Document Management

A Focus on Electronic Document Storage at IUB

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Introduction

Indiana University purchased 176 million sheets of paper in fiscal year 2009-2010. Implementation of technologies to reduce paper usage could significantly improve IU’s carbon footprint by reducing the amount of paper used. A critical review of technologies currently in use at IU and other universities presents a strong case for using document management technologies to reduce paper usage.

A partnership between the IU Office of Sustainability (IUOS) and University Information Technology Services offices was conceived to research document management technologies present on the IU campus. Ultimately, the goal was to present the University Information Technology Services (UITS) move into the Cyber Infrastructure Building (CIB) as a case study. Meetings with several administrators and staff in different departments and offices across campus helped to identify which technologies were being utilized and their best practices in paper reduction and document management. Interviews were also conducted via email and telephone with individuals utilizing unique electronic document storage systems at different universities, in order to compare their usage to our own systems. In this report, research and recommendations are presented to further improve paper reduction and document management on the IUB campus.

Purpose

Upon the release of this report, UITS is in the process of moving into a new technology building called the CIB ( Cyber Infrastructure Building). Many employees that were previously spread across the IU campus are being consolidated into this building. Due to the logistics of the move and physical space available in the building, there would not be sufficient room for the amount of filing cabinets and paper storage components currently utilized. 90% of the employees’ storage space will be reduced in the CIB. Thus, the KnowledgeLake EDS project was begun to find a way to reduce paper usage and physical storage of documents.

A partial case study of the UITS’ move to the CIB was conducted during the summer of 2011. This unique opportunity was presented to us through Mark Niswander and Duane Schau. KnowledgeLake is the EDS system that Mark and his team have developed to aid certain offices on campus in their electronic storage and retrieval of documents. Research was also conducted on the other prominent EDS system at IU, OnBase, as well as two other EDS systems other universities are using.

Problem

Paper reduction is crucial at both an individual and university level. Each year, the southern region of the U.S. is harvesting 54% of the nation’s total timber volumes and logging an area the size of New Jersey. Industrialized nations alone are consuming 87% of the globe’s printing paper (greenamerica.org).

According to IU Purchasing, the university purchased 174, 686, 500 sheets of 8.5 by 11 inch paper last year. This is equivalent to the carbon dioxide emissions of between 439 and 448 passenger vehicles (EPN, EPA). The need to better utilize paper reduction technologies and practices is very crucial here on the IUB campus (Smith, 2011).

At the June 15th UITS Print/Copy/Scan/Fax InfoShare, statistics were presented on the amount of paper the UITS Finance Office was storing. The office was utilizing 37 filing cabinets, which equals approximately 1 million sheets of paper (InfoShare). The dimensions of a four-drawer filing cabinet are 46-3/8 inch tall by 14-¼ inch wide. Thus, by eliminating 37 filing cabinets, the Finance Office could save approximately 2,037.60 square feet of office space (Office Depot). The CIB is 127,000 square feet, which cost the university $37 million. At approximately $300 per square foot, using this office space for filing cabinets would cost over $600,000.

After reviewing the final report of the previous intern, several recommendations for improvement were presented to us. Two of these recommendations were to provide training on how to best utilize
electronic document storage, as well as communication between departments to successfully convey their best practices in document management and paper reduction. Collaboration among departments would help alleviate similar software needs and programs.

This collaboration could best be achieved through a forum. Departments could share their best practices in document management and paper reduction practices with one another, encouraging and fostering adoption of better practices campus-wide. Discussions revealed that setting up a departmental forum for questions and discussion of best practices would be most effective. It was also identified that further research into new and existing technologies was needed.

Research also identified several barriers to these new technologies. As shown in Table 1, 10 of the 16 departments interviewed by the previous intern expressed concerns at the ease of use in an EDS system, as well as their hesitancy to learn a new technology. Digital security was also another big concern, affecting 8 of the 16 departments. The third largest concern was that of limited resources, in most cases the cost of investing in a new technology. The barriers identified through previous research have been addressed in this report.

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<tr>
<th>Type of Barrier</th>
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<td>Digital security</td>
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<td>Ease of use in EDS system/technology</td>
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<td>Confusing/lack of retention schedule</td>
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<td>Training, tech support</td>
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<td>Cross-platform technology</td>
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Table 1: Barriers chart identified from research conducted by Karin Dunne (Dunne, 2011).

Methodology

Through meetings with several administrators and staff in different departments and offices across campus, relevant technologies and best practices were identified. Interviews via email and telephone were conducted with individuals utilizing the four unique EDS systems at three universities. Our findings and recommendations on further improvement of document management and paper reduction approaches are analyzed and presented in this report.

This research involved the following methods. First, background research was conducted to better understand how to pursue the previous intern’s recommendations. From this research, interviews with relevant staff and administrators were conducted to compare and contrast different EDS systems on the market. Analysis of these interviews helped us to form our recommendations.

Results

Interviews

KnowledgeLake

History

The UITS EDS discussion began in August 2010. The Enterprise Operations Planning team sat down in October to discuss and examine their paper documents. They found their document retention schedule to be lacking and many duplicate documents were being stored. It was determined through this session that the need for an EDS system was needed, as well as better document tracking.

On December 6th, 2010, the final bidding on an appropriate EDS system was finalized with a company called KnowledgeLake. KnowledgeLake was chosen because their software is designed to
work well with an existing IU Enterprise system called SharePoint 2010. KnowledgeLake acts a service application or middleware to connect SharePoint hardware to the KnowledgeLake interface. Other software is then utilized through the SharePoint 2010 interface. SharePoint 2010 has been notoriously well received, and many users comment on its ease of use.

A centralized, university-wide server that is tightly integrated with Microsoft Office applications, SharePoint is hosted on IU’s secured servers. Similar to Google Documents, SharePoint allows for team collaboration and content management, as well as MySites for individualized content management and social networking. SharePoint MySites are individualized web spaces available for graduate students, faculty, and staff use. Users can store and edit documents and other content, plus network with colleagues and track information of interest. Users must request access to MySite, and log in to the system using a university network id.

KnowledgeLake was installed on a SharePoint test farm from December 7th through December 9th, 2010. Demonstrations of KnowledgeLake were then given to administrative staff at the Office of the Vice President for Information Technology (OVPIT), UITS, and University Counsel during the week of December 13th through 17th, 2010.

IU does not have an enterprise-wide license for KnowledgeLake, although individual departments and offices can request to purchase a license to use the technology. The main reason that UITS decided to undertake the EDS project was that staff found existing storage products intimidating or difficult to use. As of the June 15, 2011 InfoShare, Phase 1 of KnowledgeLake implementation was complete. Phase 2 of the project will be a review of the functionality of KnowledgeLake: how it’s currently operating and how to implement, utilize, and troubleshoot the Multi-Function Printers, scanners, and Print Release stations in the CIB building. The technologies being used to print and scan are the Sharp MX-5001N Multi-functional Printers and Fujitsu 5530C2 Scanners.

Features

Along with the new KnowledgeLake middleware that was purchased, a workflow tool called Nintex was also purchased. Nintex Workflow is a SharePoint 2010 product. It allows SharePoint or KnowledgeLake users to create their own workflow processes to speed up business procedures and improve efficiency of task completion. UITS employees will also have access to Print Release Stations similar to those in the Student Technology Centers [STCs] (Niswander, 2011).

Barriers

Some barriers to the implementation of KnowledgeLake were the availability of other EDS systems, hesitation or unwillingness to learn a new technology, and time constraints. Some populations at UITS prefer to store documents on flash drives or to their desktops. This practice is discouraged, and the InfoShare was provided to train users how to store documents in KnowledgeLake, as well as how to properly use the Print Release Stations in the CIB. Temporary staff were hired as scanning personnel to assist in the scanning of documents into the KnowledgeLake system. This has aided in the time constraint barrier to the project, freeing up full-time employees to concentrate on their work and prepare for the move to the CIB (InfoShare).

Effect on Paper Reduction

KnowledgeLake is still a very young document management tool. Given the timetable of the project, we are unable to make sufficient conclusions on the positive or negative effects of KnowledgeLake. It is recommended that a future intern follow up on the KnowledgeLake project to gather this information.

OnBase

History

After speaking with Mark Niswander about KnowledgeLake multiple times, research was conducted on the other widely used EDS system at IU: OnBase. A meeting with the OnBase User Support Specialist Lisa Leedy was scheduled to discuss the features of OnBase. Lisa’s insights provided clear evidence for the success of EDS on the IUB campus.
Similar to KnowledgeLake, IU does not possess an enterprise-wide license for OnBase. OnBase is licensed out to offices and set up according to each office’s individual needs. These individual, concurrent licenses are then added to the contract pool with Hyland Software. Lisa’s department is in charge of setting up these concurrent licenses and determining the yearly maintenance fees for each individual office.

Adopted by IU in 1999, OnBase was implemented for the Physical Plant. Physical Plant employees needed a way to store and retrieve documents easily. Thus, OnBase was licensed for the Physical Plant through an agreement with Hyland.

Once OnBase was successfully implemented in the Physical Plant, other departments began to take notice and express an interest in the technology. In 2000, the IUB Accounts Payable Office decided to try out OnBase to deal with invoices and other important pieces of documentation. OnBase’s success on the IUB campus led to its’ implementation on all regional Accounts Payable campus offices.

OnBase offers three different types of clients, based on the individual department’s needs. The thick client is the desktop client. In order to install it on an end-user’s desktop, you must have Oracle installed.

Out of the three clients, the thick client is the most feature-functional client. Thick client gives users the ability to scan new documents in and utilize the workflow tool. Scan stations have to be hooked up to thick client. User with workflow and scanning needs are recommended to select the thick client.

The second client is a remote desktop client. The remote desktop client does not provide as many features as the thick client, but can still access the Workflow tool. Mainly used for retrieving and indexing documents, this client is installed on a shared server.

The final OnBase client is the web client. The web client is mainly used to pull up documents and fill out eForms. Within the web client, there are three different types: the ActiveX version, HTML version, and Java version. You can add sticky notes and highlight parts of documents that you have permission to alter, just like Google Documents.

Features

An interesting feature of the OnBase interface is called Docpop. Docpop allows end users to use both Epic and OnBase systems without having to log into both systems. As long as the user is logged into Epic, he or she may move back and forth between Epic and OnBase systems. Five IUB departments currently utilize this feature.

Similar to KnowledgeLake, OnBase also provides the option of choosing a workflow tool. The Workflow tool is supposed to improve customer service by ensuring higher quality processes and faster turnaround times, reduce costs by streamlining menial tasks, and ensure accountability and compliance with business procedures. Based on the Business Process Management strategy, Workflow is a tool developed by OnBase to optimize business efficiency.

Inside the Workflow application, there are different kinds of lifecycles. The system looks at what type of document the user has opened, then asks the user questions and prompts them to decide which queue to place the document in. Departments have to pay an additional fee to utilize the OnBase Workflow tool.

Barriers

The main barrier to implementation of OnBase was cost. Since OnBase is not an enterprise-wide system, there is an initial licensing fee, as well as a yearly maintenance fee that departments must cover. Another barrier to OnBase is attitude. Habits are hard to change, and there are many different systems to navigate at IU. However, the Docpop feature is a way to simplify workplace processes.

Effect on Paper Reduction

Since its’ implementation in 2002, the Admissions Office has been able to eliminate and back file a room full of physical documents by scanning into the OnBase system. Several other offices have followed suit and are pursuing a similar course of action. OnBase has also cut down on processing time, thanks to the Workflow tool. The University College at IUPUI has been able to utilize more eForms instead of paper that is filled out by hand and then scanned into OnBase.
IUPUI Admissions and Financial Aid have also improved their workflow process, as well as reducing paper. Prior to OnBase, the IU School of Medicine was seeking a solution to better review student applications during meetings. OnBase has allowed users at the School of Medicine to pull up these applications individually or during staff meetings (Leedy, 2011).

GWDocuments

History

Initially begun in 2005, Rick Gilchrist, the Director of Enterprise Document Management for IT Enterprise Information Services, said that the original impetus to implement GWDocuments was similar to the KnowledgeLake project. The Grants and Contracts department moved to another campus, leaving behind their original location in the Research Administration building. At that time, all documents were paper copies kept in physical filing cabinets. The Documentum system was implemented to allow access to these documents from either campus location.

The GWDocuments application was built with the Documentum Webspace application from the EMC Corporation as the base product, utilizing their Windows Driver Kit (WDK) as the building block of the GWDocuments web interface. A Windows Driver Kit is a suite of software tools developed by Microsoft, allowing device drivers to be developed for the Microsoft Windows platform, including documentation and built environments. Device drivers are computer programs that allow higher-level computer programs to interact with a hardware device.

Along with the WDK, GWDocuments uses Brava from Informative Graphics, Inc. as an annotation tool and specialized viewer with their Net-IT product for capturing transcripts from Banner Student in a secure format. Net-IT Enterprise is used to automatically convert PDFs of student transcripts to CSFs. These CSFs are then uploaded to GWDocuments.

Content Sealed Formats (CSFs), similar to PDF and TIF, are accurate, encrypted versions of source files. However, these files cannot be opened by a third-party. Ideal for secure, convenient file sharing, CSFs are protected by Informative Graphic’s Visual Rights security controls and require the Brava Reader application to edit and view them (Informative Graphics).

The companion product to GWDocuments is called GWScan. Built using Captiva, also from EMC, GWScan is George Washington University’s Enterprise Scanning tool. The Captiva eInput allows end-users to scan, import, and index documents from a remote location onto a central server. Captiva InputAccel integrates documents from hundreds of different sources into the server on the back-end for the process of optical character recognition (OCR), which converts images of handwritten, typed, and printed text into electronic format.

Captiva InputAccel also allows PDF creation and exports these PDFs into GWDocuments. Captiva InputAccel enhances scanned images and captures text via OCR. It also rotates images to landscape view when required and generates PDFs with text to allow for word searches.

GWDocuments is the designated Enterprise Document Management tool for George Washington University (GW). However, GW also has two other tools they use for document management. One is ApplicationXtender, an EMC Documentum tool. ApplicationXtender has document imaging, a built-in retention policy, is compatible with other Microsoft Office products, and provides end-users with multiple ways to access content.

Net-IT Enterprise, the second document management tool, has already been implemented. GW is in the process of migrating all applications into GWDocuments. The third document management tool GW utilizes is called Nolij Web. Undergraduate Admissions and the Financial Aid offices use this tool to capture documents and aid in the decision process.

Features

Accounts Payable currently utilizes ApplicationXtender, but is planning to move to GWDocuments. All Human Resources (HR) documents are currently stored within GWDocuments, with plans to extend
access to those documents to other departments. Currently, departments tend to keep paper copies and are in the process of learning how to utilize GWDocuments.

The various schools at George Washington University, as well as the Provost Office, are now actively working on full implementation of GWDocuments. GW has also just initialized a project to implement EMC Documentum’s xCP, xCelerated Composition Platform. xCP is meant to reduce the complexity of applications and online sites, providing a workflow/case management tool based on Business Process Management (BPM).

GW’s first prototype application for xCP case management will occur in the Graduate Application process within the Graduate School of Education and Human Development. xCP will allow faculty to review and approve applications, without printing any documents, from any location and in considerably less time.

Business Process Management is a type of management strategy meant to optimize business efficiency and customer satisfaction. TaskSpace is another EMC tool meant to provide tools in alignment with BPM practices. Various faculty members use these tools for collecting, storing and searching Faculty Annual Reports.

Barriers

GW has been in the process of implementing GWDocuments since 2005, but the system is just now receiving more attention. Full implementation of GWDocuments occurred in 2007, with the exception of the Legal Services office. Gilchrist believes this attention is due to the success of several larger departments. The President’s Office, HR and several schools at GW are having a positive influence on other, more hesitant departments. Hopefully their success will continue to encourage other departments to consider implementing GWDocuments.

Effect on Paper Reduction

After implementing GWDocuments, the Sponsored Projects department now houses three filing cabinets: one for proposal documents, one for award documentation and another for operating documents such as MOUs (Memorandum of Understanding). A MOU is a document describing an informal “gentlemen’s agreement” between parties.

Although GW did not have any specific paper reduction metrics in mind when implementing GWDocuments, Rick mentioned that there was one specific instance of an improvement in paper reduction. An individual at the Dean’s Office in the School of Business had mentioned that his or her office was able to convert all paper documents to PDF documents and store them in GWDocuments. As a result, two offices were freed up for faculty. This transformation was crucial, as office space is at a premium on the Foggy Bottom, DC campus.

The primary focus of the implementation and addition of new features to GWDocuments was increased productivity. Rick said that the availability of documents from any computer with access to the software was a big decision in GW’s decision to purchase this technology. He also believes that GWDocuments increased efficiency of day-to-day tasks, as well as freeing up physical space for faculty from eliminating the need for traditional metal filing cabinets.

Currently, GW has a large project underway in the Medical Center and Health Sciences departments. Both offices are in the process of converting and scanning all paper documents into GWDocuments. After scanning, they will identify and purge any paper documents that are no longer needed. As the GWDocuments electronic document management system grows and expands, GW plans to build additional Banner and EAS interfaces, upgrade to Documentum version D6.5, add a workflow tool for document processing, and build a retention policy management guide to enforce departmental rules (Gilchrist, 2011).

According to a case study conducted by Informative Graphics on the Undergraduate Advising Department, GW was able to streamline their advising process as well. Even after GWDocuments was implemented at the university, the process was still very paper-based. A student would go to the Advising Department to schedule an appointment, but employees would then have to search
Documentum for the student’s file, print the transcript out, walk over to a large filing cabinet where student records were kept, and then transfer the student’s folder over to the advisor. Advisors would hand-write changes to a student’s courses on the transcript and place the paper originals back in the folder, returning them to the large filing cabinet in the front office.

Originally Gilchrist wanted to convert these transcripts into PDF format and store them in GWDocuments, allowing advisors print out student records and work from PDFs. However, PDFs are easy to edit and administrators feared the compromise of student transcripts. The solution was to adopt the Net-It Enterprise, Brava!, and CSF solutions.

After using Net-It to convert PDFs into CSF format, advisors can pull up student transcripts using the Brava viewer. Changes to the transcript can be annotated through Brava as well. All changes to the transcript follow the document back into the GWDocuments database (Informative Graphics).

“GWDocuments reduces the need for physical space required by file cabinets and the use of printing to include paper and toner by consolidating electronic administrative documents into a central storage area, decreasing energy use while increasing the accessibility of all documents.”

~A quote from GW’s Green Initiatives for a Sustainable GW website.

ImageNow

History

Melissa Konenakes at University of Michigan (U-M) oversees the EDS system ImageNow. Before implementation of ImageNow, departments on the U-M campus were utilizing three different electronic document storage products but these programs didn’t allow information to be shared between them. ImageNow was initially implemented to consolidate information into one system to combat the difficulty in sharing of information across departments.

Since implementation, the focus of ImageNow hasn’t changed very much. Currently, U-M does not own an enterprise-wide license for ImageNow, although individual licenses are available to all offices and departments. Departments have the ability to custom their site by modifying the structure of their drawers, which are storage folders within the ImageNow interface, as well as creating a workflow piece.

The offices that utilize ImageNow are all of the U-M Finance offices, the HR office, Risk Management office, and Financial Operations office. Several schools at U-M, as well as the Undergraduate and Graduate Admissions offices, use ImageNow. ImageNow has a wide variety of uses, including large operations and smaller departmental uses such as that of Financial Operations.

Features

ImageNow is a combination of different applications. Some of the applications include PeopleSoft, CollegeNET, and the Common Application that feeds data into the imaging system. Oracle, Inc owns PeopleSoft. Some of the software under the PeopleSoft product line include Human Resource Management Systems, Financial Management Solutions, Supply Chain and customer relationship management software, as well as software for student administration.

CollegeNET is an application that works to simplify the online application process. It works in concert with Perceptive Software’s ImageNow EDS system. The combined solutions speed up processing time of online applications, improve data completeness and accuracy, and eliminate duplicate entries in the student information system. (CollegeNET).

Similar to this is the Common Application. This application allows students to submit online college application essays. Common Application is very useful, especially to students applying to multiple universities (Common).

Currently, ImageNow at U-M doesn’t offer any special features besides a workflow tool. Melissa said she is interested in a checklist feature, which she received a demonstration of during a conference. The checklist feature provides a set process for different types of documents or work. U-M doesn’t have this feature yet, but Melissa would love to utilize it in the future.

Barriers
The main barrier to implementing ImageNow was awareness of the product. There have also been some issues with technical support. Konenakes and her colleagues must meet with departments interested in using the technology and map out the type of indexing solution that will be used before implementing ImageNow in each department. Konenakes team must first give a demonstration of the software, and have individual departments decide which features and indexing system they want to utilize within their department. Another weakness of the software is the necessity of converting PDFs. PDFs must be converted into .tiff files in order to be edited within the ImageNow interface.

Effects on Paper Reduction

Konenakes said that one of the main benefits of utilizing ImageNow has been the reduction in paper. Another strength has been the ability to embed links into the interface, as well as the ability to use PeopleSoft tools. Workflow functionality has also been a great success of the system, along with security and automatic data back up.

Prior to ImageNow, certain offices would have to travel back and forth between other offices on campus to complete workflow tasks. Documents would either be carried through the mail or by hand. Thanks to ImageNow, these processes can now be carried out electronically.

Since initial implementation, users of ImageNow have been scanning six million new pages into the system yearly. The Office of Undergraduate Admissions and Office of Graduate Admissions are the two biggest users of the workflow tool. Melissa’s office is constantly receiving calls from different departments on campus to image things so the department can get rid of their filing cabinets (Konenakes, 2011).

End-User Interviews

After meeting with the administrators of the four EDS systems, it was apparent that the end-user perspective would be useful in determining the true success of the technologies. Four individuals were interviewed on their usage of three different EDS systems both at IU and on other university campuses. Their responses gave us further insight into the benefits and weaknesses of electronic document storage.

KnowledgeLake

Elizabeth (Liz) Cromwell was one of the scanning personnel for UITS. She has assisted the office in transferring many of their paper documents into KnowledgeLake. Liz says that learning how to use the scanners and multi-function printers was an easy process.

Using KnowledgeLake is fairly simply. After the document has been sent through the scanner, the user must pick the document type. Then the user must index the document by the university ID of the employee and the date of entry. Depending on the document type, usually a user may release the document and be certain that it has been saved in the KnowledgeLake database.

The different types of paper documents that Liz has scanned into KnowledgeLake include performance reviews, offer letters, bonuses, accolades such as certificates of achievement, and discretionary letters. Liz says that the scanner she used had the ability to scan in many documents at the same time. She mentioned that other users may have a more difficult time using KnowledgeLake, but this depends on the type of documents they scan into KnowledgeLake (Cromwell, 2011).

OnBase

Bethany Phillips of Financial Management Services (FMS) provided the end-user perspective on OnBase. Bethany seems to feel that OnBase is a good system overall, and very useful to her office. She also said that OnBase was a very easy system to learn how to use. There are many different ways to search the database, utilizing different search criteria. However, FMS has a lot of documents stored in the system so it can take a while to find older documents.
FMS has been using OnBase for around nine years. Initially, the scanners were difficult to use. Bethany’s office started with a flatbed scanner, which was inconvenient in their scanning process. FMS has since found the best scanner for their purposes.

Very little paper is now scanned directly into the OnBase system. According to Phillips, the process by which FMS enters data into OnBase is simple. A user first scans paper invoices into the computer, saves them as PDF files, and places them in the correct OnBase folder. These documents are then sent to the processor who processes them as PDFs, who sends them back downstairs where they are swept into OnBase.

Within Financial Management Services, there are three separate areas or uses for OnBase. The main use of OnBase is through the Accounts Payable office, which uses it to track invoices. Invoices are then routed into Epic. This procedure allows a department user to log into Epic, where they are re-directed into OnBase to approve or disapprove the charges of invoices. Phillips’ office deals with the invoices for all IU regional campuses. The second area is through Customer Service, where documents such as direct deposit forms are tracked. The third use is for taxes, in order to track W-4 forms and the like.

Before OnBase was implemented, the Accounts Payable office had to hold onto paper documents for seven years. After OnBase was implemented, the FMS office was able to perform audits every three months by randomly selecting invoices and checking whether or not the image of an invoice was legible. After the audit, the documents can be deleted and the paper copies disposed of. Not every office in FMS has this audit system in place, but Bethany would like to see the system in place in the future.

Phillips feels that OnBase has helped with paper reduction. She has been with Financial Management Services for fifteen years, and has seen the changes that occurred after implementing OnBase. Phillips said that FMS used to store things at an off-campus warehouse, dropping off paper documents two to three times a year. Now, Phillips said that she usually doesn’t even have to take one yearly trip.

Although it was initially difficult to convince departments to check their inbox and look at the images of documents instead of printing them out, OnBase has been greatly useful to Bethany Phillips and the Financial Management Services office. It was also difficult to convince the auditors to accept the image as the actual document instead of sending them a paper copy. This is no longer a major issue for FMS.

In the future, Phillips would like to be able to sweep multi-page invoices into OnBase in one batch. She also would like to be able to skip backward and forward through a document when indexing invoices. Many times the purchase order and order number, which FMS uses to index their invoices, are not included on the first page of an invoice. This can make the indexing process difficult and tedious (Phillips, 2011).

Another interview with an end-user turned up similar results. Pamela Meredith, Associate Director of the IUPUI Undergraduate Admissions Office discussed her office’s use of OnBase in an email interview. Meredith said that OnBase was not a difficult technology to learn how to use. The implementation of OnBase actually exceeded initial time projections because of the ease of use of the system.

Meredith’s office uses all of the current features of OnBase, including storage and retrieval, and scanning, and the Workflow tool. The types of documents her office scans are any type of admissions documents, such as applications, transcripts, and supporting documents. Most of these documents are hard or paper copies. There is also a batch process that imports PDFs into the system. The greatest difficulty in using the scanners was the amount of time it took to replace old scanners and decide on which new model to purchase.

As for strengths and weaknesses, Meredith was unaware of other options available on the market. The IUPUI Undergraduate Admissions Office has been able to meet its needs with OnBase, and believes that OnBase is a very reliable system. To Meredith’s knowledge, there were no barriers to adopting OnBase.
Because of OnBase, Meredith’s office is 100% paperless. OnBase has replaced the need for paper files to travel from desk to desk, and applications are accessible to staff when they are traveling. Routing mechanisms also allow files to travel to departments outside of Admissions without the file physically leaving the Undergraduate Admissions Office.

Meredith credits OnBase with improving her office’s workflow. The ability to change logic and build or tear down online queues in an easy fashion has allowed Undergraduate Admissions to quickly deal with issues within the system. Prior to OnBase, staff spent a considerable amount of time searching for hard copies of documents. Much time was also dedicated to data entry from admissions files into PeopleSoft. The office set a goal to improve the student profile, meaning that admissions decisions needed to get to students much faster and that staff couldn’t waste time searching for paper documents.

Incoming document processing time has been reduced from 2 weeks to 1 business day. The ability for academic advisors and others across campus to simultaneously view documents is very useful in this process. Workload balancing is also much easier, as users can see which queues need more resources and re-assign staff accordingly. In the future, Meredith would like to see her office purchase the SIS/OnBase integration module. (Meredith, 2011)

ImageNow

Jeff Dils is the Document Imaging Operations Manager for the Information and Technology Services at the University of Michigan. Dils said that before ImageNow and WebNow were implemented at the university, one of three different typesetting products called FileNet was being utilized. U-M’s Purchasing department eventually realized the costs they were incurring and decided to consolidate all departments into one imaging system: ImageNow. Dils said that converting to ImageNow wasn’t difficult, and that it was much less proprietary than FileNet.

Started as part of Financial Operations, Dils’ department is responsible for scanning documents for other departments. Approximately five to six million images are scanned per year into ImageNow, WebNow, or onto DVDs. 80% of these are scanned into ImageNow or WebNow. The types of documents that Dils’ department scans are sponsored programs paperwork, student loans, purchase orders, journal entries, human study programs, International Center documents, tax forms, payroll benefits, Human Resources documents, Registrar’s Office transcripts, Purchase Order contracts, Funds, and back files for Risk Management Services and various other departments wishing to reduce paper storage, but retain information.

Dils feels there are many strengths to the ImageNow system. Since it is not as proprietary as FileNet, offices are able to make a lot of adjustments to the individual set-up of ImageNow, such as the different views available, the types of drawers, and better document security. When U-M was using FileNet, someone from the company had to be hired in to make changes to the system. With ImageNow, there is no need for this. ImageNow administrators can make changes to the interface from the University of Michigan.

As for paper reduction metrics, Dils said that U-M doesn’t have anything specific outlined. Eventually offices would like to transition to a more electronic-based, paper-less workplace, but they still utilize a reasonable amount of paper. Currently, offices are completing benefits paperwork online and submit emails for confirmation on documents. Two-sided printing has been set on as the default on printers to save paper. This is helping to reduce the volume of paper used, but the fact that Dils’ office still scans paper in doesn’t help to remove the initial creation of this paperwork.

ImageNow was implemented mainly to help with retention and improved efficiency. Prior to the implementation of ImageNow, there was a room on U-M campus full of confidential employee files. If an employee wanted to access a file from this room, someone with the proper security clearance had to bring the file to them.

Because of ImageNow, employees with proper security clearance can pull up employee documents from their computers. ImageNow also has been instrumental in improved time management and better
security of confidential documents. Dils says the main barrier to implementation of ImageNow is determining how departments would like to manage their paperwork electronically, via the types of drawers they want to use and the type of security measures needed.

Dils said that there is a workflow tool available called DataCapture. DataCapture is a verification tool that also performs OCR. There is a verification station to check that documents are properly indexed and stored within ImageNow. Currently, U-M isn’t utilizing all of the tools available to them, but this is merely because the tools U-M has fit its’ current needs.

In the future, Dils feels that the university should purchase more OCR software to ensure that documents are more searchable in WebNow. Currently, documents can be found via the indexes. But without OCR, documents aren’t searchable within the system (Dils, 2011).

**Solutions to EDS Barriers: Comparing the EDS Systems**

After interviews were completed with relevant staff and end-users, the results were analyzed. Overall, users were very pleased with their respective EDS systems. Many systems in place already address the concerns in Table 1 of this report.

Table 2: Graph depicting the benefits of an electronic document storage system

**Digital Security**

After determining that digital security was a concern for many departments on campus, an email interview was conducted with Scott Wilson of the University Information Policy and Security Office/Office of the Vice President for Information Technology and Chief Information Officer (CIO) to determine if there were any policies or discussions regarding digital signatures. In previous interviews, departments expressed their concern at the need to retain hard, paper copies of certain documents such as contracts in order to have the signature on file. Wilson was unaware of any policies that dealt directly with the retention of signed documents, although he did provide a lot of useful information regarding the differences between different types of digital signatures.

A digital signature is a mathematical scheme for demonstrating the authenticity of a digital message or document. It is used for software distribution, financial transactions, and similar activities requiring authentication. An electronic signature, on the other hand, is any electronic data carrying the intent of a
signature. Also referred to as a photocopy of a signed document, this could be an electronic sound, symbol, or process attached to or associated with a contract or other type of record.

Digital signatures are more secure than electronic signatures because they are protected by encryption. In fact, several universities now use digital signatures to publish electronic student transcripts. As for scanning paper documents into an electronic document system, a photocopy of a notarized document is usually considered a certified copy upon scanning. A certified copy is a copy or photocopy of a primary document that has an endorsement or certificate on it to prove that it is a true copy of the notarized document. At IU, Wilson said that only the University Treasurer has the authority to sign contracts, which are delegated to Purchasing (Wilson, 2011).

Another email interview was conducted with Mark Lynch of UITS Support Systems and Licensing. He stressed the importance of digital security in regards to IU data and SharePoint 2010, the platform KnowledgeLake is built upon. Lynch said, “To me the main issue between off-premises ‘cloud’ services and on-premises ‘cloud’ services boils down to legal protections and the liability the off-premises providers are willing to accept (which is almost none).”

However, research has shown that SharePoint 2010 has protections in place to protect the documents stored within SharePoint and KnowledgeLake (Bantin, 2011). Lynch also expressed concern at the cost of digital security, another barrier in Table 1. Lynch said, “If we can do it cheaper, why outsource? If not, then we should outsource to the ‘cloud’ (assuming legal issues are addressed – which they are not – yet)” (Lynch, 2011).

The KnowledgeLake/EDS InfoShare also ensured secure print release workstations. Similar to the Student Technology Centers (STC), only the owner of a document may release a document from the printer. Documents are held in queue for up to 8 hours, and print jobs may be released to any of the 6 Multi-Function Printers in the CIB (InfoShare).

Ease of Use and Technical Support

As previously mentioned, a seminar called an InfoShare was set up to teach UITS employees how to best utilize the new technologies available in the CIB, as well as those available for the move. A question and answer session was held at the end of the seminar, which provided a forum for addressing staff concerns. HELPNet will also be on hand in the CIB to assist in technical difficulties with these new technologies.

During the move, the technologies available at the Print Release Workstations included Sharp MX-5001N Multi-Function Printers. These printers have large, touch-screen full-color displays. They are useful for multitasking and graphical navigation.

The Scan Workstations housed Fujitsu 5530C2 Scanners. These scanners can capture up to 50 pages or 100 images per minute in color or black and white. The scanners can handle large documents up to 11 X 17 inch paper and smaller documents at 2.1 X 2.9 inch paper.

Limited Resources: Lower Cost of Entry and Physical Space Savings

Given limited resources, it is difficult to consider implementing new technologies, even if they may be beneficial to the department. Departments should be aware that there are already several EDS systems available at IU. The cost of KnowledgeLake and OnBase include the initial licensing fee to join the contract pool and yearly maintenance fees. If departments can afford the maintenance fees, EDS remains a feasible option.

Customization vs. Uniformity and Continuity Across Departments

Many departments expressed their concern for having the ability to customize the type of documents and folders stored in an EDS system. As seen in the four EDS systems, there is the option to customize folders to fit the department’s needs, as well as determining each department’s search and index parameters given the department’s individual needs. The systems also provide continuity across departments through features such as Docpop, allowing other users in outside departments to access the
same documents with permission from the EDS administrator.

**Other Benefits**

**Paper Reduction**

Although none of the universities had specific paper reduction metrics in place, each mentioned that at least one of their departments had experienced a great reduction in paper usage. Some offices were able to adopt a paperless workplace, while others simply had less paper to place in storage off-campus. It was easy to see that adoption of EDS systems was extremely crucial to paper reduction methods.

**Improved Workflow**

An interesting feature of many EDS systems is a workflow tool. Although not originally a part of our focus, workflow processing and workflow tools were quickly found to be crucial in the success of many EDS systems. More emphasis on improved workflow may help to persuade other offices to adopt EDS systems in the future.

**Challenges**

The time frame of the UITS move into the CIB was a complication in providing a complete case study of the move. Although several offices have completed the move into the CIB, a full analysis of the move won’t be feasible until all offices have settled into the CIB. We suggest that further analysis be carried out once all offices have finished moving into the CIB.

Another challenge was the timeframe of this internship. Since many people travel frequently during the summer, it was difficult to get people on the phone or to answer emails swiftly. However, contacting interviewees through email early in the project was helpful in overcoming this challenge.

**Recommendations**

Based on these research findings, the following priorities for future research on this subject have been identified:

**Illuminate Best Practices and success stories across the IU campus.**

Previous research has shown that training and communication among departments is crucial to paper reduction and document management strategies. Although the KnowledgeLake/EDS InfoShare was a valuable resource for UITS employees, other departments across campus did not have access to this forum. It is recommended that creation of a public forum be pursued.

A departmental forum or blog would serve as a valuable platform for discussion of best ways to reduce paper usage. It would also provide users with a place to ask questions and seek answers to their concerns. A good resource to utilize is the IU Green Teams blog: iugreenteams.wordpress.com. This blog could provide inspiration in formulation of a blog highlighting departments’ Best Practices and success stories. The UITS move to the CIB would be a great place to begin.

Departments interested in pursuing projects similar to KnowledgeLake would also benefit greatly from a document outlining Best Practices. In addition to the blog or forum, this document would provide other departments with information on green moving from the success of the UITS move into the CIB. Collaboration with another intern such as the Green Teams Coordinator would be helpful in creating an effective document and encouraging cross-fertilization of Best Practices.

**Conduct a carbon analysis of the paper scanned and recycled in the KnowledgeLake project.**

Interviews with UITS employees and scanning personnel would be useful in determining the true impact on paper reduction. Similar to the methods of this report, personal, email, or telephone interviews with a list of questions could be created. This recommendation will be crucial to completing a full analysis of the UITS move.

**Continue a case study of the UITS move into the CIB.**
Publicize the success of the UITS move into the CIB. As with GWDocuments, the success of EDS systems can only occur after other departments are aware that the technology exists and that it is successful. We recommend creating a press release or holding public tours to discuss the green aspects of the building, as well as the green efforts such as paper reduction that went into the move. Follow up on the progress of the move could be conducted through interviews with staff members and a survey distributed to all employees housed in the CIB.

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Addendum: Duplex Printing Outreach

Introduction
Accompanying this report on paper reduction is a summary of continued work on duplex printing. Indirectly related to the original focus of this project, duplex printing is a key factor in paper reduction. Briefly summarized are the results of duplex printing initiatives completed this summer.

Purpose
Past research conducted by interns on the subject of duplex printing quantified the carbon footprint of the paper making process versus the energy used to print on paper (cite Morse 2008). Results showed that the environmental impact of paper is very energy intensive. Since, discussions focused on the potential of changing the default print settings in the STCs to duplex. Opinions on the overall environmental, mechanical and financial impact of such an action vary. As discussions continue across campus, marketing materials and prompts were created to educate students on how to change the setting to duplex in the labs, on both Mac and PC computers.

Problem

Paper Reduction
As previously stated, IU purchases an increasingly large sum of paper every year. Duplex printing could help cut down on the volume of paper consumed here at the university. Marketing materials instructing students on how to change the setting will likely encourage students to change their habits or think twice before printing (McKenzie-Mohr). This decrease in printing could help to reduce the millions of sheets of paper purchased at the university.

A population of individuals on the IU campus believes that duplex printing causes more printer jams. However, a previous study conducted by a SPEA-V600 Capstone group disputes this claim. Only a small percentage of jams were reported during the time this group conducted their study, and the cause of these jams was unable to be determined (Capstone, 2011).

Methodology
As with the previous portion of this report, research was conducted to determine the benefits of duplex printing and risks associated with printers. After background research was completed, research into suitable marketing materials was then conducted. From this research, our own marketing materials were created for the STCs.

Results
Once the need for marketing materials was determined, research into relevant materials was conducted to determine the best method for informing students. A UITS campaign called Print Less Go Green was identified. From this campaign, the logo was found to be suitable as a sticker to be placed on computer monitors around campus, reminding staff and students to think before they print (UITS).

A study published in 2007 highlighted potential health risks associated with the toxicity of toner used in laser printers. The study stated that 30 percent of printers that were tested released a high concentration of particulates into the air around the laser printers. The release of these particulates was thought to originate from the toner cartridges contained within the printers (Time). Although more recent studies have expressed doubt at these concerns, one cannot dispute the fact that printing less frequently will have positive impacts on both the environment and health of an office.

Other health concerns associated with laser printers include the release of chemical gases and particles, resulting from the use of inks and toners, paper, coatings on transparencies, glue from adhesive labels, and residual cleaning chemicals. Some common health effects associated with laser printers include headaches, mucous membrane irritation, and dryness of the throat, eyes, and nose. Laser printers also emit VOCs, or volatile organic compounds, through their inks and toners.
Particulates, ozone, and formaldehyde are some additional concerns. Particulates may result from paper debris, toners, and inks. Ozone is created when a charge is applied to paper so that the ink will cling to it. Newer models of laser printers use a different system to reduce the ozone emitted, or even have filters to extract the ozone emissions. Formaldehyde is commonly emitted through papers and the coatings on papers (Aerias).

Table 3: UITS Print Less Go Green logo

Another useful resource created was a duplex printing checklist to be placed on the Print Release Station computer monitors. This list will remind students to think before they print. We hope that the checklist will encourage students to change their printing habits over time.

Table 4: Duplex printing checklist

Challenges
The main challenge to creating duplex printing materials was the time constraint. The duplex printing aspect of the project wasn’t formulated until very late in the internship, leaving very little time to create materials. However, suitable materials were created despite this constraint.

Recommendations
Conduct a survey of users in STCs to determine the effectiveness of prompts.
It is important that prompts be placed near the activity being promoted or discouraged. However, the true success of prompts in changing behavior cannot be determined without further research. A random sample of STC users could be contacted and asked to participate in a survey to gauge the true success of these prompts. The results of this survey could prove useful in determining the next steps towards encouraging duplex printing.

Continue revising marketing materials.
Through continued revision, we will be able to ensure that prompts are effective in reminding users of STCs to think before they print. Although the materials above are a great start, further collaboration and revision in these materials would be useful. Perhaps an intern with a background in graphic design would be able to create even more effective prompts.
References
Appendix

Sample Interview Questions

1. Why was ImageNow initially implemented? Has its’ original purpose shifted significantly since implementation?
2. Is the scope of ImageNow Enterprise-wide?
3. Which functional offices or systems on campus currently use ImageNow?
4. Is ImageNow used for both big systems like Accounts Payable and smaller departmental uses like eliminating paper HR files within a department?
5. Is this primarily a single solution or a combo of products/solutions?
6. Any discussion regarding use of ImageNow for things like faculty promotion and tenure?
7. What are the strengths and weaknesses of ImageNow as an electronic document storage system?
8. What metrics on paper reduction do you have from implementing ImageNow?
9. Any anecdotal or intuitive belief that it has reduced paper?
10. Other metrics or thoughts on efficiency or improved workflow?
11. What barriers were in place for adopting it, assuming there were any?
12. What are some of the special features of ImageNow i.e. workflow tool, etc?