Student Organization Web Site

By

Matthew Doering

Submitted to
the Faculty of the Information Technology Program
in Partial Fulfillment of the Requirements for
the Degree of Bachelor of Science
in Information Technology

University of Cincinnati
College of Engineering and Applied Science
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Matthew Doering	Date
Robert Schlemmer, Faculty Advisor	Date
Hazem Said, Ph.D., Department Head	Date

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ABSTRACT

KapNet, *a student organization website,* was created as one centralized resource where members can communicate and access various documents and information to further grow the organization. This site will belong to the organization, therefore keeping records longer than the averages student's stay in college. Dynamic information on the organization's public website can be easy modified with integrated tools. Digital documents will be shared, databases will store organization information including all finances, and collaboration tools will allow for quick and easy user input. Access control and user permissions will maintain important and confidential information as well as maintain data integrity. Each user will see important information that is specific to that user and have certain areas that can be customizable to display content they desire. Tasks, balances, links, announcements, and user profiles will all coincide with each individual. The organization, and each of its individuals, will be able to effectively and efficiently move each other forward.

KAPNET, A STUDENT ORGANIZATION WEBSITE

1.STATEMENT OF THE PROBLEM

Many university student organizations lack any kind of IT infrastructure. Communication is limited by scarce resources that are accessible with little to no budget allowance. Today, most records are digitalized but there exists no centralized place to maintain these records. Usually the students keep the information they have on their own personal computers. This means every four to five years, all information has walked out the door. Marketing the organization is also important to survive and thrive. Every organization today must possess a website to convey information about themselves to get others to join, at the very least. Many organizations do not have people within who have the skills to create and/or maintain a website, therefore having to pay an external company, or not having one at all.

2.PRODUCT DESCRIPTION AND INTENDED USE

The KapNet project is an online content and collaboration website. The solution will be a centrally accessible website available to all members of the organization. A server will contain a web server to host an external website, and a document management system integrated within an intranet. The website will be properly written, with correct CSS, so that the site can be changed by someone with minimal experience. It will also be database back-ended to allow users to input new information to keep the site up to date. Forms on the site will also allow for collecting guest and former member information into

the database. A wiki will allow for manuals and documentation to be searched for in the future.

The intranet will be a place to store and access various documents, calendars, financial information, potential lists, etc. Each member will log in and be connected to their corresponding role in the organization (ie: secretary, treasurer, recruitment chair, etc.) which will determine what they can access and their read and write privileges to certain areas. Databases will be used to maintain members' information, finances, tasks, and make completing forms that need to be submitted easier. Select information will also be tied to the website for a member's profile section. From within the intranet, members will also be able to send emails to the entire organization, specific groups/roles, or individual users.

3.USER PROFILES

This site is being created for use by various people. Every person has their own role within the organization and therefore has their own responsibilities to uphold. In keeping with best practices, each user should only have access, whether read, write, etc., to content pertaining to themselves or their role in the organization. Each major role is defined and their current situation stated below. The technical skill level varies by every user. Every year, new members join the organization and become users. Positions (Secretary, Treasurer, etc.,) also change every year. Therefore, the technical skill level for each user is assumed to be low.

3.1 Secretary

The secretary takes minutes for every meeting. Currently, there is no defined format, they are emailed out after each meeting and are not permanently stored anywhere. In KapNet, the minutes will be automatically titled based on date and which meeting they are for. After the minutes are uploaded, an email will be automatically sent out including a link to download the minutes. This will also save on attachments filling up small email accounts.

3.2 Treasurer

The treasurer must keep all financial records. Currently, every new treasurer has his own way to organize and maintain these records. Records are also usually not accessible for more than one to two years, as often they are kept on local computers. This does not allow for reviewing past budgets. In KapNet is a SQL database for: monthly dues, rent, budgets, and receipts (money due back to members). Individual users will be able to see their balances (and only their balances) at any time. Reports can also be generated of anyone still outstanding over specified amounts. Monthly dues will also be automatically added on the first of the month to all active status members.

3.3 Philanthropy Chair

The Philanthropy chair is responsible for putting on philanthropies each quarter. Currently, this position changes owners frequently. This leads to people being inexperienced and having little to no idea what has been done in the past, what worked, and what failed. In KapNet is a wiki to document each event: what the event was, what

other organizations were involved, how much money was raised, what organization the money was donated to, etc. A database my also be implemented to show front-end costs, money raised, and amount donated (profit from the event).

3.4 Recruitment Chair

The recruitment chair is responsible for maintaining a potentials list. This list includes names of individuals interested in joining the organization. KapNet has a database that will store names, how they heard about the organization, info about them, when they were last contacted by the organization, who their main contact person is, etc. Notes can also be added by any member who may have had contact with the interested individual.

3.5 House Manager

The house manager is responsible for distributing weekly work assignments. Currently, a list is assigned and posted during meetings. KapNet now offers a tool that will randomly assign a task to a member each week. It will also take into consideration who lives within the house and who lives outside the house in assigning tasks. A task list can also be implemented to keep track of what may need fixing around the house (and estimated cost) for the next home improvement repair day. A future tool may be implemented where the member marks the task as completed and specifies what other member witnessed the competition. The witnessing member will have to confirm once they log on to their account. Also, if the task is not completed by the due date, a fine is automatically assessed to the member.

3.6 Average Member

The average member will have this new site to organize and display information relating to them self. They will see the dynamic status of: work assignments, outstanding balances, tasks to complete, and a calendar/agenda. They will also have easy access to many various resources. Documents, meeting minutes, the organization calendar, finances, recruitment, contact lists and a method to email people within the organization will be resources accessed through the navigation menus.

3.7 Associate Member

An associate member is one in the process of joining the organization. They will need very limited access to various documents and recourses; many different than what are used by the rest of the organization. The associate members will also need tools to collaborate among themselves separate from the rest of the organization.

3.8 Public

As any organization, a pubic website is needed. Anyone can access information on the public site to find out what the organization is about. The member profiles will also gather information from the private site to populate pictures and general information. Alumni, or past members, will also be able to leave their contact information and other information about them to the organization

4.DESIGN PROTOCOLS

Much consideration went into the design of this project. With a poor design, the website will be difficult to navigate, and the users will be unable to find specific documents or information. If too cumbersome, the site risks being abandoned. Organization is important to make the site flow seamlessly.

The site has a top-down structure where categories and broken down into further subcategories. The navigation bar on the left side of the page allows for movement between primary categories. From there, secondary categories will be present on that page, or added to the navigation bar under the current page. The main interaction of the user with the product will be though the navigation bar, as shown in Figure 1. Should users need help understanding the site, a Help link is located in the navigation bar which will direct the user to help page.

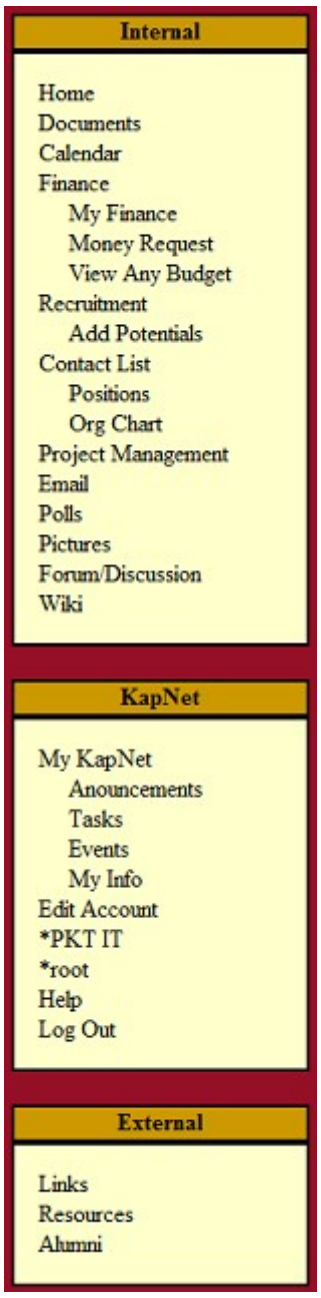


Figure 1: Navigation Bar

The color scheme of the project has adopted the colors of the organization, cardinal purple, white, and gold, and of the colors of the university, red and black. A balance and compromise of these colors create the basis of the site design.

In:figure2, is a flowchart diagram of the site. It shows the relationships of each object to one another, and how to get to each page.

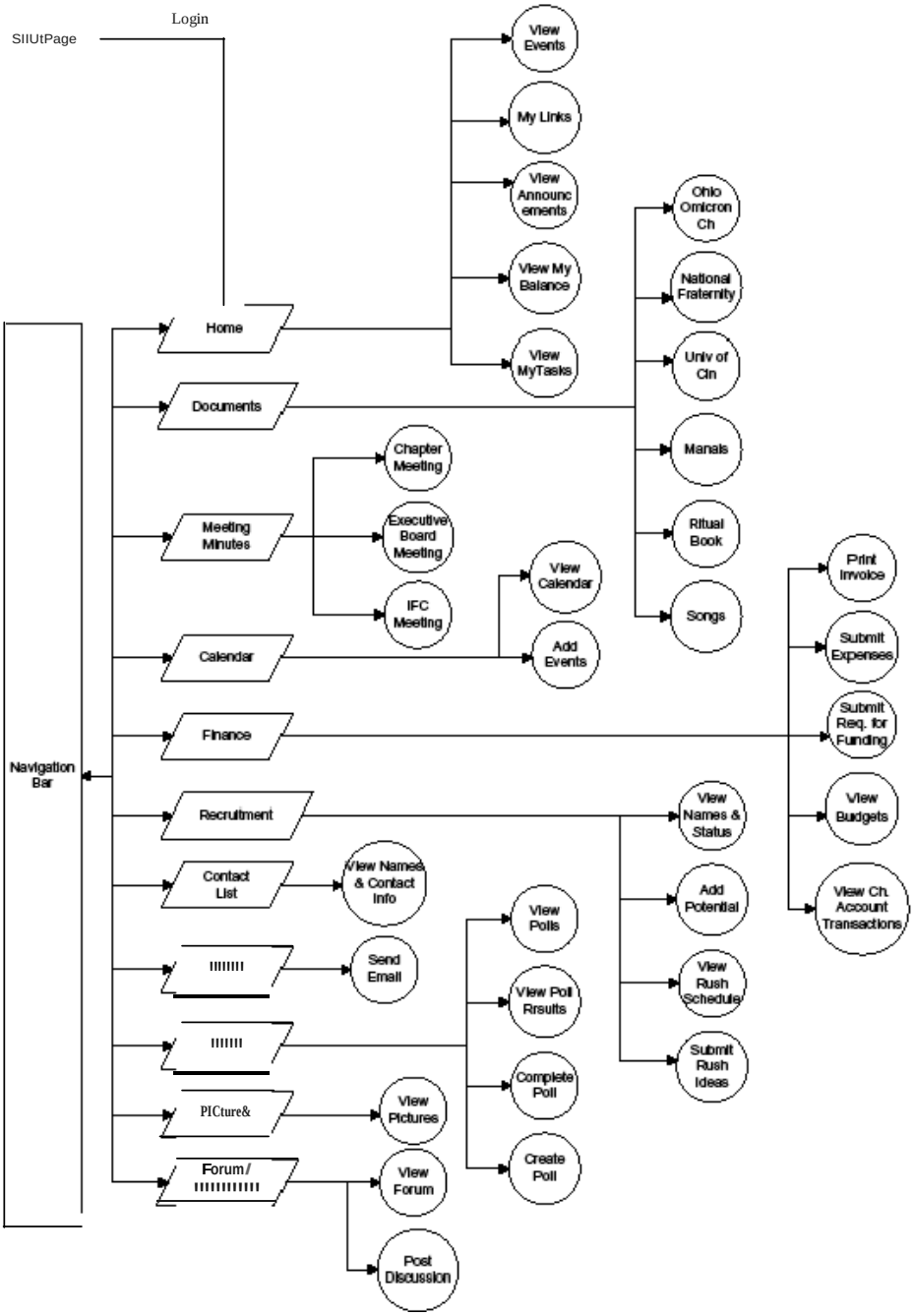


Figure2: Site Flow Chart

5.DELIVERABLES

This project has been developed to satisfy certain expectations. Below, in Figure 3, are the primary purposes of the developed site.

Purpose	Description
Secure site to access confidential documents.	Documents pertaining to the structure of the organization, meetings minutes, and various forms will be stored in a central secure location.
User permissions to allow and deny access.	Each user will have their own access level (read, or read and modify) for various sections and/or documents throughout the site.
Fully functional financial system.	Monthly dues and rent will be kept track as well as budgeted expenses. Reports can be generated for various needs.
Centralize place to store data.	Databases will store information about each member (and prospected members) in the organization as well as keep a historical record about members, events, and finances for the organization. Various forms will also be generated to collect information.

Figure 3: Deliverables

This project had some secondary objectives in mind to obtain if time and budget were permitting. Below, in Figure 4, is listing these original features. The email capability and the calendar functionality were successfully implemented. However, the forums and polling have not *yet* been.

Purpose	Description
Email capability	Users will be able to email individual users or groups within the organization from the site.
Calendar	Users will be able to view an organization wide calendar as well as contribute their own events
Open Forums	Users can collaborate amongst themselves on various topics through discussions boards
Poll each user	Voting during elections or meetings or simple questions directed at all users can be polled and tallied.

Figure 4: Secondary objectives

6.DEVELOPMENT

During the development of the project, careful consideration was taken into account with the timeline, the budget, and the hardware and software being used.

6.1Timeline

Figure 5 describes the time line followed for completing the project. Many tasks occurred simultaneously throughout the project as programming usually has a circular lifecycle of coding, testing, and fixing for each area. Each row in the timeline denotes a separate task, or subtask, to be completed.

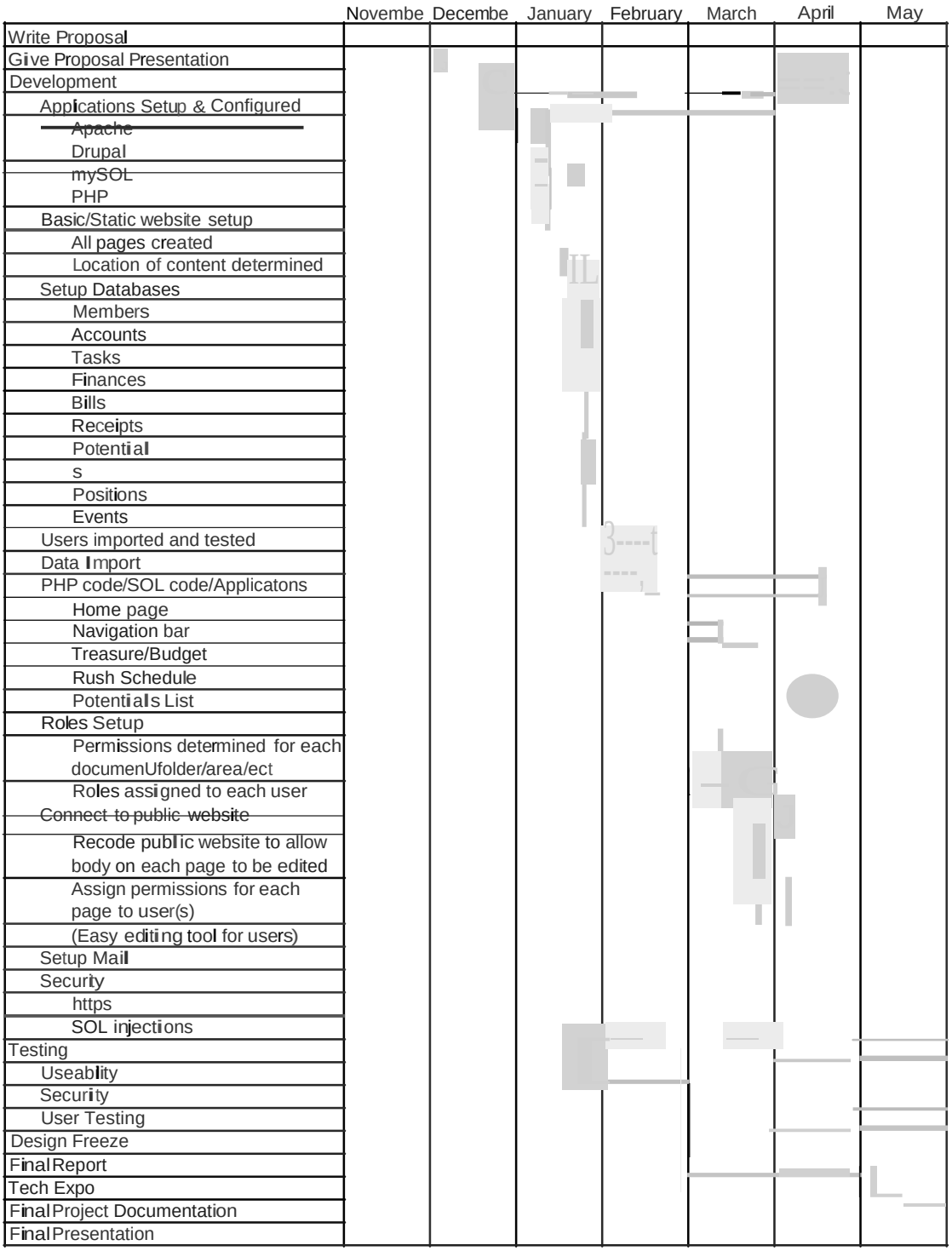


Figure 5: Completed Timeline

Key areas in the timeline include Development and Testing. They were the most important part of the project and remained ongoing throughout much of the project.

6.2 Budget

Figure 6 describes the occurred budget. Much of the software chosen in this project is open-source, a large savings on the budget. The only cost will be setting the project into production where the physical server and domain name will be needed.

Item	Description	Retail Cost	Incurred Cost
Hardware			
Server		$800.00	$0.00
Software			
Apache HTTP Server (2.2.14)	Web Server (Open Source)	$0.00	$0.00
PHP (5.3.1)	Scripting Language (Open Source)	$0.00	$0.00
MySQL (5.1.41)	Database Management System (Open Source)	$0.00	$0.00
PHP myAdmin (3.2.5)	SQL Administration (Open Source)	$0.00	$0.00
OpenKM	Document Management System (Open Source)	$0.00	$0.00
Toad for MySQL (4.5)	SQL Administration (Freeware)	$0.00	$0.00
MediaWiki (1.15.1)	Knowledge Management System (Open Source)	$0.00	$0.00
Labor			
Labor	15 Hours/Week * 16 Weeks * $20/Hour	$4,800.00	$0.00
Other			
Domain Name		$21.38	$0.00
	Total:	**$5,621.38**	**$0.00**

Figure 6: Proposed Budget [1,2,3,4].

All of the software for the project is free and open source. During development, testing, and as a final home for the project upon completion, a lightweight server is needed. As the budget is low, or near insignificant, and the maximum amount of users at the present time is about 25-30, an extensive server is not needed. Should the number of users increase in the near future, the project is easily movable to an upgraded server.

6.3 Software and hardware

Hardware and software were used together to successfully compile this project. Below, each item is described as well as what purpose it serves.

6.3.1 SERVER – A physical server is needed to host the application servers and data. It will be hosting the public website and intranet. The organization currently has about 30 members. Even with much activity per person, a minimal server will be able to handle the work load. The website displays relatively static information and is accessed less than average[1]. The organization also does not solely rely on the site to stay in existence. As the server will be the most expensive part of the project, and the organization does not have a large surplus with the budget, just about any server will qualify. This can also be upgraded in the future should the traffic and work load grow substantially.

6.3.2 BACKUP SERVER – Ideally, an identical server will be used as a backup server. Full and incremental backups would be stored in a non-directly-accessible server for protection. If the budget cannot allow for an additional server, an additional hard drive would most likely be used.

6.3.3 DOCUMENT MANAGEMENT SYSTEM – A document management system (DMS) is integrated into the site. The DMS allows for documents and other files to be uploaded and shared to other users. File and folder permissions are set in place to restrict certain members to certain files. OpenKM is the initial

DMS that was chosen. Although the integration isn't best, it allows for better user and group permissions and the capability to send emails during each document upload.

6.3.4 WEB SERVER – Apache and Microsoft IIS are the leading web servers. "Apache has a 50% market share lead over IIS making it the leading choice in platform independent web server technology today"[6]. Although the newest IIS7 has finally allowed for PHP code[7], Apache is typically known as PHP's partner[8]; IIS's partner is typically ASP[7]. Apache can be used on either Windows or Linux, whereas IIS is strictly Windows. The need for IIS and Windows would also incur additional costs if not already accessible. As Apache has a longer and stronger background with PHP, and offers a wider variety of systems to reside on, it's no doubt that Apache would be used.

6.3.5 PROGRAMMING LANGUAGE – The two leading languages for this project are PHP and ASP. PHP can be used on Linux and Windows, is faster than ASP, has a great open source forums collection of source code, and is based on the C/C++ language, has built in features such as ftp, email, and encryption mechanisms, and is considered extremely flexible for various databases[9,10,11]. ASP is tied to a Windows operating system, Windows web server, and Microsoft SQL server, has a Visual Basic like syntax, and has less speed and features[9,10,11]. As PHP has many more benefits, and works extremely well with Apache, it was used in this project.

6.3.6 SQL SERVER – A database system is needed to store a variety of information. MySQL, SQL Server 2005, and SQL Server Express are leading database systems. MySQL is open source, works well with Apache, and fulfills all the required expectations[12].

6.3.7 OPERATING SYSTEM – Microsoft Windows was used during development as it was readily available and most accessible by most testers. At deployment, the host operating system will be re-evaluated based on current needs and configurations. All software being used is supported under Windows and Linux.

6.3.8 WIKI – MediaWiki and MoinMoin were the top two choices for a documentation/knowledge management system. MediaWiki, which is the foundation for Wikipedia, is a large open-source project with a large developer community[13]. It satisfied all the basic requirements for this project.

7.TESTING PLAN

Testing must occur during the development lifecycle of the project and during closeout. The following section covers the plans associated with each.

7.1 Testing during development

It is important that all functions of the project are fully functional. The project has been continually tested throughout the development of the project. Test user accounts were setup and individually logged into by the developers to make sure everything is functioning correct to the users. This site went live many times through the development. By switching the Apache server to online, the site is accessible by the Internet.

7.1.1 LOGIN / SECURITY – The developers tested the ease of guessing passwords multiple times, continuing a session after the browser is closed, and performing SQL injections into the site. If any compromises were found during testing, that area was re-coded and re-evaluated.

7.1.2 ACCESS CONTROL / PERMISSIONS – Various test users were logged in and various documents and queries were tested to determine that the correct amounts of privileges have been granted.

7.1.3 DATABASE QUERY RESULTS – Several pages will contain information that has been accumulated from databases. The testing made sure that the right information, no more, no less, was displayed.

7.1.4 EASE OF USE – End users were periodically asked to navigate themselves through the site. Testing will make sure that the content flow, ease of use, and

performing of regular tasks are easy to understand by all users. The finance center was tested more often as the amount of content and functions could be overwhelming if presented incorrectly.

7.2 Testing at project closing

Upon completion of the project, every aspect is being tested to make sure functionally, and workability exists throughout.

7.2.1 LOAD TESTING – The server(s) are being tested under high traffic conditions to make sure the equipment can accommodate all potential traffic. Bandwidth is also being evaluated to make sure large amounts of information are not being called for any reason. Assuming no failures or noticeable slowness, the test results in satisfactory.

7.2.2 AUDITS – During the first couple of weeks, audits were setup to monitor which users access which areas of the site, and make sure those areas are authorized to that user. Any user that was found accessing unauthorized areas meant re-evaluation of all permissions, or access control lists.

7.2.3 USER FEEDBACK – After the roll out of the finalized project, polls or discussion boards will be setup within the project to get user feedback. Changes may be made accordingly determining the severity of the task and how many members have agreed with the needed change.

8.RISK MANAGEMENT PLAN

For the project to be a success, risks must be evaluated from every aspect. In Figure 7, various types of risks are listed and evaluated as a possible impact to the project.

	Description of Risk	Level of Risk	Description of the Mitigation	Probability	Impact	Type
1	Other products on the market offer same solution, and better	High	Risk Mitigation	Low	Medium	Market Risk
2	Product has low / no return on investment	Low	Risk Mitigation	Very low	Low	Financial Risk
3	Software and Hardware become outdated / unsupported	High	Risk Mitigation	Low (in reasonable time period)	High	Technology Risk
4	Too many / Too few of people use the solution	High	Risk Avoidance	Low now, Moderate in 3+ years.	Medium	People Risk
5	Project does not get completed in allotted time	High	Risk Mitigation	Low	High	Structure / Process / Schedule Risk

Figure 7: Risk Management

8.1 Alternate Products

Other products may arise that will compete with the project. If alternative solutions become more readily available, extremely low in cost, and includes all needed customizable features, the project has a high risk of not succeeding very long. Since most solutions are costly, and not customizable enough, the probably is low.

8.2 Low Return on Investment

The most important concept of any project is money. Will the time and money put into the project be recouped in a short enough period of time after completion of the project? As this project is based upon free, open source, software, the cost is low. Much time,

however, has been put into the project. As the project is a requirement and full of educational / leaning opportunities, the amount of time put in has a high benefit.

8.3 Elements become outdated

After so much time, just about all software finds a way to become obsolete. All software products used in the project are well-known, well-established products. The likelihood of them becoming obsolete in the next several years is low. Also, many of the products can be switched out with upgraded or more advanced alternatives without great impact (ex: MySQL database could be migrated to SQL Sever).

8.4 Projected audience size

The product is only efficient when being used. If too small amount of people are using the system, it will become unsupported, out dated, and likely to collapse. On the alternative side, if too many people are using the project, the hardware may not be able to handle the increased load; and in a larger organization, objectives may change and could cause the flow of the project to not be completely in parallel with the organization. Making the product fully customizable by any new developer will allow for changes or expansions to hopefully keep the project going strong.

8.5 Meet timeline

Just about all projects could go on indefinitely. It's the "due date" which decides when a project is complete. This project has a set due date and if not enough parts of the project

are present and fully developed, the project could be a failure – as a Senior Design project and as being used by the organization. As this project encompasses many smaller projects, the likelihood of not enough functionally at the due date is low.

9.PROOF OF DESIGN

To mark the end of a project, the objectives and deliverables must be evaluated. Although a project like this is never fully completed, if the deliverables set forth at the start of the project are met, then this project can be declared a success.

9.1 Secure site to access confidential documents

KapNet requires all members to authenticate into the site before being able to view any content. All passwords are encrypted with a Md5 Hash, and stored in the database as such. Figure 8 shows the default login page. Any other page within the site trying to be directly accesses will be automatically redirected to this page if not already authenticated. Figure 9 shows a username and password as it appears in the database. The document management system (DMS) requires a second level of authentication. Figure 10 show the login screen for the DMS.

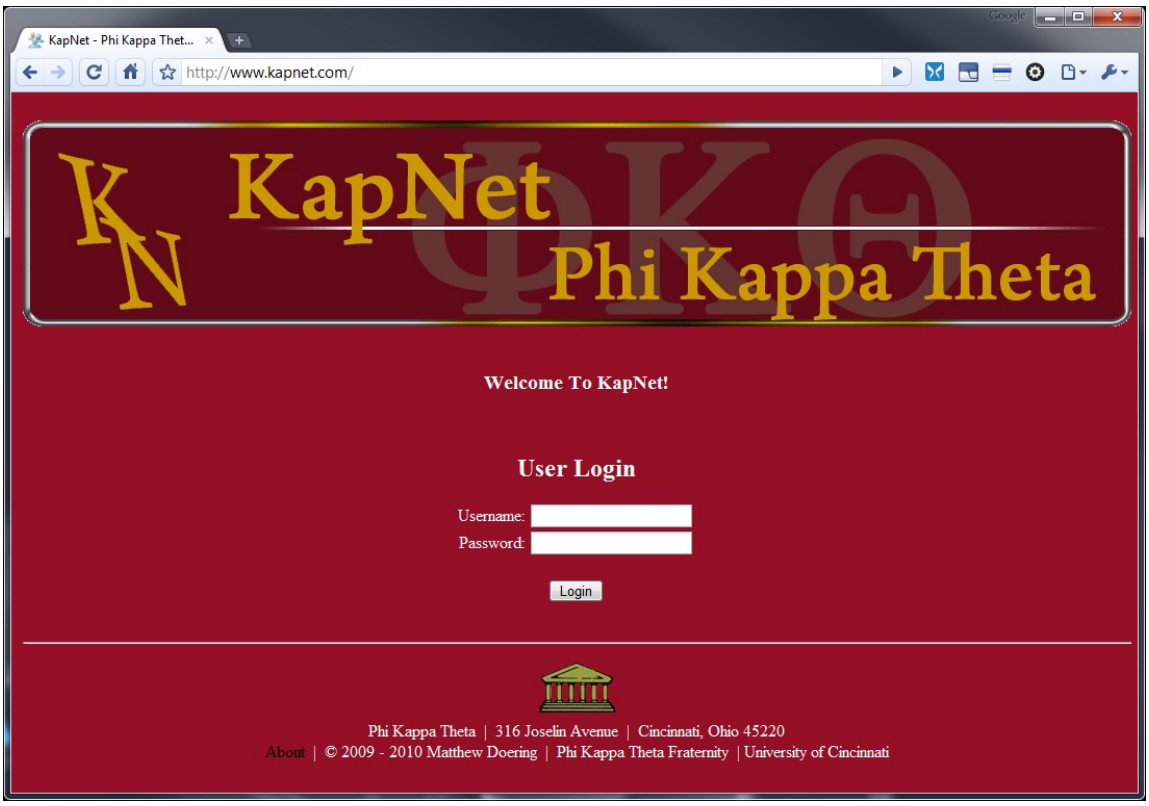


Figure 8: Login screen

UID *	UserName *	Password *	Status *
10	MDoering	5f4dcc3b5aa765d61d83	Active

Figure 9: Username and password

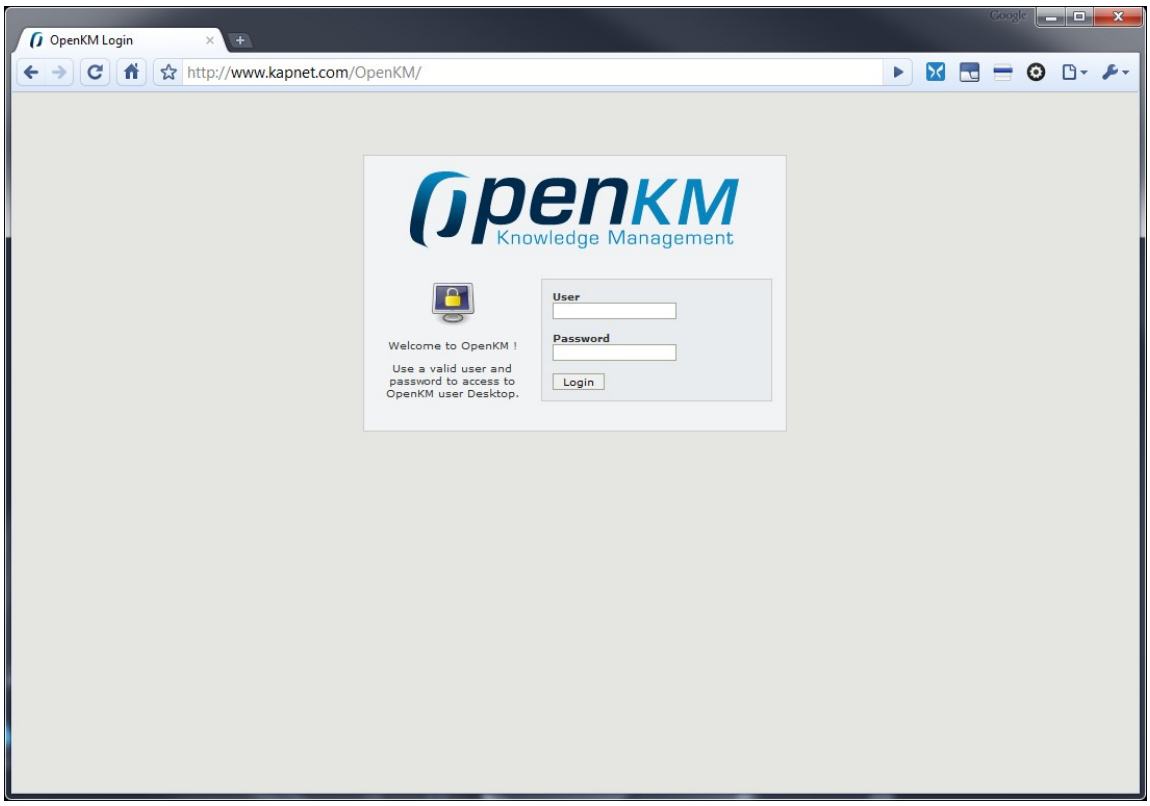


Figure 10: Login screen for document management system

9.2 User permissions to allow and deny access

Every user will share some of the same basic permissions to access and view content throughout the site. However, users with positions within the organization will have special permissions pertaining to their role. The first level of only allowing specific users is in the navigation bar. As shown in Figure 11, a position will only be shown to a user assigned to that role or position. This will be the link to the authorized area. A second level of authentication exists on each positions page. To prevent someone from typing in the direct URL from a non-authenticated account, each pages checks that the user logged in with that session is assigned the role of the page that is being accesses. If the users do not match, the page is redirected.

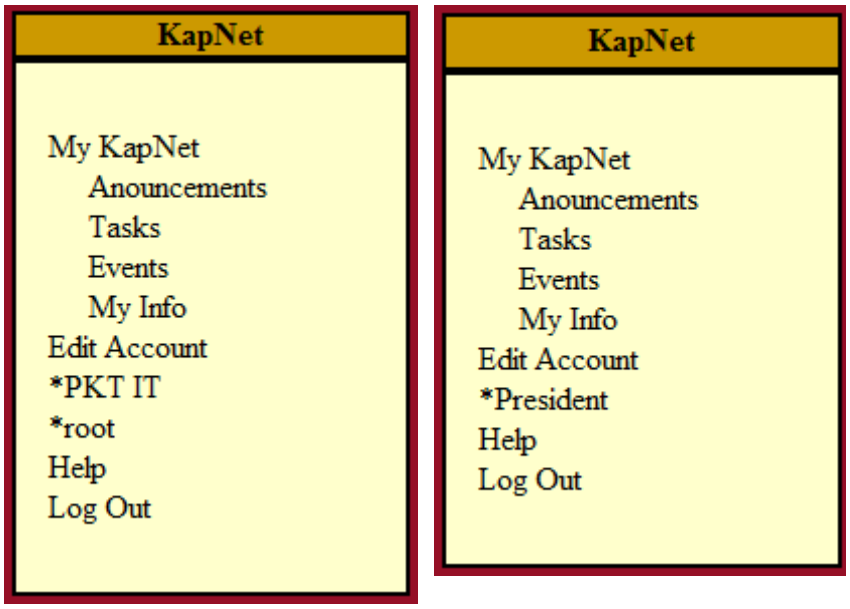


Figure 11: Positions in the navigation bar

9.3 Fully functional financial system

All finances in the organization will be documented and monitored here. The treasurer will be the only member with access to modify information in the finance area. Two separate accounts, the chapter's account, and the building company's account, can be documented. Any transactions that pertain to any members of the organization will show up in their own finance section. On the home page, each user will immediately be able to see the balance they have with the organization. Users can also view a breakdown of each of the transactions associated with them.

A few screen shoots are show on the next few pages from the treasurer's view of the financial area. Figure 12 shows the main page for the treasurer where several options are available. Monthly dues, monthly rent, fines, fees, bills, and other transactions can be recorded. Figure 13 shows how the treasure can assess the monthly dues to all members

at once. A form is automatically generated and pre-populated with amounts they pay (depending if they live in the chapter house, or not). By clicking submit, 20 transactions (or how ever many members there are) will be inserted into the database. Figure 14 shows where single transactions can occur. Any one-time events, such as fees, fines, shopping expenses and so on can be recorded and associated to their corresponding budget. At the end of the quarter, budget reports can be generated to view any variance amounts.

Figure 12: Treasurer's area

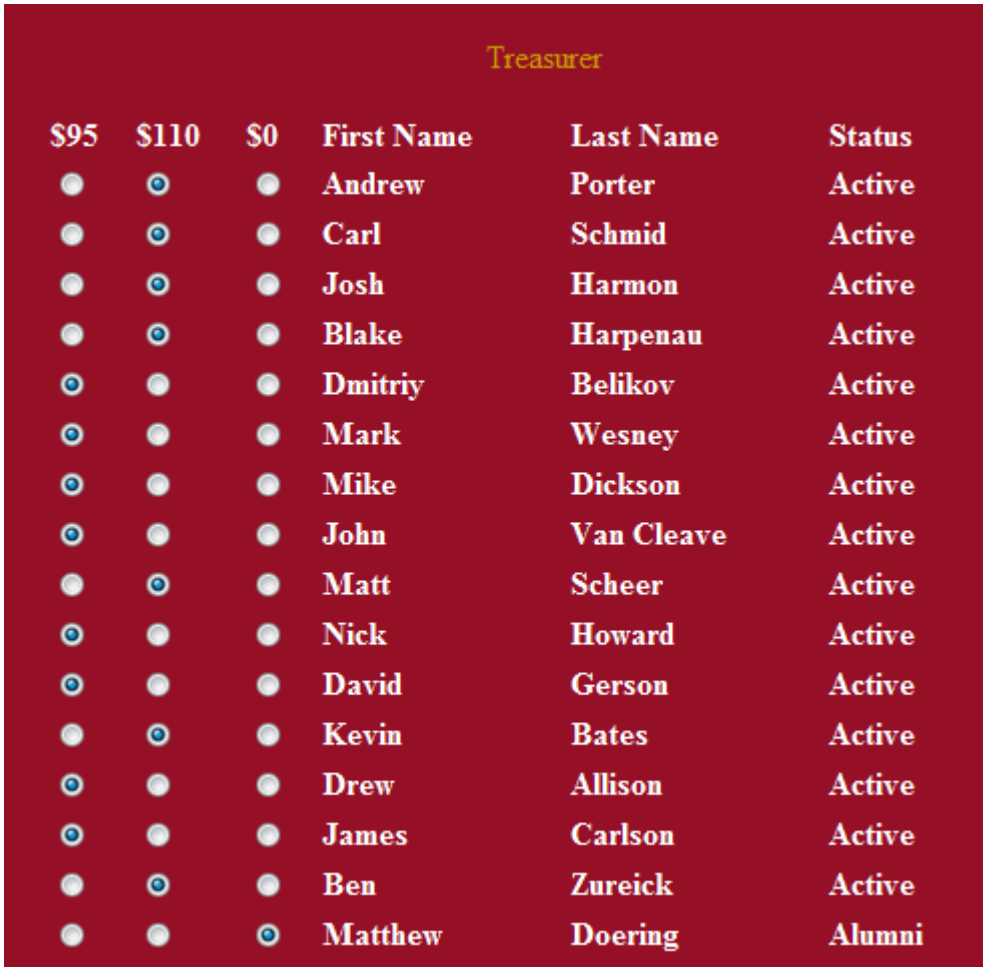


Figure 13: Assessing monthly dues

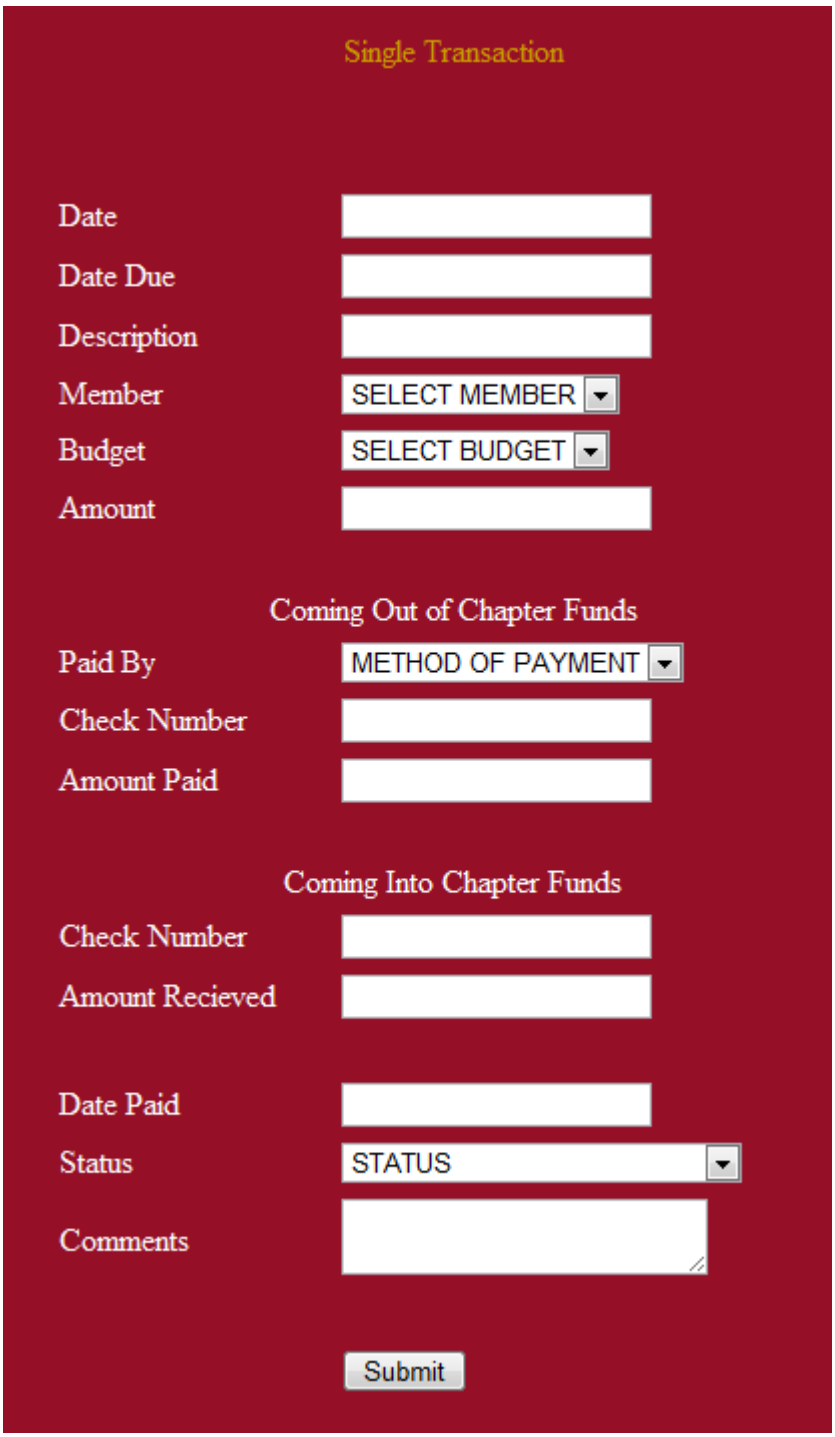
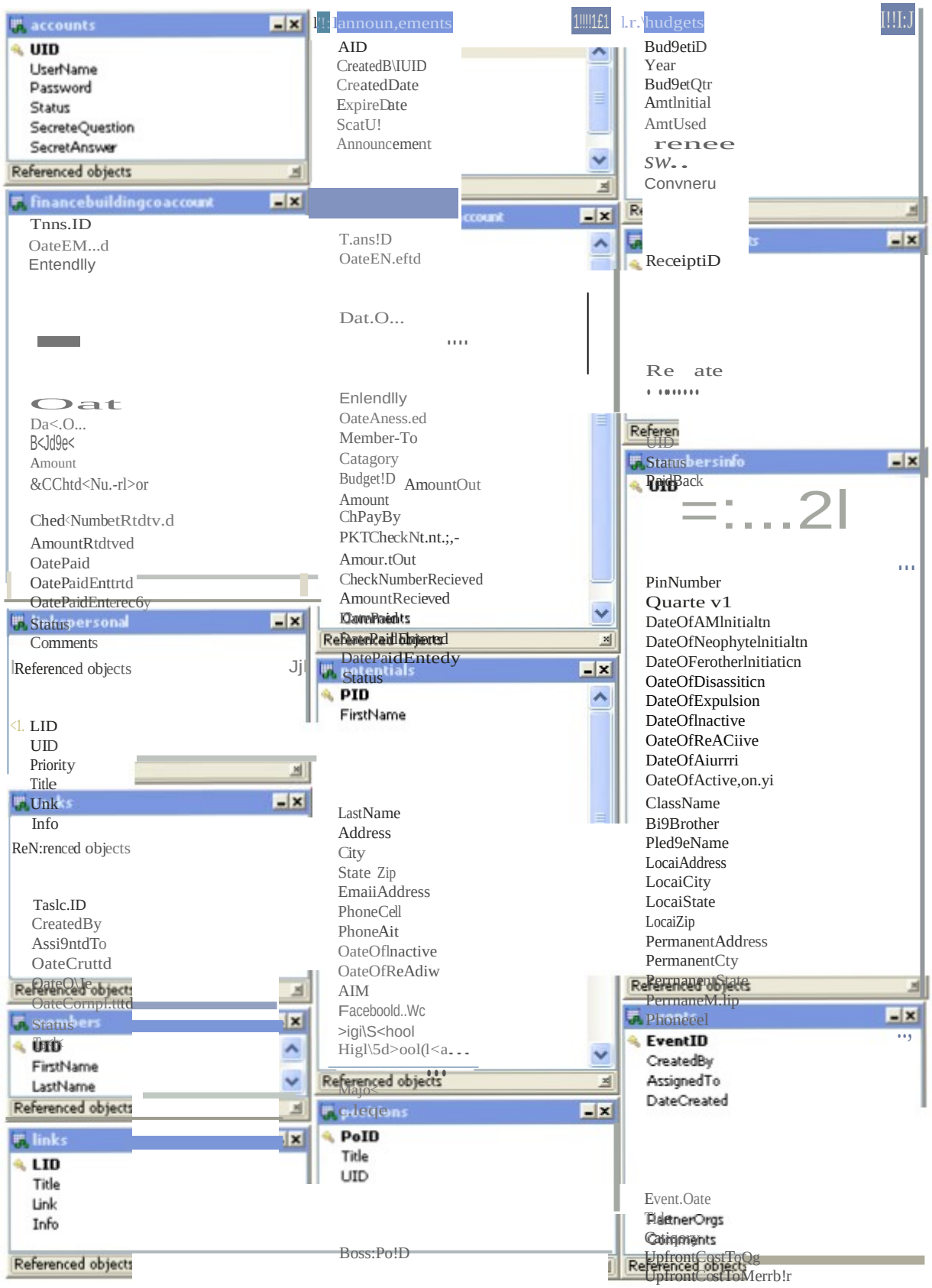


Figure 14: Assessing single transaction

9.4 Centralize place to store data

A MySQL database stores a significant amount of data about the organization. Figure 15 shows most of the tables in the databases used behind the scenes of this website to collect and display information. Data relating to finances, announcements, events, positions, tasks, potential members, and current members make up many of the tables. The most desired information to be kept here long term is information about the members. From here on out, data about all members should be kept and accessible to future members.


accounts
UID
UserName
Password
Status
SecreteQuestion
SecretAnswer
Referenced objects
announcements
AID
CreatedBy
CreatedDate
ExpireDate
ScatU!
Announcement
budgets
Bud9etID
Year
Bud9etQtr
AmtInitial
AmtUsed
financebuildingcoaccount
Tnns.ID
OateEM...d
Entendlly
Oat
Da<.O...
Amount
&CChtd<Nu.-rl>or
Ched<NumbetRtdtv.d
AmountRtdtved
OatePaid
OatePaidEnttrtd
OatePaidEnterec6y
Status
Comments
Referenced objects
T.ans!D
OateEN.eftd
Dat.O...
EnIendlly
OateAness.ed
Member-To
Catagory
Budget!D
AmountOut
Amount
ChPayBy
PKTCheckNt.nt.;,-
Amour.tOut
CheckNumberRecieved
AmountRecieved
DatePaidEntedy
Status
potentials
PID
FirstName
LastName
Address
City
State Zip
EmaiiAddress
PhoneCell
PhoneAit
OateOfInactive
OateOfReAdiw
AIM
Faceboold..Wc
>igi\S<hool
Higl\5d>ool(l<a...
links
LID
UID
Priority
Title
Unk
Info
ReN:renced objects
Taslc.ID
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Assi9ntdTo
OateCruttd
OateCornpl.tttd
Status
UID
FirstName
LastName
links
LID
Title
Link
Info
Boss:Po!D
ReceiptID
Re ate
UID
Statusbersinfo
UID
PaidBack
=:...2I
PinNumber
Quarte v1
DateOfAMlnitialtn
DateOfNeophytelnitialtn
DateOFerotherlnitiaticn
OateOfDisassiticn
DateOfExpulsion
DateOfInactive
OateOfReACiive
DateOfAiurrri
OateOfActive,on.yi
ClassName
Bi9Brother
Pled9eName
LocaiAddress
LocaiCity
LocaiState
LocaiZip
PermanentAddress
PermanentCty
PermanentState
PermaneM.lip
Phoneeel
EventID
CreatedBy
AssignedTo
DateCreated
Event.Oate
PartnerOrgs
Comments
UpfrontCostToOg
UpfrontCostToMerrb!r

Figure 15: Tables in the Databases

10.CONCLUSION

As communication is essential for any organization, this proposed website, paralleled with a strong document management system, will allow substantial growth. Users will have access to important documents, personal financial responsibilities, the organizations overall finances, calendars, contact lists, forums, and a place to send email. The public website will be connected to this intranet website to allow for more accurate, more detailed, and more up-to-date information.

Further consideration of this project would be to simply keep evolving it. Although "scope creep" is typically considered negatively upon in any project, there may be some room here. As dynamic as student organizations are from year to year, and trying to make a project encompass as many possible outcomes, it too is going to need to keep evolving with the organization. Some of the smaller projects included in the grand project could be redone to become stronger and more professional. The site, document management system, wiki, and forum, currently all have different level of authentication. A major enhancement to the overall project would be to have them all flow seamlessly with each other. The more dynamic, adaptive, and fulfilling of users needs KapNet can be, the longer it will survive.

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