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The rise of blockchain infrastructure has led to the rapid deployment of tens of thousands of decentralized applications. Despite this success, blockchain adoption is hampered by the immaturity of the technology stack: the need to understand multiple programming languages, lack of infrastructure to support the developer, poor DAO infrastructure, high costs, low throughput limits, lack of standardisation and numerous security concerns. To support mass adoption in the web3 era, blockchain infrastructure needs to provide a better infrastructure as an easy to build, trusted, scalable, cost-efficient, and continually improving platform for building widely-used applications.

This paper introduces CodeX, a multichain development solution focused on ease of development, security, scalability, reliability, and upgradeability, to address these challenges. It offers novel innovations in seamless development by providing a “zero code” programming language, an EVM-to-CosmWasm bridge, system security, performance and decentralization. The combination of these technologies paves the way to mass web3 adoption.

Specifically, CodeX offers the following features:

- Native integration of zero code programming languages built on Solidity, Rust, Scala, Ruby and others.
- Integrated cross-chain bridging technology between EVM-compatible chains and CosmWasm, without the overhead and security concerns of “rolling your own”.
- Security and scalability are achieved by combining proof-of-stake with proof-of-contribution, leveraging the Ignite (formerly Tendermint) consensus algorithm.
- The CodeX blockchain natively integrates and internally uses zero code programming language for easy to deploy and seamless transaction execution. The zero code language is built on several languages such as Solidity, Rust, Scala, Ruby as the base and supported by multiple other languages, including Java, C++, Python, and NodeJS. There are 4 different levels in order to generate the zero code as the goal. The first step is having the Library collaborating with programming veterans to generate the code by building from scratch. Step 2 is providing the translation languages from the base Library provided by the veteran programmers. The third step, from the previous step, therefore CodeX can generate Block based execution for developers to be able generate Block based smart contracts by dropping the tasks and deploy. In this step, the developers are required to understand the basic understanding of how a smart contract works but no need to code from scratch. The final step is the zero code generator where CodeX has all necessary resources for developers to build DApps without coding. Because of the zero code developed by multiple programming languages it allows developers to better protect their software from malicious entities as it is safer for the smart contract.
- CodeX allows developers to bridge from EVM-compatible blockchains to CosmWasm. Therefore CodeX supports developers to have the vision of multichain and give a seamless way to build it. The CodeX blockchain does not put such limitations on developers.

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- The CodeX blockchain leverages a combination of proof-of-stake and proof-of-contribution. The proof-of-stake increases security. While proof-of-contributor quantifies user behaviors and actions in a blockchain-based application as contribution values calculated through an algorithm. It supports the zero code language programming that CodeX developed. For instance the combination gives a better performance in terms of lower gas fee, higher transaction processing and better scalability for developed seamless applications for mass adoption and to rapidly deploy new technology innovations and support new web3 use cases.
- The CodeX blockchain is a decentralized autonomous organization (DAO) governed by a diverse community. It ensures equal voting power for all token holders, avoiding control by large entities. Participants undergo a Know Your Customer (KYC) process to enhance security and prevent malicious activities. The native CodeX token serves various functions, including transaction fees and governance voting. The CodeX Foundation, operated by the team, supports ecosystem development, manages funds, and provides educational resources. Together, these elements create a secure, inclusive, and community-driven blockchain ecosystem.

  Finally, the CodeX blockchain is experimenting with future initiatives to scale up a mass adoption and seamless development for web3 use cases and real world applications by providing a simple way to develop applications and giving infrastructure that can make things easier for developers.

Introduction

Background

Blockchain projects have grown rapidly, according to CoinMarketCap there were more than 23,000 crypto projects in operation as at March 2023. In addition, there are upwards of 300 million cryptocurrency users globally, and approximately 18,000 businesses now accept a form of crypto as payment. In the previous version of the Internet, known as web2, centralized companies like Google, Amazon, Apple, and Meta provided services such as messaging, social media, finance, gaming, shopping, and audio/video streaming. These companies had direct access to user data and used application-specific software optimized for specific use cases. They also used cloud infrastructure to deploy these applications to users. Cloud infrastructure provides access to virtualized and/or physical infrastructure services, such as rented virtual machines and bare metal hardware operating inside data centers worldwide. However, this version of the Internet required users to place trust in centralized entities, which has become increasingly concerning to society, as data breaches become ever more prevalent.

A new version of the internet called web3 has emerged to address concerns about security and trust. It uses blockchains to provide a decentralized, permissionless and secure way for users to interact with each other without the need for intermediaries or centralized entities.

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Similar to how web2 relies on cloud infrastructure, web3 applications can use blockchains as a decentralized infrastructure layer to reach a global audience.

Despite the availability of many blockchains, web3 has not been fully embraced. Existing blockchains have limitations such as high fees, low throughput, high latency, security issues, and lack of real-time responsiveness. Unlike web2 services, which have reached billions of users, blockchains have not yet enabled web3 applications to do the same.

Unfortunately, blockchain usage is not yet ubiquitous due to frequent outages, high costs, low throughput limits, and numerous security concerns. To enable mass adoption in the web3 era, blockchain infrastructure needs to follow the path of cloud infrastructure as an easy and friendly to develop, trusted, stable, scalable, cost-efficient, and continually improving platform for building widely-used applications.

Following the growth of Web3, DAO also emerged. According to DeepDAO, there are already over 216 DAOs in the market with about $10bn in assets under management (AUM) and around 2 million members across them. While DAOs look promising, ч. In no particular order, some challenges that rock most DAOs currently are poor infrastructure,d Navigating Smart Contracts - Risks and Un-immutability, People (Community) Over Profit or Just a bunch of rich folks combining to increase their earnings.

In addition, according to data from CoinMarketCap, there are currently over 10,000 cryptocurrencies or digital assets in existence. This includes well-known projects such as Bitcoin, Ethereum, Binance Coin, and Tron, as well as lesser-known projects with smaller market capitalizations. Unfortunately, following the growth of blockchain and its projects, an estimated 80% of projects launched in 2017 and 2018 failed or were outright scams and some projects may have failed due to technical issues or lack of adoption. Referring to failed technical issues and lack of adoption, the number of blockchain developers is currently smaller than the number of web 2.0 developers. This is because blockchain technology is a relatively new and specialized field that requires a unique set of skills and knowledge. According to a survey conducted by LinkedIn in 2019, there were an estimated 23,000 blockchain-related job openings in the United States alone, compared to over 151,000 job openings for web developers. Meanwhile, becoming a blockchain developer is challenging due to several reasons:

1. Complexity: Blockchain technology is complex and requires knowledge in various areas such as cryptography, distributed systems, consensus algorithms, smart contracts, and more. As a result, it can be difficult to learn and understand all the concepts necessary to become a proficient blockchain developer.

2. Rapidly evolving field: Blockchain technology is still a rapidly evolving field with new developments and updates emerging all the time. As a result, staying up to date with the latest trends and advancements can be challenging and requires continuous learning and adaptation.

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3. High demand: The demand for blockchain developers is high, and competition for jobs in the field is intense. This means that candidates need to have exceptional skills, experience, and knowledge to stand out from the crowd.

4. Limited resources: As blockchain technology is relatively new, there is a limited amount of learning resources available compared to more established, “traditional” developer resources.

Furthermore, following the adoption of the tech, the market has fragmented. While it is common to talk of operations “on the blockchain”, there is no single blockchain. In order to capture maximum market share, projects need to operate seamlessly across multiple blockchains (“cross-chain” / “multi-chain”), in a manner that is both efficient and secure. “ Unfortunately, the connection points between chains (so-called “bridges”) are often a weak link in the robustness of smart contract logic, and have become targets for malicious actors to attack the ecosystem for financial gain”.

There are many potential benefits to using a multichain approach in blockchain projects, including scalability, interoperability, diversity, and resilience. However, implementing a successful multichain project can be challenging and requires careful planning, design, and execution yet requires significant technical expertise, careful planning, and a clear understanding of the unique challenges involved. For example it is easier to integrate with an EVM compatible ecosystem or Cosmos ecosystem but still challenging to connect between EVM and CosmWasm. EVM-compatible code cannot be directly deployed in CosmWasm because they are two different virtual machines with different architectures and programming languages. Although projects like Cosmos-ETH can enable interoperability between the two networks, allowing for the execution of EVM-compatible smart contracts on Ethereum while leveraging the benefits of CosmWasm for other use cases, it still remains significantly more complicated for blockchain projects to have mass adoption across blockchains that lack native compatibility.

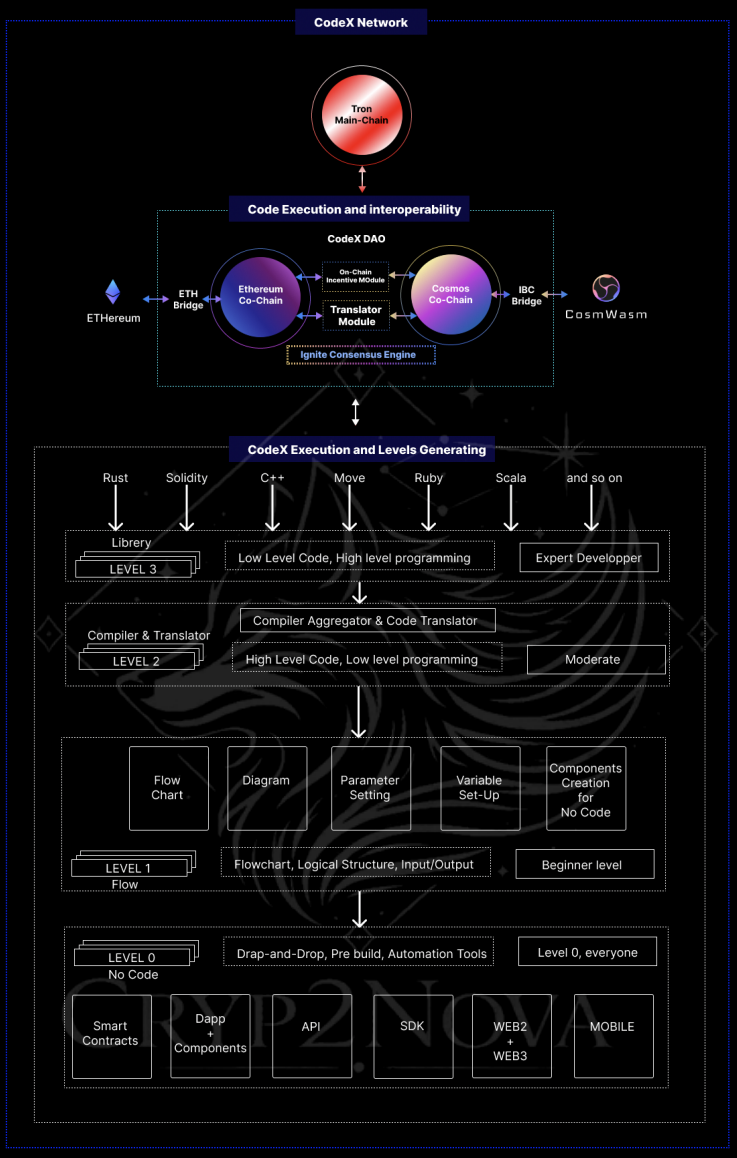
Vision

CodeX is a dedicated project for the mass adoption of blockchain users. We propose a highly abstracted smart contract language that allows users of various levels of experience to rapidly develop effective code without the need for a deep low-level understanding of the technology underpinning the blockchain. We provide connective technology between the Cosmos and Ethereum ecosystems, allowing DApps to access the benefits of multichain deployment without the need to reinvent the complex wheel of cross-chain bridging. In addition, CodeX operates as a decentralized autonomous organization (DAO) with equal voting power for all token holders, promoting a fair and inclusive governance model. Furthermore, CodeX offers public blockchain support of high throughput, low transaction fees, high scalability, and high availability for all Decentralized Applications (DApps).

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Overview

Compatibility CosmWasm SDK and EVM



Translator Module and Ignite (formerly Tendermint) Consensus Engine based

Combining the Ethereum Virtual Machine (EVM) and CosmWasm can provide developers with a powerful set of tools to build decentralized applications.

Cosmos SDK-based blockchain: The first step is to create a Cosmos SDK-based blockchain that supports both the EVM and CosmWasm. This involves setting up a new blockchain with the Cosmos SDK and then integrating the EVM and CosmWasm modules into the blockchain.

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Configure the EVM module: Once the EVM module is integrated into the blockchain, we will configure it to work with the CosmWasm module. We will define the gas limit, gas price, and other parameters that affect the behaviour of the EVM.

Develop smart contracts using CosmWasm. These smart contracts can interact with the EVM module to execute Ethereum-style transactions.

Deploy smart contracts on the EVM. Developed the smart contracts, deployed them on the EVM module. This will allow them to be executed using the Ethereum Virtual Machine.

Interact with smart contracts using the EVM: Once the smart contracts are deployed on the EVM, it is possible to interact with them using Ethereum-style transactions. This allows you to call functions and execute code within the smart contracts.

Use the Cosmos SDK to manage state: The Cosmos SDK can be used to manage the state of the blockchain, including the state of smart contracts. This allows it to track the execution of smart contracts and update the state of the blockchain accordingly.

Proof-of-stake combined and proof-of-contribution

Combining "proof-of-Stake" (PoS) and "proof-of-Contribution" (PoC) could potentially create a unique consensus mechanism that incorporates different aspects of these protocols. Here's a possible approach:

- proof-of-Stake (PoS): In this component, validators are chosen based on the amount of cryptocurrency they hold and "stake" in the network. Validators are selected randomly or through a deterministic algorithm, and their chances of being selected to create a block are proportional to the amount of cryptocurrency they have staked. PoS ensures network security by requiring validators to have a financial interest in the blockchain's stability.

- proof-of-Contribution (PoC): PoC focuses on rewarding participants for their contributions to the ecosystem's growth and scalability. Developers or community members who actively contribute to the blockchain network's development, performance improvements, scalability solutions, or community engagement are recognized and rewarded. Their contributions can be evaluated and measured based on predetermined criteria.

In this combined approach, validators in the network would be selected through the PoS mechanism. They would then participate in the block creation process by providing a proof-of-their stake. Additionally, validators who actively contribute to the development and growth of the ecosystem, as measured by PoC criteria, would receive additional rewards or recognition.

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This combination aims to create a consensus mechanism that ensures network security, establishes a trustworthy timeline, and rewards participants for their valuable contributions to the ecosystem.

How does it work?

Combining "proof-of-Stake" (PoS) and "proof-of-Contribution" (PoC) in a consensus mechanism would involve designing a system that incorporates the features and benefits of each component. Here's a high-level design outline:

1. Validator Selection (proof-of-Stake):
- Validators are chosen based on the amount of cryptocurrency they hold and "stake" in the network.
- Validators can lock up their tokens as collateral to demonstrate their commitment to the network's security and stability.
- The selection process can be random or deterministic, with the probability of selection proportional to the amount of stake held.

2. Contribution Evaluation and Rewards (proof-of-Contribution):
- Define criteria for evaluating and measuring contributions to the network's growth, scalability, and community engagement.
- Set up a transparent evaluation process to assess the contributions made by developers or community members.
- Contributions can include code contributions, performance improvements, scalability solutions, community support, documentation, or other relevant factors.
- Validators who actively contribute and meet the criteria receive additional rewards or recognition.

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3. Consensus Process:
- Validators participate in the block creation process based on their stake and selection.
- Validators that have made significant contributions (according to the proof-of-Contribution criteria) can be given additional weight or influence in the consensus process.
- Consensus can be achieved through mechanisms such as Byzantine Fault Tolerance (BFT) or Practical Byzantine Fault Tolerance (PBFT), where a certain percentage of validators must agree on the validity of a block.

4. Rewards and Incentives:
- Validators receive rewards for their participation and successful validation of blocks, typically in the form of cryptocurrency tokens.
- Additional rewards or incentives are given to validators who have made notable contributions, encouraging ongoing participation and contribution to the ecosystem's growth.

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5. Governance and Upgrades:
- Establish a governance structure that allows validators and token holders to participate in decision-making processes related to network upgrades, protocol changes, and parameter adjustments.
- Validators with significant contributions can have an influential role in shaping the network's future direction.

This is a high-level design that combines PoS and PoC. The specifics of implementation, including the algorithms, evaluation criteria, and incentive mechanisms, would require further detailed analysis, testing, and refinement based on the specific requirements and goals of the blockchain project.

Xpander and Sequential Level Programming (zero code)

Xpander is a language aggregator and compiler that allows developers to choose their preferred programming language and provides a flexible and safe environment for smart contract, Dapp, API, and SDK development. One of the unique features of Xpander is the Sequential Code Level section, which offers different levels of programming based on the user's technical expertise. Let's explore each level:

Level 0: zero code
The zero code level is the most user-friendly level, designed for non-technical users who want to build basic applications without writing any code. At this level, the user interacts with a graphical user interface (GUI) that provides pre-built templates, drag-and-drop components, and automation tools. The user can customize the look and feel of the application, add content, and define basic workflows.

Level 1: Flow
The flow level is designed for users who want to create more complex applications that involve multiple steps, decision-making, and integration with external services. At this level, the user can create flowcharts that define the logical structure of the application. Each block in the flowchart represents a task or a decision, and the user can define the inputs, outputs, and parameters for each block. The flowchart can be exported to code, which can then be edited and customized. The flow generated the final block where zero code required to be used for the level 0 or called zero code.

Level 2: Code Translator
Code translation is the process of converting source code written in one programming language into equivalent code in another programming language. The source code in the original language is translated into a target language that can be executed on a different platform or system. Users can easily translate Solidity programming language to Rush, C, and many more with seamless process. But it requires an understanding of the programming

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language. Our infrastructure is to make the process seamless without re-writing the code from the start. The code from translation can be converted to Flow on level 1.

Level 3: Library
The library level caters to users who want to create reusable components and modules that can be utilized across multiple applications. Users can write code that encapsulates specific functionality, such as data access, authentication, or user interface components. These code snippets can be packaged as libraries, allowing them to be shared with other users, promoting code reusability and collaboration.

By offering these sequential code levels, Xpander aims to provide developers with a flexible and inclusive environment that matches their skill levels and preferences. Whether users prefer a zero code approach, flowchart-based development, code translation, or library creation, Xpander facilitates a smooth development experience while emphasizing safety and flexibility in smart contract and application development.

1.Xpander allows developers from low level code, to work with the most used language programming to use, and build libraries to be able to have more resources and flexibility.
2.The developers can choose to use Rust, Solidity, C++, Move, Rubi, Scala and other programming languages to create very large developers tools.

3.When the libraries are integrated Xpander will select the most safe and reliable compiler for each different language and start to create the database of the Flow Level.

4.On Flow Level, users can start to interact in a simple way with components, blocks and start to create Tools, Smart Contracts, APIs, SDKs and more, using a simple flow level based on objects, parameters and variables.

5.When the Flow Level is done, no Coder Users can start to use all the existing Components and Tools in an easy way. Just choose what they want to use, set up name, numbers and use all the existing tools.

In advance of this simple mechanism, any Low Level can require the High level to build and create missing components. This structure will be the base of the proof-of-Contribute.

How it work for developers

The zero code programming language is designed to be user-friendly and intuitive, enabling even non-programmers to generate smart contracts, DApps, websites, APIs, and SDKs by simply providing inputs and utilizing pre-existing blocks.

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The CodeX ecosystem fosters collaboration and innovation by allowing expert programmers to contribute to the library and security of the main language. Intermediate-level programmers can leverage the zero code language's flow diagram capabilities to generate blocks and execute code. If a specific tool or functionality is missing from the library, programmers can request it through a bounty program, incentivizing experts to create the missing components.

This circular collaboration enables participants at different skill levels to profit, improve the codebase, and empower individuals to code without the need for traditional programming skills. The proof-of-contribution system ensures that developers and non-developers alike can contribute to the ecosystem by creating new libraries, compilers, security tests, flows, and block modules.

The CodeX language supports multiple programming languages and platforms, making it versatile and adaptable. It incorporates versioning and management capabilities through a package manager, facilitating code organization and maintenance.

Overall, CodeX provides a flexible, scalable, and inclusive approach to application development, empowering individuals with varying levels of technical expertise to participate and contribute to the blockchain ecosystem.

Components of the CodeX ecosystem.

Every signed transaction in the CodeX blockchain contains the following information:

1. Transaction authenticator: A digital signature or multiple digital signatures that verify the approval of the transaction initiator.

2. Sender address: The blockchain account address of the transaction sender.

3. Payload: Parameters or functions to be processed within the transaction, which can be existing on-chain entry functions or in-line bytecode (scripts).

4. Gas Price: The amount the initiator is willing to pay per unit of gas to process the transaction. Gas is used to pay for computation, networking, storage, and validation of transactions.

5. Maximum gas amount: The maximum number of gas units the transaction is allowed to consume before aborting. Sufficient gas funds must be available in the sender's account.

6. Sequence number: A sequential marker of the transaction that must match the sequence number stored in the sender's account. It prevents replay attacks.

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7. Expiration time: A timestamp defining the point after which the transaction request is no longer valid.

8. Chain ID: Identifies the blockchain for which the transaction is valid, preventing replay across different blockchain environments.

To protect against unintentional or unauthorized transactions, the CodeX blockchain employs the sender's sequence number, transaction expiration time, and designated chain identifier. These measures ensure the validity and security of transaction signatures.

CodeX accounts support key rotation, enabling the reduction of risks associated with private key compromise. Key rotation can be delegated to trusted entities, and policies can be defined for key rotation under specific circumstances. This provides users with more flexibility and enhances key management transparency.

The CodeX blockchain allows parallel transaction execution to maximize concurrency. The Xpander data model supports global addressing of data and modules, facilitating parallel execution. The block-engine optimizes parallel execution by managing conflicts, executing transactions in batches, and validating the results.

Trusted Execution Environments (TEEs), such as ARM TrustZone and Intel SGX, are used to enhance security in the CodeX blockchain. TEEs provide hardware-based security features that protect code and data from unauthorized access, tampering, or theft.

Ledger certification is implemented to ensure the integrity and validity of the ledger history and state. Validators sign and authenticate the ledger data structure, including transaction execution outputs and state write sets. Ledger history and periodic state certification enhance trust and allow for efficient state synchronization.

The CodeX blockchain provides a flexible state synchronization protocol that caters to different participants' needs, such as full nodes and light clients. Participants can choose synchronization strategies based on their requirements, optimizing for resource constraints and network heterogeneity.

CodeX DAO & Community Ownership

The CodeX blockchain is designed to be a fully decentralized autonomous organization (DAO), ensuring that decision-making power and ownership of the network are distributed among a diverse and inclusive community. The DAO framework implemented by CodeX will optimize voting power equally, irrespective of the number of tokens held by participants. This approach ensures that no single entity or large token holder can exert undue control over the ecosystem, promoting a fair and democratic governance system.

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To safeguard the integrity of the ecosystem and prevent malicious activities, the CodeX community will implement a Know Your Customer (KYC) process. This process will require participants to undergo identity verification before they can actively participate in governance and voting activities. By implementing KYC measures, the CodeX blockchain aims to maintain a secure and trustworthy environment for its community members.

The native CodeX token will serve as the primary utility token within the ecosystem. It will be used for various purposes, including transaction and network fees, governance voting on protocol upgrades, and participating in on-chain/off-chain processes. The blockchain's security will be ensured through a combination of proof-of-stake (PoS) consensus and proof-of-Contribution. These mechanisms work together to validate transactions, secure the network, and maintain consensus.

Operating alongside the blockchain, the CodeX Foundation will be managed by the CodeX team. The foundation will play a crucial role in supporting the growth and development of the ecosystem. This includes providing resources for building and maintaining the infrastructure, managing funds and investment portfolios, and offering educational programs to empower the community with the knowledge and skills needed to leverage the CodeX platform effectively.

By embracing decentralization, implementing KYC measures, utilizing the native CodeX token, and establishing the CodeX Foundation, the CodeX blockchain aims to create a vibrant and sustainable ecosystem that empowers its community members and fosters innovation in the blockchain space.

Pre-signing transaction transparency

One of the biggest issues these days is wallet protection. To improve it and create a high level of security, let's create a pre-transaction execution. A precautionary measure to explain to the user (in human-readable form) the outcome of the transaction before signing. Combining this with a known history of previous attacks and malicious smart contracts can reduce fraud. Additionally, CodeX Wallet allows you to limit transactions while they are running. Violation of these limits will abort the transaction to further protect users from malicious applications and social engineering attacks.

Conclusion

In conclusion, CodeX presents a comprehensive multichain development solution that addresses the challenges of ease of development, scalability, security, reliability, and upgradeability in the blockchain space. By offering a zero code programming language and bridging capabilities between EVM-compatible chains and CosmWasm, CodeX enables seamless development and cross-chain compatibility without compromising on security or performance. The integration of proof-of-stake and proof-of-contribution ensures a robust and scalable blockchain infrastructure. Moreover, CodeX operates as a decentralized autonomous organization (DAO) with equal voting power for all token holders, promoting a

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fair and inclusive governance model. The CodeX Foundation supports ecosystem development and provides educational resources to foster community growth. With these advancements, CodeX aims to drive mass adoption of web3 applications while offering a user-friendly and secure development environment for developers.

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