# Todo

# Scope

The purpose and scope of this documentation is to provide an overview of the Todo Service along with information like how the functionality was implemented. This document will also list the possible functionality for next version.

# Introduction

Todo-Service app is a multi-user Spring Boot app with a possibility to have a full fledge Angular front end in future. The app allows the user to see a list of existing to-dos for the user and add/update/delete to-dos.

# Technology

## Backend:

1. Spring 5 and Spring Boot 2
2. Maven
3. Java 8
4. Swagger for documentation and end user testing (in the absence of front end)
5. Hibernate – H2 Database (in memory)
6. Junit 5 and Mockito
7. SpringBootTest and MockMvc for Integration Testing
8. STS as IDE
9. Lombok
10. Jacoco
11. Postman

## Frontend

1. Angular 9
2. VSCode as IDE
3. NPM and Node
4. Jasmine for Testing

# Git Repository

I have provided the link to git repo because as part of test. I have only developed the basic backend app with ability to be tested via swagger by user.

The front end is still in WIP.

<https://github.com/Ranjana7/todo.git>

# Thought Process

I created the backend app by utilizing the start.spring.io to create a simple spring boot app with maven, spring jpa etc.

The first draft of the app was to enable the functionality to be able to do CRUD for to-do.

The second draft of the app was to enable the todo service perform CRUD for to-do based on user.

I followed TDD and started the development by writing model todo and unit test for a todo-service that can get a list of todos from the H2(in memory) database and slowly build it into the app that can perform CRUD based on User information.

In a real-world scenario, we should keep the user view of the request separate from the Service view. However, as this is just a POC and also, it is not a very large application with complex functionality. I decided to utilize the todo model for both user view and Service view. This saved me some time on applying mapping using libs like model-mapper (which I have used in my current project in Fidelity).

I have also used Lombok to make the code cleaner and to avoid manually adding getters and setters and for logging.

Central Exception handling is being implemented via Spring’s @ControllerAdvice and @ExceptionHandler to ensure clean code and proper error reporting to user.

Swagger is used for documentation and can be easily used by user for testing via following url while the app is running on localhost:

[http://localhost:8080/swagger-ui.html#](http://localhost:8080/swagger-ui.html)

The app is packaged as .war and can run on any machine without the need of any additional environment settings and/or an application server. This because possible because of the use of Spring boot that provides embedded tomcat server.

Apart from applying OOPS concepts like Encapsulation, Abstraction etc. By using Spring, we have applied a lot of design patterns implicitly for example DI/IOC, Factory Pattern, Singleton Pattern etc. Also, with this I have followed standards and good practice for url naming(like keeping the url same for CRUD but change the mapping), using constructor injection via Lombok etc.

I would have divided the TodoService interface into two separate interfaces as right now it deals with specific tods as well as fetching tods based on user. However, because this is just an app as POC, without the need of further development, I decided not to bring in the Interface Segregation Principle. In real time, it is always a good idea to separate the concerns.

Due to Time constraints, I have not implemented security. However, it will not be very complex to implement security using Spring-Security and Spring OAuth2 clinet. There are many ways to add security, we can either use the open source authorization providers like okta, auth0 or can create our own Authorization micro service.

Initially, I created a front end just to be able to test the app and it works and gets all todos and create todos. Then, I started restructuring the front end and created a better version of it. However, currently the app works for 1 todo for existing users. The work is still in progress and will need time to extend it to a list of todos. Meanwhile, the todo-service can be tested via swagger or postman or angular-app. There is one bug in app and it asks for user to login again if user created a new Todo because I am reloading if anything create/delete/update operations. Could fix it in next version.

Please note, I am using the same in-memory db for testing and the front-end app. However, this can be easily updated by adding a application.properties file in src/test/resources.

Username in DB to be used for Login to Todo App:

1. TestUser1
2. TestUser2
3. David
4. Amit
5. Ranjana
6. Guest

# What’s Next

1. Fix Front end bug
2. Create Javadoc
3. Finish Unit and Integrations tests for Todo-Service – both backend and front end
4. Implement Authentication and Authorization
5. Role based Access.
6. Add description to Todo
7. Create a unique key with description and title of todo rather making title as unique.
8. Ability to add a user by adding a microservice
9. Performance Test
10. Dockerize the Frontend and Backend
11. Set up CI/CD
12. Deploy to AWS – for starter we can use s3 bucket.