### Chapter 3 - Technologies Adapted

#### Introduction

To build the proposed solution, various technologies are used. They can be divided into the following categories.

* + - Front-end technology
      * React JS
    - Back-end technology
      * MS .net framework
    - Database technology
      * MS SQL Server

#### Front-end technology

The front-end is the interfaces within the proposed system. And this is the point at which end users engage with the system. The system needs to provide a better user experience through interfaces from the viewpoint of the end user. Therefore, we have selected React JS to develop the front-end.

#### React JS

React is a popular JavaScript library for building user interfaces, particularly web-based applications. It is often used for front-end development because it allows developers to create reusable components that can be rendered on the page, making it easier to build and maintain complex user interfaces. Since the proposed system is Expense Tracker software, there are so many individual sections that should be attached together and reused. The functionality of React may be a huge advantage while the development of front-end.

One of the key benefits of React is that it uses a virtual DOM (Document Object Model). Therefore, when data in a React application changes, the virtual DOM will determine the minimal set of changes that need to be made to the actual DOM. This could lead the application to improve the performance.

React also has a strong developer community, with a wealth of resources and libraries available to help developers build and maintain their applications. Since the team members

do not have a lot of experience of building front ends and using react for development, this can be a main benefit for the team.

Due to the efficiency, flexibility, and strong developer community of React, it is easier to build the front-end of the proposed system.

#### Back-end technology

All the functionalities of the proposed system are within the back-end development. And it is the core of the application. Therefore, back-end technology is selected carefully. That is why Microsoft .net Framework is selected to build the back end of the system.

#### MS .net framework

The .NET framework is a popular choice for back-end development because it provides a powerful platform for building and running web-based applications and services. Also, it is flexible and scalable, allowing developers to build applications for a wide range of environments and platforms.

One of the key benefits of the .NET framework is that it provides a large set of libraries and APIs that developers can use to access a variety of different services and resources. This includes support for networking, data access, security, and many other common back- end tasks.

The .NET framework also includes several tools and technologies that make it easier for developers to build and maintain applications, including a powerful runtime environment, a comprehensive set of development tools, and a large and active developer community.

#### Database Technology

The database can be identified as a major entity of the system. A database is typically designed to store and access data. A well-designed database is crucial to the system since the database stores all the relevant insights regarding the system. To develop such a database, the team has decided to use Microsoft SQL server as the technology.

#### Microsoft SQL server

SQL server has been introduced and maintained by Microsoft so far. Because of its popularity and many other facts, it is widely used as a Database Management System (DBMS) by many developers. Also, it is compatible with .net framework too.

Some of the features of SQL server are,

**Reliability:** Reliability and uptime of SQL server is making it an excellent choice for mission-critical applications that require a high level of availability.

**Performance:** SQL Server is designed to handle large volumes of data and transactions, and it is optimized for fast and better performance.

**Security:** There are many security features to protect data from unauthorized access, such as encryption, authentication, and access controls within SQL server.

**Scalability:** This allows us to handle increasing amounts of data and workloads as the needs of the application grow.

**Management:** Handy features like backup and recovery, monitoring, and performance tuning can be used within SQL server.

### Chapter 4 - Proposed Solution

#### Introduction

Our system, Expense Tracker software, will be used to manage/track incomes and expenses. Through the software, we try to provide an interface for the user to manage with the administration and through that make it easy for the user to manage their incomes and expenses efficiently.

Here the customer can track their income and expenses of their life and rate the income and expenses and through that, the user can analyze their income and expenses and easily to manage their life.

In addition, the user can easily create a budget for specific time in their life and can easily track expenses. In addition, the user can easily create a saving and link to their bank account. In addition to that, this system will send payment reminders to the user. Here we have provided the facility to take the remainder too and then the system will track the payments remainder.

#### Software Model

We are using the Agile Scrum model to develop the system. Since the user requirements have a possibility to change and we would have a ready to ship model after every scrum, we have a good chance to get the user’s idea about the project and deliver what the customer expects well.

Also on the other hand, we will be working with the industry, and we will be able to get hands on experience of how Agile Scrum method will be used in the industry which would be useful for our future career, since agile scrum is one of the widely used software models in modern tech world.

Agile methodologies, including Scrum, are known for their flexibility, iterative approach, and customer collaboration. Here are some advantages of applying Agile Scrum to the development of a money tracker system:

* Flexibility and Adaptability:
  + Agile methodologies, including Scrum, are designed to be flexible and adaptable to changing requirements. In the context of a money tracker system, financial tracking needs may evolve, and Agile allows the development team to respond quickly to these changes.
* Incremental Development:
  + Agile Scrum emphasizes incremental development through short iterations called sprints. This allows for delivering a working product at the end of each sprint. In the case of a money tracker system, users can start using and benefiting from the system sooner, even if not all features are fully implemented.
* User Involvement:
  + Agile Scrum encourages frequent and direct collaboration with end-users. This ensures that the development team stays aligned with user needs and priorities. In the context of a money tracker system, user feedback can be incorporated into the product quickly, improving its usability and functionality.
* Continuous Improvement:
  + Agile promotes continuous improvement through regular retrospectives at the end of each sprint. The team reflects on what went well and what can be improved, fostering a culture of learning and refinement. This is valuable for enhancing the money tracker system based on user feedback and changing requirements.
* Early and Predictable Delivery:
  + Agile Scrum promotes the delivery of a potentially shippable product at the end of each sprint. This allows stakeholders to see progress regularly and ensures that the most valuable features are delivered first. For a money tracker system, users can benefit from the system's functionality sooner.
* Risk Mitigation
  + Agile Scrum allows for early identification of issues and risks. Regular reviews and retrospectives provide opportunities to address challenges promptly. This is particularly important for a money tracker system where accuracy and security are critical, and any issues need to be addressed swiftly.
* Transparency:
  + Agile Scrum promotes transparency through various ceremonies, such as sprint planning, daily stand-ups, and sprint reviews. This transparency is crucial for a expense tracker system, where users need confidence in the accuracy and security of financial data.
* Customer Satisfaction:
  + By involving customers in the development process and delivering increments of functionality regularly, Agile Scrum aims to enhance customer satisfaction. For a money tracker system, this means that users are more likely to get a product that meets their needs and expectations.

The Agile Scrum SDLC model can bring numerous benefits to the development of a money tracker system, ensuring flexibility, user involvement, and the early delivery of valuable features.

#### 4.3 Users, Activities, inputs, and outputs

|  |  |  |
| --- | --- | --- |
| Users |  | |
| End User | Activities | Login using username and password.Add transactions (incomes / expenses).Take description for transactions.Attach receipt for expenses (optional).View transactions (incomes / expenses).Filter transactions.View report.Download report.Create saving.Create budget.Create remainder.Search records.Choose time-period. |
| Inputs | Username and Password.Incomes.Expenses.Saving amount.Budget amount.Input date/description for remainder. |
| Outputs | User profile.Added transaction (alert).Payment remainder (alert).Created saving (alert).Created budget (alert).View report. |
| Administrator | Activities | Loing using username and password.Create user.View transactions.View report.Create saving.Create budget.Create remainder.Send alert.Maintain event.Maintain user privacy.Manage users.Calculate balance.Search / filter users. |
| Inputs | Username and password.Unique id for new user and details.Add details for report.Add details for saving.Add details for budget.Add details for remainder. |
| Outputs | Alert for created user.Alert for add transaction.Alert for created saving.Alert for created budget.Alert for created remainder.Report. |

#### 4.4 Process.

Our software will manage the incomes/expenses of user in specific time-period. Firstly, a new customer will be registered to the application by entering the required data. This registration is done by the administration. Then at the same time, a user profile page for the user will be created.

#### 4.5 Our Approach.

#### 4.6 Project Management.

#### 4.7 Summary