



Ethereum Auction System Using Blockchain

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ABSTRACT

In the world of online marketplaces, creating online auctions is an intriguing notion, and Ethereum auctions are among the most important e-business applications. By giving buyers and sellers a forum to trade goods using cryptocurrencies, these auctions increase the safety and security of the payment system. By supplying asset addresses for their products, registered users of the Ethereum Auction program can suggest new auctions, allowing other users to make bitcoin purchases or submit bids. Because it provides a dependable, simple, and quick way to buy and sell a variety of goods and services, this system is gaining popularity. The Ethereum Auction System is made to simplify and safeguard the payment process, giving users a hassle-free experience. The system is as simple to use as visiting a webpage, so even non-technical people may do so with ease. The ability to sell goods from the convenience of their homes is a major advantage of this application.

Key words: Cryptocurrency, Blockchain and Auction.

1. INTRODUCTION

The Latin word "auction," which means "to increase or grow," is the root of the English word "auction." A common way to buy, sell, and offer services is through auctions. Online auctions, often known as e-auctions or electronic auctions, let users precisely describe their wants. In many different economic areas, including the supply of goods and services, Ethereum is increasingly being used for online bidding. The database can be managed and monitored by bidders, and user data is kept private to guarantee the accuracy of the contract documents. The Ethereum Auction System is made to simplify and safeguard the payment process, giving users a hassle-free experience. The system is as simple to use as visiting a webpage, so even non-technical people may do so with ease. The ability to sell goods from the convenience of their homes is a major advantage of this application.

Internet technology gave rise to e-commerce. E-auctions are one of the numerous heights that e-commerce has reached as a result of its rapid expansion. Online platforms eliminated restrictions on things like product diversity and accessibility, product offers, and geographic restrictions. The way auctions were conducted before were drastically altered by e-auction. Antiques are among the items up for auction on Ethereum. E-auctions are used by artists to sell their works of art, and by the government to sell signal spectrums. Auctions are set up and organized based on the auction user. The auction user chooses what to set. Some auction systems employ third-party middlemen, which poses serious issues with regard to the veracity of bids, transparency, security, and integrity of user data. One of the technologies used to log data in a way that makes it hard or impossible to edit, hack, or cheat the system is blockchain. In accordance with the terms and conditions of a contract or agreement, a smart contract is a transaction protocol that automatically executes, controls, or documents legally significant events and acts. These technologies are utilized to give the system the finest security and complete security. Thus, incorporating blockchain and smart contracts into our Ethereum auction system will address many of the issues raised above. The bidder and seller are the only parties involved in any work. E-auction ultimately benefits both the buyer and the dealer by speeding up the process and lowering costs.

The tradition of selling difficult-to-value things at auction has a long history and is still widely used today. Since buyers typically have a strong incentive to keep prices low, there is typically a significant information gap between the seller and buyers in these transactions. Due to the seller's inability to secure the effective allocation of limited resources in a one-turn pricing transaction, the items may end up going to a less valuable owner. The competition between bidders can, however, be fully utilized through an auction with appropriate market trading restrictions to accomplish effective resource allocation and other goals. Numerous researchers have investigated various strategies to increase the efficiency of the auction mechanism. William Vickrey was awarded the 1996 Nobel Prize in Economics for his work on auction theory.

Depending on whether the auction price is open or closed, traditional auctions are divided into sealed-bid auctions and open-bid auctions in various markets. Bidders submit their bids in secret before the closing time for bidding in sealed-bid auctions. The auctioneer then opens the bids and chooses the highest bid in accordance with the auction's rules. For individual commodity transactions, however, open-bid auctions like English and Dutch auctions are frequently employed. Only the winning bid price is made public in sealed-bid auctions; all other bidders' bid amounts remain secret. The

anonymity of the bidders' identities and the secrecy of their bid amounts are guaranteed by this confidentiality. In addition to being more efficient than open-bid auctions, sealed-bid auctions are typically utilized for business-to-business transactions.

E-auctions have emerged as a fresh and effective way to hold auctions as a result of the growth of e-commerce and the widespread usage of the internet. E-auctions save time and money while also provide a fair-trade environment for buyers and sellers. Business asset sealed-bid electronic auctions draw more bids and provide a higher level of certainty for the seller. Traditional e-auctions, however, have drawbacks that prevent their usage in the complicated online world, such as privacy disclosure and centralized private verification. Researchers are working to solve these problems by replacing third-party auctioneers with multiparty multi-round computation and encryption technology. Nevertheless, in the increasingly complex internet environment, it is still very difficult to develop a comprehensive system that can stop information leakage and spot fraud and repudiation.

Blockchain technology has demonstrated significant promise for enhancing the efficiency, security, and transparency of online auctions. Without the need for a centralized auctioneer, auction rules and outcomes can be automatically enforced using smart contracts and other blockchain-related technology. In addition to lowering the expenses and hazards related to using conventional auction intermediaries, this can result in an auction process that is fairer and more transparent. As you pointed out, there are still security issues like double spending and majority attacks that need to be addressed, therefore academics are looking into different strategies like machine learning to make blockchain-based auctions more resilient to these kinds of attacks.

2. RELATED WORK

In this Section, we will look at many studies that demonstrate the Online Transaction system.

A. A Secure and Fair Double Transaction Framework

Shot-sequestration preservation and trade fairness concerns, which are often disregarded in existing pall transaction mechanisms, are addressed by the proposed SF-DAC architecture for allocating virtual machine coffers in two-sided pall commerce. In order to enable secure comparison and sorting, the framework makes use of secure 3-party computing protocols, which results in a more secure double transaction system. A fair-trading system based on smart contracts is also a part of the architecture to stop stab from cancelling deals without paying a penalty. Overall, the SF-DAC framework seeks to offer a double transaction method for Pall virtual machines that is safer and more equitable.

Date of publication June 15, 2021, IEEE Access.

B. Online Combinatorial Deals for Resource Allocation

You seem to be referring to the online combinatorial auction problem, in which a seller seeks to maximize social welfare by presenting a variety of capacity-limited packages to purchasers with various valuation functions. In the area of designing algorithmic mechanisms, this issue has received extensive study. To maximize social welfare, researchers have suggested a variety of auction techniques, including the VCG mechanism, the generalized second-price (GSP) mechanism, and the combinatorial clock auction (CCA). Researchers have carried out empirical studies on online resource allocation in cloud computing, where the cloud provider makes different combinations of virtual machine resources available to customers with various requests and valuation functions. The numerical outcomes have demonstrated that the suggested auction mechanisms outperform benchmark approaches and are competitive and robust against system concerns including inadequate information, strategic behavior, and computational complexity.

Xiaoqi Tan, Alberto Leon- Garcia, Yuan Wu, and Danny H. K. Tsang

C. Online Transaction of Cloud coffers in Support of the Internet of effects

It appears that the paper is discussing how employing publish-subscribe communication broker services that are hosted in the cloud can be advantageous for the Internet of Things (IoT). The article defines the problem of maximizing the profit of a service provider and shows that it is an integer direct programmed that is explosively NP-complete, which means that, unless $P = NP$, there is no fully polynomial-time approximation strategy for the problem. The essay also covers the development of a secure double transaction system that outperforms earlier equivalent systems by enabling secure comparison and sorting utilizing safe 3-party computing protocols. The results of the simulations demonstrate that the suggested algorithm generates up to 83 more revenues than a heuristic technique while using 60 fewer coffers.

Ala Al- Fuqaha , Khreishah Abdallah , Issa Khalil and Ammar Rayes, Gharaibeh Ammar - IEEE.

D. Incentivizing Device- to- Device cargo Balancing for Cellular Networks an Online Auction Design

Growing in prominence in the architecture of small-cell cellular network infrastructures is the device-to-device (D2D) cargo balancing (D2D-LB) paradigm. In order to solve this problem, we suggest an online procurement transaction structure in this study. In order to develop a secure double transaction system that outperforms all prior similar approaches, we provide safe 3-party computing protocols that enable secure comparison and secure sorting. We provide an online algorithm with a good competitive rate for the thematic-slot problem based on the findings of single-niche studies. Our transaction algorithm layout makes sure that participants' preferred tactic is honest bidding. Numerous tests using actual trace data show that our suggested solution achieves results that are very similar to the offline optimum and cuts costs by 45% when compared to another heuristic.

IEEE JOURNAL ON named AREAS IN Dispatches, VOL. 35, NO. 2, FEBRUARY 2017

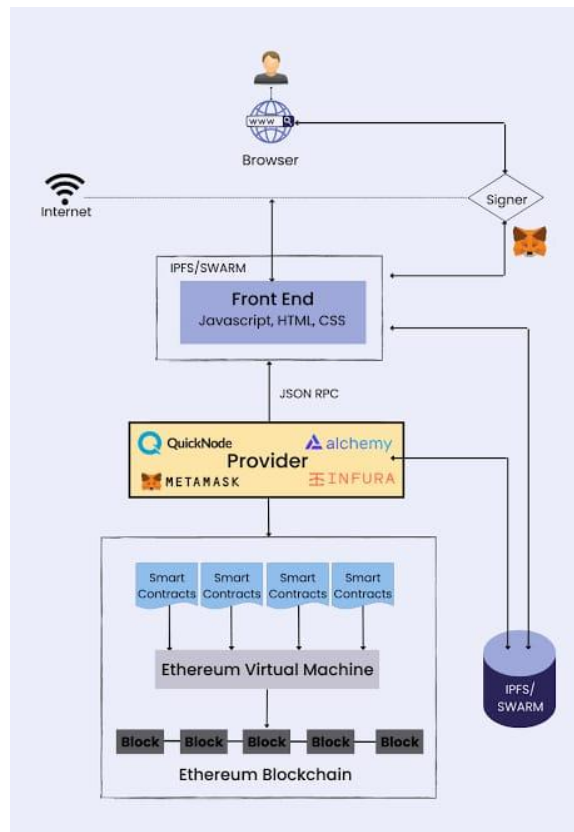
E. Online Advertising Multichannel Auction Strategies with a Profit Model

The device-to-device cargo balancing (D2D-LB) paradigm has become more widely used recently in small-cell cellular network infrastructures. The purpose of this paper is to discuss the difficulties in applying this paradigm using an online procurement transaction framework. We suggest safe 3-party computing protocols, which produce a secure double transaction system and outperform earlier comparable approaches, to assure secure comparison and sorting. Based on the conclusions from the single-niche analysis, our team has created an online algorithm for the thematic-slot problem with a highly competitive rate. Our transaction algorithm is built to encourage honest bidding as the preferred method of bias. Our suggested technique achieves nearly the offline optimum and lowers expenses by 45% as compared to another heuristic through several tests utilizing real-world traces.

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3. PROPOSED SYSTEM

People currently utilize Ethereum, a well-liked cryptocurrency, to place bids on the Ethereum Auction System project. Blockchain technology is employed in cryptocurrency to address privacy and security concerns. Cryptocurrency transactions are more secure than standard electronic transactions because the blockchain ledger is built with challenging mathematical problems. Further enhancing security and privacy is the use of pseudonyms that are not connected to any user, account, or recorded data that can be traced back to a profile. Cryptocurrencies can be bought with a number of different currencies, including the US dollar, euro, pound sterling, Indian rupee, and yen. Through a variety of wallets and exchanges, cryptocurrency can be traded for one another at a low transaction cost. The Auction System now supports Ethereum as payment, enabling users from many nations to access the system. This is made possible by these cryptocurrency wallets and exchanges.



Due to their rapid and effective processing, cryptocurrencies continue to be the preferred method for transactions. This is achievable due to how quickly the verification process moves along and how few challenges there are.

The auction system makes use of MetaMask, a browser plugin and Ethereum wallet that enables users to communicate with decentralized applications running on the blockchain. Even those with little experience with cryptocurrencies can easily set up MetaMask. It has a huge advantage over other comparable choices that have substantial user fees because it is open source and totally free. As users do not have to worry about paying additional fees to withdraw money or storing sensitive information on a third-party server that might be vulnerable to hacking, this no-fee system is directly related to privacy.

A computational resource called "gas" is necessary in the Ethereum network for actions like purchasing or displacing tokens from an exchange. Petrol prices fluctuate according to supply and demand since there are fewer miners as more people use MetaMask. When a result, when transaction volume rises, so does the cost per transaction. The GWEI (gas price) for MetaMask can reach 50 GWEI, which is more than comparable services.

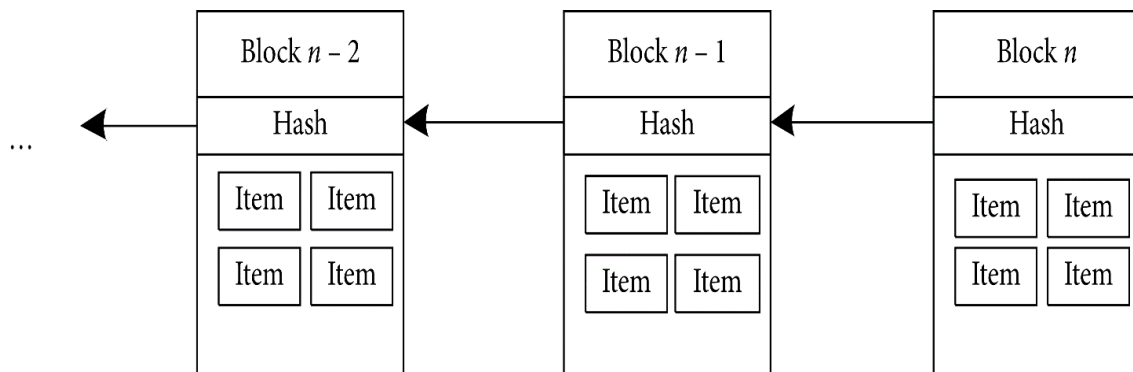
The operating system of MetaMask has a number of potential security holes that could expose users to wallet theft in the event that an unauthorized person gains access to their device. The reason for this is that users frequently put their own keys and money on the device, which may be compromised if the gadget were to be lost or stolen.

4. METHODOLOGY

❖ BLOCKCHAIN

Blockchains' consensus process and encryption technology for P2P communication secure data. Blockchains use chained file storages, which are different from typical file systems. Data records are stored in blocks, which are then chained together by writing the preceding block's hash value in the header of each block (see Figure 1). On the blockchains, users can create multiple addresses that are unrelated to their identities hash value. The additional block's copy is subsequently broadcast to all of the chain's peer nodes. Most of the nodes in the chain concur and approve the block addition procedure. In the chain, the process of agreement is referred to as consensus. The block is added to the current chain if the majority of nodes reach a consensus; else, it is dropped. Therefore, a third party's involvement in the creation process is not necessary. Address information does a better job than conventional file systems at realizing anonymity since it is impossible to link user identity to it. In reality, there are three types of blockchains: consortium blockchains, private blockchains, and public blockchains. Public and consortium blockchains have a greater number of blocks and a higher level of data tamper protection, but they are perplexed by the lower operational efficiency. Although the level of decentralization in private blockchains is lower than in public and consortium blockchains, they

Any of these three distinctive blockchain categories can be used by e-auctions.



❖ THE SMART CONTRACT

Before Ethereum combined blockchains with smart contracts, smart contracts were not extensively used since there were no trusted execution environments. Smart contracts subsequently become the centerpiece of subsequent blockchain-based apps, which are not just restricted to the e-cash space. For instance, ET-Deal, a P2P secure energy trading strategy based on smart contract 2, was proposed by Kumari et al.

Lua and Solidity are two popular programming languages for implementing smart contracts. A set of rules are specified by developers as functions in smart contracts, which are subsequently posted on blockchains. In other words, smart contracts are accessible to all users of blockchain applications and are immutable. To complete the transactions, all users communicate with smart contracts and make calls to functions. There is no potential for fraud behaviors to be carried out because smart contracts are the consensus of all participants and are automatically running without any outside supervision.

The following smart contract serves as an example of the main operations in the suggested sealed-bid auction design.

```
contract SealedBidAuction {
    struct Bid {
        bytes32 sealedBid;
        uint bidDeposit;
    }
    uint public biddingEndTime;
    uint public revealEndTime;
```

```

function bid(bytes32 _sealedBid)
Public
Payable
onlyBefore(biddingEndTime)
{...}
function open(uint[] _values, bytes32[] _secret)
Public
onlyAfter(biddingEndTime)
onlyBefore(revealEndTime)
{...}
function finish()
public
onlyAfter(revealEndTime)
{...}
}

```

5. PROCESS

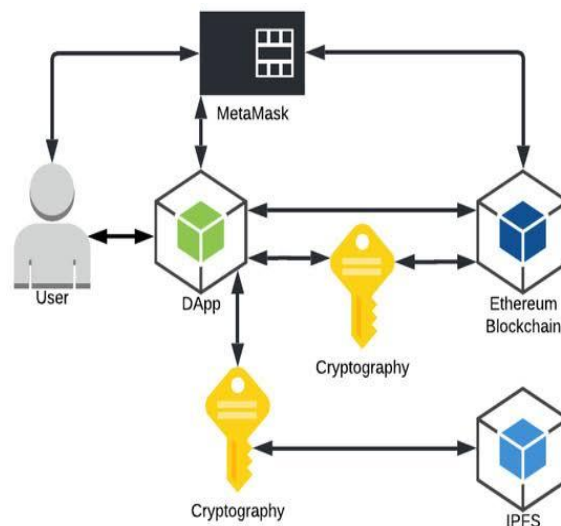
Step 1 – Registering Assets or Auction items:

The User who wants to place an item in auction, first needs to create an Asset Address which is unique for every item and created by system. The System generates Asset address for Users, which they use this asset address to create and register an auction for the item that they want to sell.

Then the User uses this at “Create Auction”, and other details and set the date for end of auction. This will create Auction for other users to place bid.

Step 2 – Making a Bid in Auction:

Other users who are interested in an Auction, can place a bid on that asset. Each time a user places a bid on an Asset, the bid amount is replaced with the amount that the user inputted (The amount should be higher than the last amount). Users use MetaMask (which is available as chrome extension) to transaction of Ethereum for bidding and selling item. MetaMask is one of best ways to transact Ethereum in a more secure way.



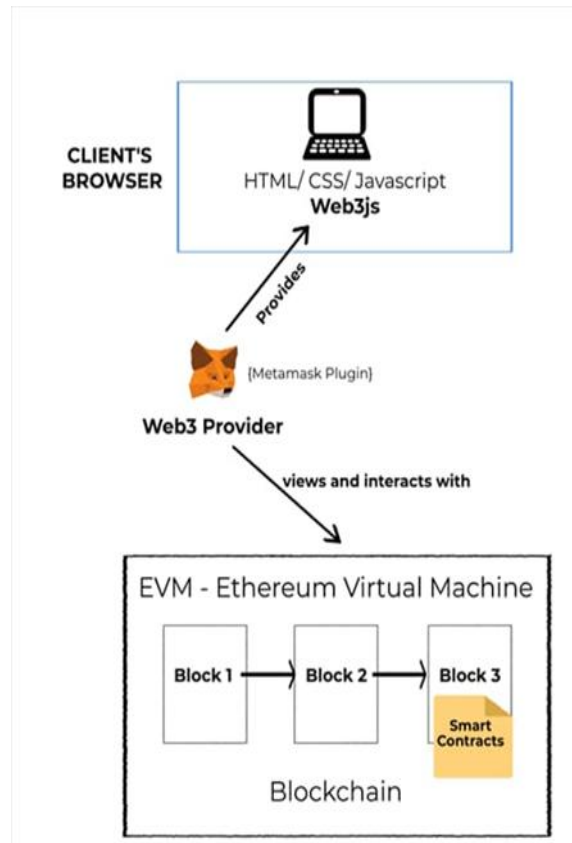
Step 3 – Making a Final Decision:

At the end of time which the user (owner of asset item) set, System will analysis the highest bid in auction system, and decide the winner or new owner of the item. Before that the system will check the authentication of both users, the user who created the auction and user who won the auction.

Then the Auction comes to an end, which will remove the auction from the auction list. Later, the user may participate in other auctions or create a new auction.

6. RESULT AND FUTURE WORKS

This Online Transaction System will make druggies more effective and more effective in their gusted and has driven business to new heights, forcing numerous to make the adaptations and changes necessary to reach a new request of knowledgeable consumers. The rapid-fire growth of E-auctions has led to an-transformation in global retail structure. A better understanding of the gusted of the consumer online transaction system can help companies gain further online guests and increase their-business profit. At the same time, consumers are more inclined to make purchases online, as they realize the benefits of e-auction. With the fashion ability of the Internet, the number of Internet druggies continues to grow, and more and more Internet druggies are getting online druggies, indeed regular online buyers. druggies will learn about cryptocurrency, its fashion ability and uses. Cryptocurrency will be the future, where druggies can buy or vend effects using cryptocurrencies like Ethereum, Bitcoin, etc.



The future of blockchain and cryptocurrency technology lies in furnishing a lightning-fast, cheap volition to established cross-border payment styles for all business types. Blockchain technology will help businesses by keeping sale costs below one percent. It can give all businesses with real-time payment processing – freeing over much- demanded plutocrat for diurnal use.

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