Project Proposal

for

OpenMarketHub

Designing an online marketplace with a better graphic interface for a better user experience.

Prepared by

Group Name: ***Team 5***

Team Members:

Bibek Dhungana

Kiriti Aryal

Santona Subedi

Arogya Bhatta

Emmanuel Ibem

Dapo Oyinloye

Jared Cortez

Suchith Chandan Reddy Pinreddy

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ACRONYMS/ABBREVIATIONS

OMH: OpenMarketHub

P2P: Peer- to- Peer

C2C: Customer- to- Customer

VPS: Virtual Private Server

CSS: Cascading Style Sheet

EC2: Elastic Cloud Compute

S3: Simple Storage Service

CI-CD: Continuous Integration and Continuous Delivery

SEO: Search Engine Optimization

UI: User Interface

PR: Pull Request

1. WHAT WILL BE PRODUCED BY THIS PROJECT?

Online Marketplaces are very popular these days. Due to the enormous client base that internet marketplaces provide, businesses are turning to them more frequently. According to a Finextra report, by 2025, payments made through online marketplaces will amount $8.7 trillion. Our team will develop a cloud- based platform that offers marketplace features. We acknowledge the fact that, a great market strategy is required to create a successful online marketplace along with great execution. After conducting extensive market research, our team has decided to implement Peer- to- Peer business model, which is also known as the Customer- to- Customer business model to build our application. This model promotes private-sector trade, typically on the internet. Customer- to- Customer businesses serve as middlemen to promote interaction and assist customers in reaching wider audiences.

We will be developing an application which will primarily focus on procurement of goods and services and enables direct interaction between sellers of goods and the buyers. Users can use this e-commerce marketplace to list their products, sell new or used products and advertise their goods and services. Moreover, this application will have e-commerce features like shopping cart, check out, etc. OpenMarketHub will serve as an online marketplace where buyers and sellers can meet just as physical marketplaces work. In other words, this peer- to-peer marketplace will connect buyers with sellers directly. With utmost realization of significance of interactive GUI, we plan to build a user-friendly interface which will offer great user satisfaction along with decrement in search time. Along with outstanding interactive graphic user interface, the users will be able to navigate the products easily and spot the distance from the seller and plan accordingly to figure out a safe and common place to meet for their business interaction. Aiming to have a high SEO (search engine optimization) ranking, our application will have a responsive design which is very vital for mobile users.

OpenMarketHub will also be a great platform where students or users can locate other students to render services for the pay. We envision services such as tutoring, moving, hairdressing, cleaning, etc. being procured directly from this platform. We will integrate a feature where users can post reviews for their business interactions and push messages and notifications. This will help potential buyers to ease their purchase and get the best experience. We also plan to provide an option to integrate their social medias. If time permits, we plan to enhance our product by adding various other modules than buying and selling of goods and services. We plan to add several modules like lost and found features, bid for their goods and services, charity options, and locate local events near me.

Our capstone project, OpenMarketHub will be an online marketplace which will allow users to buy and sell the goods and services. The primary focus of this application will be for the procurement of goods and services using interactive Graphic User Interface. This project aims at delivering high-end marketplace application to fulfill the needs of the users in an efficient manner.

2. WHO WILL USE THE RESULTS OF THE PROJECT?

- This application is primarily intended for the use in local communities. Users can turn on their location and do their business interaction in their desired periphery. Also, this application will be released in tiers starting with the Texas Tech Campus enabling student bodies to take benefits of this application.
- Students including the members of the Texas Tech University systems will be able to sign up and sell off materials they no longer use or need and make extra income. Additionally, users will be able to find other users that provide services. Most of the college students struggle financially. This platform provides an opportunity for students to find other fellow students who provide services at a fraction of cost than other professional service providers which ultimately helps them save money.
- Students will also be able to locate school events in one place.
- A potential functionality will be a lost and found module where lost items and lost pets can be reunited with their owners.
- Within no time, this product aims to spread across all the states for usage due to its high-end functionalities.

3. DESCRIBE THE PROBLEMS OR DIFFICULTIES CURRENTLY EXPERIENCED BY THE PROPOSED USER(S) WHICH WILL BE ADDRESSED BY THE PROPOSED PROJECT.

Currently, students are meeting the buyers using various other platforms such as OfferUp, Craiglist, and eBay. This project aims at creating a sense of community among Texas Tech University students and the faculty. On OpenMarketHub, the users will know they are interacting with other students like themselves.

There is no single platform for the procurement of services that specific groups of people like students need. There are several items that are ubiquitous to students and people in the college systems. Electronic devices like computers and phones, books, college housing equipment to name a few. New as well as continuing students will be able to utilize our application to receive these items from the graduating students at a fraction of the costs of purchasing new ones. With OpenMarketHub, we put these together to provide students with a way to procure goods and services from their fellow students. For instance, a student graduating and leaving the campus area with no friends in the area anymore will be able to join OpenMarketHub, advertise their items that are for sale and find other students in need of the items they are selling. The buying students will be able purchase the item in reasonable amount and the seller gets the best offer for their product.

4. DESCRIBE THE PROJECT RESULTS IN MORE DETAIL, INCLUDING HOW THEY WILL BE USED.

More sellers increase everyone's revenue on an online marketplace platform. The likelihood of attracting customer also increases the more products you can promote on your website. To create a better user experience, you must pay close attention to your website's design, product display, security, and other functionalities. In order to successfully develop an online marketplace, we as developers must fulfill all the necessities of the sellers and the buyers. We consider including the following functionalities:

- Account Management features (login, logout, school email detection for initial deployment):
  We plan to keep the signup process simple so that it will be easy for both the seller and the buyer to create an account without any haste. Since, we are primarily focused on the fellow students and with realization of their hectic schedule, we will allow them to sign up using their campus email for security reasons. Hence, keeping the signup, login, logout and other onboarding activities simple and straightforward will encourage our users to enroll on our site.

- A Product page/ landing page:
  Our product page will have a responsive design which will facilitate our users to sell and buy product with ease. We will have product listings, expandable feature to those listings, description of the products, availability, and pricing info in this page so that users can easily get detailed information about the products they are looking for. Almost all of us check the reviews before making a purchase on the internet. So, the review and rating section is one of the powerful features on our landing page. An additional feature of reviews and ratings from past buyers will play a vital role in decision- making and improve the quality of the service. This helps to gain trust and response from our users.

- Order Management features:
  Order management will have two options distributing the product to the buyer one will be shipping it locally or picking up from the retailer locally. This feature will also provide tracking information for those who chose shipping. For those who chose the option of pickup will be given a time slot provided by the retailer to pick up the item they bought. This function will also have a cancel/change product option making returns hassle-free for customers and sellers. This function will also keep track of all the past purchases made in this interface as well.

- Easy search and navigation:
  A lot of products are available for users in an online marketplace. Our main goal is to stand out from the other competitors by keeping our products organized under different categories. This helps our users to locate their desired products and make a purchase easily. Our users will be able to navigate the site easily from all the types of

portable devices. Our finished product will be mobile-friendly which in result will enhance our customer's experience. This will help the seller to operate their online business from their smartphones too. Hence, having easy search and navigation tools will portray our site as a trustworthy resource for information, services and products.

- Integration with payment systems like Paypal (E-commerce features like shopping cart, checkout, etc.):
  As a team, we have decided to add a shopping cart function which keep track of all the listing that the user is interested, and the customer can check out from the shopping cart function. The checkout function will provide secure method of payment assuring the trust of the customers. After the payment has been processed a receipt with the confirmation number will be generated that customer's payment has been processed successfully. The checkout function will also provide different types of payment methods based on the customer's desire such as PayPal or pay on spot when picking up from the seller through Zelle, etc. The checkout function can also save payment details and can be only used when CVV is entered whenever the customer wanted to process the payment which secures the card information.

- Messaging and notifications: To provide seamless secure communications between seller and buyer, our team has proposed the idea of crafting an online messaging function on the website which would provide communication between buyer and seller without even sharing one's personal information unless the buyer or seller mutually agree to do so. The messaging feature will keep track of all the communications done in the feature with one buyer or seller. The website will also provide notification to buyer and seller based on important movements that happened in the app. For example, buyer messaging a seller which will use notification feature.

5. REVIEW EXISTING SOFTWARE AND LITERATURE RELEVANT TO THE PROPOSED PROJECT.

Currently, there are so many services provided to users to buy used goods and services locally such as Craigslist, Offer up, etc. These apps are helpful for local communities because consumers sometimes want items that just work rather than buying a new item for a limited time. For example, a TTU student has a PlayStation that he/she brought from home to college, and he/she wants an extra controller so his/her roommates can play together in this case a college student can just buy a used controller from local listings saving a lot of money because the student cares about its functionality of the controller rather than if the controller is new or not. The main problem with that is customers are not able to trust the local listings that are posted in these apps due to poor quality of user experience caused by the poor user interface which causes students like us not to save money, especially international students. Due to the poor quality of the interfaces, it is not eye-catching which fails to attract customers to even explore the services.

To gain college students' trust, our team has decided to make a better user experience by creating a user interface because first impressions in these kinds of apps do matter. As you can see the user interface of Craigslist generates a bad first impression because when you first look at the image of the website below, it depicts the website being risky and causes a lot of people to not use these kinds of apps. If you compare Craigslist with the Amazon website, the user interface of the Amazon website looks more professional and consumer-friendly even with ads creating a good first impression for consumers causing consumers to trust Amazon more than Craigslist. Due to a lack of trust in marketplace platforms, college students especially international students must spend more money to buy new items for dorms such as a new mini-fridge or microwave instead of buying from one of the graduated seniors for cheap. Also, students that are graduating from college will throw these items away unless a buyer is found which also causes a waste of resources. With a better user interface in our proposed project, we will be able to save the user a lot of money for students and promote environmental sustainability.

With the current social media marketplaces such as Facebook Marketplace, buyers and sellers can see each other's Facebook profiles and they can see the post made by each of them when browsing the listing causing a huge risk to the privacy of the customer and buyers in social media such as Facebook. To tackle this challenge, our team has decided to keep the identity of the buyer and seller not visible to each other. This assures the college students that nobody is going to see their identity. This will also enable college students to buy and sell items in this marketplace most effectively and efficiently without any security risk to their personal information.

To overcome the challenges of marketplace apps, our team has decided to first add the feature of limiting access to TTU students and faculty so we can filter out scammers. The primary concern for students especially international students is whom to trust and whom not to because they are new to the college town, and they do not want to lose their money by getting scammed. To achieve the solution to this problem, our team has proposed a solution of either making students register with a student email ID or filtering out other email IDs by creating an algorithm/function in the backend where our program will check after this symbol @ whether its ttu.edu or gmail.com. If it is a registered college email extension, they will be allowed to create the account otherwise will be blocked from creating the account. Our team has also incorporated the idea of enabling two-factor authentication for safety which will assure the user that even if they cracked their user id and password, they would still need to have the 6-digit two-factor authentication code to access the account which a lot of marketplace apps do not offer. These features will enable more confidence in the consumers such as international students which will lead to more transactions locally causing local businesses/retailers to boom and will also enable a new generation of local entrepreneurs to rise.

Since the app is designed for college students, our team has also planned to add a feature that can filter the products or services based on the categories that a college student might use such as Sublease listing as one of the categories, then electronics such as mini-Fridge for dorms, etc. This filter feature will help college students to find the best deals based on the

product or service that fall into one of the categories making college students save time and not have to scroll through all the listing posted.

As a college student coming to a new place for college, especially international students, students do not want to share personal information such as email or phone number to these marketplace apps unnecessarily due to privacy or security reasons since they do not know the place. To tackle this problem, our team has planned to have a feature called guest browsing as an option for consumers and to only create an account when the consumer wants to purchase an item on our platform. This ensures consumers trust that their information is not in the platform's database until they made a purchase. Another feature that will enable information to be secure is the creation of online messaging inside the app causing buyer and seller to share their personal contact information when enquiring about the listing. This feature makes communication between seller and buyer seamless without even sharing one's information. This feature will guarantee the user that all communication about the product will be anonymous, protecting both parties.

Existing Platform	Cons	Our Solution
Craigslist	Bad user interface, lack of messaging service, lack of trust among users	Implement both a modern, friendlier user interface to build trust among users and a messaging service between sellers and potential buyers, further building trust among the user base.
Facebook marketplace	Need Facebook account. Customer can look at buyers Facebook profile if one has not taken proper precautions vice versa.	Can use OpenMarketHub as a guest or create your account. (Social login options)
Uniday's	Incomplete platform	Focus on building complete platform.
Ebay	Focus on global audience	Focus on local customers

OfferUp	Very unorganized home screen. Products of different kinds all displayed in the same page.	Use an interface to separate items into its own categories.
Etsy	Unrealistic expectations from the sellers. Poor communication medium between seller and buyer.	Facilitate better communication between buyer and seller buy incorporating real-time chatting capabilities through chat boxes between buy and seller, and inboxes for asynchronous communication

Figure 1. Brief comparisons with fellow competitors along with our potential solution

6. DESCRIBE THE BENEFITS AND ADVANTAGES WHICH THE USER COULD EXPECT AS A RESULT OF THE PROJECT.

Less spam: With school email registration, users will be required to sign up with their Texas Tech University systems email address and a verification process will follow to ensure that the provided email address is valid. This requirement will benefit the users of this platform by guaranteeing that there is no spam and all users have been validated. Another benefit of the school email verification will be quality assurance. By having proper records of all our users, we can assure users of quality service because bad operators will be known.

More focused discovery of nearby events: OpenMarketHub will employ a forum board type of discussion where events coming up in the next week, days, are listed by users of the platform who are looking to find friends or to grow their student organizations. An added benefit of this will be a sense of community where students are more involved with their school and their fellow students.

More active student body/ student life: The platform will also connect students and users that have shared interests and hobbies.

Better Graphic interface – OpenMarketHub will inspire client confidence by implementing a better graphic interface. Our responsive approach to designing the platform will allow us to gain user's trust and give them better customer experience. The users will feel they are using a safe and improved platform that is simple to use and easy to navigate.

Monetary benefits selling goods: This platform will be a great avenue for busy college students to make extra income by selling off items that they no longer user to students and faculty members.

Support local businesses: Find a group of students with a shared interest like archery. These newly formed groups of students that enjoy archery are then able to find local businesses that provide these services and thus contribute to the local economy. Later we can also have local businesses and event creators to promote their events on our website. The considerable number of young people can bring interest of party organizers to post events here.

Reselling used stuff reduces waste: This platform will drive environmental sustainability and reduce waste. By allowing users to resell goods that are usually hard to dispose of or difficult to resell due to a subpar marketplace. Our online marketplace will be our contribution to a better and cleaner environment by allowing goods to be refurbished and resold.

Economic driving force: Our online marketplace will drive economic empowerment by allowing anyone to buy or sell homemade products that are usually too small to penetrate the marketplace meaningfully. This will create a need for self-employment, reducing unemployment and driving economic stimulation by directly empowering participating members of the economy.

7. DESCRIBE THE REQUIREMENTS, COSTS AND COMMITMENTS FOR THE USER AS A RESULT OF THIS PROJECT.

Our top 3 customers are:

1. Local people (buying a selling products or services)
2. Small business (using our APIs to get information about local products and Services)
3. Developer (if they want to contribute to the projects in GitHub)

Most of the requirements discussed are focused on local people and Developer below.

Requirements:

- Create a user account if they want to sell a product on the platform.
- Must present government issued document to create a seller account.
- Platform will mediate as a middle person to discourage direct communications between users and any unwanted direct messages.
- Platform will not be responsible for outside communication between buyers and sellers.
- Any private messages outside of our website can be a way to defraud the customers and we will have a way to be reported immediately to us.
- We are using stripe APIs for the payment gateway. So, we have the right to deactivate, block or ban users if suspicious activities are on the platform.

- Users should implement 2-factor authentication for extra security or use OAuth protocol for social login with Facebook, Google, Microsoft etc.
- Any social media accounts created and linked with their OMH account with the intention of defrauding the existing customer base will be banned.
- Small businesses using our APIs should be properly authenticated. Additionally, there is a rate limit for APIs to call in a day.
- Developers who want to contribute to the project can fork the repository and create a PR on the repo.
- Postings without proper description and images will not be accepted.
- There needs to be at least 3 separate verification processes (ID, social media, Gmail) to have a verified user badge appear on the users accounts whose postings will be more search optimized and whose postings will sell faster.
- Provide accurate information about the services and products.
- The users should be physically in the US to be able to list and buy any products.
- The user cannot use images from other posts or images of the items on the internet (like amazon, Walmart) to sell their product.
- The user can cross post their own posts from other sites.
- The user posting any images for the items should show the current condition of the items clearly through these images. They can use high quality images but cannot conceal any flaws to sell faster.
- All the products bought online will have a 14-day period that the buyer can review the product and only after the buyer is satisfied will the payment be forwarded to the seller. If the buyer wants to return, then the payment is refunded.
- The users need to provide a reason to return the product if it is a used product and if it was bought online.

Commitments:

- Follow Privacy terms and Conditions.
- Use TTU email for validation.
- Provide safe Marketplace protocol.
- Android / iPhone Apps for better customer experience later after completing web applications.
- 14 days refund policy if the items are purchased online.
- Stay within the community guidelines of the site to freely buy and sell through OMH.

Costs:

Most of the technology we are using open-source software, however, these are the tentative cost for building the MVP (Minimal Viable Products)

Free Software:

- Communication: Slack, Confluence
- Version Control: Git, GitHub, GitHub Actions

- Framework: and Spring Boot and ReactJS
- Microsoft Office – Word and Email
- Styling Library: CSS modules, Styled Components, Material UI

Paid (Commercial)

- Domain name: $10 per year (from Namecheap) Working prototype on: www.openmarkethub.com
- (Virtual Private Server) VPS: $8 per month (Planning to move to cloud provider later. (AWS or Azure)
- Database: using open-source implementation (moving to S3 bucket later)
- SSL certificate: Certbot open implementation using python (free right now)

For customers, the services are free of Cost right now. (Except shipping and handling fee)

For developers and small businesses that want to use our APIs, the service is free right now.

Later, our profit will come from ads and a minor site fee for online postings that are to be shipped when sold.

Team members were trained to work with different backend and frontend tools like Spring boot. Apart from that, to track the progress of the project each member was trained to use project management tools like JIRA and Confluence. Since it is a small project and a college project the cost of developers will be non-existent. If we ever go commercial, then there would be a different platform and it would be a different story. The hardware and software needed, and their costs are very minimal right now. The existence of many open-source software and the development of APIs from big companies will help us to complete this project easily compared to if these services and applications were behind a paywall. All the hardware and software we plan to use are already available.

8. PROVIDE A LIST OF THE MAJOR ACTIVITIES OR STEPS YOU EXPECT TO UNDERTAKE IN COMPLETING THIS PROJECT.

Major Activities

1. Creating Slack channel for group discussion, communication, etc.
    a. Have all team members join Slack channel and begin organizing the project.
        i. Start date – Jan. 20
        ii. Finish date – Jan. 25
2. Rough project discussion
    a. Discuss as a group to form a better and more complete idea of OpenMarketHub.

    i. Start date – Jan. 25
    ii. Finish date – Jan. 30
3. Tools and technologies discussion
    a. Group discussions to decide which technologies to utilize for the project.
        i. Start date – Jan. 25
        ii. Finish date – Jan. 30
4. Draft project proposal
    a. Complete the Project Proposal Report as a group.
        i. Start date – Jan. 25
        ii. Finish date – Jan. 30
5. Role distribution
    a. Distribute roles among the team members based on the skills members already have or the skills they want to learn.
        i. Start date – Jan. 25
        ii. Finish date – Jan. 30
6. Customer discovery report
    a. Identify the potential customers and their problems that OpenMarketHub plans to solve and complete the Project Customer Discovery Report.
        i. Start date – Jan. 31
        ii. Finish date – Feb. 15
7. Set up the domain name and server
    a. Purchase the domain name www.openmarkethub.com and a virtual private server (VPS) for use while developing the project.
        i. Start date – Jan. 31
        ii. Finish date - Feb. 15
8. Create the project structure
    a. Create the basic structure for the front end and back end that will be used for round 1 of implementation and coding. Also, complete the Design Report documenting the features implemented in this round.
        i. Start date – Feb. 15
        ii. Finish date – Mar. 3
9. Creating the Minimal Viable Product (MVP)
    a. Program front end and back-end functionalities for round 2 implementation and coding. For the front end, create the home page, login/logout functionality, and other components as required. For the back end, create APIs and security functions. Complete the Design Report documenting the features implemented in this round.
        i. Start date – Mar. 3
        ii. Finish date – Apr. 11
10. Review, refactor, and optimization.
    a. Review and refactor the project code and add any extra features and functionalities as needed. Optimize the project code if time permits. Merge and update the Design Reports from round 1 and 2 of implementation.
        i. Start date – Apr. 11

ii. Finish date – Apr. 28

11. Team review and presentation preparation
    a. Meet as a group and prepare for the Project Presentation, discussing the format of the Project Demo.
        i. Start date – Apr. 10
        ii. Finish date – End of semester

Expectation to finish entire project in 1.5 to 2.5 months.

9. WHAT HARDWARE, SOFTWARE, OR OTHER RESOURCES WILL YOU NEED TO COMPLETE THIS PROJECT?

Hardware:

- Server (using VPS—virtual private server) -- It is used to host front end, backend and database applications. SSH (Secure Shell) is used for connecting to. Server.
- Later, we are deploying it in AWS EC2 instance, S3 bucket and lambda.

Software:

- Front End: HTML, CSS, JavaScript, ReactJS, NextJS, Material UI (UI tools), tailwindcss -- generating webpages.
- Backend: Java (Spring Boot), Python (Django or Flask) -- for developing APIS
- (Microservice architecture to integrate front end with backend)
- Database: Relational Database (Postgres), Non-Relational Database (MongoDB) -- for storage

Other Software:

- Git and GitHub --- for versional Control and Code Management
- JIRA and Confluence – For Project management
- GitHub Actions – For CI-CD (Continuous Integration and Continuous Delivery) process.
- Confluence: documentation and task designation
- Task Capture: For process design and flow charts
- Slack: internal communication between team members.

10. CONTRIBUTION OF EACH TEAM MEMBER TOWARDS THIS REPORT.

Name	Contribution
Dapo Oyinloye	Section 6, 2, 3
Bibek Dhungana	Section 7, 9
Santona Subedi	Section 1, 4 (partial)
Suchith Chandan Reddy Pinreddy	Section 5, 4 (partial)
Jared Cortez	Section 8
Kiriti Aryal	Sections 6, 7
Arogya Bhatta	Section 2,5(partial)
Emmanuel Ibem	Section 6, 5(partial)