Modeling revised workflows to determine accuracy and true benefit of reengineering
- Making adjustments and iteratively remodeling until reengineering proved effective
- Finalizing the reengineered workflow and building a proposal for management
- Building a preliminary/draft implementation project plan
- Obtaining management review and approval

STAGE 3 Project Plan and Requirement Development

After demonstrating how imaging added true value to the Bank of America processing environment in each phase, the Project Team embarked on building a project plan and identifying requirements for the system implementation:

Project Plan:

Using the draft project plan developed in the first phase, the Project Team worked with Bank of America management to fine-tune project details into an executable final project plan.

Functional Specification:

Working with the user groups in the appropriate business areas for each Bank of America phase, the Bank of America Project Team defined user requirements that would become functional specifications for the system. This involved the identification of workflow rules, queuing algorithms, time and event triggers and other processing strategies. In addition, the Project Team focused on reports, screen layouts, indexing and database element definition along with high-level operational procedures.

Navigational Prototype:

To assist in determining functional system requirements, the Bank of America Project Team built a navigational system prototype to demonstrate both the new ESP mainframe suspense processing system and it's interaction with the image system. This system gave users an idea of how the final image system would flow from screen to screen. User feedback was incorporated into the prototype and the final Functional Specification.

STAGE 4:Planning and Design

Before proceeding to Stage 4, Bank of America management reviewed the Functional Specifications and Project Plan in detail to ensure that initial system benefits were still in tact. As such, the Bank of America Project Team moved toward developing detail system design specifications:

Strategic Image Systems Plan:

As part of this stage, the Project Team revisited the corporate Bank of America vision for the strategic, enterprise-wide rollout of imaging technology to ensure that the current phase of development was consistent with this plan Through user education and participation, Bank of America created a universal interest and desire for the imaging system. Since each department had to cost-justify their use of the new system, they participated heavily in requirements and design stages to ensure appropriate system application. This participation contributed to total "buy-in" to the system by the many different departments.

Systems Design:

After the implementation platform was determined from the preliminary designs, the Bank of America Project Team produced Final System Design Specifications of the imaging and workflow system. System prototyping throughout the Systems Design stage helped expedite the design stage.

STAGE 5:Installation, Development and Testing

Before proceeding to Stage 5, Bank of America management reviewed the System Design again to insure that initial system benefits were still in tact. With the benefits intact, the Bank of America Project Team moved toward installing, developing and testing the system application:

System Installation:

The Bank of America Project Team and integrators installed basic image system hardware and software. This system provided a base platform for development, backfile conversion and training.

Application Development:

ICG developed the Bank of America workflow and imaging functionality on the FileNet imaging platform.

Testing:

After application development, the Project Team installed the application code and together performed unit and system testing on all operating routines. At the completion of formal testing, the test environment was released for training in Stage 6.

STAGE 6: Documentation and Training (Change Management)

At the start of the seven-stage methodology, the Project Team had outlined a documentation and training program that would support development of new processing procedures and user training required to operate the system. In some Bank of America phases, training on personal computers was required prior to the formal user training activities in Stage 6. In Stage 6, users had to be prepared to absorb documentation and training associated with the imaging system:

System Documentation:

As each Bank of America project phase reached completion, the Bank of America Project Team coordinated appropriate documentation with personnel involved with the system. Documentation included (1) a Systems Administrator Guide to assist Bank of America system staff in monitoring, performing system backups, handling routine maintenance and addressing simple operational enhancements; and (2) a User Operations Manual to instruct users on how to operate the Bank of America image system from their perspective.

System Training:

Once documentation was complete, the Project Team coordinated appropriate training for system users. Training included (1) Systems Administrator Training via a combination of classroom and joint participation efforts to transfer knowledge from Integrator to Bank of America. This training focused on design, reengineering and workflow programming. (Advanced training for system administrators is on-going through interaction with the integrator, and formalized FileNet classes), (2) and User Training which consisted of instructional classes on how to operate the Bank of America system for management and all claims processing personnel. Integrators performed Train-the trainer activities while the Bank of America Project Team coordinated training rollout. Bank of America advanced training programs ultimately allowed Bank of America system users to learn how to build and tailor their own productivity-increasing operating macros.

STAGE 7: Cutover, Acceptance and Warranty

After training, Bank of America proceeded to roll each phase of image system implementation into a production environment. This consisted of four steps:

Cutover:

After training, Bank of America released each phase of image system development into operation. Appropriate support personnel surrounded the users and system in order to address any anomalies in system operation.

Acceptance:

The Project Team certified system acceptance when completely confident that the system could provide expected operational support to Bank of America.

Warranty:

After acceptance, integrators such as ICG provided warranty on that phase of the image system for 90 days. If no integrator was involved, Bank of America provisioned for "warranty-type" staffing after system acceptance.

Maintenance:

Ongoing through all Bank of America phases, ICG has provided maintenance for the entire Bank of America imaging system. Bank of America System Administrators supplemented this effort.

CONCLUSION

In conclusion, the Credit Operations imaging system is a showpiece example of superior innovation, technology, and implementation strategies. Combined, these qualities have had an expansive impact on the Bank of America organization. Because of that impact, the system is a model effort for other Bank of America departments to use for developing their own solutions for improved business operations.

The utilization of handwriting recognition and neural-based robots are the two outstanding innovations that put this system at the forefront of technology. In addition, other features such as simplified and automated workflow, user-designed graphical application interfaces, customized administrative tools, and a set of productivity monitoring tools should be considered superior efforts as well.

Tremendous cost savings due to extensive productivity gains and operational improvements characterize the overall impact to the organization. Productivity gains realized in the data entry department allowed Credit Operations to eliminate the high costs of vendor processing by boosting their volume by 300 percent. An easier and friendlier data entry application improved operator productivity by 60 percent, and reduced training time by 14 days. Because of these improvements, additional departments were able to reduce their operating costs by reducing staff and or improving their operating activities.

By utilizing a superior implementation methodology, project timing and costs were kept under control. In addition, conflict resolution and change management were handled with relative ease which allowed the team to focus on more important aspects of the project.