Design and Implementation of a Service to Facilitate Purchases Between Customers and Businesses Using Cryptocurrencies

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Introduction

Cryptocurrencies are a new and rapidly evolving form of digital currency. They are decentralized, meaning that they are not subject to government or financial institution control. This makes them an attractive option for online payments, as they can be made quickly and easily without the need for a third party.

However, there are still some challenges to using cryptocurrencies for payments. One challenge is that not all businesses accept cryptocurrencies. Another challenge is that it can be difficult for users to find and use cryptocurrency wallets.

This proposal outlines a plan to design and implement a service to facilitate purchases between customers and businesses using cryptocurrencies. The service will provide a user-friendly interface for customers to create and manage their cryptocurrency wallets. It will also provide a simple way for businesses to integrate cryptocurrency payments into their products.

Problem Statement

There are some challenges to using cryptocurrencies for payments, such as:

- Not all businesses accept cryptocurrencies. This is because cryptocurrencies are a relatively new form of currency and many businesses are not familiar with them or do not have the infrastructure to accept them.
- Cryptocurrency wallets can be complex to use. There are a variety of cryptocurrency wallets available, and some of them can be difficult to set up and use. This can be a barrier to entry for new users.
- Cryptocurrency prices can be volatile. This can make it difficult for businesses to price their products and services in cryptocurrencies (Although it's not the concern of this project).

Existing cryptocurrency payment solutions are often complex and difficult to use for both businesses and customers. This has limited the adoption of cryptocurrencies for online payments.

Proposed Solution

The proposed service will address the challenges of cryptocurrency payments by providing a user-friendly interface for customers and a simple integration for businesses.

The service will have a backend and frontend component. The backend will be responsible for managing user accounts, cryptocurrency wallets, and transactions. The frontend will provide a user interface for customers to create and manage their wallets, and to make payments to businesses.

Business Model

The service will generate revenue by charging a commission on each transaction. The commission rate will be set to be competitive with other payment processing services.

Implementation Plan

The service will be implemented using a variety of technologies, including:

- Golang for the backend
- JavaScript for the frontend
- React for the frontend user interface
- A blockchain database to store cryptocurrency wallets and transaction data or a simple RDBMS (will be decided later)

Timeline

The service will be developed and deployed in two phases:

- Phase 1 (2 months): Develop the backend and frontend components of the service.
- Phase 2 (1 months): Integrate the service with some cryptocurrency exchanges, payment processors, and businesses.

Challenges

One challenge of the project is to ensure the security of user accounts and cryptocurrency wallets. The service will implement a number of security measures, including:

- Storing user private keys in a secure manner
- Using encryption to protect user data
- Implementing two-factor authentication
- Performing regular security audits

Another challenge is to deal with the fragmentation of the cryptocurrency market. The service will initially support a limited number of cryptocurrencies, but it will be designed to be easily expandable to support more cryptocurrencies in the future.

Also we're not sure about using cold wallets. Cold wallets are cryptocurrency wallets that are not connected to the internet. This makes them more secure than hot wallets.

Hardware security modules (HSMs) are specialized devices that can be used to protect cryptographic keys and other sensitive data. It's used in many financial services. We're not going to use HSM in the project.

Benefits

The proposed service will provide a number of benefits to both customers and businesses:

- Customers will be able to make payments to businesses using cryptocurrencies in a convenient and secure manner.
- Businesses will be able to accept cryptocurrency payments without having to deal with the complexity of managing cryptocurrency wallets and transactions.

Conclusion

The proposed service has the potential to make a significant contribution to the adoption of cryptocurrencies for online payments. The service will provide a user-friendly interface for customers and a simple integration for businesses. This will make it easier for both customers and businesses to use cryptocurrencies.

Academic Papers

The following academic papers may be relevant to the project:

- Kim, Shee-Ihn, and Seung-Hee Kim. "E-commerce payment model using blockchain." *Journal of Ambient Intelligence and Humanized Computing* 13.3 (2022): 1673-1685.
- Thanapal, Karthikeya, et al. "Online Payment Using Blockchain." *ITM Web of Conferences*. Vol. 32. EDP Sciences, 2020.
- Oo, Kyaw Zay. "Design and implementation of electronic payment gateway for secure online payment system." *Int. J. Trend Sci. Res. Dev* 3 (2019): 1329-1334.

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