Minerva

by

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Abstract

22 percent of turnover happens in the first 45 days from the start of employment. Onboarding is critical for the longevity of a new hire's career at any company. Minerva was a web application which held all the resources that new hires received during their training period. The application dedicated drive space to each employee and held their resources. It was a new employee's one stop service for onboarding resources. It used ASP.NET, SQL server, and Bootstrap to hold the entirety of a user's resources. The user could access files saved to their drive, complete learning courses, and surf the company wiki. Minerva created network drives for each employee on hire and assigned them all the materials they needed for their specific training. This allowed trainers and trainees to have their resources available and to be prepared before the first day of training.

1 Problem Statement

1.1 Introduction

Starting a new position or new job all together is extremely strenuous, beginning a new position requires focus and commitment. On the very first day every motivated employee will want to be ready to learn as much as possible. Information overload and disorganization can put a heavy toll on the new employee. Minerva encourages employees to stay organized and informed by keeping all their information in a contained file space designated to their specific login. Minerva will allow a new employee to be acclimated to a new environment before their first day.

1.2 Problem Statement

"According to statistics compiled by Click Boarding, an onboarding software company in Eden Prairie, Minn., the value of a structured onboarding process or program is that 69 percent of employees are more likely to stay with a company for three years if they experienced great onboarding." (Hirsch, 2017). One of the largest problems facing a new employee or intern is getting acclimated to the new work environment. After finishing the stressful procedure of getting hired onto a new job. New hires then must deal with the strenuous task of trying to fit in at your new job. The research we have completed shows that without a structured onboarding program the employees were over 50% more likely to stay with a company for more than three years. We will develop a centralized onboarding application that will lead to a decrease in new hire turnover within the first three years.

1.3 Solution

Our solution is to create a web-based application that will be able to not only store any resources the new hires may need, but also give them access to resources that will allow them to get acclimated in a timely manner. We plan on assigning everyone their own personal drive or folder management system on a locally held server. We want to allow users to access this material from home before they arrive for orientation. To do this we will use in-browser cookies that match to their specific database entries and limit their access using active directory to check and verify their access privileges.

1.4 Project Description

Minerva is a web-app that was intended to use pulse VPN to get a direct connection to the server hosting the drives for the employees. Each account has a single drive path associated with the user or new hire. This drive path is not editable, and the new hire is only able to access their specific directory or folder system on our or the company's network. The initial login page activates the cookies and directs the new hire to their file path within our network. Minerva only allows the user access to this file path or drive and restrain their ability to access any other part of the network outside of their drive where they can store their folders and files. Minerva will have all the resources that the employee needs uploaded before their first day of orientation. A motivated new hire will be able to look over the resources that would have been handed out to them on the first day and get a better understanding of the material they will be presented over their training. Minerva is designed to help prepare new users with the materials they need on hire and upload notes that they will take in their training sessions. Giving a user a personal drive on hire allows them to have a dedicated spot on the company network to store any documentation

that they need. We can also prepare the trainers with the materials they will need for a new training course and place it in the trainers dedicated drive.

1.5 Project Goals

The main objective for Minerva is to streamline and create a simple and positive onboarding experience that will increase employee retention. Using a simple user interface, Minerva will allow for new employees to have access to all the information they need about their new company and position before even setting foot on company property.

1.6 User Profiles

Table 1: User Profile, depicts the user types within the application. There will be two user types that users will fall under. There is the **New Hire** and **Admin.** The **New Hire** will have the ability to login and be able to upload and view documents. The **New Hire** user will be able to view the learning that is assigned to the **New Hire** as well as view the wiki data or knowledgebase. The **Admin** user will be able to function as the administrator. The **Admin** will be able to manage accounts listed with their company, login, view the processes and status of the **New Hire's** application process, and can view account and contact information. The **Admin** accounts will also have full access to editing the **New Hire's** learning objectives and editing the wiki or knowledge articles provided by the company.

User Profile Form
Application: Web portal to allow creation, reading, and uploading/downloading files for onboarding employees
Potential Users: ● People that are being onboarded to a new company ● Current employees that need to complete trainings ● People from technical and non-technical backgrounds **Potential Admins:** ● Human Resources specialists ● Privileged individuals assigning training to new/current employees ● Personnel in charge of creating and deleting users

Experience with Similar Applications: Minerva will be a simple to use platform. Any person with experience with social media platforms will be able to easily navigate the application.
Task Experience: Businesses professionals will be able upload, download, and view videos on the service. Experience with social media platforms
Frequency of Use: Minerva will be used by all professionals of any specialty for their onboarding and educational needs. Minerva will be able to be accessed through the internet.
Key Interface Design Requirement that Profile Suggests: Simple user interface to promote positive experience. Users can easily upload and download data

Table 1: User Profile

1.7 Use Case Diagram

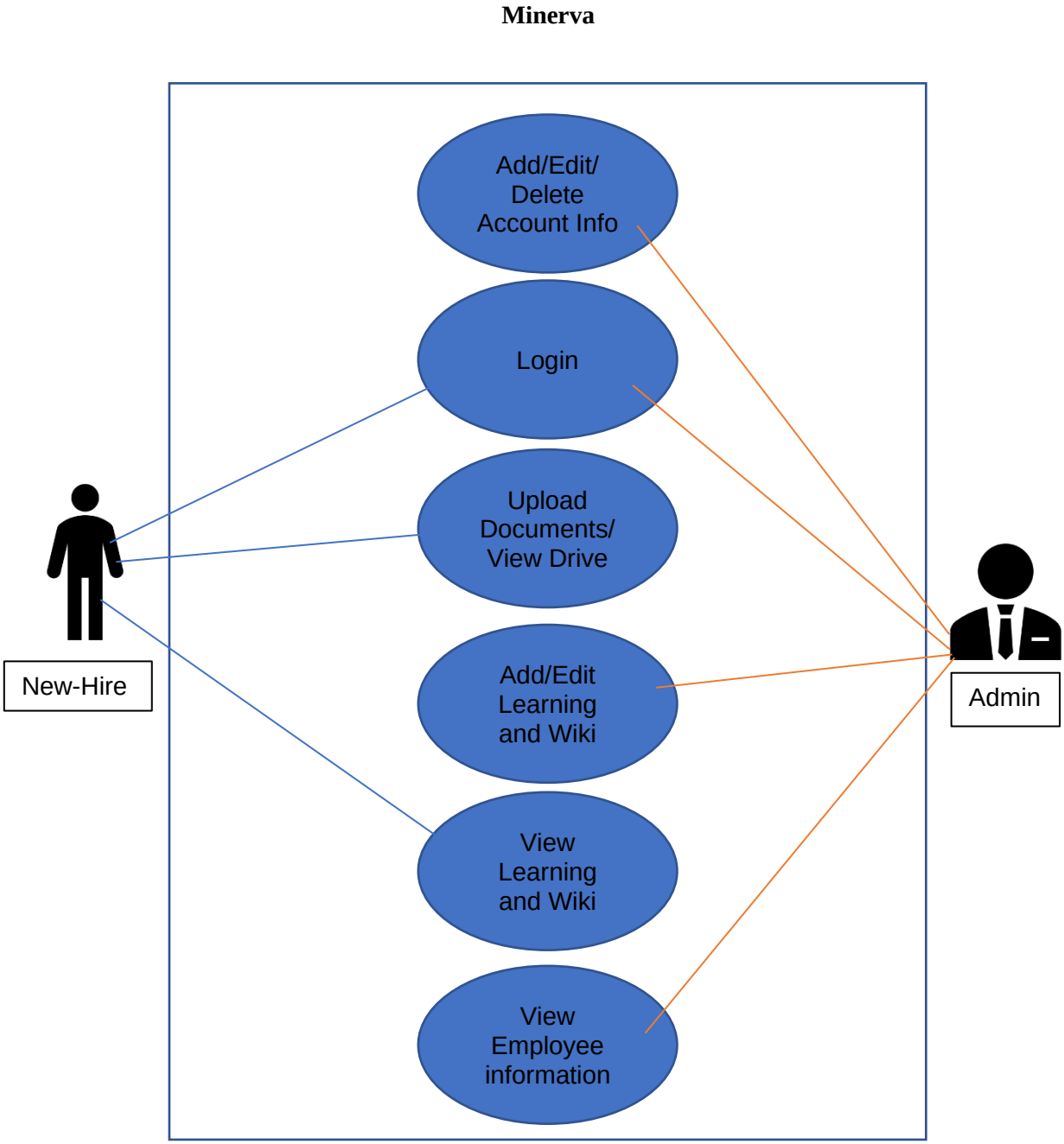

Figure 1: Use Case Diagram

Figure 1: Use Case Diagram, shows who will be using which features from our site. The Non-Admin users will not be able to add/edit any material that is not under their drive.

2.0 Project Management

2.1 Budget

Our project was run through open source software, existing hardware, evaluation licenses, and demo products. This allowed the team to save thousands on needed materials through creation of the project. The bulk of the expenses would be the man hours to build the project through technical expertise and the hardware used to host the product. Currently, Microsoft Server 2019 licenses range from $972 (Standard License) to $6,155 (Datacenter License). We had two MS Server 2019 Datacenter licenses in our environment that would total to $12,310 for server licenses alone. The labor costs in **Figure 2: Budget,** were calculated by giving each of us a $20/hr. wage. This came out to be by multiplying the wage by 15 hours for each week that we were developing the project over the course of the year. $20/hr. multiplied by 15 hours a week, for 32 weeks comes out to be approximately $9,600 per team member or $19,200 for the team.

Item	Expected Cost	Actual Cost
Hardware	$12,310	N/A
Coding Software	$0	N/A
Labor (total for team)	$19,200	$0

Figure 2: Budget

2.2 Objectives/Deliverables

At Risk	Task Name
	Research and Planning
	Form Project Team
	Build Team Contract
	Initial Submission
	Abstract
	Re-Submission
	Prepare for Presentation
	Build User Profile
	Create User Diagram
	Create Draft Report
	Present Project Design
	Structure and Design
	Draft network diagram
	Create Network Infra
	Find specific server version
	Create and test server ISO in virtual environment
	Create Domain Controller
	Create Active Directory
	Create web server
	Implement firewalls
	Testing on LAN
	Test usability
	UI and Back-end Coding
	Build Front page
	Build Log in Page
	Profile Creation
	Create UI for file system.
	Create Employee Homepage
	Create Admin Homepage
	Create Add/Edit/Remove Employee page
	Create View and Add Learning web pages
	Create View and Edit Wiki Pages
	Integrate Pulse VPN
	Get Website hooked up to Hardware/Server
	Route Drive System properly.
	Performance and Monitoring
	Work on Design and performance of website
	Bug-Fixing
	Evaluating Efficiency

Table 2: Objectives/Deliverables

2.3 Project Schedule - Gantt Chart

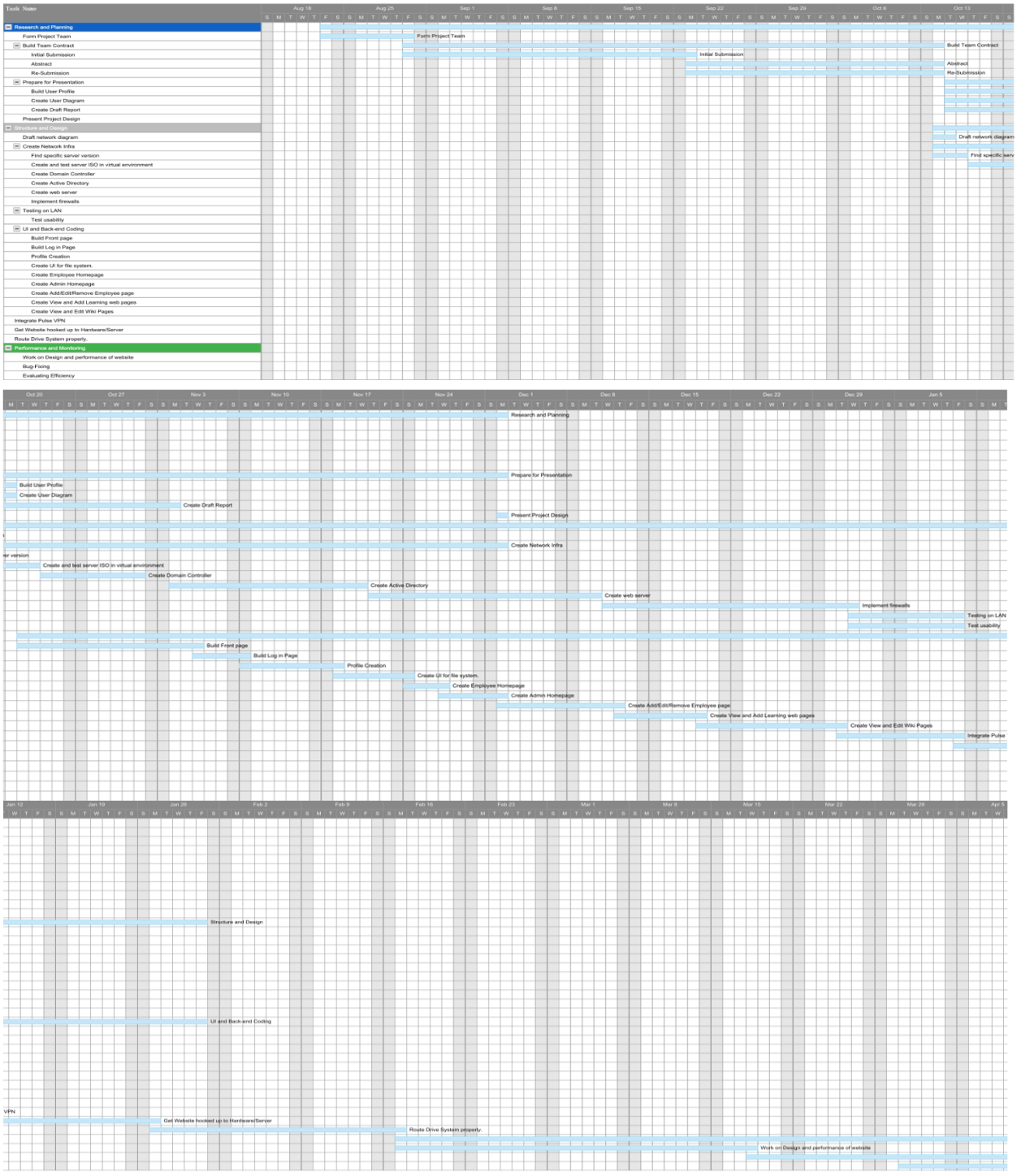

Figure 3: Gantt Chart/Timeline

3.0 Technical Elements

3.1 Network Architecture (Hardware/Infrastructure) & Security

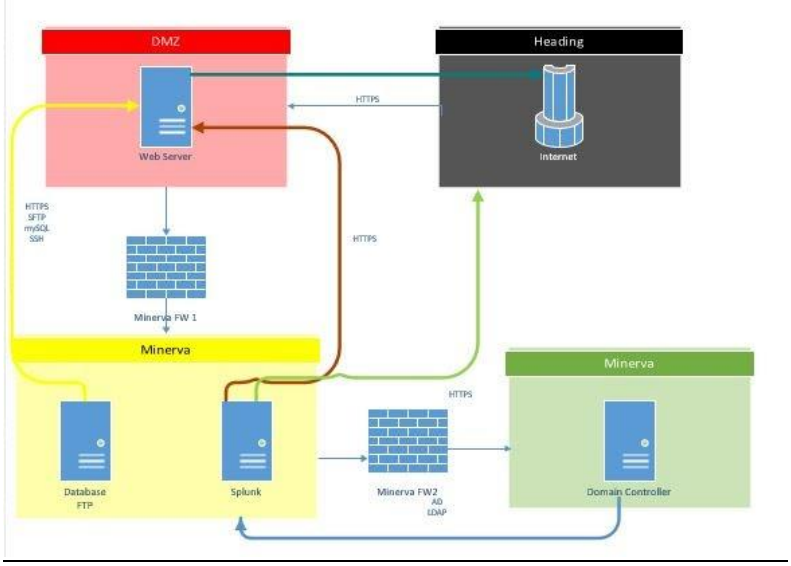

Figure 4: Technical Diagram

The purpose of the project is to be able to allow for users and industry partners to be able to connect to a website to streamline the new hire onboarding process. Our presentation will include a virtual environment built out that will allow for a cost effective and hardware efficient solution. The virtual environment will consist of two servers, firewalls, and a database (**Figure 4: Technical Diagram**) environment began with a Domain Controller (DC) and a simple web server using NginX to allow for clients to connect to the Minerva service. Over the course of the project, several other engines were tested to see the performance of each program. The web server is in the Demilitarized zone (DMZ). The DMZ is bordered by a pfSense firewall that leads to the DC which contains the Domain Name Service (DNS) and Active Directory (AD). The Active Directory will be used by Minerva personnel and not the client companies. There is a simple PowerShell script that has been created that will allow Minerva personnel to create bulk amounts of profiles within the Active Directory environment. Admins

(Human Resources specialists) will have to manually escalate and assign permissions to any users. The critical infrastructure will be supported by a system log (Syslog/Sysmon) server that will be running the Enterprise version of Splunk. Splunk will be fed logs from the core devices in the environment and be indexed for any security analysts. The logs will consist of Windows security and event logs. These logs will be sent to the Splunk server by Splunk's Universal Forwarder. The Universal Forwarder is a tool that will send the logs to a specific host (in this case the Splunk server depicted in **Figure 5: Splunk Server)** and index them for long term storage. Early on our efforts were focused on being able to have a service and system that would allow users to connect to the application. Once the application is built then we will start building up the defenses of the web server and application.

Figure 5: Splunk Server

3.2 Application (Software)

Minerva is an ASP.NET web application that will use common CSS and JavaScript stylings

based on bootstrap giving it a very recognizable feel and formatting. Visual Studio Community 2017 was the IDE which gives a nice template to start creating an ASP.NET application. The beginning of the project started off with a home page which will allow easy direction into our login page that will direct you into the application. The login page will validate your credentials against the known users in our provided SQL database as well as give you a connection directly to the server after logging in successfully. From that point you will be able to see the resulting features given for your login information. We have implemented both a nav bar to take you to the sites that do not need authentication to reach such as our home page, login page, and contact page. However, once you get inside and are validated you will be able to return to the homepage and previous pages with a breadcrumb element. This will allow you to return to a previous page without starting back at the home or log in page. The Employee home page will allow the users to choose between options such as navigating, adding, and editing their personal folder or drive space. They will be able to view and respond to their learning/objectives given by their specific admin. They will also be able to navigate a wiki or site hosting much of their public and non-public information for their employees. We also plan on developing a bot that will assist the users in searching for this information so that they do not have to waste time searching the site. On the admin side we will allow the admin to add/remove employees from the server/application, as well as assign learning/objectives, and edit the wiki.

3.3 Security

This project was secured by using open source firewall software from PfSense, and the Enterprise version of Splunk. Splunk is a software that collects logs from machines. In this case, Splunk was getting Windows logs and indexing them for later viewing and storage purposes. In

addition to these users will have their own accounts with passwords.

4 Visuals

Here is a collection of images that will make up the user interface of Minerva. Each image will cover a different page of the website starting with **Figure 6**:**Home Page** or default page. **Figure 7: Login Page** that will have the option to log in as an employee or as an Admin. **Figure 8: Employee Home Page** contains the list of links for employees and **Figure 9-11** will be the pages that are reached from the employee home page. **Figure 12-15** will be the admin home page as well as the sites that are reached form the admin homepage.

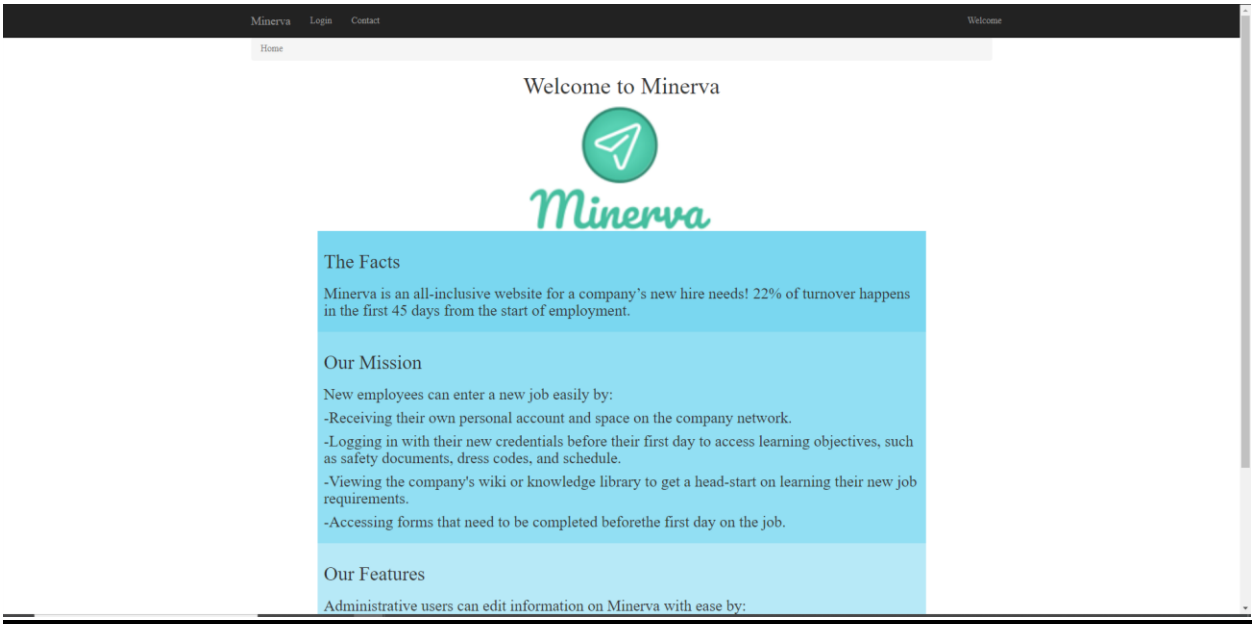

Figure 6: Home Page

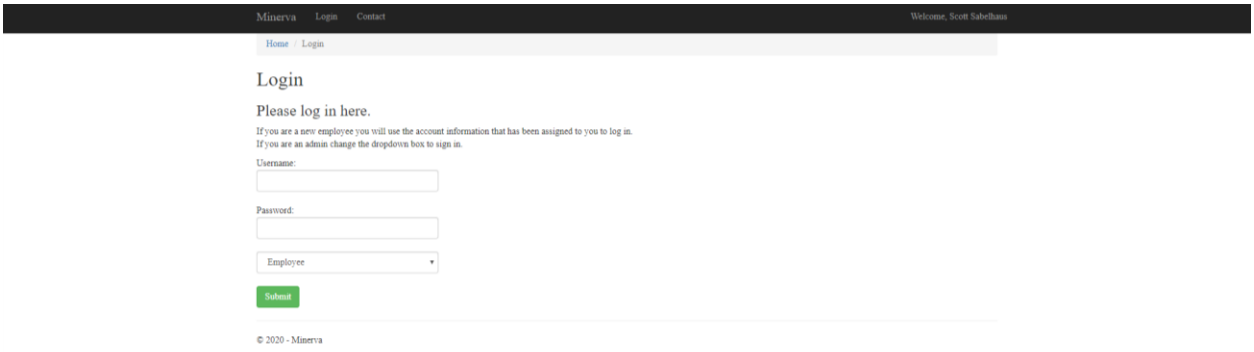

Figure 7: Login Page

Figure 8: Employee Home Page

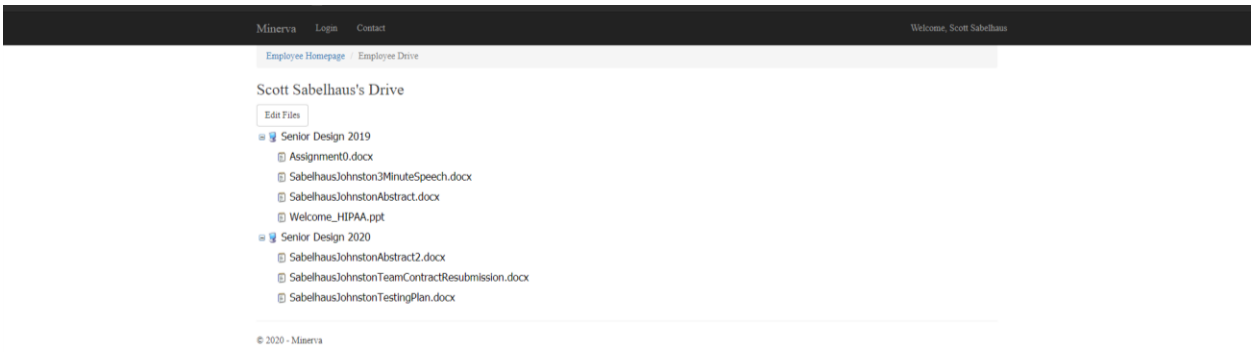

Figure 9: Employee Drive

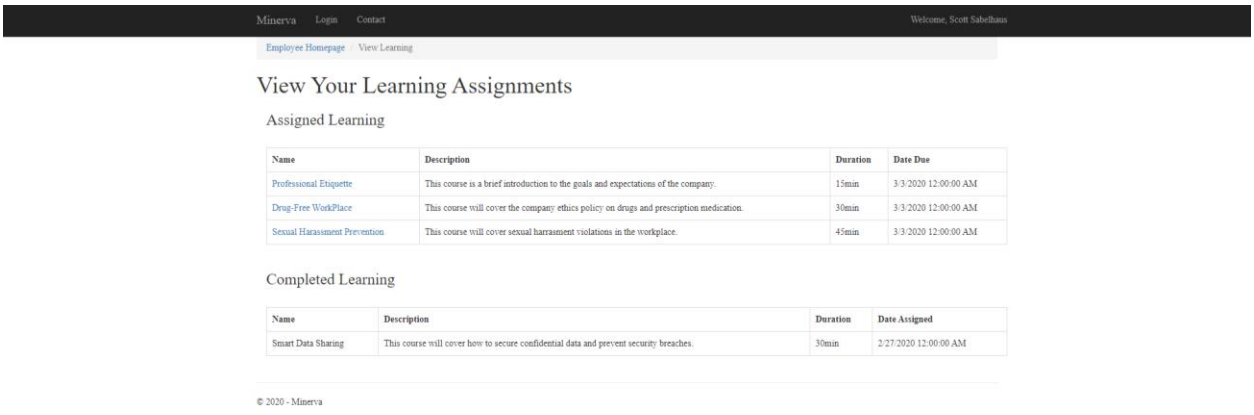

Figure 10: Employee Learnings

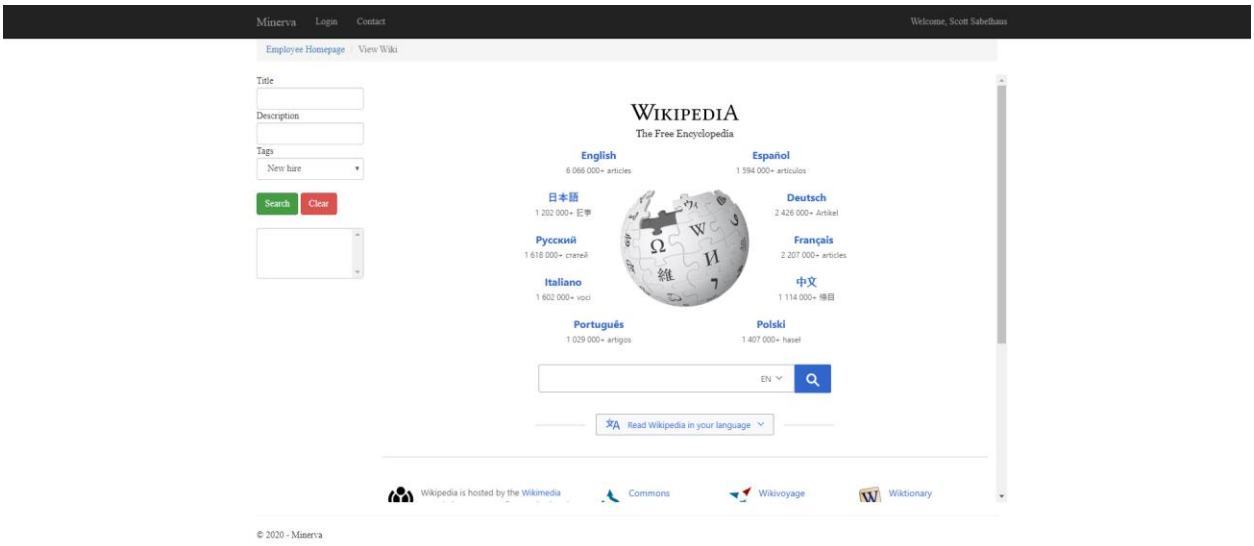

Figure 11: View Wiki

Figure 12: Minerva Admisinstrator

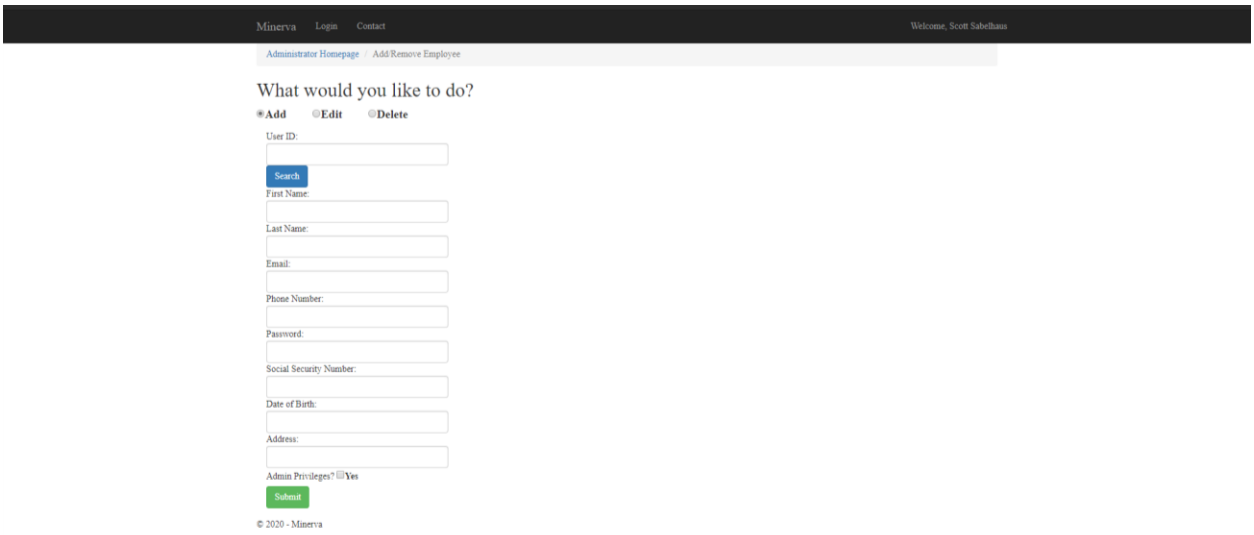

Figure 13: Add/Remove Employee

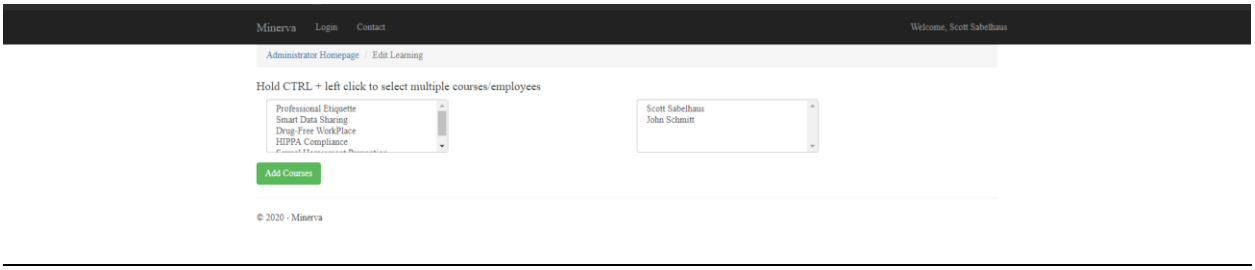

Figure 14: Edit Learnings

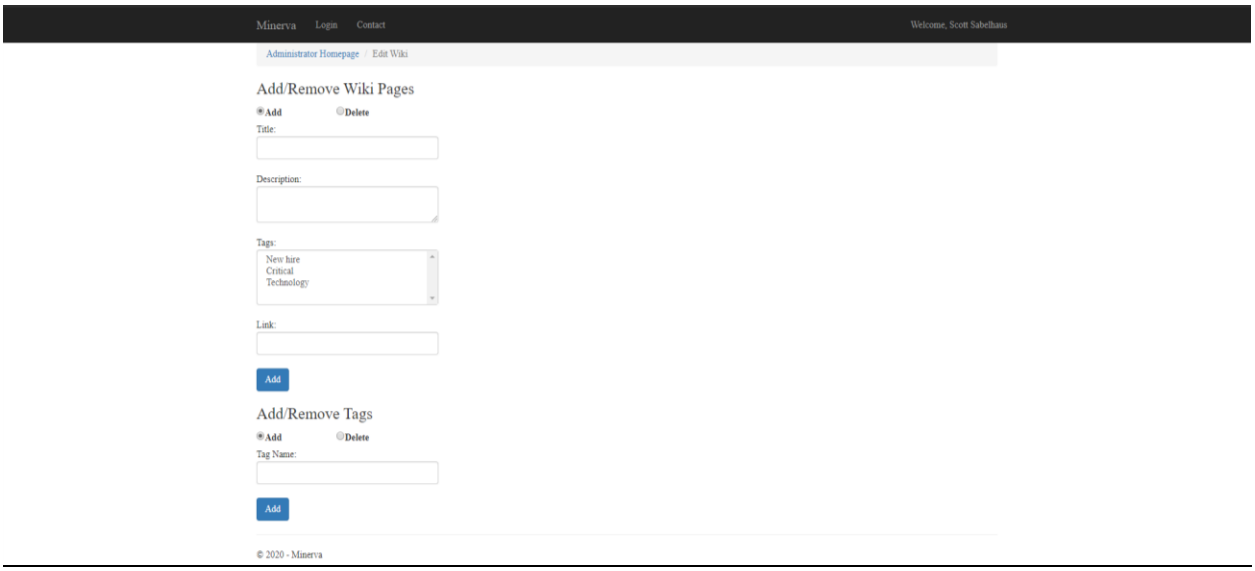

Figure 15: Add/Remove Wiki Pages

4.1 User Interface

The user interface begins with **Figure 6** being the homepage, then immediately after is followed by **Figure 7** the login page. After entering the credentials that have been given to you, then you will have an option to select admin or employee to be directed to the correct place. Selecting employee will direct you to **Figure 8** the employee home page where the user will be able to navigate through the employee pages such as **Figure 9** the employee drive where users can manipulate their dedicated drive space. **Figure 10** will be where the users take their learning and complete their objectives to do before they are completely onboarded. **Figure 11** is where the standard employee account will be able to view and search for wiki pages/articles provided by the company.

From the login page (**Figure 7**) if you were to log in as an admin and have the correct credentials then you will be taken to the admin homepage **Figure 12**. From there you will be able to edit employees(**Figure 13**), your employee's learning(**Figure 14**), or the company wiki pages and tags(**Figure 15**).

5 Test Plan

5.1 Overview

Minerva will initially begin being just the DC and the web server. Once the site and foundation for the project has been made and users are able to connect to the application, best practices and other features will be added. From a networking and infrastructure standpoint, firewalls will start to be implemented and connections to the core systems will start to be restricted to a need only basis. Non-essential processes and services will be disabled and locked down as necessary.

5.2 Objective

The objective of the test is to ensure functionality and accessibility of the server and its service. Once both criteria have been achieved, further security measures will be installed, and more detailed features will be incorporated to the Minerva application.

5.3 Test Cases

Test	**Steps**	**Result**
Login	Attempt to log in	**Pass:** Successfully logged in - taken to employee or admin homepage **Fail:** Unsuccessful Login please try again.
Employee/Admin Homepage	Open a link from Employee/Admin Homepage	**Pass:** Directed to correct page with personal user information **Fail:** Only possible if the employee fails to log in authentication which will redirect to log in page
Edit New Employee	Add/Update/Delete Employee	**Pass:** Database will be updated, and prompt will appear displaying a successful update has been made. Drive folder created automatically **Fail:** Catch exception will occur, will ask user to try again and inform them where the problem occurred

Add/Create Learning	Click multiple courses and/or names to assign courses and users to each other	**Pass:** Database updates, new users will have courses in their assigned learning. **Fail:** Catch error occurs and displays prompt of incorrect data and displays prompt of incorrect data.
View Learning	Enter View Learning page and click into a course.	**Pass:** Course will open properly to document for learning course and move to completed. **Fail:** courses will not be loaded in because they do not have learning assigned
Add Wiki/Tags	Add Title, Descriptions, Tags, and Link to create a new wiki entry.	**Pass:** wiki page will be created, tags will be created, prompt informs user of successful addition to database. **Fail:** catch errors from the database will inform the user of incorrect data entered.
View Wiki Pages	Loads wiki home page immediately then click on separate entries	**Pass:** loads wiki pages and will switch between entries within the page. Users will also be able to return results from search. **Fail:** iFrame may not be compatible with the site which would not be caught by making the page. Otherwise failed search results will inform the user and ask them to try again.

Employee Drive	Open drive page and view/edit files in drive.	**Pass:** opens drive page and all folders are accessible and editable **Fail:** Drive folder not created successfully. Users may have been added to the database without being created in the website.

Table 3: Test Case Results

5.4 Test Results

Much of the testing done led to creating more features that needed to be implemented. Things that were not thought about beforehand such as needing to create folders on the creation of a user. This required needing to recreate the entire database. This happened multiple times over the course of the project where the database or the backend code would need to be re-created with different goals in mind. We finally had the database and backend code communicating well enough we have been able to pass all test cases listed in **Table 3.**

6 Conclusion

6.1 Problems Encountered

During this project we encountered a few problems, and they all provided a great learning experience. As a team and with proper communication we were able to overcome most of the problems.

1) One of the bigger issues the hardware and infrastructure had was the time limit on server licenses and moving locations for school, co-op, and current events. The infrastructure would have to be reconfigured if the hosting device had to be moved to a new network. We were successful in connecting the critical services and servers to each other.

2) Initially we had issues getting the website to show properly on the web server. After talking with our advisor, we began looking into a different hosting platform that allowed us to properly display and access the service.

3) While the security of the application was important, we were unable to add all the security features we wanted. We were told “you have to build the house before you lock the door.” This led us to focus on functionality and user experience and performance of the application.

6.2 Fall Semester 2019

During the Fall semester Hunter did research and planning on the network architecture. A lot of planning went into deciding the best type of servers to build. Windows server 2016 and 2019 were optimal choices. Performance tests are continuing, the only major issue Hunter faced with using Windows 2019 as the web server contains a recently discovered security and performance issue. The issue being that if the webserver were to be misconfigured it would cause all clients connecting to cache the file, and crash. On reboot the client machine would read the cached file again and crash and reboot. Hunter was able to build a stable DC with Windows 2019 and has automated the process for creation of accounts for users. This will allow for users to put in requests to create their own profiles for the 'new hire' roles. Any additional roles will require an admin to manually create the account or escalate privileges for the person in question. Scott had researched many aspects of what an employee believes would help an employee fit in easier and quicker at a new job. Hunter also provided very helpful advice and feedback from friends and associates who have had similar issues or desires in the past. Scott has been developing the front end of the website to provide an easily navigable user interface as well as designing the code behind the web pages. After watching multiple courses on linked-in learning that our advisor Yahya had recommended Scott was able to decide on creating the frontend and backend in Visual Studios 2017 Community Edition. The project will be put together using C#, ASP.NET, and SQL database. The webpages will be written using Jscript, Html and CSS. Scott used Bootstrap which comes preloaded in the ASP.NET framework. Using bootstrap allows web pages to be easily formattable and automatically adjustable when scaling the window of whatever browser, you use. Yahya has given us many suggestions on features that could be added into our application such as a wiki for helpful resources and a bot that will pull up some of said resources based on searches done by employees. The wiki will be editable in the admin account features as well as adding/removing employees and assigning learning to employees. The employees will be able to navigate the wiki, navigate their folders on their allocated drive space designated to the individual, and see the learning and advice given by the admin they are assigned to.

6.3 Spring Semester 2020

Learning to correctly save cookie information allowed users to stay logged in up to an hour after their initial log in. This prevented unauthorized use of the site. If someone was able to connect to one of the website's other pages but did not have the correct cookie information that would connect to the database, then they would be redirected to the login page. With various forms of testing we were able to create a grid view table that would allow users to click on links with the titles of courses so that they would be able to advance on to their learning in a different page and then complete their learning. We had planned on implementing a VPN and other security features from the beginning of this project but we had many unexpected issues that prevented us from being able to spend more time on them such as server licenses expiring, reconfiguration of VM's due to physical machine changing location, and learning new content like Splunk and Pfsense. It is unfortunate but because the IT Expo was online this year it was not required for us to have our project work off a physical device and allow for people at the to interact with Minerva. We were able to keep the wiki page search function and more substantial content and aesthetics because we were able to save time running the program on a local computer instead of a virtual server. The file pathing and server connections could be modified at a future date with relative ease, but the VPN connection would have nowhere to go without an external server.

Bibliography

Hirsch, Arlene S. “Don't Underestimate the Importance of Good Onboarding.” *SHRM*, SHRM, 16 Aug. 2019, www.shrm.org/resourcesandtools/hr-topics/talent-acquisition/pages/dont-underestimate-the-importance-of-effective-onboarding.aspx.

Poster

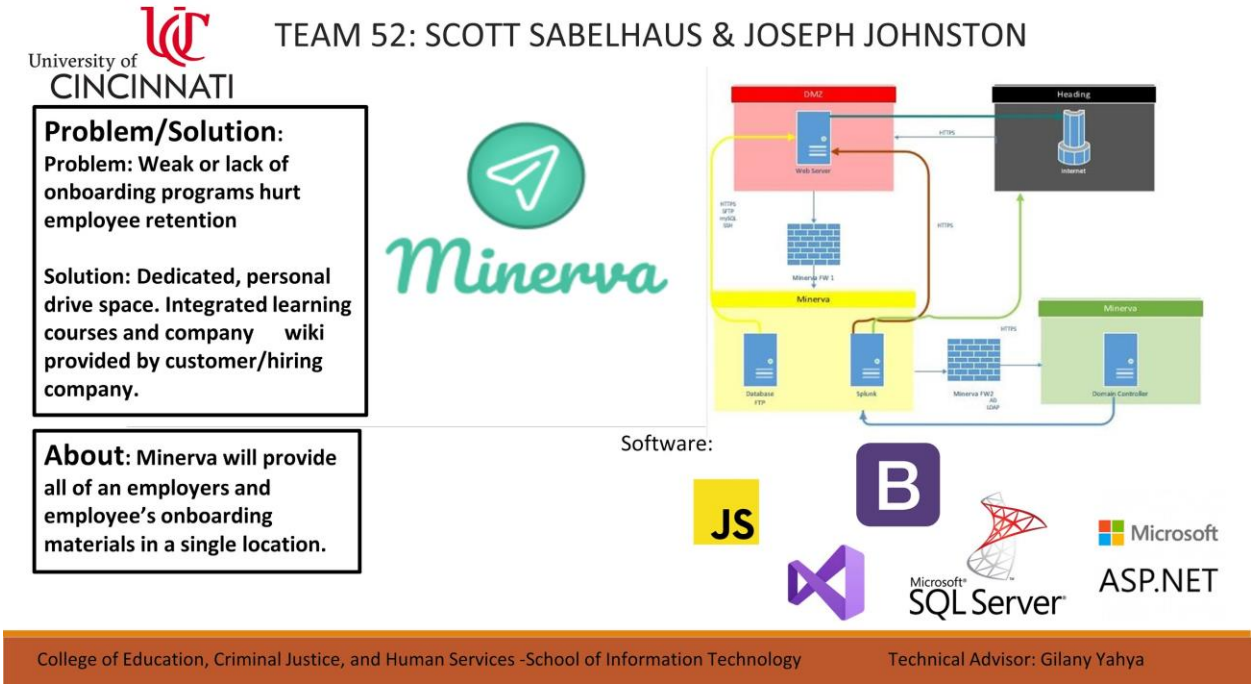

Figure 16: Minerva Poster for Tech Expo