WEB APPLICATION DEVELOPMENT

A SUMMER INTERNSHIP REPORT

Submitted by

ANKIT ANURAG

Intern

Under the supervision of

Mr. Hardik Dave
Head,
IT-SAP Application Development

Reliance Industries Limited

Reliance Corporate Park,

Ghansoli, Mumbai

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Ankit Anurag

ABOUT THE COMPANY(RIL)

Reliance Industries Limited (RIL) is an Indian conglomerate holding company headquartered in Mumbai, Maharashtra, India.Reliance Industries is India's largest private sector company on all major financial parameters. In 2004, Reliance Industries (RIL) became the first Indian private sector organisation to be listed in the Fortune Global 500 list. The company operates world-class manufacturing facilities across the country.

Reliance Industries' activities span hydrocarbon exploration and production, petroleum refining and marketing, petrochemicals, retail and telecommunications. The petrochemicals segment includes production and marketing operations of petrochemical products. The refining segment includes production and marketing operations of the petroleum products. The oil and gas segment includes exploration, development and production of crude oil and natural gas. The other segment of the company includes textile, retail business and special economic zone (SEZ) development.

The Enterprise Application Development Team is responsible for developing and maintaining various web applications and other services for RIL.

ABSTRACT

SAP contains a feature called ‘Change Log’, which when active for a table, registers any and all changes made to the table data. This includes creating, modifying and deleting records. This log can then be viewed based on various filters such as date of change and filtering by primary key(s).

The project, titled “**CHANGE DOCUMENT MANAGEMENT”,** dealt with developing a Node JS API to simulate the change log feature of SAP for application in any existing or new API, and developing an Angular UI to check the log records.

This API offers various endpoints which can be targeted to create a log entry, depending upon the type of operation. Two tables are created in the database, and log entries are added to them. The UI is designed to access these records, with additionally providing various filters to access this information. The Change Log API is triggered by the client API on receiving an HTTP call, and makes entries to log tables accordingly.

A brief introduction of various technologies used in the project development are introduced and briefly described in subsequent chapters. Implementation details, requirements and testing responses are also described briefly.

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1. INTRODUCTION

1.1 Objective of Internship

The objectives of an internship program are to -

- To build the strength, teamwork spirit and self-confidence in a student
- To provide an opportunity to learn real-life work skills and etiquettes hands-on at a real job
- To gain valuable skills, knowledge and experience in a field to allow you to make a career transition
- To help apply the theory and skills learned in classroom settings
- To strengthen resumes by giving students work experience

1.2 Problem Statement

The project “CHANGE DOCUMENT MANAGEMENT” was to be developed for maintaining the logs of changes made in any table in any database on a MySQL server using a web API. The Change Log API will be targeted by the client with some expected payload, and entries will be made in the log tables, which can be viewed using the UI designed alongside.

This application should help in determining when the changes were made, what changes were made and who made those changes.

2. ANALYSIS OF ACTIVITIES DONE

2.1 Duration and Other Details

Table 1 : Details of Internship

Start date	6th June, 2019
End date	5th August, 2019
Total duration	Two months
Position	Web Developer
Working days	Five days a week
Supervisor	Hardik Dave

2.2 Roles and Responsibilities

As an intern my responsibilities at RIL was to cover all aspects of designing the API and UI as per the project idea. This required core knowledge about various designing tools like HTML, CSS and JavaScript and backend development tools like NodeJS. The main responsibility was to design an API that would be easy to implement and had minimal compatibility issues. Furthermore, the UI was to be minimal and appealing. Another API was designed to perform simple HTTP requests and test the Change Log API.

2.3 Project Schedule

The duration of internship was two months, dated from 6th June, 2019 to 5th August, 2019. During those two months, the time spent on various topics was as follows:

Study and analysis	:	14 days
Frontend designing	:	14 days
Backend designing and testing	:	21 days
Documentation	:	7 days

3. REQUIREMENT ANALYSIS

3.1 Functional requirements

The functional requirements of the API and UI are as follows:

- The “CHANGE LOG API” should log all fields where changes were made, along with the old and new data, the user who changed it and the date and time on which they were changed. This included deletion and creation of new entry.
- There should be no direct interaction with the database by the user. The API should perform all required actions, including creating the required log tables if they do not exist.
- The user should be able to view these log changes using the designed UI. A search form should be provided to filter out the logs, as per requirement.
- The log data should be available in a tabular structure, along with additional details available on click.
- The user should be able to successfully implement this API, irrespective of the database and languages being used by the client-application.

3.2 Technical requirements

Hardware requirements

- A server to host the API
- A database where log changes are created
- Memory requirements dependent on how many applications trigger API

Software requirements

- Web browser
- API - Node JS v12.4.0, NPM v6.9.0
- UI - Angular v7.3
- Database - MySQL server v8.0.16

4. IMPLEMENTATION

The various implementation tools are as listed :

Operating system	: Windows 7 | macOS 10.14
Development environment	: HTML5, CSS3, JavaScript, MySQL
IDE	: Visual Studio Code

4.1 Development Tools

HTML

Hypertext Markup Language (HTML) is the standard markup language for documents designed to be displayed in a web browser. HTML describes the structure of a web page semantically. 'Hypertext' refers to links that connect webpages to one another, either within a single website or between websites. Links are a fundamental aspect of the Web. HTML uses 'markup' to annotate text, images and other content for display on web pages. This project was designed using HTML5.

CSS

Cascading Style Sheets is a style sheet language used or describing the presentation of a document written in a markup language. CSS is designed primarily to enable the separation of document content from document presentation, including aspects such as the layout, colours and fonts. It allows one to adapt the presentation to different types of devices. This project was styled using CSS3.

JavaScript

JavaScript is an extremely popular scripting language, used on both frontend and backend. It is one of the most popular and in-demand skills in today's market for good reason.

> **Node JS** : It is a JavaScript run-time environment, which is used to execute JavaScript outside of a browser. Node JS has many applications, one of them being server-side scripting. It is used as the server-side scripting language for many popular applications today, like NASA, LinkedIn, Netflix, etc. This project uses Node JS v12.4.

> **Angular** : It is JavaScript framework designed by Google for client-side scripting. One of the popular frameworks in use, it allows the development of Single Page Applications. This means that when a request is made to the server, only certain parts of the web page are re-rendered instead of reloading the entire page. This increases the appeal and also lowers the time taken for server side interactions. This project uses Angular v7.3.

> **Bootstrap and Angular Material** : They are frontend libraries based on CSS and JavaScript for styling a web page. Both are extremely popular libraries providing a larger number of functionalities and can be used alongside each other. This project uses Bootstrap v4.3 and Angular Material v7.3.7.

MySQL

MySQL is a popular open source relational database management system, developed, distributed and supported by Oracle Corporation. It is used for convenient storage and fast retrieval of data in organisations. This project uses MySQL server v8.0.16.

4.2 Concept Definitions

I. HTTP/HTTPS

HTTP means HyperText Transfer Protocol. HTTP is the underlying protocol used by the World Wide Web and this protocol defines how messages are formatted and transmitted, and what actions Web servers and browsers should take in response to various commands. HTTPS or HyperText Transfer Protocol Secure is an extension of HTTP and is used for secure communications over. A network.

II. API

An application programming interface is a code that allows two software programs to communicate with each other (a browser and a database in this context).

III. REST

REST or Representation State Transfer, is an architectural style for providing standard between computer systems on the web, making it easier for systems to communicate with each other. REST-compliant systems, often called RESTful systems, are characterised by how they are stateless (history of interaction is irrelevant) and separate the concerns of client and server (changes to client and serve can be made without affecting the other).

IV. CRUD

CRUD stands for Create, Read, Update and Delete and is the standardised use of HTTP Action Verbs. This means that creation of new record should be done through ‘POST’, updation through ‘PUT’, deletion through ‘DELETE’ and retrieval through ‘GET’.

4.3 Test case

An API designed to perform CRUD operations on a table having columns ‘name’ (type string) and ‘date’ (type date) was used to test the CHANGE LOG API.

Table 2 : Test case response

Action	Response	Result
A new entry was created by the client, and the API called.	Log tables as required were created and one entry in each log table was made.	Pass
A new entry was created by the client, and the API called.	Entries made in the previously created log tables. One entry in each log table was made.	Pass
The ‘name’ field in one of the entries was modified.	One entry in each log table was made.	Pass
The ‘name’ and ‘date’ field in one of the entries was modified.	One entry in the header table, and two entries in the detail table were made.	Pass
One of the entries was deleted.	One entry in the header table, and three entries in the detail table were made.	Pass
A search was made without entering any details in search form. (UI)	All the entries made were returned and displayed.	Pass
A search was made by entering one field in search form.	Expected entries were displayed.	Pass
A search was made by entering multiple fields in search form.	Expected entries were displayed.	Pass

4.4 Deployment Tools

Tools used

I. Git

Git is a distributed version-control system for tracking changes in source code during software development. It is designed for coordinating work among programmers, but it can be used to track changes in any set of files. Its goals include speed, data integrity, and support for distributed, non-linear workflows. Git was used throughout the project to keep track of changes and permit group management of the project.

II. GitLab

GitLab is a web-based DevOps lifecycle tool that provides a Git-repository manager providing wiki, issue-tracking and CI/CD pipeline features, using an open-source license, developed by GitLab Inc. The project was uploaded to GitLab on the local group, to allow every developer in the group to have access to the code of the project.

III. KuberNetes

Kubernetes is an open-source container-orchestration system for automating application deployment, scaling, and management. It was originally designed by Google, and is now maintained by the Cloud Native Computing Foundation. Kubernetes was used to deploy the project to a server for use by various parties in the organisation.

5. CONCLUSION

During my summer internship at Reliance Industries Limited, I worked on the task to create a Node JS API to register changes made to any table in any database simply by calling the API and providing the expected payload.

The task required the development of a UI to view the logs. The UI was designed using Angular and provides various criteria based on which the searches can be filtered.

MySQL was used as the database, while KuberNetes was used for the deployment of the project.
Throughout the course of this internship, I learned to work with multiple technologies including Node JS, Angular, MySQL, Git among others. Even better was that I learnt how to structure real-life projects, and various tools that can assist with this task. Furthermore, it was an experience to sit in a professional environment and see everyone go about their tasks.

6. REFERENCES

Following websites were referred for completion of this project:

- http://stackoverflow.com/
- https://nodejs.org/
- https://www.npmjs.com/
- https://angular.io/
- https://material.angular.io/
- https://www.mysql.com/
- https://github.com/
- https://medium.com/