Web Chat Application

Analysis and Design Document

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Revision History

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| --- | --- | --- | --- |
| **Date** | **Version** | **Description** | **Author** |
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# Project Specification

The purpose of this project is to design and implement a chat application that can be accessed by the users by using a web browser. The application should allow sending multiple types of messages including text messages, messages containing images and file attachments. The application will allow users to belong to multiple conversations, each conversation containing multiple users. When a user sends a message to a conversation every user associated with that conversation should see it.

The application should use a database that will be used for two purposes:

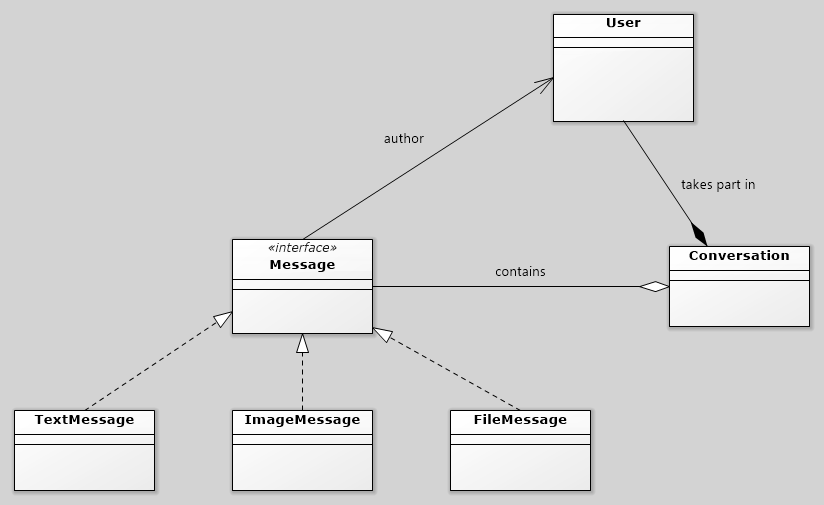
* Storing information about users and the credentials that the user should use for logging in
* Storing messages sent by the users

# 

# Elaboration – Iteration 1.1

# Domain Model

Below is a conceptual class diagram that describes the following:

* There will be multiple kind of messages and each type will be handled differently
* A conversation will contain multiple messages. These messages will be considered owned by that conversation
* A conversation has multiple users that take part in it. New users can be added or existing ones removed

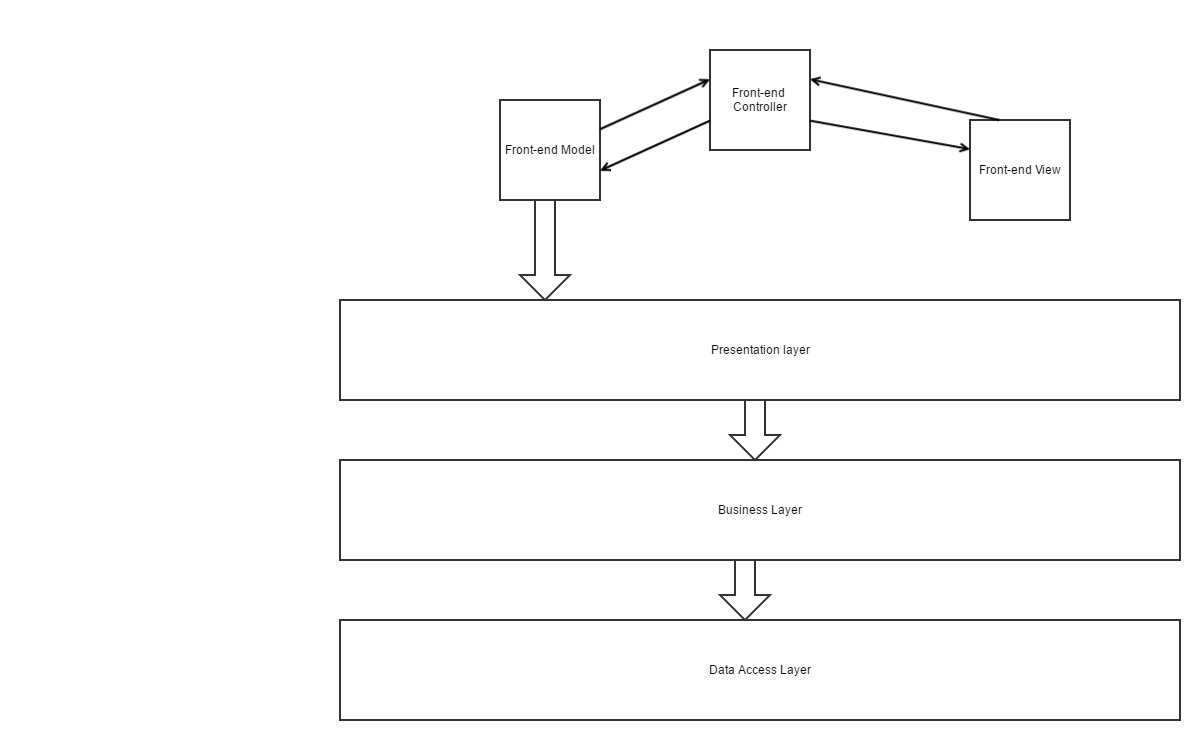
# Architectural Design

## Conceptual Architecture

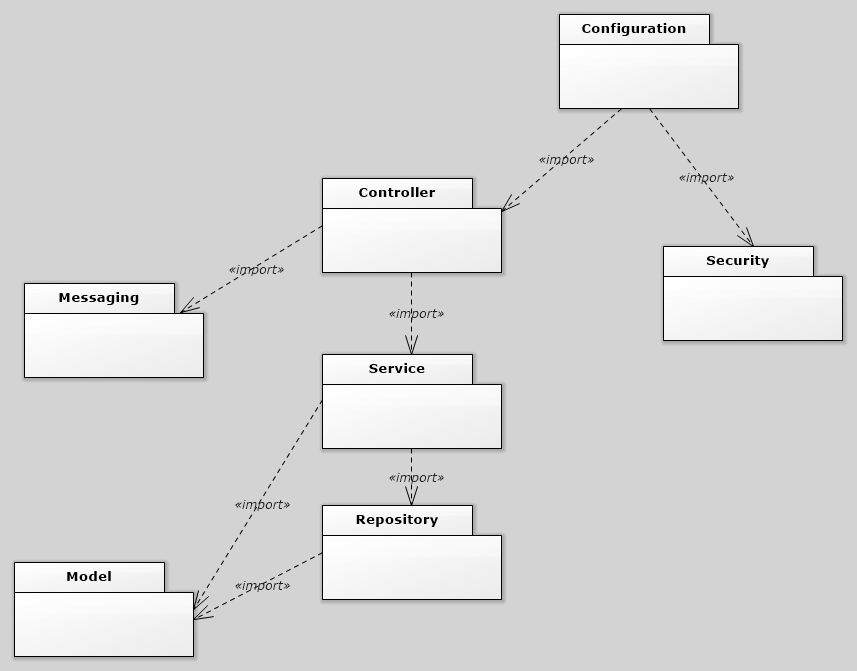
The system will use a client-server model with the Client running inside the user’s web browser and the server being on a separate machine responding to the client’s requests.

The architectural pattern used will be the Layers pattern. This will split the application into multiple isolated layers that contain different parts of the application. The main layers of this system will be:

* Data Access Layer – contains the logic used to access the database and provides data for other layers
* Business Layer – contains the logic of the application that describes how transactions should be performed and how objects should be handled
* Presentation Layer – contains the logic used to communicate with the client. It takes inputs from the user and processes them by calling services from the Business Layer and then returns a reply for the user with the result of their actions

The application will also have some components that might span across different layers. Examples of such components are the ones responsible for security, logging and exception handling.

## Package Design



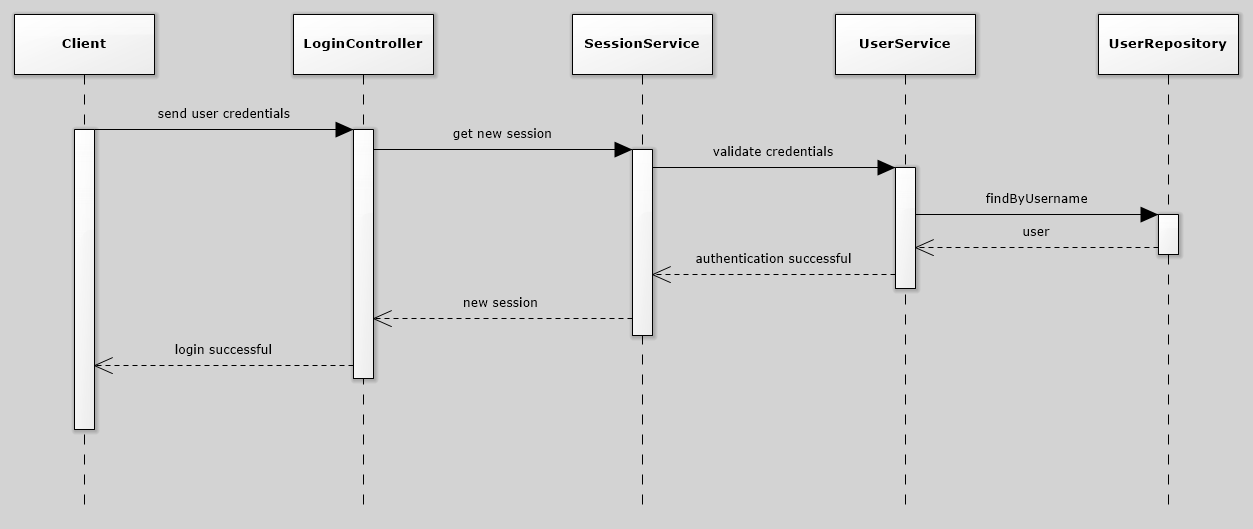
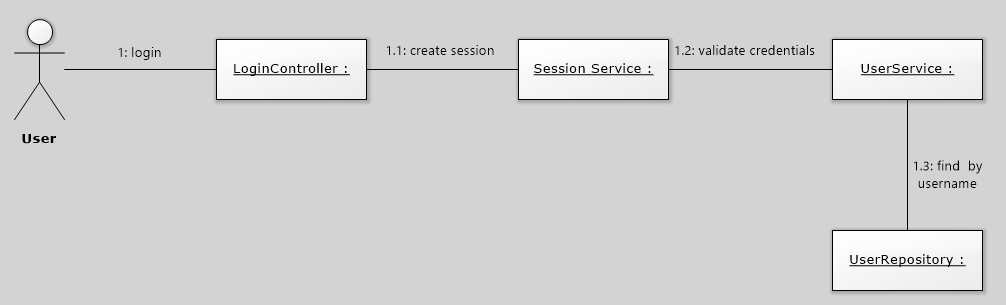
## Component and Deployment Diagrams

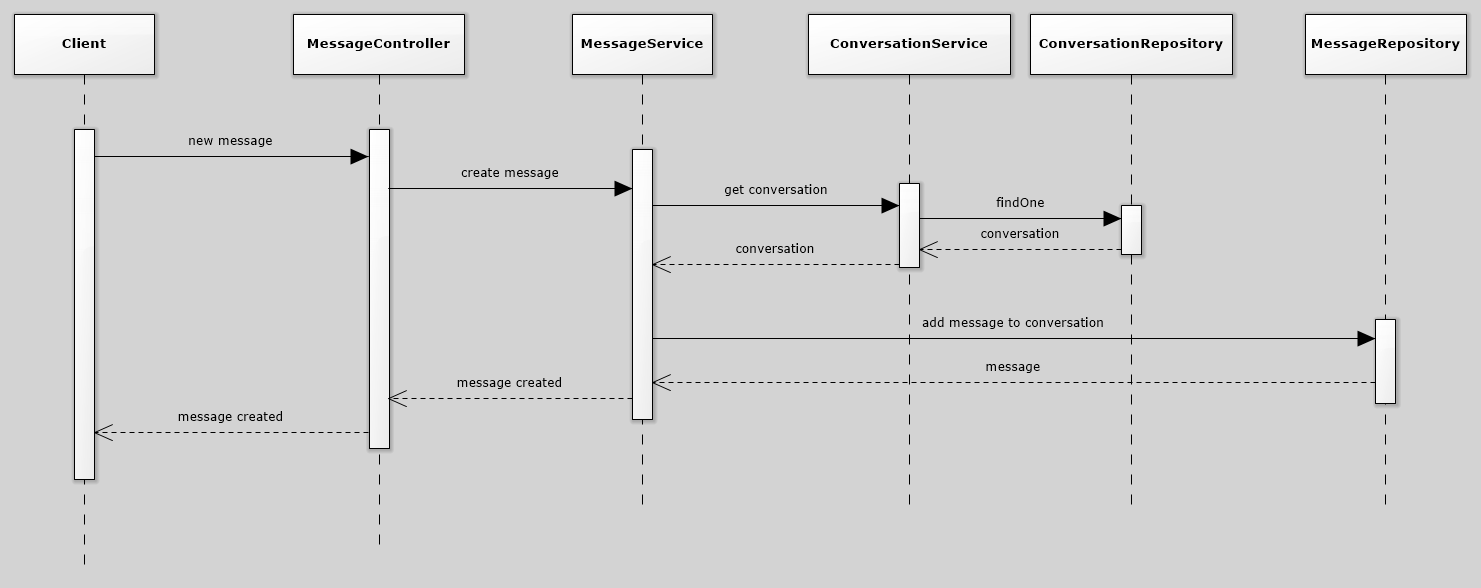
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# Elaboration – Iteration 1.2

# Design Model

## Dynamic Behavior

Scenario 1: User logging into the application

Scenario 2: User adding a new message

## Class Design

The GoF patterns that will be used:

* Factory Method – used to make the creation of message objects easier. The services would not have to know any details about the creation of these objects (for example how each concrete message is instantiated)
* Observer – the application will use a publisher/subscriber model to send out messages to its users
* Builder – used to make the creation of objects easier by not having to use constructors with a large number of parameters. All the model classes (except Message because there will be a factory method for this purpose for messages) will have a builder associated with them.

# Data Model

# Unit Testing

The important services from this project will be tested by creating unit tests with Junit4 and SpringBootTest. The unit tests will contain tests where it is expected that the operation will be performed successfully and tests where the operation should fail. In the last case testing will ensure that the system will not let abnormal data be inserted into the database or sent to other users and that it will respond with the expected exception or error message. Also, the tests should be ran on a different spring profile that uses different resources from the regular profile*.*

# Elaboration – Iteration 2

# Architectural Design Refinement

*[Refine the architectural design: conceptual architecture, package design (consider package design principles), component and deployment diagrams. Motivate the changes that have been made.]*

# Design Model Refinement

## *[Refine the UML class diagram by applying class design principles and GRASP; motivate your choices. Deliver the updated class diagrams.]*

# Construction and Transition

# System Testing

*[Describe how you applied integration testing and present the associated test case scenarios.]*

# Future improvements

*[Present future improvements for the system]*

# Bibliography