

## Development Details

### Background

Carepatron's vision is to be the healthcare platform for the entire world. It's an all-in-one platform for healthcare practitioners and their teams to manage their client list, write clinical documentation, schedule appointments, invoice and bill clients etc all inside a single secure workspace.

### Scenario

A Dietician needs a way to view relevant healthcare documents for their patients.

When they create a new patient record in Carepatron, they want the healthcare records of the patient to automatically sync from their Primary Healthcare Provider (usually a General Practitioner/Family Physician/Primary Care Physician) into Carepatron.

The types of documents could be lab (blood) results, relevant progress notes, and relevant physical assessments.

#### Use Case:

1. Dietician receives an email from a new prospective patient, who needs their services
2. The Dietician creates a patient record in Carepatron using the name and email address of the patient
3. The relevant healthcare documents from their Primary Healthcare Provider are now viewable to the Dietician in Carepatron

### System Requirements

- Patient records can be created/updated/deleted in Carepatron
- Relevant Healthcare documents from a patient's Primary Healthcare Provider are synced into Carepatron
- A patient's Primary Healthcare Provider can use a different healthcare management application (not Carepatron)

## Analysis & Planning

Estimated: 2hrs

Actual: 2hrs

### Assumptions

- The application for the Primary Healthcare Provider exists.
  - For this solution we will create a mock microservice to get the data.
  - We will try to create a solution from different providers using microservices.
    - Data and schema for each provider may differ, but for this exercise we will make it all the same.
- The application for the CRUD of the patient's records is not yet created.
  - We will create a CRUD microservice for the patient's record.
  - We will create a CRUD UI for the patient's record.
    - Additional
      - We will add an option for selecting the Primary Health Provider
      - We will add a field to add the number for the Primary Health Provider
      - Sync is recognized by both these fields
    - Then integrate the UI and the microservice.
  - We will integrate the UI and the microservice.
- We will focus on delivering on the synchronization of the documents to the patient's records.
  -
- In this exercise, the whole solution is developed by a single developer but the tasks can be done by multiple developers.

### User Stories

#### User Story 1 (US01) Create a Mock Schema for Primary Health Provider Documents

Details:

- Create a mock schema for Primary Health Provider Documents.

Estimated: 1hr

#### User Story 2 (US02) Create a Mock Schema for Dietician Patient Records

Details:

- Create a mock schema for Dietician Patient Records.

Estimated: 1hr

### User Story 3 (US03) Create a Repository for the solution

#### Details:

- Create a repository for all the work.

Estimated: 15min

### User Story 4 (US04) Create a Microservice for Carepatron Healthcare Provider

#### Details:

- Create a microservice for Carepatron Healthcare Provider.
  - Create a solution for this microservice.
    - Create a service to get the patient documents.
  - Apply model first approach for the data.
    - Apply the schema used in US1.

Dependency: US1

Estimated: 4hrs

### User Story 5 (US05) Create a controller for Company1 Healthcare Provider

#### Details:

- Create a controller the microservice created in US4 to simulate for Company1 Healthcare Provider.

Dependency: US4

Estimated: 1.5hrs

### User Story 6 (US06) Create a controller for Company2 Healthcare Provider

#### Details:

- Create a controller the microservice created in US4 to simulate for Company2 Healthcare Provider.

Dependency: US4

Estimated: 1.5hrs

### User Story 7 (US07) Create a Microservice for Dieticians' Patient Record

#### Details:

- Create a microservice for Dieticians' Patient Record
  - Create a complete CRUD solution for this microservice.
  - Apply model first approach for the data.
    - Apply the schema used in US2.

Dependency: US2

Estimated: 6hrs

## User Story 8 (US08) Create a UI for Dieticians' Patient Record

### Details:

- Create a UI for Dieticians' Patient Record.
  - Create a complete CRUD solution for this UI.
  - Apply model first approach for the data.
    - Apply the schema used in US2.

Dependency: US4,US5,US6,US7

Estimated: 4hrs

## User Story 9 (US09) Push changes in repository and finalize documentation

### Details:

- Push changes in the repository and finalize documentation.

Estimated: 1hrs

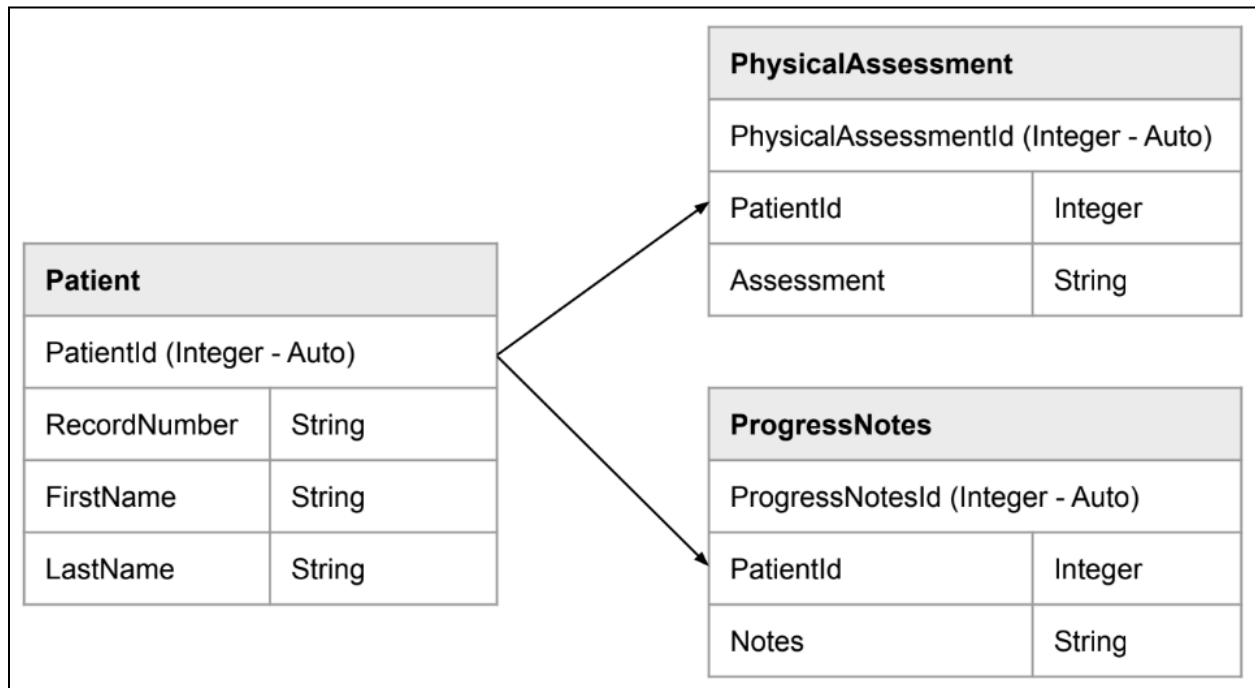
## Implementation

### US01

Estimated: 1hr

Actual: 30min

Actual work: Created a simple schema for the primary health provider documents.

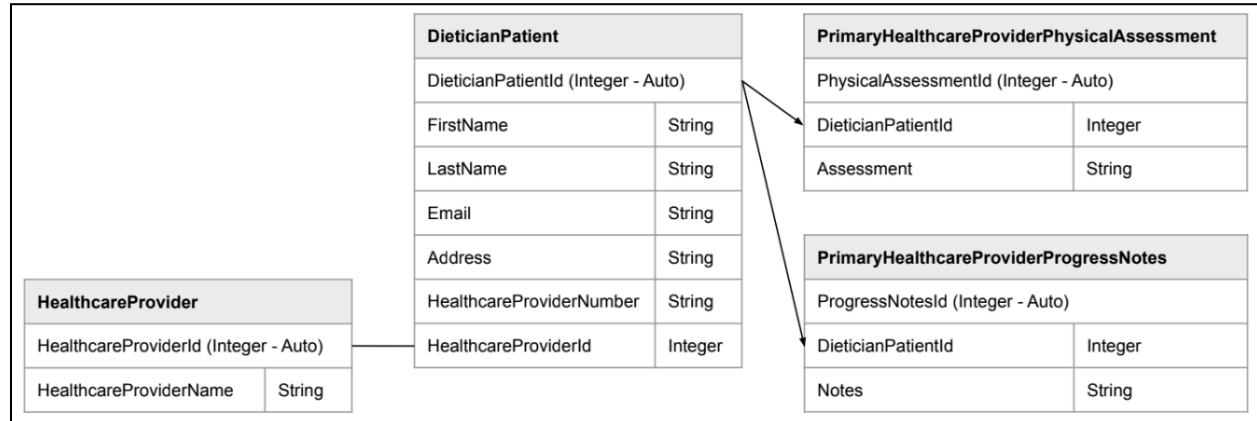


## US02

Estimated: 1hr

Actual: 30min

Actual work: Created a simple schema for the dietician patient records.



## US04

Estimated: 4hrs

Actual: 8hrs

Actual work:

- Created an API solution in visual studio using .NET 8 and used a repository pattern for segregation of codes for better architecture.
  - CarepatronHealthcareProvider.Api,
    - Interfaces the controllers
  - CarepatronHealthcareProvider.Controller
    - Has the classes controls the request and response of each service
  - CarepatronHealthcareProvider.Contract
    - Has the classes for the request and response of each controller
    - Not used, only put as a future change
  - CarepatronHealthcareProvider.Domain
    - Has the classes that contains the service implementations
  - CarepatronHealthcareProvider.Data
    - Has the repository classes for data manipulation
- Issues encountered:
  - Took me a while to fix my issue with data migration.

## US05

Estimated: 1.5hrs

Actual: 2.5hrs

Actual work:

- Created a new controller for Company1.
  - Added models, repository, service.
- Issues encountered:
  - Had to fix my issue with child data not showing in the result.

## US06

Estimated: 1.5hrs

Actual: 0.5hrs

Actual work:

- Created a new controller for Company2.
  - Added models, repository, service.

## US07

Estimated: 6hrs

Actual: 6hrs

Actual work:

- Created a new controller for Dietician Patient Records.
  - Added models, repository, service.
  - I only created the creation of data then it is only syncing using a carepatron healthcare provider.
    - Syncing of notes not finished.
- Issues encountered:
  - I'm having an issue with automapper so I opted to use it, hence I just manually mapped the request to the model..

## US08

Estimated: 4hrs

Actual: 0hrs

Actual work:

- No work done. Not enough time. But please use the controller to create new data. Please get back on what is only finished in US7

## US03

Estimated: 15min

Actual: 15min

Actual work: Created the repository in GitHub. Link here: <https://github.com/khalel/Exam4.git>

## US09

Estimated: 1hr

Actual: 15min

Actual work: Pushed changes in repository and finalized documentation.

## Software Definitions

CarepatronHealthcareProvider.Api

- Has Mock Controller for Carepatron Healthcare Provider
- Has Mock Controller for Company1 Healthcare Provider
- Has Mock Controller for Company2 Healthcare Provider
- Has Controller for Dieticians' Patient Record

UI

- (Not created) User interface to simulate the solution

## Things to Consider

- Instead of calling another service to sync data, we can instead use message queuing.
- We can add more validation to sync the data.
- Naming of database objects can be better.
- Calling of other services from other companies can be synchronous using gRPC.
- Add security fetching the data using tokens or identity.
- We can update the manipulation of data using contracts.
- Syncing of data can be refined for further discussions.

## How to Run

- Run the microservice
  - Upon running it will do a data migration to simulate creation of the database with sample data.
- Not finished (Run the UI)
  - Try the CRUD functions, please see sample request post at the end of this document.

## Migration Data

### Patient

| PatientId | RcordNumber | FirstName | LastName  |
|-----------|-------------|-----------|-----------|
| 1         | CHP001      | Ramon     | Magsaysay |
| 2         | CHP002      | Fidel     | Ramos     |

## PhysicalAssessment

| PhysicalAssessmentId | PatientId | Assessment               |
|----------------------|-----------|--------------------------|
| 1                    | 1         | CHP001 First Assessment  |
| 2                    | 1         | CHP001 Second Assessment |
| 3                    | 2         | CHP002 First Assessment  |
| 4                    | 2         | CHP003 Second Assessment |

## ProgressNotes

| ProgressNotesId | PatientId | Notes               |
|-----------------|-----------|---------------------|
| 1               | 1         | CHP001 First Notes  |
| 2               | 1         | CHP001 Second Notes |
| 3               | 2         | CHP002 First Notes  |
| 4               | 2         | CHP002 Second Notes |

## Company1Patient

| Company1PatientId | RecordNumber  | FirstName | LastName  |
|-------------------|---------------|-----------|-----------|
| 1                 | Company1HP001 | Jose      | Magsaysay |
| 2                 | Company1HP002 | Mickey    | Ramos     |
| NULL              | NULL          | NULL      | NULL      |

## Company1PhysicalAssessment

| PhysicalAssessmentId | Company1PatientId | Assessment                      |
|----------------------|-------------------|---------------------------------|
| 1                    | 1                 | Company1HP001 First Assessment  |
| 2                    | 1                 | Company1HP001 Second Assessment |
| 3                    | 2                 | Company1HP002 First Assessment  |
| 4                    | 2                 | Company1HP002 Second Assessment |



## Company1ProgressNotes

| ProgressNotesId | Company1PatientId | Notes                      |
|-----------------|-------------------|----------------------------|
| 1               | 1                 | Company1HP001 First Notes  |
| 2               | 1                 | Company1HP001 Second Notes |
| 3               | 2                 | Company1HP002 First Notes  |
| 4               | 2                 | Company1HP002 Second Notes |

## Company2Patient

| Company2PatientId | RecordNumber  | FirstName | LastName  |
|-------------------|---------------|-----------|-----------|
| 1                 | Company2HP001 | Jaime     | Magsaysay |
| 2                 | Company2HP002 | Jimmy     | Ramos     |
| NULL              | NULL          | NULL      | NULL      |

## Company2PhysicalAssessment

| PhysicalAssessmentId | Company2PatientId | Assessment                      |
|----------------------|-------------------|---------------------------------|
| 1                    | 1                 | Company2HP001 First Assessment  |
| 2                    | 1                 | Company2HP001 Second Assessment |
| 3                    | 2                 | Company2HP002 First Assessment  |
| 4                    | 2                 | Company2HP002 Second Assessment |

## Company2ProgressNotes

| ProgressNotesId | Company2PatientId | Notes                      |
|-----------------|-------------------|----------------------------|
| 1               | 1                 | Company2HP001 First Notes  |
| 2               | 1                 | Company2HP001 Second Notes |
| 3               | 2                 | Company2HP002 First Notes  |
| 4               | 2                 | Company2HP002 Second Notes |

## HealthcareProvider

| HealthcareProviderId | HealthcareProviderName |
|----------------------|------------------------|
| 1                    | Carepatron             |
| 2                    | Company1               |
| 3                    | Company2               |

## DieticianPatient

| DieticianPatientId | FirstName | LastName  | Email     | Address     | HealthcareProviderNumber | HealthcareProviderId |
|--------------------|-----------|-----------|-----------|-------------|--------------------------|----------------------|
| 1                  | Ramon     | Magsaysay | rm@rm.com | Philippines | CHP001                   | 1                    |

## PrimaryHealthcareProviderPhysicalAssessment

| PhysicalAssessmentId | DieticianPatientId | Assessment               |
|----------------------|--------------------|--------------------------|
| 1                    | 1                  | CHP001 First Assessment  |
| 2                    | 1                  | CHP001 Second Assessment |

## PrimaryHealthcareProviderProgressNotes

| ProgressNotesId | DieticianPatientId | Notes               |
|-----------------|--------------------|---------------------|
| 1               | 1                  | CHP001 First Notes  |
| 2               | 1                  | CHP001 Second Notes |

## Sample Request Parameters

### POST

/DieticianPatient/CreatePatient

```
{
  "firstName": "Fidel",
  "lastName": "Ramos",
  "email": "fvr@fvr.com",
  "address": "Philippines",
  "healthcareProviderNumber": "CHP002",
  "healthcareProviderId": 1
}
```