Department of Computer Science & Engineering
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Detailed Design Specification
CSE 4317: Senior Design II
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Clouders
eMarket

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Revision History

Revision	Date	Author(s)	Description
0.1	9.07.2020	MK	document creation
0.2	9.11.2020	MK, RK, SB, NT, NP	complete draft
0.3	9.12.2020	MK, RK, SB, NT, NP	release candidate 1
1.0	9.12.2020	MK	official release

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1 INTRODUCTION

EMarket web application is designed especially focusing to help the local business and people to sell their products.It is an classified-ad websites where the local people or business can post their ad of the products that the buyers can search and contact them to pay and get the item. The key features of the application are listed below:

1) Registration for the new account, Login and Logout.
2) Post an Ad for certain amount of time and can be sponsored to be displayed at the homepage of the application.
3) User can seen the seller review and contact them through provided information in the application.
4) User can search for the products through name, zip code.
5) Users can make an offer in any Ad and report the Ad for spam, duplicate and so on.

This web application is not designed focusing for the particular customer rather it will be designed for the many people and local business i.e. overall class of customers. Thus, our product when released will be available for the general people.

2 SYSTEM OVERVIEW

This section should describe the overall structure of eMarket software system. EMarket consists of the three different layer as Presentation Layer, Application Layer and Repository Layer as shown in the figure below. This architecture layer give a easy and simple approach showing how the information is passed, received and stored. The top-level of system layer allows user to request and display the response received from application layer whereas application layer will performs the business logic using the data received from the repository layer doing the CURD operations. As in the diagram below, presentation layer will be displayed once the users browse the domain address of the eMarket in their web browsers. After this the user will make the request like Post an Ad, Login through the help of the thymeleaf, CSS and bootstrap and communicate with the application layer where the system will validate, authenticate and authorized tasks based on their request. Then this application layer will communicate with the repository layer with the storage logic and query and responds back to presentation layer sending response to users using thymeleaf, CSS and bootstrap.

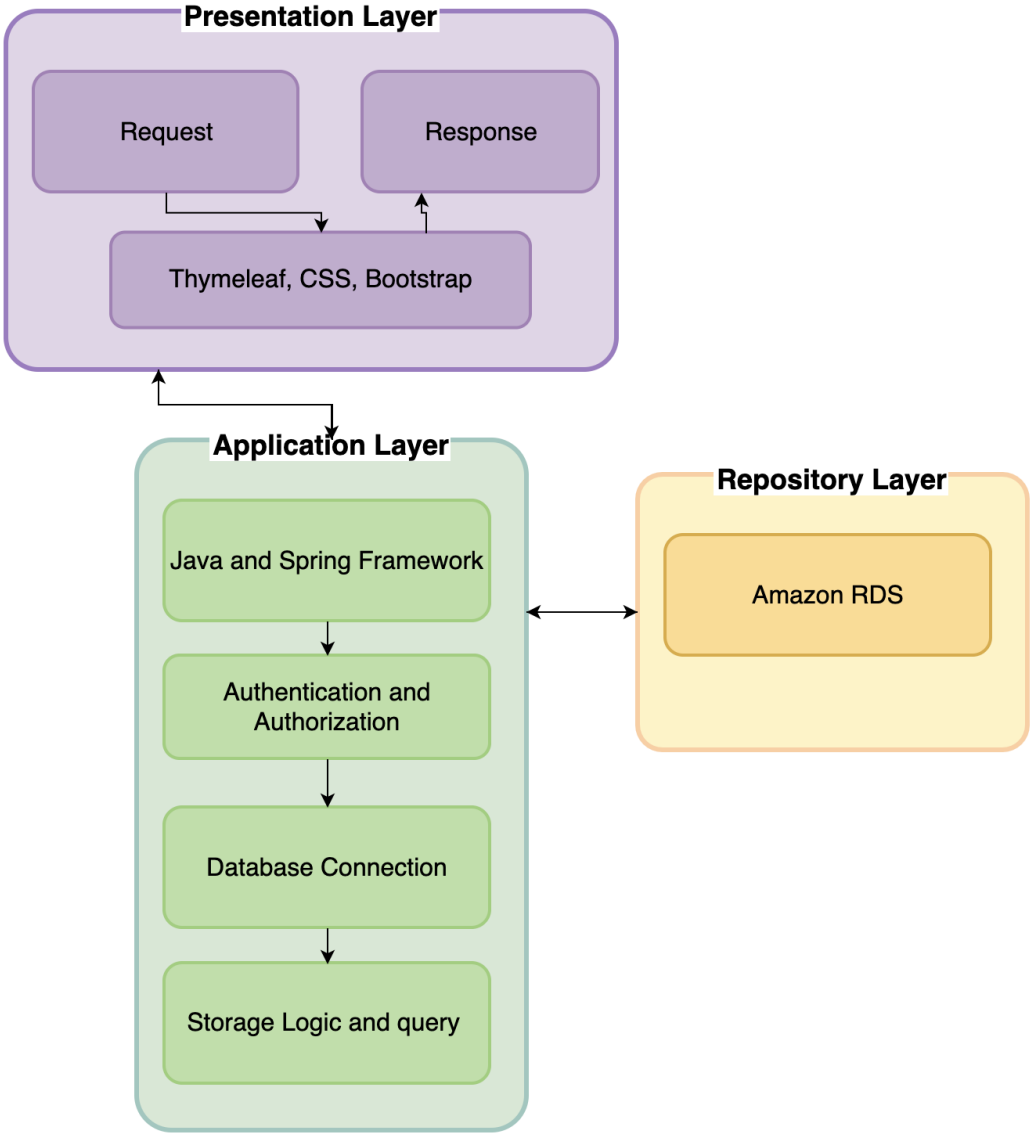

Figure 1: System architecture

3 Presentation Layer Subsystems

This layer will plays the vital role in displaying the content to users whenever users will browse the eMarket domain address. It will be nice looking modern design that will be used to get the request from the users and response back with the useful output. This layer will presenting the different functionalities and features of the application such as login, registration, posting an Ad through the help of the back end services available in the system, contacting to the seller. Thus, our presentation layer includes Thymeleaf, CSS, Bootstrap4. Thymeleaf is the Java Html5 template engine for displaying the data and information that is received from the server to users by adding beautify through the help of CSS and Bootstrap.

3.1 Layer Hardware

Since, this application is a software only application, there will not be any layer hardware in any aspect of this project.

3.2 Layer Operating System

eMarket is a web-based Software so there would be no dependency on Operating system. Any device with a web-browser capability can access eMarket website.

3.3 Layer Software Dependencies

It will be using the Thymeleaf for frontend part with the help of the Bootstrap framework which would be the addition help design the website faster and easier.

3.4 Request

In this subsystem, when the users will open the domain address of the eMarket, they can look at the content available and presented by the system like the list of products, login and registration form. The users can make alot a request like viewing the full description of the products, in order to post an Ad, register to use the full services. This subsystem will be the web service available in the presentation layer.

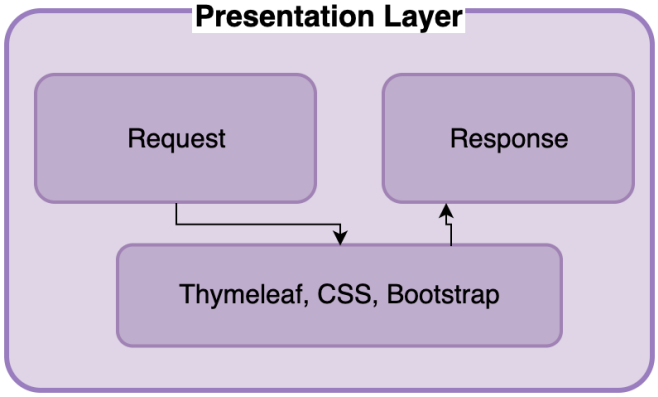

Figure 2: Presentation Layer subsystem description diagram

3.4.1 Subsystem Hardware

All systems and subsystems will be software only, there will not be any hardware components in this project.

3.4.2 Subsystem Operating System

On any Operating system with a web-browser capability

3.4.3 Subsystem Software Dependencies

Spring framework

3.4.4 Subsystem Programming Languages

Java programming Language

3.4.5 Subsystem Data Structures

This subsystem will get userâs information like email, password and click to post an Ad from users and send that data to the database.

3.4.6 Subsystem Data Processing

The subsystem will get the request from the users and send to application layer for processing.

3.5 Thymeleaf, CSS, Bootstrap

This is the very important sub system layer of the presentation layer which presenting in viewing and designing the user interface of the system.

3.5.1 Subsystem Hardware

All systems and subsystems will be software only, there will not be any hardware components in this project.

3.5.2 Subsystem Operating System

On any Operating system with a web-browser capability

3.5.3 Subsystem Software Dependencies

Bootstrap 4 framework, Thymeleaf

3.5.4 Subsystem Programming Languages

No programming language are used in this subsection.

3.5.5 Subsystem Data Structures

No special data Structures were used in this layer.

3.5.6 Subsystem Data Processing

Since the web page is done with all Bootstrap and Thymeleaf, no special system processing is done at this subsystem. All processing is done in the application layer.

3.6 Response

The subsystem is mostly important to display the results from the users based on their request through the help of the thymeleaf.

3.6.1 Subsystem Hardware

All systems and subsystems will be software only, there will not be any hardware components in this project.

3.6.2 Subsystem Operating System

On any Operating system with a web-browser capability

3.6.3 Subsystem Software Dependencies

Spring framework

3.6.4 Subsystem Programming Languages

Java programming Language

3.6.5 Subsystem Data Structures

No specific data structures is used in this section.

3.6.6 SUBSYSTEM DATA PROCESSING

Receive the information from the application layer and process it in the user presentation view.

4 Application Layer Subsystems

This application layer section breaks down layer abstraction to another level of detail. In this layer, the application will be using the java programming language as the base programming language and spring framework with its spring security features for authentication and authorization of the users. After this, the application will connection to the database and store the user information and retrieve from the database using the storage logic and query.

4.1 Layer Hardware

Since, this application is a software only application, there will not be any layer hardware in any aspect of this project.

4.2 Layer Operating System

eMarket is a web-based Software so there would be no dependency on Operating system. Any device with a web-browser capability can access eMarket website.

4.3 Layer Software Dependencies

Spring Framework which will include spring security, spring starter mail. Similarly, Lambok Framework will be used to create the boilerplate of the bean.

4.4 Java and Spring Framework

In this layer of the sub-system, the application will be using the Java programming language and the Spring framework for the designing and building this application. Spring MVC which is Model View Controller is so effective in building the website. Here, the model are build which is processed by the controlled for mapping and the view are used for displaying it. It is the web service of the project.

4.4.1 Subsystem Software Dependencies

Spring Framework

4.4.2 Subsystem Programming Languages

Java Programming Language

4.4.3 Subsystem Data Structures

No specific data structures is used.

4.4.4 Subsystem Data Processing

It will process the incoming request from the presentation layer like click on posting Ad, Contact seller request.

4.5 Authentication and Authorization

In this sub system, spring security play the vital role for the authentication and authorization for the users role based on the credentials they provided for login.

4.5.1 Subsystem Software Dependencies

Spring Security Framework

4.5.2 Subsystem Programming Languages

Java programming Language

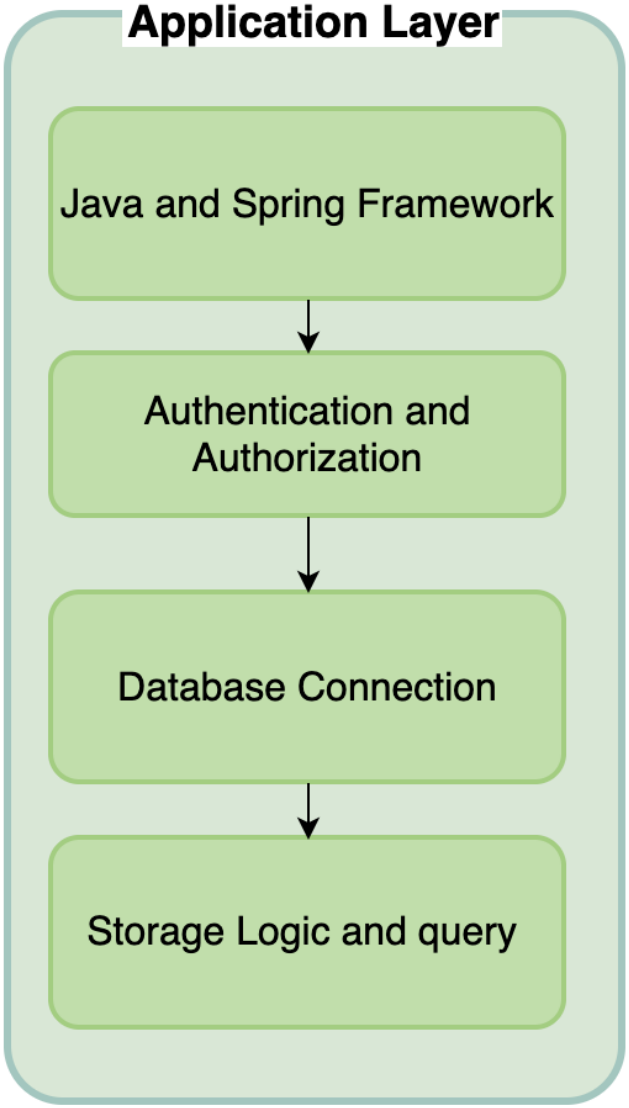

Figure 3: Application Layer subsystem description diagram

4.5.3 Subsystem Data Structures

Data structures available in the spring security will used. For instance: all username from the database will stored in the Array form and check their corresponding password.

4.5.4 Subsystem Data Processing

It will take the username email and password available in the database and validates the user's role based on it.

4.6 Database Connection

In this sub system, it will setup and make the connection with the Repository layer i.e. database by defining the parameter needed for it in application properties of the application. In this layer, the database URL, username, password and MYSQL java connector is used. Similarly, for the JPA, the

dependency is added in the pom.xml file and the hibernate is also defined in application properties.

4.6.1 Subsystem Software Dependencies

Hibernate and Java Persistence API(JPA)

4.6.2 Subsystem Programming Languages

Java programming Language

4.6.3 Subsystem Data Structures

Different Repository are created as the form of the interface and an interface in the Java programming language is an abstract type that is used to specify a behavior that classes must implement.

4.6.4 Subsystem Data Processing

It will validate the credentials of the database and try to connect with it upon running the program.

4.7 Storage Logic and query

This is the important sub system of the application layer where the logic for storing and retrieving data from Repository layer takes place. In this layer, our application will be using JPA(Java Persistence API), hibernate for making the easy and quick communication with the Repository layer. Here the logic includes creating the table for database, retrieving user information by using the query such as findbyID(), save() function available through JPA.

4.7.1 Subsystem Software Dependencies

Hibernate and Java Persistence API(JPA)

4.7.2 Subsystem Programming Languages

Java programming Language

4.7.3 Subsystem Data Structures

The interface of the database connection is implemented here by defining the class and their operations.

4.7.4 Subsystem Data Processing

It will get the users data and request and processed in order to save and retrieve from the database.

5 Repository Layer Subsystems

This is the repository layer of the subsystem where all user are stored present in the web. Similarly, it will also used to fetch the data for displaying in the presentation layer. In this section the user information such as name, email, phone number, address are stored as well as the product information such as product name, price, category, image will be stored in their respective tables or entity.

5.1 Layer Hardware

Since, this application is a software only application, there will not be any layer hardware in any aspect of this project.

5.2 Layer Operating System

eMarket is a web-based Software so there would be no dependency on Operating system. Any device with a web-browser capability can access eMarket website.

5.3 Layer Software Dependencies

Java Persistence API(JPA)

5.4 Amazon RDS

Amazon Relation Database services is the relational database service provided by the Amazon web services. It is since running in the cloud and helps to simply the setup, operation, and scaling of a relational database for applications. Under this services, we will be using the Database management system, MY SQL which will responsible for storing information based on the logic applied in application layer. There will be different Entity and their relation will be defined in this database workplace for more efficient and quick storage and retrieval of the information as per the user request. This subsystem is the web service for storing and retrieving data.

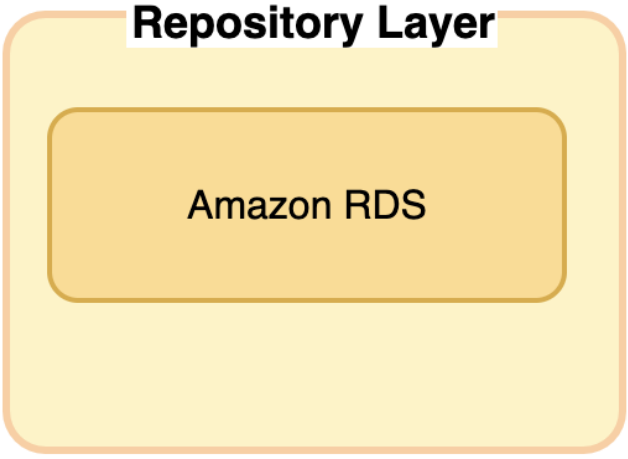

Figure 4: Repository Layer subsystem description diagram

5.4.1 Subsystem Software Dependencies

No any specified software Dependencies in this layer.

5.4.2 Subsystem Programming Languages

No programming language is used as all the logic are performed in the application layer.

5.4.3 Subsystem Data Structures

Data retrieve from this layer will be stored in the form List of the class or the single class. For instance, if needed to get the user data, either we get as List<User> or just User and here User is the class with different attributes such as firstname, lastname, email and so on.

5.4.4 Subsystem Data Processing

All the data processing will take place in the application layer.

References