Online Shopping (MERN Stack)

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Abstract - This research paper is a web-based shopping system for an existing shop. The aim of this paper is to deliver the online shopping application into different platforms like android, internet.

It is an attempt to provide the advantages of shopping to customers of a real shop through internet. It helps buying the goods in the shop anywhere through web by using an android device. Thus, the customer will get the benefits of online shopping and home delivery from his/her favourite shop. This system can be installed to any shop in the locality or to multinational branded shops having retail outlet chains.

If shops are supplying an online portal where their customers can enjoy easy shopping from anywhere, the shops won't suffer the loss of any more customers to the trending online applications such as FLIPKART or EBAY. Since the application is available in the Smartphone and on the web, it is easily accessible and always available.

Key Words: E Commerce, MERN, Online Shopping, MERN Stack, Shopping

1.INTRODUCTION

A. What is E-Commerce?

E-commerce means electronic commerce. It means handling goods and services through the electronic media and internet.

E-commerce is the usage of electronic communications and digital information technology in business transactions to create, modify and reshape relationships for value creation between or among organizations, and between organizations and individuals.

E-commerce takes in carrying on a business with the help of the internet and by using the information technology like Electronic Data Interchange (EDI). E-Commerce relates to a website of the merchant on the Internet, who trades products or services directly to the customer from the portal. The portal uses a digital shopping cart or digital shopping basket system and allows payment through credit card, debit card or EFT (Electronic fund transfer) payments.

B. Background history related to project:

In the age of Globalization, huge progress in science and technology has brought changes in to the world of trade, commerce, banking marketing. Electronic commerce broadens the marketplace to national and international markets. It reduces the cost of developing processing, distributing and reacquire paper-based information. The Importance of E-Commerce is very ample because it decreases the transaction cost. decreased transaction cost leads to consumer endorsement. In short E-Commerce is creating a very big change in commerce and marketing.

It is the application of technology towards the mechanization of business transaction and work flow. It is a device that addresses the desire of firms, consumers and management to reduce service costs while developing the speed of service delivery.

Electronic commerce remains a comparably new, emerging and constantly evolving area of business management and information technology.

2. Proposed work plan

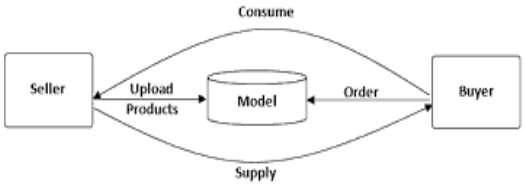

Fig - 1: Seller to buyer model

MERN Stack development flow:

Let's see how MERN stack development incorporates the back-end process of ecommerce development.

- The user accesses the front end and sends in a request. React.js processes the client-side requests, parses and sends it to the next phase
- The next stop is Node.js, which parses requests at the server-side.
- The request then enters the Express.js, which makes requests to the database and returns the response.
- Then comes MongoDB, which retrieves the data and returns data to Express.js

- Now, the retrieved data relays through Node.js and React.js and displays the data response to the customer

Advantages of going with MERN Stack:

- Covers the entire web development cycle using JavaScript from front end development (client-side) to back end development (server-side)
- Supports the MVC (Model View Controller) architecture for a smooth development process flow
- Union of four robust technologies, i.e., MongoDB, Express.js, React.js, and Node.js.
- Prevents grunt work build-up and keeps the web application development organized.
- Includes an extensive suite built-in testing tool.
- Open-source framework and backed by excellent community support.

An optimal e-commerce site should load faster even during demand days and fetch quick response to usage spikes. If you are starting up a new e-commerce portal with MERN stack development, you can cater to at least 10k concurrent users effectively. Node.js lets you expand further with Node.js based microservices architecture, which enables you to handle millions of concurrent customers at a time.

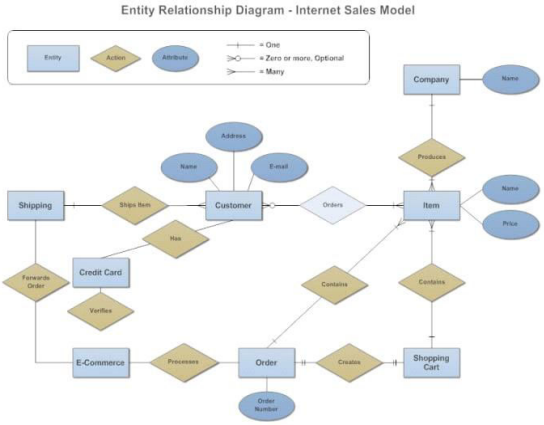

Fig -2: Entity Relationship diagram

In an e-commerce website, going asynchronous is the better option because of the vast number of products and unlimited user actions at unpredictable time slots. MERN stack development can enable your site to tackle numerous concurrent users. We'll tell you more about how the MERN stack development can help build your ecommerce website.

MongoDB: A NoSQL database that is responsible for data storage and Node.js makes sure that the server is in operation continuously.

Express.js: A backend web framework that allows you to develop web applications with the help of a more straight forward interface.

React.js: A front-end web library that aids web development by allowing data change without reloading the page.

Node.js: A JavaScript runtime that runs on Chrome's V8 JS engine. It's weightless as it uses an event-based and unblocking input/output model.

RESEARCH

The best eCommerce backends in the world are designed for scalability, for they are always in charge of generating, maintaining and delivering the information to the frontend displays of a user.

The backend of your eCommerce application, however, can be either homogeneous or heterogeneous and comprises of 2 parts: the database (where the data or information is stored) and a server (which connects the data with the browser).

The Problem

When your eCommerce business critically depends on elements such as payment gateways, logistics, suppliers, shipping etc, it induces more complexity for you to maintain high performance and availability 24×7.

Integrating most of these elements can slow down crucial activities, limiting your website's performance. Behind the scenes (preferable at the backend), there will be hundreds or thousands of requests that are instantly pinged around the world to carry out such kinds of complex operations.

There's a lot more going on in those few seconds; there's a lot more that can go wrong with your website in those few seconds.

Note that, the backend of your application is one of the most critical part of any website. In most complex websites, the frontend depends gravely on the backend.

"The frontend of a website depends gravely on the backend."

So, if the backend of a website fails due to complexity, the frontend will fall apart. As simple as that!

The Real Problem: slow backend load time

At times, a lot of developers focus on improving the frontend performance of an eCommerce to rectify these things. The real hindrance, however, remains the slow backend load time.

So, if you have a slow backend, the only thing that your users will see on your site is a white screen (which is due to the backend tasks are not completed). The bulky your load, larger would be the backend load time. Also, at some point, it may get skyrocketed to a certain extent that the application becomes unstable.

Moreover, a study done by Moz, shows that a slow backend load time (which is also referred to as Time to First Byte) can have a serious impact on your Search engine rankings.

A good thumb rule is that back end load time should take not more than 20% of your total load time. A desirable back end load time is 200ms or less.

Developing an eCommerce application with Nodejs makes a lot more sense because it ensures the balance between frontend and backend load time due to its asynchronous nature.

Here's a graph which represents the importance of Asynchronous programming in improving the backend load time of an eCommerce website:

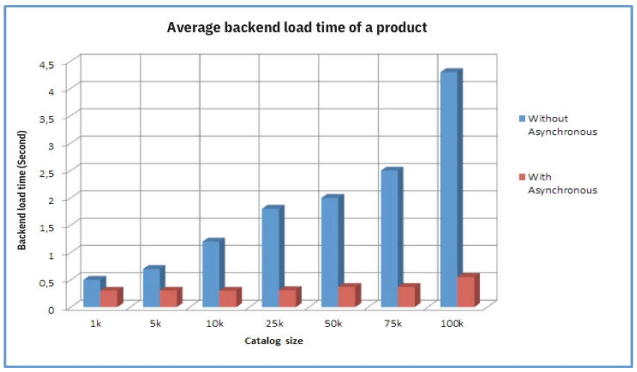

Fig -3: Average backend load time of a product

Observe how using Asynchronous communication in web application saves you a lot on backend load time. In web applications such as eCommerce where you have large list of products, going asynchronous makes a lot more sense. The good news is that Node.js allows you to use Asynchronous programming and make things easy for you. What's more, Node gives you an ability to handle multiple concurrent users at a time. The reason being it be single-threaded and its event-driven architecture. This is unlikely the case with other web technologies, which creates an additional thread for each request. This takes up the whole memory until the processing gets over.

Node.js help developers to make the best use of event loop and call-backsfor I/O operations. The event loop is the classic Node.js's way of breaking the long-running request into smaller chunks.

After using Node.js, in its backend, PayPal experienced a 35% decrease in the average response time for the page which made the start-up time 200ms faster.

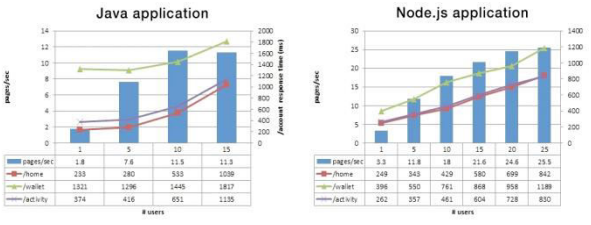

Fig -4: Performance difference between node.js and java

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CONCLUSIONS

E-Commerce isn't almost conducting business transactions via the web. Its impact is going to be far-reaching, and more prominent then we all know currently. this is often because the revolution in information technology is occurring simultaneously with other developments, especially the globalization of the business. The new age of worldwide e-commerce is creating entirely new economy which will tremendously change our lives, will reshape the competition in various industries, and alter the economy globally. As companies are gaining high profits, more and more other companies are developing their websites to extend their profits. Since more businesses are being held online leading to high economy development and emergence of a more innovative and advanced technology. Websites to extend their profits. Since more businesses are being held online leading to high economy development and emergence of a more. are automatically asked, whether they would like to order the pdf, and are given instructions as to how to do so.

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