

# Design and Implementation of an Online Bookselling Web Application using Programmatic Approach

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**Abstract** - Taking a close look at the global scenario it may not be wrong to conclude that the concept of buying and selling goods and services on an online platform has gained a lot of popularity from the past few decades. An e-commerce enterprise has successfully set up their benchmark in providing quality assured products to its customers with a minimum stress and even promises to deliver the same in the near future without any compromise. However, it is a well-known fact upon which most of the business experts agree is that the business environment isn't stable and it constantly keeps on changing at a blink of an eye. Each and every time some new concepts are put forward, some new methodologies and approaches are devised; some new strategies are reformed and are implemented around the globe. So, these changes certainly encourage the task of the developers to develop an application that resembles these characteristics in it. These changes not only have an impact on the developer's side but also create a new set of challenges to the business troops that haven't been on a commercial platform before. To exist in the market, they need to adapt themselves to these changes quickly, as soon as possible. This not only requires a thorough knowledge about the business prospects but also a small technical awareness that will assist them to make a stable release of their online commercial business.

The paper certainly aims at reviewing some of the crucial stages that are encountered in developing an e-commerce system. Apart from simply designing the user interface and a handful of dynamic pages. The web application developed here within even integrates a payment gateway that accepts payment from its customers in real time. Moreover, it even triggers the use of Mail chimp, an E-mail Marketing Platform that updates its clients on regular basis and even tries to resolve their queries. These features not only change the outlook of a web application but also provide a true essence of an e-commerce website as fully functionally oriented.

**Key Words:** E-commerce, Gateway, Transaction, Marketing, Deployment, Multi-Threaded, Enterprise

## 1. INTRODUCTION

### 1.1 Overview

Nowadays an e-commerce enterprise is viewed as current business trend. It wouldn't be wrong in saying that the concept of e-commerce has made it possible to for every business entity to diversify their business and make the most

out of it by constantly engaging with their customers through mails, sms etc. or any such kind of electronic media. Looking at the current growth in e-commerce, the e-commerce is soon likely to grab a larger portion of the Indian market so this certainly makes it's mandatory for every small-scale business troops to nourish themselves in these current trends instead of simply relying on their old-fashioned business methodologies.

Setting up an online store isn't an easy task; it not only requires a definite draft of the short term and long-term goals of the business but also a small technical experience in order to create the exact resemblance of the business the customers are willing to engage. The development process further includes some decisive criteria that are to be taken care of before totally getting into it.

### 1.2 Steps Involved

A general approach of developing an e-commerce system confronts the following stages.

1) Planning. It is sole base and foremost activity of each and every goal that is to be achieved irrespective of the field. Without a proper plan the e-commerce system either collapses or lacks quality content leaving the customers unsatisfied. This phase encompasses a set of management practices along with some technical proficiency. It acts as an outline for the developers as they move towards their objective. It holds a discussion on various issues like what kind of the product is to be sold? How the payment needs to be accepted? How is it possible to achieve consistency? Creating a backup plan in case of system failure, tackling the end customer issues, etc. is devised in this phase.

2) Determining the scope: The act of determining the scope of your e-commerce system before practicing the techniques will surely be an asset for your business enterprise. Getting to know whether the product or services you're trying to sell actually worth's and can help you withstand the fluctuating market. This will not only make you more competitive but will also make you aware about the current requirements and challenges faced by the enterprises. It may include any whole of an organization or a simply classified behavior or a subset of a function of your system.

3) Licensed E-commerce Platform: An e-commerce platform is nothing but software suite that allows various business organizations to manage their sales, marketing and other operations on the internet. Therefore, choosing a right e-commerce platform is the most important thing in compiling such heavy systems. A business owner can even have his self-hosted platform but the hosted one is usually preferred because it incorporates some new features that increase your business worth.

4) Licensed Hosting Platform: Making your resource available to every user around the globe requires hosting those files on an appropriate server. Choosing a right server for hosting will surely help to boost your online commercial as far as the performance and the accessibility isn't compromised. A quick access to the products and an easy to go navigation will surely have a positive impact on the mind of the customers and that will be an asset for your enterprise.

5) Maintenance: The real task of developing team comes into action when the system is finally deployed. While interacting with the system if the customers faces any problem than those problems need to be resolved by concerned team at the very moment they are captured. The phases not only concentrate upon providing quick solution to its clients but also stimulates addition of new functionalities and patches in timely manner for the smooth running.

## 2. WEB APPLICATION ARCHITECTURE

Web application architecture is nothing but a general interaction between the application component, the middleware system and the database. It consist of all sub-peripherals and external application interchanges for an entire web application. Choosing a right architecture solemnly depends upon the functionality of your web application, whether it is simply informative or a dynamic content generating web application. To achieve quality outcomes, selecting an appropriate architecture is must.

The application designed here within is a Java based Web Application that make use of a three tire architecture platform wherein each and every functionality of the application is separated and operated independently, holding the spirit of a three tier architecture.

### 2.1 Three-tier Architecture

It is a modular architecture that separates the Presentation Layer, Business Layer and Data Layer and ensures that each and every layers works independently without the involvement of the other two.

1) Presentation Layer: It defines the user interface of your web application where the customer will spend most of his time. The interface is usually designed using various scripting languages and Frontend Frameworks available on the internet itself to provide true delightful appearance to the

application. Some of the notable technologies include HTML, CSS, Bootstrap, JavaScript etc.

2) Business Layer: This is the influential layer where the entire logic of your web application resides. The root functionality of a web application is specified in this section. It processes the input and selection received from its clients and serves them accordingly. Additionally it even has a potential to handle the generated live content and even stimulates the extraction of results from the database.

3) Data Layer: It comprises of the valuable data sources or more specifically the database that the web application uses to store the client information along with some stored procedure and queries. E.g. MySQL, Microsoft SQL Server, Mongo DB etc.

### 2.1 Advantages

- 1) It is robust.
- 2) Ensures Independency between the layers.
- 3) It is Secure and reliable.
- 4) It is Scalable.
- 5) Ease of Maintenance.

As the digital world seems to expand, an application is certainly considered as a prominent element of these transformative expansion. An improvement in these modern application architecture is continuously seen by trying to expand the capabilities of both frontend as well as backend.

## 3. CLIENT AND SERVER-SIDE TECHNOLOGY

### 3.1 Client-Side Technology

The entire client side of the web application has been designed using various scripting languages and front-end framework to provide a true essence of an e-commerce to the web application. The layout of the application is kept straightforward and transparent at its best, to provide easy navigation of the user within the site. Further, the client side even carries out some basic validation techniques on the user entered data and selected input and the code used to handle such validation is scripted using JavaScript.

Programming Languages used:

- 1) HTML
- 2) CSS
- 3) Bootstrap (Frontend Framework)
- 4) JavaScript

### 3.2 Server-Side Technology

On the server side the application makes use of the Java technology. The application uses Java Server Pages (JSP) and Java Servlets for handling the backend operations. These are target elements of the web application that are designed to provide the core functionality to the web application ranging from generating dynamic contents for the user to ensuring the portability. There as on behind using these technologies for the backend purpose is its wide usage and acceptance along with some pre-dominant features.

Features:

- 1) It is Cross-Platform language.
- 2) Efficient Memory Management.
- 3) Multi-threading.
- 4) Provides Security.

### 3.3 Database Technology

The application makes use of MySQL as the backend database.

Features:

1. MySQL is a relational database management system which stores information in different tables, thereby allowing clear view of the stored data. These tables can be easily referenced to each other, to access and maintain data easily.
2. It is fast, reliable and easy to use.
3. It is a multithreaded database engine that allows various task to be executed at the same instant.

## 4. RELATED WORK

### 4.1 Profile Section

Understanding the customer thoroughly is designated as the top most priority of any e-commerce enterprise willing to sustain itself in the market. The profile section of the application has been designed in such manner that acquires all the personal information about the customer provided during the sign-up stage along with its preferences and interests. The section is advised to gather only a specific information from the customers that is sufficient enough to actually understand them and serve them with most relevant choices according to their interest. Moreover, the profile section also provides a detail about the book the customer has ordered under the 'My Books' section. It even allows the customer to check the status of the ordered books. Additionally, it even keeps track of the books that the user has uploaded for selling purpose. For an easy Change of password, a separate section is designed to eliminate the time required in searching the same and the log out section just below it makes it possible for the customer to logout from the zone with ease.

The below interfaces depict the actual sub-modules of the profile section.

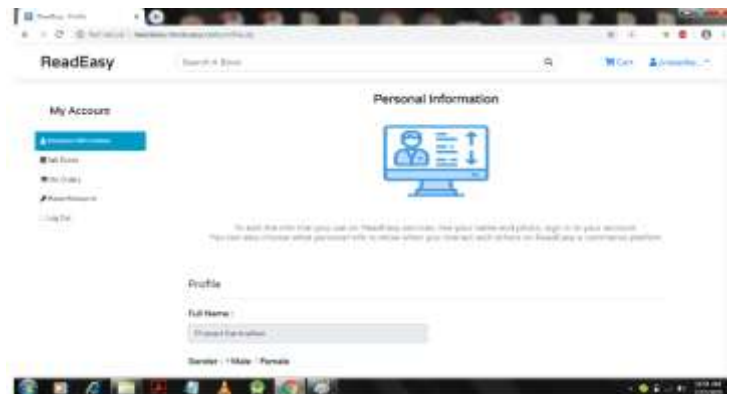


Fig 1. Personal Information

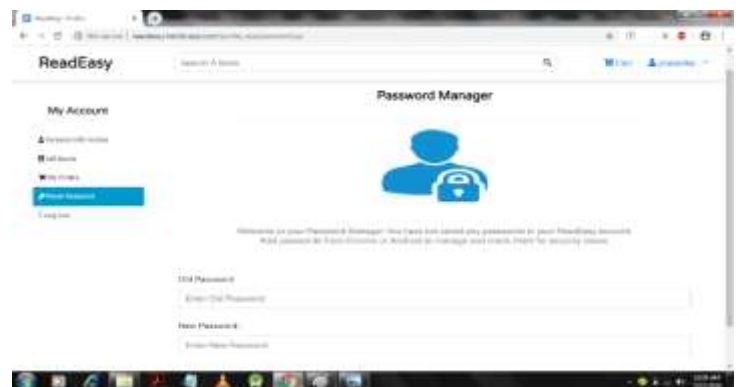


Fig 2. Change Password

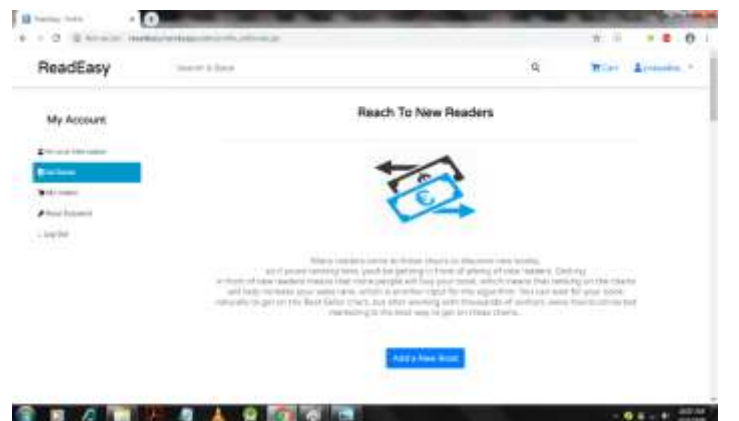


Fig 3. My Books Section

### 4.2 Shopping Cart

The shopping cart is considered as one of the most important elements of an e-commerce website. Keeping in mind, the urge of procuring items into a single unit and buying those items at a one single instant. The web application has developed a well-equipped shopping cart with an amiable interface, where the user can add as many books he wishes to buy of different interests. Moreover, the cart even allows a user to view the book details right from

the cart itself thereby saving the time of getting back to store. It even allows user to add up to the default quantity according to his/her requirements. The total price of the books the user has to buy is displayed at the bottom of the cart which is the nothing but the cumulative price of each and every book that is kept inside the cart. It makes it easier for the customer to examine the overall price he is willing to pay. A user can even remove a book from the cart itself, if he wishes to do without any exceptional requirement.

The below interface depicts a view of shopping cart that is implemented into the web application.

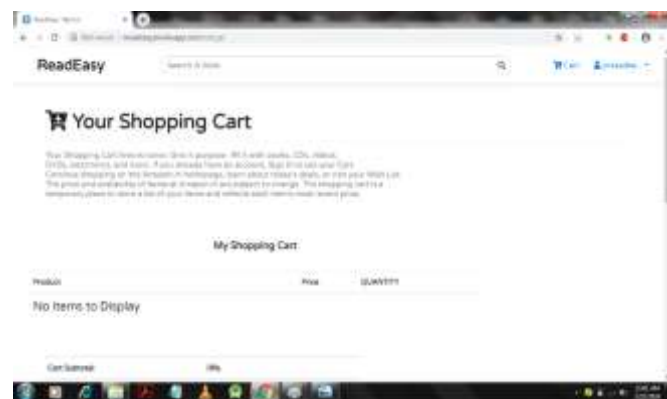


Fig 4. Shopping Cart

### 4.3 Checkout Mechanism

The entire Checkout mechanism of the application has been designed and developed at its best to provide friction less experience to its customers, thereby allowing the customers to make plenty of purchases. The checkout mechanism is integrated along with the shopping cart, herby allowing the customers to view the list of books on one side and proceed to pay on the other side. This eliminates the 'Preview Order' phase as the items are easily visible on the other side of the screen. The process requires no additional information to be entered as most of the information is retrieved from the backend to save time. Just in case the user wishes to deliver the package on the other address, or has some other interest. He can do so according to his convenience.

To build a trust worthy relationship with the customers, the checkout process involves no hidden charges in it. Additionally, this section is only made visible to the user, whenever he/she brings up a book in his own cart. Unless and until the user adds a book in his cart the payment section isn't visible to the user. It is a single page checkout process that requires most of its details to be entered on the first page itself rather that redirecting to different pages. All the required areas are assembled together into different units that can be later collapsed as per the need. The sole purpose of doing so is to make the web application more spacious and easier to view.



Fig 5. Checkout Screen

### Payment Gateway: PayU

The web application makes use of PayU as its payment gateway to accept payments from its customer in real time. The below interfaces show the actual payment way through that requires the card details of customers willing to pay. Further, the Fig.7 shows actual workflow of the payment from the web application to the concerned authority.



Fig 6. Payment Gateway.

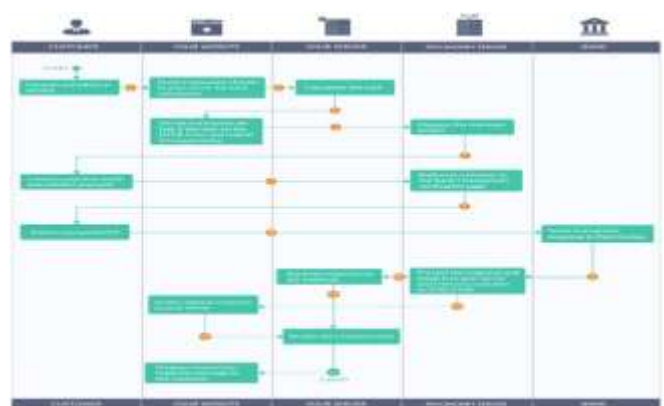


Fig 7. Flow of Transaction via Payment Gateway.

### 4.4 Mail Chimp: An E-mail Marketing Platform

E-commerce Marketing is nothing but an act of promoting goods and services to its potential customers through a variety of marketing channels. The only way to achieve a global reach of a web application is to drive maximum traffic to the store, converting that traffic into leads, and finally

those leads into sales. Marketing is what makes it possible, it's a genuine way of creating awareness amongst the customers about a particular product that indirectly helps to increase the sales.

The web application makes use of Mail Chimp, an Email Marketing Platform that send E-mails to its customers on their registered Mail-Id. It makes it possible for the customers to stay updated with new arrivals in the store. Apart from been commercial, Mail chimp even sends a welcome message and a simple birthday wish to its clients on behalf of our web application encouraging their active involvement or participation with the community.

The below interface depicts an arrival of 'Welcome' message on the customers registered e-mail on behalf of our web application.



Fig 8. Welcome Mail via Mail Chimp.

#### 4.5 Heroku: A Cloud Platform as a Service (PaaS)

The deployment phase, as the name suggest is a process of bringing the fully functional product developed by the developers/professionals into alive environment. Deploying a web application is nothing but copying the code, configuring and enabling a specific web application to a specific URL. Once the app has been successfully deployed it is made accessible to the public. At a point of deployment, it is usually assumed that the website is been able to function in real time without generating any kind of erroneous situations and uses a correct directory structure and contains web.xml and weblogic.xml deployment descriptor specified.

The below interface shows the deployment status of our Online Book Selling web application on Heroku. It is a container-based cloud platform as a service that allows the developers to deploy mange and scale modern apps without working about the servers, hardware or infrastructure.

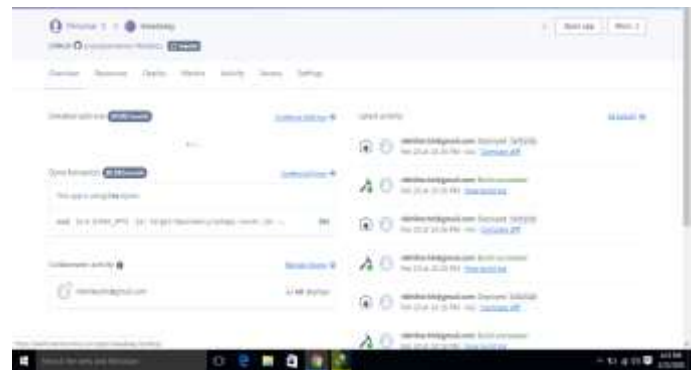


Fig 9. Heroku Dashboard



Fig 10. A View of Deployed Web Application.

#### 5. FUTURE SCOPE

An explosion of the online buyers and penetration of e-commerce in our daily lives will surely cross its mark in the upcoming years. The growth won't be specific to a certain region, and it will surely affect the online retail at various time periods around the globe. Eventually when all the continent markets will mature, the global market will shrink the geographic boundaries further – giving rise to a more favorable e-commerce scenario. It must be noted that the retail market in India itself is expected to grow to USD 1.2 trillion by 2021 from USD 795 billion in 2017. This certainly gives us a fair idea about the future of an e-commerce enterprise.

A massive increase in internet users, a simple payment gateway and logistics, easy interaction, user friendly experience, easy availability etc. have made these sectors play a major role booming in the Indian economy. It is worth noting that the e-commerce is never going to lose its charm as far as the principles of an e-commerce are followed thoroughly and are perfectly implemented to its clients. In order to sustain in the market, the web application has left all the sources open in order to implement some new requirement in the near future, if the need arises. It even tries to expand its geographical boundaries to help serve the customer who love to read. Moreover, it even promises to deliver some study materials to the students engaged in academics, providing some educational videos to understand the concepts better, and also allowing them to review the

books according to their private interests, leaving no chance in demotivating their involvement.

Engaging Consumers," Journal of International Technology and Information Management: Vol. 25 :Iss. 4 , Article 3.

## 6. CONCLUSIONS

Advancing in an E-commerce system is a complex task. These systems have a very heavy usage and are prone to disintegrate if not handled properly. Simply establishing an online store won't work unless and until those stores are managed properly by the professionals. A common issue arising in developing and maintaining such systems is lack of guidelines. The developers need to assist themselves with some flexible guidelines in order to maintain the business standards. In real time business, e-business also needs the attention, focus and hard work to establish goodwill, reputation and profitability. The business challenges of competition, marketing, customer support, settling payments, integrating accounts, etc. are applicable to any online business too.

The paper itself is an outcome of the current prestige of an e-commerce enterprise in the society along with current trends and even advises the small business troops to engage into an online activity as soon as possible to avoid extinction from market. Maintaining such heavy systems will definitely challenge the skills of the developers specially, in case of promoting an online business that not only provides services to its clients but indirectly even affects the social-economic practices of a country. An online bookstore should not be limited in simply providing quality assured books to its customers but also needs motivates those sections of the society who are prone to such things through their respective channels.

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