Winter Internship Report - Infixzon Pvt. Ltd.

B.Tech 2020 Batch Winter Internship

Student Name: Dhruv Alkesh Chokshi
Enrollment ID: **202001049**
B. Tech. Project (BTP) Report
BTP Mode: ***Off Campus***
Dhirubhai Ambani Institute of ICT (DA-IICT)
Gandhinagar, India
202001049 [at] daiict.ac.in

Mentor's Name: Suketu Modi
Company's Name: *Infixzon Private Limited*
Company's Address: 3rd floor, Avadhesh Huse, Sarkhej - Gandhinagar Hwy
opp Gurudwara, Bodakdev, Ahmedabad - 380054
suketu.m [at] infixzon.com
On-Campus Mentor: BTP Coordinator

***Abstract*—This document summarizes what I gained, encountered, and contributed during my winter internship at Infixzon Pvt. Ltd. in my 8th semester**

***Index Terms*—internship, office, offline, backend**

I. Introduction

During my internship at Infixzon Pvt. Ltd., I held the position of Backend Development Intern, specializing in Node.js. This experience allowed me to bridge the gap between theoretical knowledge and practical application in the realm of software development. This report serves as a reflection on my journey, highlighting the significance of coding proficiency, effective teamwork, and the fundamental principles of building reliable software. I will delve into the specific projects I worked on, the challenges I encountered, and the invaluable lessons I learned along the way. Throughout this period, collaboration with my backend team colleagues played a pivotal role as we navigated through various stages of the Software Development Life Cycle (SDLC) and sprint cycles, emphasizing the importance of clear communication and adaptability.

II. Learning Outcomes

Technical :
Software Management Proficiency: The Model that I was supposed to implement and work under was Agile Model.
Programming Proficiency: Used Javascript extensively for backend development. Brief knowledge about Java Spring Boot.
Database Management: I was supposed to work with firebase as my database management tool.
Non-Technical :
Teamwork: Collaborated and communicated effectively and openly to achieve project goals as a team.
Adaptability: Adapted to the company environment, how it works and manages things.
Creativity: Brain storming to discuss different ways to develop the system.

Identify applicable funding agency here. If none, delete this.

III. Contributions

It involves three sections where I first got familiar with what we are supposed to develop, taking inspiration from the software that are available in the market and studying how they are developed next is what we developed and the latter one is about what we as a team achieved.
1.) Research and Creating Strong Base :
We were first asked to list down some of the EPC management software then study them like Primavera P6. Later the software which was available and the one which we supposed to modify was developed in Java Spring Boot, so studied about Java Spring Boot. So, being an intern, my initial period of internship was dedicated to learning about the software which we were supposed to modify and research about other existing ones and understanding the tech-stack. I faced a lot of difficulty in understanding Java Spring Boot and it took a lot of time as I couldn't find proper study material for it online. Various meeting and tutorial session helped me understand it. Even though the development was not supposed to be in Java Spring Boot but it was necessary to understand the existing system as well. This phase laid the foundation for future tasks.
2.) Development phase :
I began doing coding work, which meant I got assigned tasks in JIRA to first find out the features that were implemented in the previous system developed in Java Spring Boot and later modify them in Node JS, I was supposed to little bug fixing as well in the previous system. This is important for any software project. Then, I had to analyse error logs and got responsibilities for specific parts of the project. As an intern, my role wasn't huge, but it taught me a lot. Towards the end of my internship, I helped a lot with other projects in the backend team and the new interns who joined with Java Spring skills and Node JS to make important parts work better and help fix bugs.
3.) Conclusion :
I did bug fixes in the code, got positive word of mouth from the seniors, I was given tasks and completing them as well as the one's fully assigned.

IV. Learnings

During my internship, I had the privilege of delving into the world of backend development, where I not only gained a deep understanding of its intricacies but also honed my skills across a spectrum of cutting-edge technologies essential for modern applications. Below, I outline the primary coding and development-related tools and technologies that I had the opportunity to learn and proficiently utilize throughout this enriching experience.

- **Java Spring Boot**
  Java Spring Boot is a popular framework for building backend systems including those for EPC(Engineering, Procurement, and Construction). The system that was already present had its backend written in Java Spring Boot, which I was supposed to study and understand. I felt understanding Java Spring was the toughest job for me, because here I was introduced to all new tech and expected to understand it, and find a few bugs. Even though Java Spring is scalable, company wanted me to try my hands on the same backend with Node JS. Java Spring employs RESTful APIs for communication between the server and frontend. Here in Java Spring several key architectural patterns and technologies are utilised, like dependency injection and MVC(Model-View-Controller). Both these are also employed when worked with Node JS as well.

- **Mongo DB**
  Mongo DB is a NoSQL database that stores data in flexible, JSON-like documents. Here in EPC management, Mongo DB's document-oriented nature aligns well with the varied and often complex data structures associated with projects, resources, tasks. I am familiar with Mongo DB as I have been using it since my second year in college for making projects using MERN stack. It is easy to use and a lot scalable. It is designed for horizontal scalability, making it well0suited for applications with growing data volumes and user loads. So, I already had hands on experience with Mongo DB which helped me in my internship. The best thing about Mongo DB which I got to learn and know is Sharding which allows data to be distributed across multiple nodes, enabling horizontal scaling and improved performance.

- **Node JS**
  It is powerful, event-driven JavaScript runtime environment built on chrome's v8 JavaScript engine. I along with my backend team modified Java Spring backend into Node JS backend system. I have a lot of experience in using Node JS as since early college years I have been a web developer and used Node JS extensively. This software is built on asynchronous event-driven architecture. It handles concurrent requests and I/O operations efficiently, making it an ideal choice for real-time application for EPC management. The backend utilizes Express JS, that is a minimalist and flexible web application framework for Node JS. Web-Sockets for real-time communication for me is the best feature. It was facilitated by libraries like Socket.IO, enables real-time bidirectional communication between clients and server. Web-Sockets are utilised for features such as live updates, notifications, and chat functionality in the EPC management software. Socket.IO provides a robust and efficient mechanism for handling Web-Socket connection and events.

- **Firebase**
  Since, Node JS is replaced with Java Spring Boot, Mongo DB is replaced with Firebase. Firebase Realtime Database is a cloud-hosted NoSQL database provided by Google Firebase. It offers real-time sync and data persistence making it excellent choice for scalable and collaborative application. It stores data as JSON and synchronizes it in real-time across connected clients. It is hosted in the cloud eliminating the need for backend infrastructure management and enabling seamless scalability. While Firebase Realtime Database provides real-time data synchronization and persistence, Express.js can still be utilized for routing and middleware functionalities in the Node.js backend. Cloud functions for Firebase executes functions in response to various events triggered by Firebase services, such as changes in Realtime Database, Firestore, Authentication events, Cloud Storage uploads, and Cloud Messaging notifications. These cloud functions are triggered by specific events and receive context information about the triggering event.

- **AWS**
  Amazon Web Services is a comprehensive cloud computing platform offered by Amazon providing wide range of services for computing power, storage, databases, etc. Integrating AWS with Firebase allows to leverage the strengths of both platforms to build scalable, reliable, and feature rich applications. Here Firebase offers real-time data sync, while AWS Lambda enabled to run code without provisioning or managing servers. AWS Lambda is used to respond to events triggered by Firebase Realtime Database changes, performing custom business logic, data processing. Real-time data processing was done with AWS Kinesis. It is a platform for real-time data processing and analytics, allowing developers to ingest, process and analyse streaming data in real-time. Storage integration was done with AWS S3 which provides scalable object storage. Authentication was offered by AWS Cognito and computing power by AWS EC2. AWS EC2 is Elastic Compute Cloud which provides scalable virtual servers for running applications and servers. Deployment was powered by

AWS Amplify, which is a development platform for building cloud-powered applications.

V. My Tasks

During my internship, I put into practice the skills I learned by using them to solve real problems and help the team reach its goals. I applied what I knew to actual projects, dealt with challenges as they came up, and made valuable improvements along the way. Overall, I used my skills to make a positive impact on the team's work.

- During the first half of my internship, I was supposed to research about the existing products in the market and technology used. It included studying about Java Spring as well because the existing system was in Java Spring and we were supposed to migrate it.
- We had a meticulous 3-week sprint cycle with 10 story points worth of coding and assessment tasks to complete with a strict deadline.
- The tasks assigned to me were, initial study about software and Java Spring and finding a few bugs if any in the existing code. Understanding Java Spring along with bug fixing consumed a lot of time.
- Later part was of migration from Java Spring and Mongo DB to Node JS and Firebase as Realtime Database along with hosting and deploying on AWS.

A. *My job in Backend Team*

- Since it was an EPC management software, we were made to sit with a civil engineer to understand what is EPC and what are different modules in it.
- The three modules are Engineering, Procurement and Construction. I was supposed to work for the Construction module which further had 3 different modules, that are Architectural, Structural and MEP(Mechanical, Electrical and Plumbing).
- Now my job here is to develop a system for the organisation, that is any construction company to micro-manage their jobs.
- Initially it starts with user registration, here the user is individual as well as the organisation. Since it is EPC management software, the organisation requires a meticulous record of every employee and their tasks.
- User that is the Organisation is registered with its Name, Address, etc.
- Each organisation that is a construction company has a person who will be assigned the role of super admin and that will be the owner.
- When the registration is done an individual is also supposed to fill in its detail along with the organisation he works for so that its information gets registered and whenever a particular job needs to be assigned to a particular employee the project manager can assign it.
- Super Admin appoints the project manager who further appoints employers and keep a record of their jobs and their work along with different sites of the construction company along with different project managers.
- There is a dashboard which has different features, one of them included version control where in, if any changes is made to the module of architecture, notification reaches to the other 2 modules that is structural and MEP and a new version is created for it.
- When an employee registers, he automatically receives a link for joining that organisation and once he joins, the project manager assigns him the job.

B. *Features of the Dashboard*

- Smart Drawings: Here the structural and architectural drawings of the building are saved and an option for minor editing to be done is also given. Even if a minor change is done, version tracking is done and the version is updated.
- Stakeholder Management: This is one such feature that gets all clients, contractors, engineers on the same platform and can collaborate.
- Daily Logs: It reduces the time to fill in important information on daily basis.

InterPersonal Growth

- Team Collaboration: Engaging with senior developers and actively participating in code reviews allowed for a swift adaptation to the team's methodologies. This collaborative environment not only accelerated learning but also provided valuable insights into coding standards and best practices, ultimately enhancing contributions to team objectives.
- Continuous Learning: Regular attendance at weekly tech talks, covering a wide range of topics from software architecture to cutting-edge technologies, significantly expanded technical knowledge. These discussions served as an invaluable opportunity to refine skills and stay abreast of industry trends.
- On-Call Experience: Being part of the weekly on-call schedule offered exposure to around-the-clock availability, presenting a unique experience in managing responsibilities and promptly addressing issues as they arose.
- Daily Sync Meetings: Active participation in daily sync meetings proved instrumental in gaining deeper insights into code intricacies and understanding the underlying business context. This fostered a more robust thought process and imbued development work with a greater sense of purpose.
- Cultural Harmony: The company made sure everyone felt like part of the family. They organized lunches and outings where we could relax and have fun together. These events helped us bond and feel connected, making us feel valued. By caring about our happiness and friendships, the company created a positive vibe that made us enjoy our work even more.

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