IPRO 347
Developing a document Control System
FINAL REPORT

Instructor: William Maurer

Sponsors: Abrasive-Form

IPRO Team: Vitali Basiourski, William Cabrera, Christopher Drag, Samad Erogbogbo, Richard Ike, Maciej Krolikowski, Daniel Mendez, Erin Mersch, Anton Orlichenko, Justin Roediger, Despina Zouridis

Date: Thursday, July 24, 2008

1. Introduction

The IPRO 347 team is being sponsored by Abrasive-Form Inc. to lead the company into a paperless form of tracking projects. Abrasive-Form currently uses a paper folder, which they call the "job folder" to hold all the important documents for completing incoming projects. This job folder travels along with the pieces of the project until the project is completed. Once a project has been completed, and the final product is shipped out, the job folder for that project is then kept in an on-site filing cabinet.

So far this has led to several problems for Abrasive-Form. As the company is increasing in size and completing increasing amounts of projects, they have had to dedicate a large portion of their offices to the storing of old job files. Abrasive Form keeps all of their completed job folders for future access whenever the need may arise. This has also led to a lot of time being wasted by the employees of Abrasive Form traveling to the back offices where the job folders are held to look up information.

The IPRO 347 team will be helping Abrasive Form come up with a solution to this very serious problem. The solution generated thus far is to scan all the documents contained within the paper job folders into PDF form, and use a digital filing program (such as Bugzilla which is a free open source program) to organize the PDF files into sub folders, and allow for quick referencing based on critical criteria such as the job number, part number, customer name, or part number. All this information would then be contained in a single server that can be accessed on any computer throughout the company through an internal network.

2. Background

Abrasive-Form is a contract based manufacturer that specializes in precision grinding. They provide services for many metal industries, but focus primarily on the Gas Turbine and Aerospace Industries. Established in 1976, Abrasive-Form is a multimillion-dollar company with a modern 62,000 square foot plant in Bloomingdale Illinois, that houses 37 creep feed grinding machines.

As the unfinished products are received from the customer, Abrasive-Form creates a "job number" and "job folder" for that batch of product. This number and folder collect all the relevant data regarding the processing done to that batch. Abrasive Form uses a program called "Vista" that generates a large part of the paperwork and tracks other activities throughout the completion of the project. A physical job file is created and collects all of the paper documents that are related to the processing of the job. Most of the documents contained in this folder can be summarized as; incoming receiving documents, contract review and purchase order documents, in process inspection documents, subcontracting documents, shipping documents, quality control certificates, job processing documents, and other miscellaneous documents. Each of these documents are generating during various processes along the path of receipt, processing, inspection, and shipping. Depending on the status of the job i.e. open, pending, and closed, the job folder will be stored in multiple areas. This can lead to the job folder being misplaced since there can be ambiguity about the status of the job.

There are various personnel that need access to the job files at various times for a variety of reasons. This includes Production, Quality Control, Sales, and Accounting. Access to these files may be required while the job is waiting to be processed, while it is in process, and several months after processing has been completed.

Abrasive-Form has contracted the IPRO 347 to create a digital form of the job folder that is easily accessible to all branches of the company remotely at their work stations. The folders should be searchable based on the job number, the customer name, and the part number. The access will allow viewing rights, printing, and emailing, and at no time will the documents be removed or altered from the database. There will need to be a procedure to quickly destroy the paper documents once they have been scanned into this system making the digital copy referenced by everyone.

This is the first project Abrasive-Form has done with IIT's IPRO office. Therefore, this will be the first attempt at correcting this problem for the company. However, with the ease of computers and the relative inexpensive costs for a company to outfit its employees with computers, this is not the first time a company has moved towards digital data storage and local network sharing. There are many examples of companies that have chosen to use digital storage successful and there is plenty of software available to organize the data. It is the responsibility of the IPRO team to listen to the wants and needs of Abrasive-Form and find the best way to transition this company to paperless records.

3. Objective

The objective of our team was determined by indentifying who the users of the database are and what demands needed to be met. We identified these users to be the five major departments of Abrasive-Form. These departments are IT, Accounting, Quality control, Operations, and Purchasing. After interviews and brainstorming, we came up with the following goals for our database:

- For the IT department, our goal is to have a database with the following capabilities;
    1. Remote access
    2. Off-site backup
    3. Search Engine (internal)
    4. Electronic Copies
    5. Real Time
    6. Easy/Fast Access

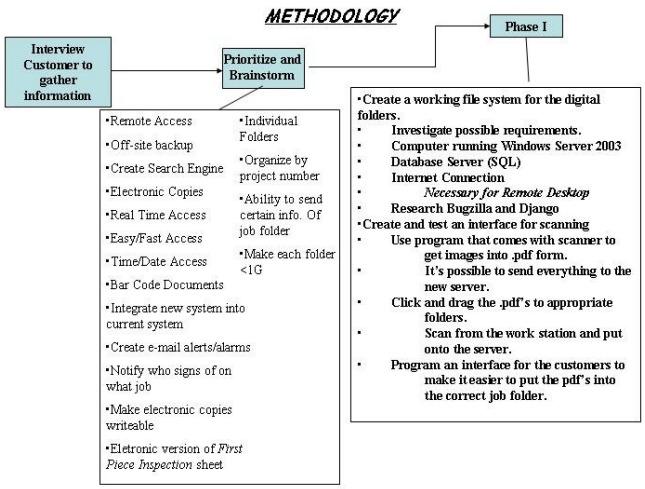
- For Accounting Department, our goal is that the database should have;
    1. Time/date Stamps
    2. Bar coding for incoming parts
    3. The ability to perform the same task as Visa (old system) thereby making it obsolete.

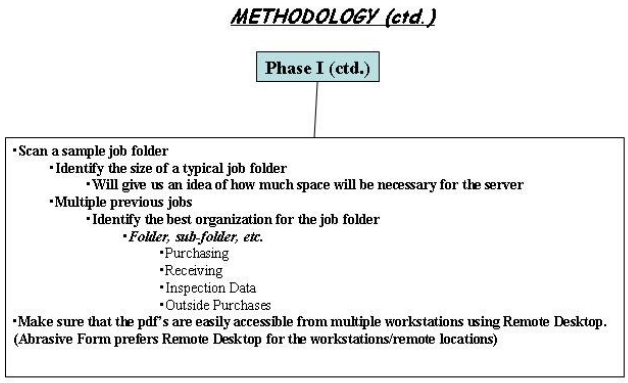
- For the Quality Control department, we want our database to have
    1. Email alerts
    2. Tracking of who's signing off on what.
    3. Ability to Alter Electronic documents (write - to)
    4. Alarms/call to action on certain important issues.
    5. Tracking of Quality/Quantity issues
        - Order was 100 and we only sent 98, why? What's wrong?

- Our goal for the Operations department is to create a database that will be able to generate and archive inspection reports.

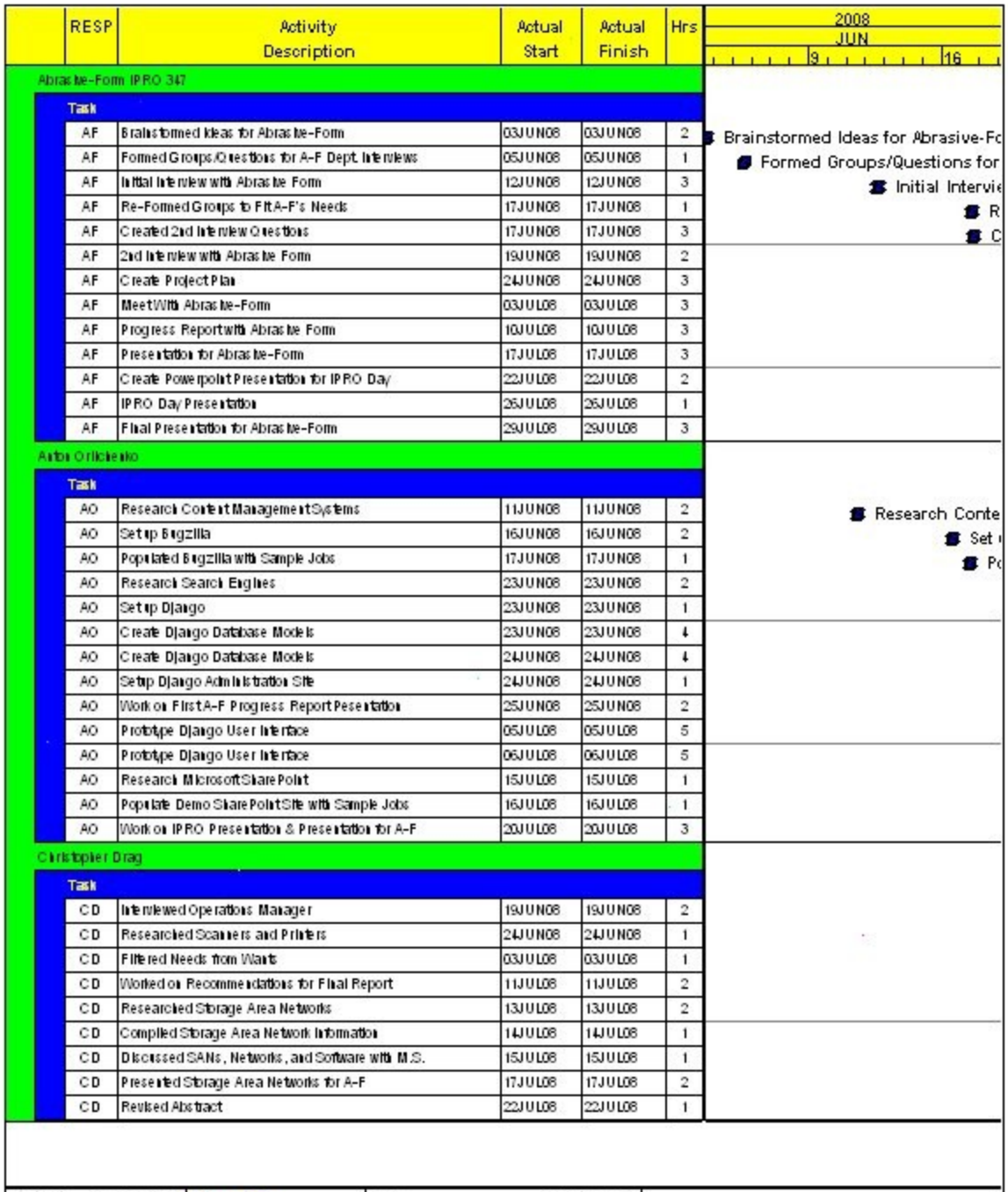
- For the Purchasing department
  1. We want the database to be "selective" or "qualified"
     - Eliminate remote access for purchasing personnel.
  2. The goal is to sub-divide the job folder into:
     - Purchasing/receiving
     - Inspection data
     - Outside purchases
     - Shipping
  3. The Job folder should be by arranged by project number (I.D)
  4. Our database should have the ability to send parts of the folder out to the customer if necessary (inspection data)
  5. The Database should be smaller than one gig per folder
  6. The Database should have ability to integrate data from CMM
  7. The Database should be able to import from Vista (old system)

4. Methodology/ Brainstorming/Work Breakdown Structure





	RESP	Activity Description	Actual Start	Actual Finish	Hrs
Abrasive-Form IPRO 347					
Task					
	AF	Brainstormed Ideas for Abrasive-Form	03JUN08	03JUN08	2
	AF	Formed Groups/Questions for A-F Dept. Interviews	05JUN08	05JUN08	1
	AF	Initial Interview with Abrasive Form	12JUN08	12JUN08	3
	AF	Re-Formed Groups to Fit A-F's Needs	17JUN08	17JUN08	1
	AF	Created 2nd Interview Questions	17JUN08	17JUN08	3
	AF	2nd Interview with Abrasive Form	19JUN08	19JUN08	2
	AF	Create Project Plan	24JUN08	24JUN08	3
	AF	Meet With Abrasive-Form	03JUL08	03JUL08	3
	AF	Progress Report with Abrasive Form	10JUL08	10JUL08	3
	AF	Presentation for Abrasive-Form	17JUL08	17JUL08	3
	AF	Create Powerpoint Presentation for IPRO Day	22JUL08	22JUL08	2
	AF	IPRO Day Presentation	26JUL08	26JUL08	1
	AF	Final Presentation for Abrasive-Form	29JUL08	29JUL08	3
Anton Orlichenko					
Task					
	AO	Research Content Management Systems	11JUN08	11JUN08	2
	AO	Setup Bugzilla	16JUN08	16JUN08	2
	AO	Populated Bugzilla with Sample Jobs	17JUN08	17JUN08	1
	AO	Research Search Engines	23JUN08	23JUN08	2
	AO	Setup Django	23JUN08	23JUN08	1
	AO	Create Django Database Models	23JUN08	23JUN08	4
	AO	Create Django Database Models	24JUN08	24JUN08	4
	AO	Setup Django Administration Site	24JUN08	24JUN08	1
	AO	Work on First A-F Progress Report Presentation	25JUN08	25JUN08	2
	AO	Prototype Django User Interface	05JUL08	05JUL08	5
	AO	Prototype Django User Interface	06JUL08	06JUL08	5
	AO	Research Microsoft SharePoint	15JUL08	15JUL08	1
	AO	Populate Demo SharePoint Site with Sample Jobs	16JUL08	16JUL08	1
	AO	Work on IPRO Presentation & Presentation for A-F	20JUL08	20JUL08	3
Christopher Drag					
Task					
	CD	Interviewed Operations Manager	19JUN08	19JUN08	2
	CD	Researched Scanners and Printers	24JUN08	24JUN08	1
	CD	Filtered Needs from Wants	03JUL08	03JUL08	1
	CD	Worked on Recommendations for Final Report	11JUL08	11JUL08	2
	CD	Researched Storage Area Networks	13JUL08	13JUL08	2
	CD	Compiled Storage Area Network Information	14JUL08	14JUL08	1
	CD	Discussed SANs, Networks, and Software with M.S.	15JUL08	15JUL08	1
	CD	Presented Storage Area Networks for A-F	17JUL08	17JUL08	2
	CD	Revised Abstract	22JUL08	22JUL08	1



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Run Date 24JUL08 15:14

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IPRO Sheet 1A of 3B

Final Report

Classic Schedule Layout

Date	Revision	Checked	Approved

Primavera Systems, Ir

	RESP	Activity Description	Actual Start	Actual Finish	Hrs
Despina Zoinidis					
Task					
	DZ	Budget Investigation	24JUN08	24JUN08	3
	DZ	Scanner Research	25JUN08	25JUN08	4
	DZ	Printer Research	27JUN08	27JUN08	1
	DZ	Shredder Research	01JUL08	01JUL08	2
	DZ	Scanning/Shredding Company Research	07JUL08	07JUL08	2
Erin Mersch					
Task					
	EM	Meeting Minutes	05JUN08	05JUN08	3
	EM	Meeting Minutes	12JUN08	12JUN08	3
	EM	Meeting Minutes	17JUN08	17JUN08	3
	EM	Meeting Minutes	19JUN08	19JUN08	3
	EM	Meeting Minutes	24JUN08	24JUN08	3
	EM	Created ProjectGantChartfor Midterm Report	26JUN08	26JUN08	7
	EM	Meeting Minutes	26JUN08	26JUN08	3
	EM	Meeting Minutes	01JUL08	01JUL08	3
	EM	Meeting Minutes	08JUL08	08JUL08	3
	EM	Meeting Minutes	10JUL08	10JUL08	3
	EM	Meeting Minutes	15JUL08	15JUL08	3
	EM	Meeting Minutes	17JUL08	17JUL08	3
	EM	Meeting Minutes	22JUL08	22JUL08	3
	EM	Adjusted ProjectGantChartfor Final Report	23JUL08	23JUL08	4
Justin Roediger					
Task					
	JR	Organized the Team Structure section of Midterm	25JUN08	25JUN08	2
	JR	Created Poster for IPRO Day	21JUL08	21JUL08	3
Maciej Krotkowski					
Task					
	MK	Researched Abrasive-Form	03JUN08	03JUN08	1
	MK	Created Electronic Copies of Sample Jobs	16JUN08	16JUN08	3
	MK	Altered Electronic Documents for Sample Jobs	17JUN08	17JUN08	1
	MK	Researched Scanners	20JUN08	20JUN08	10
	MK	Researched Scanner Software	23JUN08	23JUN08	1
	MK	Worked on Final Power Point Presentation	24JUL08	24JUL08	3
Richard Ile					
Task					
	RI	Compiled Information from Interview	23JUN08	23JUN08	2
	RI	Interface Design	05JUL08	05JUL08	2
	RI	Continued Interface Design	17JUL08	17JUL08	2
Samad Erogbogbo					
Task					
	SE	Project Plan	26JUN08	26JUN08	6

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IPRO Sheet 2A of 3B

Final Report

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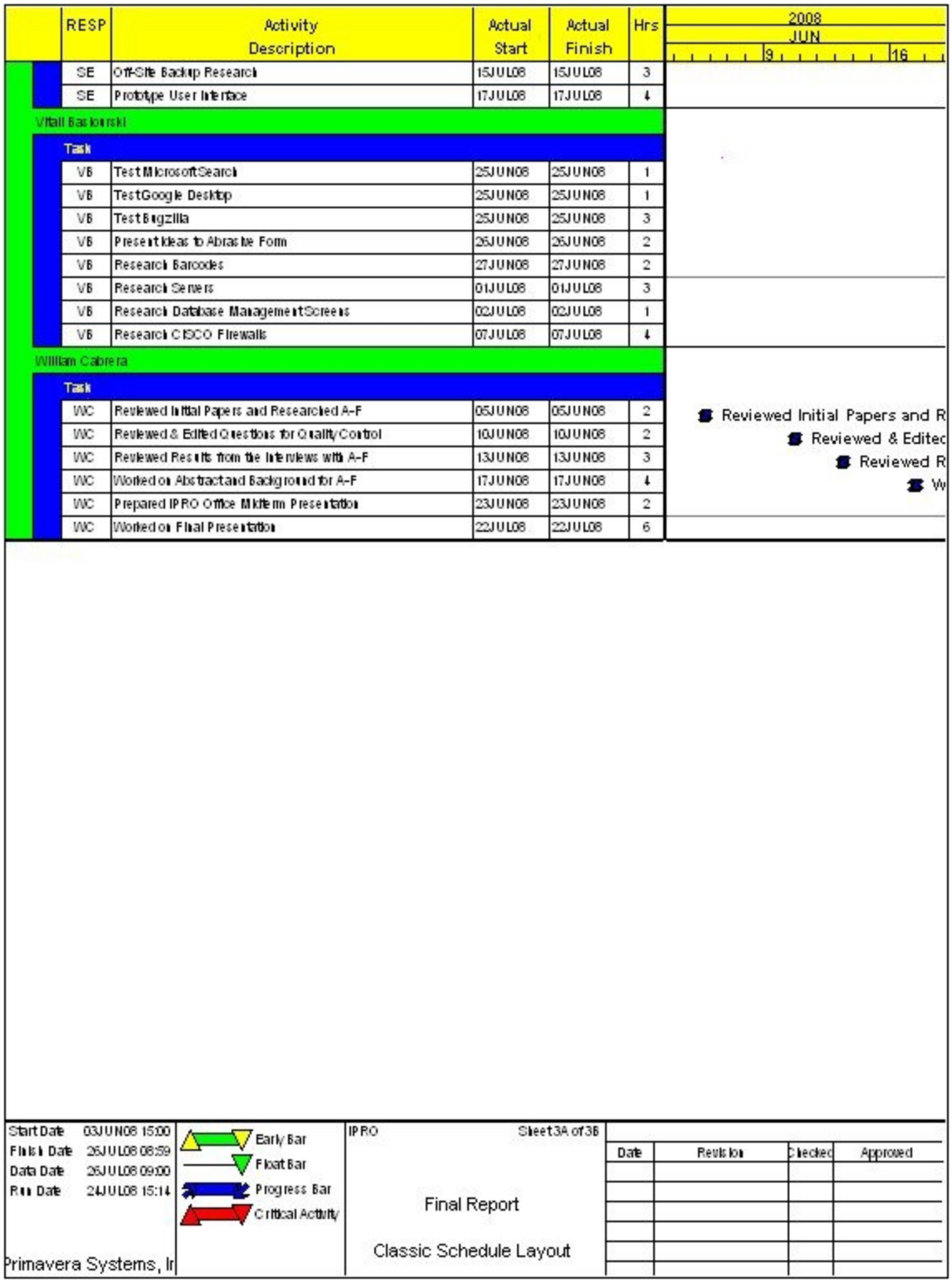
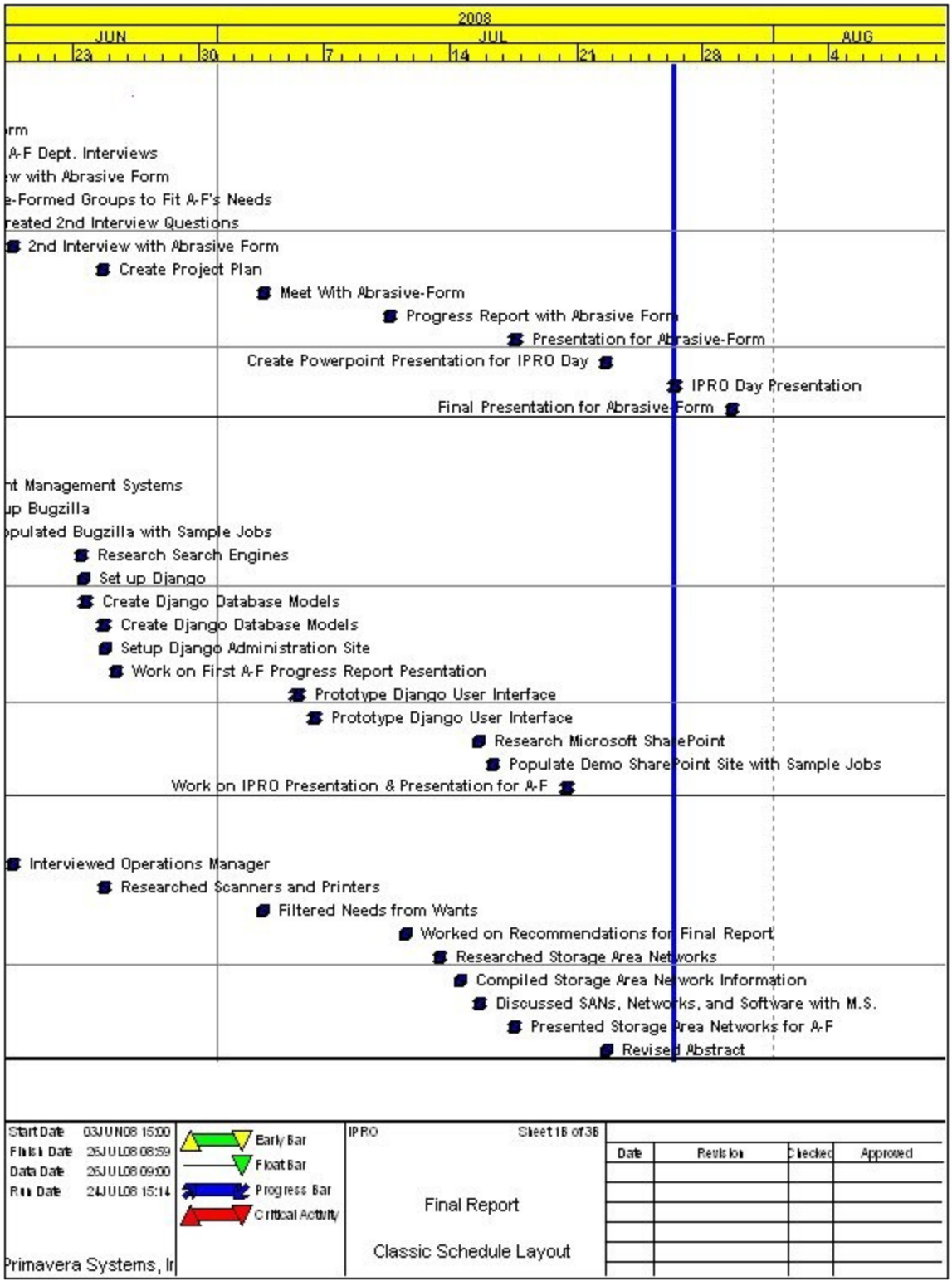
	RESP	Activity Description	Actual Start	Actual Finish	Hrs
	SE	Off-Site Backup Research	15JUL08	15JUL08	3
	SE	Prototype User Interface	17JUL08	17JUL08	4
Vitali Baslonski					
Task					
	VB	Test Microsoft Search	25JUN08	25JUN08	1
	VB	Test Google Desktop	25JUN08	25JUN08	1
	VB	Test Bugzilla	25JUN08	25JUN08	3
	VB	Present Ideas to Abrasive Form	26JUN08	26JUN08	2
	VB	Research Barcodes	27JUN08	27JUN08	2
	VB	Research Servers	01JUL08	01JUL08	3
	VB	Research Database Management Screens	02JUL08	02JUL08	1
	VB	Research CISCO Firewalls	07JUL08	07JUL08	4
William Cabrera					
Task					
	WC	Reviewed Initial Papers and Researched A-F	05JUN08	05JUN08	2
	WC	Reviewed & Edited Questions for Quality Control	10JUN08	10JUN08	2
	WC	Reviewed Results from the Interviews with A-F	13JUN08	13JUN08	3
	WC	Worked on Abstract and Background for A-F	17JUN08	17JUN08	4
	WC	Prepared IPRO Office Midterm Presentation	23JUN08	23JUN08	2
	WC	Worked on Final Presentation	22JUL08	22JUL08	6

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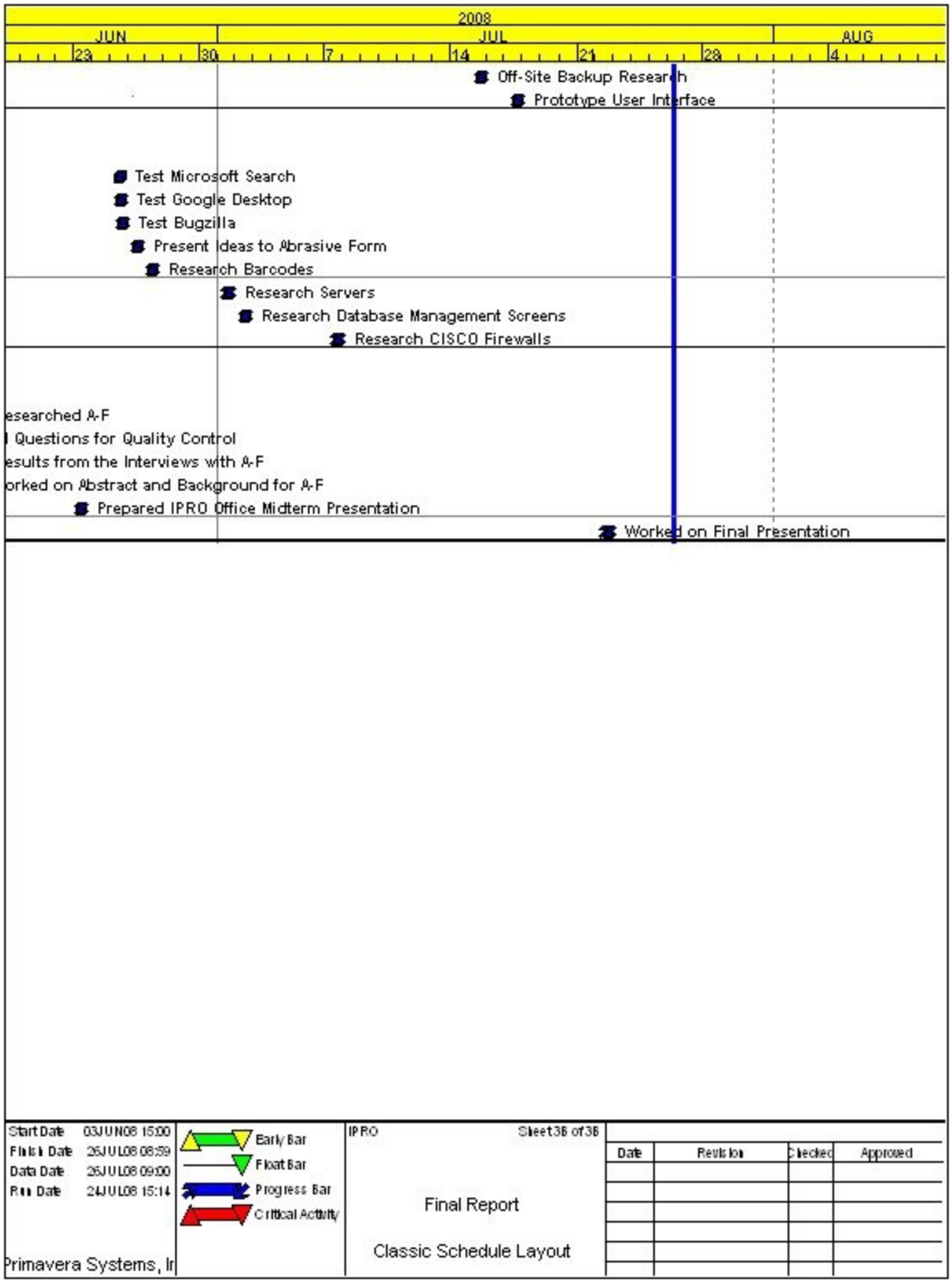
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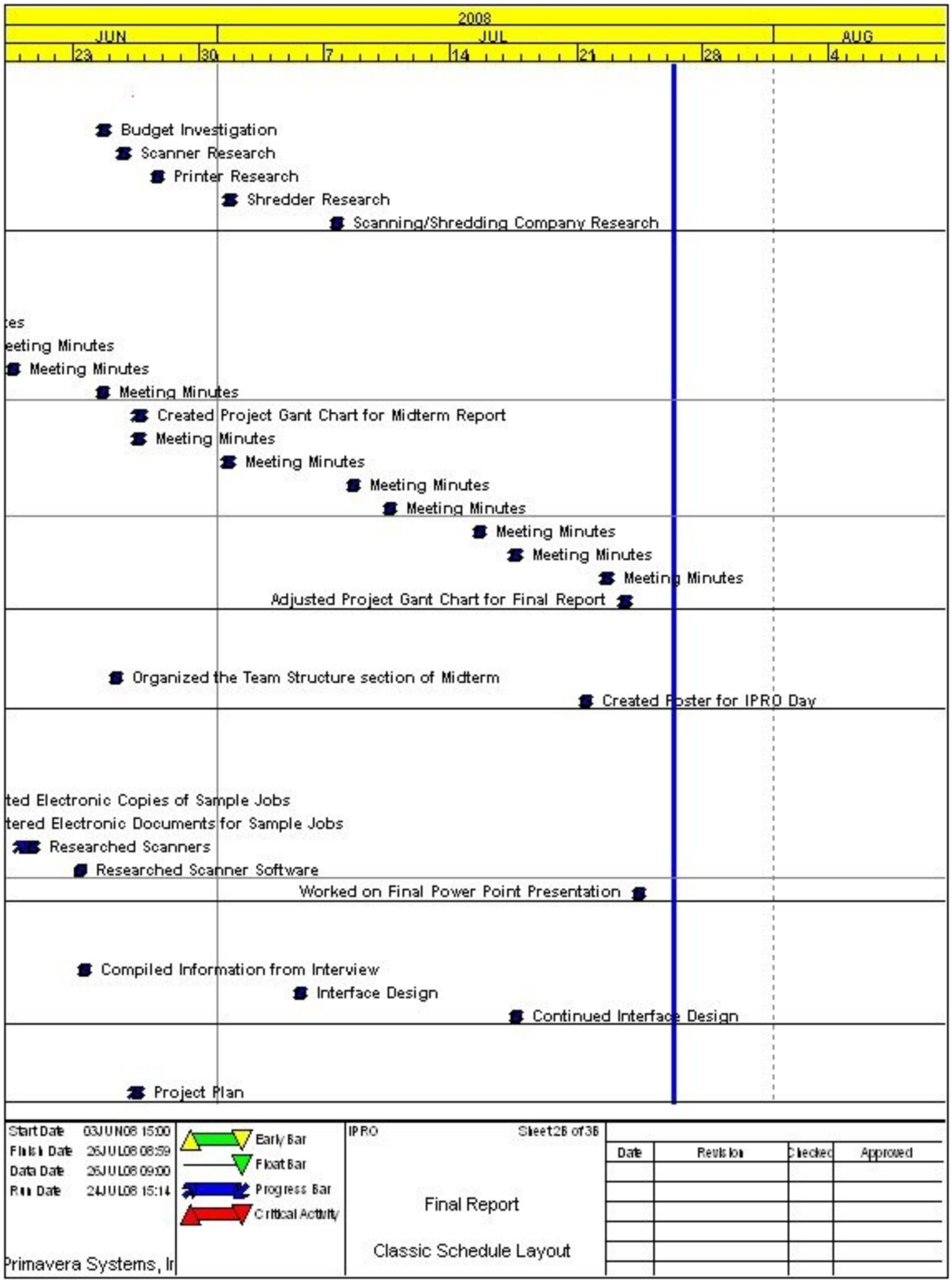
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5. Assignments

Name	Major, Year	Skills and Strengths	Experience and Academic Interest	Team
Basiourski, Vitali	4th year ME	Creative solutions to problems, good at managing people, Programmed with C ++ and fortran	Intern at Widgi Worx, Pricing research as well as preliminary deal-making, some prototype design/refurbishing experience. Interested in power generation and prosthetic aids.	Quality control, System testing
Cabrera, William	5th year ME	Leadership, Organization	Green engineering	Quality Control
Drag, Christopher	4th year Electrical Engineering	Organization and structure. Trying to do too many things with not enough time to complete them.	I have been a GED tutor for 4 years at Daley College. Power Engineering, reading about artificial organs and new technology.	Operations
Erogbogbo, Samad	4th year ME	Project management, Microsoft Office, team worker	Coop in Mechanical Engineering Industry, previous IPRO experience, athlete	Accounting, IPRO Liaison
Ike, Richard	4th year ME, minor in Material science	IPRO experience, strong group worker, AUTOCAD and MATLAB experience.	3 years of experience in metallurgy as an intern/research assistant. Interested in specializing in metallurgy and a degree in management.	Accounting
Krolikowski, Maciej	4th year BME	Team worker, Project management, project construction and demonstration	Neural engineering device construction and demonstration (2 years) Currently designing neural probe controllers.	Purchasing/Production control, File organization & scanning
Mendez, Daniel	EE, 5th Year	Tech savvy, Strong team skills	4 years as Power Industry intern. Interests include power generation & distribution as well as electric motor drives.	Operations
Mersch, Erin	Business Administration and Applied Science	Primavera Project Planner	Construction management and Law school	IT
Orlichenko, Anton	3rd year Computer Engineering	GSD, works well under deadlines, Good problem solver	Knowledgeable in Unix/Linux/Mac OS, proficient in programming java, C, and Ruby. Some experience in MATLAB, Python and other languages. Interested in biotech and medical imaging.	IT
Roediger, Justin	4th year BME, minor in business	Effective team worker, good public speaker, MATLAB experience	4 years working in HVAC industry, athlete, interested in pursuing health management and consulting.	Purchasing/Product control
Zouridis, Despina	5th year Architecture	Design	Pursuing a career as an architect.	Purchasing/Product control

Our team was also divided into sub teams as follows;

- IT
    1. Erin Mersch
    2. Anton Orlichenko

- Operations
    1. Daniel Mendez
    2. Christopher Drag

- Purchasing/Product Control
    1. Despina Zouridis
    2. Maciej Krolikowski
    3. Justin Roediger

- Accounting
    1. Richard Ike
    2. Samad Erogbogbo

- Quality Control
    1. Vitali Basiourski
    2. William Cabrera

Minute Taker : Erin
Agenda Maker : Team
Time Keeper : Team
Weekly Timesheet Collector: Professor Maurer
Master Schedule Maker : Samad
Igroups : Team

6. Budget

Our major expenditure was on transportation to and from our sponsors head office in Bloomingdale Illinois. Six students drove their cars to aid in the commute. A total of 1918 miles were covered during the semester. The table below breaks down the mileage for each driver;

	Travelled miles of each driver					
Date of trip	**12-Jun**	**19-Jun**	**3-Jul**	**17-Jul**	**29-Jul**	**TOTAL**
Justin Roediger	91	91	91	91	91	455
Chris Drag	68	68	68	68	68	340
Samad Erogbogbo	91	91	91	91	91	455
Vitali Basiourski	22.3	22.3	22.3	22.3	22.3	111.5
Despina Zouridis	72	NA	72	72	72	288
William Cabrera	67.34	na	67.34	67.34	67.34	269.36
Grand Total						**1918.86**

7. Obstacles

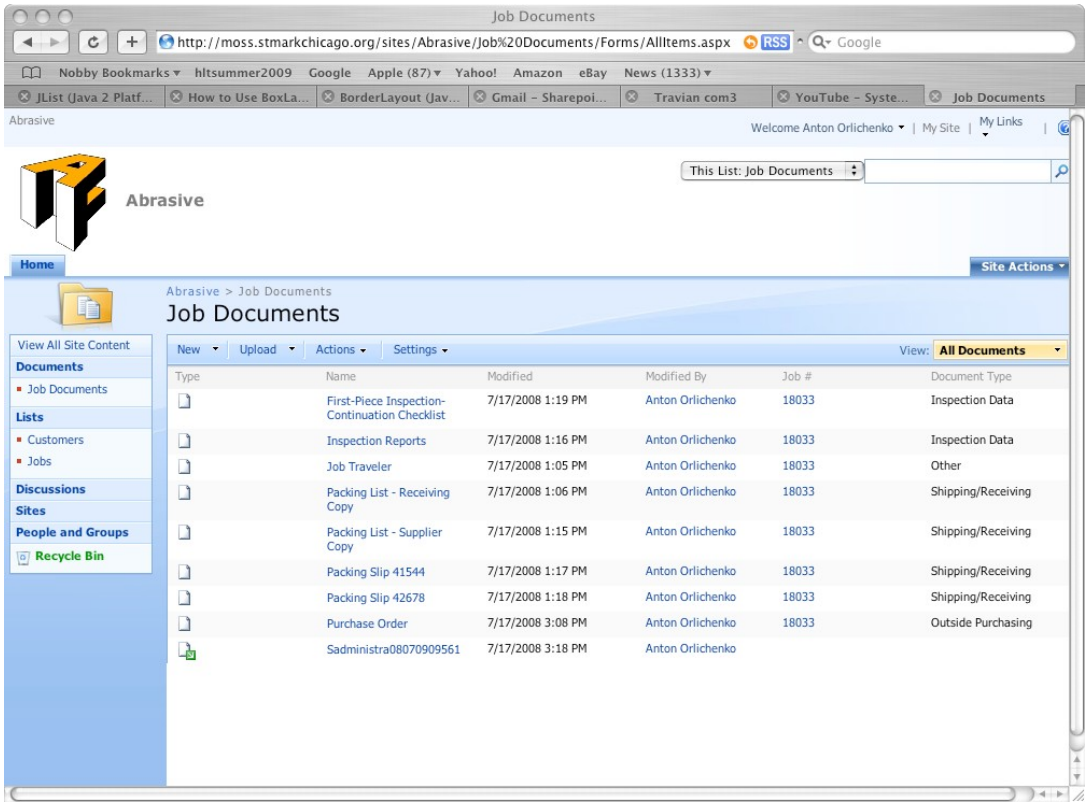
Our teams' execution of this project was hindered by a couple of factors which we overcame through team work and adequate strategizing. These obstacles are listed below;

1. Difficult to get in contact with company
    - Delay in project progress
    - Delay in interviews
    - Information of current resources not clear
2. Interviews
    - Employees more concerned with wants than needs
3. Majority of the team not familiar with programming
    - Creating a customized database proves to be a difficult task

8. Results

Our team considered certain options such as scanning the work documents and storing them in individual work folders while using a search engine that would search through those folders in order to find a certain document or several document. Another option was to create a custom database that would store and pull the job folders out of a server or out of a storage area network. After meeting with the company several times to discuss their needs, the team was able to find a practical solution to their paper cluttering problem. We were able to come up with a database using a program called *SharePoint*, which comes free with any recent Microsoft server. This program works by having the users individually log-in to access the job folders. However, the files would not be stored on the server because this would slow down the performance of the server as well as frustrate the users by causing a time-lagging barrier. Instead, all the files and folders would be stored onto a Storage Area Network (SAN), which is a separate module filled with hard drives that is independent of the server. In order for users to access the job folders on the SAN, the server would be connected to the SAN, which would act as a bridge, and transfer the documents or job folders to whichever user is trying to access it. This would avoid time-lagging and user frustration.

Below are copies of various functions of our share point data base;


Job Documents
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Documents
Job Documents
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Customers
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Type | Name | Modified | Modified By | Job # | Document Type
First-Piece Inspection-Continuation Checklist | 7/17/2008 1:19 PM | Anton Orlichenko | 18033 | Inspection Data
Inspection Reports | 7/17/2008 1:16 PM | Anton Orlichenko | 18033 | Inspection Data
Job Traveler | 7/17/2008 1:05 PM | Anton Orlichenko | 18033 | Other
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Packing List - Supplier Copy | 7/17/2008 1:15 PM | Anton Orlichenko | 18033 | Shipping/Receiving
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Packing Slip 42678 | 7/17/2008 1:18 PM | Anton Orlichenko | 18033 | Shipping/Receiving
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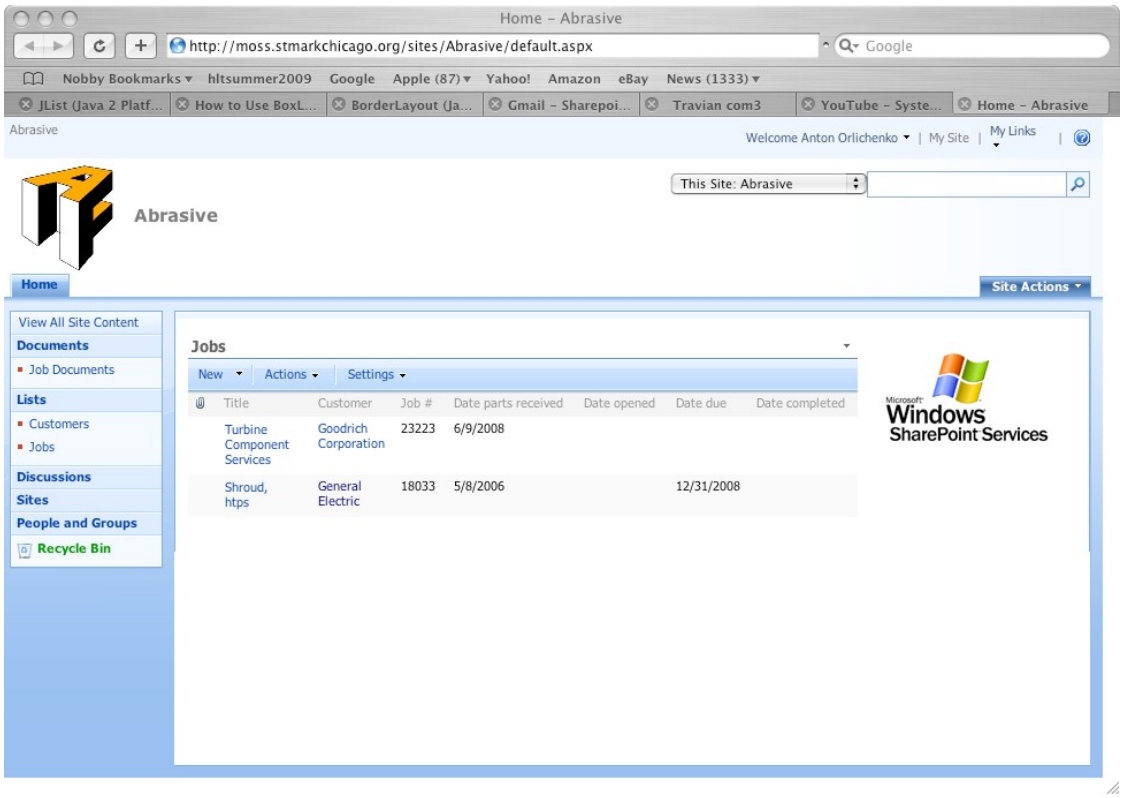
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Abrasive
Welcome Anton Orlichenko | My Site | My Links
This Site: Abrasive
Home
Site Actions
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Job Documents
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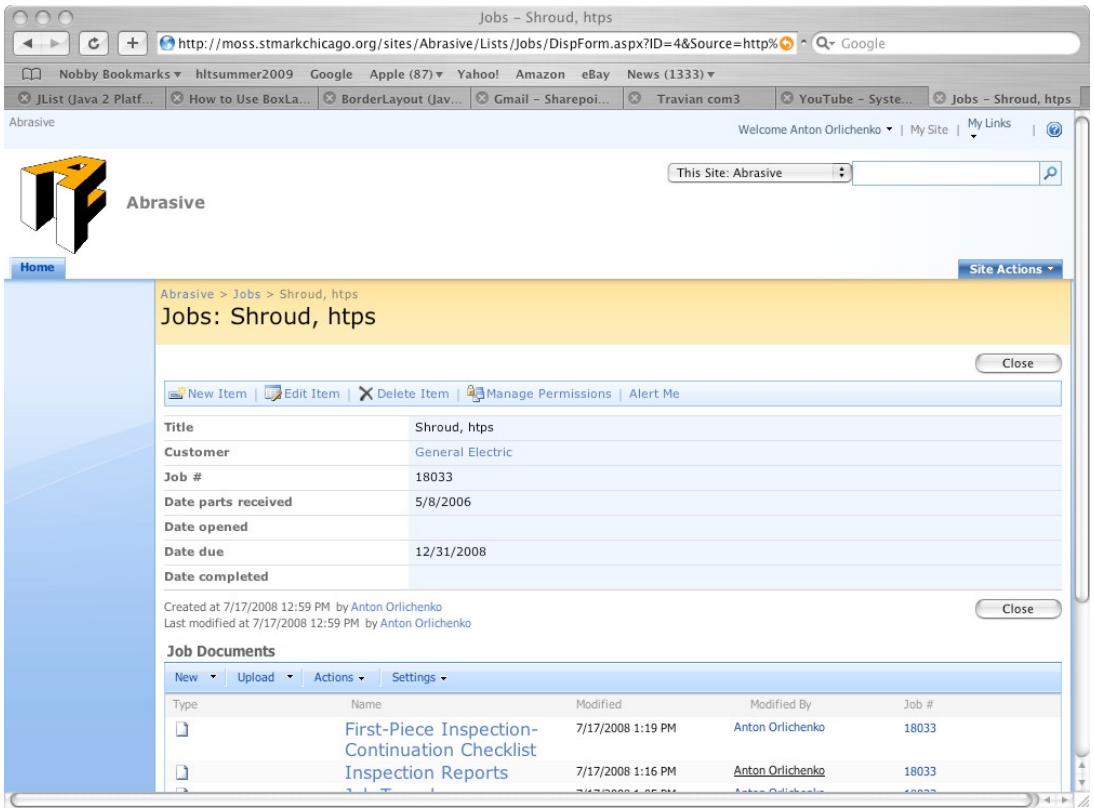
Jobs
New | Actions | Settings
Title | Customer | Job # | Date parts received | Date opened | Date due | Date completed
Turbine Component Services | Goodrich Corporation | 23223 | 6/9/2008
Shroud, htps | General Electric | 18033 | 5/8/2006 | 12/31/2008
Windows SharePoint Services



9. Recommendations

In order to continue the success of this IPRO into future semesters, our team has come up with some recommendations that will be helpful. These recommendations are;

- Future IPRO members should be familiar with *SharePoint,* which is a content management system that comes with Microsoft Server 2003.
- Future members need to work closely with Abrasive Form to improve the functions of the database in order to make it easier to use, improve its accessibility to multiple users logged on simultaneously.
- Future members should use this semester's module and create more features and perks that will improve the overall flow and consistency of the content management system. It is preferred that some of the future members are computer science majors, or familiar with the Microsoft Server application.
- We recommend the purchase of several scanners that will help Abrasive-Form scan and store their paper documents into a digital form. Having separate scanners, besides those used for day to day activities, will shorten the amount of time needed to scan and save 15 years of data. We found many high end scanners that will provide Abrasive-Form with the support they need, at a relatively inexpensive price.
- We suggest the purchase of a Storage Area Network (SAN) for Abrasive-Form. This network allows Abrasive-Form to digitally store their files on hard drives safely and accurately. This is a very good item to have since a SAN comes with expandable memory. We estimated that Abrasive-Form needs approximately two Terabytes of storage in order to convert their documents into a digital pdf file.

10. References

All the information needed for the execution of this project was obtained from online research. Information on storage solutions was conducted through various phone sessions with companies like Microsoft. Scanner recommendations were researched through various electronic stores and some models were obtained via recommendation from outside sources. Our sources include the websites of Google, Microsoft, Bugzilla and Django.

11. Acknowledgments

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- Mark Sami, IIT graduate and SharePoint consultant, for his coaching and recommendations on how to improve and maximize the efficiency of our product for the customer. He was also instrumental in our choice of using share point.