BLOCKCHAIN REPORT

TRADING COMPUTATIONAL POWER USING BLOCKCHAIN

CHIPNET

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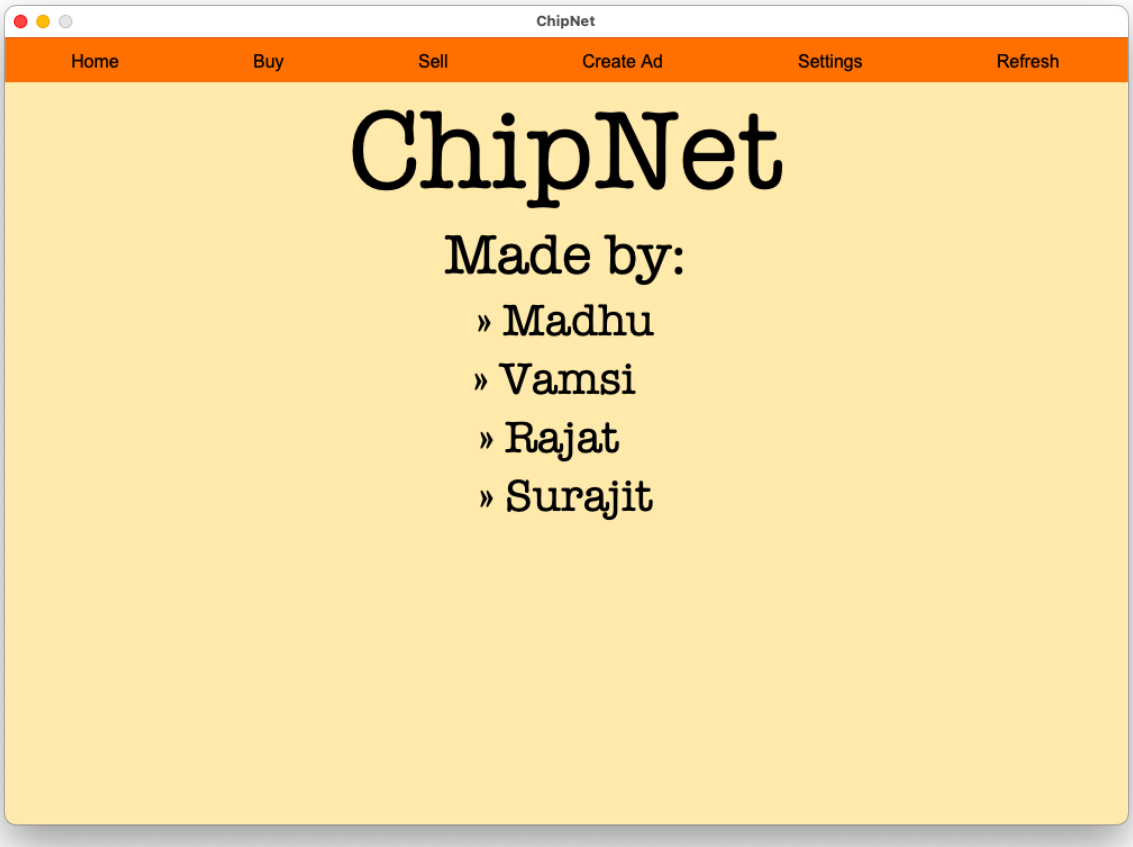


Introduction

Blockchain technology has revolutionized the way we think about financial transactions, providing a secure, transparent, and decentralized platform for exchanging value without the need for intermediaries. However, the benefits of blockchain extend far beyond finance, and can be applied to a wide range of industries and applications. In particular, the idea of trading computational power using blockchain has the potential to create a more efficient and accessible market for computing resources, allowing users to buy and sell processing power directly without the need for expensive hardware or infrastructure. This project aims to explore the potential of this technology, and to develop a platform that can enable users to trade computational power in a secure and decentralized manner. By leveraging the power of blockchain, we hope to create a more efficient and accessible market for computational resources that can benefit users across a range of industries and applications.

The Idea behind *CHIPNET*

The idea is to develop a platform for trading computational power using blockchain technology. The platform will enable users to buy and sell processing power directly, without the need for intermediaries or expensive infrastructure. The idea is to create a decentralized and transparent marketplace for computational resources, where users can access the computing power they need, when they need it, and at a price that reflects the true market value. The platform will be built on a blockchain-based protocol (Ethereum), which will provide a secure and tamper-proof record of all transactions. Users will be able to access the platform using a user-friendly interface, and will be able to choose from a range of computing resources, including CPUs, GPUs, and specialized hardware for machine learning and

other applications. Overall, the project aims to create a more efficient, accessible, and secure market for computational resources, which can benefit users across a range of industries and applications.

The Implementation of Smart Contract

We chose Ethereum as our blockchain platform. We implemented our service as a smart contract that lets sellers create advertisements of the computational resources they can provide, and lets buyers make bids (like in auctions) on the advertisements. The seller will approve a bid that is to his liking. Our smart contract is written in solidity.

The smart contract keeps track of all the Advertisements, Bids on those advertisements, and the services provided by sellers. The most important functions of the smart contract are the following:

- ➔ *PostAd*: Lets a seller post an Ad(vertisement)
- ➔ *bidOnAd*: Lets a buyer make a bid on the Ad that the seller has to approve or reject
- ➔ *cancelBid*: If the seller isn't approving in a required amount of time, the bidder can just cancel his bid and the money will be returned
- ➔ *approveBid*: To approve a bid made by the buyer.
- ➔ *postCredentials*: encrypt and store the credentials where the buyer can see.
- ➔ *endService*: called by the seller when the service ends so that he can get paid.

When a user makes a bid on an advertisement, he has to transfer the money to the smart contract. The smart contract will then act as an escrow. After the end of the service, the smart contract transfers the money to the seller. The buyer can get this money back by canceling before the bid is approved.

We make use of ethereum events in our application. When a bid is approved an event listener listens for that event, and starts a service in response to that event on the seller's machine.

The Implementation of Backend

Our plan was to mimic ***AWS EC2***, a very popular *centralized* web service by AMAZON that provides scalable computing capacity in the cloud. The way EC2 works is:

- ➔ It lets us select an Operating system, processor, memory and Storage according to our needs and purposes
- ➔ Then creates the instance
- ➔ Gives you an access link and an **SSH** key, which you can use from anywhere where an SSH client is available.

Our project CHIPNET works similarly, but in a decentralized manner. Unlike a centralized authority making all the decisions about whether or not to serve a particular customer, CHIPNET uses blockchain to create an open trading platform.

The users of this platform will be the general population. This will work because for most of the day, for most of the people, their computers are idle, ie. not doing any useful work. That idle time can be used to make profit by selling their computational power on CHIPNET.

The very first challenge we encountered is figuring out how to isolate the computational power, memory, and storage for selling. The answer is to use ***Docker***. Docker's original purpose was to make developing and deploying software in a consistent environment by creating and running docker images. But we thought that it could also be used to isolate computational resources.

Docker lets us specify the amount of processing power, the amount of memory, the amount of storage required to run a docker container. It also lets us specify the Operating system and the software that should be on it.

The next challenge we faced is creating the base docker image. Creating the Docker image is essentially the equivalent of choosing an Operating System in EC2. Just creating a docker image isn't enough. It has to be configured for SSH. And it needs to be accessible via SSH. Since systems that need to be accessible via SSH need to have a public IP, we can't directly generate and send an SSH link. For this we use ngrok service. Ngrok is a tool that allows you to expose services that are running on your local computer to the internet, making it accessible from anywhere. So the image needs to not only configure SSH but also has to make sure that the SSH service is connected to ngrok.

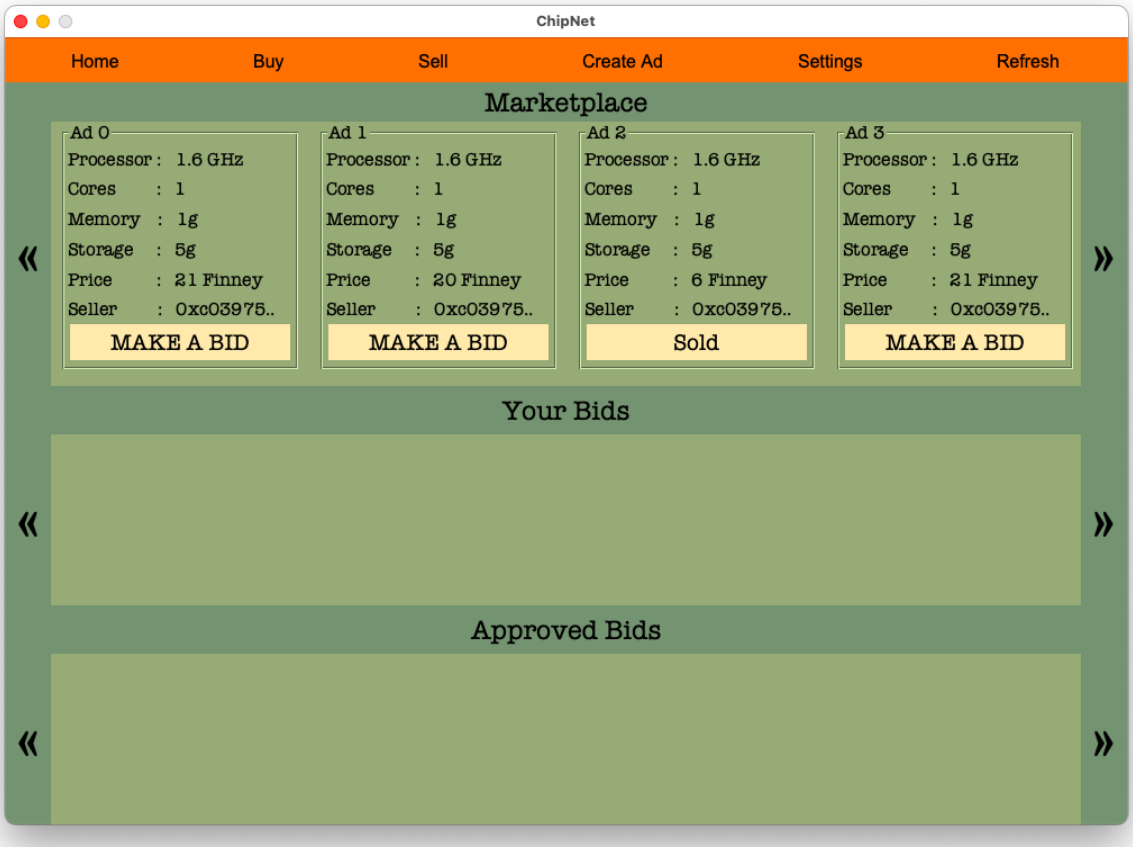
Our next challenge was in sending the SSH credentials securely to the buyer. We can't directly send the SSH access key and the password, as the buyer is anonymous. We can't also directly put the credentials on the blockchain, as it is open for everyone to see. So what we came up with is to use public key cryptography. When buying the computational power, along with his computational requirements, he sends his public key. Then, we use the public key to encrypt the credentials, then upload them to the blockchain. This way, only he will be able to read the credentials using his private key.

Usage

To interact with the smart contract, you need the ChipNet app. The two important functions of the ChipNet app are: Buying computational resources, and Selling computational resources.

To buy, you only need the app. You don’t need to install anything else. But, to sell a service, you need two things: 1) an ngrok key, which is free if you sign up on the website. 2) you need docker installed and running.

This is what the app looks like:



The buying and selling happen inside buy and sell tabs. There is a marketplace where all the ads are listed. Your Bids tab shows the bids you made on ads in the marketplace. Any bids you made that are approved are shown in the Approved Bids tab.

Conclusion

In conclusion, the project of trading computational power using blockchain technology has shown great potential for revolutionizing the way computing resources are shared and utilized in the digital world. The use of smart

contracts on the Ethereum platform has enabled secure and transparent transactions, while also providing a decentralized and distributed system that promotes fairness and efficiency.

Through this project, we have demonstrated the feasibility and effectiveness of using blockchain technology to create a marketplace for trading computational power. The project offers a new and innovative solution to the challenge of balancing the supply and demand of computing resources, while also creating new opportunities for individuals and organizations to monetize their unused computing power.

Looking ahead, there are many potential applications and opportunities for further development of this technology, including the integration with other blockchain-based systems, expansion to new markets, and the development of new and innovative services. As the use of blockchain technology continues to grow, it is clear that the project of trading computational power is poised to become an important part of the digital economy.