

# **Business Requirements Document:**

## **Eden Fresh**

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# 1. Executive Summary

This Business Requirements Document (BRD) outlines the requirements for our web application, Eden Fresh. It contains both functional and non-functional requirements, our objectives for the project, the reasons why our product is needed, and the scope of our project. The BRD will be used to determine what needs to be done and a detailed explanation of our product.

## 2. Project objectives

Eden Fresh's primary objective is to provide an online platform for urban growers and buyers to connect with each other, allow growers to sell their products and receive profit, while giving convenience for buyers to purchase homegrown ingredients around their neighborhood. Eden Fresh is a web application that aims to help bridge the gap between urban growers and potential buyers within their neighborhood. The primary objective is attainable as a result of the features that our web application provides. It will allow growers to post their current listings for sale and buyers will be able to reserve a selected stock. Once the grower has replied to a request, the web application will allow growers and buyers to interact with each other. It is up to the growers and buyers to set a designated meeting place for a transaction to happen. We aim to finish the development and launch Eden Fresh by May 2022.

## 3. Needs statement

Currently, there are very few options for growers to sell their produce to the public which ends up leading to food waste. On the other hand, there are currently many individuals who would want to buy from their local community because the produce they are looking to buy is

either obscure or they would rather buy fresh produce from their local community; however, they do not have any means to connect to their local growers. Eden Fresh helps build the gap between the grower and buyer. Eden Fresh is a free web application that growers and buyers can access and use as a means to connect to each other. If the growers have produce that the buyer needs then the buyer can put the produce on reserve and if there are any questions regarding the transaction the buyer or grower can reach out and connect with each other using the chat feature of the application.

## 4. Project Scope

### 4.1 In Scope

The following areas are in scope for this project:

- Our web app will support:
  - Google Chrome version 89 and any later versions released until May 2022
  - American English, be available for anyone within the United States only, U.S. metric system, and support U.S. currency
  - English-translated name of the produce if exists and their English-transliterated name if a translated name does not exist
  - Users who are 18 years or older

### 4.2 Out of Scope

The following areas are out of scope for this project:

- Monetary transactions will not be supported by our web application

- No regulation on how or where the transaction will occur

## 5. Functional & Non-Functional Requirements

### 5.1 Set-up Shop

- Value:
  - Set-up shop will help the value of Eden Fresh because it allows the grower to post their current produce listings for sale on their profile.
- Dependencies:
  - To create a post, sellers must have to input all the required fields of information regarding the product
- Functional Requirements
  - Sellers are able to post their current products for sale and their preferred meetup location on their profiles.
    - The preferred meetup location will be used as the criteria for the miles radius search.
    - The preferred meetup location will default to the seller's home location, but the seller can change it to another location at any time.
      - The preferred meetup location will not be visible to see until a transaction is ready.
      - Sellers' location will be used with their permission in order for the system to facilitate search features.

- Sellers are able to set the necessary information for each product, such as the current number of stock, price per pound or piece, images of the product, and a description of the product.
  - Whether the price is per-pound or per-piece is chosen by the seller.
  - A posting is limited to 4 images and 40 MB per image.
  - The description is limited to 1000 UTF-8 characters.
  - Sellers will be able to update any of the product information at any time.
- Sellers are limited to having up to 20 active posts at a time.
  - Sellers cannot post another listing if they already have 20 active listings.
- Non-Functional Requirements:
  - The system will generate only one post at a given time
  - Images uploaded to the product description are considered fast if it is uploaded within 5 seconds.
  - The system would be considered fast if the posts are uploaded to the page within 5 seconds.
  - Posts last indefinitely and can be removed by the seller at any time
  - This feature will be available for users to use as long as they do not have 20 active posts
  - The error rate of users attempting to post a product with invalid information is within 10%
- Failure Behavior
  - User attempts to post without inputting all the necessary product information
    - The system will not allow the user to post it and a pop up will inform the user that there is missing information
  - User attempts to post when they have 20 active posts already

- The system will inform the user that they are over their post limit
  - User attempts to upload more than 4 images, the image that is larger than 40 MG, they write a description that is not UTF-8 characters
    - The system will inform the user of an error
  - If the user attempts to type more than 1000 characters.
    - The system will stop the user at 1000 characters
  - User attempts to post but the system is unable to for whatever reason (ie. internet failure)
    - The system will inform that it was unable to post at that time
- Success Scenarios:
  - The price, image(s), and description of the product will be added onto the product post.



## 5.2 Reservation and Transaction

- Value:
  - Reservation and Transaction will help the value of Eden Fresh because it allows buyers to send a reservation request to the seller regarding the amount of produce they desire to reserve on a listing.
- Dependencies:
  - There must be in-stock produce on a sellers profile for buyers to reserve
  - Buyers can reserve produce given that amount doesn't exceed the stock amount
  - To reserve a product, the stock amount has to be greater than zero
  - For a transaction to go through, both the buyer and seller have to confirm the request within the allotted time.
- Functional Requirements
  - Buyers are able to reserve their desired product from a seller by selecting an amount from the current unreserved stock and sending a request to the seller.
    - Buyers are unable to reserve produce that is currently out of stock or reserve an amount that is greater than the current stock.
    - Buyers are able to send the request to the seller after confirming the amount they have selected
    - Sellers will receive a notification for the request to accept or deny it.
      - Sellers also have the option to cancel a reservation after accepting.
      - Once a reservation is accepted, the buyer will receive a notification about its acceptance and the reservation will last for 72 hours without confirmation of a transaction by the seller.

- Once the reservation is confirmed by the seller, the product stock will be reduced by the number reserved.
  - If the transaction is not confirmed within 24 hours, it will be canceled and the stock is not reduced.
- Buyers can also cancel a reservation at any time.
- Buyers can send a request to the seller to change the reserved amount to another non-zero amount within the unreserved stock count.
  - The request can be sent after the reservation is accepted.
  - Upon request, the seller will receive a notification and must accept or decline before the transaction can be confirmed. The confirmation date is also extended by 24 hours if the initial request was already accepted.
    - If accepted, the reserved amount is changed to the buyer's desired amount.
    - If declined, the reserved amount remains the same.
- After the reservation is accepted, the buyer is able to view the state of the transaction according to the seller.
  - The seller is able to set the state to one of 3 states: "Processing", "Pending Approval", and "Ready".
  - The initial state of the reservation after acceptance is "Processing".
  - If the buyer has requested a change to the reservation, the state is automatically set to "Pending Approval".
    - Once the reservation is accepted or declined, the state is automatically set back to "Processing".

- Once the product is gathered and the seller is ready to perform the transaction, the seller will manually set the state to “Ready”.
  - Once this occurs, a chat request will be sent from the seller to the buyer (if there is not already a chat open between the buyer and seller), and a notification will be sent to the buyer, notifying that the transaction is ready.
- Non-Functional Requirements:
  - For a given produce listing, the system will generate only one reservation request
  - The number of product reservation requests that our system will handle will double in the future
- Failure Behavior
  - The user attempts to reserve more than what the seller has
    - The system will inform the user that there is not enough stock available to fulfill their request
    - The system will not reserve any product for the user until it's at or under the listed stock
- Success Scenarios:
  - If buyers request a valid amount of stock for an available product, then the system will send a notification to the seller
  - If a user cancels a product reservation request or a seller denies a request, then it would be removed from the system and be no longer viewable.
  - If a seller accepts a product reservation request, then the system would deduct the request amount of stock from the available stock and send a notification to the buyer

- If a buyer requests to update the initially requested amount of stock and it is approved, then the initially requested amount will be changed and the currently available stock will be changed.

## 5.3 Request Fulfillment

- Value:
  - Request Fulfillment will help the value of Eden Fresh because it allows buyers to post a request for a specific amount of produce that is visible to all sellers.  
  
Furthermore, sellers can leave a post on the buyer's request, with a price offer to fulfill their request.
- Dependencies:
  - There must be sellers in the system in order for buyers to have their requests fulfilled
- Functional Requirements:
  - Buyers are able to post a request for a specific amount of produce that is visible to all sellers.
    - The request can be left posted for 30 days and canceled by the buyer at any time.
      - If the request is left unfulfilled for more than 30 days, then it is automatically removed.
  - Sellers can leave a post on the buyer's request, with a price offer to fulfill their request.
  - Once the buyer has selected a seller to fulfill the request, the request is removed.
  - After selecting a seller, the buyer can see the state of the order.
    - The seller and the app are able to set the state to one of 2 states: "Processing" and "Ready".
    - The initial state of the reservation after acceptance is "Processing".

- Once the product is gathered and the seller is ready to perform the transaction, the seller will manually set the state to “Ready”.
  - Once this occurs, a chat request will be sent from the seller to the buyer (if there is not already a chat between the buyer and the seller), and a notification will be sent to the buyer that the transaction is ready.
- Non-Functional Requirements:
  - The system will generate only one request fulfillment bid posting at a time
  - The system will be considered fast if the post is posted within 5 seconds
  - The posted request will be viewable by other users for 30 days unless it is removed by the user at any given time
  - The system will automatically remove the request from the database when it is left for more than 30 days or removed by the user
- Failure Behavior:
  - User tries to post a request for an nonexistent ingredient
    - System will not allow the request to be posted and an error will show up to inform the user
  - User tries to post a request but is unable to for whatever reason (ie. internet failure)
    - The system will inform that it was unable to post at that time
- Success Behaviors:
  - If a buyer posts a request fulfillment post, then it will be viewable for other users to see and will be left available for 30 days
  - If a seller replies to a buyer’s request fulfillment post, then it will be viewable for other users to see and the user that posted it will be able to accept the request

- If a buyer accepts a proposed offer, then it will be removed from the system and no longer be viewable for other users to see and reply to

## 5.4 Miles Radius Search

- Value:
  - Miles Radius Search will help the value of Eden Fresh because it gives users the ability to do a miles radius search around an inputted location and find ingredient listings.
- Dependencies:
  - The system will only be able to get a user's current location if
    - the user allows the web application to obtain their location and
    - the user location service is on
  - In order to conduct the miles radius search, users must use their current location or input a specified location
    - Locations inputted must be valid in order for the search to work
- Functional Requirements:
  - Buyers will be able to search for ingredient listings within a specified distance of their choosing from a location they have set.
    - Buyers will be limited to a 5, 10, or 15-mile search radius which allows buyers to search for sellers around a location of their choosing.
    - Buyers are able to use their current location or set a specific location as the center of the area search
      - Buyers' current location will be used as their placeholder location until they have changed it to a location of their choosing
  - Users' current location will be used with their permission in order for the system to facilitate search features.
    - The buyer is also able to change their current location to a valid location



- Non-Functional Requirements:
  - The system is considered fast it is able to filter the results within 5 seconds
  - Unless permission was allowed, the system will not be able to get the user's location and will notify the user
  - The error rate of users attempting to search with an invalid location is within 10%
  - There's a 75% chance that an error within our system will be resolved within 24 hours
  - The system must ask the user for permission to use their current location in order to be compliant in using location services
- Failure Behavior:
  - The user attempts to input an invalid location
    - The system will not be able to find the location, therefore the system will inform the user that the location cannot be found
  - The user attempt to use their current location when their location is unable to be seen
    - When their location service is off:
      - The system will inform the user that their current location cannot be use
    - When they have not given permission to the webapp :
      - The system will inform the user that it is unable to access the user location until permission is given
- Success Behaviors:
  - Depending on if a buyer uses their current location or an inputted location as their search location, then the system will display all of the available ingredients within their search location

- The search radius will be constrained to a 5, 10, or 15 miles radius and will display all the available ingredients within the constraints
- Users will be able to change their search location at any time and the system will use the inputted location as their search location.

## 5.5 Cuisine Filter

- Value:
  - Cuisine Filter will help the value of Eden Fresh because it gives users the ability to filter their miles radius search results by selecting their desired cuisine.
- Dependencies:
  - The cuisine filter can only be applied after the miles radius search has been conducted
- Functional Requirements:
  - Buyers have the option to refine their search results by using the cuisine filter. This applies a filter to the buyers' miles radius search in order to find sellers that specialize in their desired cuisine
    - Buyers will be able to select predefined cuisine(s) applied for their filter and the results from their miles radius search will be refined down to the specified cuisine.
      - List of Possible Cuisines to Select:
        - Asian
          - Chinese, Japanese, Indian, Korean, Thai, Vietnamese
        - European
          - French, Greek, Italian, Spanish
        - Latin American
          - Mexican
- Non-Functional Requirements:
  - The system is considered fast if it can filter the results within 5 seconds

- The error rate of users attempting to search with an invalid location is within 5%
- As long as the mile radius search feature is functional, users are able to apply a cuisine filter to their search
- If the miles radius search feature becomes unavailable, then the cuisine filter will be down until miles radius search feature becomes available
- Currently, the system will support 11 different possible cuisine filters and will support more in the future
- Failure Behavior:
  - The user attempts to select a cuisine when the address is invalid
    - The system will send an error message and not allow the search to go through
- Success Behaviors:
  - Depending on the filter that the user has applied to their search results, the system would then filter down the search results to only show ingredient listings of the selected cuisine

## 5.6 Real-Time Notifications

- Value:
  - Real-Time Notifications will help the value of Eden Fresh because it lets the users have a way of getting notifications regarding updates to their reservations/requests, direct messages, and product updates.
- Dependencies:
  - To receive notifications, users must opt-in to receive notifications, follow a buyer, and have a current reservation or request
- Functional Requirements:
  - Users will be able to receive and view their real-time notifications
    - Users will be able to change their real-time notification settings at any time
  - The default notifications that users will receive are product updates, direct messages, ratings and reviews made about them or their products, and update notifications regarding their current reservations
  - Buyers must opt-in to get notifications about followed sellers individually
  - All users can opt to not receive product update notifications, direct message notifications, ratings and reviews made about them or their products, and notifications from sellers that they follow.
    - Users cannot hide notifications regarding product reservations and request fulfillment.
  - Users can delete one or multiple notifications.
- Non-Functional Requirements:

- The system is considered fast if the notification shows up on the user's page within 5 seconds
- Notifications are not shared between other users. Users that received the notification are the only ones that are able to view it.
- All notifications saved will be automatically deleted every 6 months (January 1st and July 1st) unless users choose not to delete the messages.
- Users will be able to receive real-time notifications within 90% of the time without failure.
- Failure Behavior:
  - The user tries to view/get notifications before giving permission for the system to do so
    - Until the user allows the system to do so, via the settings page, the user will be unable to receive any notifications
- Success Behaviors:
  - If a user has opted-in to get notifications about followed sellers individually, then the system will send the user those notifications and the user is able to view them
  - If a user has opted-out to no longer receive product update notifications, direct message notifications, ratings and reviews made about them or their products, and notifications from sellers that they follow, then the system will no longer notify the user regarding them
  - Users will be able to delete one or multiple notifications, so the selected notifications for deletion will be removed within the system

## 5.7 Transactions View

- Value:
  - Transactions View will help the value of Eden Fresh because it gives users the ability to see a list of all accepted reservations and request fulfillment bids involving them, sorted chronologically, latest-first.
- Dependencies:
  - Users must have accepted reservations or request fulfillment bids in order for this view to have content within it
- Functional Requirements
  - Users will be able to see a list of all accepted reservations and request fulfillment bids involving them, sorted chronologically, latest-first.
    - If a chat is open between the user and the other party of a transaction, they can access that chat through the transaction listing.
    - When a transaction is ready, they will be able to view street directions to the transaction's meeting point.
    - Edits to the transactions can be initiated from this view.
  - Cancelled and completed transactions are also visible but can be removed by the user.
- Non-Functional Requirements
  - The loading of the transaction page is considered fast if the page can be loaded within 5 seconds
  - Users will be able to view current and completed transactions within 90% of the time without failure.

- If any of the features that can be accessed through the transaction view were unavailable, then they cannot be available in this feature until they are available.
- Transactions will be listed in chronological order. The most recent transactions will be placed at the top and the older ones will be placed at the bottom.
- Transactions are not shared between other users. Transactions that are being made and its information are only available to the parties involved in the transaction.
- Failure Behavior
  - User attempts to view a reservation or request when no other user has accepted/fulfilled the transaction
    - The system will not have that transaction in the page
- Success Behaviors:
  - Users will be able to view the list of all transactions that they have initiated in chronological order from newest to oldest.
  - If a user selects to delete a completed or rejected transaction within the list, then the selected item(s) will be removed from the system.
  - If a chat is open between the user and the other party of a transaction, they can access that chat through the transaction listing.
  - When a transaction is ready, users will be able to view street directions to the transaction's meeting point.
  - Users are able to edit in-progress transactions from this view, so the system must be able to update a given transaction if there were changes made



## 5.8 Meeting Point Directions

- Value:
  - Meeting Point Directions will help the value of Eden Fresh because users will have access to a map showing street directions from a location of their choosing to the seller's meetup location
- Dependencies:
  - A buyer's reservation or request fulfillment bid must be ready in order to access the map of street directions to the meeting location
- Functional Requirements:
  - Once a buyer's reservation or request fulfillment bid is ready, they will have access to a map showing street directions from a location of their choosing to the seller's meetup location.
    - With the users' consent, their current location will be used as the origin point to connect to the preferred meeting location as the default.
      - The origin location to begin directions from can be changed by the user.
    - Sellers will be able to change the preferred meeting location at any time.
  - Once the respective transaction either expires or is marked complete by the seller, the buyer will no longer have access to the seller's location or directions there.
- Non-Functional Requirements:
  - The system will not store the user's location/information once the transaction is completed

- The system would be considered fast if it is able to retrieve the user's location and load up directions for the user within 10 seconds
- Unless permission was allowed, the system will not be able to get the user's location and will notify the user
- The error rate of users attempting to search with an invalid location is within 10%
- There's a 75% chance that an error within our system will be resolved within 24 hours
- The system must ask the user for permission to use their current location in order to be compliant in using location services
- If the 3rd party Maps and Directions Service our system is using becomes unavailable, then the feature will be inaccessible to users until the 3rd party service becomes available again
- Failure Behavior:
  - The user uses an invalid start point
    - the system will be unable to find the address, therefore the system will show an error message and not be able to give directions
  - The user uses their current location
    - Before allow the system to access their location
      - The system will show an error message and ask the user to go into setting and allow the system to use their current location
    - When their location is turned off
      - The system will show an error message of being unable to retrieve their current location
  - The user tries to view the address before the transaction has been confirmed
    - The system will not allow the user to see the meeting point location

- Success Behaviors:
  - Depending on if a buyer uses their current location or an inputted location as their origin location, then the system will display the directions from the origin location to the meet-up location
  - Users will be able to change their origin location at any time and the system will use the inputted location as their origin location.
  - Once a transaction has been completed, the system will prevent the users from attempting to view the meet-up location and the directions to there

## 5.9 Following Sellers

- Value:
  - Following Sellers will help the value of Eden Fresh because it gives the buyers the ability to follow their preferred sellers and receive notifications regarding their product postings.
- Dependencies:
  - Users will only be able to follow sellers if the seller has not blocked them
- Functional Requirements:
  - Buyers will be able to follow sellers, which adds them to a list of sellers they follow and lets them receive real-time notifications if the seller has restocked a product or posted a new product on their profile
    - Buyers will be able to follow sellers through the seller's profile.
    - Buyers are able to unfollow sellers at any time, which removes them from their following list.
  - Buyers will be able to view their following list on their profile.
    - Users are able to view another's following list by going onto their profile.
      - Users will be able to make this information visible or hidden.
  - An individual buyer can follow up to 300 sellers.
- Non-Functional Requirements:
  - The system is considered to be fast if the buyer is able to see the seller's profile within 5 seconds.
  - The system is considered to be fast if the user's following list is updated within 5 seconds.
  - The error rate of users attempting to follow another user is within 5%

- The system will keep all user's followings lists private and hidden from view by other users
- An individual user can follow up to 300 sellers. The system will be able to follow double the current amount in the future
- An individual user can follow other users as long as they do not currently have 300 sellers in their following list
- Failure Behavior:
  - The user tries to follow a seller that has blocked them
    - The system will not allow the user to follow the seller
  - The user tries to follow a seller when they have already followed 300 sellers
    - The system will inform the user that they have exceeded the limit and not allow the user to follow any more sellers.
- Success Behaviours:
  - When a user chooses to follow a seller, the system will add the chosen seller to the user's following list
  - If a user attempts to follow another seller and they have 300 sellers in their following list, then the system will prevent the user from following them
  - If a user chooses to unfollow a seller, then the system should remove the chosen seller from the user's following list
  - Once an individual user follows a seller, then the system should begin sending notifications regarding the followed seller

## 5.10 Rating and Review

- Value:
  - Rating and Review will help the value of Eden Fresh because it gives users the ability to rate the experiences that they have with each other based on a transaction that they had. Furthermore, this lets users know who is trusted to conduct business with and users who are not trusted.
- Dependencies:
  - A transaction must be completed in order for the buyer and seller to rate and review each other
- Functional Requirements:
  - Buyers and sellers will be able to rate and review each other once a transaction between them has been completed or cancelled.
    - Buyers and sellers are allowed to rate each other from a 1-5 star scale.
    - A user can rate and review any specific user and product only once, but it can be changed at any time.
    - Buyers will be able to rate and review the product(s) that they have received and their experience with the seller. Sellers will be able to rate and review their experience with the buyer.
      - A review is limited to 4 images and 40 MB per image
      - The review is limited to 1000 UTF-8 characters.
  - Buyers and sellers are able to view all ratings and reviews that others have posted.
    - Ratings and reviews regarding a buyer or seller will be viewable on their profile

- Ratings and reviews regarding a product will be viewable on the product listing
- Non-Functional Requirements:
  - The system is considered fast if the user is able to post their rating and review within 3 seconds
  - The system will generate only one rating and review per product or user
  - The system will ensure that none of the user's personal sensitive information is posted, unless the users themselves wrote it in the description.
  - The error rate of users attempting to follow another user is within 10%
- Failure Behavior:
  - The user tries to rate and review a user that they have not completed a transaction with
    - The system will return an error and not allow the user to post the review up
  - The user tries to write a review that is not UTF-8 characters or/and upload more than 4 images and an image that is more than 40MB.
    - The system will return an error
  - The user writes a review that exceeds 100 character
    - The system will return error stating the character limit has been exceeded
- Success Behaviors:
  - If a user has inputted valid information within the review then the system will post the review
    - Valid information: 40 MB images, UTF-8 Characters
  - If a transaction has been completed or cancelled, then both both parties of the transaction are given the option to make a rating and review

- If a user chooses to view a rating or review, then they should be presented with the information that has been posted for that rating/review
- If a user has already created a rating and review regarding a particular user and product, then they are allowed to change their rating and review



## 5.11 User Block Feature

- Value:
  - User Block Feature will help the value of Eden Fresh because it gives users the ability to block other users and prevent them from opening chats with them, following them, or viewing old and new posts by the user that blocked them.
- Dependencies:
  - There must be other users in the system in order for a user to block another user.
- Functional Requirements:
  - All users can opt to block other users.
    - Blocked users cannot open chats with, follow, or view old and new posts by the user that blocked them.
    - Blocking a user who has already opened a chat with you will prevent them from sending more messages to you.
      - All previous messages are still visible to both parties.
    - Blocking a user who is already following you will remove you from their following list.
  - Users can view the list of users that they have blocked and they are able to unblock them
    - Users are unable to see another user's list of blocked users.
  - A user can block up to 1000 other users.
- Non-Functional Requirements:
  - The system is considered to be fast if the blocked users are added to the blocked list, removed from the following list, and blocked from chatting with the user that is blocking them if it is within 3 seconds

- The error rate of users attempting to block another user is within 5%
- The system will keep all user's blocked lists private and hidden from view by other users
- An individual user can block up to 1000 sellers. The system will be able to follow double the current amount in the future
- An individual user can block other users as long as they do not currently have 1000 users in their following list
- Failure Behavior:
  - The user tries to block more than 1000 users
    - The system will return an error stating that the limit has been exceeded
- Success Behavior:
  - When user one blocks user two, the blocked user should show up on the user one's blocked list
  - If a user is blocked, no notification about that blocked user should show up
  - The blocked user should not be able to see the user's profile and visa versa
  - Both users should not be able to open old chats with each other once one is blocked

## 5.12 Chat Feature

- Value:
  - Chat Feature will help the value of Eden Fresh because it allows users to send a request to another user to open a chat between each other to ask questions that they may have regarding their stock and arrange a place to meet up
- Dependencies:
  - To chat with each other, one user has to send a request to the other user and the second user must accept the request
- Functional Requirements:
  - All users can send a request to another user to open a chat between each other to ask questions that they may have regarding their stock and arrange a place to meet up.
    - Users that receive the request can accept or decline beginning a chat.
    - Users cannot have multiple active chats with the same user.
    - Users are able to communicate by text with each other through the chat.
      - Each chat message is limited to 500 UTF-8 characters.
      - Images of sizes up to 30 MB can also be sent.
  - Users are able to access previously opened chats
  - Users can have up to 500 active chats at once.
    - Opening a new chat after having 500 active chats will result in the oldest one being deleted, preventing either party from accessing the deleted chat.
    - Users can manually close chats.
- Non-Functional Requirements:

- The system is considered to be fast if the messages are viewable to the opposing user within 3 seconds
- Uploading an image to the chat is considered fast if it is uploaded within 5 seconds
- The error rate of users attempting to follow another user is within 10%
- The system will keep all user's chats private and only accessible between the two parties.
- The system currently supports users to have up to 500 active chats. The system will support double this amount in the future.
- Failure Behavior:
  - The user tries to send a message that is not UTF-8 characters or/and sends an image that is more than 30MB.
    - The system will return an error
  - The user tries to send a message that exceeds 500 character
    - The system will return error stating the character limit has been exceeded
  - The user tries to have more than 500 active chat
    - The user must have under 500 active chats in order to open more chats
  - The user tries to open multiple chats with the same user
    - The system will automatically open the old chat for the user to send messages on
- Success Behavior:
  - The user is able to send their message given that it is within the limits given
  - When a user sends their message, the message is viewable to the other user
  - The user is able to start a new chat with another user
  - The user is able to accept or decline a chat invite

## 6. Core Components Requirements

### 6.1 Security:

#### 6.1.1 Authentication

- Value:
  - A mechanism for identifying a valid user of the system.
- Dependencies:
  - The user must not already have an active authenticated session with the system on the current device, otherwise authentication is not possible.
  - The user must be on login view or attempting to access to a protected resource as defined in Authorization
- Functional Requirements:
  - The user must provide a valid security credentials whenever attempting to authenticate with the system
  - Valid security credentials consist of a valid username and valid time-based one-time password (OTP)
    - Valid usernames will consist of the following:
      - a-z
      - 0-9
      - ., @!
    - OTP is defined in NIST SP 800-63b section 5.1.4.1
    - OTP is changed upon every successful use
    - OTP expires every 2 minutes
    - OTP must be at minimum 8 characters

- Valid characters will consist of the following:
  - a-z
  - A-Z
  - 0-9
- A maximum of 5 failed authentication attempts within 24 hours for the same account before account is disabled
  - 24 hour timer begins on the first failed authentication. If the account was not disabled after 24 hours, then the fail count resets to 0.
  - Account is locked until a valid account recovery is performed by the user or by a system admin. Upon successful account recovery, the failed count resets to 0.
  - For each failed attempt, the account undergoing authentication and the IP address that initiated the authentication request will be recorded.
- Non-Functional Requirements:
  - System failures from this feature must not result in the system going offline
    - The error handling takes place when features do not show results.
- Success Behaviors:
  - User submits valid security credentials. The user is automatically navigated to the user's home view.
- Failure Behaviors:
  - User submits valid security credentials. Automatic navigation does not take place.
  - User submits valid security credentials. The user is automatically navigated to a view other than the user's home view.

- User submits invalid username. A system message displays “Invalid username or password provided. Retry again or contact system administrator”.
- User submits invalid OTP. A system message displays “Invalid username or password provided. Retry again or contact system administrator if issue persists”.
- User submits invalid security credentials. A system message displays “Invalid username or password provided. Retry again or contact system admin”.
- User submits valid security credentials for a disabled account. A system message displays “Account disabled. Perform account recovery or contact system admin”. The failure attempt is recorded accurately.
- User submits valid security credentials for a disabled account. A system message displays “Account disabled. Perform account recovery or contact system admin”. The failure attempt is not recorded accurately. The system attempts to log that the failure attempt did not complete successfully

## 6.1.2 Authorization

- Value:
  - A mechanism for restricting access to protected resources (e.g. functionalities data, and views) to only valid users. Authorization will take place when users want to access a restricted area. Authorization access to restricted or protected resources depends on who can access by authorization rules.
- Dependencies:
  - User must be authenticated to enforce user-specific restrictions, User account must be active
- Functional Requirements:
  - By default, unauthenticated users will only be given access to resources or functionalities that does not require knowledge of user's identity
  - The operation and timestamp of each unauthorized access will be recorded by the system
  - The system must prevent unauthorized users from viewing, modifying or deleting any protected data (scalar or aggregate data)
  - The system must prevent unauthorized users from executing any protected functionality
  - The system must prevent unauthorized users from viewing or interacting with any protected views
- Non-Functional Requirements:
  - Any user access modifications should be active upon the next successful authentication by user
  - System failures from this feature must not result in the system going offline
- Success:



- User attempts to access a protected functionality within authorization scope. Access is granted to perform functionality.
- User attempts to access protected data within authorization scope. Access is granted to perform read operations.
- User attempts to modify protected data within authorization scope. Access is granted to perform write operations.
- User attempts to access protected views within authorization scope. Access is granted to the view. User is automatically navigated to view.
- Failure Cases:
  - Unauthorized access is not recorded by system when authorization fails. A system log of failure is attempted.
  - User attempts to access a protected functionality outside of authorization scope. Access is denied and a system message displays “Unauthorized access”.
  - User attempts to access protected data outside of authorization scope. Access is denied and a system message displays “Unauthorized access to data”.
  - User attempts to modify protected data outside of authorization scope. Access is denied and a system message displays “Unauthorized access to data”.
  - User attempts to access protected views outside of authorization scope. Access is denied and a system message displays “Unauthorized access to view”.
  - User attempts to access protected views within authorization scope, but contains protected data that is not within read scope. Access is granted to the view. Upon completion of automatic navigation to view, a system message displays “Unauthorized access to data” with protected data not visible within the view.
  - User attempts to access protected views within authorization scope, but contains protected data that is not within write scope. Access is granted to the view. Upon

- completion of automatic navigation to view, protected data is visible within the view. Attempts to modify the data will result in a system message that displays "Unauthorized access to data."

### 6.1.3 Logout

- Value:
  - A mechanism for ending an active authenticated session. Users that logout will lose their access to application features that are only accessed by logged in users.
- Dependencies:
  - In order for for this feature to function, the user must have an active authenticated session on the device, otherwise the user is unable to perform the operation
- Functional Requirements:
  - The user will be navigated to the home view of the system upon successful completion.
- Non-Functional Requirements:
  - The current active session on the device will end within 5 seconds upon invocation.
  - System failures from this feature must not result in the system going offline.
- Success Behaviors:
  - User performs a logout request. The active session ends. The user is automatically navigated to the default home view of the system with the default culture settings. A system message displays “Logout successfully” upon completion of automatic navigation to home view. The logout process is completed within 5 seconds upon invocation.
- Failure Behaviors:

- User performs a logout request. The active session has ended. The user is not automatically navigated to the default home view. A system message displays “Logout operation error” or no message is shown.
- User performs a logout request. The active session has ended. The user is automatically navigated to the default home view, but not set to the default culture settings. A system message displays “Logout operation error” or no message is shown.
- The logout process takes longer than 5 seconds.

## 6.2 User Administration:

### 6.2.1 Account Creation (Registration)

- Value:
  - A mechanism for creating new user accounts within the system. Logged in users are given access to application features that are only accessible to logged in users.
- Dependencies:
  - In order for users to create an account, they must not already have an active authenticated session.
- Functional Requirements:
  - The user provides a valid email address that belongs to the user.
  - The user provides a secret passphrase for requesting OTP
    - Secret passphrase must be a minimum of 8 characters
    - Valid characters will consist of the following:
      - blank space
      - a - z
      - A - Z
      - 0 - 9
      - ., @!
- Non-Functional Requirements:
  - System administrators cannot be created using the Account Creation feature.
  - All user accounts must be stored in a persistent data store.
  - System failures from this feature must not result in the system going offline.
- Success Behaviors:

- The user registers with a valid email and valid passphrase. A system message displays “Email confirmation pending”. The user receives a confirmation email within 15 seconds upon invocation of the system message. The user completes email confirmation within 24 hours. User is notified of the username. A system message displays “Account created successfully”.
- Failure Behaviors:
  - A user registers with an invalid email or invalid passphrase. A system message displays “Account creation error. Retry again or contact system administrator” or no system message.
  - User registers with a valid email and valid passphrase. A system message displays “Email confirmation pending”. The user does not receive a confirmation email at all or an email within 15 seconds upon invocation of the system message.
  - User registers with a valid email and valid passphrase. A system message displays “Email confirmation pending”. The user receives an email confirmation within 15 seconds upon invocation of the system message. The user does not complete email confirmation within 24 hours.
  - User registers with a valid email and valid passphrase. A system message displays “Email confirmation pending”. The user receives an email confirmation within 15 seconds upon invocation of the system message. The user completes email confirmation within 24 hours. User is not notified of the username.
  - User registers with a valid email and valid passphrase. A system message displays “Email confirmation pending”. The user receives an email confirmation within 15 seconds upon invocation of the system message. The user completes

email confirmation within 24 hours. The user is notified of their username. A system message does not display.

- User registers with a valid email and valid passphrase. A system message displays “Email confirmation pending”. The user receives an email confirmation within 15 seconds upon invocation of the system message. The user completes email confirmation within 24 hours. The user is notified of their username. A system message displays “Account created successfully”, but the account is not created and stored in the data store.

## 6.2.2 Account Deletion

- Value:
  - A mechanism for deleting a user account. Users that wish to no longer have an account for our application are given the ability to permanently delete their account from our system. Account deletion will permanently remove all data regarding that user.
- Dependencies:
  - In order for the user to delete their account, they must already have an active authenticated session and have permission to delete their account
- Functional Requirements:
  - Only a system administrator account can delete another system administrator account
  - All personal identifiable information (PII) along with the user account data is permanently deleted from the system
  - Account deletion is irreversible
- Non-Functional Requirements:
  - System failures from this feature must not result in the system going offline
- Success Behaviors:
  - The user is able to select to delete their account, and all PII data and user account data is permanently deleted from the system. A system message displays “Account deletion successful”. Upon acknowledgment of the system message, the user is automatically navigated to the home view with default language and culture settings.
- Failure Behaviors:



- The user selects to delete their account, but the system does not delete the PII data or user account data
- Data is not permanently deleted from the system.
  - PII data / User account data
- A system message is not shown or the wrong message is shown after all PII data and user account data is permanently deleted from the system
- The user is unable to acknowledge the system message “Account deletion successful” after the successful data deletion.
- The user user is not automatically redirected to the default home view of the system.
- The user is automatically redirected to the default home view, but the default language and culture setting is not shown.

### 6.2.3 User Management

- Value:
  - A mechanism for administration of any user account. System administrators are given the ability to perform several types of operations on the user database either in singular or bulk operations.
- Dependencies:
  - In order to access user management functions, the user must be a system administrator currently on the user management view, with an active authenticated session.
- Functional Requirements:
  - All user management operations will be performed on a persistent data store.
  - Only system administrators have access to the User Management view, and the ability to view and modify all accounts and their associated user profile data within the system.
  - System administrators can perform single operations:
    - Create account
    - Update account
    - Delete account
    - Disable account
    - Enable account
  - System administrators can also perform bulk operations, allowing for execution of multiple operations of the same or various types within the same request.
    - Bulk requests can be made through an uploaded file extract.
  - The system must have at least one system administrator account with total system access at all times.

- Only a system administrator can create another system administrator account.
- Non-Functional Requirements:
  - Single operations must complete within 5 seconds of invocation.
  - Bulk operations must perform at most 10000 operations per request.
  - Files used in file extract bulk operations cannot be greater than 2GB in size.
  - Bulk operations must complete within 60 seconds of invocation.
  - System failures from this feature must not result in the system going offline.
- Success Behaviors:
  - User is able to perform any single UM operation within 5 seconds upon invocation. A system message displays “UM operation was successful”
  - Users are able to perform less than 10K UM operations in bulk within 60 seconds. A system message displays “Bulk UM operation was successful”
  - Users are able to perform 10K UM operations in bulk within 60 seconds. A system message displays “Bulk UM operation was successful”
- Failure Behaviors:
  - Single UM operation takes longer than 5 seconds
  - Bulk UM operations takes longer than 60 seconds
  - Single UM operation completes within 5 seconds, but no system message is shown or inaccurate system message is shown
  - Bulk UM operations completes within 60 seconds, but no system message is shown or inaccurate system message is shown
  - Single UM operation completes within 5 seconds, with system message “UM operation was successful” shown, but latest data is not written to data store
  - Bulk UM operations completes within 60 seconds, with system message “Bulk UM operation was successful” shown, but latest data is not written to data store

- 10K Bulk UM operations completes takes longer than 60 seconds
- 10K Bulk UM operations completes within 60s seconds, but no system message is shown or inaccurate system message is shown
- 10K Bulk UM operations completes within 60 seconds, with system message “Bulk UM operation was successful” shown, but latest data is not written to data store

## 6.3 System Observability:

### 6.3.1 Usage Analysis Dashboard

- Value:
  - A visualization mechanism to have a view on user behavior within the system. It will be performed by different charts. Key Performance indicators are used to measure performance of views.
- Dependencies:
  - In order to navigate to the view, the persistent data store must be active and accessible by the system. Users must be a system administrator, on the Usage Analysis Dashboard view and have an active authentication session.
- Functional Requirements:
  - Key Performance Indicators (KPIs)
    - The top 5 most visited view of all time (bar chart)
    - The top 5 average duration per view of all time (bar chart)
    - The number of logins per day within the span of 3 months (trend chart)
    - The number of registrations per day within the span of 3 month (trend chart)
    - Two application specific feature metric
      - The number of post created per day within the span of 3 month(trend chart)
      - The number of success transaction per day within the span of 3 month(trend chart)
- Non-Functional Requirements:
  - All data must be fetched from a persistent data store.

- All KPI data must be automatically refreshed in intervals of 60 seconds.
  - The view must load within 15 seconds upon completion of navigation.
  - System failures from this feature must not result in the system going offline
- Success Behaviors:
  - Users can navigate the view within 15 seconds. All KPIs automatically refreshed data within 60 seconds.
- Failure Behaviors:
  - User is a system administrator, but unable to navigate to the page.
  - User is able to navigate to the page, but the view does not load within 15 seconds upon navigation completion.
  - Users are able to navigate to the page, view loads within 15 seconds, but no KPI data is refreshed.
  - Users are able to navigate to the page, view loads within 15 seconds, but not all KPI data is refreshed.
  - Users are able to navigate to the page, view loads within 15 seconds, but all KPI refresh takes longer than 60 seconds.

### 6.3.2 Logging

- Value:
  - An internal mechanism for tracking all events of the system for auditing. The internal mechanism tries to track all the events auditing during the user's use.
- Dependencies:
  - In order to perform logging, an account data store must be active, accessible by the system, and have storage capacity for log entry.
- Functional Requirements:
  - All log entries must be immutable, and saved to a persistent data store.
  - All log entries must contain a UTC timestamp, log level, user performing operation, a category and a description/message.
- Non-Functional Requirements:
  - The logging process must not block any user from performing any interaction with the system
  - The logging process must complete within 5 seconds upon invocation
  - System failures from this feature must not result in the system going offline
- Success
  - The system logs system success events
  - The system logs system failure events
  - The system logs user success events
  - The system logs user failure events
- Failure Cases
  - The logging process took longer than 5 seconds to complete upon invocation
  - The logging process blocks a user from interacting with the system

- The logging process completes within 5 seconds, but did not save to a persistent data store
- The logging process completes within 5 seconds, but does not accurately save the event to the persistent data store (i.e. timestamp, log level, category, message, etc.)
- Previously saved log entries are modifiable



### 6.3.3 Archiving

- Value:
  - An internal mechanism for offloading log entries to preserve system resources.

Archiving allows for the system to offload any data that is no longer needed in order to accommodate for more storage.
- Dependencies:
  - In order for for this feature to function, persistent data store must be active, persistent data store must accessible by the system, and archival destination location must have storage capacity
- Functional Requirements:
  - Archival process must consolidate and compress entries being archived
  - Archival process must offload entries to another location
  - Archival process must remove offloaded entries from the system after successful archival
- Non-Functional Requirements:
  - Archival process must execute every 00:00:00AM (local time) on 1st of the month
  - Archival process must only offload log entries that are older than 30 days
  - Archival process must complete within 60 seconds upon invocation
  - System failures from this feature must not result in the system going offline
- Success Behaviors:
  - Archival process executes at 00:00:00AM (local time) on the 1st of the month. All log entries older than 30 days are consolidated, compressed and relocated to another location. All archived logs are removed from the system. The entire archival process completes within 60 seconds upon invocation.
- Failure Behaviors:

- Archival process did not start at 00:00:00 AM
- Archival process started at 00:00:00 AM, but not local time
- Archival process started at 00:00:00AM (local time), but not on the 1st of the month
- Archival process started at 00:00:00AM (local time) on the 1st of the month, but did not archive any log entries even though there are logs older than 30 days
- Archival process started at 00:00:00AM (local time) on the 1st of the month, but did not archive all log entries older than 30 days
- Archival process started at 00:00:00AM (local time) on the 1st of the month. All log entries older than 30 days are not consolidated.
- Archival process started at 00:00:00AM (local time) on the 1st of the month. All log entries older than 30 days are consolidated, but are not compressed.
- Archival process started at 00:00:00AM (local time) on the 1st of the month. All log entries older than 30 days are consolidated and compressed, but is not relocated to another location
- Archival process started at 00:00:00AM (local time) on the 1st of the month. All log entries older than 30 days are consolidated, compressed and are relocated to another location, but archived logs are not removed from the system.
- Archival process took longer than 60 seconds to complete upon invocation.

## 7. Project Criteria Requirements

### 7.1 Universal Requirements

#### 7.1.1 User Privacy

- Value:
  - A mechanism to inform and protect user data from being used without consent
- Functional Requirements:
  - EULA per GDPR or California Consumer Privacy Act (CCPA) / California Privacy Rights Act (CPRA)
  - Opt-out of user data collection and selling of user data
  - Explanation of use of data
  - Deletion of user data / user account
- Application Specific Requirements:
  - All user data from this feature will be under the EULA
  - Users will be given the option to opt-out of data collection and the collected user data will not be sold
  - The user data being collected will be used for logging and determining the general statistics of the application
  - When a user deletes their account, all of the data that is related to them will be permanently removed within the system

### 7.1.2 Error Handling

- Value:
  - A mechanism to prevent system failures from making the system go offline to any user.
- Functional Requirements:
  - Allowed System Failures:
    - Web Server loses internet access
    - Cloud/Host Provider outage
  - System failures from this feature must not result in the system going offline

### 7.1.3 UI / UX

- Value:
  - To provide an intuitive interface for users to interact with the system
- Functional Requirements:
  - All system messages to the user must be displayed in the default culture settings for non-Authenticated users and the selected culture settings for Authenticated users
- Non-Functional Requirements:
  - All text must be in the selected language and culture setting
  - All formats align with the selected unit of measurement
  - All views must not require assistance from another human understand how to interact with the view
  - All system messages must appear within 5 seconds of the resolution of an operation
  - System failures from this feature must not result in the system going offline

#### 7.1.4 Documentation

- Value:
  - To provide artifacts that describe the system in detail
- Functional Requirements:
  - Low-level design documents
  - User Manuals
  - FAQs