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EXECUTIVE SUMMARY

The NCOG ecosystem (NCOG Search Engine, NCOG Earth Chain, NCOG Pay, and the \$NCOG token) essentially aims towards providing a platform that facilitates the monetary incentivization of its users through a connected world of activity. Simply, NCOG pays users to various online activities including but not limited to browsing, sharing, shopping, and generally participating in a connected world.

NCOG's "big idea" is the targeted incentivization of a connected world. The monetary incentivization of NCOG's users for their online and smartphone activities will correspond to a significant increase in user-advertiser and user-affiliate interaction. This increase in exchange provides greater monetization for each NCOG user and ultimately increases revenue for NCOG's partners.

NCOG has created an online currency and monetary mechanism known as the NCOG Pay and \$NCOG Tokens which are minted on our independently generated NCOG Earth Chain. \$NCOG tokens are the currency NCOG users are paid for their various revenue-generating activities. A commission is paid to our users instantly every time revenue is earned within the NCOG.com portal by using the portal and its many features. \$NCOG is also earned outside the NCOG portal through NCOG's affiliates and 3rd party sites. One feature that makes NCOG distinct from all other competitors is instant gratification. When a member performs any revenue-generating activity they are immediately paid in \$NCOG. The Miles can then be used to purchase goods or services in the outlet center or can be converted to other currencies (dollars, euros, yen, etc.) via the NCOG exchange center. People will also be able to spend their \$NCOG directly taking advantage of the millions of items listed in the NCOG Outlet Center. The NCOG Outlet Center currently boasts 1.8 million brand-name products.

The NCOG Search Engine is a Meta-Search Engine that is on its transformative pathway towards becoming a decentralized and distributed search engine with advanced algorithms that pave the way for the "Internet of Tomorrow". The NCOG search engine integrated various technologies such as blockchain, AI, ML, AR, and VR in order to create a plethora of online activities that bring technological advancements to the very way we connect ourselves to the internet.

Moreover, it gamifies the online and offline activity of its users by incentivizing them for almost anything and everything that they do in their daily lives. Data is a commodity and consumers are the ones that generate it and we believe that they do deserve a piece of the pie they bake. NCOG helps create data awareness among its users and allows them to leverage it to earn revenues of their own.

The NCOG Earth Chain is the fastest blockchain in the world by TPS (Transactions per Second). Integrating our own multi-chain system with our processes makes it possible for our users to enjoy Instant transactions, extremely low gas fees due to our model, and the feeling of instant gratification like never before. The NCOG ship is about to set sail towards the "Internet of Tomorrow"! **Step on the NCOG Ark into the Future!**

MISSION STATEMENT

The NCOG's mission is to create a globally successful company around the premise that the monetary incentivization of web services and consumer data, the integration of decentralized technologies such as blockchain, and the leveraging of technological advancements such as Artificial Intelligence and Machine learning to enhance and bring innovation to the general online user experience will provide the strongest value proposition to NCOG's users, advertisers, affiliates, and stakeholders.

VISION STATEMENT

To see NCOG become a household name and a leader in web services globally and a pioneer in the global transition from an overused Web 2.0 to a decentralized Web 3.0 before the end of the decade on par and in

competition with names such as Facebook, Microsoft, and Google. NCOG will be responsible for normalizing data incentivization and a transition to the “Internet of tomorrow”!

INTRODUCTION

What is the NCOG Search Engine? NCOG Earth Chain

Although blockchain technology enables a consensus to be maintained across all nodes without the need for a central authority, challenges like delayed transaction settlement and scalability continue to impede its use in everyday life. However, smart contract systems that enable quicker confirmation times give optimism for the future of blockchain. The poor pace of new ledgers is a key barrier, but a new model called NCOG has been created utilizing Direct Acyclic Graphs (DAG) to tackle chronic difficulties in current public distributed ledger technologies and enhance speed and efficiency. The forest Protocol, which has been incorporated into the structure of the NCOG Earth Chain, has been accepted by the NCOG platform and is designed for usage by any apps created on top of it, including quick transactions with near-zero transaction fees. NCOG's purpose is to guarantee interoperability across all transaction bodies globally and to build a network that enables real-time transactions.

NCOG is a cryptocurrency that seeks to be extensively used in a variety of sectors, including telecommunications, banking, and logistics. The business intends to build its Smart Contract-based ecosystem, to which all partner companies globally will have access. The NCOG Foundation aspires to be a pioneer in the future generation of distributed ledger technology, with great accuracy and dependability in their transactions. Decentraland is a blockchain-based open-source platform built for creativity and cooperation that enables users to construct decentralized apps (DApps).

NCOG envisions a future in which quick and straightforward transactions allow for simple and convenient purchases from the comfort of one's home or office. The business created DAG technology to make global monetary systems compatible with one another and to establish new, highly reliable infrastructures. This technology promises to promote smooth and quick transactions with minimal transaction costs, making purchasing simpler for consumers and creating a more efficient global economy.

PROBLEM STATEMENT

The present financial system has limits, and many people feel that blockchain technology may solve these problems. For blockchain to be generally embraced, NCOG thinks it must be readily transferred, irreversible, and fee-free. However, existing blockchain systems have constraints that prohibit them from achieving this requirement, such as long confirmation times or large transaction costs. This year is expected to be a good one for blockchain technology

Issues of scalability

Traditional blockchain networks need all nodes to validate and store a single block, resulting in longer production times. The size constraints also prohibit the chain from being indefinitely stretched, resulting in network constraints that significantly affect performance. The parallel technique used by NCOG tries to overcome these challenges by executing more operations and breaking down these delays.

Fees

The blockchain's transaction fees are an essential part of its financial attractiveness. These fees are given to block miners in exchange for transaction confirmation. The block reward also incentivizes consensus participants and protects against DDOS and staking threats. NCOG, on the other hand, feels that exorbitant

fees for a scalable blockchain with a huge user base may deter innovation. As a result, the organization is looking into ways to reduce these expenses or discover alternate alternatives.

History data

Blockchain technology is a safe and creative technology that is being utilized in a variety of businesses. However, it can only store information in blocks and cannot retrieve data from other sources for verification. This implies that to have real-world applicability, an extra layer capable of storing past transactions alongside those included in current blockchains must be created. NCOG thinks that this extra layer might contain features such as keeping accounting data that are constantly available without having to revert to previous versions.

Ordinary users face two fundamental problems

A search query made by two different users will often yield very different results. Due to Google's ability to collect a tremendous amount of user information, it adjusts its search results accordingly. In addition, many other factors are taken into account, such as location, previous user requests, local laws, etc.

Google is frequently criticized for its unclear mechanism of indexing links, which is the main complaint from users. For example, one piece of content may appear very relevant to a given query, whereas another appears far below the top twenty results, containing much more relevant content.

Privacy concerns surrounding search engines

Search Engines have been criticized for collecting data about Internet users, tracking them aggressively, disclosing too much information to governments, and used for other marketing activities without giving credit (Monetary Benefits) to their users.

The practice of collecting data about Internet users, tracking them aggressively, and disclosing too much information to governments have been criticized for a long time.

Google and other search engines use algorithms that are hidden and controlled by a few powerful people. Using decentralization, we can make information open and community-driven

Isn't it time we moved on to Web 3.0?

Web 2.0, which emerged in the early 2000s, brought about a significant shift in the way we use the internet. It introduced dynamic and interactive features, such as social media, blogs, and user-generated content, which made the internet a more collaborative and engaging space. However, as technology continues to advance, it's becoming clear that Web 2.0 is no longer sufficient for meeting the needs of today's internet users.

One of the main limitations of Web 2.0 is its centralized architecture. This means that a small number of large companies, such as Google and Facebook, control a large amount of the data and information on the internet. This centralization has led to issues such as data privacy breaches and censorship, as well as a lack of control for users over their own data.

Web 3.0, also known as the "Semantic Web," aims to address these issues by creating a decentralized and more intelligent internet. Instead of relying on centralized servers to store and manage data, Web 3.0 utilizes distributed ledger technology, such as blockchain, to create a decentralized network of computers that work together to store and share data. This decentralized architecture gives users more control over their own data and allows for greater security and privacy.

Web 3.0 also aims to create a more intelligent internet by using artificial intelligence and machine learning to make sense of the vast amount of data available online. This will enable the development of more sophisticated search algorithms, personalized recommendations, and automated decision-making, which can greatly improve the user experience.

In addition, Web 3.0 will also make it possible to have decentralized applications or dApps, which are built on blockchain technology and thus offer a more transparent, secure, and efficient way of carrying out transactions and operations.

Overall, while Web 2.0 has greatly improved the way we use the internet, it's clear that we need to move on to Web 3.0 to fully realize the potential of the internet as a decentralized, intelligent, and secure network that truly serves the needs of all users.



OUR SOLUTION

As a means to solve the problems of existing blockchain solutions, NCOG aims to develop a new implementation of DAG-based solution, which intends to create a new platform that improves the scalability and versatility of existing DAGs. In a DAG-based blockchain, transactions are grouped into blocks and linked together in a graph-like structure. This will result in faster transaction confirmation times, as transactions can be confirmed in parallel rather than waiting for a new block to be added to the chain. NCOG's technology is intended to create potentially infinite scalability, and process hundreds of thousands of transactions per second even with large numbers of nodes participating in the network.

The NCOG Earth Chain is intended to solve the scalability limitations of existing blockchain with **the Forest Protocol**. This is intended to be achieved by adopting a method where a single event block verifies the previous transaction, and transactions are verified and processed asynchronously without being approved by the miners as in prior blockchains. Thus, increased transactional load will not lead to delayed approval or bottleneck effects. It intends to also manage historical information on its own without being assisted by external databases such as the Oracle/MySQL/PGSQL Databases. Event blocks that store information from transactions that arise include multiple data packages. A data package may include transactions, Smart Contracts, historical information, reputation management, and rewards. The NCOG Earth Chain intends to make the processing infrastructure in our society more transparent and reliable. With fast and safe processing methods based on DAG and independent management of historical information, the Forest protocol is intended to be expanded into various industries along with Smart Contracts.

NCOG's platform has a unique technology, NCOG Earth Chain is a new type of distributed infrastructure that intends to solve the scalability issues of existing blockchains through the rapid processing of blocks on large scale. NCOG Earth Chain intends to process in real time not only transaction information but also event block data in a distributed environment.

FOREST PROTOCOL

We introduce our Forest protocol, denoted by F to reach faster consensus using topological ordering of events for an asynchronous non-deterministic distributed system that guarantees BFT with deterministic finality. The core idea of Forest is the NCOG's DAG, which is a block DAG. Nodes generate and propagate event blocks asynchronously and the Forest algorithm achieves consensus by confirming how many nodes know the event blocks using the NCOG's DAG. In Forest protocol, a node can create a new event block, which has a set of 2 to k parents. NCOG DAG is used to compute special event blocks, such as Root, Clotho, and Atropos. The Main chain consists of ordered Atropos event blocks. It can maintain reliable information between event blocks. The NCOG's DAG and Main chain are updated frequently with newly generated event blocks and can respond strongly to attack situations such as forking and parasite attack. We introduce Staked Dag protocol which presents a general model that integrates Proof of Stake model into DAG-based consensus protocol Forest. Both generate blocks asynchronously to build a weighted DAG from Validator blocks. Consensus on a block is computed from the gained validating power of validators on the block. We use Lamport timestamp, Happened-before relation between event blocks, graph layering and hierarchical graphs on the weighted DAG, to achieve deterministic topological ordering of finalized event blocks in an asynchronous leaderless DAG-based system. The Forest protocol allows dynamic participation so that any participant can join the network at any point of time. Assigned layers are used to achieve deterministic topological ordering of finalized event blocks in an asynchronous leaderless DAG-based system.

The important concepts of Forest protocol are as follows:

- Event block: Nodes can create event blocks. Event block includes the signature, generation time, transaction history, and reference to parent event blocks.
- Happened-before: is the relationship between nodes which have event blocks. If there is a path from an event block x to y , then x Happened-before y . “ x Happened-before y ” means that the node creating y knows event block x .
- Lamport timestamp: For topological ordering, Lamport timestamp algorithm uses the happened-before relation to determine a partial order of the whole event block based on logical clocks.
- Stake: This corresponds to the amount of tokens each node possesses in their deposit. This value decides the validating power a node can have.
- User node: A user node has a small amount stake (e.g., containing 1 token).
- Validator node: A validator node has large amount of stake (≥ 2 tokens).
- Validation score: Each event block has a validation score, which is the sum of the weights of the roots that are reachable from the block.
- NCOG’s DAG: is the local view of the DAG held by each node, this local view is used to identify topological ordering, select Clotho, and create time consensus through Atropos selection.
- S-NCOG DAG: is the local view of the weighted Directed Acyclic Graph (DAG) held by each node. This local view is used to determine consensus.
- Root: An event block is called a root if either (1) it is the first event block of a node, or (2) it can reach more than $2/3$ of the network’s validating power from other roots. A root set R_s contains all the roots of a frame. A frame f is a natural number assigned to Root sets and its dependent event blocks.
- Clotho: A Clotho is a root at layer i that is known by a root of a higher frame $(i + 1)$, and which in turns is known by another root in a higher frame $(i + 2)$.
- Atropos: is a Clotho assigned with a consensus time.
- Main chain: Staked Dag’s Main chain is a list of Atropos blocks and the subgraphs reachable from those Atropos blocks.

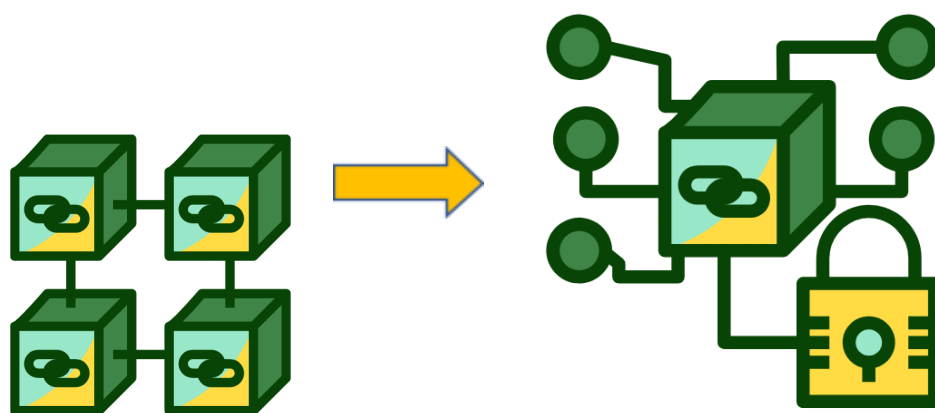
Regarding the fairness, PoW protocol is fair because a miner with p_i fraction of the total computational power can win the reward and create a block with the probability P_i . PoS protocol is fair given that an individual node, who has W_i fraction of the total stake or coins, can a new block with W_i probability. However, in PoS systems, initial holders of coins tend to keep their coins in their balance in order to gain more rewards. NCOG’s Forest protocol is fair since every node has an equal chance to create an event block. Nodes in Forest protocol can enter the network without an expensive hardware like what is required in PoW. Further, any node in Forest protocol can create a new event block with a stake-based probability, like the block creation in other PoS blockchains. In a PoS blockchain system, it is a possible concern that the initial holders of coins will not have an incentive to release their coins to third parties, as the coin balance directly contributes to their wealth. Unlike existing PoS protocols, each node in Forest protocol are required to validate parent event blocks before or can create a new block. Thus, the economic rewards a node earns through event creation is, in fact, to compensate for their contribution to the on-chain validation of past event blocks and its new event block. Forest protocol is more intuitive because our reward model used in stake-based validation can lead to a more reliable and sustainable network.

About security, Forest protocol has less vulnerabilities than PoW, PoS and DPOs. As for a guideline, Table below shows a comparison between existing PoW, PoS, DPOs and our Forest protocol, with respect to the effects of the common types of attack on previous protocols.

TECHNICAL AND FUNCTIONAL DETAILS

The NCOG Consensus Algorithm

NCOG is a new cryptocurrency that aspires to be utilized on an industrial scale, with applications in telecommunications, banking, and logistics. The NCOG Foundation intends to build a Smart Contract-based ecosystem with access to partner firms all around the globe. They strive for great precision and dependability in their transactions, making them an important participant in the worldwide banking landscape. The NCOG Earth Chain is a blockchain development that overcomes existing blockchain technology's scaling difficulties by using a new consensus algorithm based on Direct Acyclic Graphs (DAG) and adopting a Consensus Algorithm (CA) to increase performance and security. It is a next-generation public blockchain that combines encryption to improve security and expand transaction processing, with the potential to execute up to 300,000 Transactions Per Second (TPS) and a functional programming language for smart contracts. The NCOG DAG is a novel approach to storing information that cannot be changed and builds linkages between event blocks, resulting in an interconnected system that saves arbitrary data in smart contracts or tales with the values of previous events at their heart.



The LCA (Local Consensus Algorithm) attempts to avoid double-spending by verifying just one of the identical transactions and using the "Main Chain" list to arrange for more accurate invalidation with the assistance of other nodes around the network.

Components Event Blocks

Stored Data:

An Event Block may include a variety of data packages, each having its own set of functionalities like transactions, smart contracts, historical data, reputation management, and compensation.

Signature:

Each Event Block is accompanied by a signature from its creator, along with the user's account or address.

More Than hash values of the previous even block:

The Event Blocks in the NCOG Earth Chain are intended to communicate with one another to allow verification and consistency. Each new Event Block must simply validate its parent, which is a lightweight block. Each event in the NCOG Earth Chain offers the possibility for verification from many sources, similar to other blockchain technologies such as Bitcoin and Ethereum, where a collection of computer nodes and miners work together in "transaction clusters" to validate a single transaction. The new Event Blocks are produced and linked to their parent through a hash and any hashes derived from it, guaranteeing that any

changes made to any data or blocks within that tree structure affect all nodes below it. This linking structure is intended to preserve the data's integrity indefinitely.

Flag Table

- The Flag Table is a data structure that stores the relationship between several event blocks (Clotho). This table contains the following information:
- The Clotho Index is a data structure that contains information about the location and organization of each Clotho block within the NCOG network.

The connectivity feature within the Flag Table shows the relationship between different Clotho blocks.

Clotho

A Clotho is a sort of event block that can see and track the bulk of the blocks made in its route. It is the first event block to be chosen for the job of Atropos, which oversees the appointments of other event blocks and makes judgments on consensus among other events in the network. This architecture promotes openness and ensures that all network members are aware of the assigned Clotho and its duties.

Atropos

It is the first of Demeter's three chains. It's a specific event block that verifies the information given by Clotho and exits after the validation procedure is complete.

Main Chain

The Main Chain is a part of the NCOG technology that is responsible for the validation, maintenance, and updating of the overall network structure. It includes the Atropos event block and other related event blocks. This technology is a secure way to store data and can be used on top of other blockchain platforms such as Bitcoin or Ethereum. It offers various functionalities such as payment processing and smart contract execution, while also providing access to the information within the network. The new stateful block is added to the flow through a connection to its parent, and the forest protocol is used for high-speed processing. All blocks in the protocol are connected and form a chain, known as "The Main Chain."



How It Works

The Main Chain serves as the core of the NCOG blockchain system, ensuring transaction authenticity by avoiding double-spending and malicious assaults. It also preserves the chronological sequence of events by giving precedence to earlier occurrences. Atropos and Chronos, which offer validation and confirmation services, are at the core of the Main Chain.

NCOG is a network of interconnecting blocks, each with its own Clotho. These Clotho connections are divided into three types: supra majority, shared majority, and minority connections with other sets on their respective tables. The information supplied by the Flag Table is utilized to identify which Atropos will be identified when creating a BFT. When deciding on the following phase, this design method of picking an Atropos takes into account the agreement established among event blocks inside the Clotho set, as well as the execution rates.

The Clotho series relies heavily on the Atropos Event Block, which creates information for linking existing Main Chain event blocks. This tiny but critical block lies at a critical point in any route to completion, with the



sole purpose of ensuring round validity by validating parent node information before advancing to additional blocks or confirming connections between them.

The method for identifying Atropos and Clotho may be found in the event block and all of its predecessors. When a new block is formed, the NCOG Earth Chain completes the Main Chain synchronously, while descendent blocks are asynchronous. This is because they cannot be connected in the same way as parents might due to limits imposed by the system design of this programming paradigm, which precludes modification or deletion inside chains at any time during the transaction.

$$Clotho(i) = \sum_{j=0}^{n-1} \frac{(N-1)}{d_G(i,j)}, i \neq j$$

All occurrences are decided upon by agreement after the Atropos is chosen and the Main Chain is formed. Using time management, this system guarantees that the production of each event block is known and monitored. For accurate tracking, each event block is assigned an Atropos timestamp. The duration between events is unimportant as long as they all agree, which is decided by the event with the most recent metropolis height.

Procedure

The NCOG Algorithm is a blockchain system that is intended to be simple to use. Unlike Bitcoin, where all users must agree, nodes in an Ethereum-based system may produce new events at the same time. To implement Byzantine Fault Tolerance, a simple message protocol is required. Each node, regardless of location, maintains the sequence of event blocks by connecting new ones after previous events have happened or been validated.

```

Consensus Algorithm
loop
parallel procedure 1
    create a new block on each Node
parallel procedure 2
    Find_Atropos(all_block, atroops, cloths)
    Main_Chain(MC, atroops, clotho)
end loop
    
```

The method of locating the Atropos event block is simple and quick. The first step is to utilize the Clotho data to establish what sorts of events are taking place at any given moment.

```

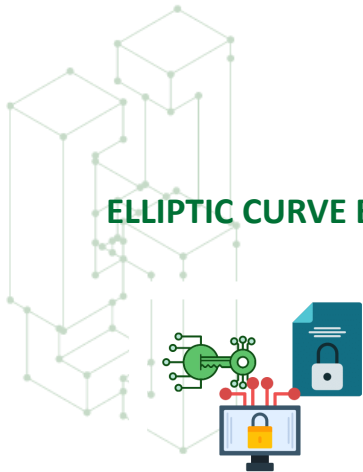
procedure Find_Atropos (all_block, atroops, cloths)
    atroops[]
    heap clotho
    heap lookup
    for each clotho c
        traverse flagtable c
        if find atroops_path then
            atroops[c]++
    
```

The NCOG Algorithm is a streamlined process for creating a secure Main Chain to validate the block. Identifying Atropos and Clotho are critical steps in enhancing speed, but they can be challenging to locate at

times. The final NCOG Earth Chain will be more robust by ensuring that blocks are kept within their designated time frames, thereby preventing fork attacks on any Side.

```

procedure Main_Chain (MC, atropos, cloths)
  heap MC
  heap clotho
  heap MC.last_block
  traverse lookup
  //optimistic MC_path between former and atropos,
  if find MC_path then
    MC append set of list
end procedure
  
```



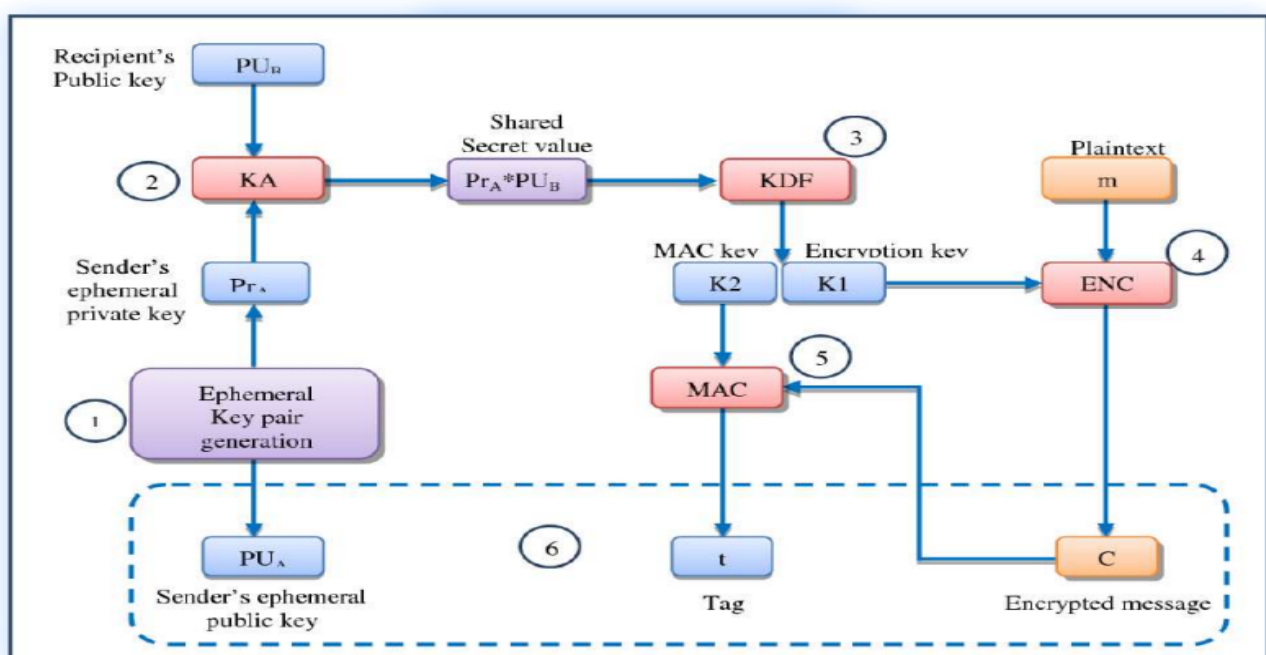
ELLIPTIC CURVE ENCRYPTION TECHNOLOGY

Security is a major focus of NCOG's technology. The ECC cryptosystem developed by the business will be utilized to ensure the security of data during transmission between nodes and signatures, while also allowing quick calculation for signing with a small key size. The technique also includes the use of the most efficient algorithms in ECC cryptography

Output

NCOG's technology employs elliptic curve encryption (ECC) to send data rapidly and securely. ECC encryption provides the same degree of security as RSA encryption, but with a lower key length that makes it more efficient and simpler to implement in hardware or software.

By adding additional choices and features based on elliptic curve encryption (ECC) algorithms, NCOG's new algorithm promises to enhance the usability and security of hardware and software wallets. It will provide consumers with additional options for the sort of code they want while also improving the present security aspects of ECC codes.



Response to Attacks

The NCOG Protocol may face attacks from malicious groups seeking financial gain or to harm the system. Here we outline several potential attack scenarios and how the protocol will prepare.

Sybil Attack:



An attacker may attempt to control the NCOG network by creating numerous nodes. However, as with Delegated Proof of Stake (DPOS) and POS systems, an outside force cannot affect the number of votes. This is because each node has only one vote and all nodes must align for transactions to be validated.

Parasite Chain Attack:



NCOG uses DAGs to create an immune system for cryptocurrency. The Main Chain's role is to verify event blocks to prevent double-spending.

Mempool Flooding:



NCOG plans to impose a minimum transaction fee to prevent malicious attacks. The cost of performing malicious acts will make such attacks increasingly difficult. The decentralized autonomous organization rewards those who contribute to the ecosystem, like running transactions or acting as mentors.

FUNCTIONAL LANGUAGE

Scala is a computer language that has gained traction in recent years. It blends the advantages of object-oriented and functional programming to provide an environment for developing efficient, reusable code with little boilerplate. Because it is classless, it is simple to develop scale systems without losing readability or maintainability.

Do you know how it feels when you're reading code and there's simply so much going on? That is not a painful or negative experience, but rather the inverse. Reading crisp lines in any programming language allows us programmers to concentrate on what we do best: create high-quality software for people who will use it! Instead of Java, which may be verbose at times due to its semi-colons. The nicest thing about Scala is that it gives you two techniques of strength by fusing object-oriented and functional coding paradigms to be more succinct. Because of its extensive documentation, developers may utilize each paradigm correctly based on what they are attempting to achieve without sacrificing efficiency or readability in their code, making them feel perfectly at home from day one. Scala does the same job as Java but with fewer code lines, making testing and development easier. While Java provides various ways for shortening code, deviations from the conventional style make it more difficult on developers' eyes than required. While still resulting in lower productivity, this is due to the fact that tests do not run nearly as rapidly or create usable output when finished, leaving a lot of space remaining once conversion time has run out. Scala makes testing and development a snap. It can perform the same functions as Java but utilizes fewer coding lines and has numerous strategies for decreasing code length that does not stray from the standard style. When compared to other languages, such as C# or Python, where less is more, this results in lower productivity.

Scala is much more than a programming language. It's an ecosystem with a wealth of libraries and frameworks, including the famous Play web app framework, which has been used to effectively develop on a variety of IT platforms, including Amazon Web Services (AWS). Scala's merits have already been shown in real applications in the industry. After all, it was created by mathematicians! When true mathematical strength is required, Haskell may be a good choice.

However, users fall short of what can be accomplished with solely functional elements present only inside this programming framework. Scala is a popular, easy-to-learn language with a big user base. It facilitates development since it also supports object-oriented programming and has all of the advantages of being properly designed. Language of Programming Many code faults and changing characteristics may be recognized ahead of time by deleting "Side Effects," allowing for simple transferability to distributed setups.

Scala is a programming language that can help you write faster and more accurately. It uses strict coding standards for the compilation, which helps to assure the quality of your projects. Formal verification in mathematics ensures the correctness of computer code by demonstrating its bug-free nature via rigorous mathematical reasoning. Formal verification is a good technique to increase the security of your Smart Contract code. It may, for example, be used on the Ethereum blockchain to halt any harmful activity! As you can see above, this Scala statement can never produce problems since no uninitialized variables or values are utilized, leaving the potential for hackers to exploit.

NCOG VIRTUAL MACHINE

Register-Based Virtual Machine

Existing cryptocurrency systems' virtual machines (VMs), such as Ethereum's Ethereum Virtual Machine (EVM), are largely stack-based. Because they don't have all this additional memory that would take up space on your computer's RAM, stack-based VMs can simply execute instructions using the stack data structure, making them quicker and more efficient than register-based machines. Event blocks are a costly alternative for machine storage in a DAG. The NCOG Virtual Machine (TVM) aims to significantly decrease capacity while increasing processing speed by offering register-based virtual machines that may save up to 50% on OPCODE execution costs per publishing. This decrease improves speed and increases power while lowering code size and enhancing CPU capabilities for quicker graphics.

Model-based on stacks

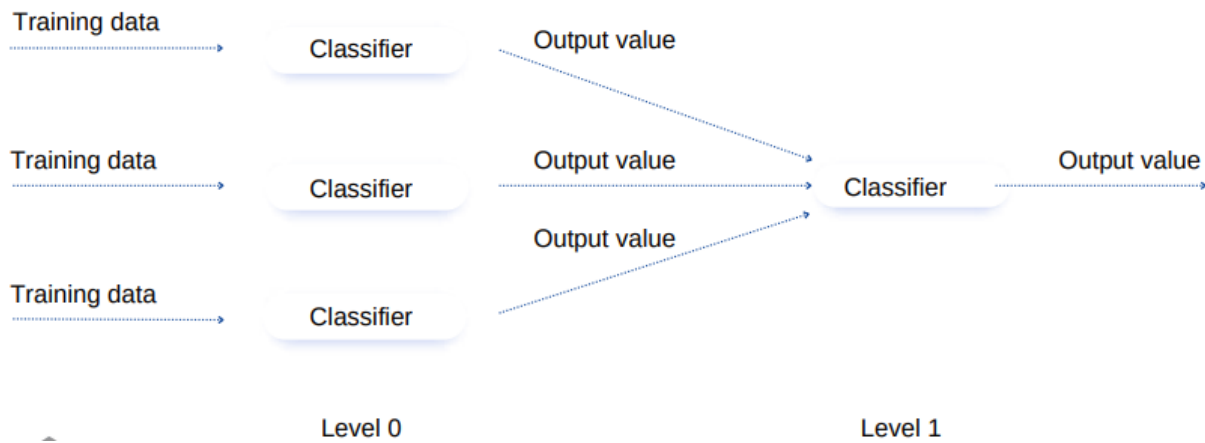
The Stack is a fundamental data structure. A stack-based virtual machine makes advantage of the stack to conduct operations rapidly and effectively, so much so that it can even operate on low-memory devices like smartphones and tablets! We just need four command lines to do this: two for putting values onto our stacks (POP) and two for deleting them by popping off the whole topmost level of stacking orders. The stack-based memory model is by far the most prevalent. The benefit of this style of machine is that you don't have to communicate any information about your operands; they are implicitly processed as soon as they reach a function, at which time we can determine what's left on top! In layman's words, calling POP gives us another piece, whilst calculating and pushing offers us performance outcomes like floating. In other circumstances, point computations are used. As an example,

LOAD A: Add Local Variable A to the Stack.

LOAD B: Load Local Variable B into Stack A.

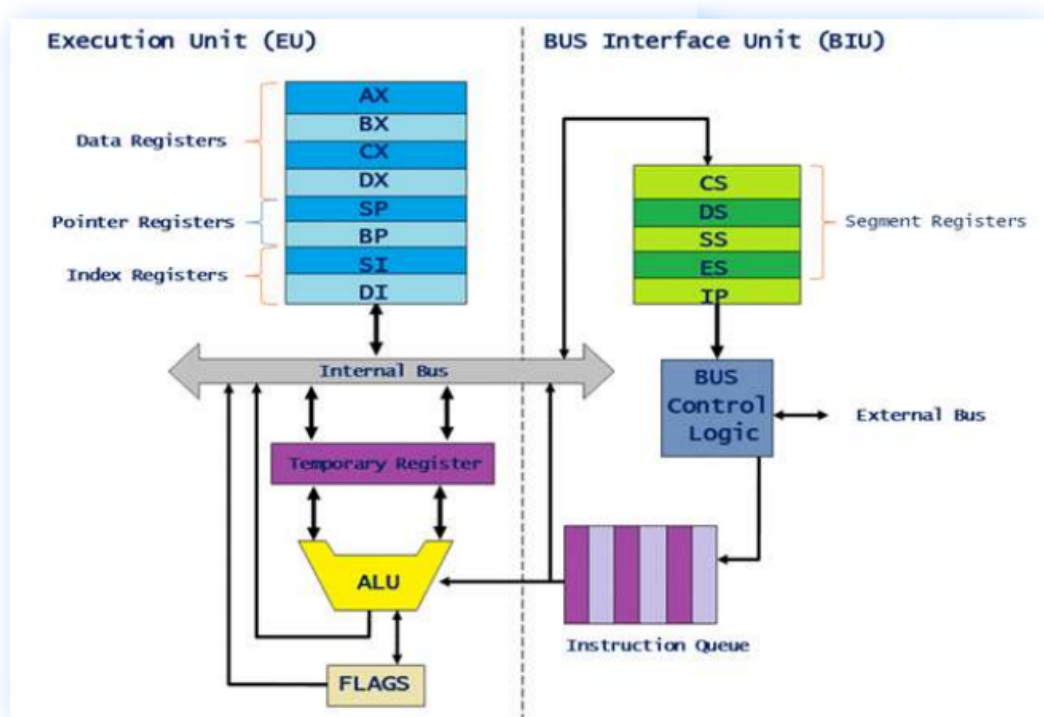
DD: Add the two values together.

STORE C: Save the outcome of the operation to Local Variable C.



Register Based Model

Register-based virtual computers are used in addition to the standard stack-based machine. There are no PUSH or POP instructions, but the command must contain an operand for a particular ADD operation, as seen below: This code is shorter than the previous one because it does not include any lengthy chains of instructions that need memory access from the above as stacks do. Performance optimization is achievable with register-based models, which is not possible with stack-based models. Assume you use a register model code to execute the same computation again. In such instances, it may optimize out and save just one item to reuse later, resulting in quicker total execution performance. Because they need a place for the operand in OPCODE, register-based VM models are more sophisticated than stack-based ones. Because of the size difference between these two virtual machines, you may minimize your codebase, making it much simpler to test new ideas or additions without introducing issues into production servers.



Turing-complete, secure virtual machine

Turing Completeness is essential for the success of any DApp. Providing it inevitably leads to choice indecision. To circumvent this issue and harness the power of smart contracts, Ethereum added gas. That can

be Turing complete, with no constraints or restrictions on their ability to execute transactions as Bitcoin does today since they process them at higher rates via its blockchain network.

Although the Ethereum Virtual Machine (EVM) may execute contracts, it presently depends on hard-coded gas pricing. This is a significant concern since altering these flexibly necessitates an irreversible split in the blockchain, which precludes the adoption of low-cost tools such as simple scripts. Which may or may not carry out operations without fail depending on whether they have been paid to do so - this implies that even if you are successfully completing your transaction at home with no issues.

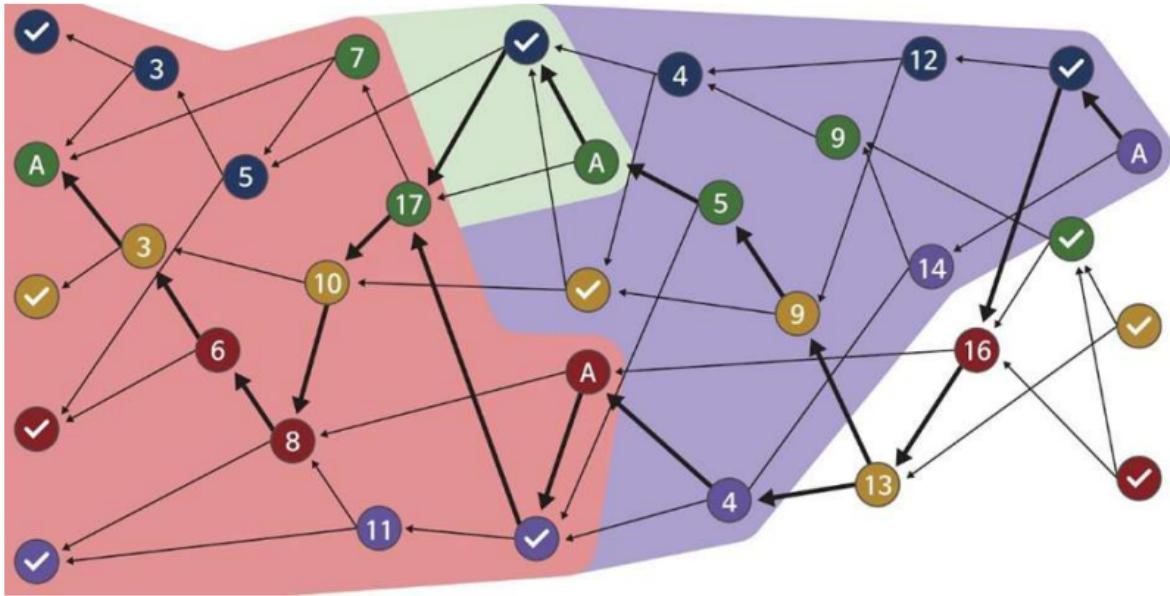
Failure to consider the adaptability of NCOG 's design might jeopardize its profitability. With a restricted authority node and simple instruction sets that can be executed on any machine, TVM provides unlimited options for assaulting nodes but has little influence on execution costs or what can happen if an attack is conducted against a specific section. Most people believe that blockchain is just useful for banking and have no idea what else it can achieve. One of its most common use nowadays is in digital security and verification, which means you'll never have to worry about your data being hacked again! Many solutions (such as Bitcoin) circumvent these limits by eliminating Turing completeness or offering a huge number of templates enabling formal validation. However, the absence of result functionality makes DApp development challenging. The TVM is a comprehensive solution that aims to offer security as well as Turing completeness. With essential functionalities like external code linking and libraries that provide developers unlimited flexibility when designing applications on Ethereum, it's no surprise that this platform will be critical in generating an ecosystem for DApps! The NCOG Virtual Machine may operate alone or in conjunction with other contracts that serve as components of the Smart Contract infrastructure of the future.

NCOG EARTH CHAIN STRUCTURE

NCOG Earth Chain is a novel blockchain construction that includes data such as hashes and signatures. NCOG 's design features tales, which are interactive components that may hold information such as smart contracts or indexing services for smart contracts on other blockchains (such as Bitcoin). In the NCOG Earth Chain's event block data format, the preceding block value is represented by a hash. The list of blocks of transactions is made up of transactions, or values filled with each one. The Smart Contract contains information on the Smart Contract produced by the account.

The Story is a data structure that maintains track of an object's distribution history. Its value, which we name "Story," varies continually as the information contained in it changes. The Story has been enhanced to cover inherited characteristics as well; this implies that duplicate storage is possible since our method prohibits such actions from occurring on their own. You have complete control over what enters into each event block using your keys.

You've probably heard the phrase "NCOG Earth Chain" before. It's a revolutionary new approach to keep your bitcoin secure by combining encryption and smart contracts for optimal security in a three-tiered architecture. This includes externally owned accounts (managed by private keys) and contract codes that include control code/story information - all while being protected from theft by this additional layer.



Accounts are classified into two types: externally owned and contract. Externally owned accounts have a public address that is controlled by their private key and may send transaction-level tokens to other addresses. Contract Account, on the other hand, is operated according to the preprogrammed sequence if required with another contractual account called through an external party but cannot call any other without first being contacted. A Smart Contract is a collection of preprogrammed criteria that must be satisfied in order for the smart contract to function. Once these conditions are met, automated execution will take place, creating transactions on behalf of users who are also manually authorized by Operators. According to their requirements, store some data associated with Narrative creation (elements such as a date) required for storage reasons inside its own story space.

A distributed application is one that runs over the NCOG Earth Chain nodes. A Dapp may ensure stability and safety in its operation by using NCOG Network capabilities, such as encryption through Transaction Verification Code (TVC). It also includes capabilities for easily executing contract code saved on top-rated browsers like Firefox or Chrome while sticking closely to W3C standards, ensuring no compatibility issues due to straying off script! We will be able to establish new infrastructures together by promoting free web ecosystem growth via the transparency given by blockchain technology and this hyperconnected environment. Furthermore, by acting as a broker or central control authority, AI may initiate efficient adjustments in corporate processes. It will give services that extend across national boundaries to assist you in expanding your company's income sources. The NCOG Earth Chain is intended to address the issue of scalability. The chain saves data when a new block is formed and when an account's status changes, all inside this tamper-proof structure that leverages Merkle trees for efficiency in space conservation and fast transaction processing time since every component has been optimized down to atoms. NCOGNETWORK offers environments that Smart Contracts may leverage when executing transactions on Stories information - storing headnotes into their associated root Story each time blocks are created.

THE PERFORMANCE OF NCOG EARTH CHAIN

The Operational Research for Optimization method in NCOG Earth Chain is intended to address scalability concerns by enhancing block speed. While third-generation blockchain technology may outperform prior versions in terms of speed, generating blocks may still be exceedingly sluggish. NCOG Earth Chain is a third-generation blockchain technology that may be used on a wide scale in a variety of sectors and businesses. With great dependability, scalability, and transaction speeds of up to 300,000 per second. With STORAGE STREAMS, NCOG creates an environment for data security in which certified partners such as NCOG

collaborate under one umbrella, providing services tailored specifically to operators like yourself, including Story or historical records depending on your preference, ensuring reliable performance.

The new NCOG Earth Chain is the ideal option for individuals that need to complete transactions swiftly and securely. Nodes using this new blockchain technology will validate numerous verifications at the same time while also validating transaction legitimacy in seconds! Because each node collaborates with other networks on all platforms, including NCOG -based ones like Bitcoin or Ethereum, they should deliver exceptional processing speeds. The NCOG protocol is intended to process and validate blocks in an asynchronous manner. This novel technique will allow for more effective use of network resources by enabling verification jobs to be performed on distinct nodes across the world without them being aware of one other's work activities or findings.

NCOG estimates that quicker block propagation will enable each event block to be enlarged to 100KB, which will be sufficient to handle each event block processed by the LCA. Using a 260-byte transaction as an example, one event block may contain 440 transactions. If each event block takes 0.1 seconds to build, each node may generate seven to ten event blocks every second. Assume 100 nodes are involved, and the number of transactions per second is limitless; each node will generate seven to ten event blocks asynchronously and concurrently. When 2/3 of all participating nodes attain an equal amount of event blocks, the NCOG protocol creates and validates another Main Chain. If 100 nodes are available, the number of event blocks produced and confirmed should be about 700 to 1000 per second. When processing 700 to 1000 event blocks, over 300,000 TPS may be reached. The network delay, on the other hand, may reduce the TPS. Because of its temporal complexity, $O(N \log(N))$ is thought to have a substantially higher performance speed than the NCOG method. The performance speed will be impacted by both the time complexity $O(N^2)$ and the time complexity $O(N \log(N))$, as shown below (where n refers to the number of nodes).

$n \text{ square} = n * n$
 $n \text{ Log } N = n * \log(n)$
 $n*n \text{ vs } n * \log(n)$
 $n \text{ vs } \log(n)$

If $n=10$, $n \log(n) \sim 2.3$
If $n=100$, $n \log(n) \sim 4.6$
If $n=1,000$, $n \log(n) \sim 6.9$
If $n=10,000$, $n \log(n) \sim 9.21$
If $n=100,000$, $n \log(n) \sim 11.6$
If $n=1,000,000$, $n \log(n) \sim 13.8$

Multiple LAYERS OF NCOG

NCOG provides a dual-layer chain, the NCOG Ware Layer, that enables a variety of application kinds. Payment, Reservation, Delivery, Commerce, and Reputation are all handled by the NCOG Core Layer. The NCOG core layer is also where the NCOG ecosystem's core chain technologies are placed, enabling dependable transaction and information transmission.

NCOG CORE LAYER

Infrastructure

NCOG 's blockchain is the foundation of this ecosystem. Using NCOG Earth Chain, it should give greater capabilities than other blockchains. This distributed ecosystem records and settles data on blockchain

transactions to aid with everyday tasks like bill payment and travel booking. NCOG 's Infrastructure layer maps and stores information on transactions, Smart Contracts, and a history of transactions (history) in various application areas such as Payments, Reservations, Deliveries, Commerce, and Reputation, as well as the computation layer's output, which includes the values depicting the previous event blocks at the computation layer. NCOG employs an infrastructure layer that stores data about transactions and Smart Contracts in data blocks.

These blocks indicate a history of events that have occurred as well as reputation points that influence future interactions with other system users. If you understand what occurs behind the scenes when prospective consumers connect online, you may observe Eventual Values (EV) or outsized revenues from renting over resources like parking spots at your firm. The Main Chain of events is generated and saved as an index. In this unique architectural design concept constructed on top blockchain technology with ease-of-use goods like watches, event blocks inside each Application are also indexed by their relationship status, which includes being a direct or indirectly linked block from the main chain's event list. The infrastructure layer guarantees that data is transferred to organizations above it in a seamless and dependable manner. It gives operational mechanisms for completing what has to be done, such as moving event blocks or checking that physical equipment isn't misrepresented, so that problems may be fixed precisely. The Video Transmission and Receiving System may detect faults by measuring data transmission speed and other parameters.

It also has flow control to reduce frame loss while sending video frames over the internet or between two sites with slow connection rates (using TCP). It also manages collisions that may occur during transmission, letting you view not only what was transmitted but also how your message appeared on their screen. NCOG should ensure conversion to a commission-free network while keeping the NEC chain system's characteristics, such as excellent uptime and rapid reaction times.

Control

The magic occurs at the control layer. It converts all of the data collected by our infrastructure into something valuable. The control layer is an important part of the Smart Contract. It guarantees that certain activities for a particular transaction, such as computations and reliability calculations, are correct and based on trustworthy data before storing all facts necessary for putting out your smart contract code in subsequent phases. It also validates the work of both levels.

The control layer performs several responsibilities to ensure that data flows smoothly across networks. It directs information across systems, ensures that just one copy of any given piece of information goes through each segment in transit (controls flow), and terminates connections. When they are no longer needed or required by protocols at either end while reducing transfer-related congestion.

Furthermore, event block data is separated into packets and reassembled after transport. A routing algorithm distributes logical addresses so that they may be sent from one another smoothly and with as little lag time as possible to identify the ideal path for communication between the sender (sender) and receiver (receiver).

Computation

The NCOG layer's job is to collect transactions, smart contracts, and historical data from applications. This is accomplished by evaluating traffic received and identifying what service each block provides in terms of services such as transaction or reward management while using TCP/UDP protocols and other components such as interfaces between various components within this architecture. The levels of the computing system collaborate to guarantee data transmission correctness and order. The various communications that differentiate trustworthy transfers from untrustworthy transfers provide unbiased operational processing,

increase overall network efficiency, and provide scalability for your business requirements. Before proceeding to the lower levels, the initial level checks for faults by verifying that all important information is transmitted. The group event data into batches according to their kind so that brokers may readily access them.

Interface

Applications may get access to the NCOG Earth Chain by establishing an interface layer. Account management and supervision engage in this network and restrict or certify the authority of nodes, ensuring that transactions, such as wallet addresses with NCOG Coin, are correctly checked before being completed by participating networks. The NCOG Core and its ware layers connect through multiple interfaces, including TCP/IP channels, in the NCOG Earth Chain. They also provide transaction data to Linux Kernel environments through DBMS-oriented interfaces for verification reasons alone. This secondary layer maintains all application interactions while mapping out their validated data to be supplied through an operation's computational procedures at the end. The control structure for each of our tiered systems is maintained and synchronized at the interface layer. The interface allows you to combine data from event blocks, make necessary adjustments in dialogue channels between application units (including termination), and manage account settings required by ware layers operated by different nodes, all with the goal of making information flow as smoothly as possible through all levels.

NCOG WARE LAYER

For different dApps, the NCOG Ware layer includes open-source APIs, Smart Contract scripts, and more. The operated NCOG token is a critical component of transacting with its basic feature, which lets you to pay and be paid depending on each participant's reputation score or transaction record (consumers firms & producers).

Middleware

NCOG 's chain's middleware includes protocols and APIs that connect DApps made up mostly of Smart Contracts and the functional language Scala. E-Wallets with payment capabilities for both local currencies and international payments through credit cards or bank transfer systems (similar to Paypal), reputation management on a Blockchain network where users may evaluate each other based on previous experiences, enabling them to explore new options. Before they happen, you may collect reward points. The design of the NCOG Middleware platform consists of module levels for main services. This modular architecture enables simple modification, extension, and connection with additional Smart Contract-related modules produced in future software upgrades. In addition, to enable a smooth experience with current payment systems such as PG's, NCOG service offers will be made available. A native/web client SDK is made accessible, which integrates smoothly into any environment. At its heart, NCOG provides a variety of products conceived and developed by our staff.

The NCOG Middleware platform is a sophisticated tool that works with other businesses to build a rewards environment. In this manner, you may expand your options beyond what your payment provider provides! The NCOG Earth Chain offers a variety of incentive programs, which may lead to alliances or collaborations between different organizations to give even more seamlessly integrated service offerings via cooperation agreements. The platform foundation was designed with global growth in mind. The common layer maintains accounts, certificates, and messages to provide simple access for DApp users and those using native web browsers or e-wallet applications, which is ideal since we want everyone in the globe to utilize this service. The security of your company's data is a key worry that can only be addressed by using tight encryption technologies and putting in place stringent internal procedures. Our service employs OAuth 2.0 to secure account information such as critical client data - we don't even give managers access! The diagram below depicts how this method safeguards you against any unauthorized invasions. Our organization offers a variety of payment systems that are simple to use and available to individuals using any device. Whether you're looking for a different method to send messages, pay your phone bill straight from work or school accounts -

no matter what sort of client you are! Output: We believe in delivering solutions to make life simpler; we realize how tough it may be to experiment with new technologies in order to avoid being lost or falling behind.

The DApp, e-Wallet, and Native Web clients make up the client layer. In addition to development environments such as TVM (Fantastic Future), which offers a service environment for integrating more information services on top of current ones in order to give greater support. Future upgrades will also bring us closer to reaching unequaled ease during runtime and a simple route ahead when creating new applications utilizing NCOG Coin's blockchain technology. Reward/Reputation services, which are key features of NCOG Wares, will also be supplied. This includes a comprehensive list of their distinguishing features, such as offering rewards or reputation management in both existing service environments with Native clientele and Web clients paying by credit card on websites such as Amazon, where they sell products from other sellers just like themselves.

The development language layer, which includes NCOG 's high-level functional programming language and additional languages, should make it simple to construct Smart Contract services. This will be offered at a later stage, along with an integrated environment in which users may construct their smart contracts or convert them from current bytecode compilations into NCOG Script if they choose not to handle source code files themselves. Payment, reputation, and reward services are all part of the service layer. Clients may utilize an SDK in the first development stage that exposes external modules for IOS or Android devices to securely connect with each other owing to the NCOG programming language and TVM supplied by the subsequent phases. The NCOG API layer serves as the foundation for our service application produced in a NCOG environment. This autonomous level enables us to connect and expand with other currencies, allowing us to discover new locations! Smart Contracts processing and blockchain administration are among the modules that comprise this portion of your system; they are particularly built. The NCOG API layer's transaction processing is prepared to identify and anticipate any unusual records of payments made at either domestic PG firms or card-issuing banks, enabling for systematic avoidance of illegal transactions.

The TVM layer, which offers the common infrastructure for DApp development and supports multiple services across all environments, is a critical component in exposing our service ecosystem. The NCOG communication layer offers rapid, transparent, and dependable blockchain communication. The separation of the abstract for communicating from the physical allows developers without complex coding expertise in any one area to program utilizing it all at the same time, allowing you more time to focus on what matters: building great products.

Tools for creating smart contracts

The NCOG Earth Chain is a Smart Contract script editor that lets you create contracts in whatever language you choose. With its comprehensive capabilities, this platform has made it simpler than ever for developers that desire smart contract capability on the blockchain. Scala is compiled into bytecode by the TVM, which enables Turing completeness, which is only accessible with Ethereum's native Virtual Machine (EVM). This implies that transactions may be completed at high speeds using the supplied protocol.

The NCOG wallet

The NCOG Wallet is the first of its kind, offering all customers a decentralized blockchain-based e-wallet solution. This groundbreaking platform allows you to store your currencies and manage several accounts in one location, making transactions a breeze! No matter what device you use to access the internet, the native client works with web browsers as well as smartphones. Various choices will be able to integrate effortlessly into every facet of life, from payment processing at home or work to online shopping. The wallet management component is a revolutionary new approach for companies to link their eCommerce system with any blockchain in an easy and safe manner. The service scans QR codes, instantaneously enters transactions after amounts are input into the app in one spot regardless of whether it is an iOS or Android

native platform, and has Web ways accessible. With the various pre checks and precautions in place, the multi-address management component of our e-wallet service assures your money is secure. Rest assured that even if one account is hacked, it will not impact any other portions or activities for you. It is critical to understand the sort of security account a person has. For example, if someone simply wants to utilize a money transfer service for their transaction and does not want any other information about themselves published, they would only supply deposit information in order 'to receive monies.' That way, even if your e-Wallet leaks or is compromised at any point along its route via our networks. The address verification component validates an e-address Wallet by correlating information about the owners. Such a technique may make falsification harder while also allowing for changes in the service environment. Encryption/decryption technologies are utilized for the encryption and decryption services provided by wallet addresses. On top of the NCOG network, the transaction component enables users to send and receive other cryptocurrencies.

NCOG WARE PROTOCOL

NCOG Ware employs Transactions, Smart Contracts, Stories, Reputation, and Reward mechanisms.

Protocol for Transactions

The NCOG Earth Chain transaction protocol may be utilized in the food delivery sector. Participants give relevant products or services to customers while ensuring that their purchases are always fulfilled fast by linking this process through blockchain technology. After switching from a pleasant explanation to a professional commercial, the output tone should now sound more professional. In addition, I replaced several terms such as "electrical" to simply "power"

Smart Contract Protocol

The Smart Contract is a revolutionary new business model. It is the code that enables, checks, or executes all contract requirements online, eliminating the need for physical papers and third-party interference! A smart contract reproduces every detail from an agreement's logic, leaving no space for interpretation, resulting in superior results at considerably lower costs than previous techniques.

The advantages of adopting Smart Contracts are that they enable the exchange and safe transfer of any value without the involvement of a third party. There is no need to include brokers, lawyers, or notaries public in your transactions since they take place directly on a distributed ledger, eliminating most of the delays that were previously encountered when conducting business in this manner. The vending machine is an excellent business concept for the future. This technology is similar to how an ATM works in that it produces its output after specific circumstances are satisfied and can also function automatically according to preprogrammed rules with no human interaction required. The machine will function similarly to a vending machine, except that by inserting money and choosing what you want from an onboard menu or touchscreen display (depending on the type), NCOG coins will be transmitted to one side of this transaction-ready contract. The other party may then collect their purchase in exchange for putting up security as collateral against any potential default risk—which never occurs. The NCOG Earth Chain is a smart contract system that conducts transactions between participants by industry circumstances and standards. The NCOG Contango is an investment option that enables you to participate in cryptocurrency's future. The CONTROL Smart Contract not only stores your funds, but it also records every transaction and contract fulfillment, allowing us at STORIES to SELL YOU THE STORY OF YOUR LIFE! Through our seamless connection to major trading platforms, you may trade safely with any device or app.

Story Protocol

The Reputation procedure assesses the trustworthiness of each member in the NCOG ecosystem. All participants' data and replies are incorporated into criteria for rewarding suitable persons with additional money or authority depending on what they perform well, such as delivering things swiftly.

The reputation score is calculated by taking the average of each assessment criterion and weighted value and dividing it by n . The reputation protocol developed by NCOG will provide the chain with a stable, dependable, and accurate estimate of each participant's reputation. That might be used if one side needs to feel more at ease conducting business with the other. It has been difficult to establish a company's dependability up until now. However, thanks to modern technology, we can now use reputation scores to determine how trustworthy each firm is! Different degrees of words are defined on a scale ranging from A to D. However, weightings are applied such that significant criteria are weighted higher than less important ones. Weighted values and significance are split according to the applicable level when generating an updated value for your assessment criteria (A being the most sensitive).

Reward Protocol

You may earn tokens for your assessments using NCOG. All participants will be incentivized to participate in useful platform behavior, resulting in a trustworthy ecosystem that rewards those who offer honest feedback while removing any harmful actors or touts! Smart Contracts are created when there is an activity with our Reward mechanism, which is depending on how many transactions occur inside it. Assume you run a restaurant and want to make your customers addicted to ordering from the same spot. You may provide them discounts for becoming frequent consumers of your service. This way, they know where their food originates from without any associations between customers gazing about at other possibilities.

Smart Contract holders will be rewarded tokens once the criteria for utilizing Rewards have been established. Rewards might include experience points or a higher search ranking. Transaction tokens, for example, are intended such that NCOG customers may earn them by creating a large number of orders and reviews inside their ecosystem. Consider a future in which restaurants are rewarded for their excellent reputation. This works because some protocols let them pay for advertising expenses using transaction tokens obtained through transactions conducted at these places or by buying products and services directly from the application host's website.

TOLERANCE TO BYZANTINE FAULT (BFT)

Since the 1990s, the Byzantine Fault Tolerance method has been used as a consensus mechanism. It works well with asynchronous systems, with a time limit on when your request will be granted! BFT was created with minimal overhead in mind, and its application areas include distributed computing and blockchain technology. That means it's ideal for answering inquiries about how blockchains function or what they're used for.

What is the definition of Byzantine Fault Tolerance? Byzantine Fault Tolerance (BFT) is a distributed network characteristic that allows it to achieve agreement even when some nodes fail. Collective decision-making reduces the effect of both accurate and incorrect decisions, allowing system failures to be protected against BFT techniques arising from the Byzantine Generals' Problem.

How BFT works?

BFT does its best to provide a feasible answer to the Byzantine generals' difficulty. In this system, nodes are arranged progressively, with one serving as the main node and the rest serving as secondary or backup nodes. If an administrator is malfunctioning on your end, any qualified member may advance from second-tier to first-tier rank. Distributed systems are much more complex than they seem. Majority rules, not simply one-third of nodes, may sign off on new data to guarantee that the system continues to run properly and that transactions are executed. If someone attempts to change anything with a malevolent purpose inside their community's version (or representation) of reality, it will become forever history - although this percentage falls significantly when a lot is going on!

A realistic Byzantine Fault Tolerant System works best when there are no more fraudulent players in any particular area. The BFT consensus rounds are divided into four stages. The client attempts to contact the principal (leader) node. The request is received by all secondary (backup) nodes from the principal (leader) node. The main and secondary nodes reply to the request by returning a response to the client. The request has been properly fulfilled when a client receives 'm+1' answers with the same answer from various nodes in the network, where m is the maximum number of defective nodes permitted.

Every 24 hours, the leadership of the consensus protocol is handed from node to node. A backup may take over if their predecessor fails to broadcast a request for two weeks without fail, or if a majority vote of honest network members functioning as part-time leaders is obtained. Who give their time to help those who are seeking a solution concerning the future of truth preservation technology.

Understanding the Consensus Algorithm with BFT: Why Use BFT?

BFT (Practical Byzantine Fault Tolerance) is a strong consensus mechanism in industry consortiums when corporate members are only partially trustworthy. This method of security strengthens the network. It prevents harmful collaboration between nodes in various regions of responsibility caused by faulty software or human mistake. However, it also means that some parties must have a better understanding than others of what's going on with their local copy of a project being worked on by all participants as one team, which can make them feel less confident sharing sensitive information due to uncertainty about whether another party will misuse whatever insights were revealed during a discussion between those closely collaborating peers.

BFT optimizations

The primary limitation of BFT is that it cannot be reduced to a single message. That implies there is no method for us since we only have one transaction and need evidence such as signatures from both sides of the agreement, with a total counterpart equating to BTCs. MAC Codes are more CPU-heavy than RSA digital Signatures, making them perfect candidates given how much simpler things might theoretically be on both sides. RSA digital signatures are only needed to promote a backup replica into the main and for view updates and new views. View updates are not possible until one of two conditions is met: there are no longer any operational primaries in use, or all requests have been handled, whichever comes first! All other communications, on the other hand, need MACs such as SHA256 authentication. Miguel Castro and Barbara Liskov of the Massachusetts Institute of Technology discovered that three-dimensional calculating MACs is three times quicker than computing digital signatures, even when comparing MD5 and RSA 1024 bits, which we now have SHA256 and 2048 bits.