

IET 493: Senior Design III
Information Engineering Technology Program
Prof. Russell McMahon

Computer Equipment Management Systems For the College of Arts and Sciences

By

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Abstract

Computer Equipment Management Systems For the College of Arts and Sciences

By
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Computer Equipment Management System is an easy-to-use asset management and a Web based help desk application project for the College of Arts and Sciences. There are 1500 to 1600 computers over 30 departments in 13 buildings in the College of Arts and Sciences, in the west campus of University of Cincinnati. A help desk management application is needed for College faculty, staffs and IT technical support specialists. It allows IT technical supports to track college user's office location, computer warranty, service requisition data and computer's ageing reports.

This project is developed on a Windows 2000 Server, and is implemented with a Cold Fusion Server and SQL Server 2000. The interactive Web application can add, delete and update user and computer information in the database. Asset control can oversee the centralized college wide computer inventory and user information. With the login ID and password, three user types can view different user interfaces. Summary reports can generate for department or administrative offices.

Computer Equipment Management Systems For the College of Arts and Sciences

1. Statement of the Problem

The McMicken College of Arts and Sciences (A&S) is one of the largest colleges in the University of Cincinnati (11). In the past year, because of the Collegiate Structures Initiative (CSI), faculties from the former University College now joined in A&S. The College has 32 departments, with employees in 13 different buildings. Currently, there are about 1,600 computers, laptops, printers and workstations used by almost 700 A&S faculty, staff and student workers.

According to PC Magazine, from 17 to 28 percent of computers need repairs after 2 to 4 years (only 10 percent of the Apple desktops needed repairs) (9). Problems such as virus infections, hardware or software failure, hard drive or driver corruption, and networking connection problems all cause users anxiety. Technical support specialists in Information System department receive quite a number of service requests each day from different users. Service might be from the 12 computer labs, department faculty or a Dean's office. A help-desk management system to utilize in organizing, reporting and scheduling is needed for A&S Information Technology office.

1.1 Definition of the Need

A&S Information Technology department has 3 full time employee and 4 student workers supporting about 1600 computers. The increase of the service requisitions makes scheduling, recording for problems and tracking services more and more difficult. Equipment data, such as date of purchase, brand, model, memory, processor, warranty time and the service tag number on each computer or equipment are also needed to help

the technical support specialists to determine how to solve the computer problems. Each year, a number of new computers, printers, software licenses, file/ application servers, and backup/RAID device are purchased by the annual budget, and those purchasing data is needed to be stored for future use. A database and user interfaces are needed to store and retrieve service record, computer's basic data, and user's information. An asset management application is necessitated for A&S Information Technology department.

Technical support specialists are also responsible for answering general questions daily, such as location and operating hours of the computer labs, where to download the newest virus protection software and newest technical installation and updates, or how to use system utilities(4). Repeating these answers each day occupies a lot of time for the technical support people. If the information is easy to access for the general user through Internet, this is helpful to reduce unnecessary phone calls or Email.

Each UC asset including computer is assigned a UC tag number, so the college asset control manager can determine the most accurate number of equipment for the College and the University. When College purchases computers from bulk institutional purchase for computer labs or professors, the Business Affairs issues a unique identification number for each computer or equipment (10). These tag numbers are given out after computers have been delivered to departments, then the department staffs need to manually place the label on each computer. To record this UC tag number along with the user and computer basic information associate with this computer is important to prevent swapping or lost of computers. The historical service records can also be linked to show the status of this machine.

2. Proposal for the Computer Equipment Management Web Site

The Computer Equipment Management System will allow A&S Information Technology office to manage on-line basic information about computers and users interactively. Database management system stores A&S computer basic information such as warranty expiration date, date of purchase, serial number, manufacturer, UC tag number, memory, MAC address, and its user's office location, phone number, job title, department and e-mail address. Instead of user make request to replace their old computer by phone or email, asset control manager can list the oldest computers to replace quickly.

General users, staffs, faculty or even students can submit on-line service request forms about problems concerning their computers to IT department. Technical specialists then diagnose and repair their computer shortly, update the status, and file the solutions or questions in the database. This information may include the date of service, causes of the problem, repair on parts/drivers, installation of new system or anti-virus protection, warranty time, and who performed the service. Technical support specialists can share and post latest news updates and general questions and answers.

This system will be accessible over the A&S Intranet, and uses a client-server architecture which A&S has developed on a Windows 2000 Server and its Web Server, Cold Fusion Server, SQL Server database management system, and client Web browsers.

2.1 User Interfaces:

A&S staff and faculty can use their College computer to browse to the CEM Web Site through the Intranet. In order to secure the system, a technical support specialist, an administration user or a data entry staff must log in to the CEM as an authorized user to view, search and interactively update the computer equipment database.

All the A&S staff, faculty and student workers browsing from the College computers can:

- Submit a service request form to the technical support group
- Download any new anti-virus software or updates
- Read the latest technical updates and Q&A.

The department technician or data entry staff (computer lab assistants and secretary):

- View, edit, add or delete computer information.
- View reports generated for each departmental administrative purpose.
- Submit service request forms for faculty or staff.
- Enter service records after repairing the machines, including date/time, which parts were replaced, who performed the service.

The administrative users and College technical support:

- Add, update or delete **users** and **computers** information interactively update database on-line.
- View the service inquiries submitted from which user and what is the problem according to the trouble that use provide, assign technical support to repair the machine.
- View reports generate on computer purchasing information for all the departments and admin group.
- View reports on service record history.
- Post latest updates on viruses, service packs and Q&A.

2.2 Technical Details

Software

The application processing will be implemented using Cold Fusion, which supports a language called CFML (Cold Fusion Markup Language). CFML interfaces with the Internet Information Server and acts similarly to a CGI (Common Gateway Interface) script. HTML and JavaScript code is embedded in CFML (7). CFML was chosen over other languages for the major functions due to its ease of use with embedded SQL and its simple integration with JavaScript and HTML. JavaScript will be used to

create the user interface and to create graphs from data supplied by the Cold Fusion component.

Macromedia Studio MX will be used to develop, edit and animate Web graphics and coding. Macromedia Studio MX includes Dreamweaver MX, Flash MX, Fireworks MX, Freehand MX and other multimedia resource kits. Studio is the complete suite of tools for building rich, interactive Internet content and applications delivered across major platforms and devices.

WWW Server

The project will be completed using a Windows 2000 Internet Information Server and a Microsoft SQL Server database management system. Windows 2000 was chosen over other platforms because familiar tools like database servers, spreadsheets, and visual programming languages can be easily integrated with the WWW server.

Database

The database will be implemented with a database management system (DBMS) using SQL Server 2000. Embedded SQL will be used to interface with the database because of its ease of use. Several tables will be created to hold the data, such as department, building, employee and equipment.

3. Budget

Item	Explanation	Prise
Macromedia Studio MX	Own	249.00
Macromedia Cold Fusion Server	Own	1,299.00
Windows 2000 Server	Own	910.95
SQL Server Standard Edition	Own	775.00
Microsoft Excel 2003	Own	174.99
Total:		3,408.94
Actual Total:		\$0

Figure 1: Software Budget Chart (All products are educational versions and with the best discount) (8)

4. Product Description

Computer Equipment Management System is an easy-to-use asset management and web based help desk tracking application. It is designed for the College of Arts and Sciences IT department, administration users and all the staffs and faculty in the college. This Web application can allow College technical support specialists and College staffs to manage equipment information and user information. This computer inventory system establishes a relational database to employee data, computer equipment data, department information and building information (3). CEMS Web based application is accessible over the A&S (College of Arts and Sciences) Intranet, and uses a client-server architecture which A&S has developed on the Windows 2000 Server, a database management system on SQL Server, a Web server, and client-side Web browsers. It can

be used by IT department, Business Office and academic department staffs and faculty to submit on-line service requisition forms, track their status on-line, and add, update or delete any user or computer information, manage equipment asset, view centralized or distributed reports, and categorize all the trouble-shoot records.

5. Description of the Intended Uses:

The CEMS uses ColdFusion and SQL Server to create a centralized computer inventory management system for College. It can be access by any of the computer in the College through Internet Explorer. The Internet applications will be linked with SQL Server and perform interactively update for all the users.

5.1 Easy Accessibility of Service Requisition

By submitting an on-line service request form, IT support specialists can get to the computer problems in a timely manner. Faculty and staffs can visit the site to get an estimate waiting time, who and when will perform the repair and the status about this request. Faculty can request to setup a new PC or drivers, install leaning software, perform a virus scanning or help with the email system and Internet connection.

5.2 Centralized Inventory Management of Equipment

Department staff or data entry staff updates computer basic information over in their work area on the CEMS web application. By the linkage of database, administrator of asset control can oversee the centralized college wide computer inventory and user information. Administrator of IT department can easily calculate the number of the older computers that will need to be replaced, and provide a better budget planning. They are able to know the number of computers or printers distributed in each department.

5.3 Simple Distribution of Functioning Reports for Academic Department

Based on login authorization levels, different functioning reports can be retrieved by different users. Academic department secretaries can manage distributed summery reports under each department login name. Using search engine, administrative users can easily search a computer or equipment information by user's last name, or search by UC tag number. Computer aging reports can be viewed by asset managers. General technical updates, anti-virus download, and summery service report can all be posted on the CEMS Web pages.

6. User Profiles:

There are three categories of users. All the A&S staff and faculty can use their College computer to browse to the CEMS Web Site through Internet Explore. Technical support specialists must log in to the CEMS as an authorized user to view, search and interactively update the computer equipment database. Administrative users need to login as well.

6.1 General College Users

General College users include all the A&S staff, faculty and student workers browse from the College computer's Internet Explore. These employees should be comfortable to navigate this application. They should know how to fill out an on-line form, enter all the required fields and SUBMIT the application. They are able to:

- Submit a service requisition form to the technical support specialists for computer problems.
- Track the status of service requests and technician's responds
- Download any new anti-virus software or other software updates
- Read the latest technical updates and Q&A.

6.2 IT Technician and Secretaries

This group of users is authenticated to login to CEMS web application. Each academic department should have only one to two employees perform the job.

They are responsible for maintaining the basic information of computer in their

department. They also help with the general College users to submit service requisition form if their computers are complete down. Some of IT Technicians are part of this group because some departments are under staff of secretaries.

They are able to:

- View, edit, add or delete computer information.
- View reports generated for individual department and for administrative purpose.
- Submit service request forms for faculty or staff.
- Enter service records after repairing the machines, including date/time, which parts were replaced, who performed the service.

6.3 Administrative Users

This group of users includes IT director, business office managers, asset managers and Dean's office. Administrative users are responsible for maintaining faculty or staff basic information. These data includes name, department, and office location. They can add, update or delete employees and computers information interactively. Administrative users can view college wide summery reports of different functionality.

- View reports generate for all the departments and computer labs for asset management.
- View aging reports on warranty expiration and purchase date to determine how many computers need to be updated or replaced.
- Add, edit and delete employee information.
- Post latest updates on viruses, service packs and Q&A.

7. Interfaces

All the interfaces are written by CFML, and is executed by Cold Fusion Server.

ColdFusion is connected with SQL Server to perform interactive updates. JavaScript and HTML are embedded in it for form validating and formatting.

7.1 Login Page

This page is for authorized users to login by entering their user name and password. This page includes an UC logo and the links to service requisition form and a page to create his/her user name and password when first time login in. The service requisition form is available for all the computer users of A&S College. They can submit technical problems and request for technical support from A&S technician. The detail of service request form and technician editing the status of request will introduce later.

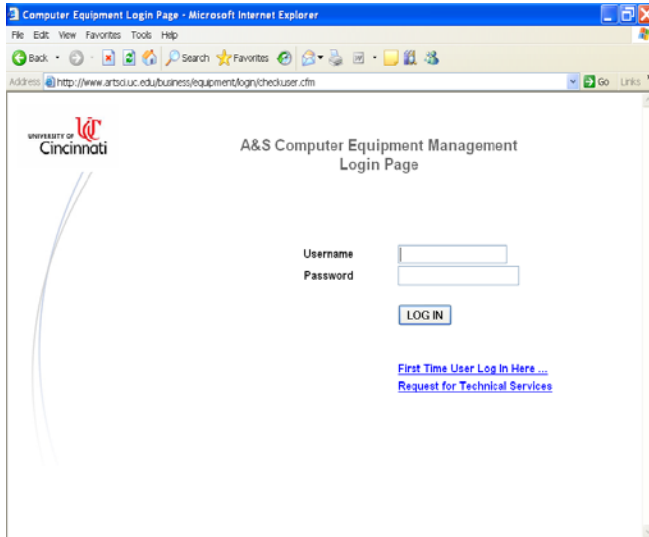


Figure 2: Login Page

Computer Equipment First Time Login Page - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Search Favorites Go Links

Address http://www.artsciuc.edu/business/equipment/login/firsttimeuser.cfm

UNIVERSITY OF
Cincinnati

A&S Computer Equipment First Time User Login Page

Soc. Sec. Num. (000-00-0000)

Username

Please enter a 6 to 8 characters for your Username.

Password

Please enter an 8 characters or numbers combination for your password.

LOG IN

[Back to Home Page...](#)

Figure 3: First Time User Create Login Information

First time user login link allows user to create his or her own password, and it's only for authorized department users and administrative users. By entering social security number to compare with employee data as well as the login key is on for that authorized person, the user name and password will be added to login table when login button is triggered.

7.2 Menu Page

The menu bar includes: Search User/Equipment, Reports, Departmental listing, User Information management, Service Request editing and logout. DHTML and JavaScript give the dynamic navigations when moving the mouse over each subject. Search User and Equipment can allow to search by users last name and by computer unique UC tag number. Reports allow users to see Computer Lab report, IP report, computer aging for faculty and staffs. Aging report shows the purchase information which shows how old is the user's office computers. If a user has multiple computers in

his office, it only shows the newest one, and it will also show users without any computer.

(See Figure7)

The Logout clears all the session variable and go to the login page.

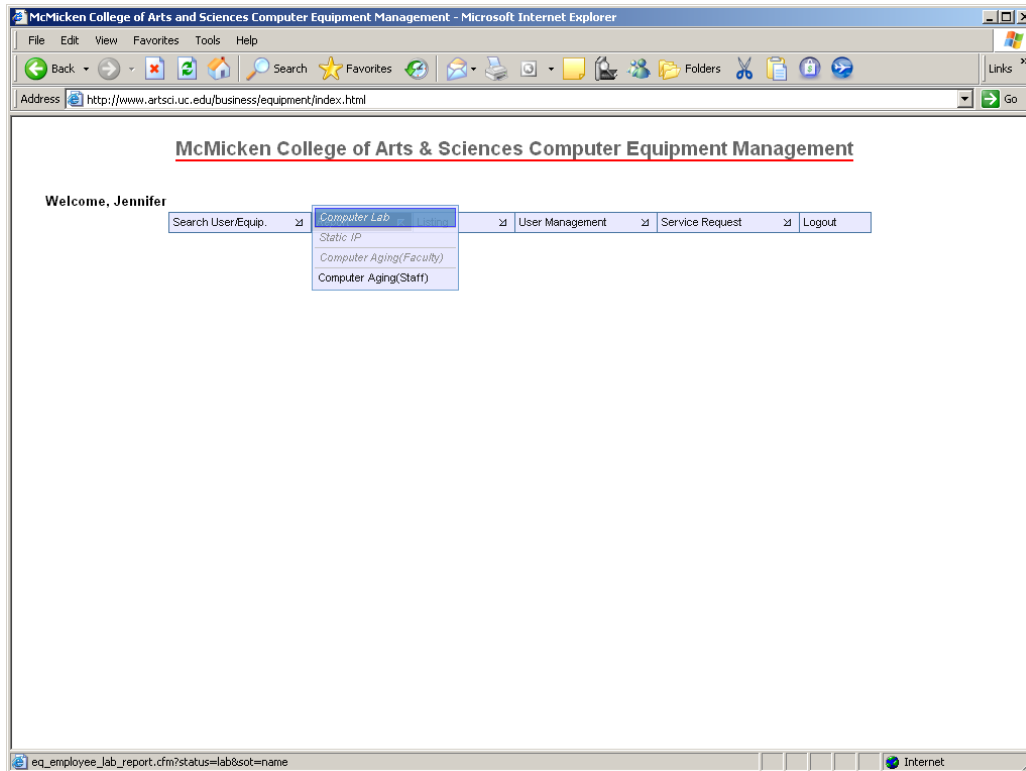


Figure 4: Menu bar

7.3 Search Equipment by User or UC Tag

Most of the equipment editing and managing are performed in these pages. By searching user's last name or equipment's UC tag number, admin users can add, delete or update equipment information.

7.3.1 Search by Last Name

This page can allow users to type in a last name and result all the match users, and their computers. This search doesn't need to type complete last name, the query will do a likely search to find the entire last name contains that enter. Unless the check box of

searching the exact match is checked. From the links beside the computer, user can choose to edit the computer information, delete the computer or move that computer to another user (See Figure6). Under all the computer listing is a link to add new equipment to that user. The user's full name is a link to edit user's basic information.

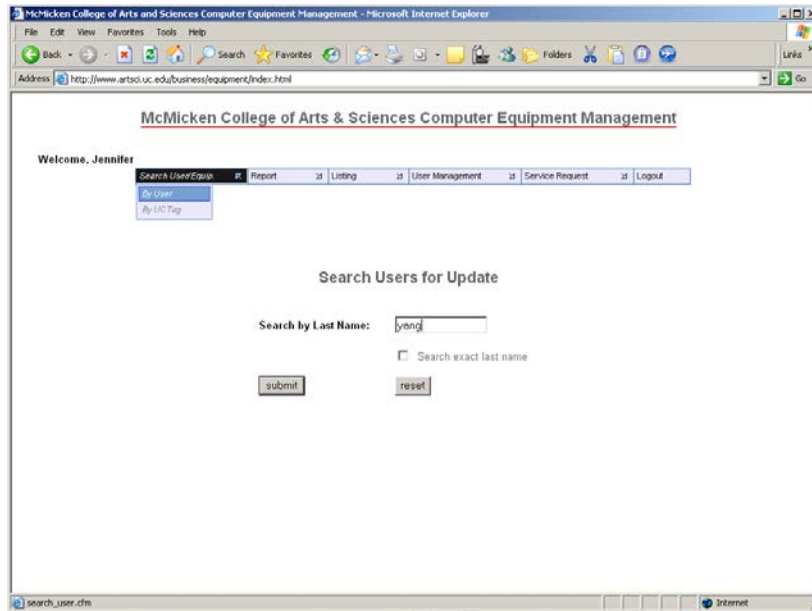


Figure 5: Search User

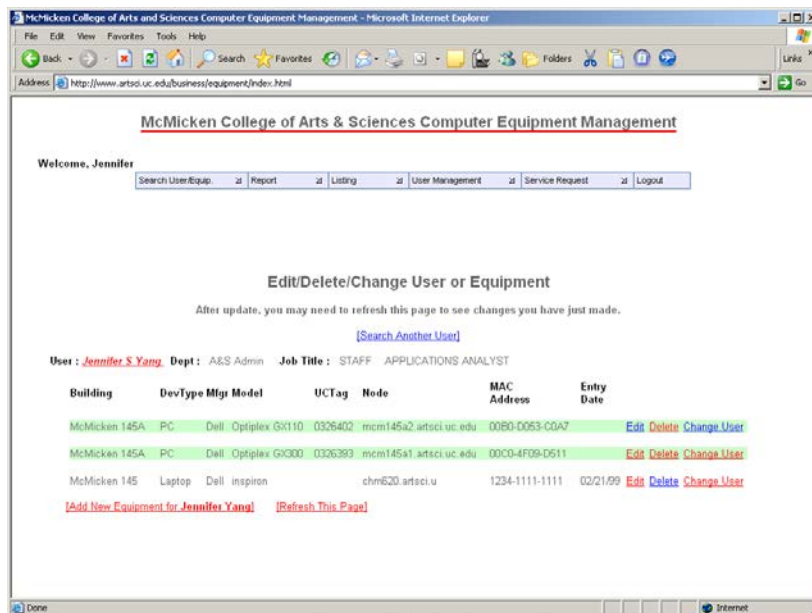


Figure 6: Edit User and Equipment

7.3.2 Search by UC Tag Number

By submitting a UC tag number which is a unique number to identify UC asset, it brings up the user and equipment information directly. Add new equipment, update or delete that equipment link is also included here. The difference between search by user's last name is it doesn't show the rest of the equipment that user owns.

The screenshot shows a web browser window titled "McMicken College of Arts and Sciences Computer Equipment Management - Microsoft Internet Explorer". The address bar shows "http://www.artsci.uc.edu/business/equipment/index.html". The page content includes a navigation bar with links: Search User/Equip., Report, Listing, User Management, Service Request, and Logout. Below the navigation bar, the text "Welcome, Jennifer" is displayed. The main heading is "Search UCTag for Update". There is a form with the label "Search by UCTag:" and a text input field containing "0326402". Below the input field are two buttons: "submit" and "reset".

Figure 7: Search by UC Tag Number

The screenshot shows the same web browser window as Figure 7, but the page content has changed. The main heading is "Edit/Delete/Change User or Equipment". Below this heading is a message: "After update, you may need to refresh this page to see changes you have just made." There is a link "[Search Another UCTag]". Below this is a summary of the user information: "User : Jennifer S. Yang Dept : A&S Admin Job Title : STAFF APPLICATIONS ANALYST". Below the summary is a table with the following columns: Building, Mfr, Model, UCTag, Node, MAC Address, and Entry Date. The table contains one row of data: "McMicken 145A Dell Optiplex GX110 0326402mcm145a2.artsci.uc.edu 00B0-D053-C0A7". To the right of the table is a link "Edit Delete Change User". Below the table are two links: "[Add New Equipment for Jennifer Yang]" and "[Refresh This Page]".

Building	Mfr	Model	UCTag	Node	MAC Address	Entry Date
McMicken 145A	Dell	Optiplex GX110	0326402mcm145a2	artsci.uc.edu	00B0-D053-C0A7	

Figure 8: Edit User and Equipment information by UC Tag Search

7.3.3 Edit Equipment Form

This page edit equipment's basic information such as manufacturer, model, memory, serial number, warranty expiration date, UC tag, MAC address, location of this computer and purchase date. Device type drop down box is to change different type of equipment such as PC, laptop, printer, server or workstation. By submitting this form, the data updates equipment table in SQL server database. The Delete link also opens a window, and asks "Are you sure to DELETE this equipment?" The delete button automatically closes that window and refreshes the edit equipment page.

The screenshot shows a web browser window with the URL <http://www.artsci.uc.edu/business/Equipment/edit...>. The page title is "Update Equipment Form".

User Information:

- Full Name: Yang Jennifer
- Dept: A&S Admin
- Building: McMicken 145A

[Move this equipment to another user](#)

** Indicates A Required Field*

Equipment Details:

- Device Type: PC
- Manufacturer: Dell
- Model: Optiplex GX110
- Memory: 256 MB
- Serial No.: 1VGX10B
- Warranty Till: 11/16/2004 Days Left: -193
- UC Tag Number: 0326402
- Node Name: mcm145a2.artsci.uc.edu
- MAC Address 1: 00B0 D053 C0A7
- IP Number:
- External IP No.:
- Port No.:
- Open to Public: No
- Building: McMicken

Equipment Table:

MAC Address	Entry Date	
00B0-D053-C0A7		Edit Delete Change User

Figure 9: Update Equipment Information Form

7.3.4 Change User

This page is to change the current user of this equipment or computer to another user from selecting a name on the list. By clicking on the name of the new user, this change user window would be closed and the edit page is refreshed and by this action.

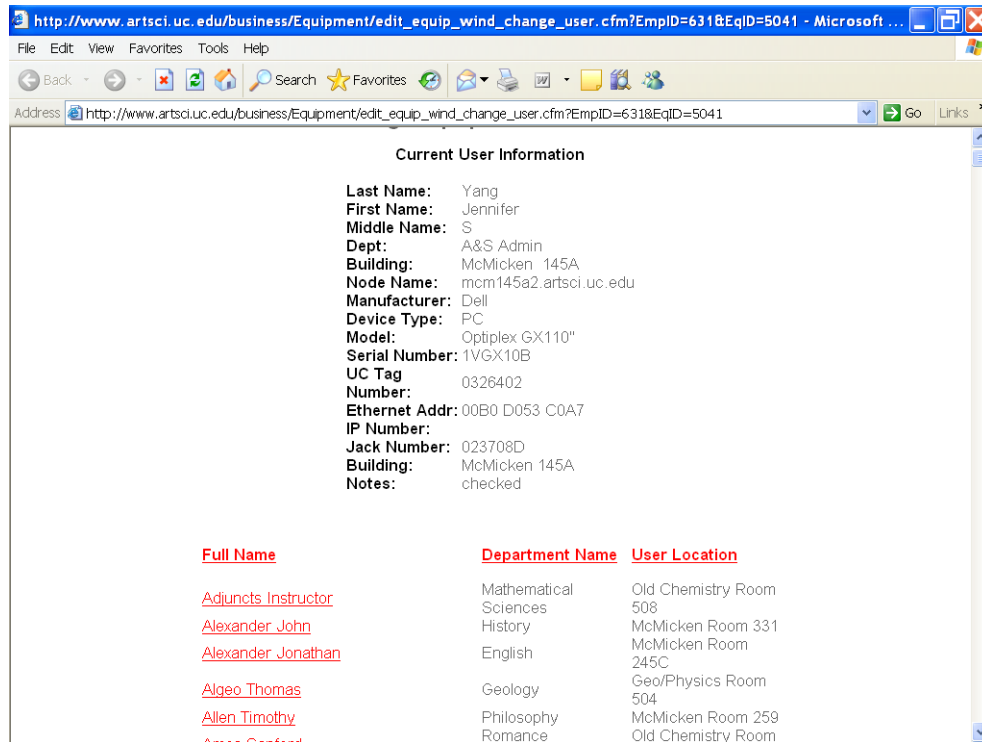


Figure10: Change Computer to another User

7.3.4 Edit User basic Information

By clicking on the link located on the user's name opens this user editing form page. This page is to update user's basic information such as their office location, phone, email, job title, department and status. Status can be faculty, staff, dean, department head or student worker. This action updates the employee table in the SQL Server interactively as well. Mostly, department secretary will do this update for their department faculty or staff since they are more aware of the employee's changes or movements around their departments.

McMicken College of Arts and Sciences

File Edit View Favorites Tools Help

Address http://www.artsci.uc.edu/business/Equipment/edit_user.cfm...

Change User Information

* Indicates a required field.

Last Name * Yang

First Name * Jennifer

Middle Name S

Department * A&S Admin

Status * staff

Position * APPLICATIONS ANALYST

Building * McMicken

Room * 145A

ML 372

Phone * (5 61785

Fax 60142

Email Address * jennifer.yang@uc.edu

Email System * Outlook

Submit Reload

McMicken 145A PC Dell

McMicken 145A PC Dell

[Add New Equipment for Jennifer S Yang]

Figure 11: Edit Employee Basic Information Form

7.4 Computer Reports

The second navigation menu mainly provides the reports for administrative users to view and retrieve data easily.

7.4.1 Computer Lab Report

This report shows a list of computers in all the A&S computer labs and the computer information in that computer lab. Administrative users can view college wide computer labs listing, and department user can only view their own department computer labs.

McMicken College of Arts & Sciences Computer Equipment Management - Microsoft Internet Explorer

Address: http://www.artsci.uc.edu/business/equipment/index.html

McMicken College of Arts & Sciences Computer Equipment Management

Welcome, Jennifer

Search User/Equip. | Report | Listing | User Management | Service Request | Logout

Computer Lab Report

05/28/2005

Sort by: [Name](#)

Name	Department	Node Name	Mfg	Model	Purchase Date	Device Type	Location
Anthropology_brm440	Anthropology	440brn02.artsci.uc.edu	Dell	Dimension L500c	12/23/1999	PC	Braunstein 440
Anthropology_brm440	Anthropology	printrel.artsci.uc.edu	Dell	Optiplex GX1	07/16/1999	PC	Braunstein 440
Anthropology_brm440	Anthropology	440brn01.artsci.uc.edu	Dell	Optiplex GX270	04/21/2004	PC	Braunstein 440
Anthropology_brm440	Anthropology	440brn02.artsci.uc.edu	Dell	Optiplex GX270	04/21/2004	PC	Braunstein 440
Anthropology_brm440	Anthropology	440brn03.artsci.uc.edu	Dell	Optiplex GX270	04/21/2004	PC	Braunstein 440
Anthropology_brm440	Anthropology	440brn04.artsci.uc.edu	Dell	Optiplex GX270	04/21/2004	PC	Braunstein 440

Figure 12: Computer Lab Report

7.4.2 Static IP Report

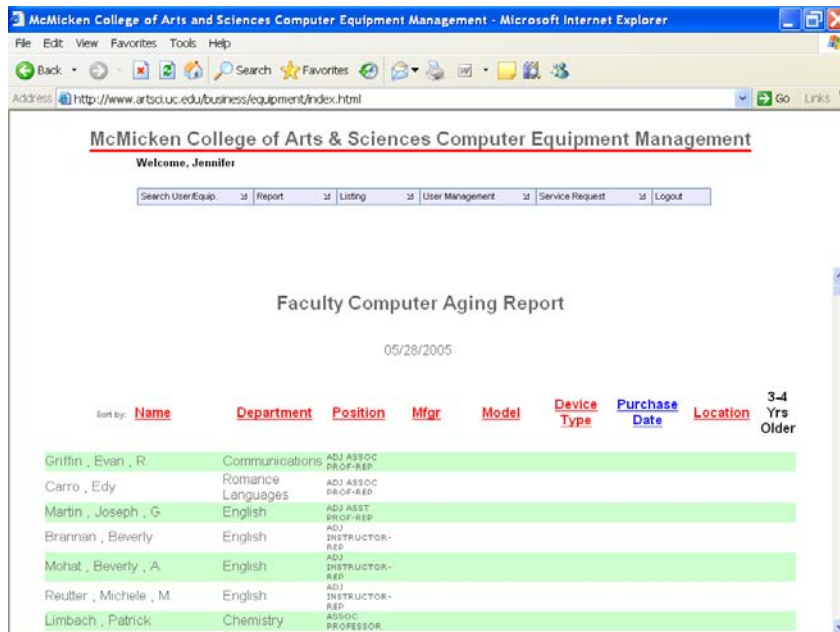
This report shows all the equipments with a static IP number, usually are network printers. This report is useful when IT technical support specialists meet problems concerning network printers, or users need to add a printer, but don't know it's IP address. Again, department users can only view departmental printer's IP listing. Administrator can view all the listing.

Node Name / Alias	Ethernet Address	IP Number	Ex. IP Number	Location	Device	Jack Num.	Notes
anthrolab14.bm.uc.edu	0001-E685-D378	010.042.008.254		Braunstein 440	Network Printer		
bm401hp1.artsci.uc.edu	0001-E64D-3AEE	010.042.007.253		Braunstein 401	Network Printer	0405D-	Printer is connected to a HP J
bm406j4600.artsci.uc.edu	0001-E69A-3F0E	010.042.007.244		Braunstein 406	Network Printer		
bm415hp1.artsci.uc.edu	0030-C1D3-8E74	010.042.007.237		Braunstein 415	Network Printer	0405D-0068	
bm415hp2.artsci.uc.edu	0001-E801-589D	010.042.007.236		Braunstein 415	Network Printer	0405D-0066	

Figure 13: Static IP Report

7.4.3 Faculty/Staff Computer Aging Report

Faculty/staff computer aging report page provides the user's full name, department, model of the computer, location, and the purchasing date. The main purpose of this report is to know which faculty has the oldest computer and when the annual purchasing screen comes, the A&S Deans office can view this report and determine how many computers would need to purchase this year. The last column 3-4 years older shows the flags to mark computers are older than three years, and the number of stars flags the age of that computer. Users without computers are on the top most and then follow by the oldest computer in the list. If a user has multiple computers in his or her office, it shows the newest computer only. All the columns can sort the order of the report by clicking on the links of headings. This report shows the newest computer for one faculty or staff if he or she has multiple computers.



McMicken College of Arts & Sciences Computer Equipment Management

Welcome, Jennifer

Search User/Equip. | Report | Listing | User Management | Service Request | Logout

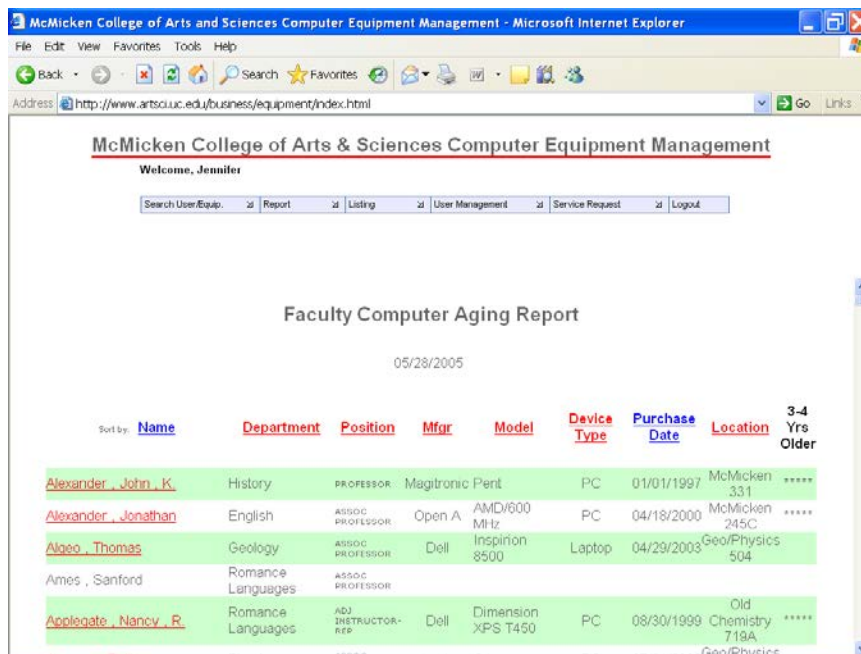
Faculty Computer Aging Report

05/28/2005

Sort by: **Name** | Department | Position | Mfr. | Model | Device Type | Purchase Date | Location | 3-4 Yrs Older

Name	Department	Position	Mfr.	Model	Device Type	Purchase Date	Location	3-4 Yrs Older
Griffin, Evan, R.	Communications	ADJ ASSOC PROF-REP						
Carro, Edy	Romance Languages	ADJ ASSOC PROF-REP						
Martin, Joseph, G.	English	ADJ ASST PROF-REP						
Brannan, Beverly	English	ADJ INSTRUCTOR-REP						
Mohat, Beverly, A.	English	ADJ INSTRUCTOR-REP						
Reutter, Michele, M.	English	ADJ INSTRUCTOR-REP						
Limbach, Patrick	Chemistry	ASSOC PROFESSOR						

Figure 14: Faculty Computer Aging Report



McMicken College of Arts & Sciences Computer Equipment Management

Welcome, Jennifer

Search User/Equip. | Report | Listing | User Management | Service Request | Logout

Faculty Computer Aging Report

05/28/2005

Sort by: **Name** | Department | Position | Mfr. | Model | Device Type | Purchase Date | Location | 3-4 Yrs Older

Name	Department	Position	Mfr.	Model	Device Type	Purchase Date	Location	3-4 Yrs Older
Alexander, John, K.	History	PROFESSOR	Magitronic	Pent	PC	01/01/1997	McMicken 331	*****
Alexander, Jonathan	English	ASSOC PROFESSOR	Open A	AMD/600 Mhz	PC	04/18/2000	McMicken 245C	*****
Algeo, Thomas	Geology	ASSOC PROFESSOR	Dell	Inspiron 8500	Laptop	04/29/2003	Geo/Physics 504	
Ames, Sanford	Romance Languages	ASSOC PROFESSOR						
Applegate, Nancy, R.	Romance Languages	ADJ INSTRUCTOR-REP	Dell	Dimension XPS T450	PC	08/30/1999	Old Chemistry 718A	*****

Figure 15: Faculty Computer Aging Report (sort by name)

By clicking on the heading, this listing can sort under different column attribute.

The last column 3-4 years older shows stars that represents how old is this computer up to 5 years. If the computer is old than 5 years, it shows 5 stars only.

7.5 Departmental Listing Page

The third navigation menu is a listing menu. This page can list departmental computers and their information by selecting a department from a drop down box. This selecting box only shows when administrative user login. The departmental user login, this page will not show the drop down box of selection for different department, but only that department the login user belongs to.

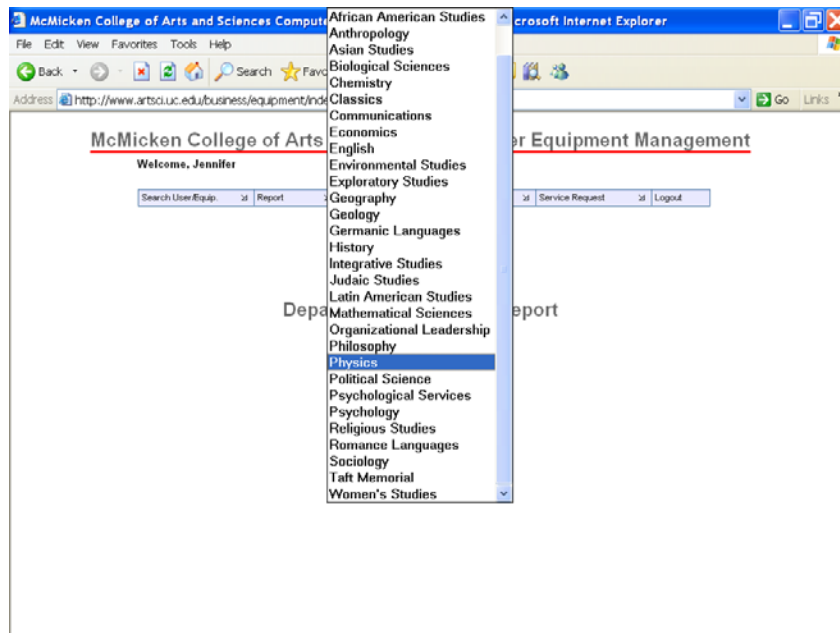


Figure 16: Department Listing1

This listing page is different from the Faculty/Staff Aging Report. Not like Aging report only shows the newest computer for a single user, this listing shows every computer a staff or faculty has. They may include the computers used by graduate assistants in another office than the professor's, or the lab's computers under that department.

Name	Node Name	Ethernet Address	Mfg	Model	UC Tag	Serial Number	Device Type	Status
Argyres, Philip	goeo404.artsci.uc.edu	0000-0000-0000	Apple	G4			PC	Faculty
Bortner, Larry	marcuso.brn.uc.edu	0000-9423-3B14	Apple	Mac Iix		F9242UA	PC	staff
Bortner, Larry	studycntr7.geo.uc.edu	00C0-4F2C-7D24	Dell	Optiplex			PC	staff

Figure 17: Department Listing 2

7.6 User Management

This navigation link is to add new users who just join to the College, as well as delete the user who has left or retired. This links can only view by admin login, and it can't view by any departmental login.

7.6.1 Add New User Form

JavaScript validates each data field and pops up a message box if invalid entry to stop the record to be submitted. Such as name, department, location, and job title are required field, and do not allow empty entry. When select a department, the mail location is given by the different selection of department mail location. Email field is validate by characters and followed by a “@” and followed by characters plus “.” and characters.

The screenshot shows a web browser window titled "McMicken College of Arts and Sciences Computer Equipment Management - Microsoft Internet Explorer". The address bar shows "http://www.artsi.uc.edu/business/equipment/index.html". The page header includes the title "McMicken College of Arts & Sciences Computer Equipment Management" and a welcome message "Welcome, Jennifer". A navigation bar contains links: "Search User/Equip.", "Report", "Listing", "User Management", "Service Request", and "Logout". The "User Management" link is highlighted, and a dropdown menu shows "Add" and "Delete" options. The main content area is titled "Add New User" and includes a note: "* Indicates a required field." The form fields are: "Last Name *", "First Name *", "Middle Name", "Department *" (with a dropdown menu showing "-- Select Your Department --"), "Status *" (with a dropdown menu showing "Adj-nonrep."), "Position *" (with a dropdown menu showing "ACCOUNTANT 2"), "Building *" (with a dropdown menu showing "Administration"), "Room *", "ML", "Phone * (5 digits)", "Fax", "Email Address *", and "Email System *" (with a dropdown menu showing "-- Select Your Email System --").

Figure 18: Add New User Form

7.6.2 Delete User Form

This page is to delete a current user by providing a user's last name and first name.

This action will first search the computers or equipment under that user, and to delete the user, his or her equipment has to be changed to another user or deleted first.

The screenshot shows a web browser window titled "McMicken College of Arts and Sciences Computer Equipment Management - Microsoft Internet Explorer". The address bar shows "http://www.artsi.uc.edu/business/equipment/index.html". The page header includes the title "McMicken College of Arts & Sciences Computer Equipment Management" and a welcome message "Welcome, Jennifer". A navigation bar contains links: "Search User/Equip.", "Report", "Listing", "User Management", "Service Request", and "Logout". The main content area is titled "Delete A Current User-testing" and includes a note: "Search for the user you want to delete from the database:". The form fields are: "Complete Last Name: *", "First Name: *", and "Middle Name:". Below the fields are "submit" and "reset" buttons.

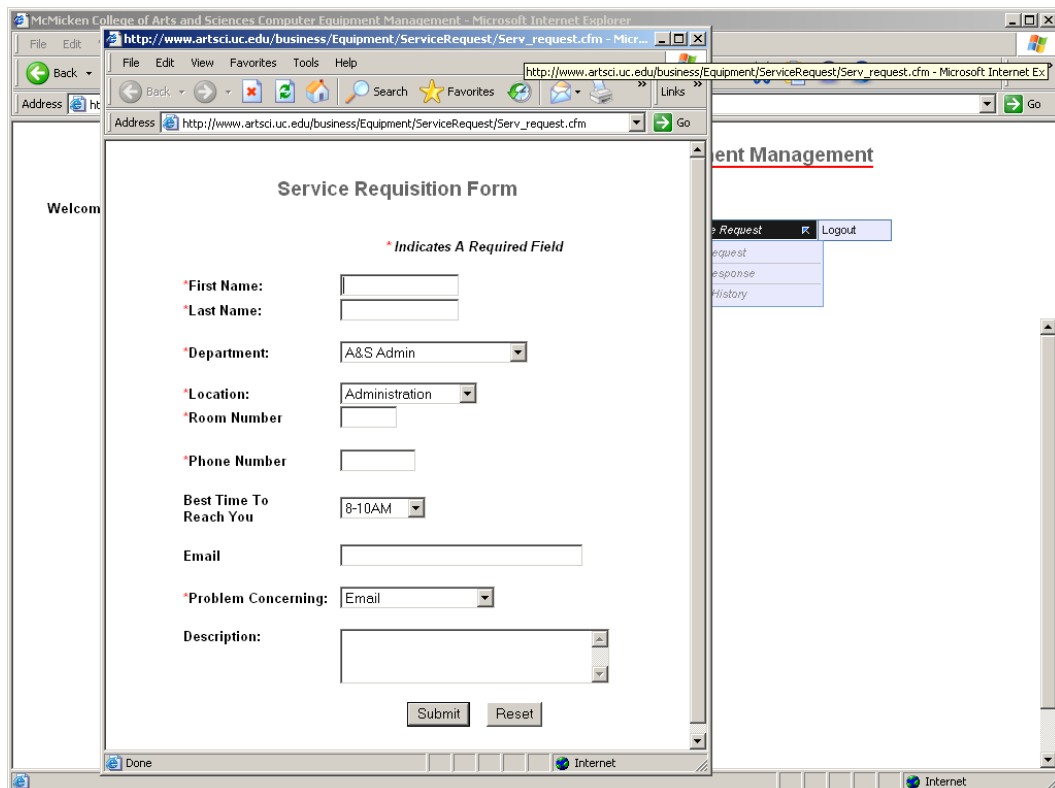
Figure 19: Delete User Form

7.7 Service Request

This page can allow staffs or faculty to submit service requests to IT technical supports. They can track their status and responses by technical supports. Through the on-line interactive updates, computer users and IT tech supports can gain a better communication.

7.7.1 Submit Service Requisition Form

College computer users can submit this form if they have any technical problems. By providing their name, department, phone number to contact, email, problem concerning and detail descriptions if that is necessary. This link is not only located inside the login page, but also shows outside of the login page, so the general users doesn't have to login.



The screenshot shows a web browser window with the address bar displaying http://www.artsci.uc.edu/business/Equipment/ServiceRequest/Serv_request.cfm. The page title is "McMicken College of Arts and Sciences Computer Equipment Management - Microsoft Internet Explorer". The main content area is titled "Service Requisition Form" and includes a "Welcome" message on the left. The form contains several fields with asterisks indicating required fields: "First Name:", "Last Name:", "Department:" (a dropdown menu showing "A&S Admin"), "Location:" (a dropdown menu showing "Administration"), "Room Number", "Phone Number", "Best Time To Reach You" (a dropdown menu showing "8-10AM"), "Email", "Problem Concerning:" (a dropdown menu showing "Email"), and "Description:". There are "Submit" and "Reset" buttons at the bottom of the form. On the right side of the page, there is a "Request Management" section with a "Request" link and a "Logout" button. Below the "Request" link, there is a list of links: "request", "response", and "History".

Figure 20: Service Requisition Form

7.7.2 Listing of Service Request

This page is for technical specialists to view what are the new requests, assign a technician to a problem and edit the service status and how to resolve the problem.

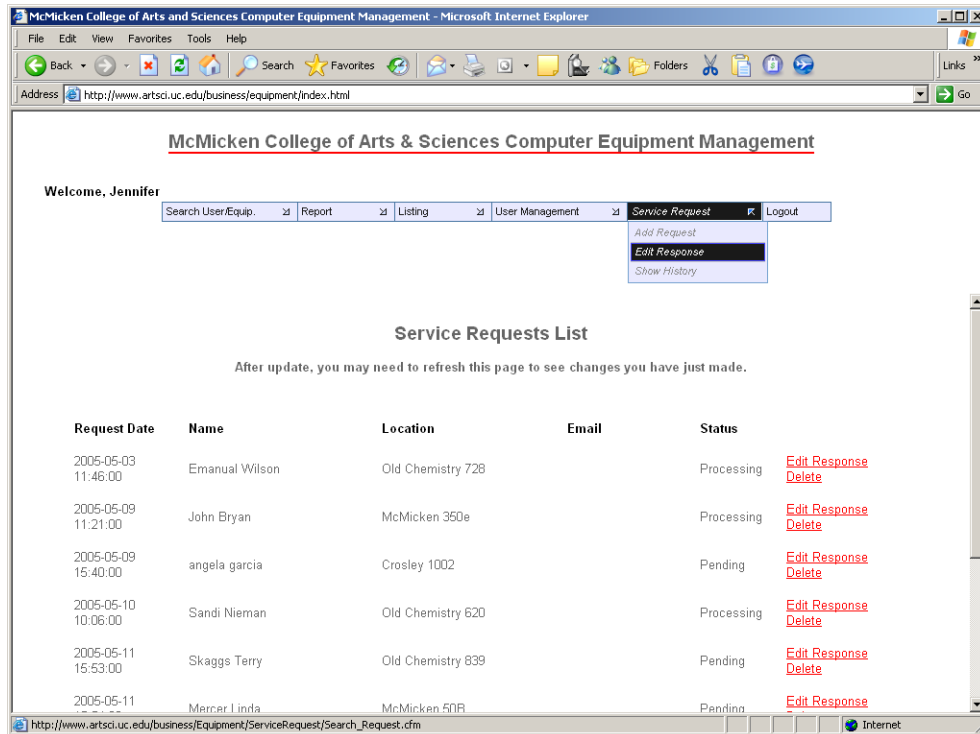


Figure 21: Service Request Listing

7.7.3 History Service Request

This page lists of all the history service requests that the service tickets are completed. It is used by technical support specialists to search for similar problems, and share the solutions with other analysts (5). It is useful for the help desk documentation, and can be categorized by different type of requests in the future.

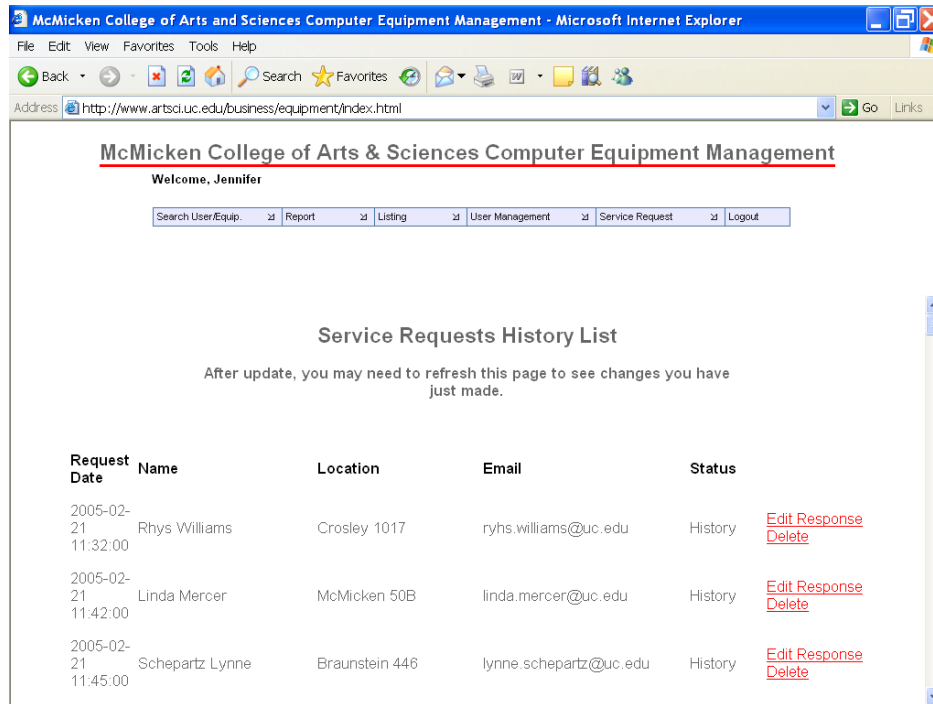


Figure 22: History Service Request Listing

8. Timeline

ID	Task Name	Start	End	Complete
1	Research	9/30/2004	10/28/2004	Yes
2	White Proposal	10/15/2004	11/21/2004	Yes
3	Present Proposal	11/18/2004	12/1/2004	Yes
4	Develop/Test Database	11/25/2004	2/26/2005	Yes
5	Plan/Develop Web Pages	12/3/2004	4/2/2005	Yes
6	Write Product Description, Intended Use and User Profile	1/13/2005	1/27/2005	Yes
7	Develop User Interface, deliverables and Prototype	1/27/2005	2/25/2005	Yes
8	Test Prototype	2/4/2005	2/28/2005	Yes
9	Revise Prototype and deliverable	2/6/2005	2/25/2005	Yes
10	Documentation	2/20/2005	2/28/2005	Yes
11	Present Completed Prototype (SD 2 end)	3/3/2005	3/10/2005	Yes
12	Build Beta Project	3/30/2005	4/20/2005	Yes

13	Test Beta Project	4/5/2005	4/25/2005	Yes
14	Revise Beta Project	4/10/2005	4/30/2005	Yes
15	Build Final Project	4/20/2005	5/5/2005	Yes
16	Prepare Testing Plan	5/5/2005	5/15/2005	Yes
17	Test Final Project	4/25/2005	5/19/2005	Yes
18	Debug and Modify Program	5/7/2005	5/19/2005	Yes
19	Revise Final Project	5/1/2005	5/15/2005	Yes
20	Prepare Tech Expo	5/15/2005	5/20/2005	Yes
21	Documentation	4/15/2005	5/31/2005	Yes
22	Review Completed Final Report	5/23/2005	6/2/2005	Yes

Figure 23: Timeline Chart

9. Database Structure

(Table names are bold underline)

Building

BuildingID int(4), primary key
Name varchar(35),
Gateway varchar(35)

The purpose for this table is to store the building id, building name and its gateway IP address if it's available. This building id will be the foreign key of Employee table and Equipment table.

Department

DepartmentID int(4), primary key
Name varchar(35),
ML char(5),
Fax char(5),
DeptID_USIS char(5)

The Department table stores information about each of the departments of College of Arts and Sciences, such as English, Chemistry, and Geology. It also stores the department mail location and fax number. Each department usually has only one fax line. DeptID can be used as a foreign key in the Employee table.

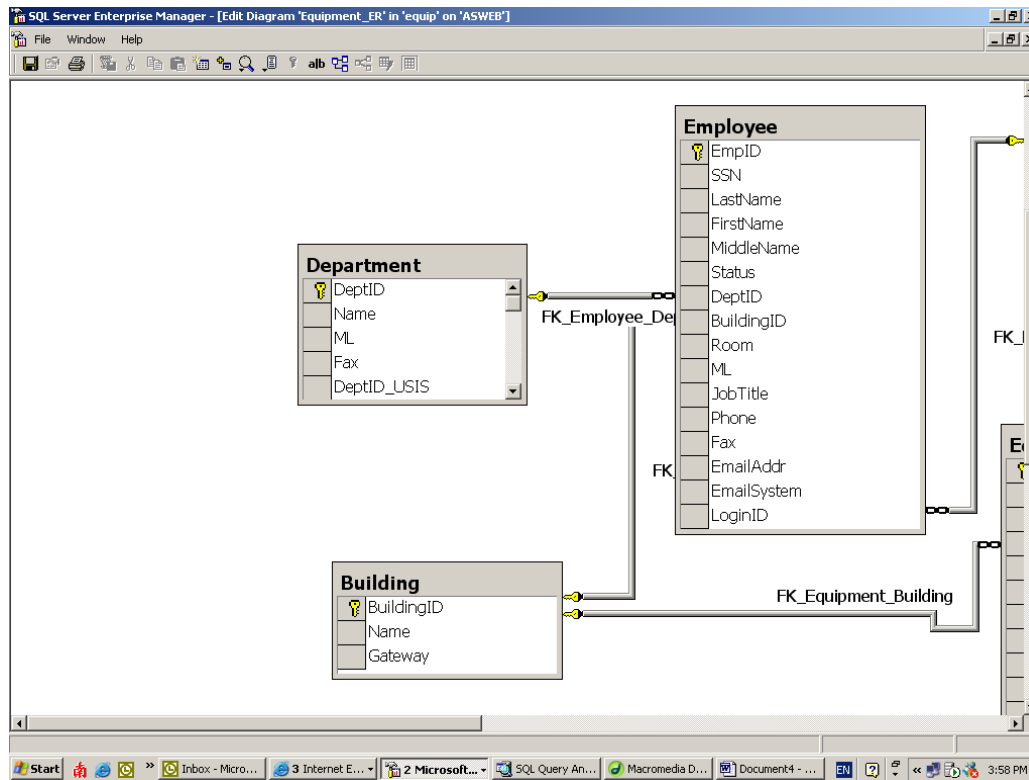


Figure 24: Database ER Diagram 1

Employee

EmployeeID	int(4),	primary key
LastName	varchar(35),	
FirstName	varchar(35),	
MiddleName	varchar(35),	
Status	varchar(35),	
DepartmentID	int(4),	
BuildingID	int(4),	
Room	varchar(6),	
ML	char(5),	
JobTitle	varchar(50),	
Phone	varchar(10),	
Fax	varchar(10),	

EmailAddr	varchar(50),
EmailSystem	varchar(50),
LoginID	int(4)

Employee table stores employee information, such as name, departmentID, office room, mail location, job title, phone, fax, email address. Status column contains faculty, staff, department head, student worker or deans. Only the authorized employee has Login ID in Login ID column. This Employee table and Equipment table can be one-to-one, one-to-zero or one-to-many relationships. For example, a staff may have one computer, multiple computers, or he may not have any computer at all.

Login

LoginID	int(4),	primary key
UserN	char(10),	
Password	char(8),	
AuthorizedID	int(4),	
DepartmentID	int(4),	
Second_DepartmentID	int(4),	
EmployeeID	int(4)	

Login table contains Login ID, username, password, authorization level, Department ID, second department ID, SSN and Employee ID. Login data is inserted into database through a web application by authorized user login for the first time. The authorized user must be a user in the Employee table with a valid key in Login ID attribute. After he successfully login into the CEMS for the first time, an insert command will add his/her username and password information in Login table, and also update his/her Login ID in Employee table. Authorized ID is the authentication level for different users group. Higher level can utilize more functions. Department ID can allow program to track which department the login user is belonging to. A second department

ID might be given when another department's data also wants to be showed in the same login name.

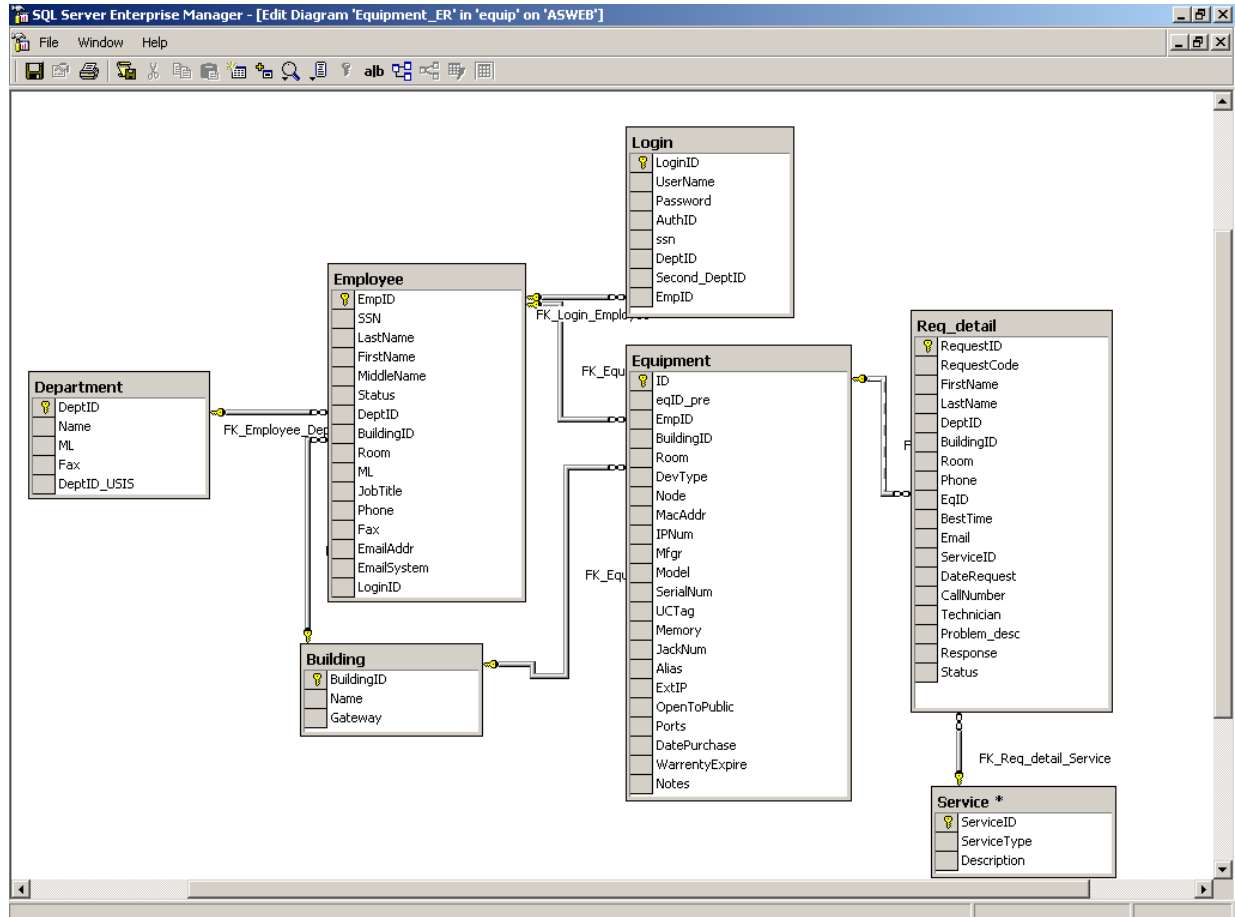


Figure 25: Database ER Diagram 2

Equipment

EqID	int(4),	primary key
EmployeeID	int(4),	
BuildingID	int(4),	
Room	varchar(6),	
DevType	varchar(20),	
Node	varchar(50),	
MacAdd	varchar(12),	
IPNum	varchar(15),	
Mfgr	varchar(35),	
Model	varchar(35),	
Serial	varchar(35),	
UCTag	varchar(35),	
Memory	int(4),	

Alias	varchar(50),
DatePurchase	smalldatetime,
WarrantyExp	smalldatetime,
Notes	varchar(150)

Equipment table contains equipment ID number, employee ID number which the user's ID of that equipment belongs to, location, type of the equipment, Mac address, IP, manufactory, model, serial number, UC tag number, memory, purchase date and warranty expiration date. Equipment table links with employee table, building, and service request detail table.

Req_Detail

RequestID	int(4),	primary key
RequestCode	char(20),	
FirstName	varchar(30),	
LastName	varchar(30),	
DeptID	int(4),	
BuildingID	int(4),	
Room	char(6),	
Phone	char(10),	
BestTime	char(10),	
Email	varchar(50),	
ServiceID	int(4),	
DateReq	smalldatetime,	
CallNumber	int(4),	
Technician	varchar(50),	
Problem_desc	varchar(500),	
Response	varchar(500),	
Status	varchar(50)	

Service

ServiceID	int(4),	primary key
ServiceType	varchar(50),	
Description	varchar(150)	

Req_Detail table stores the service request data such as the name, office location, phone, email address the person who requests for service. Service ID links to the service table which contains the type of service, such as network connection, setting up email,

installing new software, installing hardware, printer problems, and others. Technician, response and status attributes should be entered by IT technical supports, and the data can be posted on the tracking page for staff and faculty to view their status and technician's responses.

10. System Flow Diagram

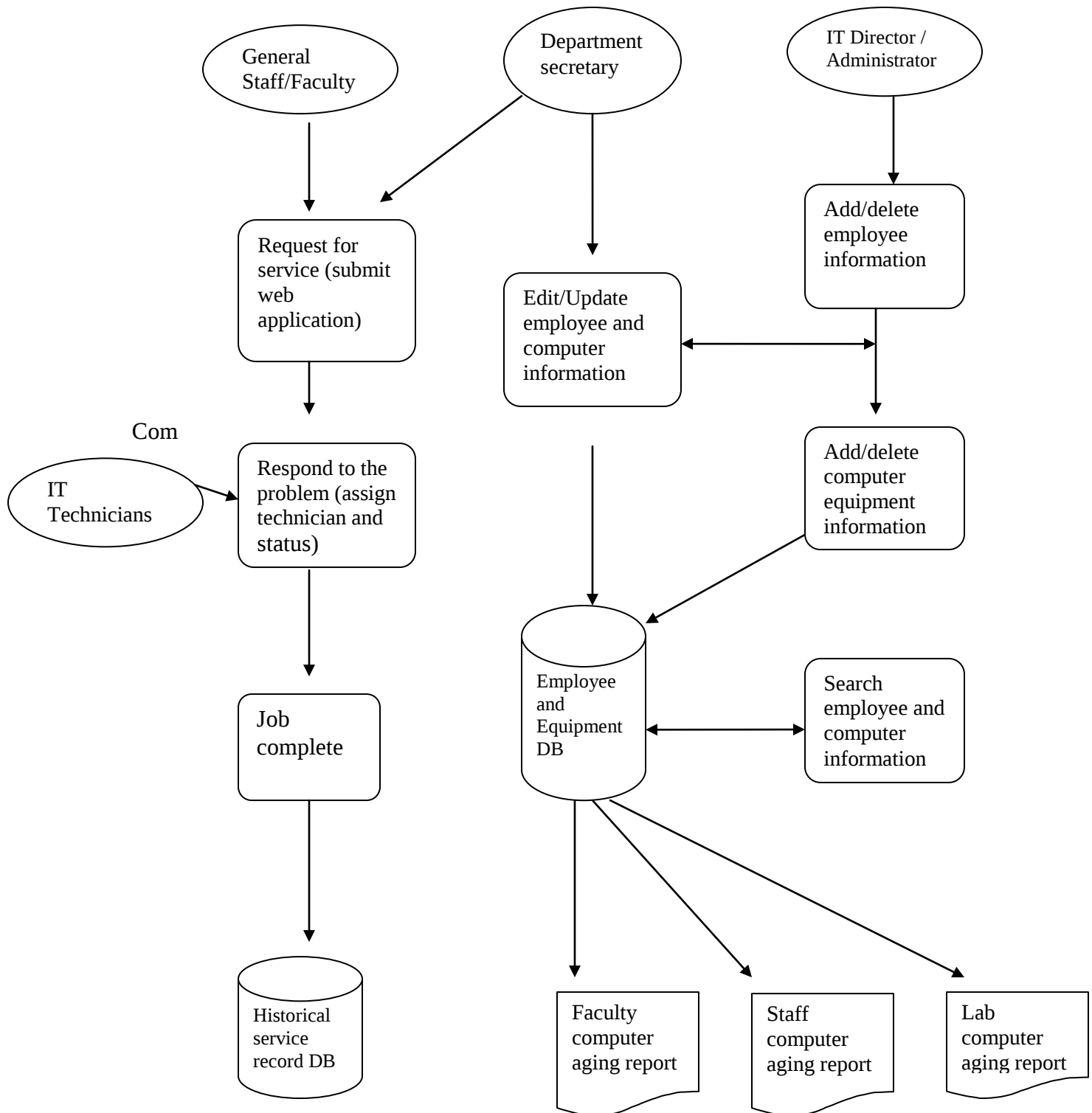


Figure 26: System Flow Diagram

11. User Case Diagram

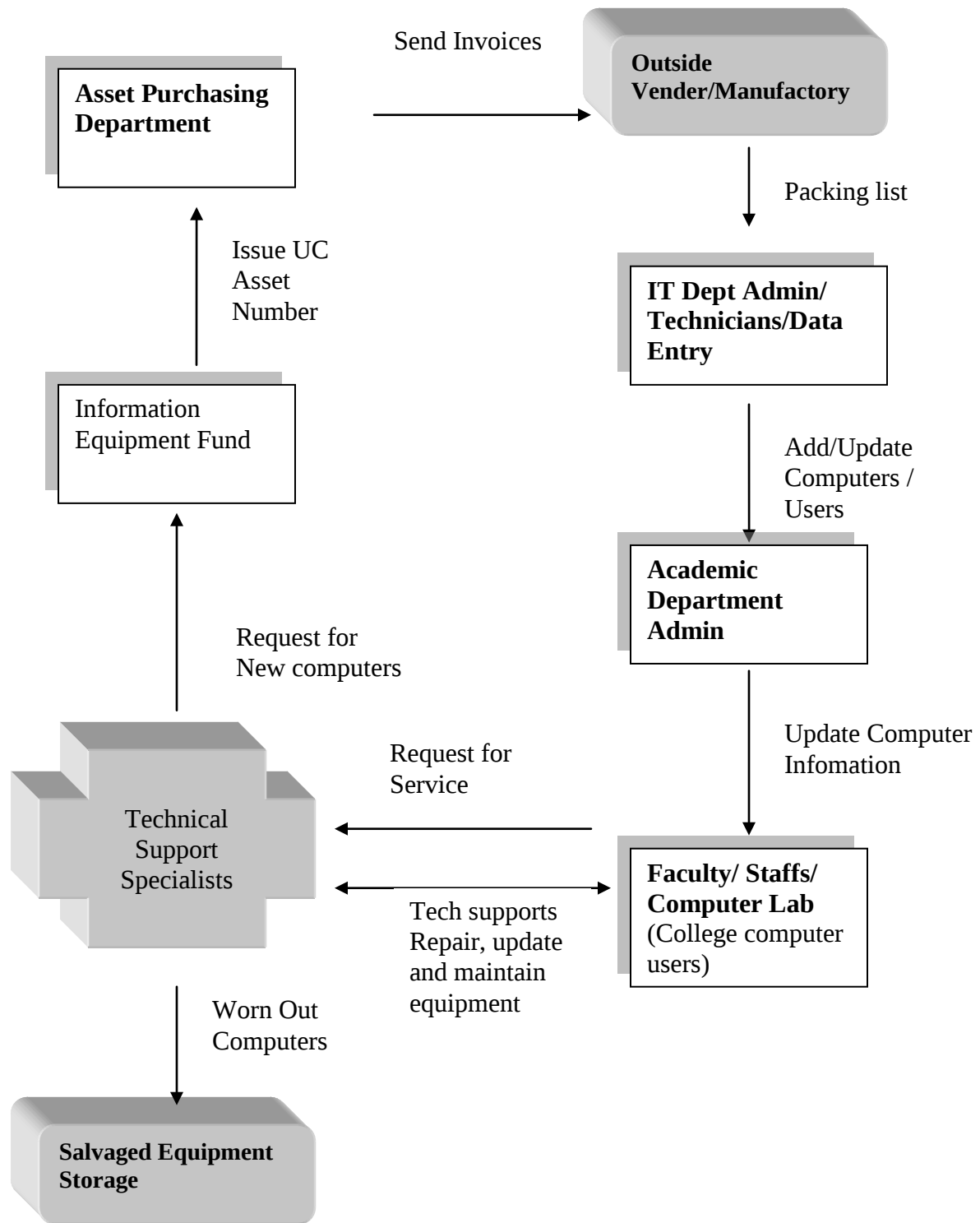


Figure 27: User Case Diagram

12. Statements of Deliverables

Web Application and Database Management:

1. Create a back-end relational database linked with the front-end Web interfaces.
2. Dynamic front-end Web interfaces developed in ColdFusion, HTML and JavaScript.
3. Migrate Access database into SQL Server 2000.
4. A login page for authentication users login with their user name and password, and be able to create their user name and password at the first time login.
5. A menu bar on every pages for easy navigation of the application.
6. Allow College employee to submit on-line service requisition forms.
7. Allow to track on the status of service request on-line, and view IT technician's responses.
8. Authentication for different user login with user name and password, and set up different levels of privilege for different users.
9. Set up session time out for 30 minutes, and which let the session automatically log out if there is no movement involved.
10. Ability for departmental users to:
 - a) Update computer or equipment hardware information.
 - b) Update computer or equipment owner's basic information.
 - c) Add and delete computer information under that department.
 - d) Search equipment or computer under UC tag, brand or owner's last name of the equipment.

- e) View reports generated for individual department and be able to sort by column headings.

11. Ability for administrative users and IT department

- a) Edit service request status, answering requests in detail, and assigning requests to technicians.
- b) View College wide computer equipment reports generated for staffs, faculty and computer lab.
- c) Search user and computer information through out the College.
- d) Add and delete users, and update user information, such as name, office location, email address, phone number, department and job title.
- e) Add and delete computer equipment, and update computer information, such as model, memory, MAC address, purchase date and warranty expiration date.
- f) Switch computers between users, change computer ownership.

12. View individual department computer report lists by selecting from a drop down box, as well as by selecting brands.

13. Create a historical service report, categorized by different problems for IT resources and Q&A.

This project provides interactive, real-time interfaces for computer equipment inventory and administration management. A&S administration group, business

management and IT department director can use CEMS Web applications to retrieve computer and equipment asset profile. It will help College faculty and staffs to gain a better communication with the IT technical support on technologies and trouble-shooting. It will also help the University of Cincinnati gain a better comprehension about the Information Technology down to the College.

13. Testing Plan

Testing is a cornerstone activity of a product development process. Every line of code is tested to verify that a design generates the correct output to validate the project meeting its requirements. All the front-end views are required to provide adequate fitness for use. However, a good test strategy will clearly scope each class of test for it (6). The CEMS planed for an early testing during the program development. It is sufficient for the designer to work out of the detail of processing during unit test level. However, at the implementation phase, black box testing from one or two department secretaries helps to test the applications. By updating of data, adding and deleting data from the department secretary's act through the work flow to make sure on every task are adequate. Form validation on all required fields or special formatted fields is also functioning.

System test perform on the Windows 2000, XP operating system using Internet Explorer 5.0 and 6.0. CEMS is not available for Netscape Internet browser because the JavaScript is not able to function in the Netscape browser. A&S Information System department will be able to help College users to install IE in additional operation system which does not support with Internet Explorer.

The unit testing is an integral part of an efficient and effective strategy for testing systems. It is best performed by the designer of the code under test. The guidance provided by a checklist that identifies the required unit testing activities (2).

- A policy with regards formality, documentation, and coverage has been determined early enough in the project.
- Give an efficient and effective overall strategy when the unit testing relate to other levels of testing.
- The needs of units which are particularly critical, complex, or risky have been considered.
- The document will be reviewable, repeatable, and archivable.

The questions should be considered when evaluating unit testing for adequacy include:

- Have all statements been exercised by at least one test?
- Has each conditional statement been exercised at least once by the tests?
- Have all boundary cases been exercised?
- Was any design assumptions made about the operation of this unit? Have the tests demonstrated these assumptions?
- Have the tests exercised the unit over the full range of operational conditions it is expected to address?

14 Recommendations and Conclusion

14.1 Recommendations

My previous experience on Web designing with ColdFusion program facilitates with this project. Although, sometime to meet with the requirements, it has to work around the CF tags, and develop another method over the ColdFusion basic functions. So far, ColdFusion still the fastest way to build and deploy Web applications (8).

For the form validation, cfform supports some basic JavaScript validation such as required fields show message box if empty, but quite a few special data field still need to hand coded JavaScript validation. For example, Email address data field needs to check with the character “@” and followed by a valid Email account. Auto refresh a page when on-click a selection of a drop down box, or other actions. The JavaScript skill requires extra attention.

There were several areas of concerns from users when this project is on production. First is when multiple faculties share with one computer. To implement this, a table to store equipment ID and employee ID is needed. A number of reports can show the name of the second or third user who share with the same computer.

A help document can be created for entry level user, and direct them to find the information that needed for equipment. For example, some department secretaries don't know how to get MAC address and IP address. Help notes that list of step by step directions can assist with this issue.

14.2 Conclusion

This project is requested by the IT/IS Office of College of Arts and Sciences. To be assistance of administrators and College Dean's office on mainly the functioning reports and edition applications, this project is created for the needs of most accurate data and user-friendly interactive applications. However, to maintain the data corrections CEMS needs all the college users to involve. I've also learned a lot from this project through the communication with different level of users and different culture of each department, and knowing of what they want to see on the Web interfaces. What can really help them on their day to day work, but not add more work load to the users.

Appendix A

Research References

1. Adobe.com. <http://partners.adobe.com/public/developer/acrobat/devcenter.html>
2. CG Software Computer Admin Pro.
<http://www.computeradminpro.com/index.php>
3. Computer Database Management System.
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7. Macromedia.com. <http://www.macromedia.com>
8. Microsoft.com <http://www.Microsoft.com>
9. PC mag. <http://www.pcmag.com/>
10. Property Control Surplus Equipment Management.
<http://www.uc.edu/surplus/default.asp>
11. The McMicken College of Arts and Sciences.
http://www.artsci.uc.edu/collegemain/pros_ug_students/adultLearners.html
12. Web-based software from New-Generation Software <http://www.web-based-software.com/>

Appendix B

Code Snippets

B 1: Login Code Snippets

Login page records the login session variables to identify the login user's information and authorization level. These session variables pass on through out the pages without sending by URL or form variables. The Login is basically a form, and the user name and password entries will send by form variables. These form variables compare with the login table to see if record count returns to 1. If it equals to 1 match, retrieve that authorization ID, Employee information and setup session variables or else show invalid entry.

```
<CFQUERY datasource="#dsn#" name="us">

    select username, password, authID, deptID, Second_DeptID

    from login

    WHERE username = '#form.username#' AND password =
'#form.password#'

</CFQUERY>

<!-- if we have an invalid request -->

<CFIF (#us.RecordCount# IS not 1)>

<center>

<table width="358" border="0" cellpadding="0" cellspacing="0" width="300">

    <tr align="center">
```

```
<td colspan="3" width="468" class="title" bgcolor="#CCFFCC">A&S
Computer Equipment Management Login Page</td>  </tr>

<tr>    <td colspan="2">&nbsp;</td>

    <td width="169">&nbsp;</td>

</tr>

<tr align="center">

    <td colspan="3" class="subtitle">&nbsp;<div>Sorry, Invalid
Password<br><br><br><a href="checkuser.cfm">Try Again?</a> </td>  </tr>

</table>

<!--Validate Login-->

<CFELSE>

<!--Write Login Info to Server Session.Variables-->

<cfoutput>

    <CFSET Session.AO = "Yes">

    <CFSET Session.authID = us.authID>

    <CFSET Session.username = us.username>

    <CFSET Session.DeptID = us.deptID>

    <cfset Session.Second_DeptID = us.Second_DeptID>

    <CFLOCATION url="../index.html" addtoken="No">

</cfoutput>

</CFIF>
```

B 2: Aging Report Code Snippets

Here is the SQL statement that is used for computer aging reports. This report shows the age of computers for faculty or staff.

```
<cfquery datasource="#dsn#" name="eq_list">

select a.EmpID as EmpID, a.LastName as LastName,

a.FirstName as FirstName, a.MiddleName as MiddleName, a.JobTitle as Position,

a.LastName+', ' + isnull(a.FirstName,',') + ' ' + isnull(a.MiddleName,',') as fullname,

a.Status as Status, a.DeptID as DeptIDEmp, a.BuildingID as BuildingIDEmp,

a.Room as RoomEmp, b.Node as NodeName, b.ID as eqID, d.Name as DeptName,

b.IPNum as IPNum, b.Mfgr as Mfgr, b.Model as Model, b.DevType as DevType,

b.BuildingID as BuildingIDEquip, b.Room as RoomEquip, c.Name as BuildingName,

b.DatePurchase as DatePurchase

from Employee a left join Equipment b on

(a.EmpID=b.EmpID and a.BuildingID = b.BuildingID and a.Room = b.Room)

left join building c on b.BuildingID=c.BuildingID, Department d

where

<cfif url.status eq 'faculty'>a.Status in ('Faculty', 'Adjunct-rep.', 'Dept. Head')

<cfelse>a.Status in ('Staff', 'Assist. dean', 'Assoc. dean', 'Dean')</cfif>

and a.DeptID = d.DeptID

and (b.DevType in ('PC', 'Laptop', 'Workstation') or b.DevType is NULL)

<cfif Session.DeptID neq 22>

and a.DeptID in (#Session.DeptID# <cfif

isdefined("Session.Second_DeptID") and (Session.Second_DeptID neq ")>
```

```
,#Session.Second_deptID#          </cfif> )</cfif>
```

order by

```
<cfif url.sot eq 'dept'>d.Name, a.LastName, b.DatePurchase</cfif>
```

```
</cfquery>
```