Eden Care Home Care Delivery Application

4th Year Engineering Project

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Functional Requirements Document

Version	Description of Change	Author	Date
1	Completion of FRD Document for Project Day, 2020	Nickolas Schmidt	April 10th, 2020

CONTENTS

1 INTRODUCTION

The Eden Care home care on demand application is an iOS and Android application for individuals to request home care for themselves or a relative on demand. Users can sign up to be a service receiver or a service requester if service is needed by another individual. This application is tied to the Eden Care organization working out of Regina, Saskatchewan and all caregivers are defined by the Eden Care Communities company.

1.1 Purpose

This functional requirements document outlines the functional requirements of the Eden Care home care delivery application developed by The Ni(C)(K)S for their 4th year engineering project. This application will be utilized by all individuals with the need to request home care on demand for themselves or a family member. The request will be fulfilled by an Eden Care caregiver. This document will include a scope overview, background information on both The Ni(C)(K)S and Eden Care Communities along with the methodology and practices employed for this project.

1.2 Scope

This functional requirements document outlines the documentation for the Eden Care Communities home care on demand mobile application developed by The Ni(C)(K)S for their 4th year engineering project. This document will outline the background on Eden Care Communities, any assumptions and constraints The Ni(C)(K)S will follow when developing this product. The document will also contain the user requirements and any data flow diagrams and logical models. Furthermore, the document will also outline any security and privacy measures taken by both The Ni(C)(K)S and Eden Care Communities. Finally, this document will discuss the testing practices done by The Ni(C)(K)S including error handling and validation rules and any other conventions and standards.

1.3 Background

This product will be created in association with Eden Care Communities. Eden Care is a housing corporation residing in Regina, SK. Their operation began in 1950 with the opening of Regina Lutheran community. This community houses many different elderly individuals with a variety of care needs. In the 1970s Eden Care communities expanded its business into long-term care. With the expansion into long-term care, Eden Care Communities is committed to providing a variety of different services to fit each individual member. More recently, Eden Care Communities has expanded its operation to offer services for seniors still residing in their homes. This service, dubbed, Eden Care at Home, allows individuals to receive a variety of care services ranging from personal care, housekeeping, companionship and nursing services. In 2016, Eden Care communities expanded into child care services. The inclusion of "Saplings Early Learning Centre" into the Lutheran community helped bridge the generational gap between seniors and

children providing a more fleshed out community for everyone involved. More recently, Eden Care Communities has been investigating ways to expand its Eden Care at Home services. A mobile application where users can request the home care services from a smart device will allow customers to order services at any time.

The mobile application will be developed by The Ni(C)(K)S for their 4th year engineering product. The document was created by The Ni(C)(K)S as they are the third party developers working for Eden Care Communities on the Care on Demand application. The entirety of the development of both the product and its associated documentation will be handled by The Ni(C)(K)S. Eden Care Communities will be used as a reference when working on this product as their input will help determine the requirements and end result of the application.

1.4 References

Meeting Summary: Reimagining Home Care Planning Session (Oct. 18th)

- Introduction to Eden Care Communities, who they serve and what they do as a non-profit in Regina, SK
- Home/Foot Care introduction - providing a variety of services to people in need (~200 users)
- Create a mobile application to manage incoming service requests from customers and deploy them to specific care partners through an admin user

Meeting Summary: Eden Care on Site Visit (Nov. 1st)

- Design the application using a person centered approach
- Developed different user personas
- Discussed different interfaces for the user to interact with the application including voice commands, chatbots and a standard touch/swipe interface
- Received from Eden Care a list of the required services to be included in the application
- Discussed payment methods and the possibility of an individual refusing services and an ability to refund payment after an order is processed.

Meeting Summary: On Campus Meeting with Bill Pratt (Dec. 20th)

- Discussed the three different view flows including Customers, Care Partners and Admin.
- Discussed the requirements for each view and fleshed out each user flow
- Discussed the details of each service and an ability for customers to choose a preferred care partner to execute the ordered service

Meeting Summary: On Campus Meeting with Bill Pratt (Jan. 24th)

- Showed off initial UI design for customers
- Demo of account creation and login functionality for new customers to join and access the mobile application

Meeting Summary: ENSE 477 Scrum Report including Bill Pratt (Feb. 4th)

- Demonstrated the UI flow for the customer view to both Bill & Tim
- Discussed using Trello as a Kanban board for user stories and tasks
- Received a UI critique to make the customer view more vibrant and less bland

Meeting Summary: Online Meeting between The Ni(C)(K)S (March. 10th)

- Discussed final pages that need to be made for Admin/Customer views
- Planned out features available in the MVP
- Will begin commenting and cleaning code for pages that are finished

Meeting Summary: Online Meeting between The Ni(C)(K)S (March. 24th)

- Fleshed out topics to be included in Experience Report document
- Discussed implementing secondary features for the Admin and Care Partner users
- Continue with code comments as more pages are completed
- Discussed the completion of all features related to ordering a service

Meeting Summary: Online Meeting between The Ni(C)(K)S (April 3rd)

- Discussed final code implementation and set a due date of April 6th
- Outlined the video presentation and topics it will include as well as how demos of the application will be recorded
- Added information to the poster topics
- Started outlining the Code Review document

1.5 Assumptions and Constraints

For this project the majority of the assumptions and constraints are dependent on the platform that the Homecare on Demand application is built for. Being a mobile application, a prime assumption and constraint is that the user is limited to using a mobile device and the accompanying features of a mobile device. Another major feature of this project is the time limit given, meaning all work must be submitted on April 10th, 2020 regardless of missing features or existing bugs.

1.5.1 Assumptions

Assumptions for this product will include all assumptions regarding the users ability to operate a smart device including tablets and smartphones. Users will be assumed to understand how to navigate through a mobile application using swipe and button press commands. Other assumptions include legality issues including the assumption that any information entered into the application through account setup and ordering services is legal information and does not contain any explicit information about the users or others.

- This product will operate on both iOS and Android mobile devices
- Digital infrastructure costs will be covered by Eden Care Communities
- This product will not need to comply with the requirements of HIPAA
- Any product legalities will be covered by Eden Care Communities

1.5.2 Constraints

Constraints for this product will include the conditions of how the product works, any specific design decisions made, and any legal or technical requirements necessary to complete the project.

- There is no available Macbook computer for iOS testing
- This project must be completed by April 10th 2020, engineering project day 2020.
- This product must not include any patient medical data as per our legal standards
- This product must be designed with careful consideration of accessibility for people of all ages and abilities.

1.6 Document Overview

This document will outline the startup and development of the Eden Care on Demand application. This will include the startup information including any background information necessary on both The Ni(C)(K)S and Eden Care Communities. Eden Care Communities approached the development team with an idea to make a mobile application available to the general public in Regina, SK. The application would be used for ordering home care medical services remotely and on demand. This application is to be developed for both android and iOS platforms and contain the ability for users to order a service. Likewise, the application also requires a login for Eden Care home care providers to view and fulfill the services that have been requested by the users. Finally, the admin user will have the ability to modify orders and create new admin and home care provider accounts. This document will outline the methodologies and steps that The Ni(C)(K)S took when designing and implementing the application on behalf of Eden Care.

2 METHODOLOGY

This project followed an Agile development cycle which involved the group, The Ni(C)(K)S working in two week scrums of development and other project work. After each of the two week segments the team would then meet with the mentor and occasionally a member of Eden Care, Bill Pratt to discuss the features created in that two week cycle. This would include a discussion on upcoming planned features with a given timeline of when The Ni(C)(K)S planned to complete that feature as well as a discussion on ways to improve the previously developed content of the Homecare on Demand application. As development furthered, the group found themselves shifting into a waterfall method as they focused on completing all the available features for a customer account before moving on to the admin and care partner accounts.

3.1 Context

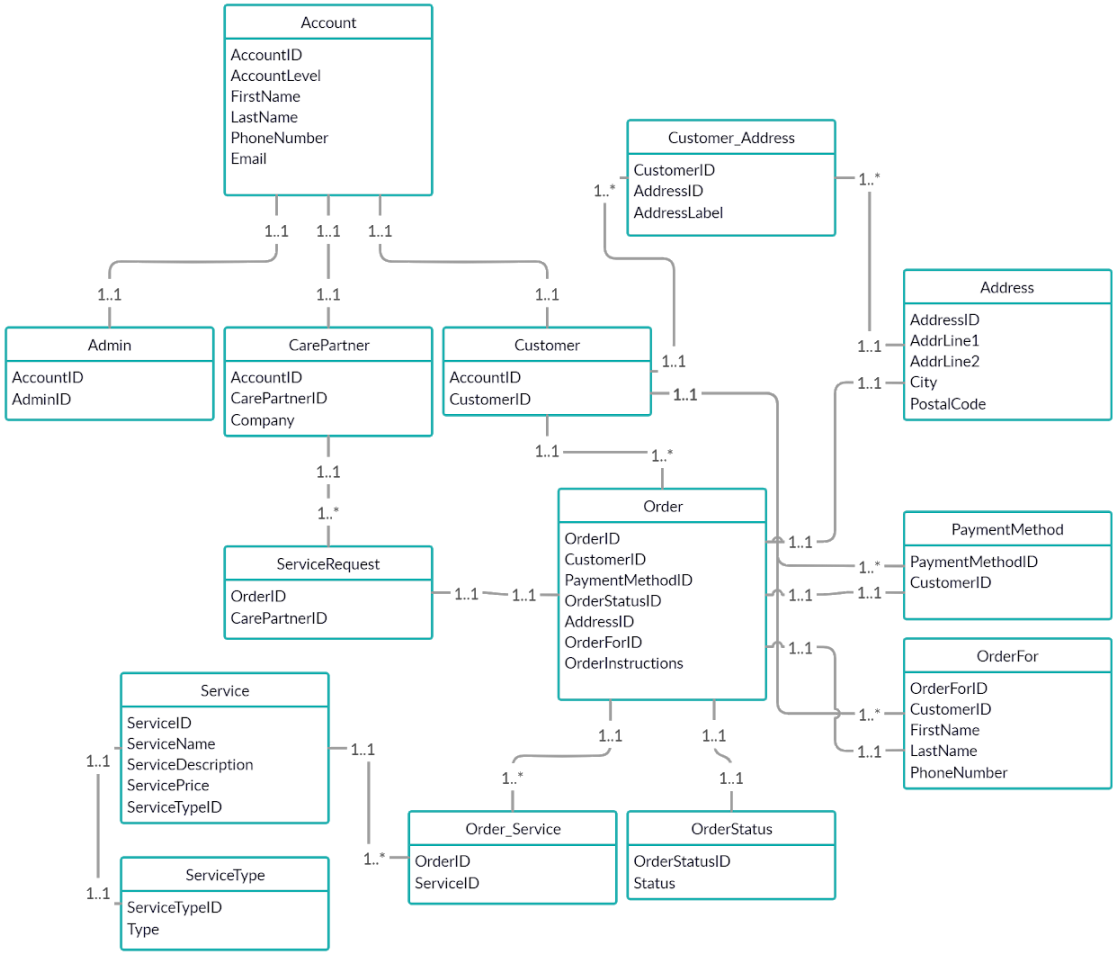
The Care on Demand ERD diagram outlines the account entity and its specifications as well as its corresponding relationships throughout the project. As noted on the diagram, an account can be separated into three subclasses which are the Admin,

Care Partner, and Customer classes. These classes contain their own specifications as well as inherit all specifications from the account entity. For the Care Partner and Customer entities, each has their own specified flow with specific relationships to service requests and ordering.

A Customer requires an address in the order to indicate the location for which the service is being ordered. As a Customer may order services for themselves and eventually for others, multiple addresses are stored each with their own label to indicate to the user which location they have chosen. Once an order has been placed by the customer, they are able to view the status of their order so a customer can prepare for the visit by the care partner.

A Care Partner has a similar relationship to orders as a customer. A Care Partner is able to look at incoming assigned orders and use the calendar feature of the application to monitor the services they are to complete in a day. The Care Partner has the ability to request that a service's time be altered if an issue has arisen during the work day. This modification is completed by the Admin user and a notification is sent to the Customer whose service is being impacted.

An Admin also relates to the general account class but contains no other relationship to the other entities outlined in the diagram. This is due to the fact that an Admin does not fulfill service requests.


Account
AccountID
AccountLevel
FirstName
LastName
PhoneNumber
Email
Customer_Address
CustomerID
AddressID
AddressLabel
Address
AddressID
AddrLine1
AddrLine2
City
PostalCode
Admin
AccountID
AdminID
CarePartner
AccountID
CarePartnerID
Company
Customer
AccountID
CustomerID
Order
OrderID
CustomerID
PaymentMethodID
OrderStatusID
AddressID
OrderForID
OrderInstructions
PaymentMethod
PaymentMethodID
CustomerID
ServiceRequest
OrderID
CarePartnerID
OrderFor
OrderForID
CustomerID
FirstName
LastName
PhoneNumber
Service
ServiceID
ServiceName
ServiceDescription
ServicePrice
ServiceTypeID
ServiceType
ServiceTypeID
Type
Order_Service
OrderID
ServiceID
OrderStatus
OrderStatusID
Status

4 FUNCTIONAL REQUIREMENTS

4.1 User Requirements

The Eden Care home care on demand application will be used by three separate parties including a client, home care provider and an administrator. User requirements will be separated based on operating users and will also include a shared section containing tasks necessary by all user types.

Customer users create accounts through the application. The account creation process requires users to submit their name, address and phone number as well as an email and password which is used to log into the app. A customer is also required to submit an address and can save multiple addresses to their account each with their own address label. The account creation field also offers customers the ability to connect accounts as a friend/family member to order home care service for one another. This connection must be approved by both sides and may need to be approved by an administrator. Security for this type of account includes encryption for the user's phone number, location and password before it is stored into the database of users. Other sensitive information, including credit cards, will be secured using Stripe, a payment service for Android and iOS applications.

User requirements for customers:

- As a customer I would like to request home care service for myself to receive home care without having to schedule an appointment days in advance.
- As a customer I would like the ability to remove myself from the application, via deleting my account or account records, to protect my information and privacy.
- As a customer I would like the ability to set up recurring appointments for a set time so I don't have to manually schedule each appointment.
- As a customer I would like to request home care, with appropriate credentials, for my friend or family member when they are unable to.
- As a customer I would like to link my account to a friend or family member's account to order home care services for one another.
- As a customer I would like to select a desired care partner as part of an order request so I get service from someone I already trust
- As a customer I would like the ability to request that a friend or family member be removed from my account in the case of a death, etc. to protect their information and privacy.

Home care providers will have their accounts added to the application by an administrator. This process will allow home care providers to create their own passwords with their given email addresses. This allows for admins to control which home care providers have access to the application and therefore who can complete requests. As with customers, home care providers passwords will be encrypted before they are stored in the database. However, other than a password no further personal information will be stored for home care providers.

User requirements for home care providers:

- As a home care provider I would like the ability to view past clients I have provided home care assistance to so I can reference back any information as needed.
- As a home care provider I would like to be notified when a service request comes in that I am able to perform in order to keep up with incoming requests.
- As a home care provider I would like to be able to confirm that I am able to perform the requested service to stay on time and therefore not be assigned additional service requests that I am unable to fulfill.
- As a home care provider I would like the ability to contact (in-app or by phone number) clients to confirm service requests details as needed.
- As a home care provider I would like the ability to modify the time I will be completing a request so I can adjust any unforeseen circumstances that may arise during the work day.

Administrators will have their accounts added to the application by an existing administrator. A master administrator will be created by the development team, The Ni(C)(K)S, and will be used for testing. This master administrator account will then be able to create other administrators as well as creating any home care provider accounts. Any administrator accounts created by the master administrator account will be able to create/modify/delete home care provider accounts but will be unable to create another administrator account. Admin accounts will use generic email and passwords to sign into the application and its associated database. The password will be encrypted and no other sensitive information will be held for any administrator account, master or otherwise.

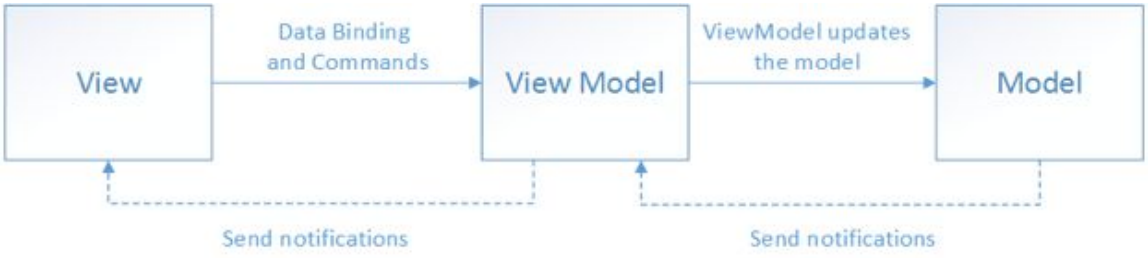
User requirements for administrators:

- As an admin I would like to add/remove/modify Eden Care home care providers from the application to keep the available care providers current
- As an admin I would like the ability to connect clients to together with their associated family member or friend in the event that a user is having difficulties doing so themselves
- As an admin I would like to approve account connections to ensure user accounts are connected appropriately to their friends'/families' accounts.
- As an admin I would like to see a list of requested services in progress and scheduled to ensure operations are running smoothly.
- As an admin I would like the ability to create orders on behalf of a customer in the case that the customer has contacted Eden Care through the application

4.2 Data Flow Diagrams

The Model-View -ViewModel method was utilized to link the element on the page to the data inside the code to perform the applicable tasks. This MVVM model is similar to the more traditional Model-View-Controller (MVC) pattern and is very useful when developing clean code when using C#. Each view, or page, has its associated ViewModel files which are where the data on each page is processed. All Model files were translated into database tables to store the information our application would need

for processing data. The MVVM pattern follows a strict separation between the View, ViewModel and Model sections of the code.



4.3 Functional Requirements

The Eden Care Home Care on Demand application can be accessed by 3 primary groups, the customer accounts, admin accounts and care partner accounts. A customer account is created by registering through the application. The admin accounts are created by an existing admin account. Care partner accounts are also created through this function. The primary functions of the Eden Care Home Care on Demand application is to serve customers orders by sending them to an admin who then sends the incoming order request to an available care partner.

4.3.1 Functional Requirements - Customer Accounts

A Customer account is able to create an account and login to the application. Once logged in the customer is then able to order a service from the list of available services. Once a service has been selected and ordered it is directed to the admin account.

4.3.2 Functional Requirements - Admin Accounts

An admin can login using predetermined credentials and view a list of new orders. From the list, the admin can view the order details including the time, place and preferred care partner of the customer. From this page, the admin can then send an order to an available care partner account.

4.3.3 Functional Requirements - Care Partner Accounts

A care partner can login using the account created by the admin user. Once logged in, the care partners can view any upcoming activities they have to complete. From this page they can select the service they will be performing by selecting the start order button. This will then change the order's state to "in progress". Once an order is fulfilled the care partner marks the service order "finished" where it appears in the "past orders section" in the order history page for both the admin account and the associated customer account.

5 OTHER REQUIREMENTS

5.1 Interface Requirements

This application will be primarily used by the home care on demand customers and Eden Care home care providers. On the customer side, the UI design will consist of a simple view containing larger text fields and buttons to be operated by users who are potentially unfamiliar with mobile apps. This interface will stay away from scrolling screens to discourage confusion if a customer loses their place while placing an order. For pages containing a map field, the user will be able to zoom in and out on the map to find certain locations using a pinch/pull method.

Similarly, for the home care provider views, the application will consist of a minimalist view with large interfaces to easily navigate through. The care partner will be able to select the address of their upcoming order, by selecting the address the application will route to the maps feature of the device and preload the customers location. This will ensure that a care partner can easily move from order to order during the work day. As with the customer view, the use of a scroll bar will be negated for ease of navigation purposes.

This application will interface with a database stored in Amazon Web Services. This database will host the services that can be ordered by a user as well as all users personal information including the saved addresses. Communication between the database and the mobile application will be done through an API.

5.1.1 Software Interfaces

The mobile application Home Care on Demand requires users to use it through a smart device including mobile phones and tablets. All usability for this application lies in the software itself. The only other software that is used is the OS for which the mobile device runs on. This OS is responsible for booting the application.

In the application itself, a payment service will be implemented using Stripe. Stripe is a third party payment interface used in Android and iOS applications. Payment services for our application will be handled in app and a user will be expected to provide a payment method using the Stripe service. This service will not be implemented in the applications MVP but is planned to be used in further development after Project Day 2020.

5.1.2 Communications Interfaces

The mobile application interfaces with a Transact-SQL database hosted with AWS's RDS service. This database contains user information, care home service data, and customer order data that the app is able to access through the use of a REST API. The REST API is hosted with AWS's Elastic Beanstalk service, so the application is able to access the database at any time. Image resources are stored in an AWS S3 bucket that the application is able to access to dynamically load the images across it, this also allows image files to be changed in one single location without making any changes to the

application. User account data is securely stored and validated with AWS's Cognito service; passwords are not stored in the database and instead kept seperate with Cognito. Cognito is also used to perform email verification when a new user registers and when an existing user changes their password.

Furthermore, the application has the ability to open up the native phone application of a device when a user selects the "Contact Eden Care" button located at the bottom of most pages throughout the application. This button automatically inputs the customer support phone number for Eden Care for ease of use. This service is handled by both the application and the user's OS.

Finally, for home care providers this application will interface with Google or Apple maps to indicate the location of the next service each provider is to fulfill. This will be done with an API which routes the user to their given OS map application either Google or Apple and will autofill the location into the application.

5.2 Hardware/Software Requirements

The application is written to work with both iOS and Android platforms. Therefore, a user with any form of iOS or Android device is free to download and use the application. This includes Apple iPads as well as any Android tablet. At this time there is no web based solution for the application.

5.3 Operational Requirements

The Homecare on Demand mobile application is required to have a 99.9% uptime. As it is an always online application it is expected to receive order requests made at any time. A further list of requirements is below:

- The system is required to accept new account creation request at any time
- The system is required to create new orders at any time
- The system is required to log in users at any time
- The system is required to update the admin users with any new orders as they are created

5.3.1 Security and Privacy

A. State the consequences of the following breaches of security in the subject application:

1. Loss or corruption of data
    - Any loss or corruption of data due to a security breach would result in orders not being completed on time or at all
2. Disclosure of secrets or sensitive information
    - This application does not contain any sensitive information about its customer base. In the event of a breach of security only a customer's name, email, phone number and address have the potential to be stolen. No information is stored for the care partner and admin accounts' usage within the app.

3. Disclosure of privileged/privacy information about individuals
    - This app does not allow users to view any data that is not related to themselves. In the event of a security breach, the user has not disclosed any privileged information. Therefore, only the items listed in section 5.3.1 - 2. have potential to be stolen.

B. State the type(s) of security required. Include the need for the following as appropriate:

1. Physical security.
    - There is no physical security required, as all in person interactions will be within the scope of Eden Care Communities
2. Access by user role or types.
    - Each user type requires a password and unique email address to access the app. Customer users may create their own accounts to access the app, whereas new Care Partner or Admin accounts must be made by an existing Admin account.
3. Access requirements based on system function
    - Only Admin users have the ability to create different accounts including new Customer, Care Partner and Admin accounts

5.3.2 Reliability

1. State the damage can result from failure of this system, indicate the criticality of the software, such as:

    a) Loss of human life
    - No loss of human life would occur in the event of a system failure of the Eden Care Care on Demand application

    b) Loss of revenue
    - The largest impact due to a system failure would be a loss of revenue as care partners would be unable to complete new orders as there would be no indication that they were coming in.

    c) Loss of employee productivity
    - Another major implication due to a total system failure would be lack of productivity as care partners and admins would be unable to process any orders

2. What is the minimum acceptable level of reliability?
    - As with most online applications a minimum acceptable reliability of 99% is to be expected to ensure the system can receive orders at any time as they come in.

B. State required reliability:

- Our application is as reliable as AWS since our data is hosted on there. AWS guarantees an uptime of 99.999999999% for all its services. However; in the

event of possible downtime AWS has procedures in place to refund the customers based on the percentage amount of downtime.

5.3.3 Recoverability

A. In the event the application is unavailable to users (down) because of a system failure, how soon after the failure is detected must the function be restored?

- The application must be restored within 10 minutes of the system failure to ensure orders are completed at the expected time.

C. If the processing site (hardware, data, and onsite backup) is destroyed, how soon must the application be able to be restored?

- The likelihood of this happening is low. This is because all of our data is stored using AWS services which creates backups of data in multiple regions of the world. AWS states their services are “Designed to provide 99.999999999% durability and 99.99% availability of objects over a given year”.

5.3.4 System Availability

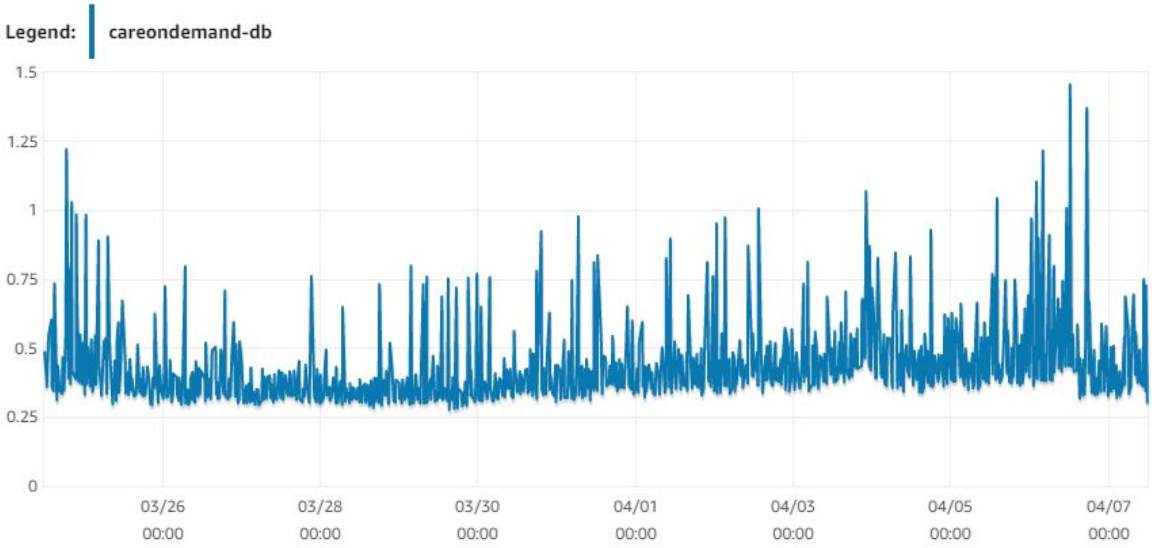
The application will accept orders 24 hours a day, seven days a week. This is due to the application being online which allows users to submit service orders any time they desire. The services ordered will be performed by care partners Monday through Sunday during the times of 8am-8pm.

Peak times for this system will include mornings between 9am-12pm. At this time, it's expected that weekends will be far less popular for service requests. However, as the application is delivered to more people it's expected that weekends will prove to be popular with new clients.

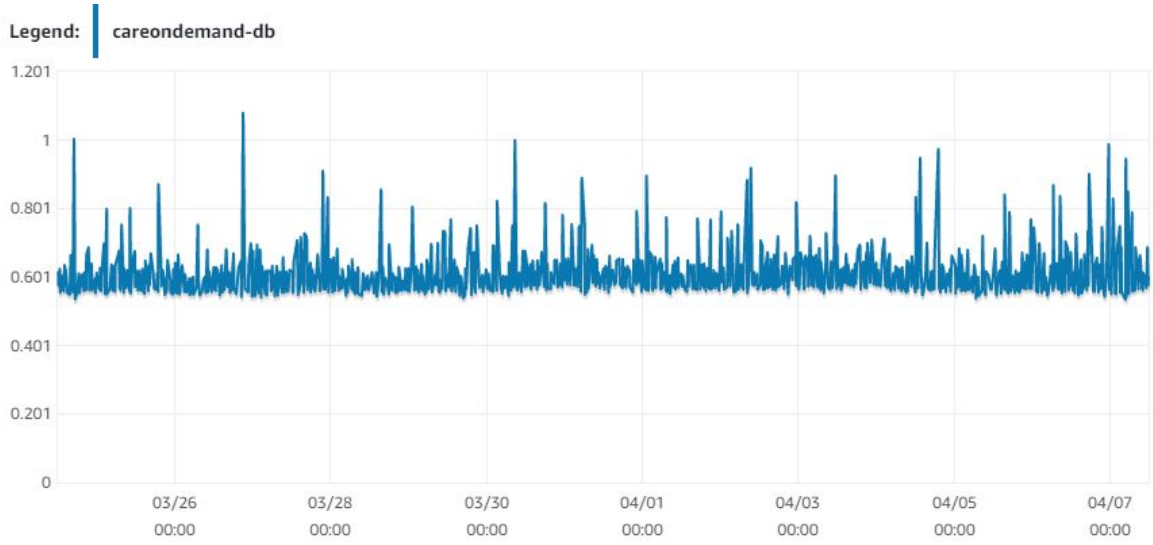
5.3.5 General Performance

A. Response time for queries and updates

- Reading: On average, the read time of a query is 0.3ms to 1.3ms.

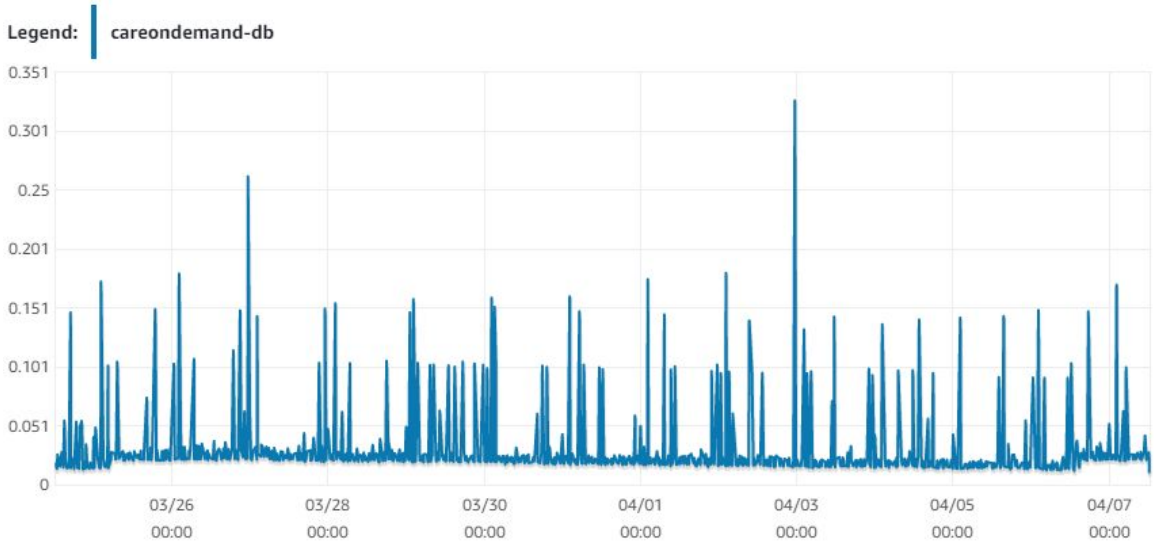


- Writing: On average, the write time of a query is 0.5ms to 1.0ms.

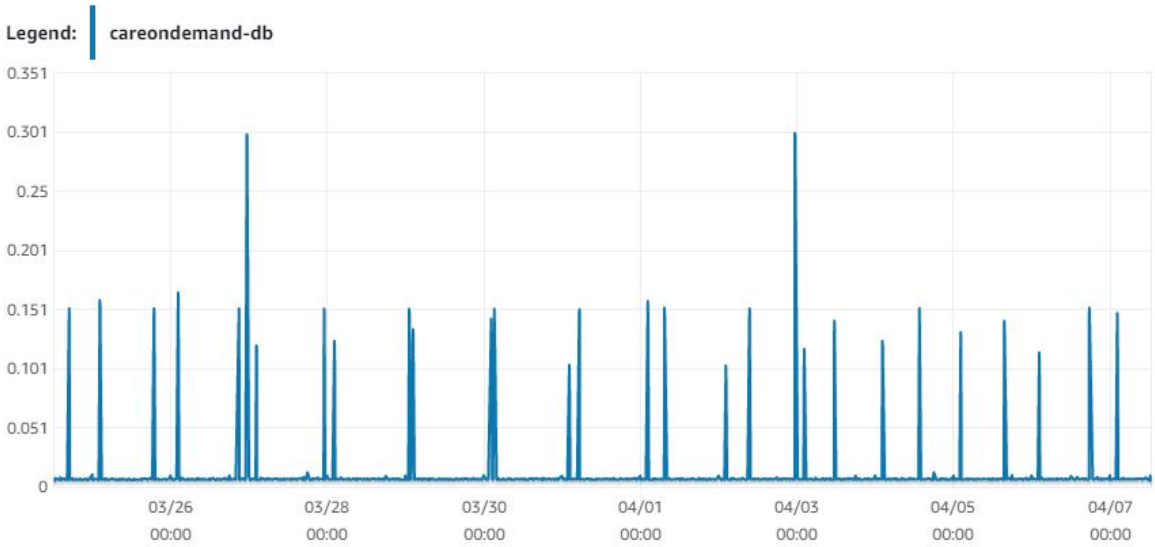


B. Throughput

- Reading: Read throughput tends to top out at around 0.15 MB/s with the uncommon occurrence of reaching up to 0.3MB/s.



- Writing: Write throughput also tends to top out at around 0.15 MB/s with the uncommon occurrence of reaching up to 0.3MB/s; however, as can be seen in the graph below, writing is less frequent than reading.



C. Expected rate of user activity

- Initial usage - 100 customers
- Six months - 500 customers
- Twelve months - ~2500 customers

5.3.6 Capacity

As discussed in the General Performance section, the Care on Demand application will be capable of holding an approximate user base of 2500 accounts. This includes customer, care partner and admin accounts. This application is expected to be able to expand its capacity if needed with the use of the AWS database. For the regions including

Regina & Saskatoon a maximum size of approximately 25’000 users can be expected in the next 3-5 years as Eden Care deploys the service in multiple locations.

5.3.7 Data Retention

Customers are able to remove themselves from the application at any time by contacting an admin at Eden Care. Also, a related customer will have the ability to request a family members account be removed in the case of death or other reasons. If a customer account has been inactive for 18 months all data for that customer will be removed by an admin account.

All order information will remain in the database for a time of 18 months after which it will be removed from the applications database. The NI(C)(K)S are not responsible if any information is saved by Eden Care longer than is expected to be stored in the applications database.

5.3.8 Error Handling

- The user will be directed to an “error” page in the event that the application performs irregularly.
- Error messages are displayed as alerts in the application in case of incorrect user input such as incorrect login information or fields left blank.

5.3.9 Validation Rules

- In order to create an account a user must enter a valid email address in the form example@example.xyz
- A user cannot create an account with a email address that has been used to create an account previously
- In order to login to the application a user must enter a email and password combination that is registered in the database
- In order to login to the application a user must verify the account with the verification email sent after a new account is created
- In order to store an address to be associated with a user account the address must be a valid location in Regina SK
- In order to link two accounts together to order services for one another both users must verify that the two accounts will be linked
- In order to order a service the user must select a date for which services will be performed on
- To order a service, a user must input all fields in the Order Details page including time, date, location and personnel

6.0 Future Development

The app was requested by Eden Care Communities to assist them in organizing their staff and services. As a result, after the capstone deadline we plan to continue our efforts in delivering a completed product to our customer. The list of potential features includes, but is not limited to:

- An in app payment option using Stripe as the interface to give Customers the option to pay with Apple Pay, Google Pay, and Credit Card
- Push notification for all three types of users. Each user will have options to enable specific feature notifications based on their preferences
- Accessibility options including Voice Commands, Digital Assistant interfacing, an in app Predictive Menu, and Native Device gesture integration
- Account linking to allow users to order for their family members/friends that cannot order for themselves
- Incorporate a system to deal with refused services either at the Admin approval level or once the Care Partner arrives to perform the service
- A terms of use document including liabilities and security
- Testing and integration to include Apple iOS devices
- A website application version of the product
- Service list expansion to include childcare services

APPENDIX A - GLOSSARY

AWS - Amazon Web Services

ERD - Entity Relationship Diagram

HIPAA - Health Insurance Portability and Accountability Act

MVVM - Model-View-ViewModel

RDS - Relational Database Service

S3 - Simple Storage Service