



Automation and Containerization for Smart E-Marketplace

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ABSTRACT

We are all dealing with a pandemic that has resulted in significant changes in people's lifestyles. People were not prepared for such an event. As a result, everybody has made some intense memories managing the circumstance. However, because life moves on, individuals have changed their lifestyles and adapted to the current reality. As a result, the internet and online shopping are becoming increasingly important to clients all over the world. People's daily activities have become more reliant on internet platforms. As a result, the core concept is to make consumers' lives easier. The goal is to create an easy-to-use web-based interface that allows consumers to search for items, see a detailed description, and pay for them online using a safe and convenient approach, as well as user-specific roles and accessibilities for customers, sellers, and admin. It also automatically retrieves the cost and description of that product from a variety of different e-commerce sites, sorting them by price. The app's containerization is implemented as part of the increasing DevOps culture

KEYWORDS: E-Marketplace, E-Commerce, Automation, DevOps, Containerization

INTRODUCTION

People may now perform a variety of activities from the comfort of their own homes, one of which is internet shopping, thanks to advances in technology and science. Due to the ever-increasing demand and craze among people, it has attracted a lot of attention. The term "online shopping" refers to the act of purchasing goods on the internet rather than at a real store. People nowadays are preoccupied with making a living and have little time for shopping; but, with the introduction of internet shopping, they can now get anything from clothing to footwear to electronics to appliances and much more.

A. Motivation

Online shopping is the ideal alternative for folks who

don't have a lot of free time and are pressed for time at work. It is a convenient alternative for folks who cannot handle busy locations or malls to purchase since they may order anything from the comfort of their own home or office.

Physical buying does not provide for such a wide range of possibilities as online purchasing does. One may look through many websites and select a product that meets the needs.

Online buying does not necessitate the use of real currency, and you may pay with your debit or credit cards, however cash on delivery is also an option.

However, as customers migrate from old methods to emerging models that offer more flexibility in terms of service and transparency, businesses are being

compelled to change to an e-environment in order to keep their clients. Simultaneously, many businesses are turning to the e-marketplace to extend their consumer base and reach out to more people in different parts of the world, increasing market rivalry. Firms are bound to organise better, evaluate more thoroughly, and plan their actions more efficiently as they become more aware of the restrictions as well as the benefits afforded by the e-marketplace.

Tap2Trade is a user-friendly e-marketplace that allows users to purchase and sell items. Tap2Trade is a unique online platform that evaluates the costs of a certain product across several websites and offers the greatest bargains to clients, as well as making recommendations for the best deals. Customers can also get recommendations based on their previous searches. Our aim is to provide a beneficial service to each and every customer by giving an internet platform where they can purchase and sell things at a reasonable price.

B. Scope

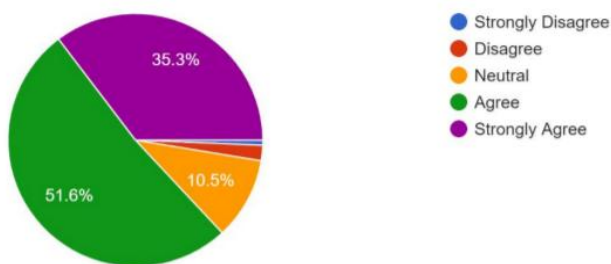


Fig 1: Has the pandemic lockdown increased frequency of buying online

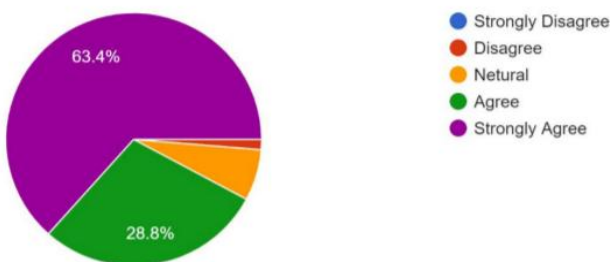


Fig 2: Users who would continue to buy goods from e-commerce companies post lockdown

Because India has the world's cheapest 4G internet and everyone is so conveniently connected. Everything in this world is at our fingertips.

The use of e-marketing capabilities in a variety of businesses, including the logistics industry, creates enormous development prospects. Customers make up a total market size of 150 million, with a rise of 11%

every year. They offer a more cost-effective manner of conducting company transactions, in addition to providing major efficiency advantages to the whole marketing system. The fact that marketing implementations are not constrained by geographical limits or timetables also contributes to this advantage. This allows e-marketplaces to reach out to hitherto untapped markets.

Because everything in India is becoming digitised at such a rapid pace and everyone has access to the internet, the internet will be India's largest market in the next few years.

C. Challenges

1. Implementation Of Price Comparison Automation

One of the key issues was being able to get the pricing of a given product from numerous different e-commerce sites in the shortest amount of time feasible. It must be completed asynchronously and must alter React's virtual DOM in the product page. The challenge was also to guarantee that the information provided was accurate in relation to the product for which the request was made. This had to be a server-side automated process, which necessitated a full understanding of automation systems such as Puppeteer.

2. User Interface And User Experience

One of the most difficult aspects of producing an app is creating a simple and effective user interface. A better UI results in a better user experience. Web apps that are simpler and more customer-centric are in great demand these days. Small UI components may have a tremendous influence on the user experience. The visitor to your website will have a better experience if the navigation is intuitive. Without a steep learning curve, intuitive navigation guides your audience to the information they want. Visitors can discover information without difficulty when the navigation is easy, resulting in a faultless experience that keeps them from going to rivals.

3. Speed

Users will not wait if our application is sluggish. They're going to depart. This is the current state of affairs when it comes to web application development. We may only have one chance to persuade a consumer to utilise our product. If we're creating an app with a lot

of content (for example, images), we need to make it more resilient to ensure speed. This will prevent people from abandoning the website due to sluggish loading times.

LITERATURE SURVEY

A. A Surge In E-Commerce Market In India After Covid-19 Pandemic

Today, online shopping accounts for 40% of all internet usage. The covid-19 epidemic, according to IBM's research, drove the industry forward by around five years. Furthermore, following the Covid-19, customers are predicted to be more inclined to purchase online due to social alienation and remaining at home. With the use of secondary data obtained from approved websites, this study evaluates the expansion of e-commerce as a result of the covid-19 epidemic and determines whether e-commerce has become a substitute source of conventional marketing or not. Following the outbreak of the covid-19 pandemic, the popularity of e-commerce surged by 17% and is likely to continue to climb. Electronics, fashion and accessories, health and pharma, and fast moving consumer goods (FMCG) fared exceptionally well, with average sales increase of 133 percent.

Consumers have increased their usage of online commerce, social networking, internet telephony and teleconferencing, and streaming of videos and films as a result of the COVID-19 pandemic's enforcement of social separation, lockdowns, and other measures. As a result, business-to-consumer (B2C) sales have increased, while business-to-business (B2B) e-commerce has increased as well. 2 Medical supplies, home needs, and food goods are among the items where B2C sales have increased the most. Internet and mobile data services have also grown in popularity.

The organization limit and spectrum to oblige the shift to online activities has direly must be adjusted by the two operators and governments.

Like no other occurrence in recent history, the COVID-19 epidemic has put wholesale and logistics services, as well as other aspects of supply chains to the test. E-commerce in products has been disrupted as a result of the lockdowns implemented to prevent the virus from spreading further. As a result of the stoppage of manufacturing activities, reduced output, and labor shortages, many businesses have continued to

face supply issues. Those with warehouse facilities in damaged areas have had to make difficult decisions about how or not to continue producing their goods. As a result, the pandemic has exposed supply chain weaknesses and put organizations' capacity to adapt quickly to the test.

The COVID-19 pandemic has demonstrated that e-commerce can be a valuable tool and solution for customers in times of crisis, as well as an economic engine for small enterprises. The epidemic, on the other hand, has exposed not only the importance of digital technology in general but also a number of global vulnerabilities.

B. Price search behavior in e-markets

Price is one of the most crucial sources of information for clients when making purchasing decisions. The growing importance of electronic commerce in the economy has piqued scholarly interest in online buying behavior.

Due to the growing quantity of price-related online sources of information and the customer's enhanced accessibility to pricing data made possible by new technologies, searching for online price information may become more difficult. Consumers are increasingly presented with information sources such as sellers' websites, online adverts, price-comparison sites, online reviews, and social networks in the internet environment, making the price-searching process more difficult. When customers try to compare online costs to physical ones, the process becomes even more complicated, igniting a fresh debate about whether prices in offline and online channels should be unified or differentiated.

In comparison to conventional retailers, the price-setting process is more complex, taking into consideration the increased openness of pricing information, the simplicity of price searching provided by the technical equipment engaged in this action, or the diversity of price information sources.

In the internet world, the two most important problems are price level and price dispersion. While various researchers have looked at the pricing level in online businesses vs traditional stores, the results have been mixed. Thus, after comparing Christmas package pricing across traditional and Internet channels, it was concluded that Internet prices are significantly lower

than those in traditional retailers.

According to other research, there are disparities among internet shops based on their standing. As a result, Xing and Tang (2004) found that prices set by online-only shops are 6.8% cheaper on average than prices set by online multi-channel retailers.

C. Devops In E-Commerce Software Development: Demand For Containerization

Developers consider a set of competencies and cultural patterns as most helpful for the future of software delivery for an e-commerce solutions provider, according to the report. Automatic deployments, the use of Git VCS, and deployment to cloud settings utilizing containers are all examples of these capabilities. Furthermore, professionals demonstrated a good attitude toward accepting operational responsibility and gave comments on the present CI/CD pipeline's flaws.

Containerization is one of the technologies that has had a significant influence on continuous integration and delivery processes, allowing for the following capabilities:

- Replicating a production environment on the developer's machine to reduce the delta between the two, guaranteeing that the product is further developed performs as expected in the production environment after being tested on a local system.
- Deployment of containers to the target environment allows the program to be reproduced in a certain state regardless of the host operating system.

The meaning of compartment as "a standard unit of software that bundles up code and every one of its dependencies so the program runs fast and dependably starting with one PC climate then onto the next" reflects both of these features.

To sum up the advantages of containerization technology in operations, the ability of containers to run is separated from the software environment and hardware, with operations staff having the power to set container resources and configuration. This capability allows maintenance efforts to focus on keeping the application up and running at all times. Abstraction from the software environment and hardware also means that the program may be easily replicated in a variety of settings, such as quality assurance and production.

D. Assessment Of E-Marketplace In Increasing The Cost Efficiency

The E-marketplace has both advantages and disadvantages. Barriers arise in this vertical mostly due to a lack of understanding of the E-Marketplace. As a result, the benefits are only seen in theory and not in practice, at least not yet. Many firms are still unsure whether or not to join the 'electronic' bandwagon. Traditional marketplaces have a lot of information on how they work, but digital marketplaces don't have the same advantage. Furthermore, previous firms have operated on the basis of a 'trust-based relationship' between two parties; they are not transitioning to a platform where they must locate their own trusted parties to conduct business. Businesses are hesitant to adopt e-marketplaces because they may locate several providers of the same goods on one platform because of the trust issue. E-commerce is the trading of goods and/or services through a computer network, most often the Internet. The market is active.

E-marketplaces provide three key activities as a facilitator: connecting buyers and sellers, facilitating transfer or exchange services, and offering an institutional framework. The e-marketplace is made up of many components. Customers, sellers, and suppliers, as well as digital products, front-end, and back-end services, intermediate services, and infrastructure, are all included. The internet trading platforms that allow the interaction of sellers and buyers are frequently administered by third-party businesses that do not own the products or services directly. They administer the e-marketplace by offering infrastructure and intermediary services. Third-Party E-marketplaces are the name given to such marketplaces. As a result, these marketplaces enable providers to offer any type of goods or service as long as they agree to the terms and conditions provided by the marketplace's third-party operator. The involvement of a third party ensures that there is no monopoly over product sales since there is no preference.

METHODOLOGY

As the business expands in response to increased demand, organizations' demands for flexibility in services, agility in delivery, and cost and timing transparency continue to rise. It is simpler for businesses to meet these expectations with the support

of the E-marketplace. A closer look at how the E-marketplace works are needed to better grasp how it works. To begin, all transporters, fleet owners, brokers, and clients must first register with the online marketplace. Customers in need of assistance then make requests, publish them on the marketplace, and wait for answers. As a result, the carriers submit bids for their services and costs in response to the request. Both parties should be able to view the lowest offer at the end, and the customer should be able to choose the transporter based on the services provided.

- **Planning:** Initiated by clients in need of logistical assistance.
- **Placing the order:** Placing the order for the needed products in response to a client request. It comes to an end when the consumer completes a request for one of the personal discretion services.
- **Direct connection** between the consumer and the chosen seller. Documentation, for example, is completed in accordance with predefined requirements. Transparency and efficiency are improved at this point.
- **Tracking:** The order is now in motion, and this stage, with the assistance of technology, allows you to track the package's progress. In this step, real-time insights are also gathered in order to increase efficiency.
- **Invoicing:** An automatic invoice is created upon delivery using the pertinent data accessible on the centralized dashboards, making the entire process seamless, clear, and efficient.

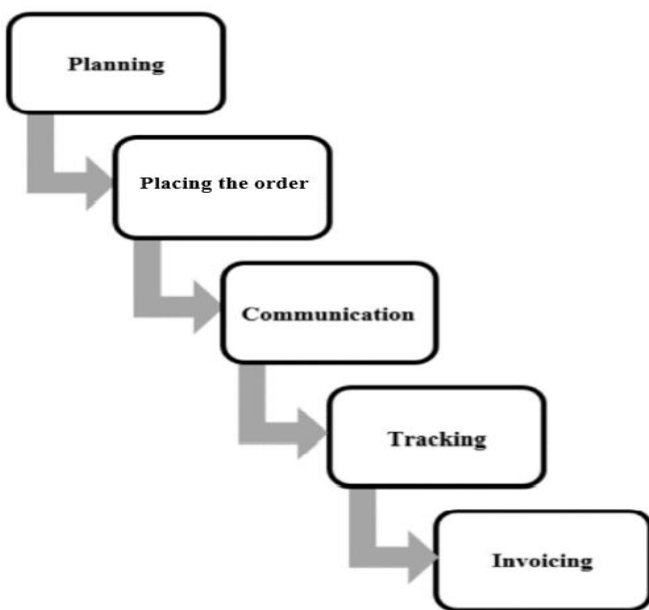


Fig 3: Flow chart of users product buying journey

ARCHITECTURE

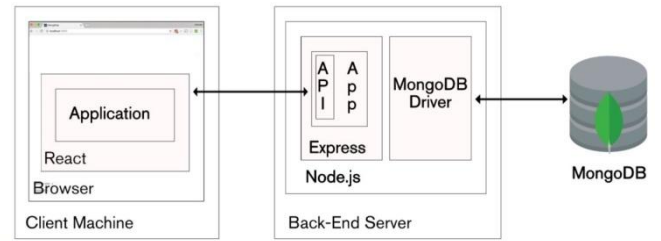


Fig 4: Internal architecture of client & server side of the application

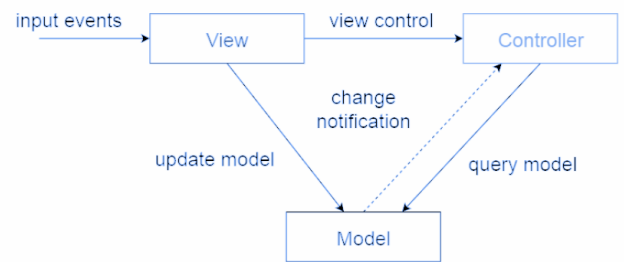


Fig 5: Application follows MVC architecture

A. Node.js

Node.js is a cross-platform, open-source runtime environment and framework for executing web applications outside of the client's browser.

It's a server-side programming language that's mostly used for non-blocking, event-driven servers like standard websites and back-end API services, although it was created with real-time, push-based architectures in mind. Every browser has its own JS engine, and node.js is one of them. The V8 JavaScript engine in Google Chrome is used to power js.

B. MongoDB

MongoDB is a database based on a scale-out architecture, which has constantly grown popular among all types of developers for designing scalable systems with changing data schemas.

MongoDB makes it easier for developers to store structured and unstructured information as a report database. It stores documents in a JSON-like way i.e. BSON. Most current computer languages can translate this format to the native objects, which makes it a logical choice for developers.

C. Mongoose

Mongoose is a MongoDB and Node.js Object Data Modeling (ODM) module. It handles data associations, does schema validation, and is used to translate

between objects in code and their MongoDB representations.

D. React

React.js is an open-source JavaScript pack that is utilized to make single-page applications' UIs. For on the web and versatile applications, it's used to deal with the view layer. One can likewise make reusable UI parts with React.

Designers may utilize React to gather monstrous web applications that can change data without invigorating the page. The goal of React is to be quick, versatile, and simple to utilize. It simply deals with the application's UIs.

E. API

An API is a software interface that gives the ability to communicate between two applications with each other. In other words, an API is a messenger that sends your request to the provider and then returns the result to you.

An API describes features that are free of their implementations, permitting implementations and definitions to change without meddling with each other. As a result, by supplying the building pieces, a good API makes it easy to construct a program.

CONCLUSION

The extant literature is centered on the issue of E-marketplace, which demonstrates that firms and their executives are transitioning from conventional trade to e-commerce in order to attain a worldwide presence and increase client acquisition.

E-marketing is a revolution for businesses that want to minimize cycle times, increase sales, save costs, and strengthen client connections. The paradigm offered has provided a solid foundation for identifying the benefits of the e-marketplace.

With automated comparative pricing analysis, a better and expanded e-commerce model is offered. Containerization is adopted, resulting in platform independence and the initial steps toward the DevOps software design model.

According to the study on the development of the framework for e-marketing, e-marketing facilities provide significant marketing benefits to the logistics business. E-commerce

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