

Aqua Verse: A WEB 3.0 Blockchain Application

Asma Begum¹, Anand Shankar², Harsh Verma³, Mahaveer Singh⁴

Asst. Professor, Department of Information Science & Engineering, Atria Institute of Technology, Bengaluru, India ¹

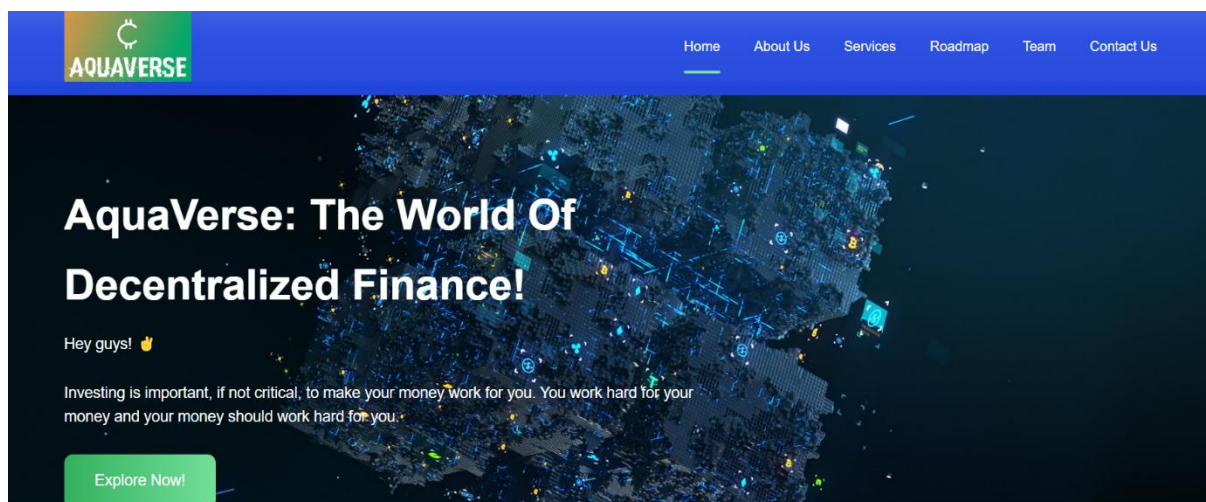
Student, Department of Information Science & Engineering, Atria Institute of Technology, Bengaluru, India ^{2,3,4}

Abstract: In the modern era, the Internet technology is transitioning at a high pace. The transition from WEB 1.0 to WEB 2.0 was very swift and even the transition to WEB 3.0 will be smooth. This paper discusses about the application of blockchain technology in WEB 3.0 environment. It also discusses about smart contract which enables a user to transact on a specific blockchain network called Ethereum. Being the second largest cryptocurrency in the market, it offers a wide variety of decentralized application. The smart contract of this paper aims at transparent and irreversible transfer of Ether tokens from one wallet address to another wallet address along with a customized note.

Keywords: WEB 3.0, cryptocurrency, smart contract, banking in blockchain, supply chain, mining, Ethereum, gas fees, minting, virtual wallet

I. INTRODUCTION

Blockchain is an immutable, virtual order book which is shared among different nodes where each node keeps updating itself. Thereby, updating the entire network. Nobody has centralized administrative access over the system, rather its synced across multiple nodes and is decentralized. Blockchain uses two verification methodologies (PoW and PoS) which are tamper resistant. Being the second largest blockchain network, Ethereum is widely used in various decentralized transactions. The project is Ethereum based decentralized WEB 3.0 application which uses a customized smart contract which runs on a user-friendly front-end.



II. RELATED SURVEY

Due to the existence of the cryptographic hash, the data stored in a blockchain are inherently resistant to modification: if one block of data is modified, all blocks afterward should be regenerated with new hash values. This feature of immutability is fundamental to blockchain applications.[1]

In order to add more values to the blockchain ecosystem, Ethereum is customized to be a platform to facilitate decentralized smart contracts via Ether. Smart contract refers to the idea that legal contracts can be notarized and executed automatically.[2]

Ethereum has hosted different categories of dApps, including exchange, energy, finance, health, identity, insurance, media, etc. However, many state-of-the-art dApps are in fact only partially decentralized. For example, Blockstack and OpenBazaar are leveraging the blockchain to validate only identities of users and not anything else.[3]

We explore reuse in dapps. We find code-level reuse is common in dapps and used for different purposes. These findings can help developers rationally design their dapps and warn users to check source codes when using dapps of category Gambling.[4]

A reference implementation of the protocol, named Zeppelin, has been partially realized in the Ethereum general-purpose blockchain, and deployed on a small-scale network. The reference implementation is highly modular and demonstrates the ability for decentralized applications to use both a traditional backend and a blockchain based backend. By using a blockchain, some application data and business logic is stored and executed on a global virtual machine, distributed between participating nodes.[5]

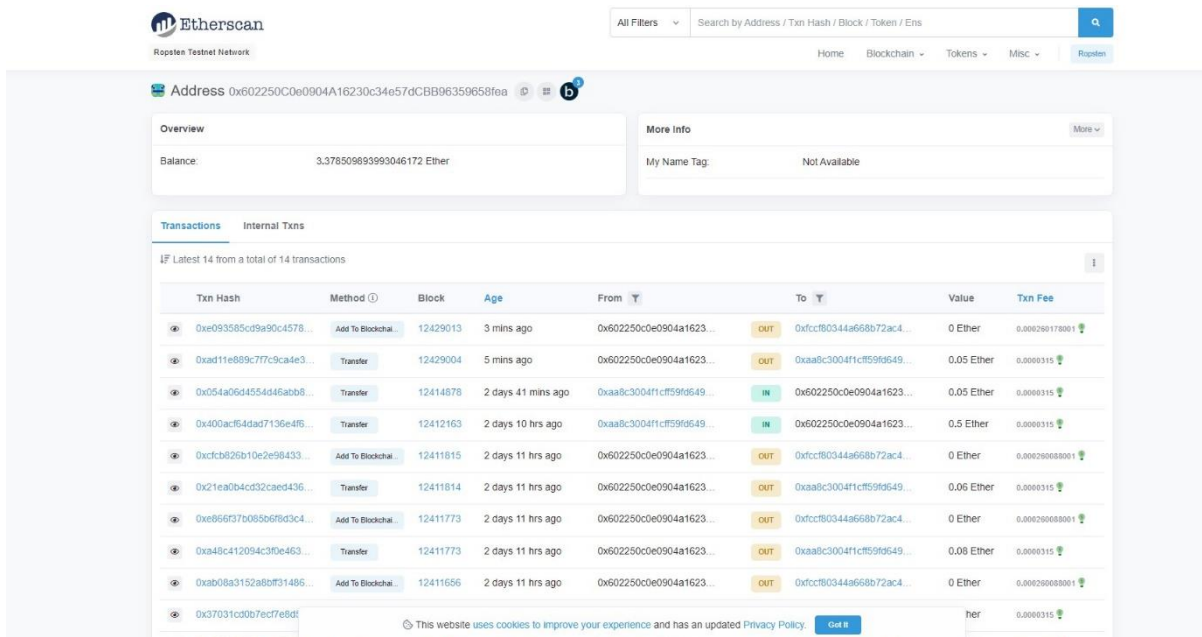
We take an effective approach to validate different types of currency transactions using Ethereum smart contracts by selecting multiple verifiers and forming a committee within the group of untrusted users. Analysis shows that the committee can get the correct verification result for each transaction.[6]

The interesting part of the block validation algorithm is the concept of "proof of work": the condition is that the SHA256 hash of every block, treated as a 256-bit number, must be less than a dynamically adjusted target, which as of the time of this writing is approximately 2^{190} . The main purpose is to make block creation computationally "hard", thereby preventing sybil attackers from remaking the entire blockchain in their favour.[7]

To leverage broader understanding of the functionality and to make the creation of contracts accessible for the general use, we propose a mechanism that semi-automates contract generation by translating institutional formalization from a human readable behaviour specification to a contractual structure in the form of smart contracts.[8]

Digital encryption currency moved into the programmable "era of smart contract". Meanwhile, Ethereum is the most active public blockchain of 2.0 mode in the world at present. The distinct feature of smart contract clearly suggests the differences between Ethereum and Bitcoin.[9]

The smart contract is like a traditional contract, with a three-step process of contract generation, release, and execution. The contract generation stage mainly includes negotiation of participants early, discussion on how to reach consensus, design of contract specifications, and develop the contract. The code of smart contract requires strict discussion and verification of participants. The second stage is contract release stage, in which tests and verification are conducted before the contract is released. Once smart contract code is deployed in blockchain, it cannot be modified again.[10]



Txn Hash	Method	Block	Age	From	To	Value	Txn Fee
0xe093585c9a90c4578...	Add To Blockchain	12429013	3 mins ago	0x602250c0e0904a1623...	OUT 0xfcfc80344a668b72ac4...	0 Ether	0.000260173001
0xad11e889c777c9ca4e3...	Transfer	12429004	5 mins ago	0x602250c0e0904a1623...	OUT 0xaa8c3004f1cf59649...	0.05 Ether	0.0000315
0x054a06d45d4546ab68...	Transfer	12414878	2 days 41 mins ago	0xaa8c3004f1cf59649...	IN 0x602250c0e0904a1623...	0.05 Ether	0.0000315
0x400ac654dad7136e4f5...	Transfer	12412163	2 days 10 hrs ago	0xaa8c3004f1cf59649...	IN 0x602250c0e0904a1623...	0.5 Ether	0.0000315
0xcfcfb826b10e2e98433...	Add To Blockchain	12411815	2 days 11 hrs ago	0x602250c0e0904a1623...	OUT 0xfcfc80344a668b72ac4...	0 Ether	0.00026008001
0x21ea0b4cd32caed436...	Transfer	12411814	2 days 11 hrs ago	0x602250c0e0904a1623...	OUT 0xaa8c3004f1cf59649...	0.06 Ether	0.0000315
0xe866f37b0856698d3c4...	Add To Blockchain	12411773	2 days 11 hrs ago	0x602250c0e0904a1623...	OUT 0xfcfc80344a668b72ac4...	0 Ether	0.00026008001
0xa48c412094c30e463...	Transfer	12411773	2 days 11 hrs ago	0x602250c0e0904a1623...	OUT 0xaa8c3004f1cf59649...	0.08 Ether	0.0000315
0xab08a3152a8b#31486...	Add To Blockchain	12411656	2 days 11 hrs ago	0x602250c0e0904a1623...	OUT 0xfcfc80344a668b72ac4...	0 Ether	0.00026008001
0x37031cd0b7ec7e8d...					her	0.0000315	

Fig: Screenshot of transaction history of transfer of Ether tokens between two wallet addresses

III. CONCLUSION

The project is built on blockchain that allows people to trade their virtual assets on a secure and transparent platform without any intermediates. In this modern era, the decentralized exchange is not free of trust. One must still trust different parties. The project effectively reduces middleman and transaction costs while offering a simple and cheap way to swap tokens on the blockchain. With a customized smart contract doing the verification asynchronously it is much more decentralized than any major exchange.

REFERENCES

1. Evaluating Suitability of Applying Blockchain Computer Science, 2017 22nd International Conference on Engineering of Complex Computer Systems (ICECCS)
2. An Overview of Smart Contract: Architecture, Applications, and Future Trends Computer Science, 2018 IEEE Intelligent Vehicles Symposium (IV)
3. S. Nakamoto, "Bitcoin: A peer-to-peer electronic cash system", 2008, [online] Available: <https://bitcoin.org/bitcoin.pdf>.
4. Smart-Contract Value-Transfer Protocol on a Distributed Mobile Application Platform, Computer Science, 2017
5. W. Fan, S. Y. Chang, S. Emery and X. Zhou, "Blockchain-based distributed banking for permissioned and accountable financial transaction processing", 29th International Computer Conference Communications and Networks (ICCCN), 2020.
6. S. Huh, Cho, Kim, "Managing iot devices using blockchain platform", 2017 19th International Conference on Advanced Communication Technology (ICTACT), pp. 464-467, Feb 2017.
7. W. Fan, Y. Park, S. Kumar, P. Ganta, X. Zhou and S.-Y. C. Chang in 2021, "Blockchain-enabled collaborative intrusion detection in software defined networks", IEEE International Conference on Trust Security and Privacy in Computing and Communications (TrustCom).
8. Wu, "An Empirical Study of Blockchain-based Decentralized Applications", 2019, [online] Available: <https://arxiv.org/pdf/1902.04969.pdf>.
9. C. Cai, H. Duan and C. Wang, "Tutorial: Building Secure and Trustworthy Blockchain Applications", 2018 IEEE Cybersecurity Development (SecDev), 2018.
10. Q. Xu, Z. He, Z. Li and M. Xiao, "Building an Ethereum-Based Decentralized Smart Home System", 2018 IEEE 24th International Conference on Parallel and Distributed Systems (ICPADS), 2018.