



## Acme Corporate Directory

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## Table of Contents

<b>Project summary and business rules</b>	<b>4</b>
<b>System Architecture</b>	<b>6</b>
<b>Technologies Used</b>	<b>6</b>
Programming Language	6
Application Framework (front end)	7
Database	7
Web Server	7
Web Server Software	7
<b>Installation Instructions</b>	<b>7</b>
<b>E.R Diagram Documentation</b>	<b>10</b>
<b>Entity Relationship Diagram</b>	<b>12</b>
<b>U.M.L Use Case Diagram</b>	<b>13</b>
<b>User guide</b>	<b>15</b>
Login page	15
Profile page	16
Search page	18
Search and View Profile Page	20
Manager approval page	21
Human resources/database SuperSearch page	22
Audit log	23
Add user page	24
Administrator Profile edit profile page	25
Change Password Page	26
Error page	27
<b>Test plan</b>	<b>28</b>
Logging in	28
Wrong credentials	28
Not an email	28
Wrong password	28
No password/email	28
Correct credentials	28
Logging out	29
Side attack	29
Back button	29

Edit profile	29
Password expiration	30
Audit log	30
Search page	30

## **Project summary and business rules**

Acme International Corporation is in need of a corporate directory application that is easy to use and easy to learn for all Acme employees. The system must be built to satisfy the following needs which we have met:

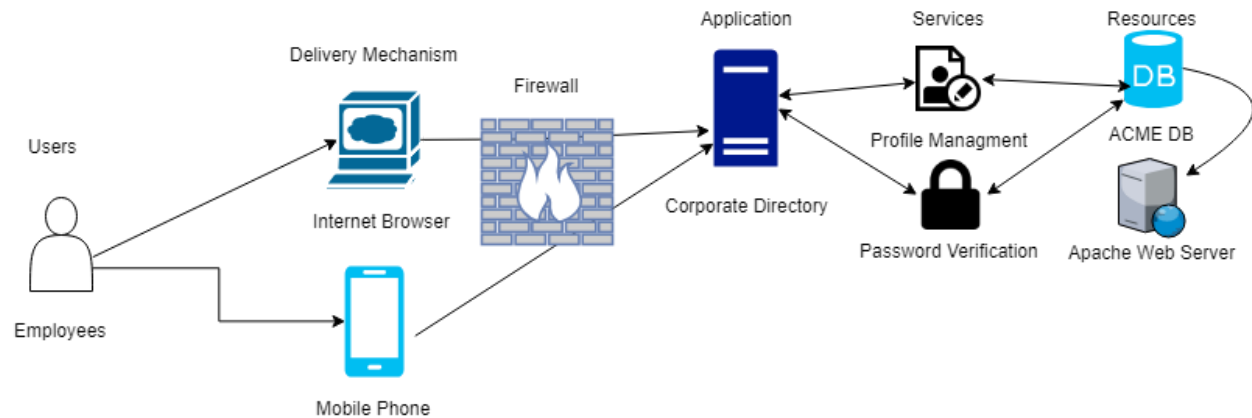
1. The application should hold all relevant information about the employee. This includes: name, title, department, mobile number, email, and city.
2. Employees should be able to search for any employee within the application.
3. Employees should be able to edit their own profile.
4. The application should have a Single Sign On system to access to all company applications.
5. The directory should be able to be searched by employee name, city, organization, or other defining attribute.
6. Managers should be able to update information for their employees, including the applications to which the employee has access.
7. We as the consultants and developers must ensure that personal information is protected from unauthorized access and that passwords are stored with one-way encryption algorithms.
8. The directory must be able to operate at a decent speed when at least 50,000 users on the system simultaneously.
9. Personal information of all users stored in the database as well as passwords must be encrypted using a one-way encryption algorithm.

10. Passwords should be set to expire every 90 days and should have minimum password requirements to enforce strong password choices.
11. The application should keep an audit log that will track when an employee logs in, logs out, accesses an application, or requests permission to access an application.
12. Employees should be able to be added and removed at any time by any employee who is in human resources.
13. Based on their role in the company, an employee should get access to specific systems.
14. At any point an employee should be able to request access to any application.
15. The application should be viewable on a mobile platform as well as a PC.

**Future Objectives or goals**

16. Expand the API to other parts of the web application.
17. A backup of the database should be setup on a second server to ensure that uptime of the application is above 90% in the event of a catastrophic event.

## System Architecture



## Technologies Used

### 1. Programming Language

- a. PHP - Server side scripting language designed for web development.
- b. HTML/CSS - Hypertext Markup Language to give text files font, colors, graphics, hyperlinks etc., used widely within the world wide web.
  - i. CSS - Cascading Style Sheet, used to format the layout of a web page.
- c. Javascript - Scripting language used to make web pages more interactive and dynamic.
- d. AJAX - Client side script that allows communication from a database without the need to refresh the entire web page.
- e. jQuery - Javascript library that simplifies web development (ajax interactions, event handling etc.)

- f. JSON - Javascript Object Notation, uses readable text to transmit data
  - g. Curl - Reflective Object Oriented language, used in interactive web applications for a better transition between formatting a web page and programming it.
2. Application Framework (front end)
- a. Bootstrap - Open source tool for developing with HTML, CSS, and javascript, provides HTML and CSS designed templates with buttons, navigation, and other components.
3. Database
- a. mySQL- Open source relational database management system made by Oracle.
4. Web Server
- a. WAMP Server - Windows, Apache, mySQL, and PHP/phpmyadmin stack within a Windows Server operating system.
5. Web Server Software
- a. Apache HTTP Server - Open source web server that is used to host a website on a network.

## **Installation Instructions**

*Assumptions:* We are assuming that the user has been given a server and has set up a virtual machine.

Step by step instructions on how to recreate the actual server.

1. Go to the webpage, <http://www.wampserver.com/en/>
2. Before downloading and installing WAMP, Visual C++ Redistributable for Visual Studio 2012 Update 4 must be installed onto the system. If this is not installed, all required visual dll files will not be installed into the system, and error messages will prevent WAMP from being installed because of the missing dll files.
3. Once in the setup, accept the agreement for the usage of WAMP
4. Choose the folder where WAMP will be installed on your system
5. Choose the start menu folder where the shortcuts for WAMP will be placed
6. Install WAMP
7. Select the default web browser that will be used by WAMP
8. Select the default text editor that will be used by WAMP
9. There is no initial setup of the mySQL database, apache web server phpmyadmin, or php as WAMP will do all setup for the user
10. Once installed, start the WAMP server.
  - a. If any errors happen after the installation, they will show up in the WAMP management app in your taskbar (this app will be sometimes be located under the up arrow within the task bar as well)
11. Make sure that port 80 is not blocked by any firewalls
  - a. Port 80 is the port used by the Apache Web Server
12. Make sure that port 3306 is not blocked by any firewalls



- a. Port 3306 is the port used by the mySQL database
13. Create an Apache Virtual Host that will host all of the necessary files needed to run the ACME corporate directory
- a. Select the name of the virtual host
  - b. Complete the absolute path of the virtual host
  - c. (Optional)- Choose a “listen” port other than the default
14. Once the virtual host is created, the httpd-vhosts will need to be edited to allow the ACME directory on your local network depending on the IP addressing scheme
15. Within the wamp64/www/(virtual host name) folder, is where all necessary php/html/css files will go to be hosted within the virtual host on the apache web server

## E.R Diagram Documentation

This section will go over the basic function of the Entity Relationship (ER) diagram for our database. The users table contains the most columns and holds basic information about every employee that works for ACME. The primary key for this table is the UserID. The foreign keys are LocationID from the Locations table, DepartmentID from the Departments table, RoleID from the Roles table, UserHash from the Passwords table, and TeamID from the Teams table. The Roles, Teams, and Departments table have similar column names. Each one has their own respective unique ID and the name of the role or department.

We have 10 different departments within the corporation and have room for expansion if necessary. The Roles table consists of three primary types: employee, manager, and admin. Each role has different assigned user permissions. The Permissions table will have a PermissionID and the name of the position. Finally, we have a weak entity table to relate Users and Permissions called the hasPermissions table.

The hasPermissions table has UserID, ApplicationID, and PermissionID as each are primary and foreign keys which makes them composite keys. Since users can have multiple permissions, this table will allow for us to take that into account and ensure that the database retains referential integrity.

Since our database needs to take into account the resetting of passwords, we have a Passwords table and relate that to the Users table. The Primary key of the

Passwords table is PasswordID, and this table has other columns such as UserHash which relates to the Users table, Password, DataChanged, and ExpireTime.

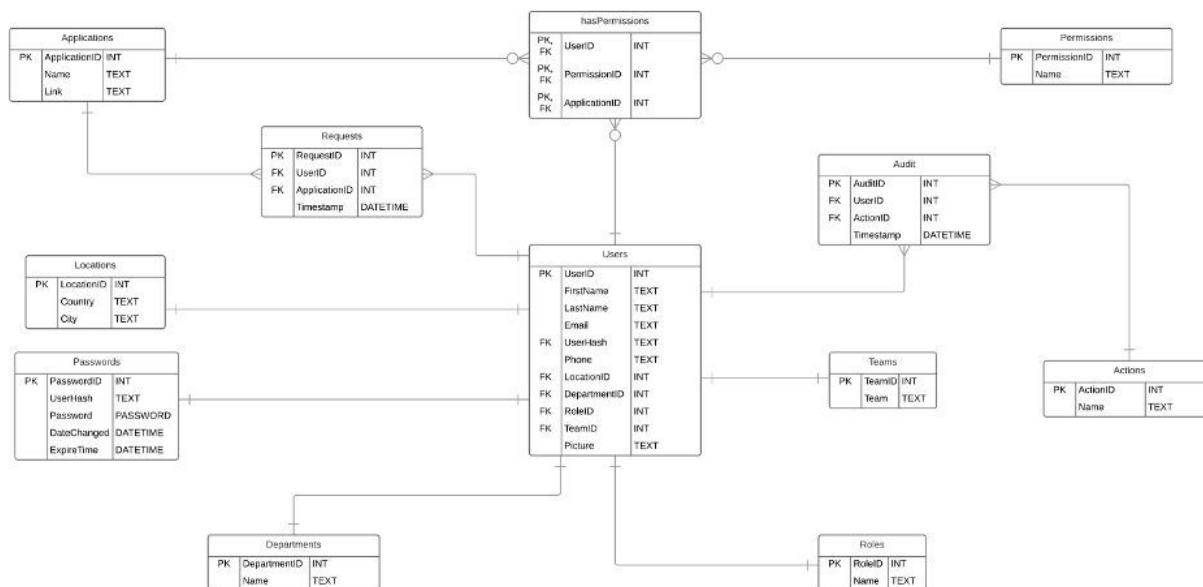
To keep track of what applications are in the database, we have an Applications table that has an ApplicationID, Name, and Link. There is also a relation between the Applications table and hasPermissions table since some users will have access to specific programs depending on their role in the company.

Going back to the Roles table, each role reports to a different role in the company. For example, an employee would report to a manager.

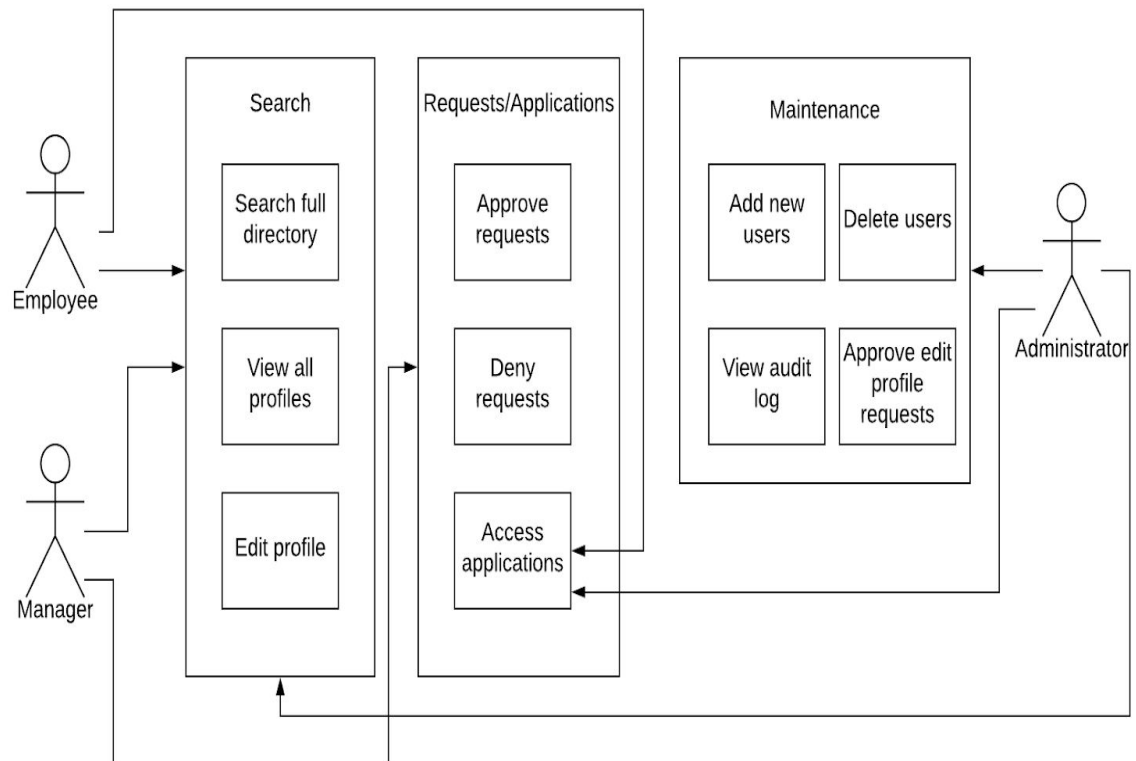
The Locations table's primary key is LocationID which relates to the Users table. This table also keeps track of the Country and City.

Lastly, we have the Audit table which logs any and all changes and actions that occur in the directory. Whether this be users making requests to access certain privileges or signing in or out, we need to keep a record of that information. The Audit table links to the Actions table by means of an ActionID which keeps track of what action was performed by the user. The actions table also has another column Name, that keeps track of what user performed the action.

## Entity Relationship Diagram



## U.M.L Use Case Diagram



**Employee** - Has lowest level privileges and only has basic functions of the application, this includes searching the directory, editing their profile, and viewing other employee profiles. Can request additional privileges.

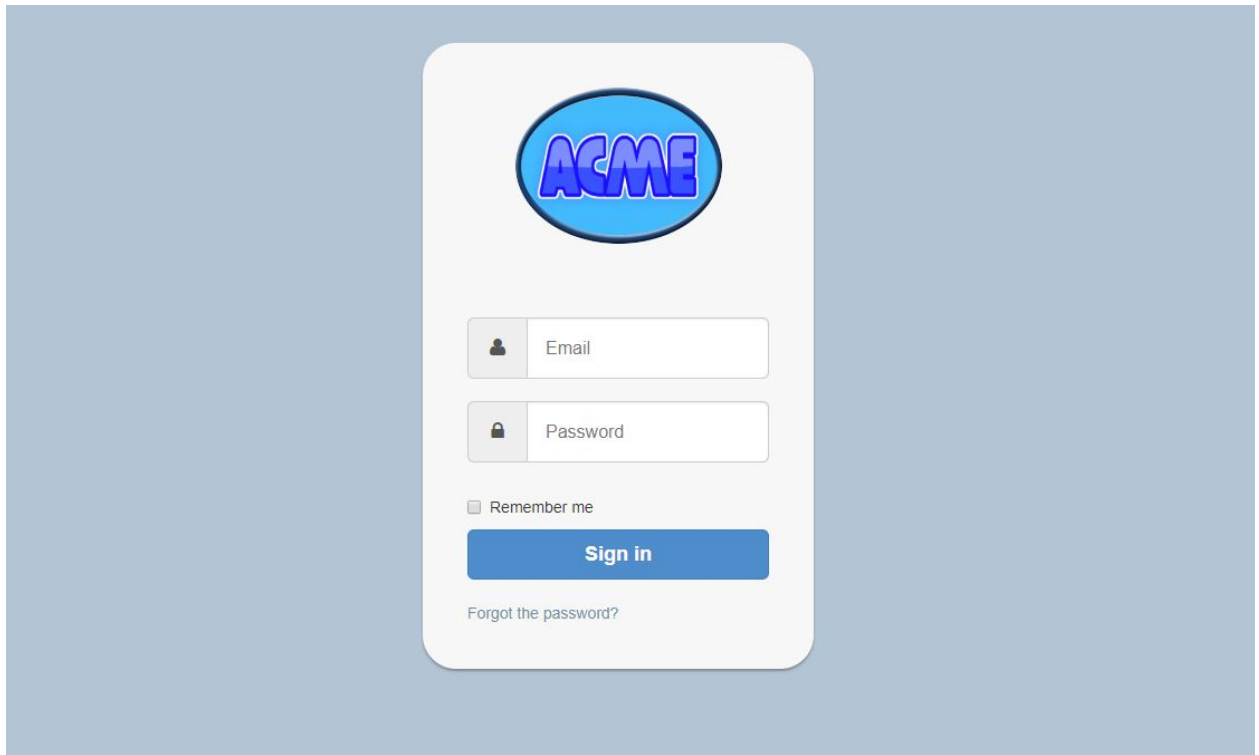
**Manager** - Has all privileges that an employee has. Also is able to approve or deny requests when employees they oversee wish to gain access to an application they do not have access to.

**Administrator** - Members of the human resources department who have all functions that employees possess. They are also able to view the audit log to track employee

activity, add or remove users to the directory, and approve edit profile requests from employees.

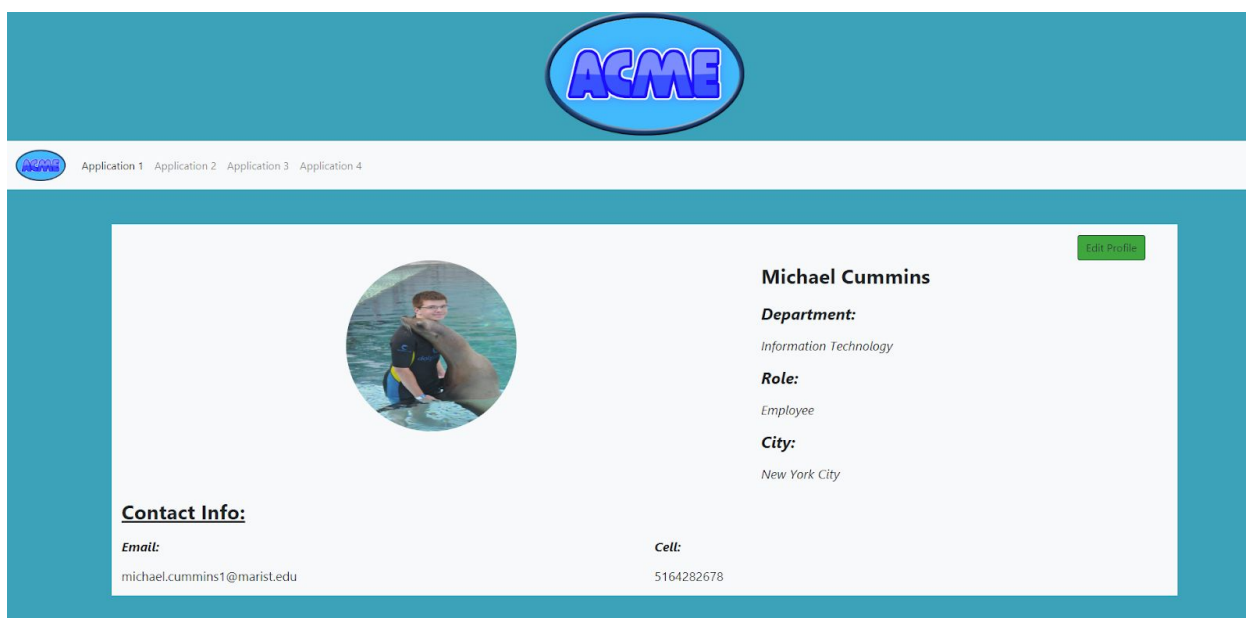
## User guide

### Login page



The first page that users will encounter is the login page. Here users can either log in to their account or go to the reset password page if they forget their password. If the user enters the incorrect credentials, they will be brought to an error page that informs them that either their email or password is wrong. Upon entering the correct email and password, they will then be brought to the home screen, also known as their profile page. If a user chooses to reset their password they will then be brought to the “change password” page. If a user enters a username that is not an email address, they will be instructed to enter a valid email.

## Profile page



Upon successfully logging in users will first see their profile page which includes their name, department, role, email, phone number, and country. This page will also display a profile picture and a brief bio about the employee. From this page users are able to access all connected applications which includes the search feature, Acme's phone system, instant messaging, and the corporate email system. Along with the applications, users can also choose to edit their profile by selecting the "edit" button in the upper-right corner. After clicking it users will be able to change most of the information displayed on their profile, with the exception of their name and country. Users can then click the "save" button to save the information and have it processed by a human resources employee to be approved.

In the upper-left corner the navigation bar allows users to access applications or request access to them. If an employee does not have access to an application, they



may request it from here by clicking on the greyed out application. Their request will then be processed by their manager who will decide whether or not they need access to the application to do their job. Once an employee has gained access the application will then no longer be greyed out.

## Search page

## ACME Database Search

<div> <div>Search</div> <div>Search by Customer Details</div> </div>					
First Name	Last Name	Department	Role	City	View Profile
Cameron	Carter	Accounting	Employee	Los Angeles	<a href="#">View</a>
Tamara	Hawkings	Accounting	Employee	Los Angeles	<a href="#">View</a>
Sammy	Pomegrane	Accounting	Employee	Los Angeles	<a href="#">View</a>
Marley	Sancho	Accounting	Manager	London	<a href="#">View</a>
Tim	Smith	Accounting	Manager	London	<a href="#">View</a>
Gregory	Uwahwah	Accounting	Employee	Paris	<a href="#">View</a>
Emma	Watson	Accounting	Employee	London	<a href="#">View</a>
Vitaly	Douglass	Economics	Manager	Paris	<a href="#">View</a>
Jeniffer	Gale	Economics	Employee	Paris	<a href="#">View</a>
Kelly	Galliard	Economics	Employee	Paris	<a href="#">View</a>
Martha	Lawrence	Economics	Manager	Chicago	<a href="#">View</a>
Sike	Mirico	Economics	Employee	New York City	<a href="#">View</a>
May	Rattingly	Economics	Employee	Paris	<a href="#">View</a>
Carl	Wheezer	Economics	Employee	Chicago	<a href="#">View</a>

The search feature of our web application uses predictive search which predicts what you are going to look at as you type into the search bar. As you type the program will filter out searches that do not match and give the user a more precise search. Users are able to look for other employees by name, department, role, country. Searching by department, role, or country will yield results that show users from those specified fields. From this page users can click the “view” button to view other employee profiles.

This page works with multiple parameters as well to give users the opportunity to have more specific searches. For instance, typing in “Smith” and “Accounting” will show all employees who are named Smith in the accounting department.

If you are an administrator, at the top of the search bar there is a button that allows you to add a new employee to the database. Next to it, next to each user is a “DELETE USER” button that when clicked prompts the user if they are certain if they want to permanently delete all of the users data.

## Search and View Profile Page

The screenshot displays a web application interface. At the top, a navigation bar contains links: Acme Search, SuperSearch Plus, Profile Editor Plus, Employee Creator, Request Page, Advanced Logger, Logout, and Change Password. A modal window titled 'Google Evan' is open, showing a profile picture of a man in a suit. To the right of the picture, the following information is listed:

- Department:** Finance
- Role:** Employee
- City:** New York City

Below the profile picture, the **Contact Info:** section is visible, showing:

- Email:** google.evan@acme.com
- Cell:** 5659970122

At the bottom of the modal, a table lists other employees:

Google	Evan	Finance	Employee	New York City	<a href="#">View</a>
Frankie	Fox	Marketing	Employee	New York City	<a href="#">View</a>

This page is displayed when users attempt to view another employee's profile.

Users may click off the screen to get back to the search page.

## Manager approval page

ACME Request Log					
#	User	Application	Timestamp	Accept Request	Deny Request
1	Billy Bob	Employee Creator	2018-12-05 10:09:58	Accept	Deny
2	Adam Trainor	Advanced Logger	2018-12-05 10:00:00	Accept	Deny
3	Billy Bob	Request Page	2018-12-05 09:50:34	Accept	Deny
4	Billy Bob	Employee Creator	2018-12-05 09:50:32	Accept	Deny
5	Billy Bob	Profile Editor Plus	2018-12-05 09:50:30	Accept	Deny
6	Billy Bob	SuperSearch Plus	2018-12-05 09:50:15	Accept	Deny
7	Tyler Dixon	SuperSearch Plus	2018-12-03 19:43:59	Accept	Deny
8	Tyler Dixon	SuperSearch Plus	2018-12-03 19:43:36	Accept	Deny
9	Tyler Dixon	SuperSearch Plus	2018-12-03 19:42:57	Accept	Deny
10	David Cyganowski	Request Page	2018-12-03 19:40:43	Accept	Deny
11	David Cyganowski	Advanced Logger	2018-12-03 19:38:50	Accept	Deny
12	David Cyganowski	Advanced Logger	2018-12-03 19:38:48	Accept	Deny
13	David Cyganowski	Request Page	2018-12-03 19:38:26	Accept	Deny

The “Manager Approval” page is where managers will be notified if an employee has requested permission to access an application. If an employee has requested access their name, application being requested, and a timestamp will appear alongside “Accept” and “Deny” buttons. Upon clicking the “Deny” button the manager is prompted asking “Are you sure you want to deny this permission” clicking yes in the popup will delete the request, clicking no will return the manager to the page. If the employee clicks the “Accept” button, then they will not be prompted and instead the request is accepted and the employee is given access to the application.

Human resources/database SuperSearch page

## ACME Database SuperSearch

Search by Customer Details

#	First Name	Last Name	Department	Role	City	View Profile	Delete User
1	Trevor	Pirone	Information Technology	Employee	New York City	<a href="#">View</a>	<button>Delete</button>
2	Tyler	Dixon	Information Technology	Employee	New York City	<a href="#">View</a>	<button>Delete</button>
3	Michael	Cummins	Information Technology	Employee	New York City	<a href="#">View</a>	<button>Delete</button>
4	David	Cyganowski	Information Technology	Employee	New York City	<a href="#">View</a>	<button>Delete</button>
5	Timothy	Zwart	Information Technology	Employee	New York City	<a href="#">View</a>	<button>Delete</button>
6	Sike	Mirico	Economics	Employee	New York City	<a href="#">View</a>	<button>Delete</button>

The “Human Resources” page is where employees who are involved in the human resources department may perform administrative duties. These include the ability to add or remove an employee to the directory. Administrators need only to click the “Delete” button to remove a user. They will then be prompted asking if they are sure they want to perform this action, after clicking “Yes” the employee is then removed from the directory. The deleted employee’s data is then removed from the database.

## Audit log

### ACME Audit Log

#	User	Action	Timestamp
1	Betty White	logged in	2018-12-04 17:34:35
2	Trevor Pirone	logged in	2018-12-04 17:18:39
3	Martha Lawrence	logged in	2018-12-04 16:50:07
4	Martha Lawrence	logged out	2018-12-04 16:48:39
5	Martha Lawrence	logged in	2018-12-04 15:59:45
6	Betty White	logged out	2018-12-04 15:54:54
7	Betty White	edited profile	2018-12-04 15:54:19
8	Betty White	logged in	2018-12-04 15:52:45
9	Betty White	logged out	2018-12-04 15:52:39

The Audit log page is where human resources employees are able to view employee activity. The logged actions are listed by the most recent action. The page is set up as a table that reads the user who performed the action, the action performed, and at what time the action happened. Employees and managers do not have access to this page. Administrators may enter and leave this page by using the navigation bar.

## Add user page

## Create User

First Name

First name

Last Name

Last name

Email

Email

Password (default is acme)

....

Phone

111-111-1111

Department

Choose... ▾

Role

Choose... ▾

The add user page is an administrator only part of the website that allows human resources employees to add new employees to the directory. Administrators can enter the employee's name, department, email address, phone number, department, role, and city. Lastly, at the bottom administrators can choose to either upload a photo of the employee or use a default avatar for them. After clicking "save" the new employee's data is then added to the database.



Administrator Profile edit profile page


## ACME Profile Finder and Editor

Search by Customer Details

#	First Name	Last Name	Department	Role	City	Edit
1	Irene	Mackinson	Finance	Employee	Tokyo	<a href="#">Edit User</a>
2	Josh	Nichols	Human Resources	Admin	Chicago	<a href="#">Edit User</a>
3	Drake	Parker	Information Technology	Admin	Chicago	<a href="#">Edit User</a>
4	Timothy	Zwart	Information Technology	Employee	New York City	<a href="#">Edit User</a>
5	James	Taylor	Marketing	Manager	Los Angeles	<a href="#">Edit User</a>

This page allows administrators and managers to search the directory while also having the option to edit employee profiles. This page uses the same search feature as the regular search page. When users click the “Edit User” button, they will be brought to the employee’s profile page and given edit permissions.


## Change Password Page




**Change Password!**

Follow these steps!

1. Password must be at least 8 characters in length.
2. Password must contain 1 uppercase letter.
3. Password must contain 1 lowercase letter.
4. Password must contain 1 number.

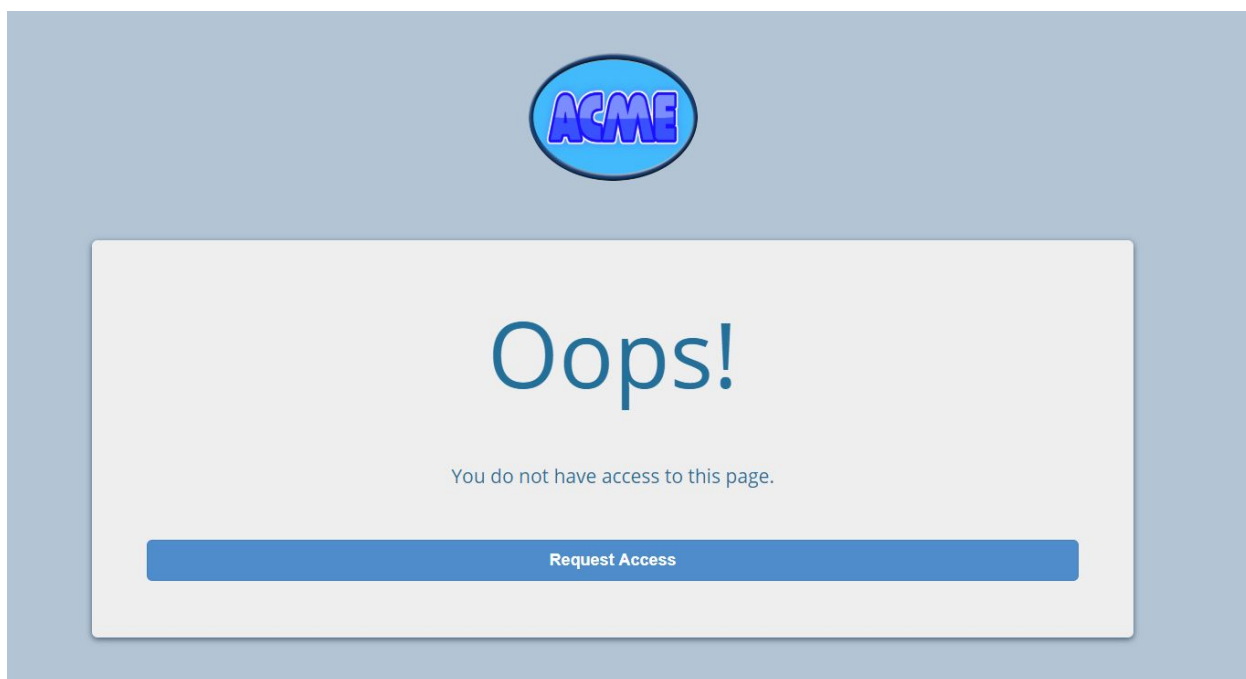
 Password

 Password

**Change Password**

The change password page is granted to all employees so that they may change their password at any point. After all of the criteria listed are met, the user may click the “Change Password” button and their password is changed in the database.

## Error page



This error page is only seen when an employee attempts to access an application that they do not have access to. If an employee presses the “Request Access” button, a request is sent to an administrator for approval. Employees must sign out and sign back in in order to access the new application. After clicking the button, users will be brought back to their profile page. Users may get off of this page by using the back button in the upper-left hand corner.

## Test plan

Our test plan is thought out so that it relates back to the business requirements at the beginning of this document. Each number after the problem tested corresponds to a related business practice.

### Logging in

#### Wrong credentials

##### *Not an email*

When a user attempts to login with a non-valid email address or an address that is not in the database, they will be prompted to enter a valid email or prompted. [3, 4]

##### *Wrong password*

If a user attempts to login with the wrong password, they will be get a popup saying "You have entered an incorrect password." [3, 4]

##### *No password/email*

If a user does not enter either a password or an email, they will be prompted to enter either one or both of the required credentials. [3, 4]

#### Correct credentials

When a user enters the current email address and password, they will be logged in and may use the web application. [3, 4]

## Logging out

Logging out is currently handled via the navigation bar. The last option on the bar “Logout” will log the user out and end their session, returning them to the login page. Users cannot log out simply by closing the browser. As their information is remembered and their session is continued from the point they closed the browser. [4, 7]

## Side attack

Currently if a user attempts to circumnavigate the login page by entering the url `http://10.10.9.100/testhost/search.php`, they will be navigated to the login page and the phrase “You%20must%20sign%20in%20first.” will display as an extension in the url. [7, 9]

## Back button

Currently, users can not use the back button to get back to the login page. The only way to get back to the login page from the application is to logout completely. If a user tries to use the back button to get back to the profile page or search pages, they can do so. [7, 9]

## Edit profile

The edit profile page is where employees may update some of their personal information. This includes their phone number, and their profile picture. Employees must enter an area code and seven numbers or the application will alert the user that they have entered an invalid phone number. [3, 6, 11]

### Password expiration

Passwords are set to expire after 90 days. Users will be given a notification upon logging in if their password is near the expiration date. They have until the password expires to change it or they will have to go through an administrator to change it instead. [10]

### Audit log

The audit log is an application that is only accessible by employees with administrative privileges. The log can be accessed on the navigation bar. There are no issues pertaining to the audit log page. [11]

### Search page

Users are able to search the directory using multiple parameters to ensure more specific searches. Users may search by employee first name, last name, role, department, region, or a combination of a number of those. Users may use the navigation bar at the top of the page to get back to their own profile or can click “View” to view other employee profiles. Upon reaching the end of the scroll bar, employees will see a message saying “No more results found” and can use the “Back to top” button to return to the search bar at the top of the page. [1, 2, 8]