INTERNSHIP TECHNICAL REPORT

Summer 2020 (May 2020 - Aug 2020)

by

MOHAN VALLIVEDU SUDHAKAR

Master's in Computer Science

Student ID: 1906017

Software Engineering Intern

BECHT

COLLEGE

UNIVERSITY OF HOUSTON-CLEAR LAKE
College of Science and Engineering

Head of the Department

Dr. SADEGH DAVARI, Ph.D.

Professor of Computer Science

Chair of the Department of Computing Sciences

ABSTRACT:

This paper is a technical report of the work I have been doing in my Summer Internship as a Software Engineer at the company “BECHT”. Becht provides technically excellent engineering solutions, plant services, and software tools to worldwide clients. The company is a growing and profitable one, responsive to client needs, committed to excellence, and poised to capture new, and interesting opportunities. I was supervised by Mr. Mark Fronek, an IT Manager at Becht.

This report includes my work experience, project summary and methodologies, my responsibilities, list of tools and technologies we are using in the projects, and accomplishments. I worked along with a team of 6+ members, including two Senior Software Engineers and other interns, on various domains of projects, from front-end to back-end, which helps me to learn a lot of things in the process. I have explained in-depth about the projects and technologies I worked on, in this report.

Table of Contents:

1. INTRODUCTION

Founded in 1964, BECHT is a rapidly growing, a multidiscipline consulting firm relied on by customers to relentlessly solve their most difficult and entrenched problems. Becht Software and Solutions is engaged in meeting the engineering modeling and software needs of the Refining, Petrochemical, Chemical and Power Industries through the development of proprietary software and custom applications. Our proprietary software applications include AP's, Fitness-for-Service (FFS) evaluations, Risk-Based Work Selection (RBWS) and Risk-Based Inspection (RBI) planning. Additionally, Becht is available to provide custom engineering analysis and software solutions to our clients.

I've joined Becht as a Software Engineering Intern on May 26, 2020, in a team of 8 talented Engineers consists of an IT Manager to Senior Software Engineers and other fellow Interns. I started working on a Software platform named Becht Connect. It is a Knowledge-on-Demand Network, a powerful suite that empowers your people, enables operational efficiency and brings an entire world of experts, information, and direct accessibility to the answers and knowledge your team needs. Later, I moved on to build an Automation tool for an internal team, completely from scratch taking full responsibilities from Coding to Testing and delivering it to the team.

I am grateful to my Manager Mr. Mark Fronek, who is there to help me whenever I have trouble in understanding the tasks and Senior Software Engineer Mr. Jon Yutzy for continuous support.

2. PROJECTS

In this section, I will be describing the projects I worked on, this summer. I would be covering some important highlights of the projects, without revealing the confidential data and information.

Firstly, I worked in developing a feature in a platform named "Becht CONNECT".
Becht Connect features include:

- Exclusive access to Becht's discipline experts.
- Capture institutional knowledge, expert responses, and FAQ's.
- Easy-to-use, web-based connectivity to Knowledge-on-Demand Network.
- Webinar Library of recorded 2hr, 5-person industry expert panel webinars.
- Ever-growing Knowledge Library with best practices.

Responsibilities:

1. I developed a feature in the Becht Connect platform, where Clients can view their company projects which are associated with Becht and can view final reports of each project in the Egnyte Cloud File System.

- First, I understood the Structure of the Code base, the database schema where the list of projects located, how to get the projects list, based on the Client login token stored in Session storage, etc.
- At last, I did the API call from the front-end using JavaScript and loaded the data into the Grid. We are using Kendo UI Telerik framework for the front-end components)
  (Kendo UI is a comprehensive HTML5 user interface framework for building interactive and high-performance websites and applications.)
- Finally, I used Egnyte API for POST and GET calls, to get number of files in the final report folder and only open it when there is at least one file, and then generate a Unique URL with an expiration date of one day, which opens the final report folder of that specific project in an another tab after a button click.

2. I designed and built an Automation tool for an internal team, in the Microsoft Excel Add-in, using C#, Windows Forms, VSTO, etc.

- Firstly, my Manager and I talked with the team, to know the requirements, what kind of Automation tool are they expecting, and what should be the work it does when you click buttons, etc.
- Secondly, my manager helped me with mockup of the user interface for the Excel sheet add-in in Lucid chart. The goal is to parse the data in the Excel sheet, which consists of 500+ rows and 20+ sheets of data regarding machines and equipment. I designed a user interface with Windows form using C# and Microsoft VSTO. So, when a user clicks on the button in the menu bar, the form will get loaded with the data of the selected row in the Excel sheet and enable the user to edit the data of that specific row.
- I designed some other buttons to get the data from other Excel workbooks and load it in the present Excel sheet, one more button to clear all the Excel sheets.
- Finally, after saving the data it, user we click a button which generates multiple sheets of each equipment with that specific data in a good-looking format. An Excel sheet may contain 15 to 20 equipment data so it will generate 15 to 20 labels within 2 seconds, reducing almost 70 to 80% time and effort to the team.

3. Finally, at present I am working on adding some extra features to the Subscription portal of the company.

- Designed various tables for the subscription portal in the Microsoft SQL database.
- I will be modifying some of the components for the user interface by getting some data from other APIs.

3. ACCOMPLISHMENTS

Most of the accomplishments are mentioned in the projects section.

- Successfully developed one of the features in the Becht Connect, to get the projects list using my own API, and display it in the Kendo UI grid table.
- Designed an automation tool for the Excel Workbook, completely from the scratch, alone with the help of my manager and delivered it to the internal team. This Excel add-ins Will save a lot of time and effort to the team.
- Learned a lot of new things and technologies in the process of designing and developing these project features and time management skills.
- Experienced the total process of software development lifecycle as well as agile methodology from requirements gathering to testing on delivering of the project.
- Learned on how to use Azure DevOps to keep track of the tasks assigned by the manager as well as git repository, push and pull requests, commit and merging other people tasks into the project.

I am grateful to my manager as well as my fellow engineers and interns for guiding and supporting me throughout the process from the start.

5. TECHNOLOGIES

I learned a variety set of tools and technologies in the process of my internship, which are the latest booming technical stack at present. The things which I learned throughout the projects are:

- **C# :**

  C# is a general purpose, multi paradigm programming language with strong typing, functional, generic, object-oriented programming disciplines. C# is intended to be suitable for writing applications for both hosted and embedded systems, Desktop applications games, web applications, etc.

- **ASP.NET Core:**

  ASP.NET is an open source, web application framework developed by Microsoft to build dynamic web applications and services. Other various versions were released after .NET which are ASP.NET MVC, ASP.NET Web API, ASP.NET Core, etc.

  ASP.NET Core is an open source and cross platform framework for building applications such as web applications cloud based as well as mobile back end . It makes it easy to build REST APIs with many inbuilt features for creating endpoints, providing authorization and authentication, as well as easy routing by adding just an attribute.

- **Kendo UI:**

  Kendo UI is and user interface framework for building interactive and high-performance web applications. It comes with the library of 70+ UI widgets, gadgets and other components for any frameworks. So, it's basically a collection of UI components with libraries for Angular, React, jQuery, etc.

- **REST API:**

  A RESTful API Is an application program interface that uses HTTP requests to get, post, update and delete data. It can handle multiple types of calls and even different data formats. So, people use third party APIs or even create our own API to update our data or to get the data from the database, as well as many other use cases.

- **Microsoft VSTO:**

  Microsoft Visual Studio tools for Office (VSTO) is a set of development tools Available in the form of a Visual Studio add-in. We can use this VSTO to create .NET applications that extend Microsoft Office to create our own solutions by using Visual Basic or C#. It also has visual designers that help you create custom user interfaces for your Office according to your business needs.

- **Windows Forms:**

  Visual Studio provides an Ide to aid in writing code, as well as rich control set written with .NET framework. Windows Forms is an early and easy way to provide graphical user interface components to the .NET Framework. By using these controls, you can quickly develop the solutions you need. There are many components which can be easily added to you work solution Just by drag and drop to your application and you can write the logic of working behind them. The provided controls include buttons, textboxes, checkbox, data grid as well as it provides layout arrangement, validation and data binding.

- **Microsoft Office Interop:**

  It is an option for creating/reading Excel files (XLS, XLSX, CSV) from C# in the .NET application. We need to download the reference of that package to use it. It provides an easy way to create new sheets in the active workbook and to read the data from the existing workbooks in the system.

- **Microsoft Azure DevOps:**

  Azure DevOps Server is a Microsoft product that provides version control, reporting, requirements management, project management, automated builds, testing and release management capabilities. We used DevOps to keep track of tasks assigned by our Manager, version controlled of all the projects. With Microsoft single sign-on feature, users sign in once with one account to access domain-joined devices, company resources, software as a service (SaaS) applications, and web applications

5. CONCLUSION

Thus, the projects I have worked on were unique and the support from my colleagues is astounding. I have been learning a lot about the industry, various technologies, managing multiple tasks at a time, version control, continuous learning and getting feedback from Senior Software engineers.

Finally, I would like to thank our manager Mr. Mark Fronek for giving me this wonderful opportunity and made my summer very challenging and enjoying.

Special Thanks to our Chair of the Department, Dr. Sadegh Davari, for allowing me to participate in this Summer Internship and my faculty advisor Dr. Pradeep Buddharaju, for his continuous support throughout my academics.