**Decentralized Internet on Polygon Blockchain**

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**MOTIVATION**

The Internet as we know it today is still broken. We have no control over the information we collect. Our personal data can be accessed by a central authority, which could prevent portions of the network from connecting with the rest of the network. The goal of the research is to eliminate centralized systems and replace them with a decentralized peer-to-peer architecture based on blockchain. It will combine web 1.0 and 2.0 visions with improved privacy, data security, and human-like interaction. Polygon (previously Matic Network) is a blockchain scalability platform and framework for linking and creating Ethereum-compatible blockchain networks. Because aggregating scalable solutions to allow a multichain Ethereum ecosystem is one of Polygon's main goals. As a result, the Polygon network is classified as a layer-2 aggregator, with the goal of establishing a multichain ecosystem of Ethereum-compatible blockchains with high interoperability. A layer-2 solution is a framework constructed on top of the base chain to alleviate some of its burdens and complement its essential flaws. Polygon is an aggregator based on Plasma. which is an Ethereum layer-2 solution that provides a platform for developing off-chain decentralized apps (dApps) with enhanced security, scalability, and performance. The Plasma framework is one of the key innovations underpinning the widespread use of blockchain technology. Polygon imagines a future without digital boundaries, where individuals may freely trade value on a global scale without the need for third-party mediators or gatekeepers. For the blockchain sector, this entails a worldwide ecosystem free of technological or brand-related barriers, in which all blockchain networks may freely interchange data. Polygon has already improved industry interoperability and taken the most significant steps toward a borderless digital world. Due to the advantages of the polygon algorithm, it will be a superior choice for deploying web 3.0 on the polygon Blockchain. The primary target of this research is to improve the backend of web 3.0 core functionality on the polygon Blockchain.

**Research Proposal**

**Introduction**

Blockchain is a decentralized distributed community that uses several nodes to share an encrypted virtual database. Any transaction that occurs inside the community is verified, recorded, and stored in a database. The Polygon blockchain contains all Bitcoin transaction records in their entirety. To begin, we will use the Polygon blockchain to create a decentralized internet or application. Polygon blockchain is a system and framework for building and connecting Ethereum-style blockchain networks. Decentralizing the internet entails forming small communities of alternative networked platforms led by users who own and own their personal data rather than giant companies. The polygon Blockchain is a standard candidate for decentralizing the internet.

**Literature Review**

It has existed for about 40 years, since the internet's inception [1]. The World Wide Web is identical to the internet, but it is the most well-known component of the internet that can be classed as techno-social in that it allows people to connect through technological networks [1]. Today's web is vastly different from that of the previous 20 years [1]. The internet has evolved significantly throughout the years and Its current application is essentially indistinguishable from, what it was when it was first developed.

The web's evolution is divided into three versions: Web version 1.0, Web version 2.0, and Web version 3.0 [2]. The first version of the World Wide Web was predominantly a read-only environment. Web 1.0 offers static content rather than dynamic HTML [3]. User information and content were provided via a static file system rather than a database [2,3]. Users and visitors to the websites were only able to access the sides with no repercussions [2,3]. From 1991 through 2004, Web 1.0 was in use [2,3The phrase "Web 2.0" was coined in 1999. Daly Dougherty, vice­president of O'Reilly Media, coined the term "Web 2.0" in 2004 [4]. ""The commercial turbulence in the computer industry induced by the move to the internet as a platform and an endeavor to grasp the rules for success on that platform" is how Web 2.0 is defined. Brand-new platform "in the opinion of Tim O'Reilly [5] .Web 3.0 was created by Tim Berners-Lee and is known as semantic web. Data will be connected to each other in this online version in a decentralized order [5]. But in Web 3.0, users will be able interact with data with the help artificial intelligence and machine learning technology.

The web 3.0 developing community enlarging upon the previous years. Types of working terms on various protocol & components of this instant. Many of the protocol still under construct. Web 3.0 network application typically communicate with mate that are obscure in the staring and have varying quality in terms of speed and reliability [6,7].By using this centralized data store method some new implementations are focused. Blockstack is one of them. Where the users don't need to faith on remote employment. The system is remoted by trust points from the middle of the network and determent Blockchain to secure critical data bindings. Blockstack implements serving for identity, discovery , storage and can service failures of radical Blockchain. The structure of blockstack is acquainted by three years of experience from a big Blockchain based origin system [8]. The creation of a completely decentralized substitute for major internet components including DNS, public-key infrastructure, and storage backends faces several fundamental technological problems [8,9]. Without relying on any distant servers, new users/nodes must develop trust in the network and discover useful data [9]. Decentralized solutions must be able to compete with the regular internet in terms of performance and scalability [8,9].

There are various blockchains behind Web 3.0 development, including Ethereum, Cardano, Solana, Avalanche, and Oracle Chain Link [10,11]. Every blockchain has benefits and drawbacks. However, Ethereum is the preferred blockchain development platform at the moment. Currently, Ethereum uses a proof-of-work algorithm [11,12]. As a result, anyone who wants to add a new node block to the chain must first complete a difficult task that requires a lot of computer processing power. Solving the puzzle "proves" that they used computational resources to "work." Mining is the term used to describe this activity. Mining is generally done by brute force and trial and error, but adding a node block is rewarded with ETH in the end. Every transaction on the Ethereum network has a gas cost [11,12]. According to some research paper, Proof-of-stake is used by the Polygon blockchain [10]. Polygon is working on a scalability solution for Ethereum-compatible blockchains at the interoperability layer two level. Polygon, as a layer-two scaling solution, employs a Proof of Stake validator system for asset security, and staking is an important aspect of the ecosystem [13]. Polygon relies on a group of validators to operate a complete node, create a node block, validate, and commit a checkpoint in the Ethereum Main net [13,14].

The Polygon blockchain contains all Bitcoin transaction data in their entirety. If a single node finds a mistake in the dataset, blockchain will rectify itself by using the thousands of other nodes as a reference point. As a result, no node in the same community can dispose of or control data at the same time. As a result, every Polygon blockchain block's transaction records are irreversibleIf a client tampers with the transaction file, the alternative nodes will cross-reference each other and find the node with wrong data fast [15,16]. This method simplifies the process of creating a specific and clear ledger order. Because of the decentralized nature of the Polygon blockchain, all transactions may be openly inspected using a non-public node or explorers such as Bscscan, Etherscan, and Polygonscan, which let anybody to see transactions in real time [17]. Each node has its own chain replication.

However, Ethereum is the preferred blockchain development platform at the moment. Currently, Ethereum uses a proof-of-work algorithm. As a result, anyone who wants to add a new node block to the chain must first complete a difficult challenge that requires a lot of computer processing power. Solving the puzzle "proves" that they used computing resources to "work."[18] Mining is the term used to describe this activity. Mining is generally done by brute force and trial and error, but adding a node block is rewarded with ETH in the end. Ethereum has created a platform where more complex contracts can be run on the network by allowing for a Turing complete language on the blockchain. Every transaction on the Ethereum network has a gas cost. Polygon blockchain, on the other hand, employs a Proof-of-Stake process. Polygon is working on a scalability solution for Ethereum-compatible blockchains at the interoperability layer two level[17,18]. Polygon, as a layer-two scaling solution, employs a Proof of Stake validator system for asset security, and staking is an important aspect of the ecosystem. Polygon relies on a group of validators to operate a full node, create a node block, validate, and commit a checkpoint in the Ethereum Main net.

Smart contracts are often coded bundles that are stored on a blockchain network when certain conditions are satisfied. On the polygon blockchain, smart agreements control which transactions and data are reflected in the blockchain community [18].Clever contracts provide a number of advantages, including efficiency, accuracy, speed, security, transparency, and so on. Pos Chain, Plasma Chain, Polygon Nightfall, Optimistic Rollups, and Enterprise Chains are all polygon blockchain projects [19]. Those scaling solutions are Ethereum Layer 2 solutions, which are based entirely on fraud proofs and trogon or malicious motion proofs that are immediately presented. As a consequence, the Polygon blockchain combines the best of Ethereum and sovereign blockchains into a compelling feature set. It elevates the back-end Web 3.0 to a whole new level, providing better safety and a better user experience [19].

**Conclusion**

In this regard, polygon blockchain technology looks to be a driving force behind Web 3.0, the ultimate next-generation internet. The way data is stored and maintained is changing thanks to blockchain. It provides a cooperatively maintained global state layer. The Internet's value settlement layer is supported by this one-of-a-kind state layer.

Objectives:

Polygon blockchain is an Ethereum-style blockchain network construction and linking mechanism and foundation. It allows for a Layer-2 scaling solution. It also provides fee and lending solutions with a high level of security, as well as fluent dApp and Dex with optimized performance.

Sub objective:

* Find the suitable blockchain for decentralized Web.
* Make Smart contract-solidity, based on the selected blockchain.
* Do the proper use of framework and scaling solution that are provided by selected blockchain.

Research Question:

Is it feasible to use polygon blockchain on current version of the web 3.0?

Sub Questions:

* How to solve prove-of-work mechanism’s limitation of Ethereum blockchain?
* How to reduce excessive amount of Gas fees of Ethereum blockchain?
* How to analyse and resolve governance dependence?

**Proposed research methodology**

This section outlines the processes required to create a Decentralized Web on the Polygon blockchain. The research will be based on a case study and a strategy of implementation. To begin, we will develop a decentralized internet or application using the Polygon blockchain.[18]. Polygon blockchain is an Ethereum-style blockchain network construction and linking mechanism and foundation. It allows for a Layer-2 scaling solution. It also provides fee and loan solutions with a high level of security, as well as fluent dApp and Dex with optimized performance [19].

Moving on to the next phase, which is to come up with a smart agreement. Smart contracts are often coded bundles that are stored on a blockchain network when certain conditions are satisfied. On the blockchain, smart agreements control which transactions and data are reflected in the blockchain community. Clever contracts provide a number of advantages, including efficiency, accuracy, speed, security, transparency, and so on. The data should be organized in a polygon sequence and the procedure should be followed step by step. The blockchain algorithm should be executed when the data sequence has been organized, and the right result should be noticed. The final stage in implementing the available framework on the blockchain. Pos Chain, Plasma Chain, Polygon Nightfall, Optimistic Rollups, and Enterprise Chains are all polygon blockchain projects. Those scaling solutions are Ethereum Layer 2 solutions, which are based entirely on fraud proofs and trogon or malicious motion proofs that are immediately presented [20].

A predetermined quantity of gas units is required by a smart contract. The amount of gas consumed is determined by the amount of processing power required by the function. Regarding transaction fees, Ethereum adopts a free-market approach to the situation. Gas pricing is determined by transaction issuers, who set the price per unit of gas. According to our findings, the proof-of-painting problem can be resolved by utilizing the Polygon blockchain [20]. It saves cost and time. Increasing the speed and efficiency of the process. Any transaction involving a community that has been validated, documented, and archived. Unlike a database, which organizes information into tables, a blockchain organizes information into blocks [21]. As a result, a blockchain is not the same as a database. The creation of an immutable record is facilitated through decentralized generation. This timeline serves as a repository for completed blocks and documents. A dependency on governance has been resolved. Since the inception of the blockchain, each node has maintained a detailed record of every transaction. Polygon stores all of the Blockchain transactions that have taken place. Errors in the dataset revealed by a single node are repaired by the entire set of nodes on the blockchain. It is possible for nodes within the same community to delete or restrict data in this manner. Transactions on the polygon blockchain are then immutable. An unapproved user who tampers with the transaction file will be easily identified by the other nodes. This method simplifies the method of developing ledger transactions. Transparently inspecting all transactions on the Polygon blockchain is accessible with the use of a non-public node or an explorer such as Bscscan, Etherscan, or Polygonscan [22].

As a consequence, the Polygon blockchain combines the best of Ethereum and sovereign blockchains into a compelling feature set. It elevates the back-end Web 3.0 to a whole new level, providing better safety and a better user experience.

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