2/14/2025

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Software DEVELOPMENT PROJECT YEAR 4

Design Document

Elderly Care Management System(Care Net)

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# **Introduction**

The purpose of this design document is to outline key features of the Elderly Care Management System(ECMS). The document provides information relating to the design of the application.

* The System Architecture Diagram that outlines the overall structure of the application
* System Sequence Diagrams will be included in the document to illustrate the functionality of the features.
* GUI Prototype Screens.
* The Database Design to illustrate how the data is organised and managed.
* Class diagram to demonstrate the structure of the system in detail.

# **System Architecture**

A diagram of a computer server

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Figure 1: System Architecture

This system architecture diagram illustrates the Elderly Care Management System(Care Net) a secure application which manages sensitive patient information. At its core, the Care Net application serves as the main interface for both Administrators and Carers, handling all patient data operations through a web interface. Patient data is secured through a dedicated Key Server that provides encryption and decryption via secure ending points and the usage of tokens for authentication between the Webapp and the Key Server with all the data then being stored in the Care Net Database. The Key server has its own separate database for encryption keys and API tokens. This multi-tiered approach ensures that patient information remains secure while still being accessible to authorized users.

# **Technologies & Tools**

This project uses multiple “technologies and tools”. This section of the document outlines the technologies and tools used: Jupyter Notebook, Cryptography Library, Secrets Library, Maria DB, Python, Django, and FastAPI

**Jupyter Notebook**

Jupyter Notebook is utilized for prototyping and data exploration of the early phases of the project. This is particularly useful for testing database queries, experimenting with data encryption methods, and visualizing data.

**Cryptography Library**

The cryptography library is crucial to ensure data security within the application. This library was used to encrypt data and decrypt data providing robust protection for sensitive information handled by the system.

**Secrets Library**

The secrets library is integral for generating cryptographically strong random numbers used primarily for creating secure tokens within the system., the tokens generated were used to communicate between to the Key Server and the Care Net app.

**MariaDB**

MariaDB was selected as the database management system to store and manage data throughout the development of this project. This was chosen as it has been reliable in previous projects.

**Python**

Python will be the core language used in this project, helping with backend tasks, handling data, and connecting different parts of this system. It has many libraries that make it easy to work.

**Django**

Django is a high level python web framework. It will be used throughout the project, helping to enhance security and streamlining the development of the application.

**FastAPI**

Utilized to develop the key server, FastAPI is a high-performance web framework that enables rapid API development.

# **System Sequence Diagrams**

## **Core Features**

## **Key Server**

A diagram of a key server

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Figure 2: Key Server Token and Key Generation System Sequence Diagram

## **Patient Profile**

### **Create Patient Profile**

A diagram of a diagram

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Figure 3: Create Patient Profile System Sequence Diagram

### **Search Patient Profile**

A diagram of a software company

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Figure 4: Search Patient Profile System Sequence Diagram

### **Edit Patient Profile**

A diagram of a computer process

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Figure 5: Edit Patient Profile Sequence Diagram

### **Delete Patient Profile**

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Figure 6: Delete Patient Profile System Sequence Diagram

## **Medical Dashboard**

### **Search Patient Medical information on Dashboard**

A diagram of a software company

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Figure 7: Search Patient Medical info on Dashboard System Sequence Diagram

### **Add Patient Medical information on Dashboard**

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Figure 8: Add Patient Medical info on Dashboard System Sequence Diagram

### **Edit Patient Medical information on Dashboard**

A diagram of a software company

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Figure 9: Edit Patient Medical info on Dashboard System Sequence Diagram

### **Delete Patient Medical information on Dashboard**

A diagram of a process flow

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Figure 10:Delete Patient Medical info on Dashboard System Sequence Diagram

### **Patient Medical Log Dashboard**

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Figure 11: Patient Medical Log Dashboard

## **Roster**

A diagram of a schedule

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Figure 12: Roster System Sequence Diagram

## **Care Planner**

### **Add New Care Plan**

A diagram of a company

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Figure 13: Add New Care Plan

### **Delete Care Plan**

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Figure 14: Delete Care Plan

# **Class Diagram**

# **Prototype GUI Screens**

## **Main Menu**

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Figure 15: Main Menu

## **Patient Profile Prototype**

A screenshot of a contact form

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Figure 16: Patient Profile

# **Database Design**

## **Key Server Key Management Table**

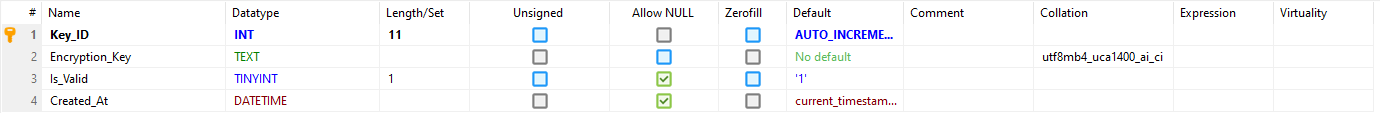


Figure 17: Key Management Table

## **Key Server Api Token Table**

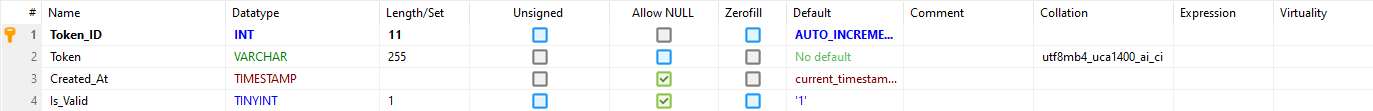


Figure 18: API Token Table

## **Patient Profile Table**

A screenshot of a computer screen

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Figure 19: Patient Profile Table

**Example Patient Data**

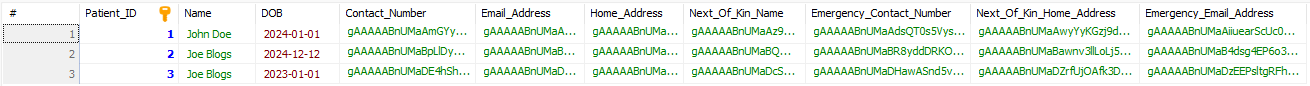
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Figure 20: Example Patient Data

# **ER Diagram**

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Figure 21: Patient Profile ER diagram

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