SOFTWARE REQUIREMENTS AND ANALYSIS SPECIFICATION

1.0 Introduction

1.1 Goals and objectives

Implement the ChocAn data processing software with the following objectives:

- Verifying a member's unique member number.
- Calculating the fees owed by a member.
- Lookup service via Provider Directory to return six-digit service code corresponding to the service provided.
- Lookup service via Provider Directory to return the service name associated with the service code
- Storing information related to the service provided including current date and time, date service was provided, provider number, member number, service code, and comments.
- Lookup service for fee to be paid for the associated service.
- Lookup service for alphabetically ordered list of service names and corresponding service codes and fees. This list must be created and stored as a file.
- Ability for ChocAn operators to add new members to ChocAn, update existing members, and delete resigned members. Same functionality applies for provider records.
- Automated (every midnight on Friday) and by demand accounting procedure to read week's files of service and generate reports including:
  - **Member repor**t: List of services provided to this member, sorted by order of service date. This report includes general information such as member name, member number, member street address, member city, member state, and member zip code. For each service on the list, additional information included is date of service, provider name, and service name. The member report must be written to a file with a file name format that begins with the member name and date that the report was generated.
  - **Provider report**: List of services they provided to ChocAn members that week. Report is sorted by date received when entered into the ChocAn terminal. Report includes high-level information such as provider name, provider number, provider street address, provider city, provider state, and provider zip code. Each service in the report includes information such as date and time data was submitted, date of service, member name, member number, service code, and fee to be paid. Additionally, a summary at the end of the report includes the

number of consultations with members and the total fee for that specific week. The provider report must be written to a file with a file name format that begins with the provider name and date that the report was generated.

- ○ **Manager of accounts payable report**: Report includes every provider that needs to be paid that week, number of consultations each provider had, and the total fee for this provider. Additionally, the total number of providers who provided services. total number of consultations, and overall fee total to be paid is included.

1.2 Statement of scope

The software to be developed requires implementation of the ChocAn data processing procedures highlighted in detail above. Functionality included is verification of provider/member information, ability to add, update, and delete member and provider information contained within the system. Additionally, on-demand and automated report generation for member reports, provider reports, EFT reports, and manager of accounts payable reports.

1.3 Software context

Businesses such as ChocAn organization need to be able to track, maintain, and monitor important information related to their business. The data processing portion of ChocAn aims to do this by providing a quick, secure, and easy way for individuals of the business to monitor information important to them. Information such as member details, provider details, available services, billing information, and weekly summary reports are contained within this system.

1.4 Major constraints

- Reports need to be able to be generated on-demand by a ChocAn manager at any time. Additionally, reports need to be generated automatically every midnight on Friday.
- Provider Directory and reports need to be stored as files within the system following a specific file naming format.
- Providers can request a Provider Directory at any time. This list of services needs to maintain a sorted alphabetical order.

2.0 Usage scenario

2.1 User profiles

Member: A person who is enrolled in a ChocAn monthly membership and has the ability to participate in a variety of services from health care professionals such as dietitians, internists, and exercise experts.

Provider: A health care professional who provides specific services to ChocAn members.

Manager: A user who manages a specific area of the organization.

Operator: A user who is granted admin-level privileges to add new members to ChocAn. Also, operators are able to delete resigned members and update member records.

2.2 Major software functionality

- **User details**: User details relating to storing, updating, and deleting member and provider information. This section covers CRUD operations that the system must support to ensure a record is kept for all users.
- **Provider Directory services**: Ability for providers to query information related to available services with their corresponding service codes and fees. Lookup services also include the ability to obtain a service code given a service name and vice versa. Also, supports obtaining the related service fee for the given service.
- **Report generation procedures**: Automated and on-demand report generation. All reports are generated once a week (midnight on Friday). On-demand reports are to be generated on an individual basis by the demand of a ChocAn manager.
- **Disk storage**: Generated reports are to be written to disk. Additionally, the Provider Directory is stored as a file.

2.3 Special usage considerations

Software functionality should be accessible at any time throughout the day. Reports generation procedures need to be able to be automated at a specific day and time of the week in addition to on-demand support.

3.0 Data Model and Description

3.1 Data Description

1. **Member Object:**

Member
Attributes
Member Number Member Name Street Address City State ZipCode

2. Provider Object:

Provider
Attributes
Provider Number Provider Name Street Address City State ZipCode

3. Operator Object:

Operator
Attributes Operator Id Operator Name Member Number Provider Number

4. Provider Terminal Object:

Provider Terminal
Attributes Terminal Id Member Number Provider Number

5. Service Object:

Service
Attributes Service Code Service Name Date of Service Type of Service Fee

6. Provider Directory Object:

Provider Directory
Attributes
Service Code Service Name Fee

7. Software Product Object:

Software Product
Attributes
Service Code Provider Number Member Number Current Date Date of Service Comments Fee

8. Acme Accounting Services Object:

Acme Accounting Services
Attributes
Membership Fee Provider Number Provider Name Amount Member Number

9. Data Center Object:

Data Center
Attributes
Member Number Provider Number Membership Status Report Generation Date Status Update Date

10. Report Generator Object

Reports Generator
Attributes
Report Id
Member Report: Member Name
Member Number
Street Address
City
State
ZipCode
Service Name
Provider Name
Date of Service
Provider Report: Provider Name
Provider Number
Street Address
City
State
ZipCode
Service Code
Date of Service
Member Number
Member Name
Total Consultations
Total Fee

11. Manager Object:

Manager
Attributes
Manager Id
Manager Number
Provider Number
Member Number

3.1.1 Entity-Relationship Diagram

Chocoholics Anonymous - Complete ERD

3.1.2 Data Flow Diagram
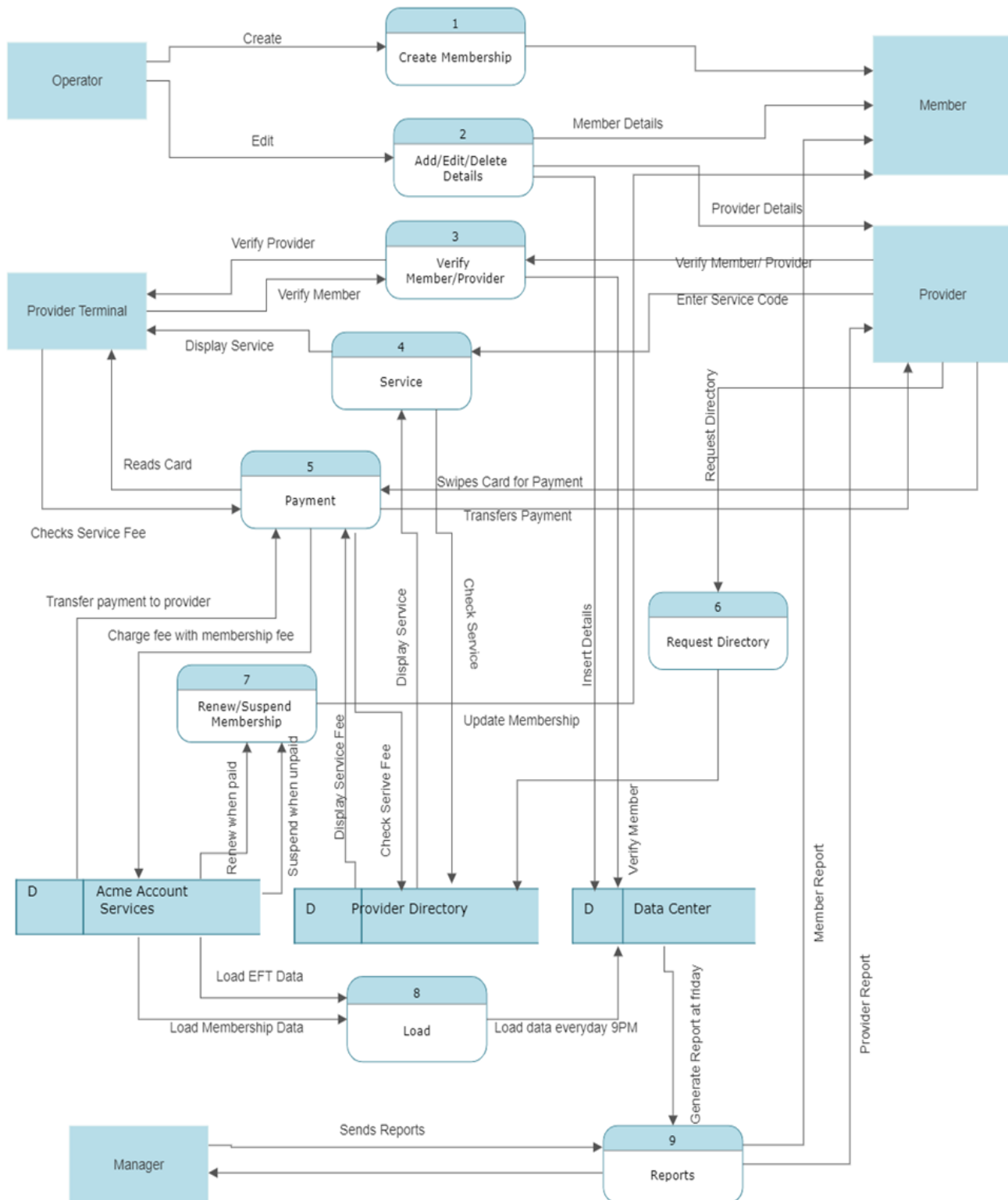
3.1.3 Object Relationships

1. **Member Class:**

Class : Member	
Description: A person addicted to chocolate, who belongs to the ChocAn organization on a monthly subscription and takes medical services	
Class Type: Entity	
Responsibilities	Collaborators
Join Choc An Organization	Provider
Pays Monthly Membership Fee on monthly basis	Manager
Requests and receives Services	Operator
Provides Details to the Operator for update	Service
Receives Member Report on weekly basis(every Friday midnight)	

2. **Provider Class:**

Class : Provider	
Description: A person that provides a variety of services to ChocAn members.	
Class Type: Entity	
Responsibilities	Collaborators
Join Choc An Organization	Member
Provides details to the Operator for update	Operator
Verifies Membership of the Member using provider terminal	Software Product
Lookup for the service	Service
Provides services to Choc An Members	Provider Terminal
Submits necessary data into the software product	Manager
Swipes membership card for payment and provide comments	Provider Directory
Requests the software product for the provider directory	
Receives Provider Report on weekly basis	

3. **Operator Class:**

Class : Operator	
Description: A ChocAn admin who is responsible for adding new members, deleting resigned members, providers and updating member, provider records	
Class Type: Control	
Responsibilities	Collaborators
Receive details from member and update	Provider
Receive details from provider and update	Member

4. Provider Terminal Class:

Class : Provider Terminal	
Description: An user interface for providers to interact with the ChocAn system. The terminal is linked directly to the ChocAn Data Center to perform procedures within the system.	
Class Type: Boundary	
Responsibilities	Collaborators
Verifies Provider	Provider
Connects to DataCenter to verify the Membership	Software Product
Displays the status of the Provider and Member	
Connects to Software Product and displays the Service Fee	

5. Service Class:

Class : Service	
Description: A type of treatment or consultation session provided to the member like a session with a dietitian or an aerobic exercise session with an Exercise Specialist.	
Class Type: Entity	
Responsibilities	Collaborators
A service is requested by the Choc An member	Provider
Provider provides the services to the Member	Provider Directory
The provider lookup for the service code in the directory	Software Product
Software Product looksup for the service fee	Member

6. Provider Directory Class:

Class : Provider Directory	
Description: An alphabetically ordered list of all service names, corresponding service codes, and fees.	
Class Type: Control	
Responsibilities	Collaborators
Receive the service code from provider and lookup for service	Provider
Provider requests for the provider directory	Software Product
Creates a form of the directory to send to Provider	Service

7. Software Product Class:

Class : Software Product	
Description: A product that stores all the information related to the services and its fee	
Class Type: Boundary	
Responsibilities	Collaborators
Displays the service based on the service code requested by provider	Provider Terminal
Records the data of the service provided by the Provider	Provider Directory
Look up for the fee of the service provided by the provider	Service
Generates the provider directory requested by the provider	

8. **Acme Accounting Services Class:**

Class : Acme Accounting Services	
Description: A third-party organization responsible for processing payments of services, membership fees, updating membership status.	
Class Type: Control	
Responsibilities	Collaborators
Records the fee of the service and transfers the payment in form of EFT to provider	Software Product
Verifies the membership fee status paid by the Member	Data Center
Suspends the member whose fee are overdue and renew who paid	
Loads the data of the membership and services into the datacenter on daily basis (every day at 9pm)	

9. **Data Center Class:**

| Class : Data Center	
Description: A database server which stores all the information of the activities performed between provider and member.	
Class Type: Boundary	
Responsibilities	Collaborators
Receives the data from the data center.	Acme Accounting Services
Updates the status of the membership.	Provider Terminal
Provide the membership status to provider terminal when requested.	Reports Generator
Connects to the Reports generator for generating the reports.	

10. **Reports Generator Class:**

Class : Reports Generator	
Description: A software scheduler used to generates reports at particular time schedule.	
Class Type: Control	
Responsibilities	Collaborators
Verifies the time scheduled for generating the reports	Data Center
Generate member report, provider report and schedule report	Manager
Sends the generated reports to the Manager.	

11. **Manager Class:**

Class : Manager	
Description: A Choc An professional who is responsible for sending the reports generated to members and providers.	
Class Type: Entity	
Responsibilities	Collaborators
The reports generated by the report generator are received by the Manager	Reports Generator
Reviews the Summary report for accounts payable	Provider
Sends the Provider report to the Provider.	Member
Sends the Member report to the Member.	

3.1.4 Complete data model

Class Robustness and Reliability diagram:
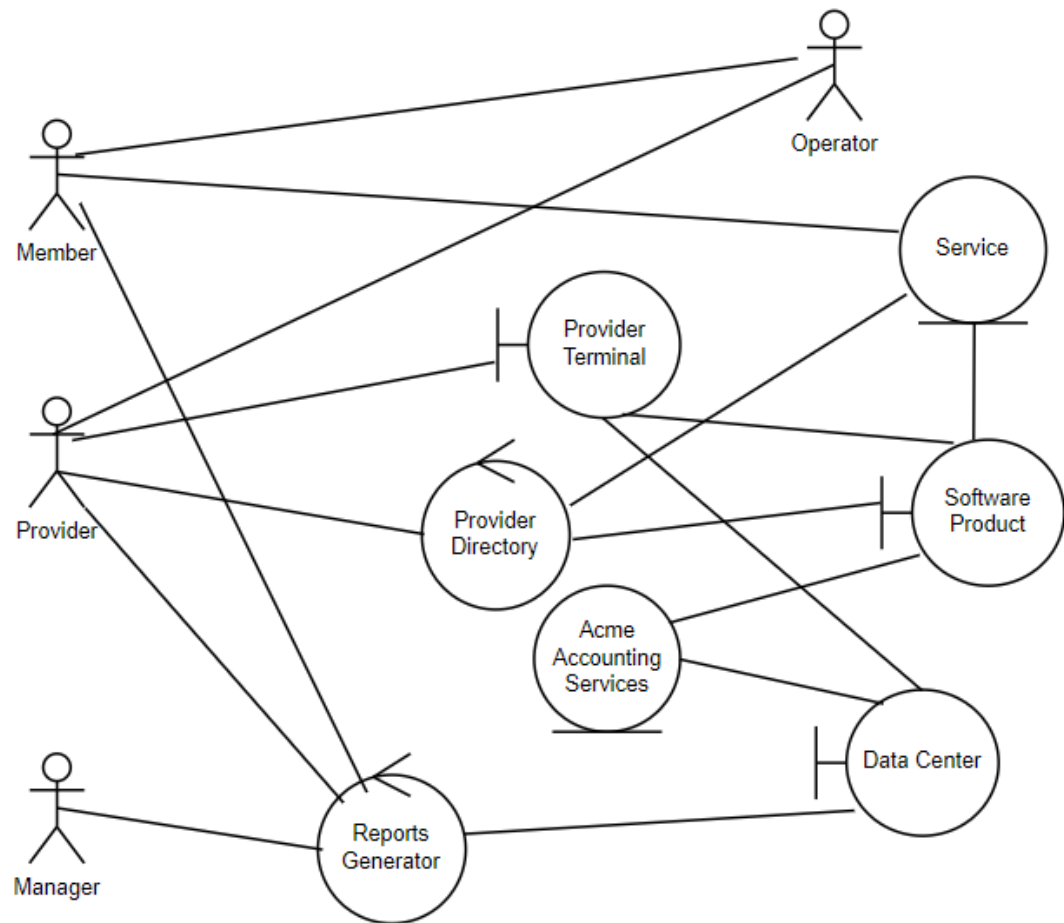
3.1.5 Data dictionary

🗓 DataDictionary

4.0 Functional Model and Description

4.1 Use cases

In the ChocAn System we initiate eight use cases. The following table represents the name of use cases and their corresponding link.

SI.NO	Name of use cases	Link
1	Updated Member/Provider Account	UpdateMemberProvider_Use_Case_Spec.docx
2	Create Membership	CreateMembership_Use_Case_Specification.docx
3	Suspend/Renew Membership	Suspend/RenewMembership_Use_Case_Specification.docx
4	Verify Details	Verify_Use_Case_Spec_Ver1.docx
5	Service	Service_Use_Case_Specification.docx
6	Process Payment	ProcessPayment_Use_Case_Specification_Ver1.docx
7	Request Directory	RequestDirectory_Use_Case_Specification_Ver2.docx
8	Load EFT Data	EFTData_Use_Case_Specification_Ver1.docx
9	Generate Report	GenerateReport_Use_Case_Specification_Ver1.docx

4.2 Software Interface Description

4.2.1 External machine interfaces

External machine interfaces will involve other computers or servers that are not involved in the ChocAn system. However, they have access to the system. In this scenario, the corresponding system like terminal equipment, EFT system and servers, The ACME accounting system act as an external machine interface.

4.2.2 External system interfaces

The external system interface basically involved all the software systems that are not in the ChocAn software system. As per contract, Our organization will work on ChocAn data processing software. Communication software will be designed by another organization like designing the ChocAn providers terminal and software needed for Acme accounting services and to implement the EFT element. So, communication software, terminal software systems, ACME and EFT

processing software are examples of external systems. ACME services is a third party organization that is responsible for payment processing of membership, suspending the member whose fees are overdue and reinstating the membership who have now paid what is owing. The EFT processing system will take data from ChocAn data software and create payment invoices for services. After creating the invoices EFT system will execute payment procedure using the banking process.

4.2.3 Human interface

4.2.3.1 User screen interface layouts

In this system we found three user interfaces screens. The manager user screen, provider user screen, and the operator user screen.

Manager screen Interface layout:

Member reports, provider reports, and account payable reports are generated in the manager screen interface layout. If the manager clicks individual reports, it will generate reports individually. Reports layout screen are shown below:
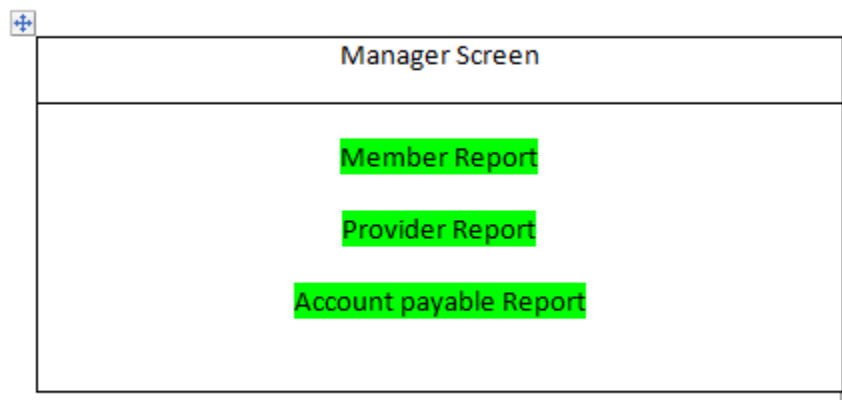
Operator screen user interface:

Operators mainly maintain members, providers, and services. It will add members, delete members, and update members. For providers and services, it will work similarly.

```
┌─────────────────────────────────────────┐
│              Operator Screen              │
├─────────────────────────────────────────┤
│                                           │
│            Members maintenance            │
│                                           │
│            Provider Maintenance           │
│                                           │
│            Services Maintenance           │
│                                           │
└─────────────────────────────────────────┘
```
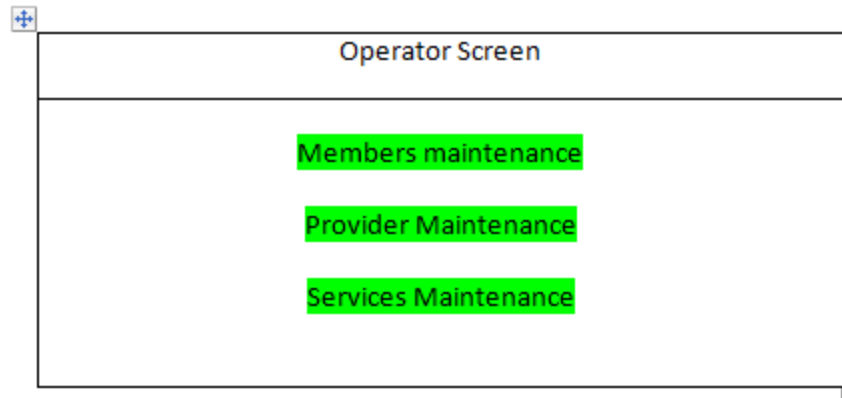
Provider Screen interface layout

Provider screen have following options:

```
┌─────────────────────────────────────────┐
│              Provider Screen              │
├─────────────────────────────────────────┤
│                                           │
│             Provider directory            │
│                                           │
│                Bill services              │
│                                           │
│              Provide services             │
│                                           │
│            Update/Create Member           │
│                                           │
└─────────────────────────────────────────┘
```
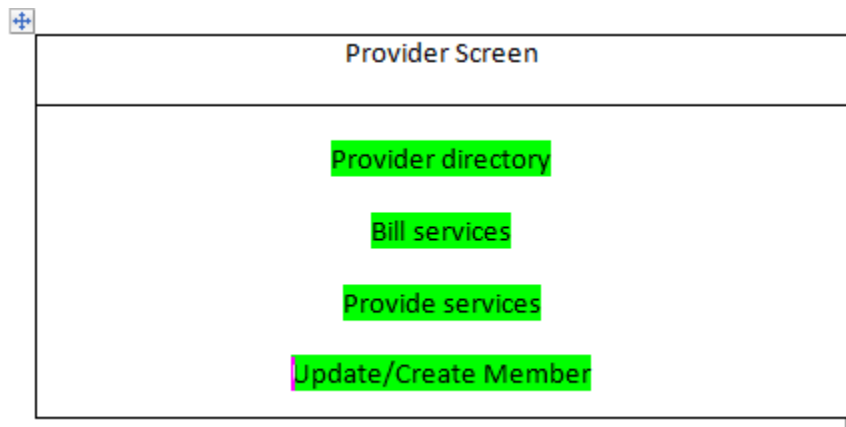
4.2.3.2 Report layouts

Manager Reports Layouts:

Manager reports have Member Report, Provider Report, and Payable report.

Member reports				
Member no	Name	Email	Address	Membership status

provider reports				
Provider no	Name	Email	Address	status

Account payable reports				
Report no	Manager	Provider	Services	Report data

4.3 Sequence Diagrams

Update Member Sequence diagram
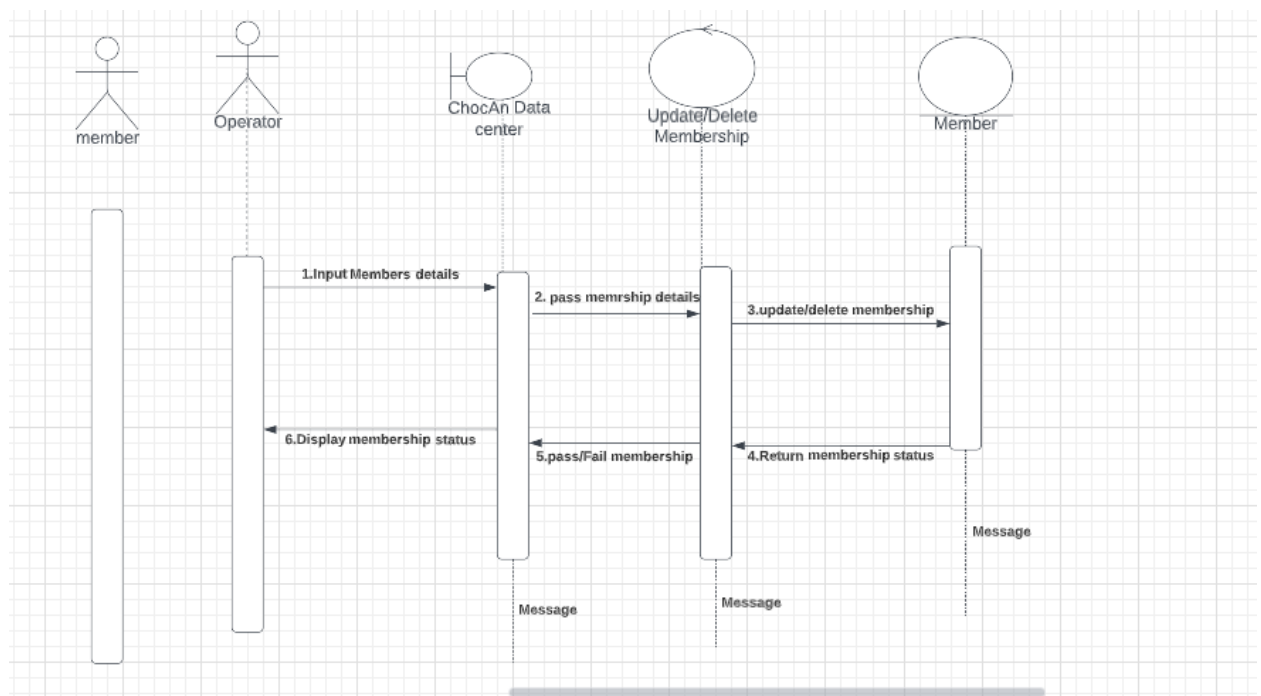
Update provider Sequence diagram

1.Input Providers details

2. pass/faill provider details

3.update/delete provider

6.Display provider's status

5.pass/Fail provider

4.Return provider status

Message

Message

Message

Create Membership Sequence Diagram

1.Input Members details

2. pass member details

3. Create member

6.Display the member number

5.pass member number

4.Return Member number

Message

Message

Message
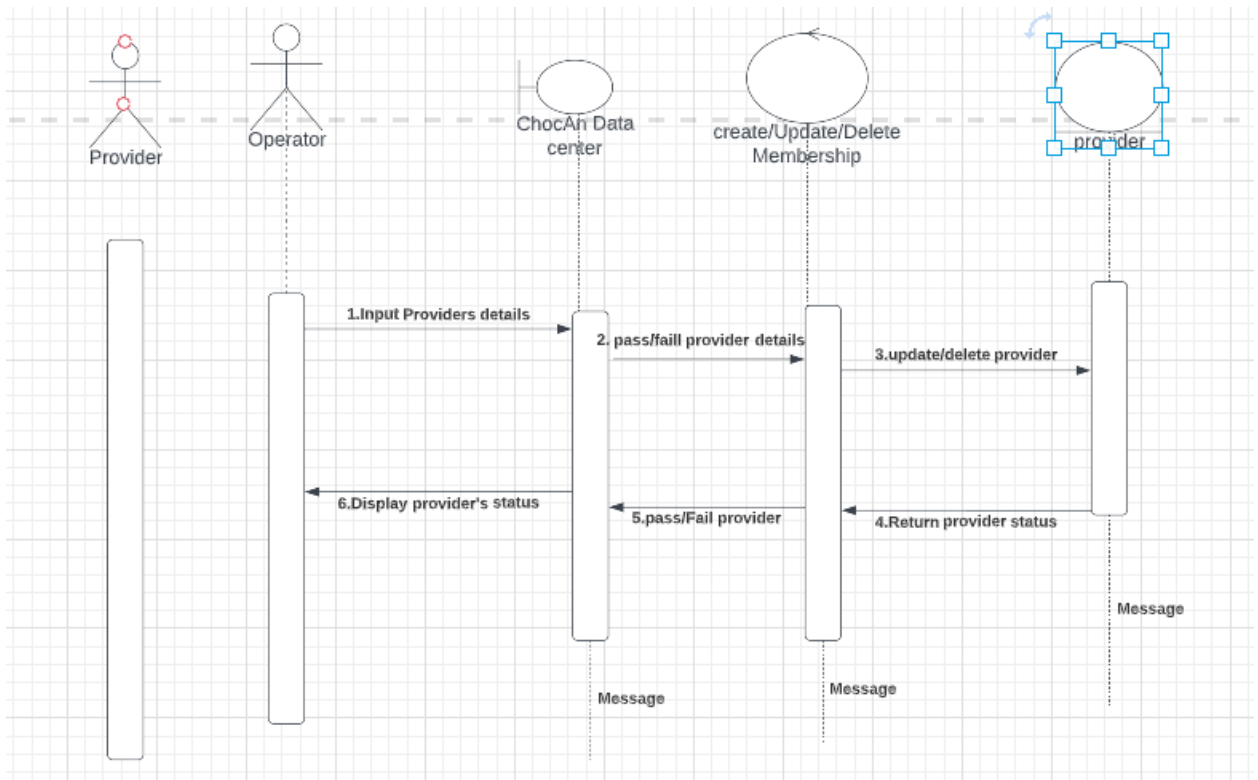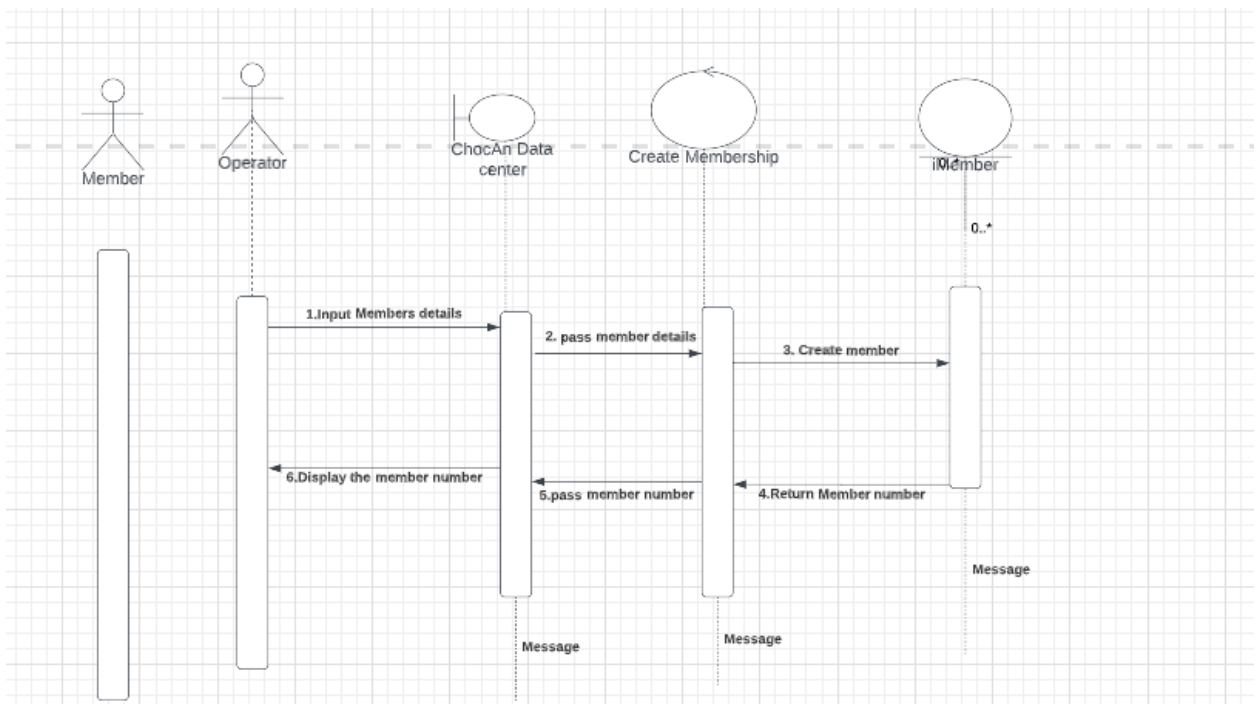
Verify Membership Diagram
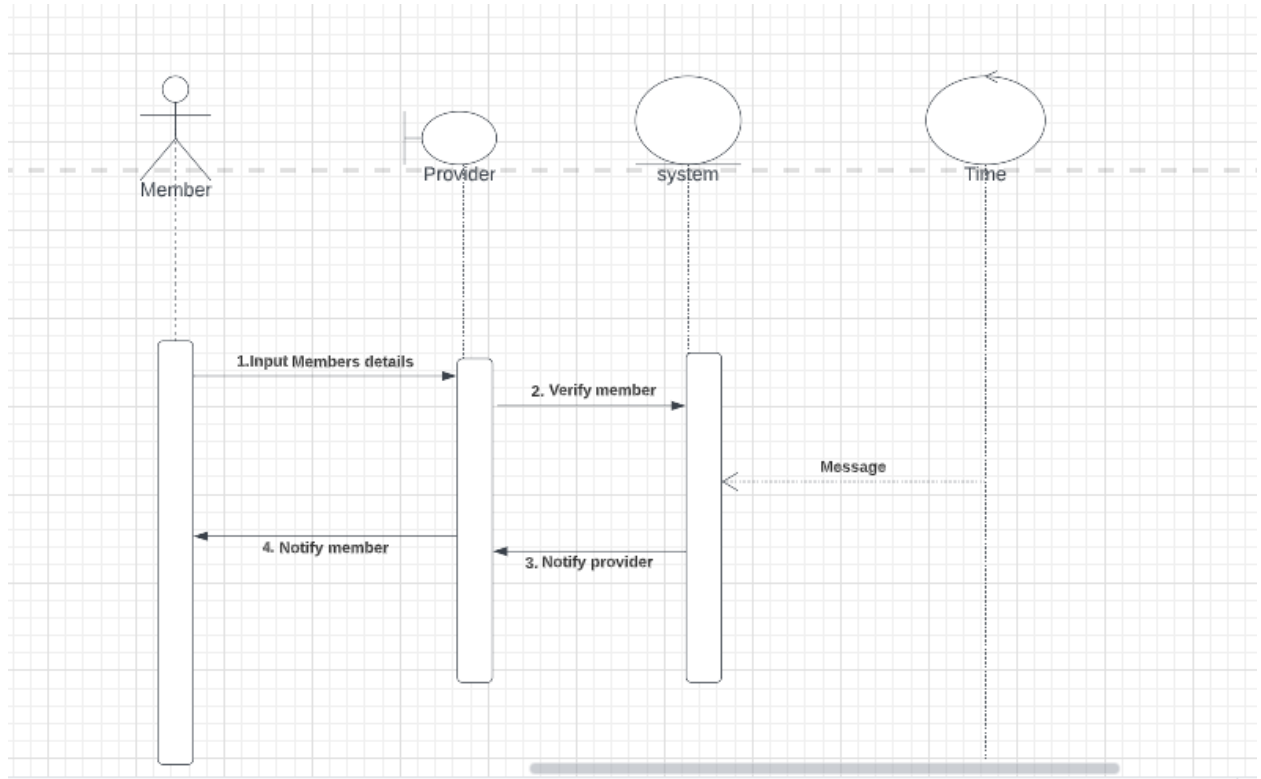
Service Sequence Diagram
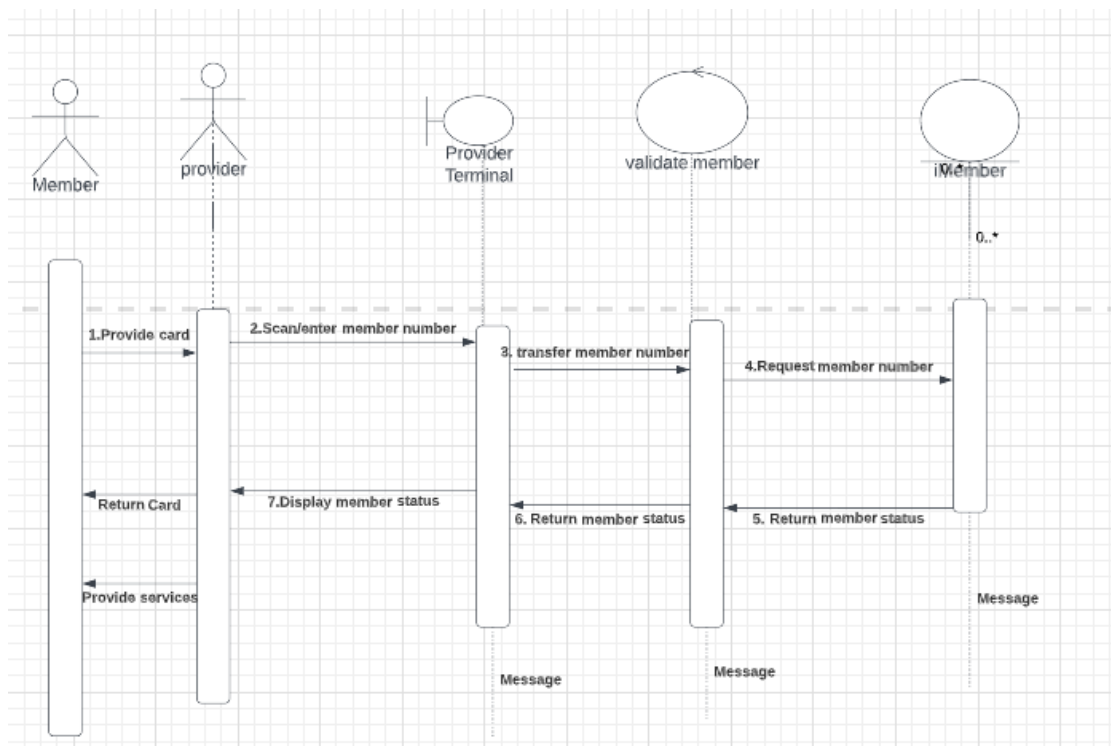
Request Directory Sequence Diagram
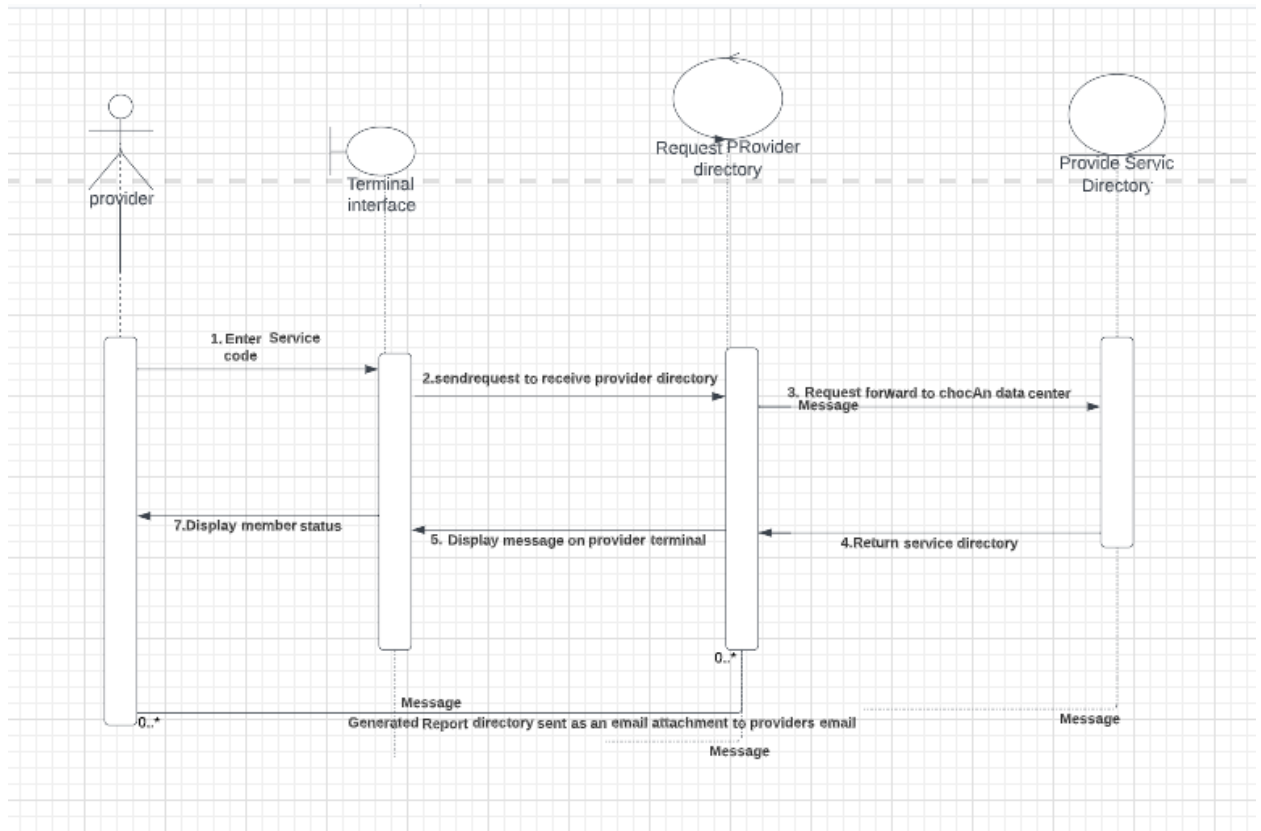
4.4 Communication Diagrams

Suspend/Renew Membership

Collaboration/communication diagram for
use_case: Suspend/ renew membership

EFT Data
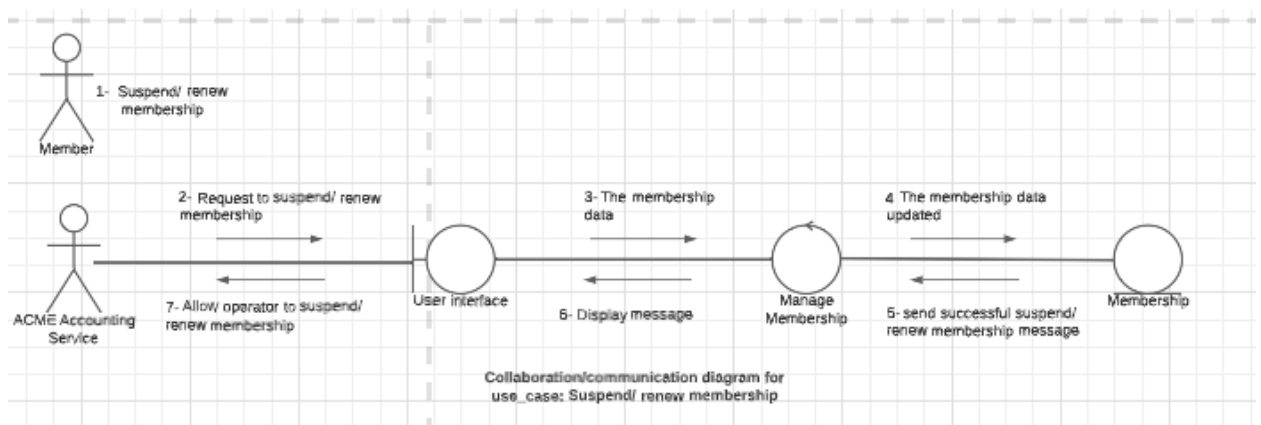
Collaboration/communication diagram for
use_case: EFT data

Process Payment
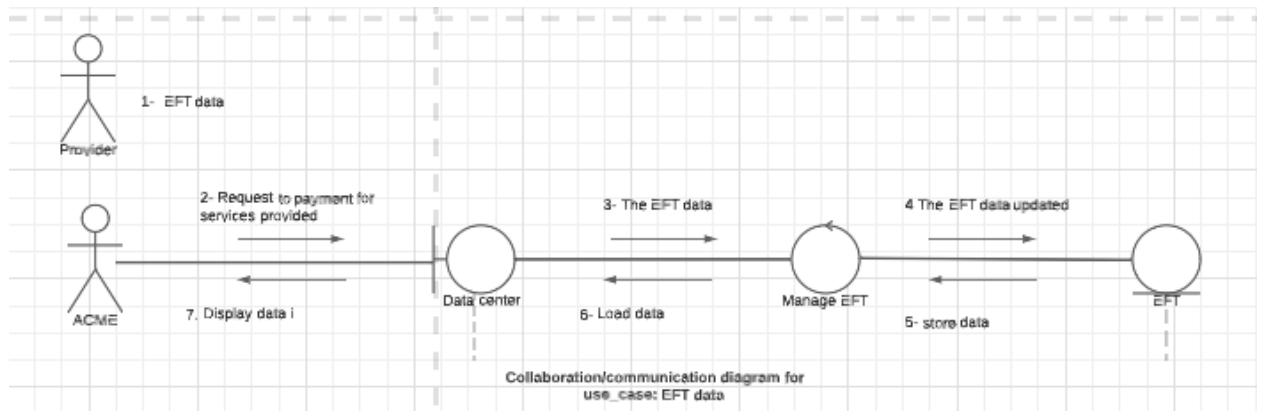
Collaboration/communication diagram for
use_case: Process Payment

Generate Report
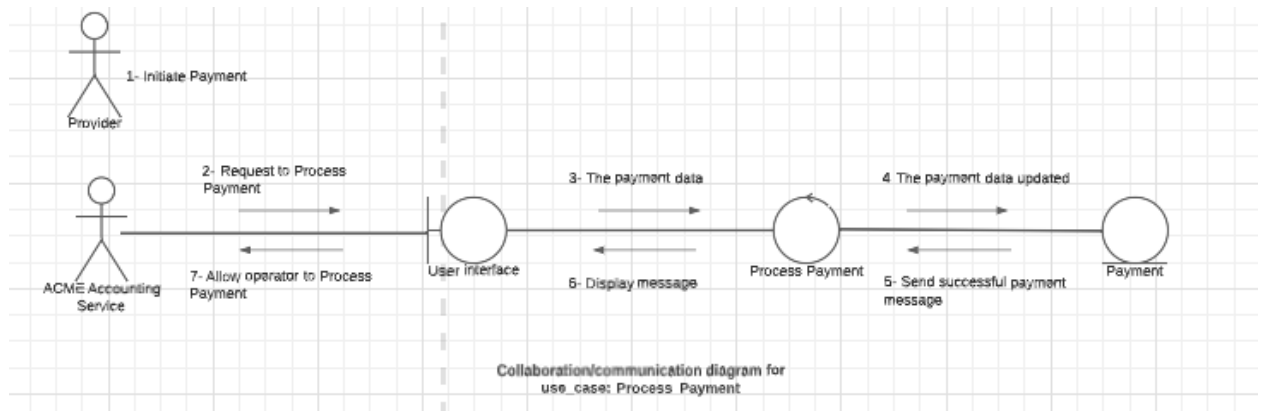
Collaboration/communication diagram for
use_case: Generate report
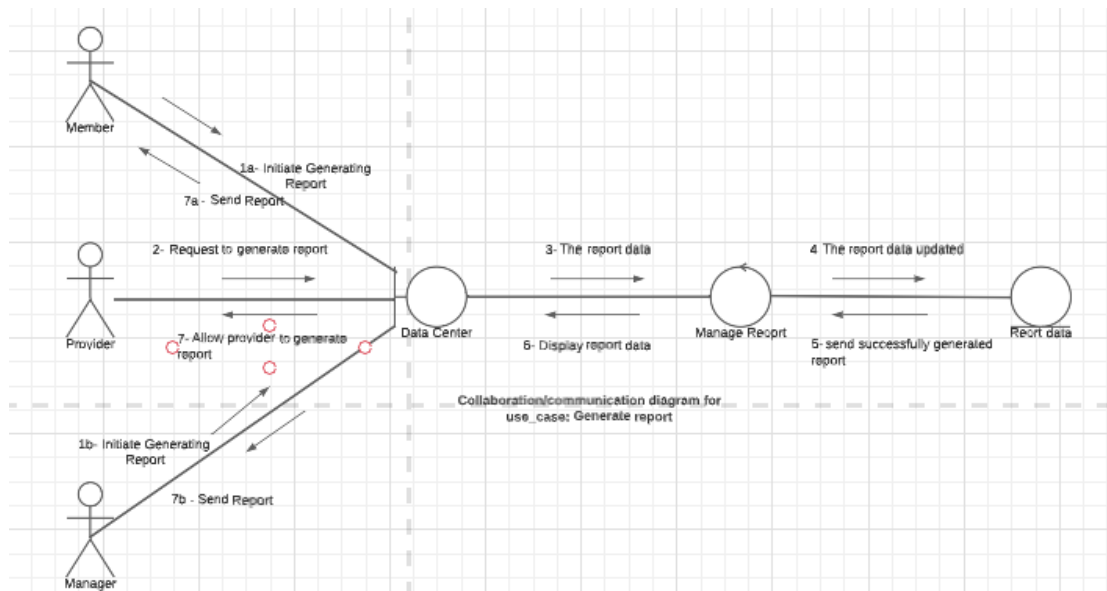
5.0 Behavioral Model and Description

Behavioral model is designed to describe the nature of system behavior in the event of external or internal factors that would affect the behavior of the system. In the proposed new ChocAn system, below are details of events, factors, and scenarios that would affect the ChocAn new system.

5.1 Description for software behavior

5.1.1 Events

1. Add Member
2. Cancel
3. Verify
4. Load
5. Update
6. Read
7. Transfer
8. Query
9. Edit
10. Suspend/delete

5.1.2 States

1. Initialization
2. Updated membership
3. Add Membership
4. Deleted membership
5. Update Provider
6. Add Provider
7. Delete Provider
8. Request directory data
9. Suspend Membership
10. Generate reports
11. Load Data
12. Quit Application

5.2 State Transition Diagrams

Membership State Transition Diagram

Initialization

Quit Application

Event Loop

A person is applying to become a member

An existing member is updating his/her personal information

Current member cancelling membership

Create New Member
New member is assigned an ID number and Member Card

Update Member Information
Providers will be notified with member information change

Delete Member
Current member status will be set to inactive and notify provider and third party payment processor

Provider State Transition Diagram

Initialization

Quit Application

Event Loop

A provider is applying to become ChocAn provider

An existing provider is updating information information

Current provider cancelling membership

Create New Provider
New provider is created and assigned an ID number

Update Provider Information
Member will be notified with Provider information change

Delete provider
Current provider status will be set to inactive and notify member

Verification, Fee Lookup, and Billing State Transition Diagram

Initialization

Quit Application

Event Loop

Provider Terminal is receiving request to verify member

Provider Terminal is verifying provider

A member is trying to find service provided

Provider Terminal is looking send bill to member

Member Verification
Member will swipe member card or provide card number

Provider Verification
System will send query to verify provider by using six digit service code

Query Service Data
System will send a query to get service information amd fee. Data will be displayed

Query Member Data
System will query member's membership data such as renewal date and balance from services. Notification will be sent via e-mail

Report State Transition Diagram

Run CRON Job Schedule = 00:00 every friday

Initialization

Finish CRON Job

Query Member Data

Query Provider Data

Query Billable Data

Generate Member Report
System will generate member report and create file and store it in server. send report to provider

Generate Provider Report
System will generate provider report and crate file and store it in server. send report to provider terminal

Generate Account Payable Report
System will generate report, create and store file in server. Send data to ACME Account Services

6.0 Restrictions, Limitations, and Constraints

1. Access AMCE servers for payment data as it is third party server
2. Scheduler is set only to generate reports on friday midnight

7.0 Validation Criteria

7.1 Classes of tests/Test Strategy

Integration test:

We will test the integration between AMCE servers and ChocAn servers for monthly payments systems and to process the EFT data from the ACME server.

Acceptance test:

We will test by creating a dummy account on the terminal to check that we can create new accounts that can be created for monthly subscription and monthly subscription payment processing for accounts for proper error messages after the end of the subscription period.Create a dummy accounts When a new member is joining ChocAn organization we need to test the account creation process,modifying the accounts and deleting those accounts when they leave organization.Searching for the service provided for the customer based on the Six-digit service code and managers should be able to retrieve the data of services provided to the ChocAn member within the week at any date range/specific date at any time.

Smoke Test:

This test is performed before the official release to ensure that all main functionalities of the software are working like create,delete,update monthly subscriptions.

Regression Testing:

In this testing we will test all the features available in the ChocAn terminal to ensure that the old functionalities are working without any impact after the new changes

7.2 Expected software response

 The software responses we have for the requirements is:

1. ChocAn operator should be able to register a new user look for subscription for ChocAn services

2. ChocAn operator should be able to create a new user joining ChocAn organization

3. ChoCAn operator should be able to delete the user leaving from the organization

4. ChocAn operator should be able to update the user details in organization

5. Accounts of ChocAn subscribers should be able to renew/suspend subscription based on the payment processing at the end of month

6. ChocAn should be able to verify members details when they swipe members card with successful message if user have valid subscription

7. If member is not valid should display an error message

8. Provider should be able to lookup the six-digit service code corresponding to a service provided

9. Provider should be able request and view an alphabetically ordered list of service names and corresponding service codes and fees

10. EFT Data is stored in Acme Account services and this data should be loaded into the datacenter every night at 9PM

7.3 Performance bounds

The data should be simulated by keyboard input and data should be transmitted to providers terminal which displays on the screen

8.0 Appendices

8.1 System traceability matrix

⊞ TracabilityMatrix

Traceability Matrix - Version 1.3

Artifact	Use Case 1 - Update Member/Provider Account	Use Case 2 - Create Membership	Use Case 3 - Suspend/Renew Membership	Use Case 4 - Verify Details	Use Case 5 - Service	Use Case 6 - Process Payment	Use Case 7 - Request Directory	Use Case 8 - Load EFT Data	Use Case 9 - Generate Report	Analysis Class Diagram	Final Class Diagram	Analysis Class Diagram	Build ERD	Complete ERD	Data Dictionary	Data Flow Diagram	Decomposition Diagram	Robustness/Realization Diagram	State Diagram 1 - Membership	State Diagram 2 - Provider	State Diagram 3 - Verification, Fee Lookup, Billing	State Diagram 4 - Reports	Sequence Diagram 1 - Update Member	Sequence Diagram 2 - Update Provider	Sequence Diagram 3 - Create Membership	Sequence Diagram 4 - Verify Membership	Sequence Diagram 5 - Service	Sequence Diagram 6 - Request Directory	Communication Diagram 1 - Suspend/Renew Membership	Comunication Diagram 2 - EFT Data	Communication Diagram 3 - Process Payment	Communication Diagram 4 - Generate Report
Use Case 1 - Update Member/Provider Account	x									x	x	x	x	x	x	x	x		x	x												
Use Case 2 - Create Membership		x								x	x	x	x	x	x	x	x		x				x	x	x							
Use Case 3 - Suspend/Renew Membership			x							x	x	x	x	x	x	x	x												x			
Use Case 4 - Verify Details				x						x	x	x	x	x	x	x	x		x							x						
Use Case 5 - Service					x					x	x	x	x	x	x	x	x	x									x					
Use Case 6 - Process Payment						x				x	x	x	x	x	x	x	x		x												x	
Use Case 7 - Request Directory							x			x	x	x	x	x	x	x	x		x									x				
Use Case 8 - Load EFT Data								x		x	x	x	x	x	x	x	x													x		
Use Case 9 - Generate Report									x	x	x	x	x	x	x	x	x	x				x										x
Analysis Class Diagram	x	x	x	x	x	x	x	x	x	x																						
Final Class Diagram	x	x	x	x	x	x	x	x	x	x																						
Build ERD	x	x	x	x	x	x	x	x	x	x																						
Complete ERD	x	x	x	x	x	x	x	x	x	x																						
Data Dictionary	x	x	x	x	x	x	x	x	x	x																						
Data Flow Diagram	x	x	x	x	x	x	x	x		x																						
Decomposition Diagram	x	x	x	x		x	x	x	x	x																						
Robustness/Realization Diagram					x				x																							
State Diagram 1 - Membership	x	x																														
State Diagram 2 - Provider	x																															
State Diagram 3 - Verification, Fee Lookup, Billing			x		x	x																										
State Diagram 4 - Reports									x																							
Sequence Diagram 1 - Update Member	x																															
Sequence Diagram 2 - Update Provider	x																															
Sequence Diagram 3 - Create Membership		x																														
Sequence Diagram 4 - Verify Membership				x																												
Sequence Diagram 5 - Service					x																											
Sequence Diagram 6 - Request Directory							x																									
Communication Diagram 1 - Suspend/Renew Membership			x																													
Comunication Diagram 2 - EFT Data								x																								
Communication Diagram 3 - Process Payment						x																										
Communication Diagram 4 - Generate Report									x																							

8.2 Product Strategies

Key product strategies include:

- Ensure ChocAn members can find services to resolve their addiction as quickly as possible.
- Ensure ChocAn providers, managers, and operators have easy and 24/7 access to the ChocAn system.
- Ensure the ChocAn system is reliable, secure, and accurate.

8.3 Analysis metrics to be used

- Lines of code: The total number of lines of code required to complete a specific task/function.
- Hours: The total amount of hours required to complete a specific task/function.

8.4 Supplementary information

NA