National College of Ireland

Configuration Manual

MSc Research Project
Cloud Computing

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Project Submission Sheet
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Configuration Manual

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1 Introduction

The purpose of this configuration manual is to guide new users so that they can setup and run the entire Research project: Hybrid Encryption Scheme for Optimizing Data Security and Latency in Mobile Cloud Computing on their local or cloud based system. The manual provides a detail set of instructions, from downloading the project files to configuring the environment and executing the project. By following all the steps correctly, users can recreate the project or can use it for their own research as a foundation for further development of the project.

2 System Configuration

The System configuration section describe information about hardware, software, and additional tools which are used for developing the project.

2.1 Hardware Requirements

- **Processor:** AMD Ryzen 5 3550H.
- **Memory:** 24.0 GB.
- **Disk Space:** 1.0 TB.

2.2 Software Requirements

- **Operating System:** Microsoft Windows 11.
- **JDK:** 20.0.2.
- **Micrsoft SQL Server Management Studio:** 20.2.30.

2.3 Tools

- **Android Studio:** LadyBug 2024.4.1 Patch 2.
- **AVD:** 35.2.10.
- **Gradle:** 8.10.2
- **Visual Studio:** 17.12.3

3 Installation and Setup

3.1 Installation

3.1.1 Installing Android Studio

1. **Download Android Studio**
   (a) Visit Android Studio Download Page.
   (b) Click on download Android Studio .
2. **Install Android Studio**
   (a) Run the downloaded installer.
   (b) Select location of installation.
   (c) Choose the components to be install (default recommended)
   (d) Click Finish to complete the installation. (Android Developers; 2024)
3. **Configuration**
   (a) Open Android Studio.
   (b) Complete the setup wizard.
   (c) Download the recommended SDK components.
   (d) Verify that the Android Virtual Device (AVD) is set up correctly.

3.1.2 Installing Microsoft SQL Server Management Studio (SSMS)

1. **Download SSMS**
   (a) Visit the SSMS Download Page.
   (b) Click the link to download the latest version of SSMS.
2. **Install SSMS**
   (a) Run the downloaded `.exe` installer.
   (b) Follow the setup wizard
   (c) Choose the installation location.
   (d) Click install and wait for the installation to complete(Microsoft Learn; 2024)
3. **Connect to SQL Server**
   (a) Open SSMS.
   (b) In the *Connect to Server* window:
      - Enter the server name..
      - Choose the authentication mode (Windows Authentication or SQL Server Authentication).
   (c) Click connect to verify the connection.

3.1.3 Installing Visual Studio 2022

1. **Download Visual Studio**
   (a) Visit the official Visual Studio download page: Visual Studio Download Page.
   (b) Click on download Visual Studio.
2. **Install Visual Studio**
   (a) Run the downloaded installer.
   (b) Select workloads based on this project.
   - *ASP.NET and web development*

   (c) Click install and wait for the process to complete. (Microsoft; 2024)

3.2 Application Setup

1. Download the provided project folder and open it. From the Project folder, open the folder named SecureData in Android Studio. After opening, you would see the project file structure shown in Fig. 1.1. The Java and XML files used for developing application pages are in the 'src' directory.

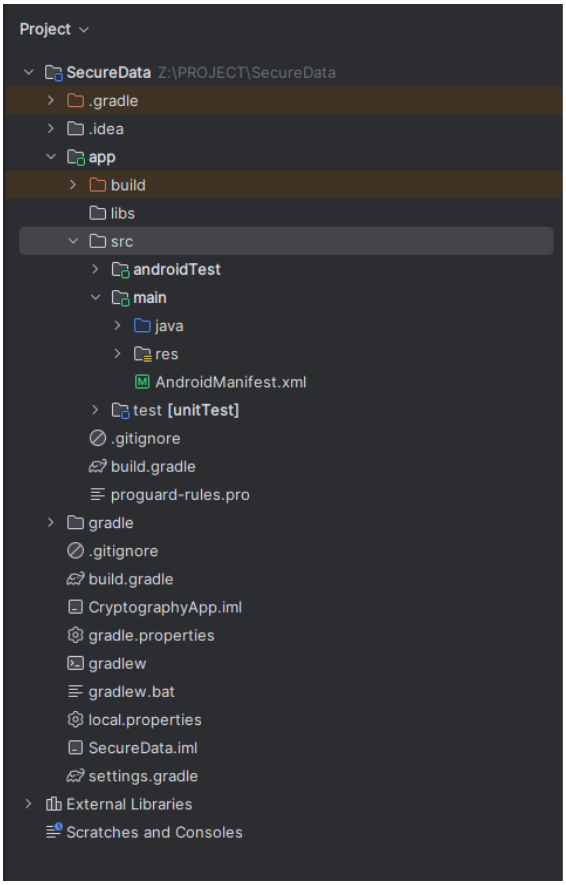

Figure 1.1: Project File Structure

2. Open terminal on Android Studio to install and verify JDK version using the command shown in Fig. 1.2. Ensure that JDK version 20.0.2 is installed. If a different

JDK is found, install the recommended version using the ‘curl‘ command shown below in the same figure (Oracle; 2024).

Figure 1.2: JDK Setup

3. Now from the same terminal verify Gradle version using the command shown in Fig. 1.3. Ensure that Gradle version 8.10.2 is installed. If a different Gradle is found, install the recommended version using the ‘wget‘ command shown in the same figure. After Completing the above steps wait for project to sync with the gradle files before launching the project (Gradle; 2024).

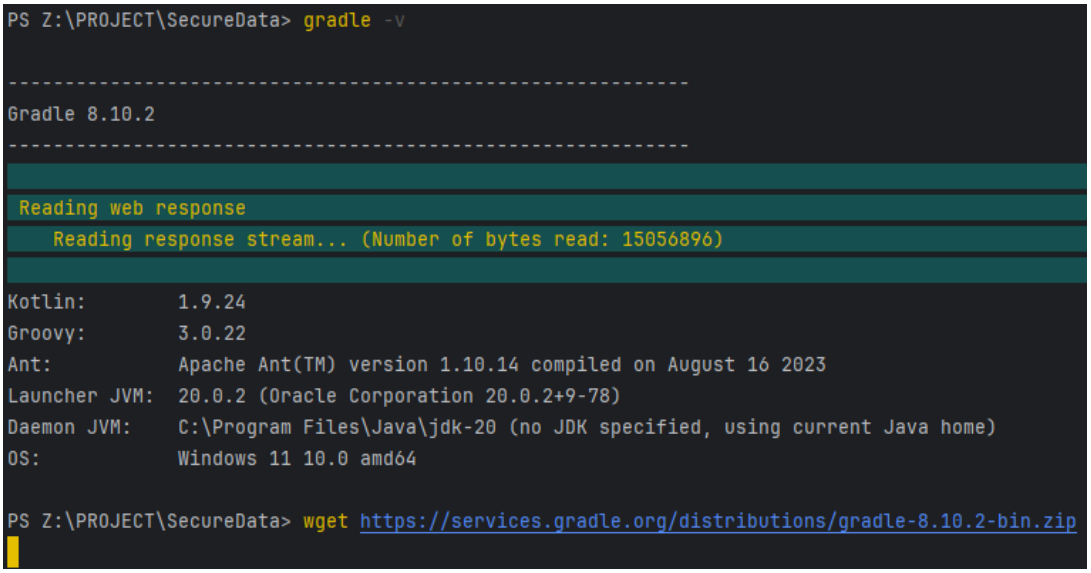

Figure 1.3: Gradle Setup

4. For creating virtual android device follow the instructions provided below:
   (a) Open Device Manager from the right tool bar and create new virtual device by clicking on + **icon**.
   (b) Select Device (eg: Pixel 6, Pixel 7) of your choice, next choose the android version image and click on finish.
   (c) After following the above steps, a new AVD can be seen in Device manager. Click on **Start (▶)** to launch the emulator.
5. After launching the emulator, locate and open the application name **SecureData** on the device as shown in Fig. 1.4

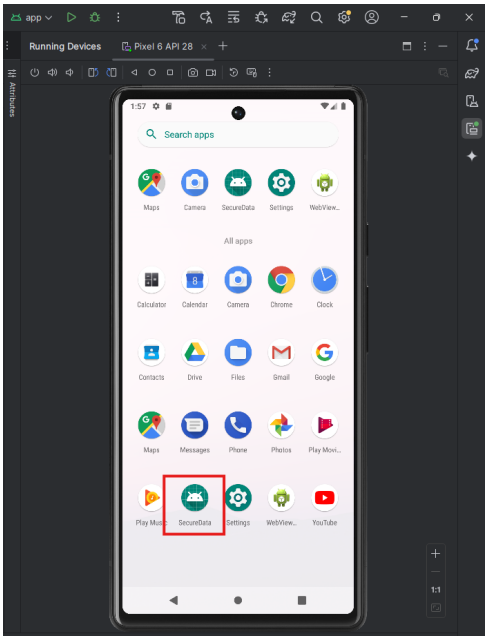

Figure 1.4:

6. On opening the application, log in by using the credentials. If not a user, previously register as a new user and then log in to proceed further as shown in Fig. 1.5 and Fig. 1.6, respectively.

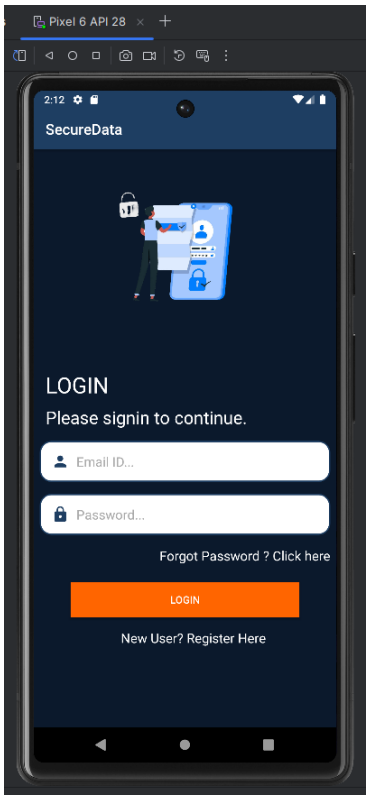

Figure 1.5: Login Page

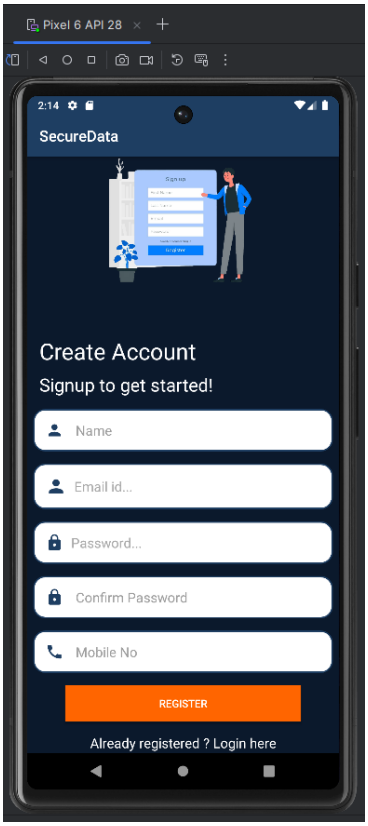

Figure 1.6: Registration Page

7. As shown in Fig. 1.7, there are 2 option on dashboard , Click on upload files to securely transfer files from virtual device onto cloud with low latency. After uploading the file it can be seen and downloaded in view file section of the application as shown in Fig. 1.8 and Fig. 1.9 respectively.

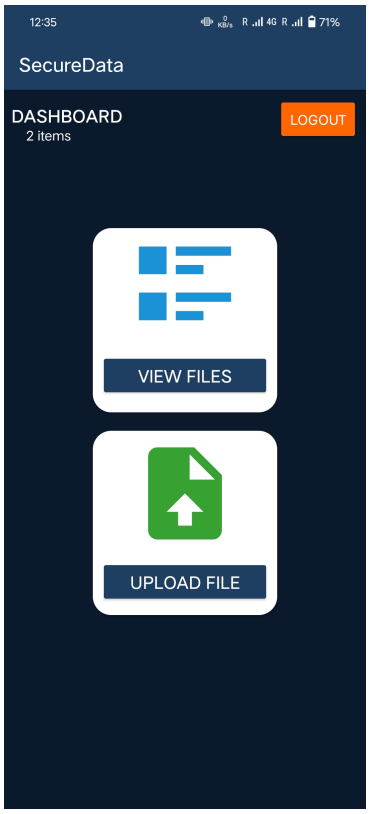

Figure 1.7: Dashboard

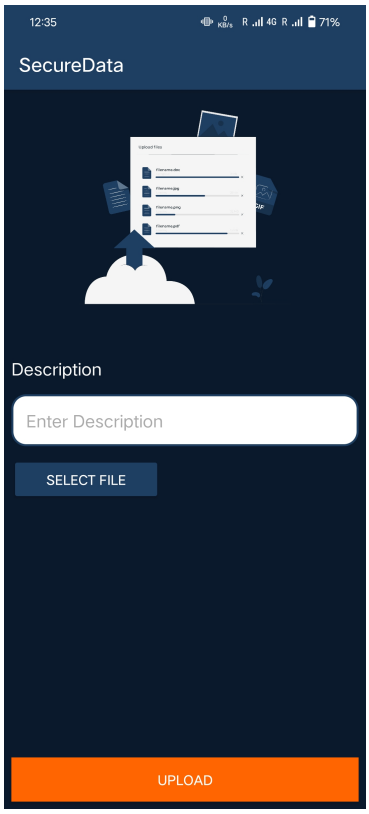

Figure 1.8: Upload Page

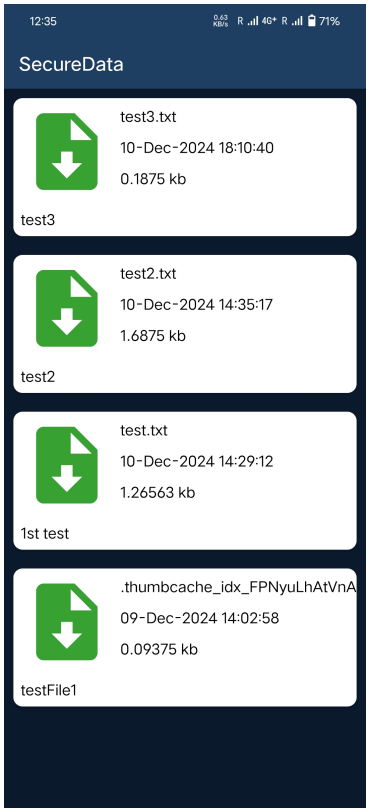

Figure 1.9: Download Page

1.3 Server and Database Setup

1. Download the Microsoft SQL Server Management Studio by following the steps provided in the Installation Section. Create a SQL Database Server as shown in Fig. 1.10

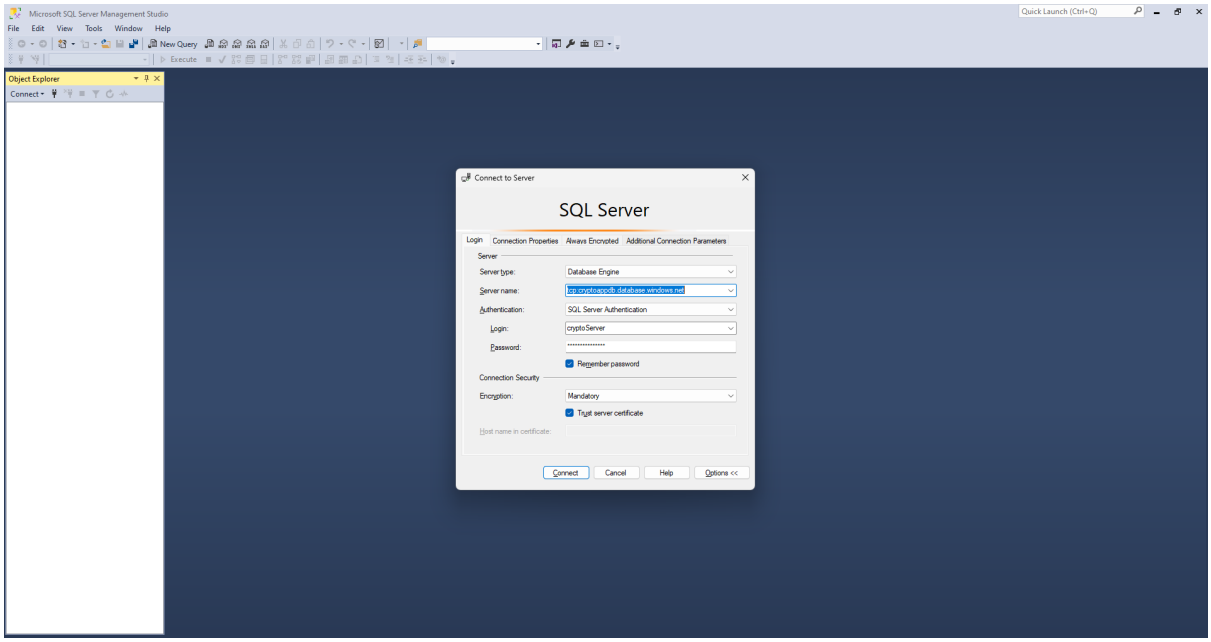

Figure 1.10: SQL Database Server

2. After creating the server, a database is created for storing the user data (Personal info, metadata, files). As shown in Fig. 1.11 and Fig. 1.12, two tables are created inside of the database, one for storing the users info like, and another for storing the encrypted files of the users respectively. All submitted info and files related to the users can be seen here.

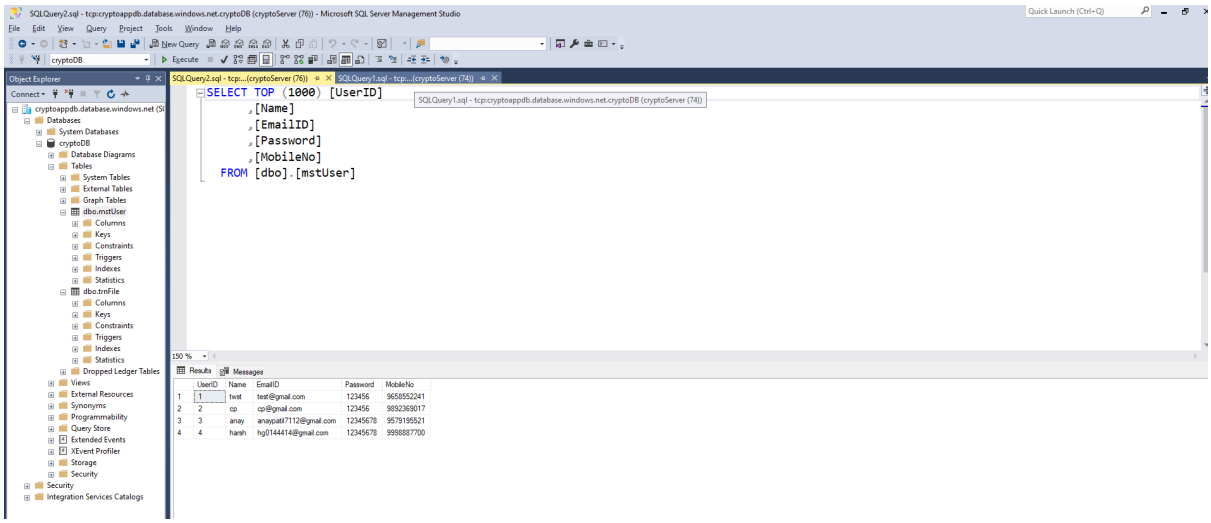

Figure 1.11: User info table

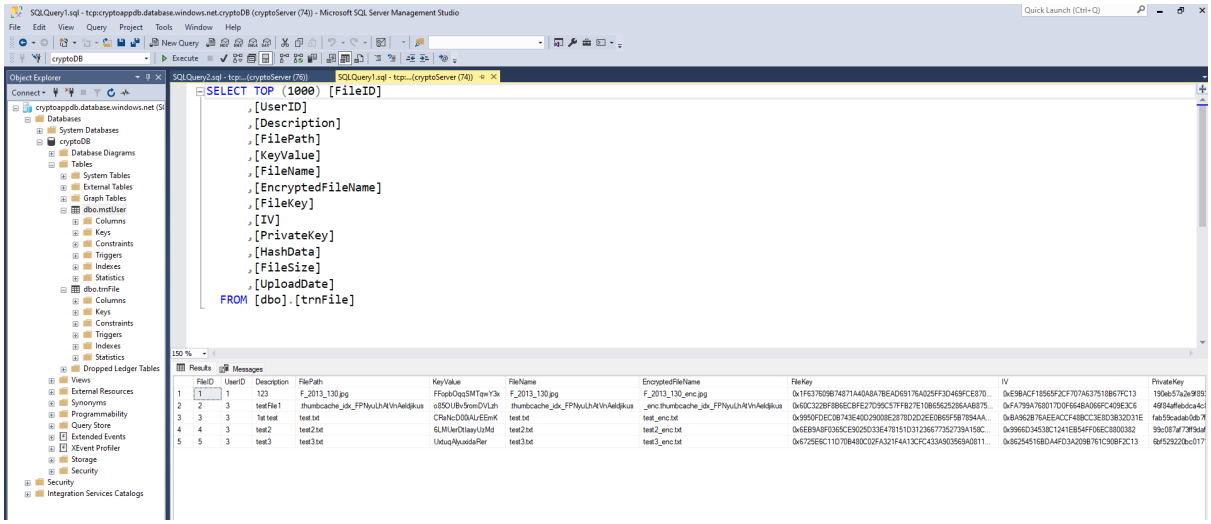

Figure 1.12: User File table

3. A sql query file is provided with the project zip document for creating tables in the database, the file content is shown in Fig. 1.13

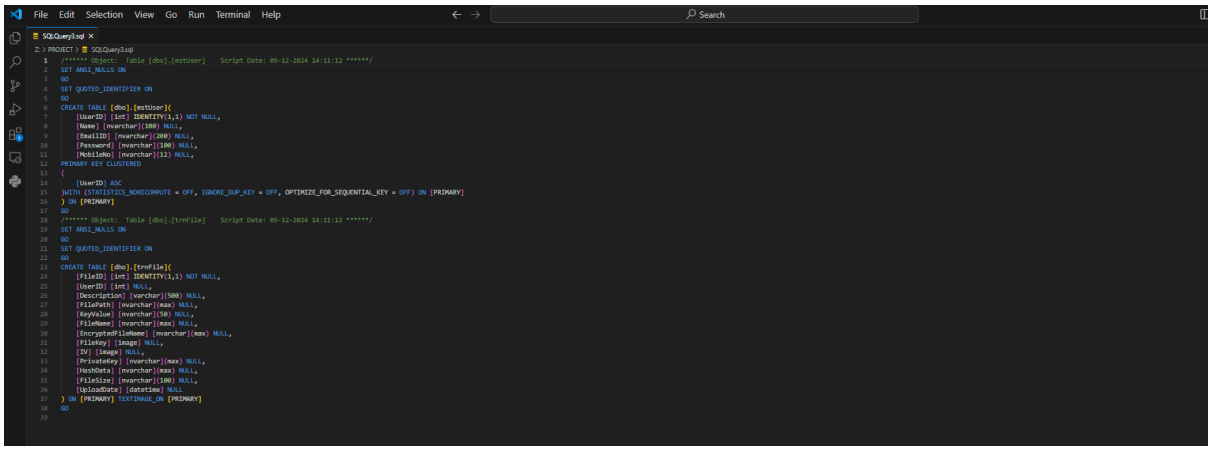

Figure 1.13: SQL Query File

1.4 Web API Setup

1. In this project, RESTful api is used for make connection between the Mobile application and cloud or any remote server. The backend script file name cryptographyServices is provided in the project zip document. To open the folder download and install Visual Studio 2022 by following the steps provided in Installation section. Before running the serive make sure all the required libraries are downloaded on you system as shown in Fig. 1.14

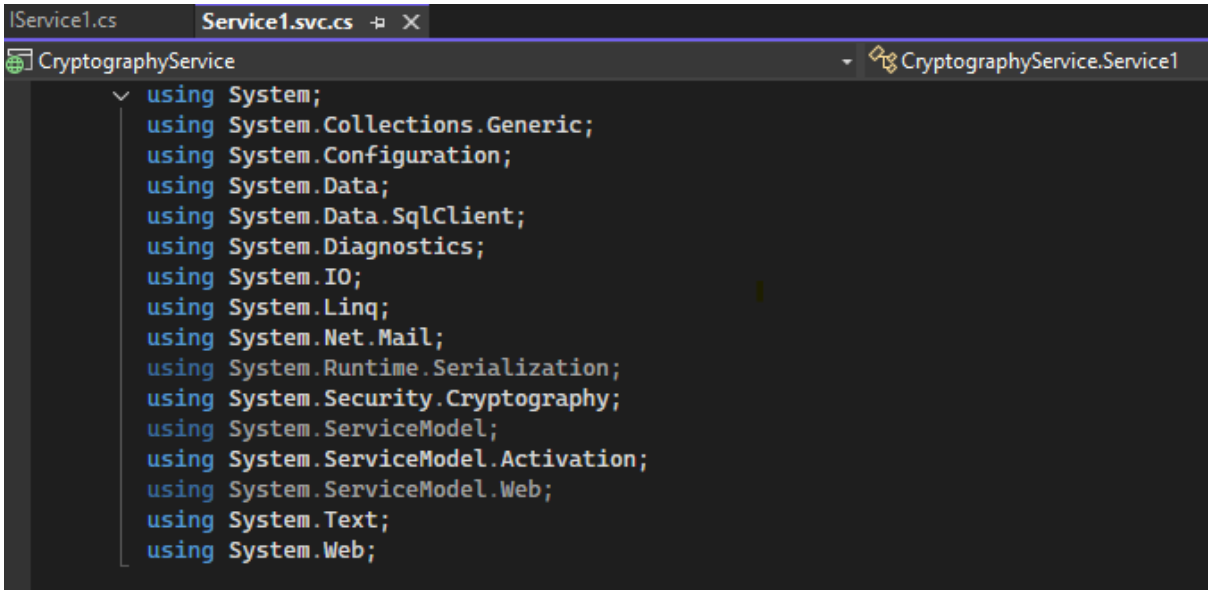

Figure 1.14: Libraries

2. After successfully installing all the dependencies find and select the Service1.svc.cs file and click on Start button as shown in Fig. 1.15 and Fig. 1.16. The Web.config contains the configuration file for connecting database.

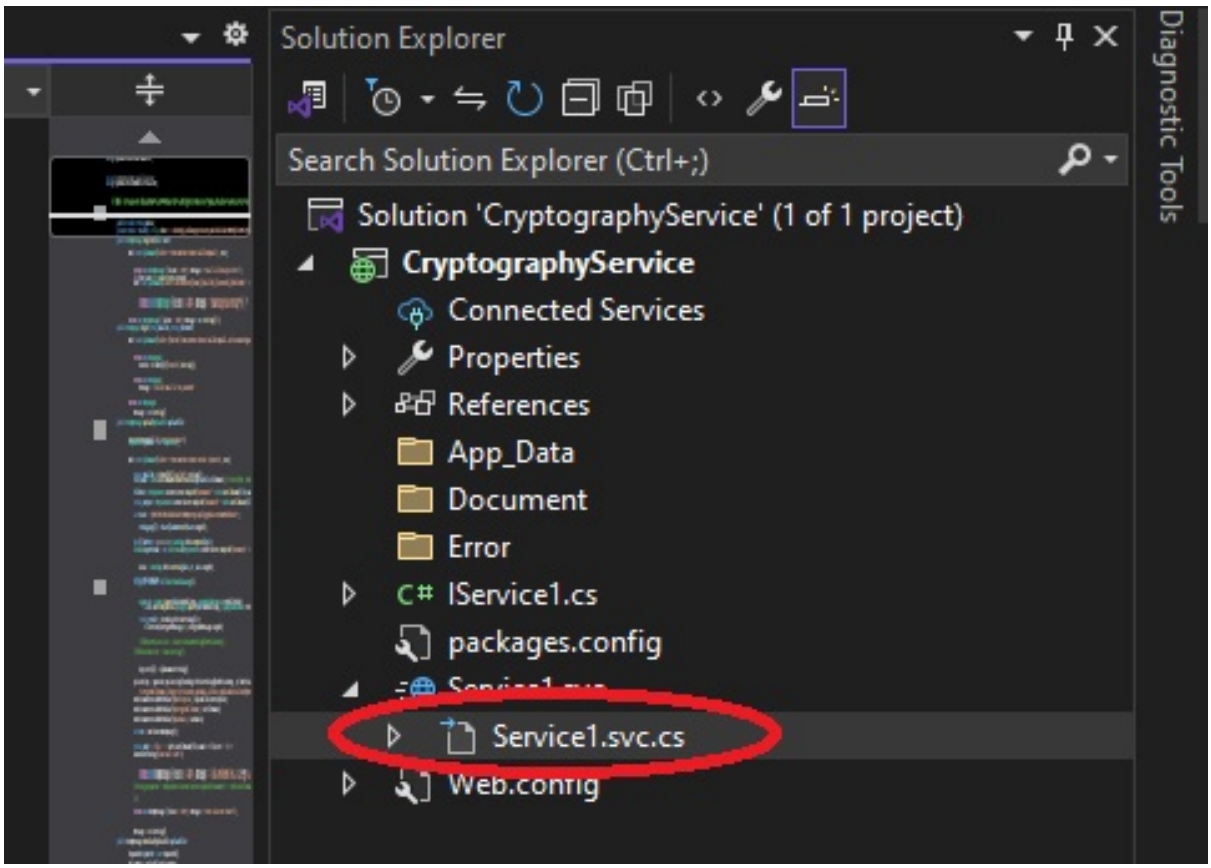

Figure 1.15: API service

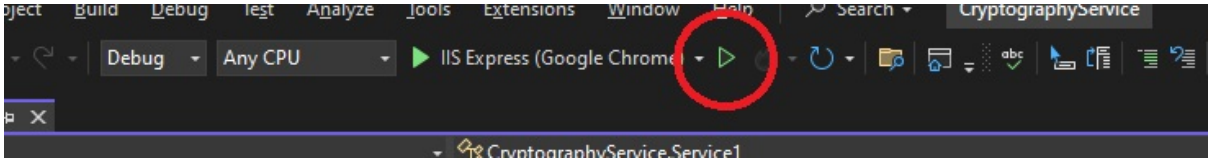

Figure 1.16: Run

3. After clicking on the run button, api service will be created and the browser installed on the machine will display it as shown in Fig, 1.17.

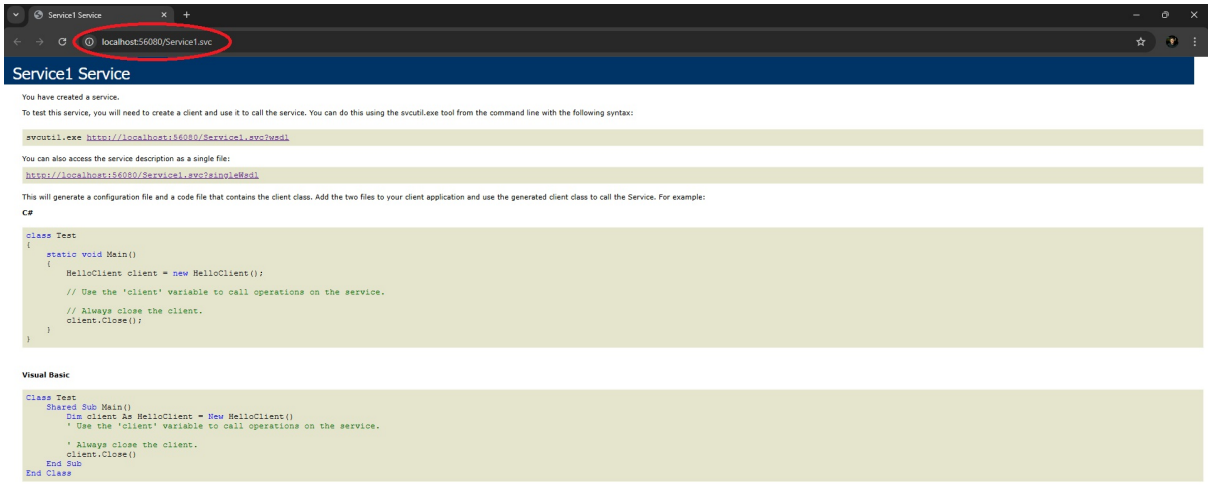

Figure 1.17: Local Connection

1.5 Deployment on Cloud

1. Create a account on Azure Cloud platform using you private or institution email address. Once created, on the dash board various cloud services displayed, which can be seen in Fig. 1.18 which are offered by Microsoft Azure.

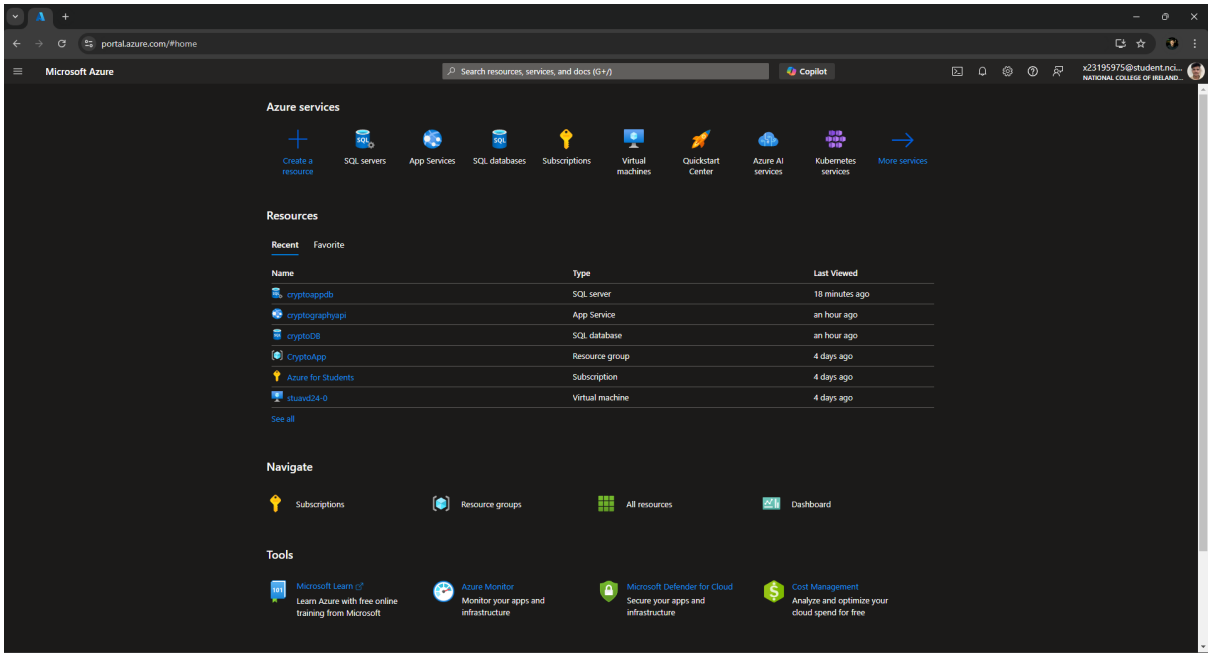

Figure 1.18: Azure DashBoard

2. Click on the search bar and search for app service. On the App service dashboard locate the create button and select web app as shown in Fig. 1.19

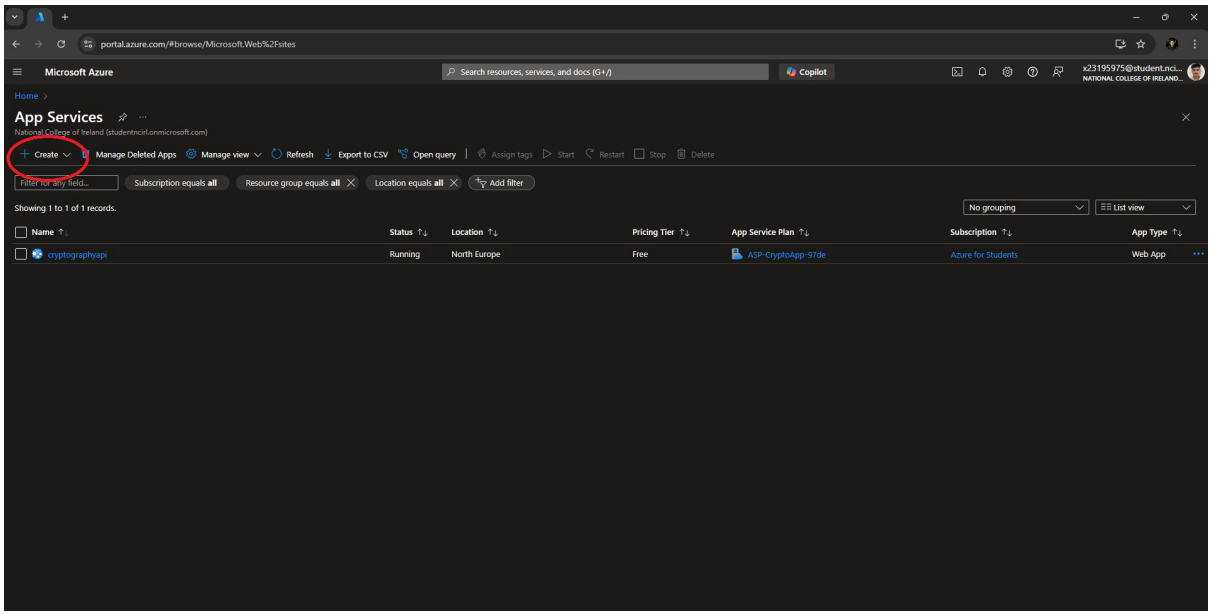

Figure 1.19: App Service DashBoard

3. Configure the App service according to the requirements and click next, as shown in Fig. 1.20

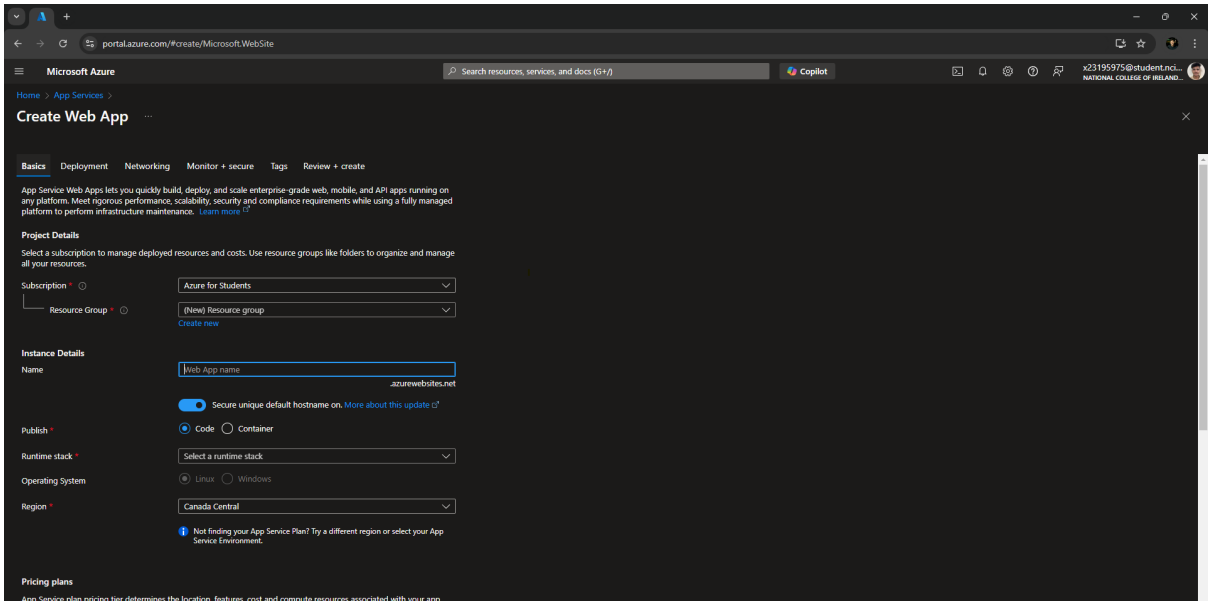

Figure 1.20: App Service Configuration

4. After successfully configuration, the project application we be deployed on the cloud. As shown in Fig. 1.21 click on the domain url and check if its deployed successfully.

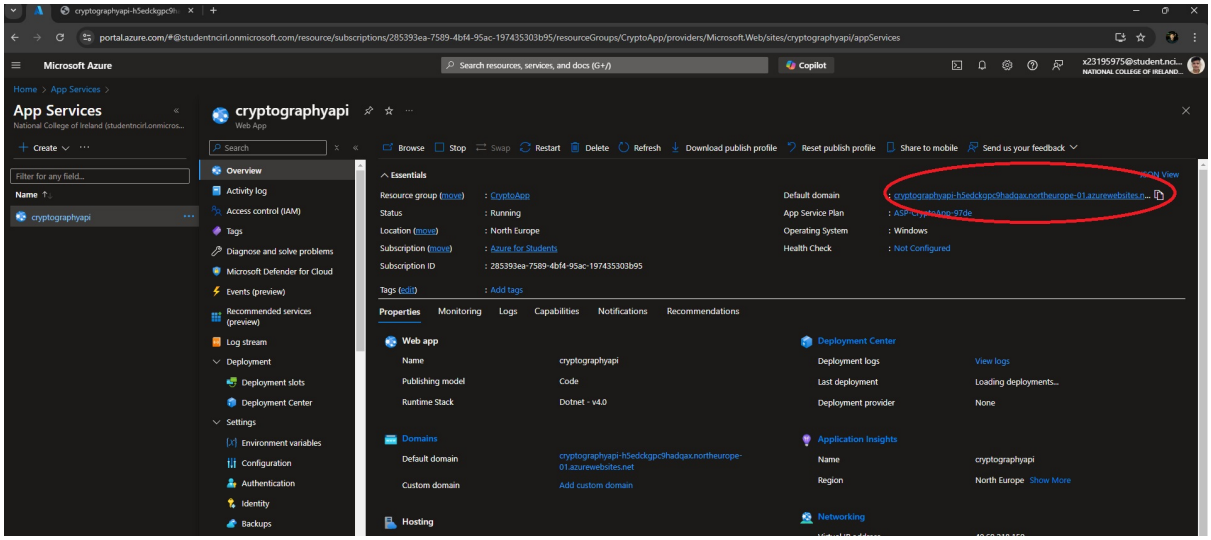

Figure 1.21: Domain URL

5. After clicking on the domain URL, a interface displayed in Fig. 1.22 shows that the deployment is successfully as the web.config file and the Servcie1.svc can be seen.

Figure 1.22: Domain URL

6. Now nivate back to the Azure DashBoard and search for SQL server. The dashboard will be displayed, click on create as shown in Fig. 1.23

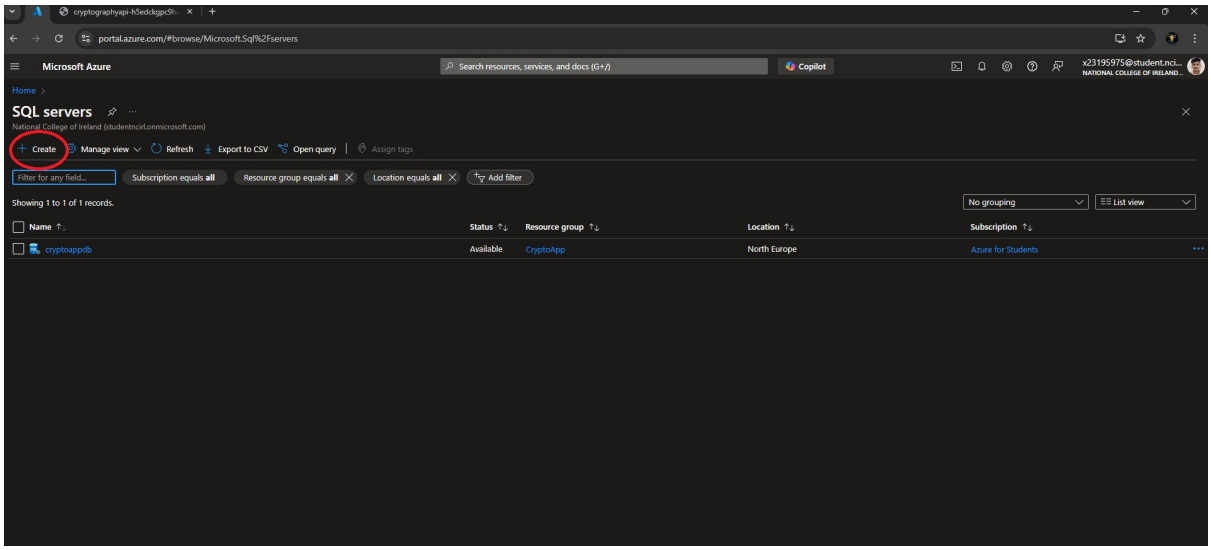

Figure 1.23: Azure SQL Serve Dashboard

7. Configure the SQl server according to the requirements and click next, as shown in Fig. 1.24

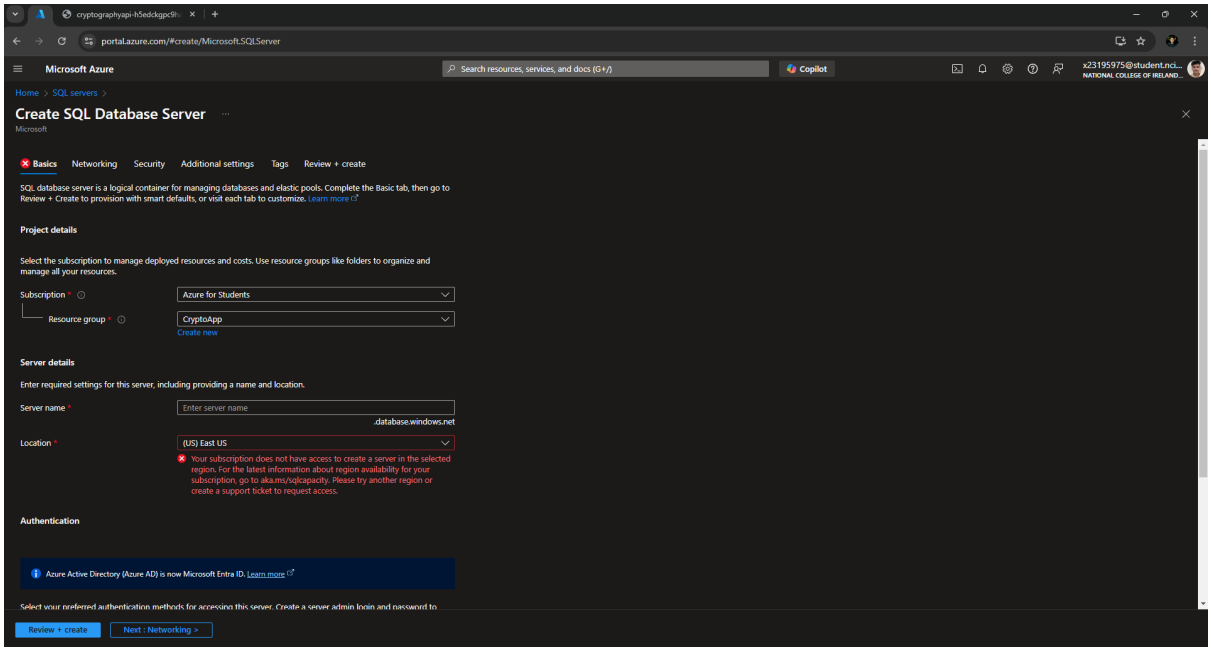

Figure 1.24: Configuring SQL Server

8. After successfully creating the SQL server, click on create database on the SQl server dashboard which is created as shown in Fig. 1.25

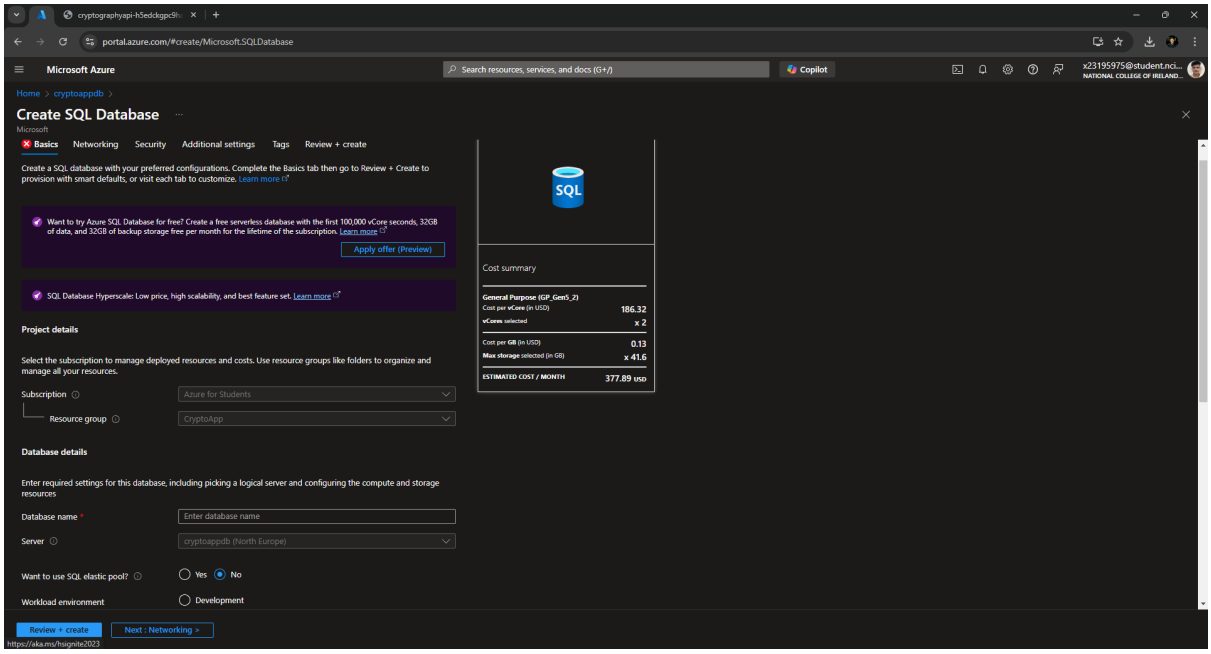

Figure 1.25: Confuring SQL DataBase

9. Go back to the Azure DashBoard and search for SQL database, the database created previously is displayed, click on it and it will show the created data, shown in Fig. 1.26

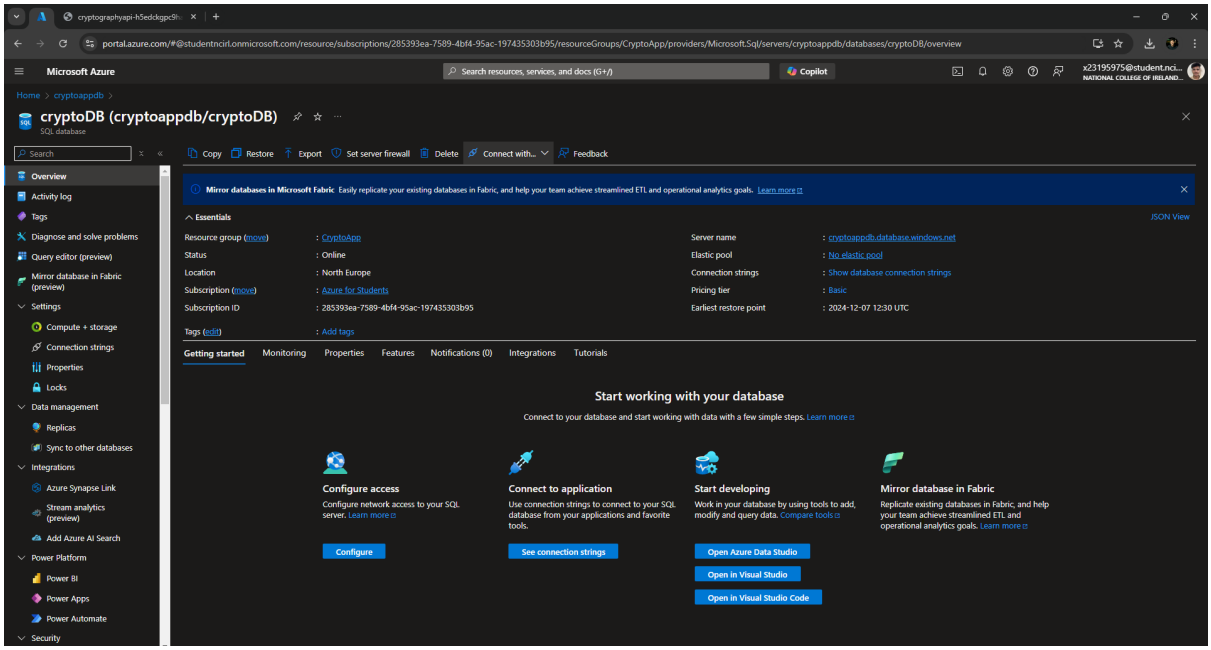

Figure 1.26: Azure SQL database Dashboard

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