Ethereum Blockchain Explorer

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***Abstract*----Ethereum blockchain explorer is a fundamental instrument that facilitates a comprehensive understanding of the decentralized and programmable ethereum network. This user-friendly interface serves as a digital window into the intricate workings of the blockchain, offering real-time insights into blocks, transactions, and smart contract executions. Designed for both developers and enthusiasts, the explorer enables users to verify transactions, monitor account balances, and explore the dynamics of decentralized applications. Through graphical representations and accessible data, it plays a pivotal role in demystifying the complexities of the ethereum blockchain, empowering users to navigate the network with ease. As a transparent and navigable tool, the ethereum blockchain explorer fosters a deeper comprehension of the decentralized ecosystem, promoting accountability and transparency within the rapidly evolving world of blockchain technology.**

***Keywords*------Ethereum, Blockchain explorer, decentralized, programmable Ethereum Network.**

I. INTRODUCTION

The Blockchain Explorer Website serves as a crucial tool for users, researchers, and developers to navigate and comprehend the intricate details of blockchain transactions. Offering a user-friendly interface, the website enables users to explore individual transactions, inspect track specific addresses, and analyze real-time network statistics. With a focus on transparency and accessibility, it provides insights into token analytics, such as ERC-20 and ERC-721 tokens, empowering users to understand token distribution and transfer histories. The open-source nature of the platform encourages community contributions and ensures extensibility, allowing developers to tailor the explorer to their needs. Ethereum Blockchain Explorer named EthXplorer is time saving website which helps user to get transaction over network of ethereum to be displayed for transparency reasons of their private things. It displays real time key metric details, So that user can get insights out of it. In essence, the EthXplorer emerges as a testament to the marriage of technological prowess and user-centric design. React.js, with its modular architecture and React components, lays the foundation for a responsive and visually engaging user interface. Simultaneously, API integration forms the bridge that connects this interface to the living, breathing Ethereum blockchain. The result is a symphony of technology and design, an explorer that not only informs but beckons users to embark on a journey of discovery within the decentralized landscape of Ethereum.

II. RELATED WORK

Here are some reviews made by the authors of various paper. In the paper [1], Blockchain-based cryptocurrencies have received extensive attention recently. Massive data has been stored on permission-less blockchains. The analysis of massive blockchain data can bring huge business values. However, the absence of well-processed up-to-date blockchain datasets impedes big data analytics of blockchain data. To fill this gap, we collect and process the up-to-date on-chain data from Ethereum, which is one of the most popular permission-less blockchains. We name such well-processed Ethereum data as XBlock-ETH, which consists of transactions, smart contracts, and cryptocurrencies (i.e., tokens). [2] EthVM: First Open-Source Block Explorer Powered by Kafka: Continuing the MEW (My Ether Wallet) legacy of open-source products that empower both users and developers to explore the possibilities of blockchain, we introduce EthVM: the first open-source block explorer and data processing engine for Ethereum, based on Apache Kafka.

A block explorer is an indispensable tool for blockchain auditing and decision making that uses a convenient browser format. Explorers help users verify the execution of transactions and smart

contracts, check balances, and monitor gas prices. For developers, block explorers reveal new possibilities of retrieving blockchain data for dapps and open-source wallets, inspiring innovation throughout the growing Ethereum ecosystem while providing the transparency that's so essential in a decentralized network. When our team first began to develop EthVM Alpha, the initial idea was to create a blockchain explorer that was easy to use, featuring a front end built with VueJS and real time updates powered by RethinkDB on the back end. [3] Modern centralized online marketplaces such as eBay offer an alternative option for consumers to both sell and purchase goods with relative ease. However, drawbacks to these marketplaces include the platform's ability to block merchants at their own whim, the fees paid to the platform when listing a product and when selling a product, and the lack of privacy of users' data. In this paper, we propose an application that remedies all three of these drawbacks through use of the Ethereum blockchain platform. The application was developed using the Truffle development framework. [4] Website for Block Explorer for Ethereum Network EthXplorer is a blockchain explorer for the Ethereum network that allows users to explore and analyze transactions, addresses, and token information on the Ethereum blockchain. It provides real-time data on transactions, token holdings, and contract interactions, offering a user-friendly interface for both casual users and developers. EthXplorer fetches data directly from the Ethereum blockchain and presents it in a comprehensible format, making it a valuable tool for tracking and understanding Ethereum-based activities. Users can search for specific transactions, addresses, or tokens and gain insights into the network's overall health and performance. [5] Decentralized Voting Platform based on Ethereum Blockchain: In traditional voting schemes the integrity has always been questionable and it is also not feasible for some voters to vote because of inter-state residency. In order to solve this problem we are using distributed ledger technology to build the application for voting which is accessible to everyone and from everywhere. The application is based on the ethereum blockchain which is making the whole system secure and unaltered in nature, which means that the every vote is counted correctly and no fraud can be possible regarding the voting. This blockchain technology stores the data in blocks and it is nearly impossible to temper the data because of the interconnected blocks which are cryptographically secured. This system solves the problem of lack of trust and transparency.

III. METHODOLOGY

An Ethereum blockchain explorer is a website that allows users to view transaction details, get real-time updates, and connect wallet to a MetaMask account to display account transactions. Explanation of its methodology as follows:

1. Fetching Blockchain Data:
   - The explorer connects to the Ethereum blockchain through an API (a way for computers to communicate with each other).
   - It constantly checks the blockchain for new blocks (like pages in a ledger) and new transactions (like entries on those pages).
2. Displaying Transaction Address Details:
   - When you search for a transaction address, the explorer looks it up on the blockchain.
   - It shows details like the block number, miner, gas used, etc.
3. Real-Time Updates:
   - It diplays immediate results when there is change in ethereum currency, ether value or gas used(gwei).
4. Connecting Wallet:
   - MetaMask is a browser extension that acts as a wallet for Ethereum and other cryptocurrencies.
   - When you connect your MetaMask wallet to the explorer, it asks for permission to view your wallet address.
   - Once connected, the explorer can show all transactions related to your wallet address.
   - It displays these transactions in an easy-to-read format, showing details like amounts sent or received, and the current balance.

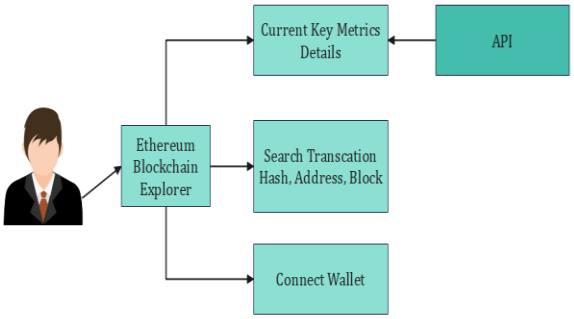

Fig 1. Methodology

IV. MODULES

User Interface Module: Handles the presentation layer.Includes components for displaying information, search forms, connect wallet functionality, and icons.

Blockchain Interaction Module: Manages interactions with the Ethereum blockchain. Retrieves and processes data related to blocks and transactions. Provides functions for searching transactions based on criteria such as address, block number, or transaction hash.

Connect Wallet Module: Manages the process of connecting a user's wallet. Interacts with wallet provider APIs. Handles user authentication and authorization.

External Data Module: Connects to external data sources to fetch additional information. Retrieves current ether price, total ether supply, latest block, ETH/BTC rate, total node count, MED (Median Gas Price), and gas price.

Output Display Module: Responsible for displaying the formatted output to the user. Shows transaction information, including transaction hash, block number, timestamp, value (Ether), and gas use.

These modules work together to provide the specified functionalities of the Ethereum Explorer. The separation of concerns allows for a modular and maintainable design. Depending on your system's complexity and requirements, you might further divide these modules into smaller components or classes.

V. RESULTS AND DISCUSSION

The final delivered website is an Ethereum blockchain explorer. It displays transaction address details and provides real-time updates on Ethereum, including Ether value, gas used, and the latest block information. The site connects to your MetaMask wallet to show your account's transactions.

It's user-friendly, making it easy for anyone to understand their blockchain activity. This explorer ensures you stay updated and in control of your Ethereum interactions. In the result it is basically Streamlined Ethereum insights at your fingertips.

Table 1. RESULTS

Sr No.	Item	Input	Output
1	Search Bar	- Transaction Hash - Block Number - Ethereum address	- Transaction details are displayed. - Address details are displayed. - Block details are displayed.
2	Real Time Update	Refresh the home page	Current Ether Price
3	Block Result	Block Number	Transaction Hash, Nonce, Total Difficulty, Miner
4	Transaction Hash Result	Transaction Hash	Timestamp, Block address(from and to), status, Gas used
5	Address Result	Address	Transaction Hash, Ether Value, Time
6	Connect Wallet	- Click on the button - Select the account - Enter the password	Connected Accounts Displays the transaction

VI. CONCLUSION

We have implemented a blockchain explorer for Ethereum which is like a detective tool for the digital world. It helps people follow the trail of transactions and activity on the Ethereum network. You can use it to check transactions, see how much Ethereum is moving around, and explore different addresses to see what they're up to. You can also connect wallet to display your transactions being done in your metamask wallet’s account.

It also displays many key metrics details which helps to monitor financial investments, confirming transaction, to do market analysis and so on. It's like a window into the inner workings of Ethereum, letting you see what's happening in real-time.

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