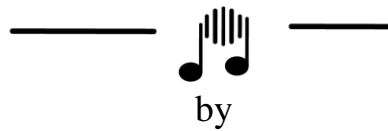


# CONCERTO



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

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## **ACRONYMS AND ABBREVIATIONS**

**AWS - Amazon Web Services**

## **ABSTRACT**

Many musicians and music fans currently do not have a dedicated social media platform to network with other like-minded people in their area. Because of this, users are resorting to websites not designed with music in mind, like Facebook and Craigslist, to interact. Concerto is an innovative website that looks to allow users to network, discover, and promote anything music related on its unique platform. Musicians and listeners alike can find valuable information on bands, upcoming shows, as well as receive recommendations based on their music listening preferences. Concerto is also a hub to connect fellow musicians who are looking for new band mates. By giving music fans a dedicated tool in Concerto, we strive to help strengthen musical communities and create a unique experience for our users.

## **1. INTRODUCTION**

### **1.1 Problem**

There is no social media platform designed with the intent for musicians and music fans to discover and network with one another. Currently musicians are using other tools such as Craigslist or Facebook to find potential band mates. Because there is no tool for this many musician's resort to completing entire projects by themselves and don't have the opportunity to perform their music with a full band.

### **1.2 Solution**

Create a new social media website to allow musicians to easily find users in their area who are interested in working on collaborative projects. Once bands are established, they can make their own page to promote their music and promote upcoming shows. Users on the other hand can use the site to help discover bands and shows in their area. Lastly, users can use the website to network with fans who are interested in the same bands or upcoming events.

### **1.3 Project Goals/Brief Methodology**

The goal of our social media platform is to create a website that is solely dedicated to allowing musicians and fans to interact easily with one another. As a result of improved networking, we hope that local music scenes are strengthened, and new bands are formed.

### **1.4 Design Objectives**

We wanted to dive deeper into getting analytics on our site and provide recommendations to people that were looking for new music. We felt that WordPress was not the best platform for that and decided that it would be something we would add in the future we have more customization of the site.

## 1.5 Overview

The remainder of this final report outlines in detail how the project was completed. The report includes the following sections: design objectives, methodology, budget, timeline, problems encountered, and future recommendations.

## 2. DISCUSSION

### 2.1 User Profile

#### 2.1.1 Project Title

Concerto - Network. Discover. Promote.

#### 2.1.2 Potential Users

Musicians, Teenagers, College Students, and Adults interested in music related networking.

#### 2.1.3 Software and Interface Experience

This website will be targeted towards average users who do not have a background in technology. Most of these users should have some experience with the general layout of popular social media platforms like Facebook and LinkedIn that our website will resemble.

#### 2.1.4 Experience with Similar Applications

Concerto users may have had prior experience with the below applications:

- Facebook
- Twitter
- LinkedIn
- Last.FM
- Bandcamp
- Craigslist

- Spotify
- SoundCloud
- Pandora
- Billboard
- iTunes
- Tidal
- Reddit

### **2.1.5 Task Experience**

- Using a web browser to create a Concerto account with multi-factor authentication
- Using a computer or mobile device to navigate the social media website
- Comfortable with creating a profile and interacting with other users

### **2.1.6 Frequency of Use**

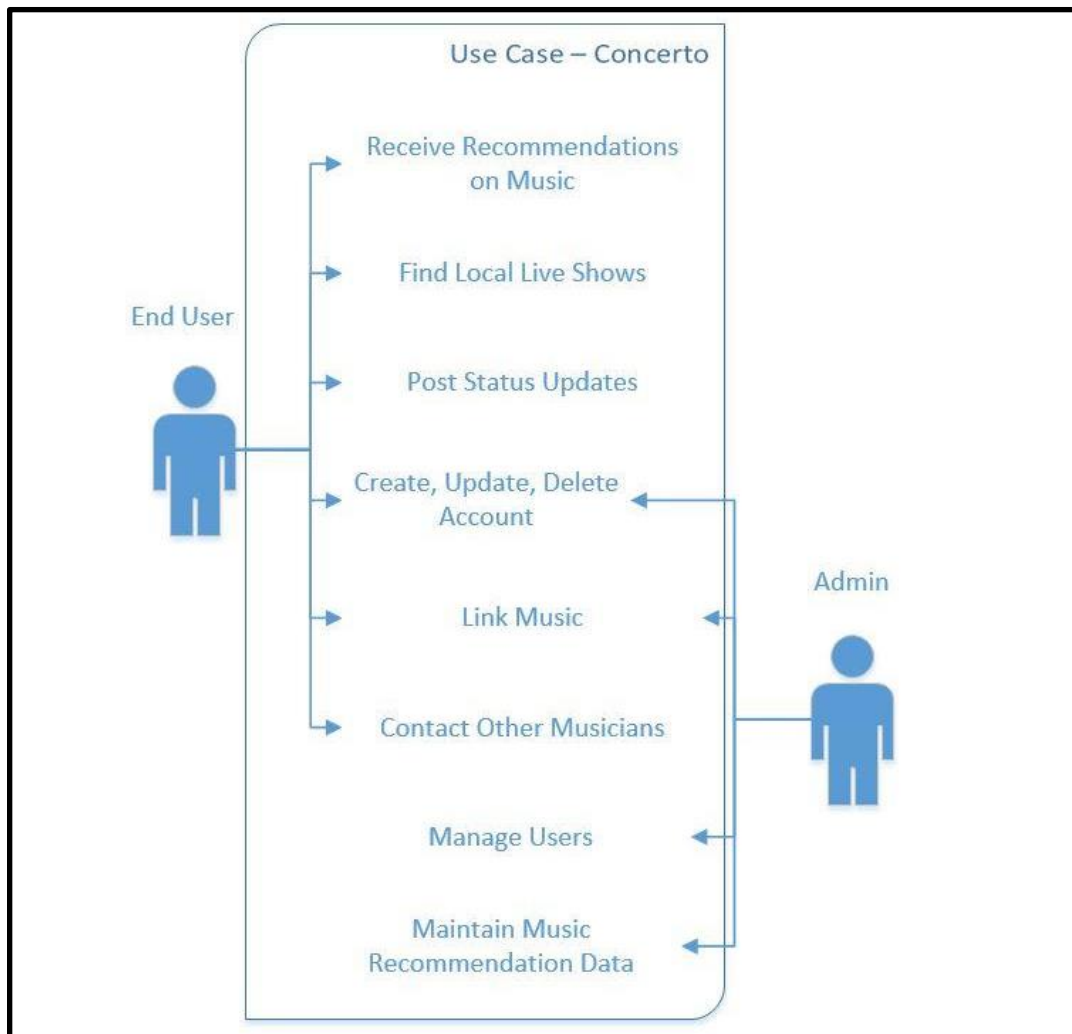
The account creation for a Concerto account will only be required when initially visiting the website. The social media platform will be used at a similar rate as other competitors.

### **2.1.7 Key Interface Design Requirements That the Profile Suggests**

- Visually appealing and easy to navigate user interface
- Easily create band pages to network and promote music
- Quickly create communities related to specific bands and music scenes

## 2.2 Use Case Diagram

The Use Case Diagram below (*Figure 1*) is utilized to show the minimum “core” features that are associated with our finalized prototype design. This is represented by the exchange between the end user, the website and the website admin.



*Figure 1: Concerto Use Case Diagram*

## 2.3 Budget

We are currently operating within Amazon Web Services’ free tier for this project. If we were to take our project public, we would be operating under a different direction. We would rely heavily on advertisements and sponsored posts for the side panels and content feed of our website. By being able to

bring in revenue with minimal overhead we should be able to operate at a profit much easier than many new companies.

<b>Budget</b>	
Component	Price
Google Maps/Places API	\$0
Amazon W2 Server Free Tier	\$0
WordPress	\$0
BuddyPress	\$0
Google Authenticator API	\$0
Web Domain Name	\$1.49
<b>Total Price of Project</b>	<b>\$1.49</b>

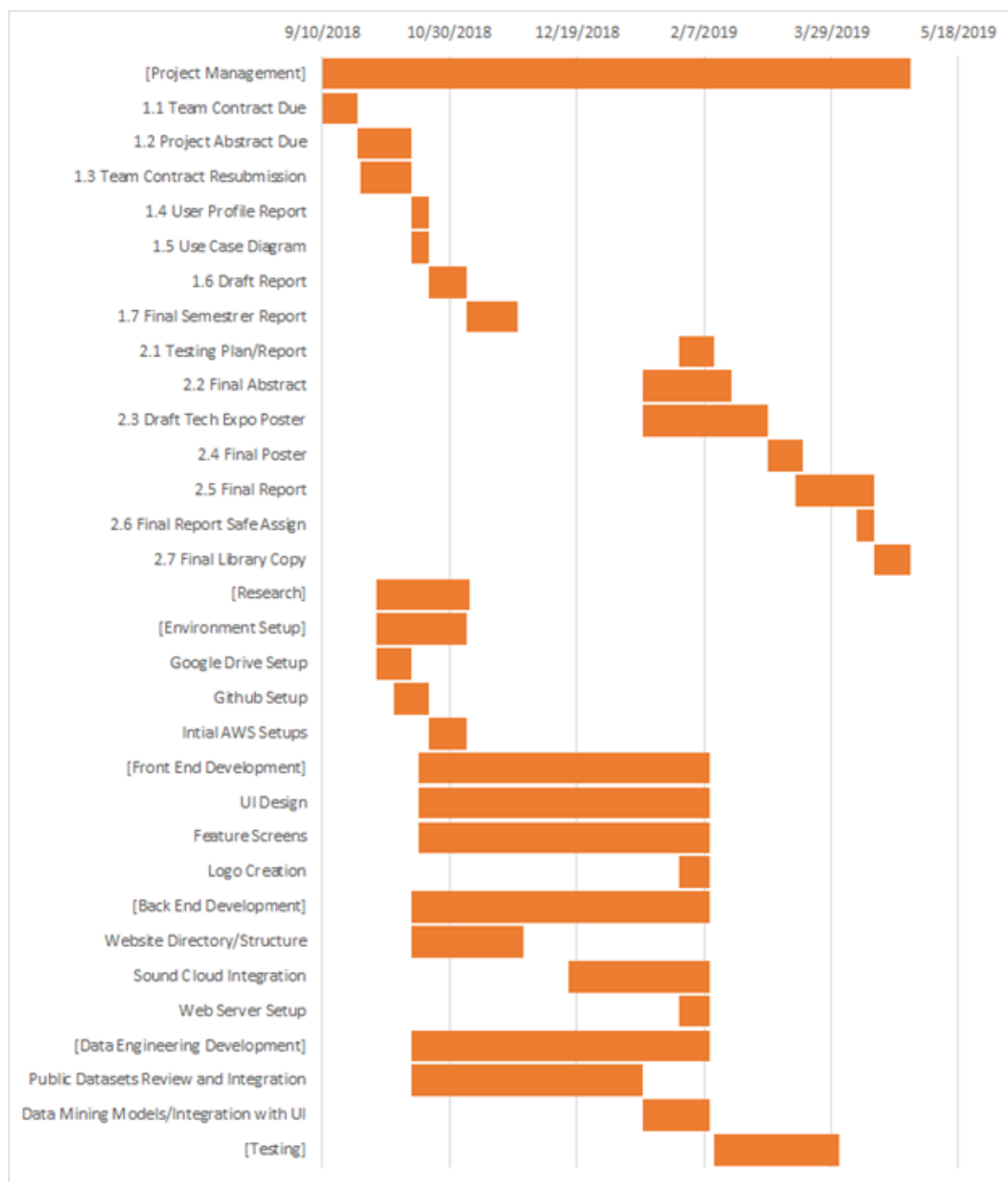
## 2.4 Project Schedule

The Project Schedule (*Figure 2*) shows the collective group project schedule throughout the next year until the final paper submission. The left side of the table shows the actual assignment/project piece that is being worked on, while the right side of the table shows the due date. The Gantt Chart (*Figure 3*) is also being utilized to show this same chart in a visual way.

Concerto WBS				
Start Date:	End Date:	Description	Duration (days):	Group Member
<b>9/10/2018</b>	<b>4/29/2019</b>	<b>[Project Management]</b>	<b>231</b>	<b>Ryan</b>
9/10/2018	9/24/2018	1.1 Team Contract Due	14	All
9/24/2018	10/15/2018	1.2 Project Abstract Due	21	All
9/25/2018	10/15/2018	1.3 Team Contract Resubmission	20	All
10/15/2018	10/22/2018	1.4 User Profile Report	7	All
10/15/2018	10/22/2018	1.5 Use Case Diagram	7	All
10/22/2018	11/6/2018	1.6 Draft Report	15	All
11/6/2018	11/26/2018	1.7 Final Semestrer Report	20	All
1/28/2019	2/11/2019	2.1 Testing Plan/Report	14	All
1/14/2019	2/18/2019	2.2 Final Abstract	35	All
1/14/2019	3/4/2019	2.3 Draft Tech Expo Poster	49	All
3/4/2019	3/18/2019	2.4 Final Poster	14	All
3/15/2019	4/15/2019	2.5 Final Report	31	All
4/8/2019	4/15/2019	2.6 Final Report Safe Assign	7	All
4/15/2019	4/29/2019	2.7 Final Library Copy	14	All
<b>10/1/2018</b>	<b>11/7/2018</b>	<b>[Research]</b>	<b>37</b>	<b>All</b>
<b>10/1/2018</b>	<b>11/6/2018</b>	<b>[Environment Setup]</b>	<b>36</b>	<b>Trevor, Cory</b>
10/1/2018	10/15/2018	Google Drive Setup	14	Trevor, Cory
10/8/2018	10/22/2018	Github Setup	14	Trevor, Cory
10/22/2018	11/6/2018	Intial AWS Setups	15	Trevor, Cory
<b>10/18/2018</b>	<b>2/9/2019</b>	<b>[Front End Development]</b>	<b>114</b>	<b>Ryan , Cory</b>
10/18/2018	2/9/2019	UI Design	114	Ryan , Cory
10/18/2018	2/9/2019	Feature Screens	114	Ryan , Cory
1/28/2019	2/9/2019	Logo Creation	12	Ryan , Cory
<b>10/15/2018</b>	<b>2/9/2019</b>	<b>[Back End Development]</b>	<b>117</b>	<b>Trevor, Cory</b>
10/15/2018	11/28/2018	Website Directory/Structure	44	Trevor, Cory
12/16/2018	2/9/2019	Sound Cloud Integration	55	Trevor, Cory
1/28/2019	2/9/2019	Web Server Setup	12	Trevor, Cory
<b>10/15/2018</b>	<b>2/9/2019</b>	<b>[Data Engineering Development]</b>	<b>117</b>	<b>Cory</b>
10/15/2018	1/14/2019	Public Datasets Review and Integration	91	Cory
1/14/2019	2/9/2019	Data Mining Models/Integration with UI	26	Cory
<b>2/11/2019</b>	<b>4/1/2019</b>	<b>[Testing]</b>	<b>49</b>	<b>All</b>

Figure 2: Project Schedule

In *Figure 3* below each large bar represents total time of work for each assignment/project piece.



*Figure 3: Gantt Chart*

## 2.5 Problems Encountered

Throughout the span of the project, we encountered several issues that affected our progress. To begin, we quickly began to have issues with server stability on the AWS platform. Due to a glitch at the

beginning, we had large portions of our site deleted. Luckily, this happened relatively early on during development. We also had some issues with uploading files to the website. At the beginning we saw that there was an upload size limit that applied to our website. In addition, we had issues with some of our nested website links in our website directory.

## **2.6 Analysis of Problems Solved**

In the beginning of the project we figured we ran into an issue where we were trying to upload too big of files which crashed our server. We made an adjustment and made sure all the files we uploaded were under 10MB so we wouldn't have an issue again. In order to change this, we had to edit some PHP files within the configuration of the website, so it limits the upload size on our site.

## **3. TECHNICAL ELEMENTS**

### **3.1 Network**

Concerto uses AWS (Amazon Web Services) to host the website. By utilizing an entry level EC2 Server, we were able to host the website and link it to the SQL database. The application also utilizes the Google Maps and Places API, but which allows many of the event features. The Google Authenticator is also fun through a Google API.

### **3.2 Application**

The web application is designed with WordPress serving as its foundation. WordPress is an open-source content management system that is based on MySQL and PHP. The WordPress plugin called BuddyPress (also based on MySQL and PHP) is used to implement basic, fundamental social media elements onto the website. Custom features and customized elements were built into the website via the WordPress dashboard.

### **3.3 Database**

We are utilizing Microsoft SQL Server which is running in conjunction with our EC2 service on Amazon Web Services. This database helps run the website as well as store user credentials, photos, videos, and settings.

### **3.4 Security**

With all three members of the group being cyber security majors, the security of the website was a critical point of focus. By utilizing a server hosted by Amazon Web Services, the group feels that the physical and infrastructure side of the server is very secure. Amazon states that all data is stored in a highly secure AWS data center. We also elected to use Google Authenticator as a solution to implement multi-factored authentication, a feature that was high up on our “wish list” <sup>[1]</sup>.

## 4. APPLICATION

### 4.1 Application Architecture

Figure 4 below represents the different technologies utilized by the Concerto website. To begin, everything is based on the AWS EC2 platform (top middle). To the left and right (Apache and SQL server) of that are the server technologies that apply to the EC2 server. Directly below the Amazon Web Services is the WordPress service, an open-source web development platform. Attached to WordPress is the Google Maps/Places API, BuddyPress, and Google Authenticator.

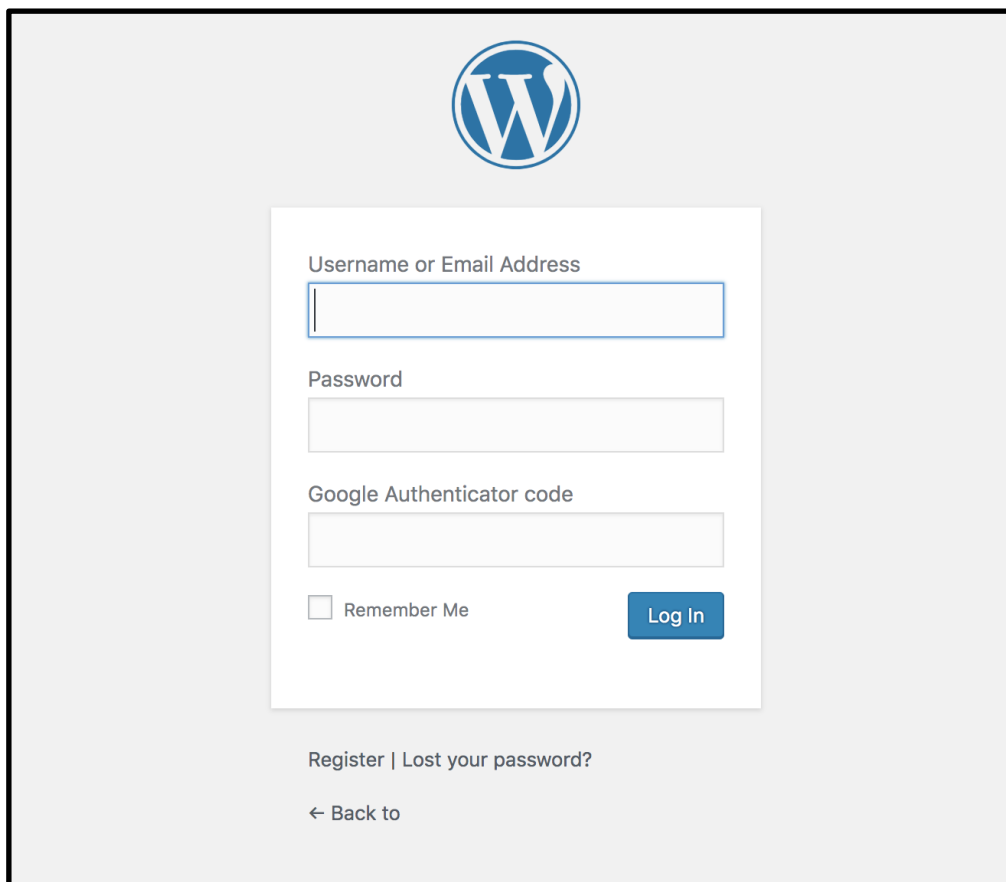


Figure 4: Technical Diagram

## 4.2 Screenshots and Examples

### 4.2.1 Login View

Below is a visual screenshot of what you will see when you first login to the Concerto site. This should be an easy process most people who have signed up for a website before. The only major difference would be that our website includes Google's two factor authentication for added security.



The screenshot displays a login interface for the Concerto site. At the top center is a blue circular logo containing a white stylized 'W'. Below the logo is a white login form with the following elements:

- A text input field labeled "Username or Email Address".
- A text input field labeled "Password".
- A text input field labeled "Google Authenticator code".
- A checkbox labeled "Remember Me".
- A blue button labeled "Log In".

Below the login form, there are two links: "Register | Lost your password?" and "← Back to".

*Figure 5: Login View*

## 4.2.2 Home View

The next view of our website is our landing page / home view. This view is the main screen for our website and displays a large portion of the important data. The main data that is displayed on this page is the feed for all the Concerto users. In addition to this, a calendar, who's online, and a login section are included.

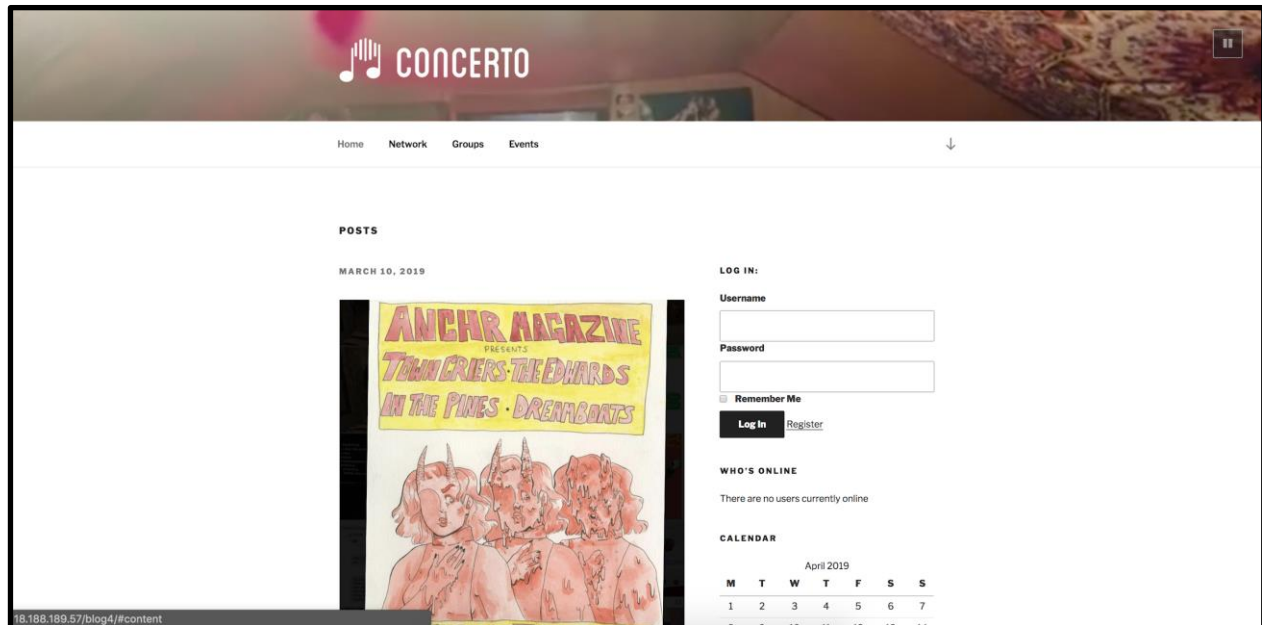


Figure 6: Home View

### 4.2.3 Network View

The next view is a simple page showing everyone who is currently a member on Concerto. It provides several search and option features. Lastly, it allows users the option to add friends and message other members.

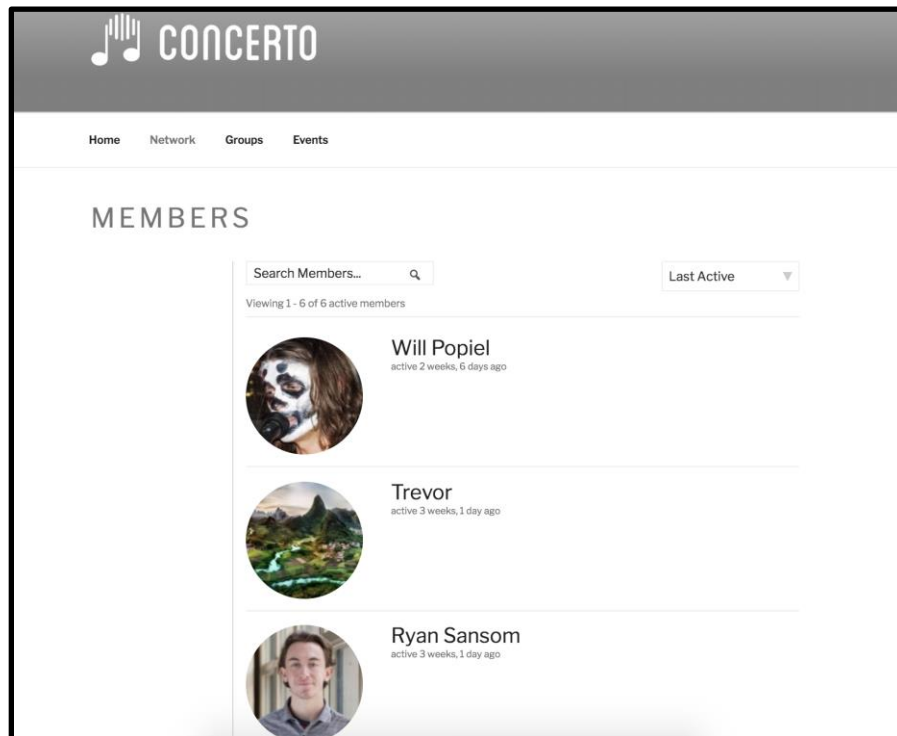


Figure 7: Network View

## 4.2.2 Groups View

Our third view lists all the groups that are active on Concerto. By clicking inside of each group, you can find more information that is inputted at the band's discretion

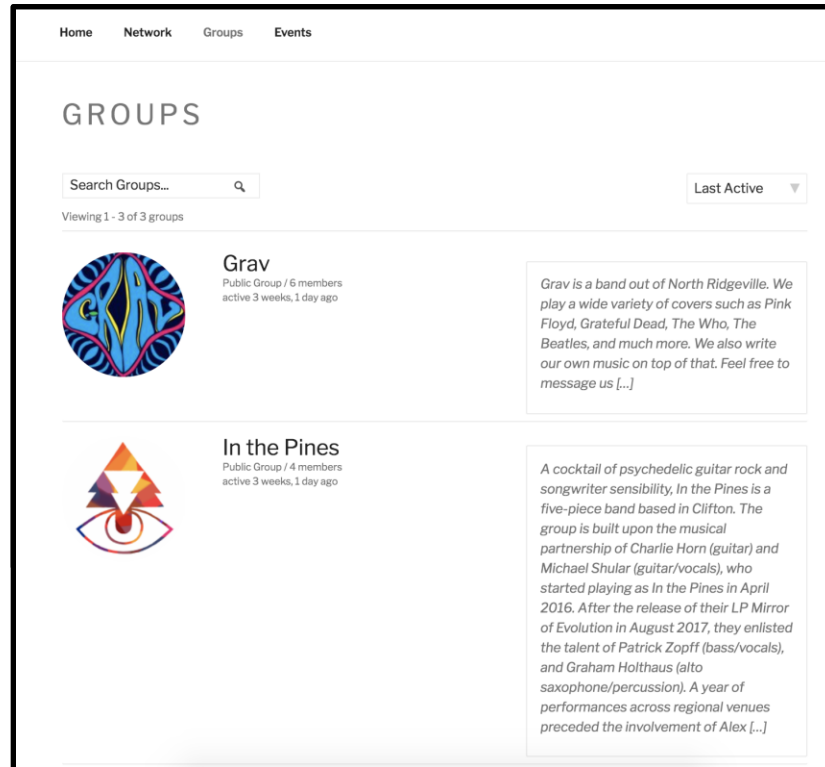


Figure 8. Groups View

## 4.2.4 Events View

Our events view is a hub where you can see all the current events listed on Concerto. This is a great location for musicians and music fans to visit to see shows in their neighborhood.

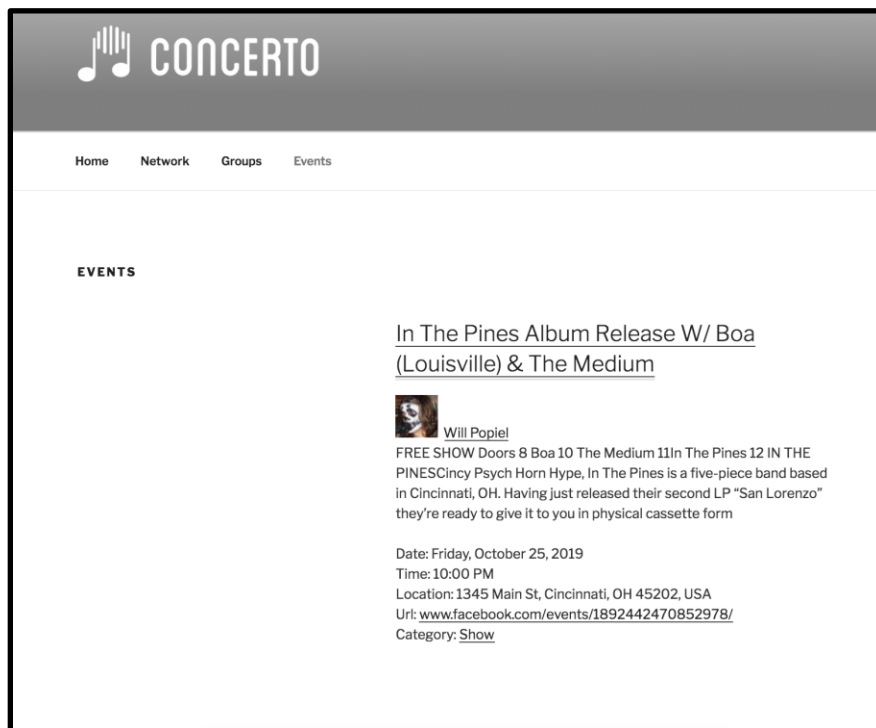


Figure 9: Events View

## 5. TEST PLAN

### 5.1 Overview

This section will include and explain the testing methods for the Concerto web application. This section should be used as a guide for the following individuals:

- Project Managers
- Developers
- Testers
- Team Members

## 5.2 Scope

The scope of testing is to test our Concerto website on desktop, tablet and mobile. The test will be organized based on our requirements that we have set for our social media website.

## 5.3 Objective

Testing is an incredibly important aspect of any project. With testing, we were able to gain valuable insight in the both the user experience and system design pieces of the project. To begin, we focused our testing on the stability of the website and ensuring that all critical/main features worked as planned. As this is a social media type website, we knew that features such as account creation, messaging, and posting were important features to test. The objective of the testing was to ensure the website is operational from an outside users' perspective. We wanted to make sure users have the same experience as we did while creating and editing the website. The tests were designed to get an end users perspective on how they experienced the site. We also wanted to make sure that as we added new features, it did not break anything else on the website.

## 5.4 Test Cases

### 5.4.1 Entry and Exit Criteria

Entry Criteria:

- Website Complete
- Self-testing complete
- Testing environments are operational

Exit Criteria:

- Tests are run
- Bugs documented and fixed

## 5.4.2 System Testing

The Concerto website will be tested by interacting between pages and making sure users can sign up and create accounts. Testing the functionality between pages will ensure our website is working properly and users are able to get to everything in the fewest amount of clicks as possible. If a bug is found during testing, then a member of our team will record it and pass it along to the rest of the team. The team will decide as a collective how to remedy the known issues. We will grade our bugs on a scale of 1 to 5 to determine what to work on first.

## 5.4.3 Testing Procedures

Below are the steps to be utilized for the testing procedure:

- Create each test scenario
- Document steps required and successful scenario requirements
- Document any bugs/issues that arise during testing

Below are the tests to be performed:

1. User Test - This test will focus on user creation, login, and password reset.
2. Stability Test - This test will focus on the functional stability of the website.
3. User Interface Test - This test will focus on the functionality and appeal of various user interface modules
4. Functionality Test - This test will focus on each main feature to ensure they are functional.

#### 5.4.4 Schedule of Team Member Testing

Below is *Figure 10* outlining the schedule of our testing from our team throughout the Spring Semester

Team Member	Timeline to be Completed	How Often
Cory Limbert	2/11/19-4/1/19	Bi-Weekly
Ryan Sansom	2/11/19-4/1/19	Bi-Weekly
Trevor Eiselt	2/11/19-4/1/19	Bi-Weekly

*Figure 10: Schedule of Testing*

#### 5.4.5 Results

Throughout the development we have discovered that WordPress tends to not function correctly when a large file is uploaded to a user's page. To accompany this, we have made our website integrate other websites that can store larger amounts of data like (audio and video) via plugins and widgets. We have also done a couple of UI changes to make the website more user-friendly. By creating a better flow for the website, we think that this will increase user convenience. We still have a few features that we are finishing up and we will continue to test them in a similar fashion to ensure that our website can continue to run as intended. Specifically relating to the testing, we divided up the testing evenly between group members. Specific results of the test can be found in Figure 11, which is a table outlining all tests completed.

Tester	Test Case	Feature	Input	Expected Output	Actual Output	Pass/Fail	Reasons for Failure	Date
Cory	TC1	User Account	As a user, I can sign in to my WordPress managed user account. I utilized the login module on the main page.	User can login successfully using their user account credentials.	Sign in Successful	Pass	N/A	2/7/19

Ryan	TC2	User Account	As a user, I can click on the "Submit" button to create a Concerto account with the user information I have entered	User can create an account successfully using their personal user information	Account created	Pass	N/A	2/16/19
Trevor	TC3	User Account	As a user, I can click on account settings to manage my profile and settings.	User can edit their user profile, along with manage specific settings and account personalization's	User able to edit settings and customize profile using account settings	Pass	N/A	2/16/19
Cory	TC4	As a user, I can create a Group using the "Create New Group" button			Group Created	Pass	N/A	2/17/19

Figure 11: Testing Results

## 6. CONCLUSION

### 6.1 Fall Semester 2018

Most of our time on the project has gone towards researching potential competitors, features and development methods for our website. As a result of this research we now have a better understanding of how we want our website to look and operate. We hope to develop a superior tool by combining the best features of other social media sites with our own. We decided that WordPress would be the best platform for this specific project. This platform has allowed us to implement many of the features we have considered necessary, as well as offer features, we did not think were possible to complete over the course of this class. We hope to improve upon our user interface and add more features specifically related to music in the spring semester.

## 6.2 Spring Semester 2019

Throughout the past two semesters, our group has worked to deliver a functioning prototype that fit our initial vision for the project. As with any project, we dealt with a few roadblocks and speed bumps. We had our share of server issues, website crashes, and compatibility issues where we were forced to be adaptive, creative, and sometimes crafty with our solutions. By utilizing our vision from last semester and the results from our feedback tests, we were able to find functional, modern design that fit our requirements for the website. Since the spring, we've been able to implement the specific elements of Google Maps API and the Google Authenticator API. These were very important elements which really helped with the user experience. Being cyber security majors, we were not very confident in our ability to code a website from scratch. The WordPress platform was very useful throughout the project.

The IT expo was truly a great experience. We were able to talk with so many great people about our project. While we expected to talk about our project with others, we were not really expecting the terrific dialogue that often occur. We received many great ideas about our project, such as having a separate page for showcasing different venues. With all three members being musicians, this project was something we were passionate about. It's rewarding to see the final product of our countless hours of work and dedication.

## REFERENCES

1. Develop a Social Media Website With These 10 Code Techniques. (n.d.). Retrieved from <https://code.tutsplus.com/articles/develop-a-social-media-website-with-these-10-code-techniques--net-1804>