ConsultAdd Services Private Limited

A Synopsis

Submitted in partial fulfillment of requirement of the

Degree of

BACHELOR OF TECHNOLOGY in COMPUTER SCIENCE & ENGINEERING

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Introduction

ConsultAdd Inc is a leading provider of Information Technology consulting and business process services. We offer strategic insights, technological expertise, and industry experience. ConsultAdd is one of the fastest growing IT consulting companies specializing in finance, banking, insurance, healthcare, retail, e-commerce domains and enterprise web development, data warehouse, business intelligence, big data in technologies.

With over 150 professionals working on information technology projects across united states, ConsultAdd is headquartered in TX and has the presence in Virginia, Pennsylvania, New York. ConsultAdd's offshore center is based in India at Pune.

More details about the company:

- **Website:**
  https://www.consultadd.com

- **Industry:**
  IT Services and IT Consulting

- **Company size:**
  370 employees

- **Headquarters:**
  Irving, Texas

- **Founded:**
  2011

- **Specialties:**
  IT Consulting, Product Development, IT Training, Amazon Web Services (AWS), Python, Java, Software Development, Cloud Development, DevOps, Elastic Stack (ELK), People First, Culture First, JavaScript, and React JS

- **Major Clients:**
  Google, Cisco, Apple, Lululemon, Kasasa, Expedia, Vanguard and many more.

Internship Profile

My Role:

I was hired for the Associate Software Engineer (ASE) – Intern role. As an ASE, I worked & contributed in growing areas of development like –

- Java-based Projects using Spring-Boot Framework (Web Development).
- Working with Relational, Non-relational & In-memory databases like H2.
- Frontend Development using Angular & React.
- Performing unit testing using Junit & Mockito frameworks.
- Integrating Security in web applications.
- Operating cloud computing services like AWS.
- Using CI/CD tools like Jenkins, GitHub Actions for deploying web applications.
- Dockerizing Spring-Boot Application.
- Working using Agile methodologies like Scrum & Kanban on Jira Software.

Currently, I am working in the chat-bot service (Virtual Agent) of a project, with the Backend & DevOps team. Since the project is in the initial stage, we are having daily stand-up meetings, in which we plan & discuss about the current state of project & how we should proceed forward as well as to complete the required tickets (tasks) in the corresponding sprints.

While going through this project, I was required to have a good knowledge of the below mentioned tools & technologies like –

- HTML5, CSS3, Java-Script.
- Java.
- Spring-Boot
- Junit & Mockito
- Angular & React
- API & REST-API's
- Building Tools like Maven & Gradle
- Microservices
- Amazon Web Services (AWS)
- Database – MySQL, PostgreSQL, MongoDB
- Git & GitHub
- JIRA ticketing System
- Docker
- Kubernetes
- Spinnaker & Jenkins
- GraphQL
- Vault

Project

Project Introduction:

E-commerce is fast gaining ground as an accepted and used business paradigm. More and more business houses are implementing web sites providing functionality for performing commercial transactions over the web. It is reasonable to say that the process of shopping on the web is becoming commonplace.

Consultpedia strives to provide solutions to develop and transfer easy and efficient way in the digital age and to help reducing the human pressure and time, to help support shop collections, the digital initiatives, and external partner institution digital projects. It provides services that include the digitization of analog objects, metadata management, cloud security, and deployment and access of digital collections. Consultpedia is a web application written for all operating systems, designed to help users maintain and organize shop virtually. This software is easy to use for both beginners and advanced users. It features familiar and well throughout an attractive user interface, combined with strong searching Insertion and reporting capabilities. The order generation facility of shop system helps to get a good idea of which are the various items brought by the customers & also makes possible for the customers to get the product easily.

There are three actors in our application- customer, employee and manager. Customers can register if he is a new user and doesn't have an account, if already registered then he can directly login to the web application using the registered email id & password and then he can order products, checkout cart and view orders. Employees can add/remove products, maintain customer's information, view & update stocks as well as can cancel/confirm the customer orders. Manager is like the admin. He manages all the details of the customer & employee.

Project Objectives:

The objective of this project is to develop a general-purpose e-commerce website where any product (such as books, food items, drinks, clothes & electronic items) can be bought from the comfort of home through the Internet. An online website is like a virtual store on the Internet where customers can browse the catalog and select products of interest. The selected items

may be collected in a shopping cart. At checkout time, the items in the shopping cart will be presented as an order. Customers can also remove the items from the cart & even cancel it, accordingly.

Usually, the customer will be asked to fill or select a billing address, a shipping address, a shipping option, and payment information such as a credit card number. An email notification is sent to the customer as soon as the order is placed.

Some other objectives of the project are:

- To provide a secure system application in terms of information retrieval.

- To create a user-friendly interface, which will help users to buy products easily.

- To properly maintain information about the employees, customers, orders and product stocks.

- To have a Manager Role which can perform various operations to maintain proper functionality and transparency.

- To help in decision making efficiently.

- To provide a systematic product inventory.

- To reliably deploy the application on cloud, so that it is available globally & works well on all operating systems.

- 24 * 7 availability of the website with reliable database.

Features of Project:

- User-friendly access

- PostgreSQL provides object relational architecture as well as many more data types.

- Cloud Deployment suits it for high volumes of both reads & writes.

- Access control is secured because of Cloud Security.

- Complete details of products from stock to prices.

- Provides 3 different types of users for accessing, i.e., Customer, Employee & Manager.

My Role:

Working in the Epimonís team as a Java Backend & Cloud Developer.

My Work:

- I made an e-commerce website called "Consultpedia". It is a web application written for all operating systems, designed to help users maintain & organize shop virtually.

- For developing, we used Spring Boot framework, written in Java language.

- For providing a genuine view, Angular is used at front end, which is written in JavaScript.

- For testing purpose, we are using the Junit & Mockito frameworks of Java.

- For deployment, we are using Elastic Beanstalk, Relational Database Service (RDS) & Simple Storage Service (S3) services of AWS.

Tools & Technologies Used:

- **Spring-Boot:**

  Spring Boot is an open-source Java-based framework used to create a microservice. It is developed by Pivotal Team and is used to build stand-alone and production ready spring applications.

  Spring Boot provides a good platform for Java developers to develop a stand-alone and production-grade spring application that you can just run. You can get started with minimum configurations without the need for an entire Spring configuration setup.

  Spring Boot offers the following advantages to its developers:

  - Easy to understand and develop spring applications
  - Increases productivity
  - Reduces the development time

- **Angular:**

Angular is a TypeScript-based free and open-source web application framework led by the Angular Team at Google and by a community of individuals and corporations. Angular is a complete rewrite from the same team that built AngularJS.

With Angular, you're taking advantage of a platform that can scale from single-developer projects to enterprise-level applications. Angular is designed to make updating as straightforward as possible, so take advantage of the latest developments with a minimum of effort. Best of all, the Angular ecosystem consists of a diverse group of over 1.7 million developers, library authors, and content creators.

Some features of Angular are:

- Cross-Platform
- High Speed & Optimum Performance
- Efficient Two-Way Data Binding
- Less Code Framework

- **PostgreSQL:**

PostgreSQL also known as Postgres, is a free and open-source relational database management system (RDBMS) emphasizing extensibility and SQL compliance. It was originally named POSTGRES, referring to its origins as a successor to the Ingres database.

Main features of PostgreSQL are:

- User-defined types
- Table inheritance
- Foreign key referential integrity
- View, rules, subquery
- Nested transactions

- **AWS Elastic Beanstalk:**

AWS Elastic Beanstalk is an easy-to-use service for deploying and scaling web applications and services developed with Java, .NET, PHP, Node.js, Python and Docker on familiar servers such as Apache, Nginx, etc.

You can simply upload your code and Elastic Beanstalk automatically handles the deployment, from capacity provisioning, load balancing, auto-scaling to application health monitoring.

At the same time, you retain full control over the AWS resources powering your application and can access the underlying resources at any time.

- **AWS Relational Database Service (RDS):**

Amazon Relational Database Service (Amazon RDS) is a web service that makes it easier to set up, operate, and scale a relational database in the AWS Cloud. It provides cost-efficient, resizable capacity for an industry-standard relational database and manages common database administration tasks.

Amazon RDS is pay as you go. It is comprised of 3 parts:

1) Hosting

2) Storage and Operations

3) Data transferred

- **AWS Simple Storage Service (S3):**

Amazon Simple Storage Service (Amazon S3) is an object storage service offering industry-leading scalability, data availability, security, and performance. Customers of all sizes and industries can store and protect any amount of data for virtually any use case, such as data lakes, cloud-native applications, and mobile apps.

With cost-effective storage classes and easy-to-use management features, you can optimize costs, organize data, and configure fine-tuned access controls to meet specific business, organizational, and compliance requirements.

- **Visual Code Studio (VS Code):**

Visual Studio Code is a source-code editor made by Microsoft for Windows, Linux and macOS. Features include support for debugging, syntax highlighting, intelligent code completion, snippets, code refactoring, and embedded Git. I have used it to implement my frontend code.

- **IntelliJ IDEA:**

IntelliJ IDEA is an integrated development environment written in Java for developing computer software. It is developed by JetBrains, and is available as an Apache 2 Licensed community edition and in a proprietary commercial edition. Both can be used for commercial development. I have used it to implement by backend code.

- **JIRA Software:**

  Jira is a proprietary issue tracking product developed by Atlassian that allows bug tracking and agile project management.

  For teams who practice agile methodologies, Jira Software provides scrum and kanban boards out-of-the-box. Boards are task management hubs, where tasks are mapped to customizable workflows. Boards provide transparency across teamwork and visibility into the status of every work item. Time tracking capabilities and real-time performance reports (burn-up/down charts, sprint reports, velocity charts) enable teams to closely monitor their productivity over time.

Proposed Method

Kanban:

Kanban is a popular framework used to implement Agile and DevOps software development. It requires real-time communication of capacity and full transparency of work. Work items are represented visually on a kanban board, allowing team members to see the state of every piece of work at any time. The following developments are implemented using Kanban.

- **Agile Development Methodology:**

  Teams use the agile development methodology to minimize risk (such as bugs, cost overruns, and changing requirements) when adding new functionality. In all agile methods, teams develop the software in iterations that contain mini-increments of the new functionality. There are many different forms of the agile development method, including scrum, crystal, extreme programming (XP), and feature-driven development (FDD).

  Pros: The primary benefit of agile software development is that it allows software to be released in iterations. Iterative releases improve efficiency by allowing teams to find and fix defects and align expectation early on. They also allow users to realize software benefits earlier, with frequent incremental improvements.

  Cons: Agile development methods rely on real-time communication, so new users often lack the documentation they need to get up to speed. They require a huge time commitment from users and are labour intensive because developers must fully complete each feature within each iteration for user approval.

  Agile development methods are similar to rapid application development (see below) and can be inefficient in large organizations. Programmers, managers, and organizations accustomed to the waterfall method (see below) may have difficulty adjusting to an agile SDLC. So, a hybrid approach often works well for them.

- **DevOps Development Methodology:**

  DevOps is not just a development methodology but also a set of practices that supports an organizational culture. DevOps deployment centers on organizational change that enhances collaboration between the departments responsible for different segments of the development life cycle, such as development, quality assurance, and operations.

Pros: DevOps is focused on improving time to market, lowering the failure rate of new releases, shortening the lead time between fixes, and minimizing disruption while maximizing reliability. To achieve this, DevOps organizations aim to automate continuous deployment to ensure everything happens smoothly and reliably. Companies that use DevOps methods benefit by significantly reducing time to market and improving customer satisfaction, product quality, and employee productivity and efficiency.

Cons: Even in light of its benefits, there are a few drawbacks to DevOps:

- Some customers don't want continuous updates to their systems.
- Some industries have regulations that require extensive testing before a project can move to the operations phase.
- If different departments use different environments, undetected issues can slip into production.
- Some quality attributes require human interaction, which slows down the delivery pipeline.