

# Milestone 3: More Detailed Requirements, Architecture, and Vertical Software Prototype

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**Course:** CEN 4010 - Principles of Software Engineering

**Semester:** Summer 2020

**Team Name:** FunkyTech

**Team Number:** 7

**Project Name:** Gather+

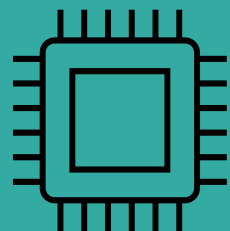
## Team Members

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# Peer Evaluation

We, the members of group seven, agree to the following percentage distribution for our involvement in the Milestone 3 assignment.

**Michael Simon** (25%) wrote the Risk Assessment portion of this Milestone 3 document.

**Brent Werne** (25%) researched software and media sources, created structural elements of the site including user forms and message boards with PHP and JavaScript, helped other members with coding, updated the non-functional section of this document, and created the UML design.

**Betsy Kuruville** (25%) also found software and media sources, created the site skeleton for the Gather+ site, populated the front-end structural elements and style for the feature-main, book hub, book placard, and wellspace pages, updated the use case and functional sections of this document, and contributed to work-flow management throughout the sprint.

**Michael Resendes** (25%) connected the Gather+ site to the necessary databases via phpMyAdmin, populated them, wrote PHP scripts for account functionality, created Bootstrap-based forms for user accounts, helped other members with coding and using GitHub, oversaw this Milestone 3 document, wrote the High-Level Architecture section, and created the video demo.

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# Executive Summary

## FunkyTech

People in today's world live in a very uncertain time. In the current year alone, we have seen unprecedented events that have taken both a physical and mental toll on the public. Over the past few months, the COVID-19 pandemic and quarantine practices have radically changed the lifestyles of billions of people around the globe. Many of us now lack the daily interaction we had with our friends, peers, and coworkers. Although things like social media can help remedy these feelings of isolation and separation, we believe these platforms do not go far enough in giving their users the camaraderie they desire.

We, the working members of FunkyTech, have decided that people now need a social platform that goes beyond surface-level sharing and posting. This decision of ours will take the form of our website Gather+, a platform based on connections rather than content.

Gather+ (pronounced Gather-PLUS) will allow its users to join communities centered on topics that interest them and communicate with other people within that group. Unlike other sites which use character/post limits and content rating algorithms that hamper communication, Gather+ will promote the idea that every user should be able to join a community and be a part of the conversation. Users will be encouraged to engage in thoughtful discussions centered on uplifting topics that many people are missing because of the pandemic.

COVID-19 has revealed that millions of people still struggle with the loneliness of quarantine/lockdown despite the abundance of social media platforms available in web and mobile form. Thus, Gather+ and its emphasis on "connection over content" will seek to bridge people together and form communities that will ideally outlast the pandemic.

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# Competitive Analysis

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Gather+	Competitors (Facebook, Twitter, Reddit)
Connection-Based	Content-Based
Equality of All Material	Content Rating
Positivity Focus	Monetization Focus
Ad-Free	Paid/Promoted Advertisements

The motto for the development of Gather+ is “Connection over content”, which is what we believe will separate Gather+ from many of the traditional social media sites used today. Sites like Facebook, Twitter, and Reddit all revolve around the idea of their users submitting content through their profiles. This content is then subject to a rating system (Facebook likes, Twitter retweets, Reddit upvotes) that prioritizes more popular content. These systems ultimately incentivize users to post content that has the best chance at being viral, and while this mindset does have its advantages (primarily financial ones), we believe it also has drawbacks that can prove detrimental to many users. Since more popular content is often easier to see on these platforms, some users may feel like their impact on the site may not be as important since they do not have as big a following as other users.

This is the issue that Gather+ seeks to resolve. Instead of “content-based”, Gather+ will be “connection-based” and allow all users to be on equal footing. Users will join discussions that will not be driven by a rating system. Therefore, all users can make a substantive contribution to the conversation. Users can measure their perceived success on Gather+ by the number of meaningful and engaging conversations they partake in, instead of feeling measured by a voting system. Additionally, Gather+ will place an emphasis on encouraging content, ensuring that users will enjoy the website and feel welcome on it.

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# Data Definition

## FunkyTech

### Team Definitions

#### FunkyTech

- The team name for Group 7 in CEN 4010. Composed of Brent Werne, Michael Resendes, Betsy Kuruvila and Michael Simon.

#### “Connection Over Content”

- The team motto for this project’s development. The emphasis is on designing our application to encourage users to engage in thoughtful conversation, and form lasting bonds with other users, rather than posting content for feedback.

#### Gather+

- The name of the website/web-based application that will be hosted on the team’s **LAMP Server**. (Pronounced: Gather-PLUS).

### Front-End Definitions

#### Bootstrap

- CSS framework used to standardize the design and appearance of the **Gather+** web application.
- **Bootstrap License**: <https://github.com/twbs/bootstrap/blob/v4.0.0/LICENSE>

#### Really Simple Syndication (RSS)

- Web-feed distribution method that will allow Gather+ to host a variety of article-related content provided by various websites and organizations.

### Back-End Definitions

#### LAMP Server

- Gather+ will be hosted on the team’s FAU LAMP (Linux, Apache, MySQL, PHP) server, which will handle all management of PHP and SQL utilized by the **Gather+** web application.
- **LAMP Server**: [https://lamp.cse.fau.edu/~cen4010s2020\\_g07/](https://lamp.cse.fau.edu/~cen4010s2020_g07/)

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## MySQL Database Management System/phpMyAdmin

- Gather+ will utilize a MySQL DBMS hosted locally on the team's **LAMP Server**. General editing and management of the database will be done through the phpMyAdmin tool also hosted on the **LAMP Server**.
- **phpMyAdmin**: <https://lamp.cse.fau.edu/phpMyAdmin>

## "user\_accounts" Database

- The "user\_accounts" database will be one of the MySQL databases hosted on **LAMP**. This database will store user information after they have created an account with **Gather+**. Information will include a user's first name, last name, chosen username, bcrypt encrypted password, e-mail address, and a list of the **Communities** he or she has joined.

## "Messageboard" Database

- Several "Messageboard" databases will be stored on the **LAMP server**. Each database will be linked to the **Placard** that hosts the **Community** discussion board on which users will communicate. **Messageboard** databases will store the usernames and the text of comments submitted by members of a given **Community**.

# Main Page Definitions

## Feature-Main Page

- The home/landing page of **Gather+**. Users will be greeted on-screen with several positive messages and images via a hero section/carousel. Users will be prompted to create an account or sign-in to a previously created account via a **Login Modal**. Signed-in users will then select one of the four central **Hubs** displayed on the **Feature-Main Page**.

## Hero Section/Carousel

- A visual feature found on most pages of the Gather+ site based on the Bootstrap concept of Hero images. It will consist of a single image, or a slideshow of images and/or text to showcase the following optional attributes: a series of positive quotes, links to external websites, or information about a given page.

## Login Modal

- A modal form that will appear on top of the **Main Page**, **"My Profile" Page**, and **Placard Page** allowing a user to sign-in to their **Gather+ Account** or follow a link to the **Sign-Up Page** to create an account.

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## “My Profile” Definitions

### Gather+ Account

- Accounts created by Gather+ users. Users will be able to customize their profile on the “My Profile” Page. Users will use their accounts to join Communities where they can partake in various discussions on a variety of topics.

### “My Profile” Page

- An account profile page where Gather+ users will be able to view and edit aspects of their profile. The page will display a user’s username, first and last name, e-mail address, and the list of Communities the user has joined.

### Blurb

- A short, optional biography a user may add to his or her profile once it has been created.
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## Wellspace Definitions

### Wellspace

- A section of Gather+ specifically dedicated to resources on COVID-19 and wellness. Relevant information will be posted here to keep users up-to-date on news regarding the pandemic, and what precautions they can take to keep themselves and others safe during quarantine/lockdown.

## Hubs Definitions

### Hubs

Separate web sections of Gather+ dedicated to a central topic that interest users. Default topics for each of the four hubs will be: Books, News Stories, Podcasts, and Games.

### Central Topic

The principal theme of each of the four hubs listed on the Feature Page of Gather+. These topics will be:

**Books:** The Books Hub will be dedicated to discussions on any fictional or non-fictional literature works, past or present. Some examples of possible subjects within the Books Hub include: narrative analysis, new book releases, and general conversations about certain authors, series, or genres.



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**News Stories:** The News Stories Hub will be dedicated to current events with an emphasis on positive and encouraging news that will uplift readers in a time of quarantine. Some examples of possible subjects within the News Stories Hub include: success stories within local communities, emerging charitable opportunities, and articles on efforts to combat the pandemic.

**Podcasts:** The Podcasts Hub will be dedicated to interesting podcasts that users within the hub can enjoy listening to regularly. Some examples of possible subjects within the Podcasts Hub include: a user recommending a new and relatively undiscovered podcast, and discussion on specific episodes of a series.

**Games:** The Games Hub will be dedicated to gaming and the connection it provides while practicing social distancing. Some examples of possible subjects within the Games Hub include: users looking to form groups for an online multiplayer games, tips regarding trending games, and user-recommended games that are ideal to play remotely.

## Placards Definitions

### Placard

Each **placard** will represent an individual media item such as a book, an article, podcast, or game. It will consist of an image, title, and associated button that links to a separate **Placard Page**. Each **placard** will be coupled with a brief description of said content via a modal.

### Placard Page

Every placard in a hub will link to a separate **placard page**. This page will feature three sections. The first section will be a larger image of the **placard** next to a full description of its content. It will have two buttons that a user can click on, the first for accessing content and the second to join a **community**. The access button will open up the second section of the same page, wherein an embedded e-reader, news article, podcast, or game will be provided. Likewise, the community button will enable a user to join the message board posted in the third section of the page. When clicked, this button will store the **community** name to a user's account.

### Community

A message board that will serve as the place of discussion for any given subject listed by a **placard**. Users will have the option to join a default **community** associated with each **placard** or create new ones.

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# Overview, Scenarios, and Use Cases

## FunkyTech

The Gather+ web-based application will serve to be, as its name implies, an online gathering place that closes the social distance created by COVID-19, in a unique and uplifting manner. Whereas self-promotion is the byproduct of many social media platforms, Gather+ focuses on positivity and connection through the formation of group discussions based on four distinct categories: books, news stories, podcasts, and games. Content for each category will be a curated selection of encouraging, intriguing, and mindful items hosted by Gather+ and sourced by other websites. The target audience for Gather+ is seen as youth ages 16 and above, including but not limited to students, young adults, and families.

Say the user is a 17-year old high school student named Ava who has been in quarantine for three months already, with only her mom for company. Not only is she restless, she misses her friends, and somehow making a TikTok video they like is not the same as getting together. She is also separated from the rest of her family, and the constant barrage of news about the pandemic gives her a perpetual sense of anxiety.

When Ava is introduced to Gather+, she'll be greeted by a banner of affirmative quotations on the feature page, which will also showcase a positive news story, a welcome message, and the four main categories inviting her to a new level of engagement. A simple, intuitive, and interactive GUI makes Gather+ easy for Ava to navigate with her average computer skills; and the premise of the site will be largely self-explanatory.

In order to access content and groups, Ava is prompted to create an account. Her account will consist of intentionally basic profile information, such as an avatar or a single photograph, a username of her choice, and an optional 300-character "blurb" biography. Upon creation and login, Ava can click on the icon for any of the four categories, each of which will lead to its own landing page known as a "hub".

Each hub will show Ava a series of books, news stories, games, or podcasts by way of a placard containing a thumbnail image. Ava can peruse each placard by sight or by the accompanying description of the subject matter. When Ava sees a placard that piques her interest, she can opt to join the associated community where she can discuss the subject of the placard with other members of that community. Each community will

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serve as a message board where Ava can post her thoughts and interact with fellow users who may do likewise. While Gather+ will furnish one default group for every placard, Ava can create her own groups in any given hub as well. This gives Ava the freedom to discuss more than just the pre-populated placards and post links to other books, stories, or podcasts that may interest fellow Gather+ users.

Now let us say that a man named Ben and his wife Lauren have been homeschooling their three elementary-aged children during the quarantine period. They have not been able to meet with their friends for drinks or have any downtime from parenting. He and his wife are on edge, and no amount of streaming shows or movies online can distract them from the inexorable tension of quarantine.

Ben and Lauren are introduced to Gather+ and are drawn to the game category. When they click on the icon, they see that it is somewhat different from the other three hubs. Placards will open up embedded games or links to external game websites like [codenames.net](https://www.codenames.net/), Roblox, and more. Article links will also guide them on the best online games to play during quarantine and how to host virtual game nights. Ben and Lauren finally have a way of connecting with peers their own age.

Teen Ava, along with young parents Ben and Lauren, will also notice a menu link that leads them to a section of Gather+ called “Wellspace”. The Wellspace section will offer resources via links and articles on staying healthy and upbeat during the pandemic, and only the most relevant news regarding the same.

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# High-level Functional Requirements

## FunkyTech

1. The Gather+ site shall permit each user to create an account.
  - Credentials for the account will consist of a username and password.
  - Full name and email address will be required at sign up/account creation.
  - Account attributes will include a photographic/avatar icon to be used throughout the site when the user is logged in.
  - Essential purpose of the account is to permit access to media and groups.
  - Data associated with an individual user shall be saved via a database and displayed in his or her account.
2. The Gather+ site shall provide users access to multimedia content.
  - Books and podcasts will be available via embedded pdf viewers and audio players, respectively.
  - News articles shall be sourced via RSS feeds from external news websites/applications.
  - Links to, and guidelines for, online game websites will be listed.
3. The Gather+ site will render messaging boards for topic-related discussions, known as “communities”.
  - Each media item will be coupled with a default community.
  - Users will be able to create communities on topics of their choice within each media section.
  - Communities will enable users to create typed posts and interact with other users.
4. The Gather+ site shall present information concerning the COVID-19 pandemic and wellness.
  - Resources about the pandemic will be featured by way of articles and links to external websites.
  - A messaging board, called a forum, shall be made available in this section for questions related to the pandemic and wellness.

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# List of Non-functional Requirements

## FunkyTech

The minimal performance requirements for the Gather Plus social media platform will be as follows:

- The Gather+ website will allow up to 20 users posting on a single community board at a time.
- The Gather+ graphical user interface will be extremely easy to use. Learning how to navigate the website should take less than 30 minutes on average.
- A b-crypt hash function will be used to secure login information. It will hide users' personal account data from potential threats.
- Expected load time for each page will be under three seconds, even if internet connection is below average.
- All data will be stored in SQL tables hosted by the team's account on the LAMP server.
- The browsers that the Gather+ website will be tested on are Firefox, Chrome, Microsoft EDGE, and Safari.
- The time it will take to refresh the page after a crash will be under five seconds.

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# High-level System Architecture

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## Front-End Architecture

### Languages/Scripts

- FunkyTech will utilize markup language HTML5; along with CSS3, Bootstrap 4, and JavaScript for the front-end design of the web application, Gather+.
- HTML, CSS, and Bootstrap will be used to design the layout of the web application and present a clean and concise UI.
- JavaScript and jQuery will be used to provide added functionality to the application, which includes the use of image carousels, logic analysis, API communication, and Bootstrap animations.
- All language/script files will be hosted on the team's LAMP server, as well as on the team's GitHub repository.
  - **LAMP:** [https://lamp.cse.fau.edu/~cen4010s2020\\_g07/](https://lamp.cse.fau.edu/~cen4010s2020_g07/)
  - **GitHub:** <https://github.com/CEN4010-S2020-G07/CEN4010-S2020-G07>

### Browser-Support

- Gather+ will be coded and updated to ensure all features on the application are compatible with the last two versions of the most commonly used desktop web browsers: Chrome, Firefox, Microsoft EDGE, and Safari.

## Back-End Architecture

### Languages/Scripts

- FunkyTech will utilize PHP and MySQL for the back-end design of Gather+.
- Both PHP and MySQL will be used to communicate with the team's LAMP server, which will host the web application and all the databases used by the app.
- PHP will be used to dynamically update aspects of the application's UI, which includes adding icons that appear once a user has signed-in, updating

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Community discussion board content, and providing informational messages that guide users on how to interact with the application.

- PHP will also be used to access and modify the various MySQL databases that will be used by the application. PHP and its use of SQL commands will provide the functionality for users to create and edit their Gather+ profiles, become members of Communities, and submit to specific Community discussion boards.

## Databases

- Databases for Gather+ will be hosted on the team's LAMP server and will be monitored and maintained primarily through the server's phpMyAdmin tool.
- Gather+ database servers will be MySQL-based and will contain tables that hold user information, community membership, and discussion board content.
- An Account table will be created manually through the phpMyAdmin tool while message board tables will be created dynamically through the use of PHP scripts found on Gather+.

### Account Database

- The Account database will serve as the repository where Gather+ user information will be stored. A general list of items that will be stored in the database table will be as follows:
  - A User's unique "UserID number" [INT(11); Primary key of table]
  - A User's created "username" [VARCHAR(30)]
  - A User's "password" [CHAR(60); stored on the database as a 60 character encryption generated via a bcrypt hash function]
  - A User's "first" and "last" name [VARCHAR(25); VARCHAR(25)]
  - A User's "email" address [VARCHAR(40)]
  - A User's joined communities [tinyINT(1); a value of 1 indicates the user has joined that community]

### "Messageboard" Database

- The messageboard database will serve as the repository where discussion comments will be stored along with the username of the contributing user. Messageboard database tables will be generated concurrently as placard topics are added to a hub. Every time a new placard is created on a hub, a Messageboard database table will be generated with the following content:

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- A unique “MessageID number” [INT(11); Primary key of table]
  - The “username” of the user sending the message [VARCHAR(30)]
  - A “text” string that contains the content of a message [TEXT]

## Database Search Protocol

- MySQL databases will be searched and updated using PHP and SQL commands embedded within the HTML documents of the application.
- Any database commands regarding user accounts will first require a connection to the LAMP server using the group’s LAMP credentials (PHP). A user will then be required to sign-in to their Gather+ account with their username and password. The username will be used to search for the user’s profile within the Account database with PHP-embedded SQL commands.
- The password entered by the user will be encrypted through a bcrypt “hash\_function()” that will generate a unique 60 character string. If this generated password and the username then matches any username and encrypted password within the Account Database, the user will then be connected to their account and will be able to edit any information within their account.

## Additional Architecture

### Media Storage

- Images used for carousels, placard headers, icons, user profile pictures and all other related images will be stored under specified “images” files located on the team’s LAMP server.

### Podcasts

- Podcasts will be hosted by the Podcast Hub through a free tool from Radio Public at [podcasters.radiopublic.com](http://podcasters.radiopublic.com). It allows for the search of any podcast show and generates an embeddable player with HTML iframe code, and includes its metadata. The audio player will then be placed in a Placard Page, allowing a user to listen and communicate with other users within the Community on that page. The process and format will be the same for every Placard and Placard Page in the Podcast Hub.

Note: other sources such as NPR may be utilized as well.



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## News Articles

- News articles and their accompanying thumbnail and content description will be provided by RSS feeds embedded within the code of the Gather+ web pages.
- The Feature-Main Page of Gather+ will host articles from a specific positive-news source with the RSS script included in its HTML code.
- The News Hub will also display Placards that link to their respective Placard Pages. Those pages will contain RSS feeds that open articles in their source websites.

## Books

- Books will be provided via embedded PDF viewers that display files directly from PDF Drive, a free source of thousands of e-books in PDF format.
- PDF files of e-books will be stored locally on the LAMP server and read through an iframe HTML tag.
- Metadata for books (and news), cover images, and book descriptions will be pulled from an e-reader management software program called Calibre. It is licensed under the GNU General Public License version three.

## Game Hosting

- The “Games” hub of Gather+ will be composed of two separate types of virtual games, divided into two sections on the “Games” hub.
- Both sets of games will include placards that display relevant information on the game and how to play.
- The first set of games will be embedded within the Games Hub page, which will allow users to access them in a separate window that will display the game and allow a user to begin playing.
- The second set of games will be composed of links to free games hosted on other sites. These will be represented on placards that contain a hyperlink to the game in addition to information on the game itself.

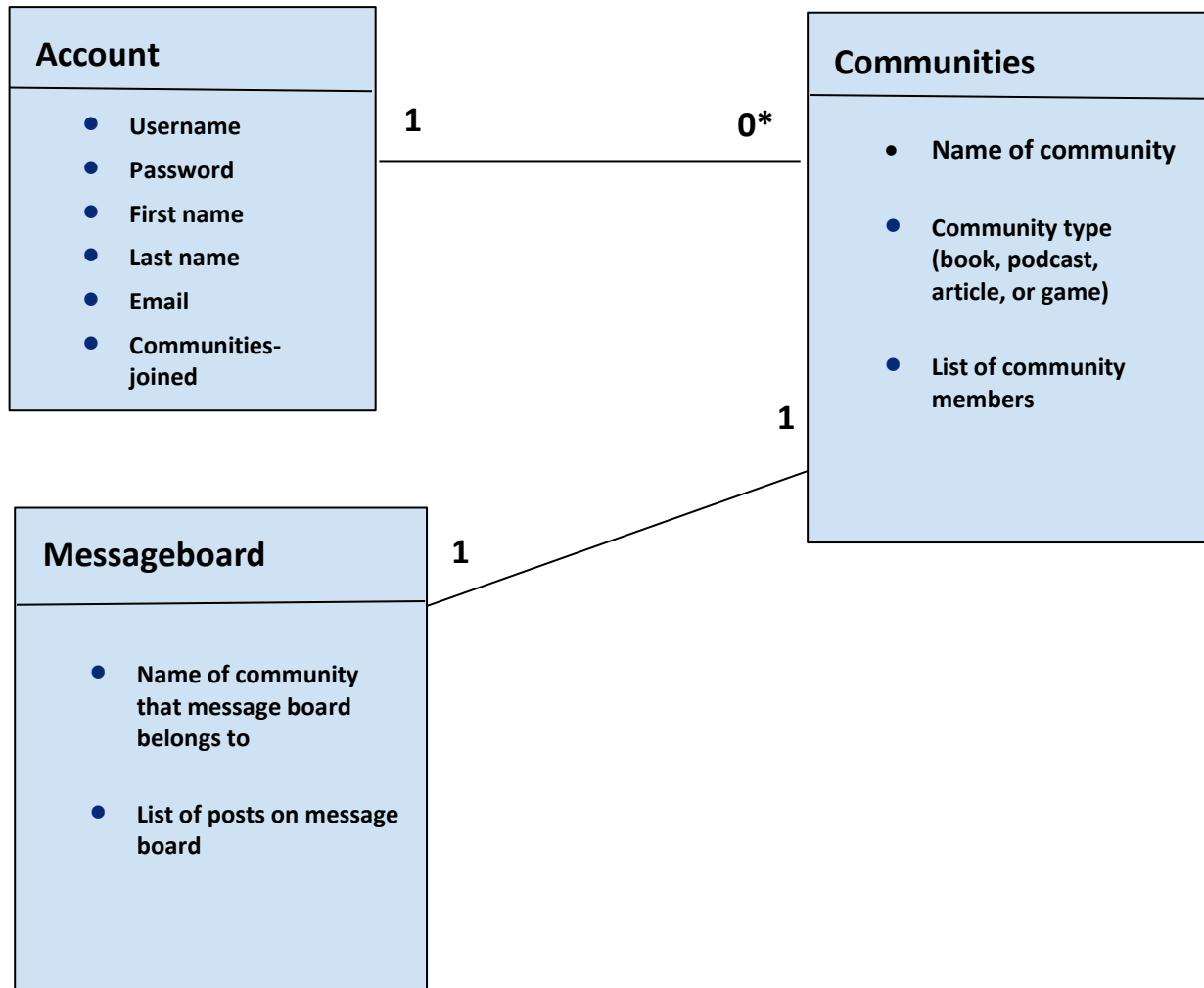
## External Code/Licenses:

Code	License
Bootstrap 4 (V4.0.0)	<a href="https://github.com/twbs/bootstrap/blob/v4.0.0/LICENSE">https://github.com/twbs/bootstrap/blob/v4.0.0/LICENSE</a>
Calibre	<a href="https://github.com/kovidgoyal/calibre/blob/master/LICENSE">https://github.com/kovidgoyal/calibre/blob/master/LICENSE</a>

# High-Level UML Design

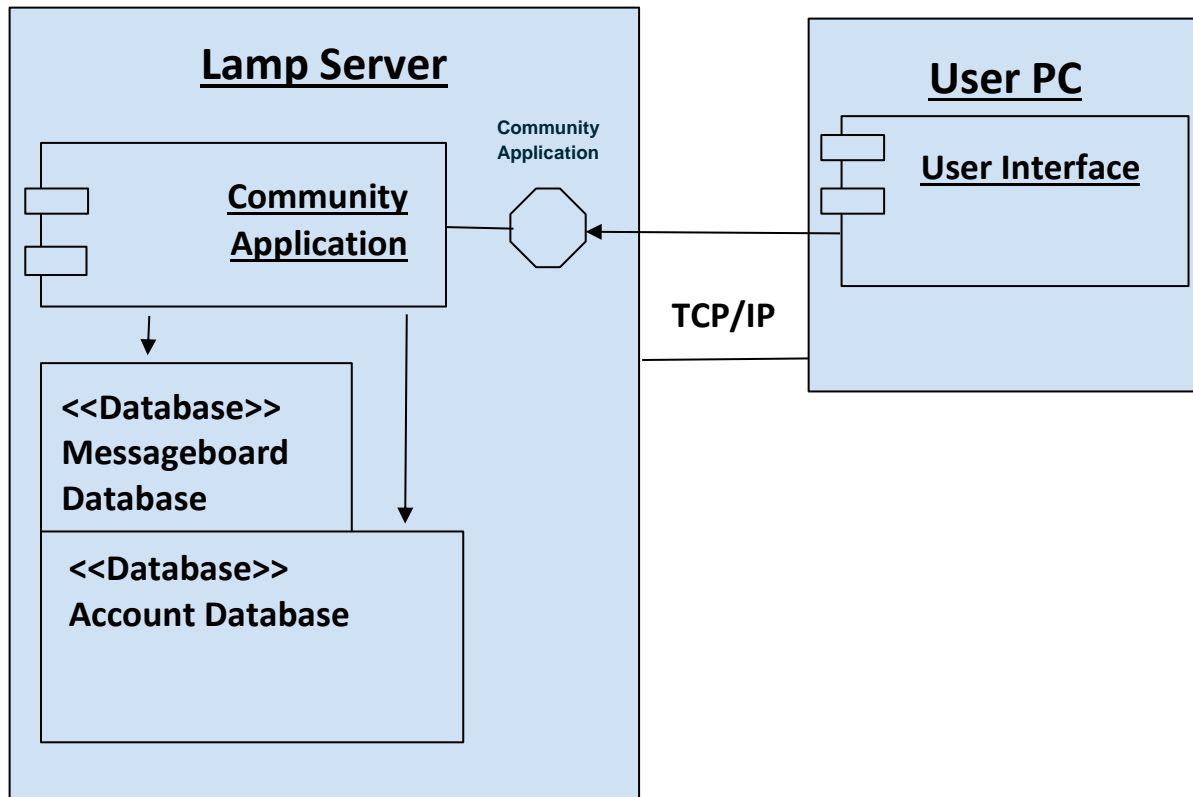
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## UML Implementation Classes Diagram:



A user may join as many communities as he or she desires. Each community has a message board assigned to it. When the user wants to interact with a message board, he or she must first most join the Community to which that message board is assigned. While the user is a member in that Community, he or she can post messages onto the message board and view them as well.

## UML Component and Deployment Diagram:



The User's PC views the user interface, and the user interface interacts with the community application on the Lamp Server. The community application is connected to the different Messageboard databases that hold the messages for the different communities offered on the site. This allows the user to post messages and read messages through the community application. The community application is also connected to the Account database. It can check if a user is a part of a community and update his or her status as a member of the community.

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# Risk Assessment

## FunkyTech

### Technical Risks

- **Risk:** Updating regular content to the Gather+ application may prove to be a challenge as we may not be able to provide 24 hour support for the site. Thus, certain hubs that require more regular maintenance and updates, such as the books or podcasts hubs, may need to be approached differently from a design standpoint than the other two hubs.
- **Possible Solution:** Researching different methods of discovering and updating content on a web page may allow these hubs to function properly without the need for constant supervision. We might be able to discover APIs or web feeds that provide the steady stream of updates we would need for the books or podcasts hub.

### Legal/Content Risks

- **Risk:** As it currently stands, the sources used to provide Gather+ with books, podcasts, news articles, and virtual games are all believed to be fair-use, free-to-use, and/or web syndicated. However, as with most issues regarding legality and copyright, more careful research and consideration will need to be done by our design team before we can confidently host this content on our application.
- **Possible Solution:** A more thorough examination of each source's legal documents, terms and conditions, and disclaimers would allow the Gather+ team to correctly ascertain which possible content sources will be fair-use for our application. As the team begins development for the product beta, we intend to carefully vet these sources before including them in the app.

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# Vertical Prototype Information

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## Vertical Prototype Link

- [https://lamp.cse.fau.edu/~cen4010s2020\\_g07/vertical\\_prototype/](https://lamp.cse.fau.edu/~cen4010s2020_g07/vertical_prototype/)

## Demonstration Video

- <https://youtu.be/4mvtAf31NN4>

## Prototype Repository

- <https://github.com/CEN4010-S2020-G07/CEN4010-S2020-G07/tree/master/vertical%20prototype>