En-Tan-Mo SCIENCE

En-Tan-Mo
AGREED VALUE SHARED BENEFIT

EN-TAN-MO
AGREED VALUE SHARED BENEFIT

En-Tan-Mo is an exciting new project which aims to build a decentralized world with blockchain technology.

Until the advent of blockchain technology. human society had, for thousands of years, been underpinned by a rigid hierarchy Adopting this new technology heralds a brand new world characterized by decentralization, equality and creativity. a place where the corporate pyramid has collapsed and traditional hierarchical structures have been obliterated. Resource allocation will be optimized by decentralized pricing and dynamic equilibrium processes without external intervention or manipulation.

A world where value transfers freely with better services in digital finance, energy distribution, property rights and people's lives.

http://www.entanmo.com

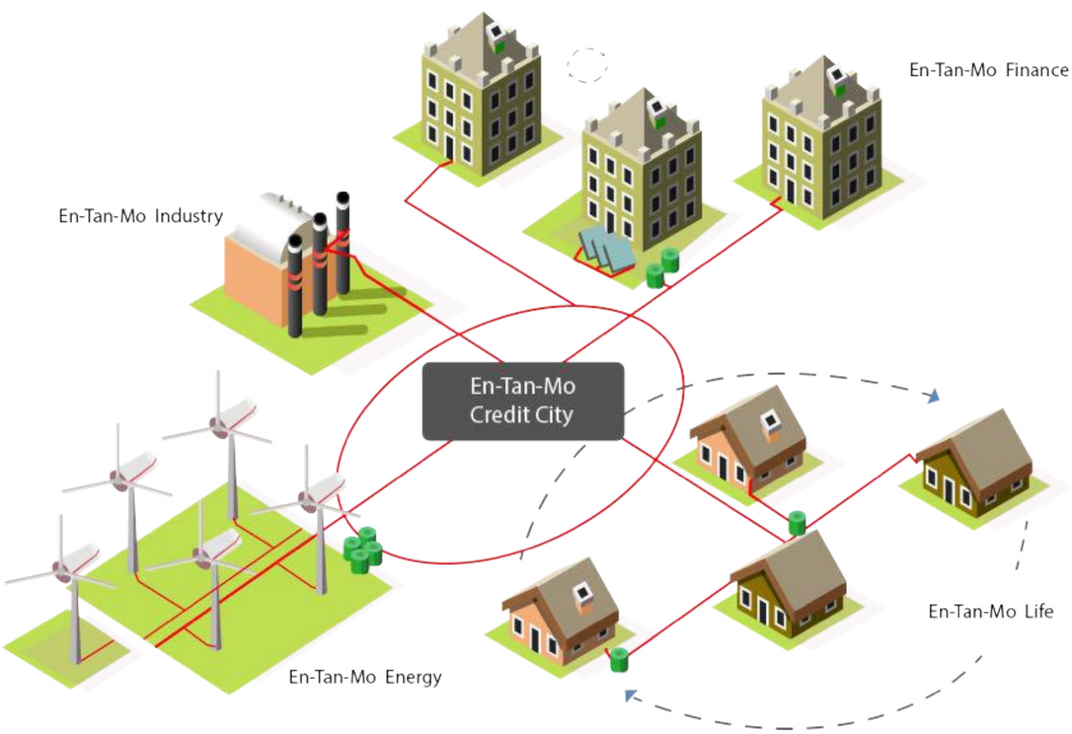
PROJECT DESCRIPTION

ETM

“AGREED VALUE SHARED BENEFIT”

Introduction

En-Tan-Mo is a next-generation blockchain based on Nash equilibrium and the idea of value transfer. Its name emerged from Entente, Transaction and Mobius. The core En-Tan-Mo team consists of a remarkable consortium of scholars, including Prof. Thomas Sargent, the leader of the rational expectation revolution and winner of the 2011 Nobel Prize in Economics; Prof. Sheldon Lee Glashow, the Nobel-winning theoretical physicist who proposed the first grand unified theory; as well as scholars from California Institute of Technology, the University of Maryland and the institut Henri Poincare who achieved SHD completeness by innovatively incorporating game theory in blockchain development. En-Tan-Mo is a place where SCV miners and Pareto mining pools support and motivate each other under Kantorovich consensus, a platform that accommodates various applications and communities in different blockchains and non-blockchain systems, and a decentralized world where people longing for equality, democracy and genuine freedom are entitled to their fair share of stake. En-Tan-Mo goes beyond a blockchain-based platform. It is a community that carries the widest variety of applications and hosts the most extensive participants and the one that is built upon solid mathematical framework and guided by profound economic and philosophical thoughts. This whitebook, therefore, is not sufficient to account for the significance and complexity of En-Tan-Mo, and merely serves as a brief introduction of the project. En-Tan-Mo development team is working on producing more papers with respect to En-Tan-Mo world, philosophy, mathematics, economics, calculation and ecology so as to shed more light on the project for interested readers.



0.0 What is En-Tan-Mo

A brief retrospect of the blockchain history

In 2008, Satoshi Nakamoto published the famous paper entitled *Bitcoin: a peer-to peer electronic cash system*. Few months later, the genesis block of Bitcoin was minted with a text "The Times 03/Jan/2009 Chancellor on brink of second bailout for banks" embedded in its coinbase, ushering in the age of Bitcoin blockchain. 2013 saw the release of the most important version of Bitcoin to date, which improved the inner management of bitcoin nodes and optimized the communication throughout the network. From then on, the cryptocurrency started to assume global influence. As the first of its kind, Bitcoin proves to be a huge success. However, its development has been serious hindered by its ability to scale. We call this stage of Bitcoin——Bitcoin Age 1.0.

To solve the scalability problem, Vitalik Buterin proposed Ethereum, another blockchain with clear design and structure. Since its inception, Ethereum has undergone several major developments, from the release of Ethereum Yellow Book to the crowdsale of Ether tokens, from iterating POC versions to the launch of Frontier, from PoW-based Metropolis to PoS-based Serenity. Ethereum, characterized by Turing-completeness, smart contract, ASIC resisting algorithm and on-blockchain applications, has become the hallmark of Bitcoin Age 2.0. With the help of Ethereum's platform interface and programming language, developers are able to write and release the next-generation Dapps.

The more recent blockchain developments need no introduction. In February 2018, Bitcoin's computing power reached 20EH/s, with more than 90,000 open-source projects running on Github. Developers from 90 countries including China, the United States, the United Kingdom, Singapore, Japan and South Korea have joined the research on blockchain technologies. Compared with that of the Internet, blockchain's growth was indeed dazzling. 1974 marked the genesis of the Internet, when ARPA published TCP/IP protocol. However, it was not until 20 years later that China was officially part of the international internet. The idea of blockchain, in contrast, immediately gained traction after the publication of Bitcoin's whitepaper. It only took a decade(2008-2018) for the technology to be known, trailed and tested by the public.

0.1 Why En-Tan-Mo

The intent of En-Tan-Mo blockchain is to build a full-fledged platform for efficient and balanced value transfer. Thus, it has been striving to achieve two things from the very beginning.

SHD completeness

CAP theorem states that it is impossible for distributed systems to provide consistency, availability and partition tolerance simultaneously. When it comes to blockchain, Satoshi Nakamoto observes that consensus can be reached via probabilistic strong consistency, which was later referred to as Nakamoto Consensus.

Similarly, there exists in blockchain-based platforms a problem called SHD Completeness. It implies that a trade-off has to be made among security, high-performance and decentralization.

On the premise of one-CPU-one-vote, Satoshi managed to ensure security and decentralization in Bitcoin blockchain but this has come at at a cost. Due to its consensus algorithm and block size design, Bitcoin falls short on scalabilty. Only 7 transactions can be processed every second and one block is mined every ten minutes. In fact, Bitcoin is flawed in more ways than one. Its decentralization was undermine by the emergence of highly-effective ASIC mining machines. Whereas mining machines reaping super-linear reward, the odds of an ordinary CPU effort mining a bitcoin dropped to approximately zero. The subsequent mining pools only made the situation worse. It is fair to say that Bitcoin blockchain is no longer the platform for equal participation as intended. As mining pools gradually increase their computing power, it seems only a matter of time before someone gains monopoly over 51% of the total computing resources of the network. Hence its security is also at stake. As such, we believe that Bitcoin blockchain has lost SHD completeness.

To counter the destructive effects brought by ASIC mining machine, Ethereum adopted Ethash, a ASIC-resistant algorithm, which for a while, maintained security and decentralization. However, CyptoKitties, the first large-scale application of smart contract which Ethereum takes great pride in, clogged up the network completely, laying bare the problem of low efficiency. A shift away from PoW towards PoS and DPoS has drastically improved the performance of Ethereum, yet to the detriment of decentralization. A network with few stakeholders holding sway is not essentially different from established centralized systems.

Under UPoS-based Kantorovich consensus, En-Tan-Mo blockchain introduces miner election mechanism which ensures the separation of token owners and mining machines and their respective stakes and interests. Thus, SHD completeness is attained without hurting security and decentralization.

Balanced transfer of value

The age of the internet has exponentially reduced the cost of information transmission and changed people's way of thinking, enabling information to be transferred swiftly and conveniently and bringing about new product and services. Value transmission on the internet, on the other hand, is not peer-to-peer. It relies on centralized institutions for book-keeping. The reason is simple. For each transaction of value, uniqueness of ownership is indispensable. This is very different from information, because digital content is, for the most time, open for replication.

With distributed ledger, trust is established in Bitcoin blockchain without a central authority, enabling value to transfer peer-to-peer and radically changing the way that information is transmitted and priced. However, powerful mining machines and mining pools broke the balance and tipped the scales in their favor. Value is now accumulating in mining pools at an alarming rate.

Ethereum has, to a certain extent, slowed down the speed of value accumulation via ASIC-resistant algorithm and "gas". But this approach, as we see it, is neither constructive and nor effective in the long run. Turning from PoW to PoS and DPoS, which was intended as a way to break the monopoly of computational resources and realize equilibrium on Ethereum, ended up putting value in the hands of a few powerful token owners and making the system more centralized than ever before.

It is a fact that the 80/20 rule applies to cryptocurrency and blockchain, meaning 80% of the value generated in blockchain is controlled by 20% of the mining population. En-Tan-Mo hopes to change the way value is transmitted and enable it to move around freely and openly by means of a balanced and equitable value transfer system. In En-Tan-Mo blockchain, participants are both the service seller and buyer in a decentralized market with a built-in price adjusting mechanism that allows price to form in a dynamic and self-organized way. En-Tan-Mo applies mean field theory to the study of dynamic price formulation, and makes sure that computing power and voting right are subject to a positive but non-linear relationship. This will rein in power concentration and create a new generation of IoV which will revolutionize business models and socio-economic activities.

0.2 En-Tan-Mo Builders

En-Tan-Mo's designers and builders come from the world's top universities and research institutes. Originally the team was composed of mathematicians who applied game theory in the development of blockchain-based platforms and came up with the name"En-Tan-Mo"from Entente, Transaction and Mobius. It was later expanded by the accession of experts in the fields of telecommunication, computer science and economics. En-Tan-Mo project is also privileged to have Professor Sargent and Professor Sheldon Lee Glashow as senior advisors. All the theoretical designs of En-Tan-Mo have adopted a double process. Firstly, the mathematicians complete the consensus design. Secondly, researchers in computer science or telecommunications rigorously verify the theoretical results by numerical simulation and hardware experiments.

What En-Tan-Mo has achieved so far would be impossible without the close cooperation between different teams and their directors who combine theory with practice, develop complementary software and hardware and integrate technology with commerce. The Kantorovich consensus mechanism was designed by experts in the fields of mathematics, telecommunications and computer science. The framework of "En-Tan-Mo Science" and the underlying stake distribution mechanism was proposed by experts who took part in Ethereum project and active users from the blockchain-community. Also former software engineers from Google, Thunder, Baidu and other leading Internet companies with rich experience are contributing to the original code development of the project.

More importantly, once the project is released online, the En-Tan-Mo builders will no longer be confined to members of the development team but include every user of En-Tan-Mo. As a self-evolutionary and participative system, En-Tan-Mo welcomes all users to actively upload compartments and develop derivative chains according to their needs. The En-Tan-Mo development team considers itself the initiator and infrastructure builder of this project. The team will do everything within its power to provide secure, stable and efficient technical service for future development. Moreover, it looks forward to collaborations with scientists, engineers and everyone who identifies with the ideas of En-Tan-Mo.

0.3 En-Tan-Mo Science

En-Tan-Mo is a full-fledged blockchain project which is underpinned by solid philosophical, mathematic and economic thoughts and supported by extensive application ecology. The development team will provide more information on En-Tan-Mo in the form of collections of essays which are available to all who are interested in the project.

Chapter 1 En-Tan-Mo world. En-Tan-Mo builds a world of blockchain 3.0 with improved services and an innovative value system. The world of En-Tan-Mo will focus on the improvement, restructuring and creation of markets. It will bring regeneration and transformation of the concept of equilibrium as essential business value.

Chapter 2 En-Tan-Mo philosophy. En-Tan-Mo is a brand new value transmission system that connects everything with value via blockchains. Thus, the decentralized nature of En-Tan-Mo is epitomized by consensus, value, dynamic equilibrium, polycentric power, openness, equality, participation, interaction and evolution.

Chapter 3 En-Tan-Mo mathematics. En-Tan-Mo blockchain will be investigated from a mathematical point of view. This chapter will provide up-to-date conclusions, future research plans and an introduction to the mathematical tools used.

Chapter 4 En-Tan-Mo economics. Under UPoS-based Kantorovich consensus, SCV miner and Pareto mining pools support and motivate each other. En-Tan-Mo brings not only technological innovation but also the reformation of business logic.

Chapter 5. En-Tan-Mo computation. En-Tan-Mo data structure, API node and codes written by software engineers will be demonstrated to illustrate the advantages of the Kantorovich consensus system.

Chapter 6. En-Tan-Mo ecology. En-Tan-Mo developed a unique multi-chain technology that includes two different categories of chains: central chains and derived chains. This structure will enable blockchains to break out of isolation, to be connected with the outside system and be capable of further expansion. In this way, we build a blockchain-based platform that can carry Dapps with over 10 million users.

Chapter 7. En-Tan-Mo Tokens. ETM token is the unique measure of transferable value in En-Tan-Mo. This chapter will also explain the token distribution plan of En-Tan-Mo.

Chapter 8. En-Tan-Mo organizations. En-Tan-Mo community consists of En-Tan-Mo Foundation, ETM Fintech, and ETM BD. En-Tan-Mo Foundation provides all-round support to user community and ensures the smooth operation of En-Tan-Mo project. ETM Fintech is an entity on privacy security and system development. ETM BD serves as an organization that promotes business development.

En-Tan-Mo

WORLD

AGREED VALUE SHARED BENEFIT

1.0 En-Tan-Mo World

1.1 Blueprint of the En-Tan-Mo World

En-Tan-Mo is disruptive innovation of blockchain technology and an interdisciplinary scientific project covering areas including philosophy, mathematics, economics and computer science.

Blueprint of the En-Tan-Mo world: supply and demand as well as participating individuals are seen as latitude and longitude lines respectively. The latter intersects and add to the former as it sees fit. Together they weave a web that is in constant self-learning and self-improvement through the chaotic shuffling mechanism. Each participant has the power to reshape the world of En-Tan-Mo with individual action and the freedom to choose profession makes people more rational, active, autonomous and far-sighted.

The collapse of pyramid: real decentralization entails the absence of dictatorship and monopoly. En-Tan-Mo will go further down the path towards equality and freedom by creating a highly-innovative world that is full of uncertainty and in general equilibrium. Individuals only follow the dynamics of free market and respond rationally to incentives. In the world of En-Tan-Mo, people receive and distribute utilities through active participation in different projects or the creation of new projects rather than wait passively for monthly salaries. Each individual is both the creator and recipient of the value transferred and transaction fee will be determined by the process of dynamic equilibrium to ensure fairness.

Notes that the next-generation blockchain technology eliminates the geographical restraints on profession, empowering mankind to become a new itinerary nomadic tribe.

1.2 History of Digital Currencies:

Ever since its inception, blockchain has been hailed as a promising technology that stands out in the history of the internet. Its birth renders all centralized applications obsolete. Digital token of blockchain, like physical currency in the real economy, is designed to function as a medium that improves the speed and scalability of transactions, thus enabling the internet to serve not only as a channel for information sharing but also as a bridge for value transfer. In 2009, the creation of Bitcoin ushered in a new era of "digital gold'. Since then, waves of gold rush has been sweeping the internet repeatedly with ever-increasing intensity. As of 2018, it is estimated that only 6 blocks (which generate 75 bitcoins as rewards) are mined every hour at the hash rate of approximately 30000PH/s. Bitcoin Energy Consumption Index, issued by Digiconomist, shows that the electricity consumed by bitcoin mining has amounted to 39.45TWh per year, an equivalent to 2 billion USD. With massive amount of computational resources pouring into the mining of digital gold, Bitcoin blockchain in 2017, in fact, has a lot in common with the United States during the 1848-1851 Gold Rush. Back then, America suffered from an acute shortage of food and clothing as a result of population explosion. The growth of service sector failed to keep pace with the surging social demand with U.S. wholesale commodity price index soaring from 847 to 1025. What Bitcoin really took the world by surprise, however, is that it only took 9 years to establish its own "Gold Standard Monetary System", an endeavor that took the real world hundreds of years to accomplish.

In 2013, Vitalik Buterin proposed Ethereum——"the next-generation of cryptocurrency and decentralized application platforms". This revolutionary innovation gave birth to the smart contract system characterized by Turing completeness, pushing ether, Ethereum's digital token, to the height of "digital oil". Ethereum allows users to build applications at low cost and great speed on a variety of modules. To be more specific, it empowers users to write applications with Ethereum Virtual Machine Code, a Turing-complete scripting language. The applications are called smart contract which is the core of the whole blockchain platform. Smart contract is the "autonomous agent" of Ethereum blockchain. When a contract receives a message, its code activates and self-executes instructions the message contains and then sends back a message or a transaction in turn. It should be pointed out that an Ethereum transaction can be either a transaction or a segment of instructions. The good thing is that it allows ether to be used in large quantities. But it also burn resources and sometimes, to the point of exhaustion that incurs serious congestion on the network. A widely used and fitting metaphor is that Ethereum is like a non-scalable highway, and on-blockchain applications are automobiles fueled by ether. Currently, Ethereum carries over 900,000 contracts, most of which are homogeneous token applications, like huge cars cramming a narrow, congested and over-charging highway.

To put it simply, Bitcoin and Ethereum are the epitomes of the gold standard economy and the energy economy respectively. Therefore, it is not hard to imagine where their economic and ecological models may lead.

The world of pyramid structure: scarcity is what makes gold and oil the cornerstones of the world economy. As oil has pivotal use-value, it replaced gold as the core products sustaining human society. Unfortunately, the world as a whole has been turned into a form of pyramid by its resource-driven nature, with few countries at the top and most countries, third world countries in particular, at the bottom as providers of cheap labor. Human society resembles pyramid structure as well. Powerful enterprises standing at the top enjoy cheap services offered by numerous small-and micro-companies and organizations who are of pyramid structure themselves. Most of the ordinary workers sweat and toil in those places in exchange for pitiful salaries. The pyramid also exists between different enterprises and organizations. Those at the top are able to amass resources at diminishing cost while those at the bottom are left to bear the pressure. Eventually, the outbreak of economic crisis will bring about the collapse of pyramids. However, a new pyramid will be erected on the ruins and the same process will go over and over again.

1.3 En-Tan-Mo Mass Emigration

1) PoW and DPoS Dual Structure: Breaking Monopoly and Centralization

PoW genesis: In the physical world, "labor" is the most extensive consensus. Commodity that embodies equal amount of labor come to be traded as universal equivalent that usually takes the form of currency. In blockchain, however, things are little different. The underlying consensus is "computing power". Digital tokens minted by miners who perform computation is the fairest gauge of value in the blockchain-based network. Therefore, consensus on computing power is the cornerstone for initial equilibrium and stability in token value. And this is what Bitcoin and Ethereum have been based on ever since their establishment.

PoW and DPoS dual structure: There is a long-standing pattern in human history that a new technological revolution would invariably bring about unfair advantage and hence disrupt the level playing field, as witnessed in areas as varied as agriculture, industrial sector and the internet. Blockchain is no exception. It is known that fairness brought by PoW has been severely undercut by the invention of super-efficient mining machines. DPoS only seems to expedite the process. Because under the consensus, in which supernodes are charged with enormous power, centralization or pyramid structure will come into existence at accelerating rate. In this sense, En-Tan-Mo proposes the dual structure of PoW and DPoS that draws upon the merits of the two protocols. As a result, we manage to exercise maximum constraints over the centralization tendency of pure PoW or DPoS consensus and ensure both efficiency and security. Under the dual consensus, stakeholders and miners are entitled to equal participation. And we welcome them to jointly make decisions on issues concerning the community as well as future updates and development. This is, to our view, the major achievement of En-Tan-Mo.

2) Cooperation among Competing Miners: Fair Coalition Rules

Under PoW, miners are required to perform intensive computation to solve a hash function and the hash rate of the mining device determines how long it would take for a miner to work out the puzzle. Miners are pure competitors, leading to low utility and huge waste of energy. To solve this problem, miners seek to form coalitions such as mining pools, only to exacerbate centralization. According to the Cooperation-Competition Theory, mining is not a zero-sum game, rather a unique form of game that can produce win-win outcome. By applying the game theory to the analysis of interaction among miners, En-Tan-Mo endeavors to forge a fair and equitable cooperation-competition relationship among participant nodes.

En-Tan-Mo uses the term" value chain" to describe the interaction among different miners in the cooperation-competition relationship. The idea of value chain highlights the co-existence of competition and cooperation in the En-Tan-Mo world. Knitting "competition" and "cooperation" together, the fresh term delivers richer implications than any of the two words alone. It brings to life a dynamic relationship among miners. We define this relationship by "impact", "intimacy", and "vision", three words that cover the tangible benefits coming out of such a relationship, i.e. increase in productivity and value. The following three approach are what En-Tan-Mo takes to deliver benefits: First, eliminating the need for duplicated computation so that considerable amount of computation resources and electricity can be saved; Second, drawing upon miners' respective competitive edge to speed up block production; Third, creating new opportunities for miners to participate in the construction of external blockchains.

3) Dynamic Supply-Demand: Rational Choice

and Nash Equilibrium

Joining En-Tan-Mo is to side with the best coalition in the digitalized world. Previous mining pools often follow the laws of optimal control theory. Under such theory, optimal choice will trigger fiercest external competition. The tenser competition gets, the smaller utility for participants dwindles. Led by Professor Thomas Sargent, scientists from the En-Tan-Mo project employ the rational prediction theory to put in place the dynamic supply-demand mechanism that leads to a real time formation of Nash equilibrium based on participants' rational choice strategies. We believe that cooperation of selection is the manifestation of supply and demand and value is the organic combination of cost and demand. Therefore, we initiate UPoS (Unified Proof of Stakes) in En-Tan-Mo that both addresses the cost concerns of PoW and takes into account the supply-demand relationship highlighted by DPoS, hence forging the coalition rules that maximize value and reduce volatility.

4) Concave Function Mechanism: Equilibrium Stakes

Traditionally, coalitions tend to favor the most powerful collaborators. The stronger collaborators become, the bigger share of income they receive. But this super-linear income model will eventually hurt all collaborators, the weak and the powerful. And it is this that leads to the formation and collapse of pyramid. En-Tan-Mo, by paying attention to the long-tail effect, empowers all collaborators to obtain relatively considerable rewards and thus sets up the coalition structure that produces lasting benefits. In this way, we ensure that powerful collaborators who gives away a portion of interests at the initial stage will harvest greater profits in the long run.

The backbone of En-Tan-Mo lies in its concave function-based algorithm. It is a completely different arithmetic function from those of the “unicorn” mining pools. It shifts away from linearized arithmetic function to concave function (or upper concave function) so as to tilt the scales in favor of the wider range of participants. Through rational expectation mechanism, it would contribute to more extensive consensus, making En-Tan-Mo the fairest blockchain network.

5) Chaotic Shuffling: Resistance to Sybil Attack and Coalition attack

The concept of SHD implies a blockchain is faced with an inevitable problem concerning decentralization and security——Sybil attack. In computer security, Sybil attack is an attack wherein an attacker seeks to subvert a blockchain (which is considered a peer-to-peer network) by creating a number of pseudonymous identities and using them to gain a disproportionately large influence. The same issue will arise with regard to coalition attacks. Mathematicians from the En-Tan-Mo project use modern theory of dynamical systems, topology as well as structural and bifurcation theory of complex invariant sets to study systems stability and control methods. They come up with a powerful method and name it chaotic shuffling based on ergodic theory and sensitive dependence on initial conditions. In such a way, an efficient pseudo-random mechanism with the highest resistance to quantum attack is devised for shuffling mining sequences.

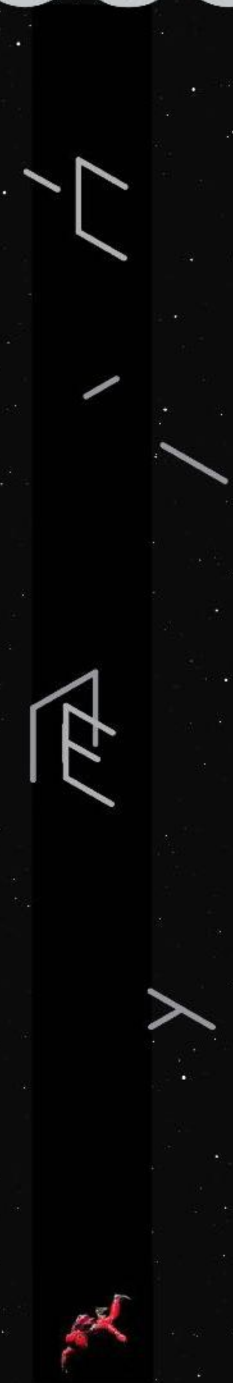
6) Open Component Library and Friendly Developer Lobby: Self-Evolution and Common Participation

En-Tan-Mo is based on the idea of BaaS (Blockchain as Service) and the standard of micro-service. Taking the self-evolving component library as its core and the developer community as its driving force, it provides an adaptation platform for other blockchains to complete the free transfer of assets and applications. En-Tan-Mo provides two-way soft channels for non-blockchain applications and data. It also provides developers with the ability to complete component uploads, reviews, and rewards in the shared lobby. For ordinary users, En-Tan-Mo provides BaaS gateways with access to barrier-free service. As a platform advocating self-evolution and common participation, En-Tan-Mo welcomes users to actively upload components and develop derived chains.

In the En-Tan-Mo world, interconnection is built among different chains and between block chains and non-block chains. Side chains are independent of the main chain. Even each relationship between supply and demand constitutes an independent chain in the parallel network that extends infinitely. Individuals are be both sellers and buyers in an efficient system without additional cost. Value flows freely between different blockchains.

"Hello! En-Tan-MoWorld!" Computing node in En-Tan-Mo will join a hybrid computation coalition, a computation carrier component with the best possible long-time utility. Each node chooses transactions according to supply and demand and gets a fair share of utility in return. En-Tan-Mo itself is a large-scale high-frequency exchange for digital tokens, a coalition mining pool, and a Dapp application platform with a natural gaming field formed by chaotic shuffling. It is also the best developers' community and the carrier for blockchain application components. Hello! Welcome to a whole new world of equilibrium and equality!

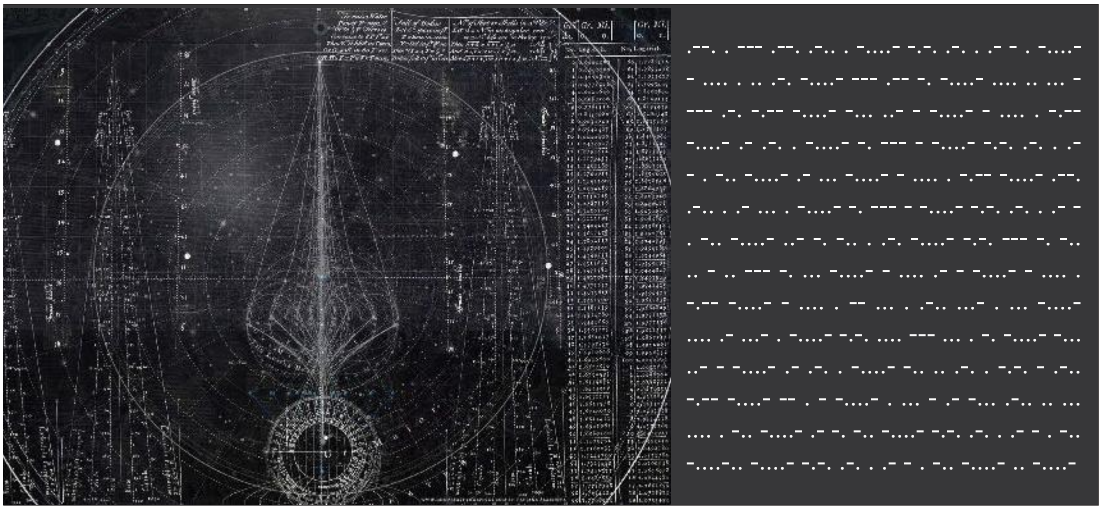
PHILOSOPHY



En-Tan-Mo

2.0 En-Tan-Mo philosophy

En-Tan-Mo is the reconstruction of production and exchange relations in the real world through topological isomorphism mapping in an abstract space, and contains profound philosophical thoughts. Within its huge structure, the essence of decentralization is to infiltrate En-Tan-Mo layers, and the concept of "ubiquitous self" can be extracted. En-Tan-Mo's philosophy can be traced back to ancient Greece and to Protagoras's famous observation that "Man is the measure of all things". Decentralization has evolved from a world in which Man worships a God or gods, to one in which he worships himself, to one in which nobody worships anybody and everybody is equal. . Complex systems and multivariate structures, consensus and value, dynamic equilibrium and devolution, self-evolution and openness are the decentralized features of En-Tan-Mo.



2.1 Complex Systems and Multivariate Structure: "Signal Value and Symbol Exchange"

Multivariate structure is described by a symbolic code and is repeatedly released in the En-Tan-Mo complex system. The multivariate structure transforms the pathways operating in different domains into a complex network system. The symbolic code gradually signs off from the object in question, and from its control over people. The En-Tan-Mo complex system takes the symbolic code and returns it to the multivariate structure but it creates a lot of differences. Liberating the symbol of the current flow to create a difference, the symbolic code follows the law of mutual inclusion. The multi-structure of En-Tan-Mo effectively overflows, intervenes in the complex system which can no longer constrain it and defines the process outside of En-Tan-Mo. In addition to the structures owned by the definition, there is also a surplus of meaning. The complex system is integrated with the performance of En-Tan-Mo, which leads to the co-variation of the association. Numerous rhythms, numerous subjects, and co-moving slips form a formal symbolic value and symbolic exchange of space.

2.2 Consensus and Value: "A Thousand Plateaus"

"A Thousand Plateaus" is entangled in various layers, codes, transcendental planes, textured spaces, etc. in the traditional ideological model, all streaming intensity, equal and reciprocal with the "plateau" of En-Tan-Mo. The connection of diversity and heterogeneity becomes the cross-over of communication between chain nodes. The consensus is highlighted in the connection, and value transmission becomes possible. The "A Thousand Plateaus" is an element that influences the direction of a segment. It is not only limited to time, but also means the ability to trace the origin of ideas and life. This means that it allows us to return to the very beginning and experience how the initial, marginal orientation took place, which in turn leads to some kind of marginal sensitivity. The equality of nodes is distributed over the evolving surface of En-Tan-Mo and is distributed in a structure of recurrent passages. The purpose is to depict a state of reciprocal facts, maintain the balance between En-Tan-Mo subjects, or explore an existing unconscious. The equality of segment extraction is designed to imitate an absolutely perfect equilibrium and is given as a fait accompli, and this equilibrium imitation is based on the En-Tan-Mo structure or the supporting equiaxial surface.

2.3 Dynamic Equilibrium and Decentralization: "Persian Letters"

The equilibrium formed by the simultaneous development of the En-Tan-Mo world, has a similar speed to that world and proceeds by similar stages. The host is no longer concerned with the guest, but with the difference of speed. En-Tan-Mo's dynamic equilibrium will be separated from the pre-existing guest. There is no host and no guest, just a natural reality and an object, and the unity of host and guest is constantly hampered. However, in the generalized En-Tan-Mo, the new unity develops complementarity, and the subject can no longer form a dualistic differentiation.

Centralized power, which is the problem of free structural systems, is always entangled in the most powerful elements. The decentralization of En-Tan-Mo is autonomous decentralization. Autonomy is not the same as incomplete freedom. It is only a more centralized form. "Man is born free but is everywhere in chains" This contradiction has proved a metaphysical impossibility.

2.4 Internal Evolution and Open: "Death of the Author".

In the deconstruction and gradual absence of the subject, the structure itself becomes the whole, and the individual defines its own meaning and existence in its mutual relationship with the whole. Therefore, the structure itself has existence as an independent entity and an isomorphic mapping to reality will serve as a basis for historical records and authenticity. Obviously, a static structure will continue to conflict with the evolution of historical structures and the complexity of the structure of the real world structure. In the postscript of his famous book The Primitive Society, Levi-Strauss has drawn attention to the complexity of the relationship between structure and evolution and its importance in the socio-political analysis of human society. The way to solve this problem in En-Tan-Mo is to embed self-evolving logic in the design, so that this system can guarantee the synchronism between reality and decentralization and the structure remains stable.

The author's death refers to the author's role as the subject of creation. He no longer has a monopoly of work. The author's identity has been destroyed in modern writing. Therefore, the concepts of time, space and origin must all be addressed again. The construction process of En-Tan-Mo itself is a kind of writing. The purpose of this writing is to realize the unity of free will and an ordered structure within a new dimension of space. This kind of creation is in the process of formulating a meta-historical rule or of writing history within its own system, and its authenticity will be determined by general consensus. For any one subject, arbitrarily setting rules and even changing history will bring about an unbridled temptation to power. Therefore, En-Tan-Mo not only recognizes the possibility that the creative subject can be deconstructed, but also actively implements this deconstruction process in order to create a truly decentralized, fair system.

References：

【01】S. Nakamoto. A Peer-to-Peer Electronic Cash System. www.bitcoin.org/ bitcoin.pdf, 2009.
【02】M. E. Hellman. A cryptanalytic time-memory trade-off. IEEE Transactions on Information Theory, 26(4):401-406, 1980.
【03】V. Buterin. Long-range attacks: The serious problem with adaptive proof of Work. https://blog.ethereum.org/2014/05/15/long-range-attacks-the-serious-problem-withadaptive-proof-of-work/, 2014.
【04】V. Buterin. Proof of stake. https://github.com/ethereum/wiki/wiki/Proof-of-Stake FAQ, 2016.
【05】G. Wood. Ethereum: A secure decentralised generalised transaction ledger. http://gavwood.com/Paper.pdf.
【06】M. Mainelli, C. von Gunten. Chain of a lifetime: How blockchain technology might transform personal insurance. Dec 2014. Z/Yen Group, Long Finance.
【07】J.-P. Delahaye. Les blockchains. "Les big data à découvert". Editions du CNRS, Chapitre 15, 118, 2017.
【08】J.-P. Delahaye. Le Bitcoin: première cryptomonnaie. "1024" Bulletin de la Société Informatique de France, n° 4, pp. 67-104, octobre 2014.
【09】J.-P. Delahaye. Le Bitcoin: une monnaie révolutionnaire. Labaratoire d'Informatique Fondamentale de Lille, janvier 2014.
【10】M. Perrin. Distributed Systems: Concurrency and Consistency. ISTE Press, Elsevier, 2017.
【11】R. Perez-Marco. Bitcoin and Decentralized Trust Protocols. Newsletter of the European Math. Soc., 100 p.32, 2016.
【12】J.-P. Bouchaud, Economics needs a scientific revolution, Nature, 455 (2008), pp. 1181 EP –.
【13】S. Underwood, Blockchain beyond bitcoin, Communications of the ACM, 59 (2016), pp. 15–17.
【14】R. Wattenhofer, The Science of the Blockchain, CreateSpace Independent Publishing Platform, USA, 1sted., 2016.
【15】H. Watanabe, S. Fujimura, A. Nakadaira, Y. Miyazaki, A. Akutsu, and J. Kishigami, Blockchain contract:Securing a blockchain applied to smart contracts, in 2016 IEEE International Con- ference on Consumer Electronics (ICCE), Jan 2016, pp. 467–468.
【16】S. Davidson, P. De Filippi, and J. Potts, Economics of blockchain, SSRN Electronic Journal, (2016).

En-Tan-Mo

MATHEMATICS

3.0 En-Tan-Mo Mathematics

This part will discuss blockchain systems from a mathematical point of view, covering our current work and future plans. We will also give a brief and intuitive introduction to mathematical theories used. Moreover, we will explain why we are building En-Tan-Mo.

3.1 Security Problem in Decentralized System

In 2009, Satoshi Nakamoto published *Bitcoin: peer to peer electronic cash system* in which he illustrated the mathematical foundations of Bitcoin blockchain and proved that the probability of successful attack on the network (double spending) is extremely low given certain Poisson distribution assumptions. In this way he gave a solution to the trust problem in distributed ledgering system, alias Byzantine general problem.

We summarize the principal ideas of Nakamoto regarding quantitative probability estimates of successful cheating in blockchain system as follows:

At the conclusion of one transaction a group of coordinated attackers starts trying to mine block with false information and build a fork upon it. At the moment that the honest miners have extended z blocks, Nakamoto calculated the probability that the fork can at some point catch up with the real chain using full probability formula. But with emergence of ASIC mining machines the original hypothesis can no longer stand as the distribution of the fork does not conform to Poisson distribution. The computational struggle to extend new blocks is essentially a Binomial random walk problem from perspective of stochastic analysis.

p = *probability an honest node finds the next block*;

q = *probability the attacker finds the next block*;

We denote by X_n the blocks mined by the attackers at the moment when the honest miners have mined n blocks. This problem can be treated as a problem of points such that q denotes the probability that the cheater successfully mines a new block; $p = 1 - q$ denotes an honest miner has won in the hashing and mines a new block, this is apparently equivalent to the probability that the attackers fail. If we look from the point of view of the attackers, then $P\left\{X_n = k\right\}$ can denote the probability of the event such that exactly k successes occurs before n failures and it can be described using Negative Binomial distribution:

$$P\left\{X_n = k\right\} = C_{k+n-1}^{k} p^n q^k \tag{3.1}$$

Under the following assumptions:

1. The number of blocks mined by honest miners n is sufficiently large;

2. There exist a finite constant λ, $n\frac{q}{p} \to \lambda$ .Denote $l_n = n\frac{q}{p}$, by the following calculations

$$P\left\{X_n = k\right\} = \frac{n^n}{(n+l_n)^n}\frac{l_n^k}{(n+l_n)^n}\frac{(k+n-1)!}{(n-1)!k!}$$

$$= \frac{l_n^k}{k!}\frac{1}{(1+\frac{l_n}{n})^n}\frac{n(n+1)...(n+k\text{-}1)}{(n+l_n)^k}(1+\frac{l_n}{n})^n \to e^{\lambda}$$

It can be obtained that the distribution law of random variable X_n is approximately Poisson distribution:

$$P\left\{X_n = k\right\} \to \frac{\lambda^k}{k!}e^{-\lambda} \tag{3.2}$$

However, with the emergence of mining pools the assumption (2) can no longer be satisfied, therefore the quantitative estimates of Nakamoto can no longer stand as a correct risk management control model for crypto-finance. Moreover, once the group of attackers obtains sufficiently strong computation resources and adjust its computational capacity by using impulse control(suddenly increasing hashing rate at the beginning of an attacking process, for example), then the probability of his success is significantly larger than what Nakamoto has estimated.

Therefore, using proof of stake algorithms and controlling q , while increasing the creation rate of blocks can more effectively undermine the chance of successful attacks and obtain more precious estimates on that probability.

When the chain of honest miners has been extended by z blocks, the difference in number of blocks between this chain and the one being mined by attackers can be denoted as $z\text{-}X_n$. Using methods from the gambler's ruin problem it can be derived that as the difference in number of blocks is z - k , the probability such that the chain of attacking group can at some point in the future catch up with the chain of honest miners is:

$$\begin{cases} (q/p)^{z-k} & if\,(z > k) \\ 1 & if\,(z \le k) \end{cases}$$

The probability of success of the attackers can be estimated as follows using full probability formula:

$$P(z) = P\{X_z \ge z\} + \sum_{k=0}^{z-1} P\{X_z = k\}\left(\frac{q}{p}\right)^{z\text{-}k}$$

$$= 1 - \sum_{k=0}^{z-1} C_{k+z-1}^{k}(p^z q^k - q^z p^k) \tag{3.3}$$

As can be seen in the works of *C. Grunspun* and *R.-P. Marco*, this probability is quite large even when the proportional computational recourses under control of the attackers is significantly less than 51%. For these arguments we will in En-Tan-Mo use a duality type consensus protocol as to monitor and constrain behaviors of miners by an election processes.

3.2 Nash Equilibrium and Consensus Algorithms

The concept of Nash equilibrium is frequently used in the design of En-Tan-Mo consensus algorithms. We first introduce its definition then briefly explains how it plays a central role in En-Tan-Mo consensus protocols.

Suppose $S_1, S_2, \dots, S_N$ denote compact metric spaces and $J_1, \dots, J_N$ define continuous functions on product space $\prod_{i=1}^{N} S_i$. We denote by $P(S_i)$ the compact metric space of all Borelian probability measures defined on S_i.

Definition: In a game of mixed strategies Nash equilibrium means the tuple $(\overline{\pi_1}, \dots, \overline{\pi_N}) \in \prod_{i=1}^{N} P(S_i)$ such that, for any $i = 1, 2, \dots, n$

$$J_i(\overline{\pi_1}, \dots, \overline{\pi_N}) \leq J_i((\overline{\pi_j})_{i \neq j}, \pi_i) \quad \forall \pi_i \in P(S_i) \qquad (3.4)$$

where

$$J_i(\pi_1, \dots, \pi_N) = \int_{S_1, \dots, S_N} J_i(S_1, \dots, S_N) d\pi_1(S_1) \dots d\pi_N(S_N)$$

Theorem($J.Nash$1950)($Glicksberg$1952) Under the above assumptions, there exists at least one equilibrium point in mixed strategies.

There is a vast and expanding literature on game theory analysis of blockchain systems such as Bitcoin. Nash equilibrium is a state of strategies (for all nodes) which no participant can gain by unilateral deviation. This is essential to ensure the stability and security of a decentralized system as there cannot be a centralized controller maintaining order by "punishing" deviations.

The problem is that strategies at Nash equilibrium are not always efficient. In Bitcoin one can even say that the Nash equilibrium is highly wasteful. This is due to the fact that the only security mechanism is proof of work, with miners entering and exiting the network freely. This is a purely non-cooperative game and the only deciding factor for wining is hashing rate. This PoW mechanism design has been very successful in making miners follow the consensus in the sense of honest mining and following "the longest chain rule". In the meantime, miners always have incentives to upgrade their mining devices to maximize their profits. Eventually the computational arms race leads to wasteful mining pools and de facto blockchain oligarchs. In economics this is often referred to as "tragedy of commons" and in algorithmic game theory "price of anarchy".

This problem can only be remedied at the level of mechanism design, "the engineering side of economics". Mechanism design is also called inverse problem in game theory: not studying the outcomes based on mechanisms but rather seeking suitable mechanism which can lead to desired outcomes. Blockchain systems are the perfect domain for using mechanism design theory as designers have a lot of freedom at designing protocols or even laying down constitutions. Here mechanism can be seen as a procedure which assigns outcomes to strategies. The reason why Nash equilibrium is so important for mechanism design is that: if players are rational and can make an educated guess about what will happen, then they will predict a Nash equilibrium. Otherwise, someone will have incentive to deviate and not follow the consensus. In blockchain systems this problem become more acute: as there is no central power to exercise constraints, participants will deviate as soon as they feel the incentives. In En-Tan-Mo we used dual PoW and DPoS mechanism design to achieve high efficiency of Nash equilibrium while maintaining strong decentralization. In our future work we plan to study the applications of Kantorovich type price mechanism and Vickery auction in En-Tan-Mo mechanism design.

3.3 Stake Redistribution Model in Electoral System

Currently many blockchain systems adopted delegated proof of stake consensus(DPoS). DPoS consensus has the advantages of economizing resource expenditure and improving mining speed. The underlying theoretical proposition is that the nodes which own higher stakes within the given system is trustworthy. According to studies of the En-Tan-Mo team on current state of blockchains and crypto-currencies, stakes are usually highly concentrated in hands of minorities with Pareto type distributions. In order to prevent the concentration of voting power we need to designate the dependence of voting power on stakes as positively correlated but nonlinear. Here we only gave a brief review of our plan.

Suppose there exist N nodes within the system and at the time of voting the proportion of stake owned by a given node I s α_i, $\sum_{i=1}^{N} a_i = 1$. We define a strictly concave function f, $\frac{\partial f(\alpha_i)}{\partial \alpha_i} > 0$, $\frac{\partial^2 f(\alpha_i)}{\partial \alpha_i^2} < 0$. The proportion of voting power of this given node will be given by $B_i = \frac{f(\alpha_i)}{\sum_{i=1}^{N} f(\alpha_i)}$, apparently $\sum_{i=1}^{N} B_i = 1$.

By definition of strictly concave function, for $0<t<1$, We have $f(tx + (1-t)y) > tf(x) + (1-t)f(y)$. Hence for any two nodes with relative stake proportion α_i and α_j

with $\alpha_i > \alpha_j$,We obtain:

$$f(a_j) = f(\frac{a_j}{a_i}a_i + (1-\frac{a_j}{a_i})\cdot 0) > \frac{a_j}{a_i}f(a_i) \quad (3.5)$$

$$\frac{f(a_i)}{f(a_j)} < \frac{a_i}{a_j} \quad (3.6)$$

The question is, under this new consensus mechanism, there is the possibility that a large stake holder will try to gain an unfair advantage in voting by controlling multiple accounts. This is called Sybil attack in cyber-security.

We consider this an irrational strategy from the perspective of game theory for the following arguments:

We start with the proposition that participants are utility-motivated. In the case of En-Tan-Mo blockchain, this means pursuing higher token rewards. Voting is a means to an end, not an end in itself.

In En-Tan-Mo transaction mechanism, each vote comes after an transaction which incurs a certain amount of transaction fee. Thus for attackers (of Sybil attack) this means extra cost. As attackers must initiate huge amount of meaningless transactions to gain more votes, this will lead to a substantial sum of fee.

En-Tan-Mo is based on game theory and rational expectation economic theory of Thomas Sargent. Our mathematical study shows that the rational expectation of utility gained by Sybil attack will not be able to cover the cost of extra transaction fee. Therefore, Sybil attack will not be the rational choice.

3.4 Chaotic Shuffling

The consensus design of the En-Tan-Mo project has made security one of the most essential objectives and sets a very high standard. In response to the problem of coordinated attacks from multiple SCV miners in the DPoS-based blockchains, the consensus layer will use chaotic shuffling algorithms.

Chaos: The extreme sensitivity of the dynamic behavior of the dynamic system to the initial value.

To put it simply, chaos refers to the fact that minimal perturbation to the initial value can result in a very large change in the mapping result, which can lead to an uncertainty in the prediction process. This uncertainty is exactly what we need. In the process of uploading blocks, if several miners want to join force to cheat, they need to identify a block containing false information consecutively. For this purpose, they need to know the sequence of miners as soon as possible so as to have enough time to coordinate. The chaotic shuffling refers to the fact that the order of miners' uploads is not determined at the outset, but that the consensus layer design specifies an algorithm that extracts certain information from each successfully uploaded block for mapping and performs multiple iterations to calculate the next miner. The number, therefore, is not known until the last minute.

1. We define a *Hénon*-type muti-dimensional mapping with the following dynamic:

$$x(n+1) = ay(n) + by(n)^2$$
$$y(n+1) = cx(n) + dy(n) + dx(n)z(n)$$
$$z(n+1) = x(n)^2 + ey(n)x(n) \quad (3.7)$$

2. Let 256 *bit* binary and its corresponding decimal numbers be I and D, respectively, and the mapping relationship can be described as follows:

(1) Generate a random number of iterations $N_1 (3 \le N_1 \le 13)$ by using uniform distriution generating function randi in *Matlab*.

(2) Randomly generate the *idxo* of initial value by using system output

$$s = x(N_1) + y(N_1) + z(N_1)$$
$$idxo = \mathrm{mod}(s,3) + 1$$

(3) Generate two random numbers $(seg1, seg2)$ using the other two dimensions of the signal

E.g:

$idxo = 2$, (i.e. select i from the x dimension as the initial value), then $seg1 = \mathrm{mod}(x(N_1),12) \quad seg2 = \mathrm{mod}(z(N_1),12)$

(4) Treat I as 32 8-*bit* blocks, divide I into 3 blocks using $seg1$ and $seg2$

$$I1 = slit(I, seg1)\ ,\ I2 = slit(I, seg2)\ ,\ I3 = slit(I, seg3)$$
$$seg3 = 256 - seg1 - seg2$$

(5) Generate "system parameter scaling value" (*var-par*), "system iteration number" (*val-N*), and "system initial value scaling value" (*val-ini*) using *I*1, *I*2, and *I*3, respectively.

(6) Use *val-par*, *val-N*, *val-ini* to initialize the hyperchaotic system and perform calculations. Select the *idxo*-dimensional signal as the output, and generate an integer D between 1-101 by exchange operation.

The chaotic mappings are deterministic, therefore at each step all miners obtain exactly the same result by calculating independently. The system can achieve stability and security while maintaining strong decentralization.

3.5 Kantorovich Duality, Optimal Transport and Decentralization

The consensus protocol in En-Tan-Mo is given the name Kantorovich consensus in homage to Soviet Mathematician Leonid Kantorovich for his work in the field of optimal transport, especially the duality theorem given in his work in 1937. This is one of the ground breaking results in linear programming and optimal transport. Here we given a brief review of the theory and how it might be related to construction of decentralized blockchain systems.

X, Y are two sets that correspond to two given domains in the physical world and certain amount of material has to be transported from X to Y. $c(x, y)$ denotes the transport cost from each point x to y. γ denotes the joint probability distribution on domain $X \times Y$ while μ and ν denote respective marginal distributions on X and Y.

Then $\int_{X \times Y} c(x, y) d\gamma(x, y)$ can be used to denote the overall transport cost.

Kantorovich duality formula

In multiple lines:

$$\inf_{\gamma \in (\Pi(\mu,\nu))} \int_{X \times Y} c(x, y) d\gamma(x, y) = \sup\{\int_Y \psi(y) d\nu(y)$$

$$-\int_X \varphi(x) d\mu(x) : \psi(y) - \varphi(x) \leq c(x, y)\} \quad (3.8)$$

Here *inf* and *sup* denote infimum and supremum respectively. Overlooking strictness in mathematical details, we give an intuitive explanation of how it can be used: in a decentralized system as "En-Tan-Mo", if $\psi(y)$ designate the price of selling at point y while $\psi(x)$ designate the price of buying at x, then $\int_Y \psi(y) d\nu(y) - \int_X \varphi(x) d\mu(x)$ can be used to designate final cost of transactions. Duality theorem shows that under given condition $\psi(y) - \varphi(x) \leq c(x, y)$, the strategy to minimize transportation cost is in dual relation with the strategy that maximize profit.

This theorem points out the importance of construction of a rational pricing system to the optimization of resource transport and allocation. Due to its implications in terms of economics this mathematical theory was for a long time rejected and criticized in Soviet Union by orthodox academics.

From the perspective of blockchain technology, optimal transport corresponds to the best strategy for transmitting value. It is reasonable to construct a trusting mechanism based on decentralized systems, to enable each participant making its autonomous decision with available transaction information such that a transparent market can emerge. A fair pricing system will emerge via dynamical equilibrium process that is based on the self-adaptive mechanism of the market itself. This is exactly how value-transfer can be achieved.

3.6 Dynamic Price Formation in Decentralized System

In En-Tan-Mo, each participant is at the same type provider(seller) and buyer of services. The core of decentralized system is the price mechanism and price formation can be achieved through self organization via dynamical equilibrium processes. En-Tan-Mo will use mean field game theory to study the price formation mechanism in decentralized trading system. This model is also called Lasry-Lions Price formation model. Suppose that price preference has some randomness. The density functions f_B, f_V designate respectively the numbers of buyers and sellers(venders). t denotes time of certain transaction and x the price. For example $f_B(x,t)$ means the number of buyers at a moment t such that the price is x. a denotes the transaction cost. The following mean field game systems will be used:

$$\frac{\partial f_B}{\partial t} - \frac{\sigma^2}{2}\frac{\partial^2 f_B}{\partial x^2} = \lambda\delta(x - p(t) + a), if\,(x < p(t), t > 0)$$

$$f_B \geq 0, f_B(x,t) = 0, if\,(x \geq p(t), t \geq 0)$$

$$\frac{\partial f_V}{\partial t} - \frac{\sigma^2}{2}\frac{\partial^2 f_V}{\partial x^2} = -\lambda\delta(x - p(t) - a), if\,(x > p(t), t > 0)$$

$$f_V \geq 0, f_V(x,t) = 0, if\,(x \leq p(t), t \geq 0)$$

$$\lambda = -\frac{\sigma^2}{2}\frac{\partial f_B}{\partial x}(p(t),t) = +\frac{\sigma^2}{2}\frac{\partial f_V}{\partial x}(p(t),t) \quad (3.9)$$

given initial conditions:

$$f_B(x,0) = f_B^0, f_V(x,0) = f_V^0$$

Here the multiplier λ is used to describe the number of transactions at moment t. σ describes randomness and δ is just a delta function.

Equations in this system are in some way similar to the simple model of one dimensional heat equations, however, the difficult part is the free boundary conditions. Free boundary value problem is one of the essential problems in modern theory of partial differential equations which naturally arises in many concrete physical problems such as phase transitions and it has wide applications in many fields.

In a decentralized blockchain system, due to the use of distributed ledgering, each nodes can adjust its own strategy dynamically in response to available transaction information. Therefore there exist essentially Bayes type adaptive control problems such that each participant uses a posteriori probability distribution to change strategy so as to maximize its own potential profit. In further work, En-Tan-Mo plans to consider dynamical price formation model with Bayasian controls and connect blockchain technology with artificial intelligence and deep learning.

References:

【17】 W. Feller. An introduction of probability theory and its applications. Vol.1, 3rd ed. John Wiley& Sons, 1957.

【18】 Л.В. Канторович, Математические методы организации планирования производства. Издание Ленинградского государственного университета, 1939.

【19】 С. М. Меньшиков. Актуальность экономической модели Л. В. Канторовича в наше время. Зап. научн. сем. ПОМИ, 2004, том 312, 30–46.

【20】 M. Doob, Kantorovich. On Optimal Planning and Prices. Science & Society, Vol. 31, No. 2 (Spring, 1967), pp. 186-202.

En-Tan-Mo

ECONOMICS

4. En-Tan-Mo Economics

Blockchain and related technologies will bring about a revolutionary transformation in modern economics. While industrial revolutions took place in a world underpinned by hierarchical business models and financial capitalism, the blockchain revolution will witness the birth of an economic system featuring humane capitalism and individual autonomy.

It is still unclear how it will unfold. Entrepreneurs and innovators will explore the uncertainty by trial and error, as they always have. However, there is no doubt that a staggering amount of wealth will be created and destroyed before a clear vision of this revolutionary transformation emerges.

The contribution of En-Tan-Mo is that it provides a balanced value transfer model at the start of this revolution so that people can have a better grasp of its meaning and significance.

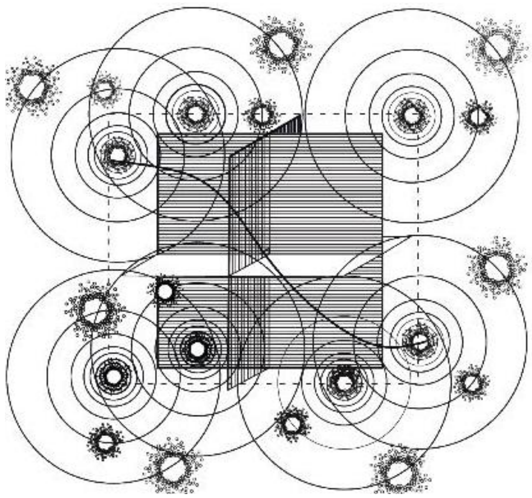
4.1 En-Tan-Mo Crypto-Economics

Trust-based relationship is common in business, especially in finance. Underlying each such relationship is the desire to eliminate uncertainty and minimize transaction costs. En-Tan-Mo makes possible for transactional information flows to be absolutely secure. This transforms the trust relationship in transaction from man-to-man to man-to-technology and so obliterates uncertainty. Moreover, this enhancement of traditional relationships of trust bring with it a reduction of overall transaction costs.

Current blockchain technologies have other negative aspects besides overall low efficiencies. The blockchains application fall short on problems including transaction speed (7 per sec for Bitcoin), privacy and retrievability (Mt.Gox being hacked). En-Tan-Mo will not only enhance overall efficiency but also ensure stable business operation. Relevant business models and value distribution system will be set up accordingly.

The object of En-Tan-Mo crypto-economics is to study the importance of machanism in a cryptographically secure and trustless leger sytem. Classical and neo-classical economics studies the production and distribution of scarce resources as well as the factors driving them. En-Tan-Mo crypto-economics studies protocols (such as laws, languages, property rights, social codes and ideologies) that make possible the collaboration between dispersed and speculative individuals and facilitate transactions in economy as well as social and political sectors.

En-Tan-Mo crypto-economics focus on the economic principles and theories that underpin blockchains and their derived applications. Economics as a whole and its branch institutional economics work with communication and exchange systems. But institutional economics concentrate not



only on protocols but on ledgers, i.e. data based on protocols.

En-Tan-Mo economics is interested in the following topics: protocol governing value transfer; social, political and economic institutional development with regard to this protocol; and how En-Tan-Mo change the value transaction mechanism at social level.

4.2 Nash Equilibrium

The reason why En-Tan-Mo excels in existing blockchains is that it proactively applies the game theory to mechanism design, which offers a solution to ingrained problems or "the price of anarchy" in blockchain systems, such as the low efficiency of Bitcoin blockchain. With intricately designed dual-consensus mechanism, the En-Tan-Mo mathematician allows all players to contribute, be it as miners or voters, in the building of blockchain and get a fair share of reward. A brief but effective consensus agreement will be put in place to adjust the relationship within miners and voters and between miners and voters. Hence the strategy set of all rational players will converge to Nash equilibrium.

Consensus mechanism and the underlying algorithms form the foundations of En-Tan-Mo decentralizations, with the essential purpose of achieving "rules without rulers" and "decentralized self-adaptive control". The most important concept in En-Tan-Mo consensus is Nash equilibrium which was introduced by the American mathematician and Nobel Prize winner, John F. Nash. Nash equilibrium can be defined as a stable state system involving the interaction of different participants, in which no participant can gain by a unilateral change of strategy if the strategies of the others remain unchanged.

An important innovation in En-Tan-Mo consensus mechanism design is the extensive application of "rational expectation theory" in game theoretic analysis. Professor Thomas J. Sargent, senior advisor of En-Tan-Mo project, is world-renowned for his academic achievement in rational expectation theory. There are several things that need to be taken into account: participants have incentives to forecast and their predictions about the future affect their present decisions. This is essential for En-Tan-Mo consensus mechanism design as the designer needs to "forecast" the decisions and strategies of the participants under various given circumstances. This corresponds to predictive model control in modern control theory. The security of the system depends on correct prediction of Nash equilibrium which itself depends on the prediction of people's beliefs and response strategies. In the future En-Tan-Mo team will conduct more rigorous study in this direction.

En-Tan-Mo reckons that pure PoW or DPoS is not enough to ensure that the strategies of blockchain users converge to Nash equilibrium. Take Bitcoin as an example, the miner who wins the hashing race and attempts to upload a block with false information would suffer a loss of computational power if the system denied extension. This is how the bitcoin system ensure fair utility for all miners. To be more specific: 1. if all blockchain users are allowed to participate in mining, then the hashing has to be difficult enough to sufficiently control the probability of successful cheating. Successful cheating occurs when the fork with falsified blocks constructed by a group of dishonest miners eventually catches up with the chain mint by honest miners. 2. The cost of mining has to be sufficiently large so as to prevent the miner from risking using a dishonest strategy. With the appearance of ASIC mining machine, it is practically impossible for an ordinary CPU miner to win a hashing race. The rise in computational power in the systems also causes it to be more difficult to engage in hashing. This overturns the Nash equilibrium. In Ethereum the full nodes are also specified GPU miners which ordinary users cannot afford. Therefore, light users can no longer participate in mining. Likewise, under DPoS consensus, large shareholders have assumed dominant positions in terms of voting. This leads to the reasonable conclusion that decisions are made by powerful minorities without mass participation. Wealth becomes centralized in the hands of a few and thus equilibrium is broken.

En-Tan-Mo and its consensus mechanism aim to provide a system in which all participants are direct beneficiaries. Benefits cannot be monopolized by large mining pools or big shareholders. Therefore, we must reforms have to start from consensus mechanisms. Players in the En-Tan-Mo game are all users and they can be categorized into three kinds of identities: SCV miner, tribunal, and Pareto miner (a members of a Pareto mining pool). They obtain ETM tokens or other rewards by either voting or adding blocks. SCV miners are elected and they cooperate in extending blockchain in an orderly way within a given period. Even though a dishonest miner has less to lose because of the decreased cost of mining, he will suffer greater loss if he is expelled from the SCV mining group due to his dishonest behavior having been detected. In order to increase the efficiency of En-Tan-Mo blocks construction process, tribunals have the duty to select the best SCV miner and will be rewarded with ETM tokens for so doing. The proportional voting stake is related to proportional token stake by a concave function so as to ensure fairness for the majority of stake holders. SCV miners and tribunals are independent and interconnected at the same time in different respects so that the distribution of PoW and stakes is clear and in equilibrium. Miners in Pareto mining pools at their current status cannot obtain ETM token rewards but they can participate in the mining of other blockchain systems as part of the colition effort. This arrangement ensures the interests of all miners at all times. Therefore, by dual consensus protocols in which DPoS and PoW are coupled, the strategies of all players in En-Tan-Mo will evolve during interactions between different types of identities and eventually converge to Nash Equilibrium.

In order to explain how consensus design affects the decisions of players (with different kinds of strategies, and with honest or dishonest mining), we repeat the following rules and hypothesis:

Hypothesis: At least half of the miners are honest;

Rules: 1. Eventually only the longest chain will be accepted; 2. Dishonest or low efficiency miners will be voted out in the election processes.

4.3 Kantorovich Consensus

Widely recognized drawbacks of first and second generation blockchain systems using PoW are: 1. Slow in transaction process. For example, the current transaction rate of Bitcoin is in no way comparable to traditional institutions such as credit card systems of banks. 2. Slow in block construction, leading to delays in transaction confirmations. 3. Scalability. The current level of efficiency constrains the scalablity of blockchains. 4. Waste of resources and environmental pollution due to PoW mining.

For these reasons, En-Tan-Mo proposes Kantorovich consensus mechanisms based on the concept of Nash equilibrium. Tribunals are shareholders in En-Tan-Mo. They do not participate in block construction but rather obtain ETM token rewards by voting based on their previous or current proportional stakes. Tribunals select SCV miners based on previous performance in hashing tests and mining. This ensures the high-performance and security of En-Tan-Mo. SCV miners obtain ETM tokens by engaging in orderly mining. The hashing rate can be reduced without loss of security so that blocks can be constructed and uploaded at higher speed. The miners not elected will enter Pareto mining pools to form a coalition and mine blocks on other chains using specially designed derived chain technologies. They will receive payoff with other tokens in propotion to their computational resources. In this way all miners are receiving positive payoff. Therefore, Kantorovich consensus can improve efficiency and scalability without loss of security.

Centralized systems still enjoy certain advantages in terms of efficiency. But by using better mathematical design of mechanism structures it is possible to balance decentralization with some centrally coordinated cooperation, and this can ensure the compatibility of security, stability and efficiency in a blockchain system. This is our main objective.

Kantorovich consensus protocol is a revolutionary kind of Proof of Stake protocol. It provides the rules by which all mining nodes will eventually reach consensus in networks. The algorithm is the key part in the En-Tan-Mo infrastructure and represents a great leap forward in blockchain technology. The Kantorovich consensus design has improved on energy-intensive PoW consensus to overcome long-standing problem of scalability. The algorithm is designed by our leading scientist and game theory team, and is to our knowledge the first PoW and DPoS coupling consensus.

The reason we use the name Kantorovich consensus is because we are inspired by the work of Leonid Kantorovich, the Soviet mathematician who won the Nobel prize in economics in 1975. He proposed a strict mathematical model for studying optimal transport and Kantorovich duality theorem. This theory showed that optimal allocation can be achieved by decentralized price system. The economic theory of Kantorovich was for a long time rejected and criticized by "orthodox" academics in Soviet Union. He was saved from further persecution due to his involvement in the Soviet atomic project. The economic theory of Kantorovich was widely recognized and put into application in the west. Optimal transport is one of the most important and dynamic directions in mathematical research for the past 20 years. Many important mathematical discoveries of Cedric Villani and Pierre Louis Lions (both winners of the Fields medal) are closely related to the Kantorovich duality theory.

4.4 SCV miner and tribunal

Miners who were chosen during the election processes and passed the hashing test are called SCV miners, or SCV. Stake holders voting to select SCV miners are called tribunals. The proportional token stake of each tribunal is mapped into a number of voting tickets by a concave function. And tribunals are rewarded for each round of voting. Eligible miners can become SCVs by winning sufficient votes and will then be able to add and verifiy blocks in order to obtain tokens as rewards.

Let's suppose a miner tries to behave in dishonest way (double spend or upload blocks with false information). The results will be as follows: 1. Since most SCVs are mining in an honest way, it can be argued that using probability theory the block mined by the dishonest miner will be a fork which would eventually be abondoned; therefore this miner will waste his mining effort. 2 Due to the periodical election system in the Kantorovich consensus mechanism, the dishonest miner will be expelled from the mining group at the next election and therefore lose the chance of getting further tokens as well as his previous deposit. We conclude that the rational behavior of any SCV will be to mine blocks honestly and efficiently.

Even though there does not exist a centralized authority overseeing the behavior of SCVs and tribunals, the mechanism design will act as the "invisible hand" in economics that guides them to obey the consensus by leveraging their interest-motived nature. This solves the trust and efficiency problems in En-Tan-Mo.

4.5 Pareto mining pools

The incentive mechanism of En-Tan-Mo is based on economic theory and has three advantages.

1. Fairness.In most blockchain systems such as Bitcoin and Ethereum, stakes are unfairly distributed with a bias towards several central mining pools. In En-Tan-Mo all individuals have fair chances because of the consensus mechanism.

2. Decentralization. In other DPoS-based blockchain, large stake holders control decision processes. This leads back to centralized control or monopoly by oligarchy. In the En-Tan-Mo system, stake holders and miners are separated in their responsibility, rights and interests. All participants can benefit from the resources and advantages of decentralization.

3. Optimality. In other blockchain systems, users have non-diversified value; different chains are like isolated islands without connections. In the En-Tan-Mo system, stake holders obtain reward tokens by voting and miners optimize their interests by switching identities between SCVs and Pareto miners.

Under the Kantorovich consensus mechanism, all miners form a cooperative-competitive mining pool. In each period, selected SCVs extend the chain in an orderly way. En-Tan-Mo organizes all unselected miners to form a Pareto mining pool. By using specially designed side-chain technologies, coalition strategies and analytical algorithms of potential real-time income, these miners participate in the mining of other blockchain systems. The rewards are distributed according to their computational resources and ensure positive outcomes for all miners.

The core economic principles of Pareto mining pools are: design of coalition strategies; choosing appropriate blockchains; building coalition structure and management systems; switching miners' mechanisms between SCV and Pareto miner status. A Pareto mining pool has the following characteristics:

1. Decentralized organization. The main objectives of Pareto mining pools are sharing the market and cooperative mining. The relation between their members is not fixed but depends on the utility strategies of blockchains. The Pareto mining pool itself is a dynamic and open system.

2. Strategic actions. The design of Pareto mining pools results from far-sighted planning. The coalition will also place emphasis on strategically improving the business environment. The focus is on the active acquisition of economic resources.

3. Equal opportunity in cooperation. Pareto pool collaboration is more strategic than tactical. It is based on sharing resources, joint advantages, mutual trust and mutual independence. By reaching mutual agreement in advance and fair division of rewards based on computational resources, this mechanism has fundamentally closed the gap between miners.

4. Managerial complexity. The Kantorovich consensus mechanism defined for the first time genuine "multiple mining". Miners need to switch between SCV and Pareto pool strategies to maximize their profits.

Pareto efficiency or Pareto optimality is a state of allocation of resources from which it is impossible to reallocate so as to make any one individual or preference criterion better off without making at least one individual or preference criterion worse off. An allocation is Pareto optimal if no further Pareto improvement can be made. In other words, Pareto improvement is the way to obtain Pareto optimality. The Pareto mining pool corresponds to the ideal state of fairness and efficiency.

References:

【21】 T. J. Sargent, Lars Ljungqvist. Recursive Macroeconomic Theory. MIT Press, 2000.

【22】 T. J. Sargent. Dynamic Macroeconomic Theory. Harvard University Press, 1987.

【23】 J. V. Neumann, O. Morgenstern. (1944) Theory of Games and Economic Behavior. Princeton University Press. 2nd edition, 1947, 3nd edition, 1953.

【24】 J. Harsanyi. Games with incomplete information played by 'Bayesian' players. Management Science 14:159-182, 320-334, 486-502, 1967.

【25】 D. Fudenberg, J. Tirole. Game Theory. Boston: MIT Press, 1991.

【26】 N. Nisan, A. Ronen. Algorithmic mechanism design. Proceedings of the 31st ACM Symposium on Theory of Computing (STOC '99), pp. 129–140, 1999.

【27】 C. Papadimitriou. Algorithms, games, and the Internet. Proceedings of the 33rd ACM Symposium on Theory of Computing (STOC '01), 749-753, 2001.

【28】 N. Houy. The Bitcoin mining games. Ledger, vol, 2016.

【29】 A. Kiayias, E. Koutsoupias, M. Kyropoulou, Y. Tselekounis. Blockchain Mining Games. arXiv:1607.02420v1 [cs.GT] 8 Jul 2016.

【30】 A. Sapirshtein, Y. Sompolinsky, A. Zohar. Optimal selfish mining strategies in bitcoin. CoRR, abs/1507.06183, 2015.

CALCULATION

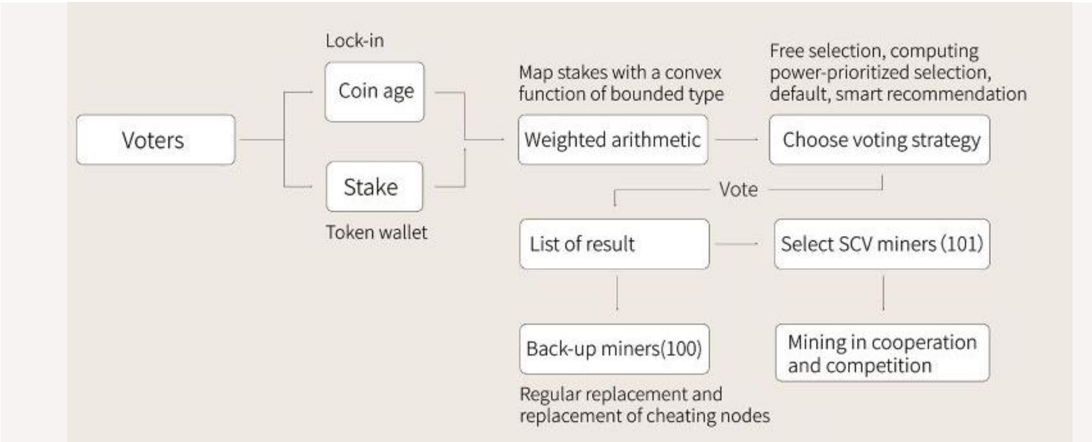
```
// Private fields
let library;
let self;
const __private = {};

__private.lastBlock = {};
__private.lastReceipt = null;

__private.loaded = false;
__private.cleanup = false;
__private.isActive = false;

/**
 * Main blocks methods. Initializes submodules with
scope content.
 * Calls submodules.chain.saveGenesisBlock.
 *
 * @class
 * @memberof modules
 * @see Parent: {@link modules}
 * @requires helpers/constants
 * @requires modules/blocks/api
 * @requires modules/blocks/verify
 * @requires modules/blocks/process
 * @requires modules/blocks/utils
 * @requires modules/blocks/chain
 * @param {function} cb - Callback function
 * @param {scope} scope - App instance
 * @returns {setImmediateCallback} cb, err, self
 */
// Constructor
class Blocks {
 constructor(cb, scope) {
  library = {
   logger: scope.logger,
  };

  // Initialize submodules with library content
  this.submodules = {
   api: new blocksAPI(
    scope.logger,
    scope.db,
    scope.logic.block,
    scope.schema
process: new blocksProcess(
    scope.logger,
    scope.logic.block,
    scope.logic.peers,
    scope.logic.transaction,
    scope.schema,
    scope.db,
    scope.sequence,
    scope.genesisblock
   utils: new blocksUtils(
    scope.logger,
    scope.logic.account,
    scope.logic.block,
    scope.genesisblock
   ),
   chain: new blocksChain(
    scope.logger,
    scope.logic.block,
    scope.logic.transaction,
    scope.db,
    scope.genesisblock,
    scope.bus,
    scope.balancesSequence
   ),
  };
 // Expose submodules
  this.shared = this.submodules.api;
  this.verify = this.submodules.verify;
  this.process = this.submodules.process;
  this.utils = this.submodules.utils;
  this.chain = this.submodules.chain;

  self = this;

  this.submodules.chain.saveGenesisBlock(err =>
setImmediate(cb, err, self));
 }
}

/**
 * PUBLIC METHODS
 */
/**
 * Last block functions, getter, setter and isFresh.
 *
 * @property {function} get - Returns lastBlock
 * @property {function} set - Sets lastBlock
 * @property {function} isFresh - Returns status of last
block - if it fresh or not
 */
Blocks.prototype.lastBlock = {
 if (!__private.isActive) {
  // Module ready for shutdown
  return setImmediate(cb);
 }
 // Module is not ready, repeat
 setImmediate(function nextWatch() {
  if (__private.isActive) {
   library.logger.info('Waiting for block processing to
finish...');
   setTimeout(nextWatch, 10000); // 10 sec
  } else {
   return setImmediate(cb);
  }
 });
};

/**
 * Get module loading status
 *
```

En-Tan-Mo

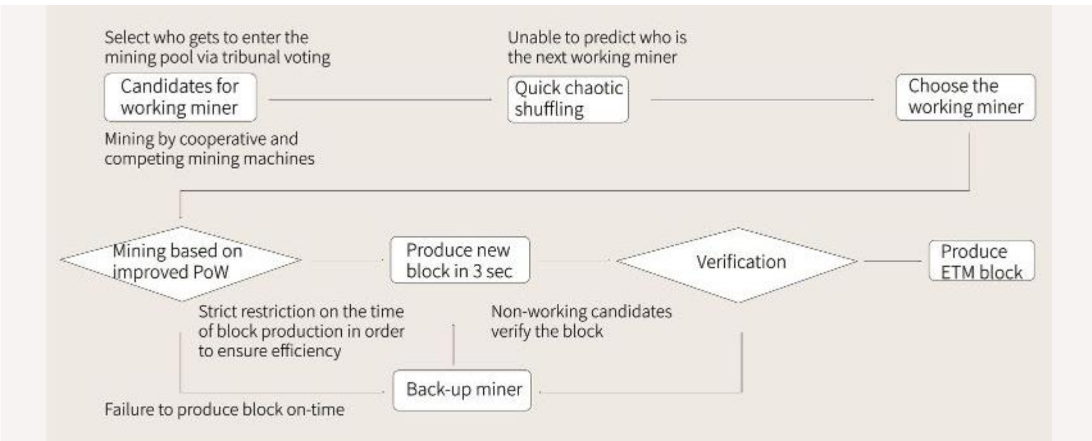
5. En-Tan-Mo Computation

5.1 En-Tan-Mo Flowchart

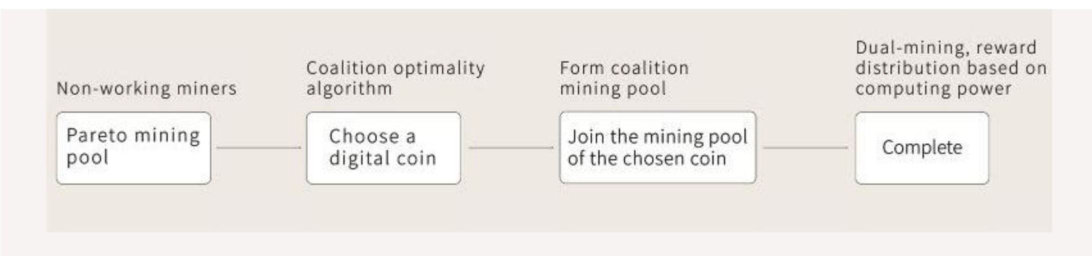
Kantorovich consensus protocol flowchart: Based on the idea of Nash equilibrium, Kantorovich consensus used the miners' team election system such that SCV miners mine blocks in given order. Without loss of security, hashing difficulty can be reduced so that mining can be faster and more efficient.



Tribunal voting procedure: tribunals(voters) can map their stakes to vote proportion with a concave function and are rewarded for their voting effort in each round of voting.



SCV miner working procedure: miners will be ranked on the basis of the number of votes they received and the top 101th miners are called SCV miners(candidates for working miner). They are responsible for building and verifying blocks and are rewarded accordingly.



Pareto mining pool procedure: miners who don't get elected as SCV miners and back-up miners(non-working miners) form Pareto mining pool. They use specialized side-chain technology, coalition strategy and real-time utility algorithmic analysis to participate in the mining of other blockchains.

En-Tan-Mo Core Codes

1.Tribunal Token Stake Equilibrium Algorithm

SCV miners are elected by voting of tribunals and they have the rights to mine blocks. The function which maps token stake into number of votes is increasing and concave to ensure the equilibrium of En-Tan-Mo ecosystem. All blocks mined by SCV miners are legitimate. "Concavity" means that the stake to votes translation rate is in inverse relation with regard to the token stakes.

```
F(balance) = weights
//threshold mapping stake to votes
translation
rate is in inverse relation with regard to the
token
stakes to ensure equilibrium
threshold Map = Map(range,rate)
rate obtained from the token value interval
rate = threshold Map.get(range)
Token weights obtained from translation
rate
weights = balance * rate
```

2.Tribunals Voting Incentive Mechanism

En-Tan-Mo is different from PoW system, it provides rewards to tribunals as well to motivate participation in the platform. SCV miners can be selected and the systems will run efficiently and securely. En-Tan-Mo's voting incentive mechanism includes two kinds of rewards: voting rewards and block production rewards. The tribunals are free to choose the percentage to obtain these two kinds of rewards. Voting rewards are obtained on the basis of the number of votes held by the tribunals. This reward is constant when participating in a vote. The mining bonus can only be obtained when the tribunals select the right SCV miners. The reward is a floating hedging value.

```
F1(tickets) = token
//Delivery ratio
tickets1 = fixed assignment //deliver to fixed
tickets
tickets2 = dynamic assignment //deliver
to fluctuating tickets   //fixed rewards +
fluctuating
rewards(According to the proportion of
selected
nodes in the total number of nodes)
token = fixed(tickets1) + dynamic(tickets2)
```

3. SCV Miners Mining Sequence Algorithm

The sequence of SCV mining must be deterministic and pseudorandom to ensure the security of En-Tan-Mo. This absolute security is achieved by using chaos theory and nonlinear dynamics.

```
//Lock the voting rights of the client
lock(balance)
//Calculate to get voting weights
tickets = F(balance) * F(time)
//Voters obtain list of delegates
delegations = votes(tickets)
//Shuffling shuffle(delegations)
```

4. SCV Miners Hashing Algorithm

En-Tan-Mo needs to achieved high-performance besides security and decentralization. SCV miners do not compete in mining but cooperate in sequential mining. By fast chaotic shuffling each block is designated to one SCV miner. This miner has to perform SHA256 hashing as soon as possible and adds the block to the chain.

```
Multiple hashing
blockhash = sha256(sha256(block))
//check time cost, miners that did not obtain
results in designated time are considered
unqualified
checkNodePerformance(useTime)
//Check whether the amount of calculation
meets the specified requirements
checkResult(blockhash,difficulty)
//If not, then change nonce
block.nonce = block.nonce + 1
```

References:

【31】 C. Grunspan, R. Pérez-Marco. Double spend races. arXiv:1702.02867v2 [cs.CR].

【32】 R. Perez-Marco. A simple dynamical model leading to Pareto wealth distribution and stability. arXiv:1409.4857, 2014.

【33】 J. P. Aubin. I. Ekeland. Applied Nonlinear Analysis. Wiley-Interscience, 1984.

【34】 J. P. Aubin. Optima and Equilibria. Springer-Verlag, 1998.

【35】 S. Adlakha and R. Johari, Mean field equilibrium in dynamic games with strategic complementarities, Operations Research, 61 (2013), pp. 971–989.

5.2 En-Tan-Mo Data

Blockheader Data Structure

Blockheader contain all information of the block. It is composed of the following fields:

- A 32-bit integer that identifies the version of the block
- 32-bit timestamp when the block was created
- 64-bit ID of previous block
- 32-bit integer corresponding to the number of transactions processed in the block
- A 64-bit integer that corresponds to the total number of transfers
- A 64-bit integer that corresponds to the total cost associated with the block
- 64-bit integers that correspond to the rewards represented
- A 32-bit integer corresponding to the length of the payload
- 256-bit hash of the payload
- Generate the 256-bit public key of the agent of the block

Version	Timestamp
Previous block Id	
Number of transactions	Length of payload
Amount of ETM transferred	
Amount of fee	
Reward of the delegate	
Payload hash	
Delegate' s public key	

Sample of a block header

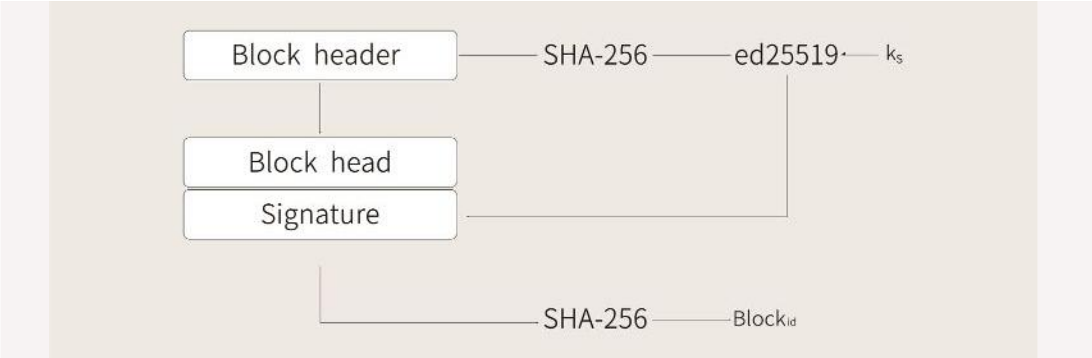

```
    "id": "15787022670460703397",
    "version": 0,
    "timestamp": 23039010,
    "height": 1574052,
    "previousBlock": "4576781903037947065",
    "numberOfTransactions": 0,
    "totalAmount": 0,
    "totalFee": 0,
    "reward": 500000000,
    "payloadLength": 0,
    "payloadHash":
  "e3b0c44298fc1c149afbf4c8996fb92427ae41e4649b934ca495991b7852b855",
    "generatorPublicKey":
 "c0ab189f5a4746725415b17f8092edd3c266d1e758e840f02a3c99547b3a527f",
    "blockSignature":
  "c6b2bcc960066be078efbfffed625f61553a7bc18ebde3892636c2f36850de234a9c
  70ba3e33b606db2eff724398026984e4d391c1fbbe70c94dd9d07ff0060b",
    "totalForged": "500000000"
   }
```


Block ID Generating Procedure

Generate hash SHA-256 of blockheader and use the trusted key to perform (ed25519 algorithm) signature.

Once the block header has been signed, the system uses SHA-256 to hash the completed block header to generate the Block Id.

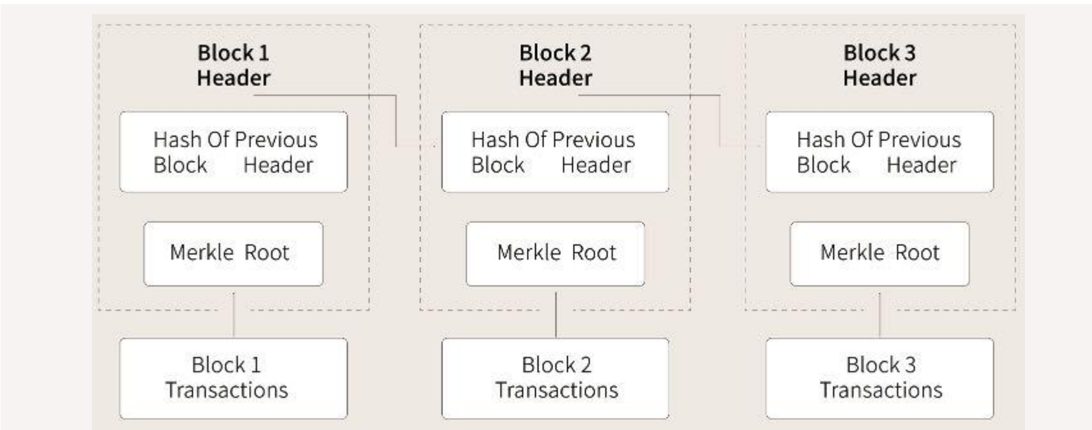
A signed block generates its block using the following flower



Blockchain Structure

It can be seen that the block mainly consists of a block header and a block body. The block header contains the version number, the address of the previous block, the timestamp, and the root of the merkle number. The block body mainly contains the transaction count and transaction bill details.

The blockchain consists of a series of data blocks generated using cryptographic methods. Each block contains the hash of the previous block, starting from the genesis block and connecting to the current area. Blocks form block chains.

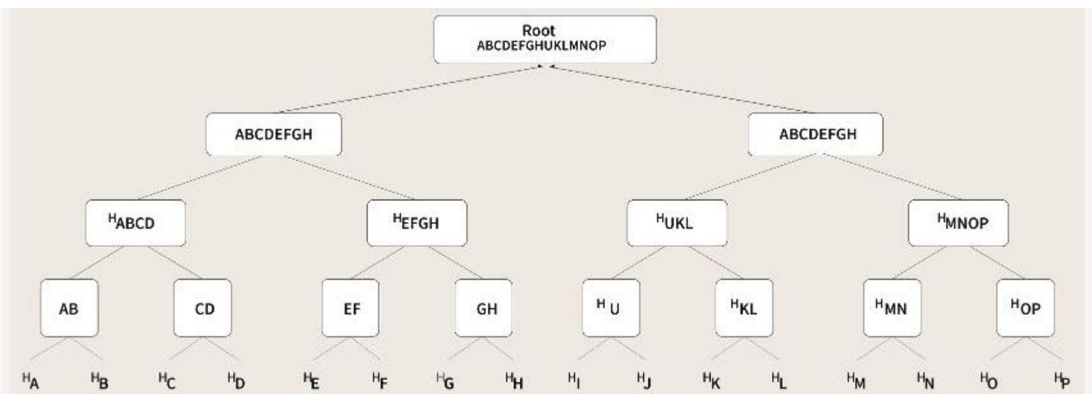


Data Storage Merkel Tree Structure

Merkle Tree, also commonly referred to as Hash Tree, is a tree that stores hash values.

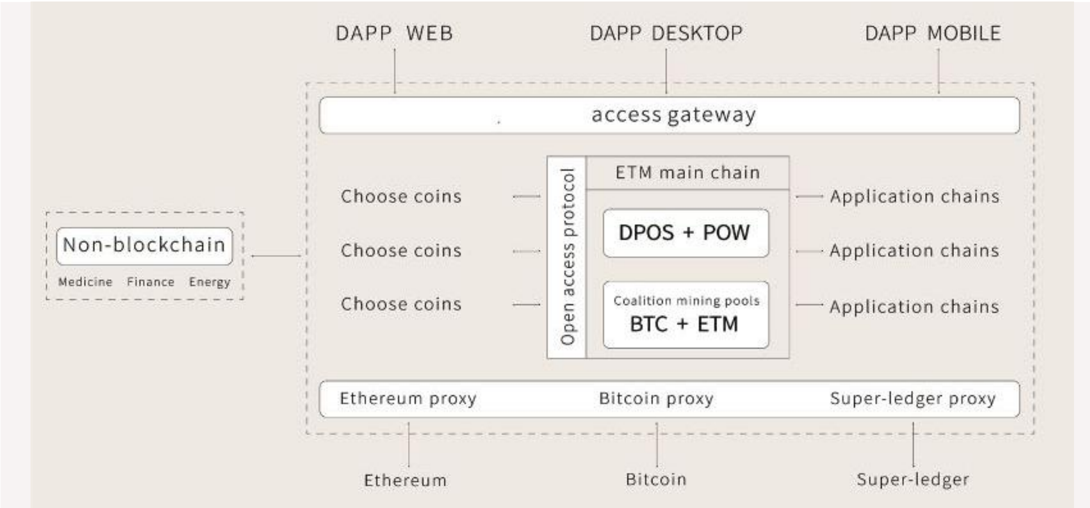
The leaves of a Merkle tree are hash values of data blocks (eg, files or data).

Non-leaf nodes are hashed with their corresponding sub-node concatenation strings



5.3 En-Tan-Mo Interface

En-Tan-Mo is based on the idea of BaaS (Blockchain as Service) and the standard of micro-service. Taking the self-evolving component library as the core and the developer community as the driving force, it provides an adaptation platform for other blockchains to complete the free transfer of assets and applications. En-Tan-Mo provide two-way invocation of soft channels for non-blockchain applications and data, it provides developers with the ability to complete component uploads, reviews, and rewards in the shared lobby. For ordinary users , En-Tan-Mo provides BaaS gateways to implement accessibility service calls. In this way, each blockchain is connected to other chains as well as non blockchain systems and this helps technology developers and ordinary users move from the Internet to the blockchain.



System Structural Diagram Description:
Application layer (web, desktop, mobile) data access through unified access gateway
. Data interaction through application components and offline resources (existing systems)
. Application components interact with data via the open access protocol
. The application component internally integrates the data on and off the chain
. The main chain and the application chain communicate through the internal protocol data and value transmission
. Cross-chain interaction with third parties through the proxy layer

---

References:

【36】 I. Bentov, A. Gabizon, A. Mizrahi. Cryptocurrencies without proof of work. In 3rd Workshop on Bitcoin and Blockchain Research - Financial Cryptography, 2016.
【37】 S. Micali. Computationally sound proofs. SIAM J. Comput., 30(4):1253–1298, 2000.
【38】 I. Bentov, C. Lee, A. Mizrahi, M. Rosenfeld. Proof of activity: Extending bitcoin’ s proof of work via proof of stake. SIGMETRICS Performance Evaluation Review, 42(3):34- 37, 2014.
【39】 C. Dwork, N. A. Lynch, L. J. Stockmeyer. Consensus in the presence of partial synchrony. J. ACM, 35(2):288-323, 1988.
【40】 S. Dziembowski, S. Faust, V. Kolmogorov, K. Pietrzak. Proofs of space. In CRYPTO 2015,
【41】 Slasher: A punitive proof-of-stake algorithm. https://blog:ethereum:org/2014/01/15/ slasher-a-punitive-proof-of-stakealgorithm.
【42】 S. Park, K. Pietrzak, A. Kwon, J. Alwen, G. Fuchsbauer, P. Gazi. Spacemint: A cryptocurrency based on proofs of space. IACR Cryptology ePrint Archive, 2015: 528, 2015.
【43】 M. Rosenfield. Analysis of hashrate-based double spending. arXiv:1402.2009v1, 2014.
【44】 T. J. Sargent and N. Wallace, “rational” expectations, the optimal monetary instrument, and the optimal money supply rule, Journal of Political Economy, 83 (1975), pp. 241–254.
【45】 T. J. Sargent and N. Wallace, Rational expectations and the dynamics of hyperinflation, Interna- tional Economic Review, 14 (1973), pp. 328–350.
【46】 B. Peters, How not to network a nation: The uneasy history of the Soviet internet, MIT Press, 2016.
【47】 J. Donier and J. Bonart, A million metaorder analysis of market impact on the bitcoin, Market Microstructure and Liquidity, 01 (2015), p. 1550008.

ECOSYSTEM

En-Tan-Mo

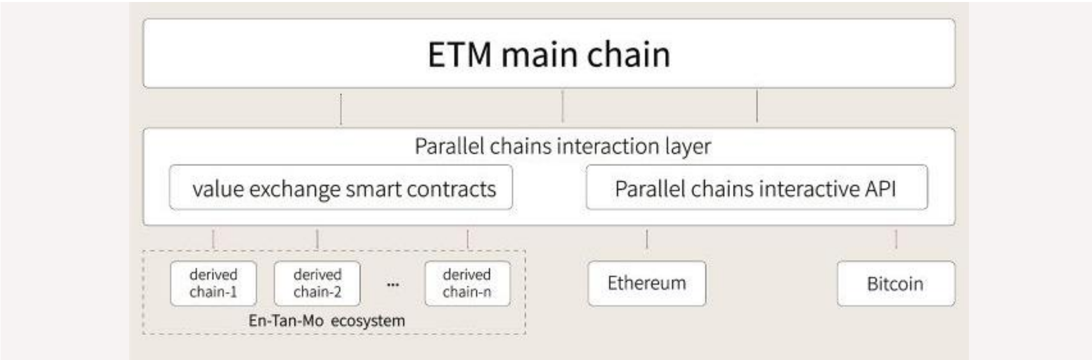
6 En-Tan-Mo Ecosystem

6.1 Central Chain and Derivative Chains

Among the many problems faced by blockchain systems, the lack of interoperability between blockchains greatly limits the application potential. For both public and private chains the key to achieving value transfer is through inter-chain technologies. These technologies can build bridges to connect and expand previously isolated blockchain systems. What they can achieve is more value lock-in rather than more value transfer. Based on investigations of current interchain technologies, En-Tan-Mo proposes a new parallel chain interactive protocol to facilitate value transfer and build a blockchain ecosystem that can include apps each with over ten millions users.

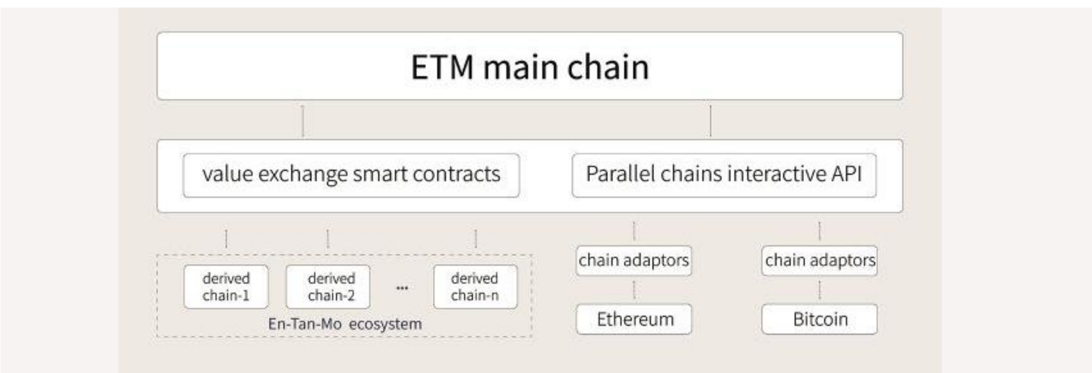
In order to solve the problem of rapid expansion and BaaS, En-Tan-Mo has designed a system of one central chain with multiple derivative chains. The central chain is responsible for network security and value transfer. A derivative chain is a special kind of blockchain targeted at specific Dapp. It is an independent and isolated system. By inheriting and replicating technologies from the central chain, each Dapp has its own ledger and token system. Its consensus mechanism, block parameter and transaction types can be customized. Derivative chains are parallel to each other.

They can achieve bidirectional transfer of assets between the central chain, other derivative chains, and external blockchain systems through the "parallel chain interaction layer". This enables users to utilize their existing assets to use the En-Tan-Mosystem.



6.2 Parallel Chain Interaction Protocol

En-Tan-Mo's parallel chain interaction protocol makes it possible to support value transfer between different blockchains. It mainly consists of two parts: a chain-adaptation module and a value exchange smart contract. The main purpose of designing a chain adapter is to provide En-Tan-Mo interaction interfaces with different chains for value exchange smart contracts in order to verify transactions on different chains. Simultaneously, builders in the community can themselves develop and improve on chain adaptors for diversified functions and obtain tokens as rewards. For example, applications can switch between underlying blockchains with different protocols using chain adaptors. Value exchange protocol is the core of parallel interaction protocols. It enables users to exchange capital on and between all kinds of blockchains, including central, derivative and external chains. An internet system of interchain value connection will be thus constructed.



Chain Adaptors

The chain adapter is like a device driver for a computer. It converts the underlying blockchain protocol into an easier-to-use way for the En-Tan-Mo central chain, allowing it to run value exchange smart contracts over the En-Tan-Mo central chain. The technologies involved include but are not limited to Hash Time Lock Constract(HTLC), SPV proof, and API development.

En-Tan-Mo will first provide adapters for some of the most commonly used blockchain systems such Bitcoin and Ethereum, and will become an open source system after stable operation. Anyone can contribute to improving open-chain access protocolsor and implement their own code. En-Tan-Mo plans to support more blockchain protocols and give corresponding rewards in the form of tokens.

Value Exchange Smart Contract

Although the innovative technology of blockchain has long been a global focus, there has always been a problem: value transactions between different blockchain systems still require third-party middlemen such as exchanges, and it is these that need to be replaced by decentralization technology. En-Tan-Mo uses minimum trust smart contract and chain adapters to replace these middlemen and function as bridge between different chains. This method has deepened the connection between the two most important elements in blockchains and brought En-Tan-Mo closer to becoming a global value transfer network.

Value exchange smart contracts rely on En-Tan-Mo's Turing complete virtual machine to operate and provide users with adequate security. A value exchange smart contract between central and derivative chains is like a decentralized exchange. It has an ETM wallet address and control over it on corresponding chains. Once a user initiates a transfer on a derivative chain which is recognized by the central chain adapter, the value exchange smart contract will automatically transfer an equivalent amount to the user's ETM wallet address on the central chain to complete the exchange of value. Simultaneously, En-Tan-Mo has incorporated Hash Time Lock Constract in order to eliminate risk for users during exchanges.

For the specific exchange process, let us take the exchange of Bitcoin and ETM as an example. The steps are as follows:

Bitcoin blockchain User A must first register with En-Tan-Mo to bind the mapping relationship between User A's ETM wallet address and the BTC wallet address;

User A generates a random secret number (a) and finds its hash value H(a). Then, a special transaction is initiated on the bitcoin blockchain to the Bitcoin address of the value exchange smart contract, which is locked for 12 hours based on Hash Time Lock Contract technology. The En-Tan-Mo value exchange smart contract must produce a hash image H(a) of the original image in order to obtain the token. Otherwise, 12 hours later, the BTC of the transaction automatically returns to user A's Bitcoin wallet address.

The En-Tan-Mo smart contract monitors the confirmation of these special transactions in the Bitcoin blockchain through the bitcoin chain adapter and performs SPV verification. Once the SPV verification is passed, the En-Tan-Mo Value Exchange Smart Contract initiates a special transaction in the central chain to User A's ETM wallet address, which is locked for 6 hours.If User A wants to obtain the ETM token in the transaction, the original image (a) of the hash value H(a) must be presented. Otherwise, the ETM token in the transaction is automatically returned to the ETM wallet address of the smart contract after 6 hours. Once User A presents the secret number (a) to retrieve the ETM token in the transaction, the smart contract will know the secret number (a), so the smart contract can access the Bitcoin blockchain network through the adapter and accept User A as a user. So in the transaction Bitcoin has been transferred from one user to another. The transaction is then complete.

What needs to be emphasized is that the central chain is only used as a decentralized value exchange, and it does not rely on locking in User A's Bitcoin to achieve value transfer. User A transfers Bitcoin to the smart contract Bitcoin wallet address, and smart contracts can be used for those users who want to exchange ETM tokens for Bitcoin. At the same time, after User A exchanges bitcoins for ETM tokens, these tokens can be transferred back to not only the bitcoin blockchain but also to other external blockchain tokens through the same process. Therefore, what En-Tan-Mo achieves is value exchange, not asset locking. In addition, all value exchange smart contract addresses initially have zero tokens. They need investment from corresponding blockchain users. In return, the smart contract distributes the transaction fees spent by the user during the value exchange process to the appropriate investors in proportion to their investment. During the investment process, users can retrieve investment funds from smart contracts at any time.

In sum, based on value exchange smart contract, what En-Tan-Mo will construct is an inter-chain value network. En-Tan-Mo does not create value out of thin air but serves as an agent of value transfer.

Application Ecosystem

En-Tan-Mo is a new generation blockchain platform. By running APPs on independent derivative chains, it effectively solves problems that have been troubling other blockchain systems such as block size expansion and delayed synchronization. The multi derivative chain mode has provided an ideal solution to the network congestion problem under high frequency trading conditions. Users only need to download a derivative chain when the corresponding APP is needed. This can greatly reduce useless synchronization data and keep the entire En-Tan-Mo network in state of high performance. Moreover, thanks to the value exchange smart contract, inter-chain network can be effectively integrated with technologies such as high-performance graphene technology, lightening payment network. As a result, En-Tan-Mo can support APPs with over ten million users and interconnect with entire blockchain ecosystems.

6.3 Mir Mall

En-Tan-Mo's Mir Mall can conveniently and effectively help companies or developers put blockchain into application more quickly and economically so that users can enjoy secure use of the facility. In view of the centralized nature of current APPs, we call decentralized applications on derivative chains Dapps. Mir Mall has the following advantage:

(1) It provides the blockchain ecosystem with APPs of over ten million users;

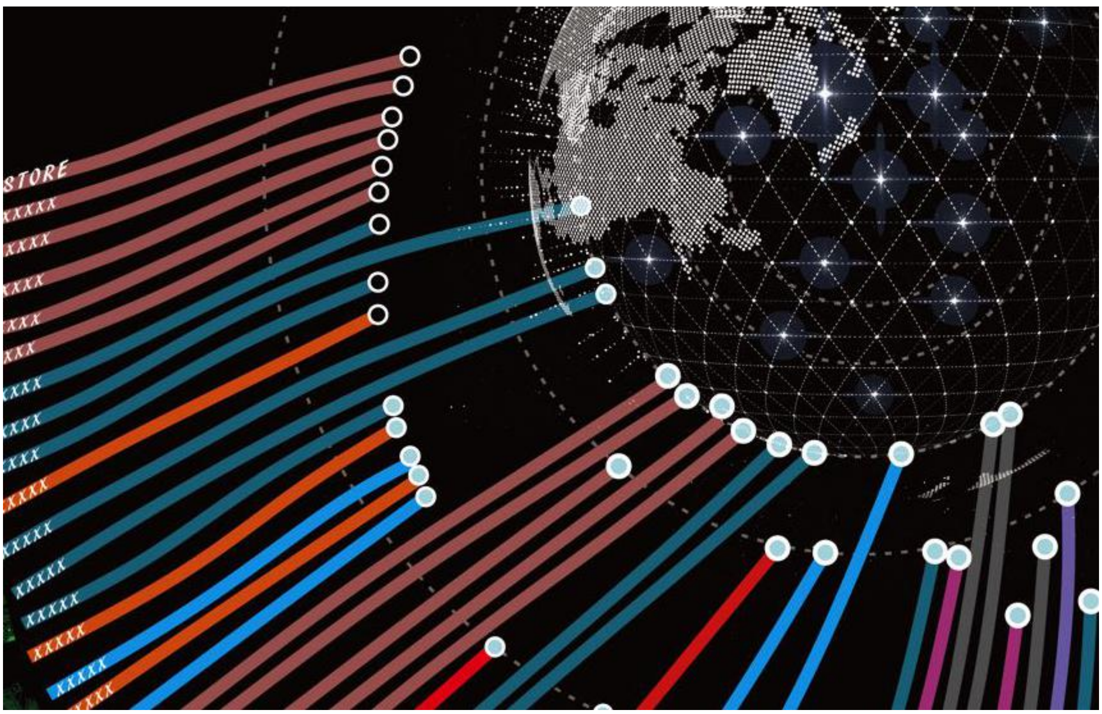
(2) Assets from derivative chains can be traded with other tokens(such as ETM/BTC/ETH) through En-Tan-Mo parallel chain exchange protocols. As a result, applications based on En-Tan-Mo will have a larger number of users.

(3) Based on the En-Tan-Mo parallel chain exchange protocol, Dapps can access data from multiple underlying blockchains, allowing Dapp to operate based on multiple underlying blockchains.

(4)With the use of En-Tan-Mo's derived chain technology and a series of SDKs, APIs, and templates provided by developers, developers only need care about business logic and can easily build, test and publish their own personalized Dapp. The reduction of the R&D costs of developing new types of applications will help developers to better and more quickly own Dapps at Mir Mall. Moreover, these Dapps can be downloaded and executed by all ETM nodes and serve all blockchain users.

(5) Based on En-Tan-Mo's derived chain technology, skilled developers can customize the mall Dapp's personalized database, consensus mechanism, transaction types, and account system.

(6) En-Tan-Mo will build a comprehensive reward system. Developers of excellent Dapp will receive tokens as rewards.



TOKEN SYSTEM & ORGANIZATIONAL STRUCTURE

En-Tan-Mo

7 Plans for ETM Issuance

7.1 En-Tan-Mo Warrants

We divide the world into the real world, the Internet world and the En-Tan-Mo world. In comparison to the real world, the Internet world has increased our ability to obtain information. As a result, the En-Tan-Mo world has also increased our ability to acquire and transfer value, and it is the best form of transition from real world commerce to the online virtual world.

Tokens are the only measure of transferable value and are the medium of circulation in the En-Tan- Mo ecosystem. The unit of warrants is ETM. ETM is the symbol of value transmission in the En-Tan-Mo world. Only when the ETM warrant is applied to the design of the business model and the editing of the smart contract can the equilibrium, decentralization, security and efficiency of the En-Tan-Mo public blockchain be revealed. So ETM is crucial to the working of the rational model. The circulation of ETM is a scientific result drawing on philosophy, mathematics, economics, and computer science.

ETM Private Placement

The En-Tan-Mo blockchain technology allows users to serve as data contributors and enjoy data assets that cannot be reversed nor tempered with. In the En-Tan-Mo world, publishing, reprinting and commentary will gain ETM warrants. When users obtain information, they also create data. At the same time, value is consumed and gained. ETM is different from any other currency, and is highly suitable as a commercial capital reserve for international companies.

ETM Represents Rights and Warrants

ETM is a higher level warrant in comparison to stocks. Essentially, anyone or any organization can use the future service capabilities of En-Tan-Mo to accept ETM under any circumstance. Users can only participate in the establishment and development of the En-Tan-Mo system if they have ETM warrants. ETM's economic incentives at the same time ensure that the user complies with the agreed rules. Violation of these rules will result in the loss of En-Tan-Mo rights and warrants.

7.2 ETM Distribution Plan

ETM Distribution and Additional Issuance

The total supply of ETM is capped at 500 million and will not involve ICO(Initial Coin Offering). The distribution plan is as follows:

32% of the initial supply will be created to the En-Tan-Mo private placement to fund technical development and market operations.

10% will go to En-Tan-Mo Foundation for the purpose of supporting the building of miner, developer and investor community ecology plus rewarding DPoS tribunals for their voting efforts.

48% will be created to PoW miners. The issuance is expected to be completed by the sixth year after the official release of ETM project. New ETM created per year will steadily decline and the share is 12%, 10%, 8%,8%,6%,4% respectively.

Development team and early contributors will obtain 10% of the ETM supply and there will be a lock-in period after the main chain is released online.

In the future, some ETM will be lost due to varied reasons. And as the project continues to develop,

on-blockchain Dapp will proliferate and thrive, injecting fresh vitality into the network and bringing about benefits. For this reasons, a DPoS-based voting will decide on the rate of additional issuance on a yearly basis, starting from the seventh year. The new issuance will not exceed 5% of the current total and go to the reward for PoW miners, DPoS voters and quality Dapps.

ETM Private Placement

ETM from private placement will mainly be invested in building platform and community ecology and supporting platform operation. Such ETM equals 30% of the total supply and will be released on Ethereum in line with the ERC-20 rules. Once En-Tan-Mo goes online, all the privately raised ETM will be mapped to the platform's central chain in the proportion of 1:1 to create the same number of tokens on En-Tan-Mo blockchain. ETM private placement consists of three rounds, each releasing 10% of ETM, with a celling of 15000, 22500 and 30000 ethers respectively.

En-Tan-Mo Foundation

En-Tan-Mo Foundation is a non-profit organization that is primarily responsible for the construction of community ecology and that provides reasonable and pertinent suggestions as a trusted third party on the long-term development of En-Tan-Mo under the supervision of En-Tan-Mo community

Therefore, the Foundation will be given 10% of ETM to cover daily operational expenses, including expenditure on the building of miner, developer, compartment and investor community ecology and rewards for DPoS tribunal's voting effort.

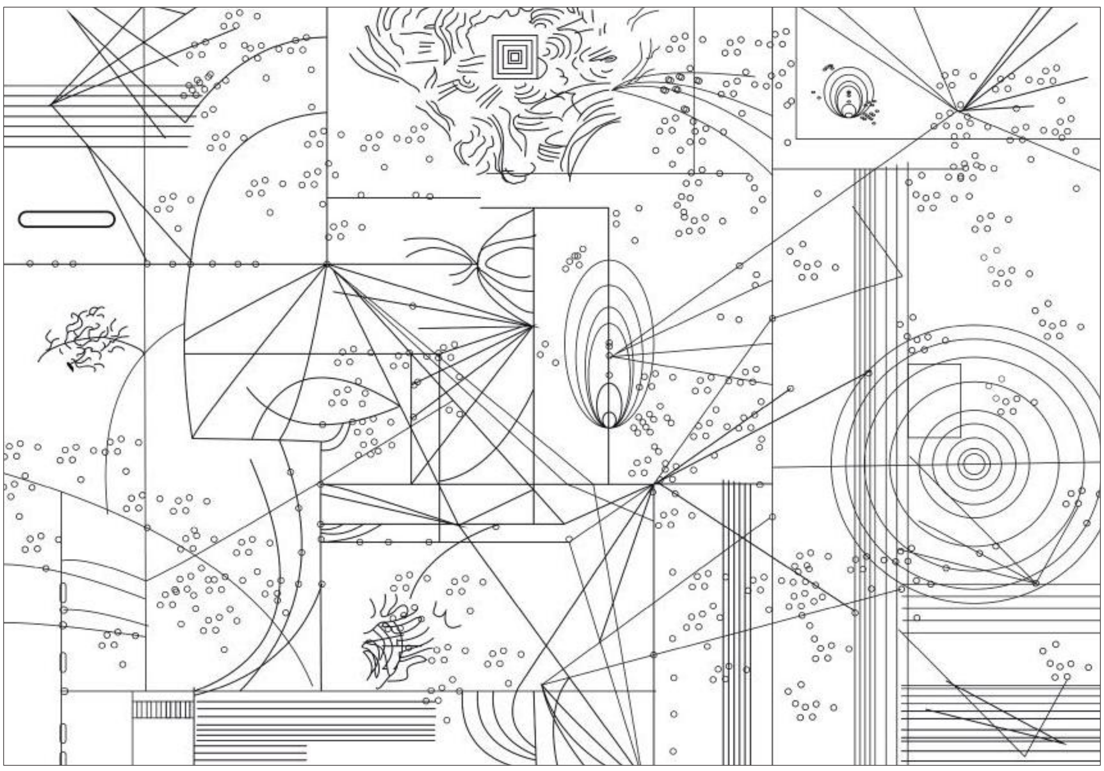
Development Team and Early Contributors

En-Tan-Mo development and operation team have provided extraordinary technical and product support for the incubation and implementation of En-Tan-Mo project. And En-Tan-Mo would never be possible without its early supporters who contribute a lot to the community building of the network. Therefore, they will receive 12% of the token total as rewards and payback.

The ETM due will be locked for two years and unlocked 50% year by year. The length of lock-in period is contingent upon the closing date of the token sale.

SCV Miner

SCV miners and stand-by miners are selected on the basis of votes. Those elected have the right to verify and add new block and receive token as reward. 48% of ETM is reserved as reward to PoW miners for the mining they perform. The figure newly created will decrease year after year so as to ensure scarcity of tokens and hold its value.



8 "En-Tan-Mo" Organization Structure

En-Tan-Mo community consists of En-Tan-Mo Foundation, ETM FinTech and ETM BD with the Foundation as its core. En-Tan-Mo Foundation is a Singapore-registered non-profit organization which aims to ensure the smooth operation of ETM project and provide all-round support to ETM user community. In addition, En-Tan-Mo project is supported by Fintech, a technology development company with a focus on blockchain technology research and development, and ETM BD Business Promotion Company.

8.1 En-Tan-Mo Foundation

The En-Tan-Mo Foundation is a non-profit organization established overseas and is mainly responsible for the ecological construction and technical support of the En-Tan-Mo community. The core task of the En-Tan-Mo Foundation is to regulate, protect and promote the self-developed En-Tan-Mo infrastructure and blockchain protocols. At the same time, it also plays a role in investigating and proposing regulations on blockchains and cryptocurrencies, protecting, enhancing, and advancing the En-Tan-Mo ecosystem, and aggregating, educating, and nurturing the En-Tan-Mo communities.

Under the effective supervision of the entire En-Tan-Mo community, we propose that the foundation, as an independent third party, would plan for long-term developments.

In addition, En-Tan-Mo Foundation will also act as a public interest organization, pay attention to public affairs and philanthropy around the world, and promote the development of a global public trust system.

The En-Tan-Mo Foundation Council has adopted a democratic decision-making process to determine the constitutional policies of the Foundation and the Secretary-General's responsibilities is to execute policies under the leadership of the Council. The board of tribunals oversees the operations of the council. The board of tribunals generally includes some well-known public figures and professional financial personnel.

En-Tan-Mo Foundation Council

The En-Tan-Mo Foundation Council's main focus is charity work. The Foundation is divided into product research, financial management, marketing promotion, human resources, legal affairs, etc.; all these divisions will jointly run the foundation's day-to-day operations.

En-Tan-Mo Foundation Charity Project

The En-Tan-Mo Foundation's Charity Project Department is the core business unit of the Foundation. It is responsible for the operations and management of the foundation's public welfare projects and fulfills the foundation's public welfare goals to implement the Council's overall decisions. In the early development process of the Foundation, the Foundation Charity Project was responsible for the drafting of the En-Tan-Mo Foundation constitution, which was approved by the council as its own operating rules.

The project department of the En-Tan-Mo Foundation is also responsible for the emergency response mechanism. Under the control of the En-Tan-Mo Council, the Foundation discusses public relations; after reaching a consensus decision, it will disclose it to the public. The overall direction of the development of the Foundation will be drafted by the Council; it will include new promotion channels, extensibility, and implementation of the channels.

En-Tan-Mo Financial Management Department

En-Tan-Mo has an independent, open and transparent financial management mechanism.

(a) All transactions of the En-Tan-Mo Foundation will be approved by professional financial officers and recorded in the block to achieve open, transparent and non-retroactive financial supervision. In addition, all expenditures of the foundation will also be audited by professional financial officers and relevant financial registrations will be made in the block.

(b) The En-Tan-Mo Foundation will publish a monthly financial report to reconcile the funds. The financial report will be audited by the expert finance officers appointed by the Foundation and authorized personnel by the En-Tan-Mo Community Personnel Management Committee.

(c) The fund-raising, major events and development of the En-Tan-Mo Foundation will be reported to the community on a regular basis. Changes in major issues and functions will be reported to the community in advance in the form of announcements.

En-Tan-Mo Human Resources Department

En-Tan-Mo has a human resources system that is open to the entire community. It is different from the traditional corporate structure. En-Tan-Mo's personnel recruitment practices are fair and open, and they are recorded in blockchain.

(a) For any recruitment of junior personnel, professional staff will perform two rounds of the aforementioned tests to form an independent evaluation report and write it into the recruitment record. All records will have features that cannot be tampered with and permanently backtracked.

(b) Candidates meeting the recruitment requirements, will need final approval by the relevant committee. The core developers, as well as the core managers, need to go through the duty-dividing process, as reviewed and approved by the foundation core team of En-Tan-Mo.

(c) For businesses that may be outsourced, an outsourcing agreement will be drafted, discussed and signed, and wages and salaries will be determined. The entire community will be notified, and outsourced contracts will be written into smart contracts.

En-Tan-Mo Fund Board of Tribunals

The En-Tan-Mo Foundation Board of Tribunals is responsible for all En-Tan-Mo participants. In order to oversee the legitimacy and performances of the directors and of project personnel and to safeguard the legitimate rights and interests of the company and its shareholders, tribunals need to effectively inspect and evaluate the financial status and management of the Foundation. The Fund's Council shall, according to the requirements of the Board of tribunals, report to the Board of tribunals itself on the signing and implementation of the Fund project, the use of funds, profits and losses.

8.2 ETM FinTech Technology Development Corporation

The role of En-Tan-Mo FinTech is mainly to develop and maintain this new ecosystem. The development of En-Tan-Mo is mainly divided into four phases:

"Petrarch": En-Tan-Mo FinTech will develop a brand-new, decentralized En-Tan-Mo blockchain that is completely protected and supported by network-based protocols and strict encryption technologies, forming a whole new set of currency rules and systems, and can be traded or exchanged with legal currency.

"Masaccio": ETM FinTech will digitally register all kinds of assets on the block-chain to ensure asset security and data integrity, develop En-Tan-Mo smart contracts, use zero-knowledge related technologies, and develop Lightning Network technologies network and coding technology to increase transaction speeds, reduce the burden on the blockchain, and increase scalability.

"Da Vinci": ETM FinTech will use En-Tan-Mo to evolve the ecosystem in broader application scenarios. The development of smart contract standards is the key. Financial transactions can be transformed into use on En-Tan-Mo, including stocks, private equity, crowdfunding, bonds, hedge funds and all types of financial derivatives: futures, options, etc.

"Giorgione": In this period, En-Tan-Mo will further evolve in the economic field. It can be used to achieve the increasingly global distribution of physical resources and human assets, and to promote large-scale collaboration in science, health, education and other fields mainly in automated procurement, intelligent networking applications, supply chain automation management, virtual asset exchange, property registration and other scenarios.

Once the system is released, ETM FinTech will no longer control the direction of the system. Only the system's stakeholders, the owners of tokens, and interested researchers will decide the future developments of the system.

8.3 ETM BD Business Cooperation Company

The role of ETM BD is to develop, support, and nurture business enterprises, and to help integrate these businesses into the En-Tan-Mo's derivative chain ecosystem. En-Tan-Mo is committed to creating an easy-to-use, fully-featured, plug-and-play system by providing integrated industry solutions such as free derivative chaining, smart contracts, and application hosting. Within the En-Tan-Mo ecosystem, developers can quickly iterate their En-Tan-Mo applications and publish them into the system's built-in decentralized application store. These applications can be downloaded and executed by distributed nodes in the platform, and serve ordinary users; the entire process is provided by the honest and secure En-Tan-Mo derived chain network security assurance.

Any individual or company that is interested in the En-Tan-Mo blockchain technology and wants to change the industry through this technology, will receive help and support by the ETM BD through a variety of flexible methods such as direct investment, assisting development, providing solutions and realizing En-Tan-Mo's blockchain application.

References:

【48】A. H. Dyhrberg, Hedging capabilities of bitcoin. is it the virtual gold?, Finance Research Letters, 16 (2016), pp. 139 – 144.

【49】 B. M. Blau, Price dynamics and speculative trading in bitcoin, Research in International Business and Finance, 43 (2018), pp. 15 – 21.

【50】P. Zhang, D. C. Schmidt, J. White, and G. Lenz, Blockchain technology use cases in healthcare, Advances in Computers, Elsevier, 2018.

Notes:

1. Policy Risks

Regulatory policies for block-chain projects and swap-financing are not yet clear in all countries; there are market risks for participants deriving from unclear policies. If the overall value of the digital asset market is overestimated, then investment risks will increase and participants may expect the growth of swap projects to be excessive, but these high expectations may not be realized.

2. Regulatory Risks

The transaction of digital assets including En-Tan-Mo has extremely high uncertainty. Due to the lack of strong supervision in the field of digital asset trading, there is a risk that electronic tokens will surge or plunge and be controlled by the dealer. If people lack experience after entering the market, it may be difficult to resist the asset shocks and psychological pressure brought about by market instability. Although experts from the academic circles, official media, etc., agree in often suggesting careful participation, there are no written regulatory methods or provisions. Therefore, it is difficult for such risks to be effectively avoided.

It is undeniable that in the foreseeable future, regulatory regulations will be introduced to restrict the blockchain and electronic token fields. If/When the sector management will be more tightly regulated, tokens purchased during the swap period may be affected by fluctuations or restrictions on prices, easiness of sale, and other market related shocks.

3.Team Risk

Currently, there are many teams and projects in the field of blockchain technology. The market competition is fierce and there is high project operating pressure. Whether the En-Tan-Mo project will be able to break through a field crowded with many outstanding projects and will be widely recognized is not only linked to its own team ability and planning, but also affected by the presence of many competitors and even oligarchs; and there is the possibility of vicious competition between them. En-Tan-Mo is based on the founder's many years of industrial networking, bringing together a team of talents with both vitality and strength, attracting senior players in the block-chain field and experienced technical developers. The stability and cohesion within the team are crucial to the overall development of En-Tan-Mo. We cannot rule out the eventuality of the departure of core personnel and the internal conflicts in the team, which would negatively affect the performance of En-Tan-Mo.

Disclaimer

This document is for informational purposes only. The content of the document is for reference only and does not constitute any investment advice, offer or invitation to sell shares or securities in En-Tan-Mo or its related companies. Such solicitation must be conducted in the form of a confidential memorandum and must comply with the applicable laws. The contents of this document are not to be understood as encouraging participation in the interchange. Nothing related to this document should be construed as participation in the interchange, including requesting a copy of this document or sharing this document with others. Legal age and full civil capacity are required for participation in any transaction. The contract signed with En-Tan-Mo is real and effective. All participants voluntarily signed the contract and declared to have clearly and fully understood of the structure and functions of En-Tan-Mo before signing the contract.

The En-Tan-Mo team will continue to make reasonable attempts at ensuring that the information in this document is true and accurate. During the development process, the platform may be updated, including but not limited to platform mechanisms, tokens and their mechanisms, and the distribution of tokens. Some of the contents of the document may be adjusted accordingly in the new version as the project progresses. The team will publish the updated content by posting an announcement or a new version of the document on the website. Participants are expected to obtain the latest version of the document in a timely manner and make timely adjustments based on the updated content.

En-Tan-Mo expressly states that it does not assume any liability for the participant's inaccurately relying the contents of this document and any actions resulting from this document. The team will spare no effort to achieve the goals mentioned in the document. However, based on the existence of outside intervening factors, the team may not always be able to completely fulfill the commitment.

ETM token is a tool to gain utility, but not an investment. ETM token owners do not have the ownership of and control over En-Tan-Mo. As a cryptocurrency, ETM token doesn't belong to the following category: (a) Currency (b)Securities (c) Share of legal entity (d) Shares, bonds, notes, warrants, certificates and other right-associated papers

Whether or not the value-added of En-Tan-Mo depends on the market law and the needs after the application is put into place. It may not have any value, the team does not make any commitment to its value-added, and is not responsible for the consequences of its value increase or decrease. To the fullest extent permitted by applicable law, the team shall not be liable for damages and risks arising from participation in the interchange, including but not limited to direct or indirect personal damages, loss of commercial profits, loss of business information, or any other economic loss. Our team decline any responsibility.

The En-Tan-Mo platform complies with any industry self-discipline statements that are conducive to the healthy development of the exchange industry. Participation means that the representative will fully accept and comply with such norms. At the same time, all information disclosed by the participants to complete such inspections must be complete and accurate.

The En-Tan-Mo platform clearly disclosed possible risks to the participants. Once participating in the exchange, they have confirmed their understanding and acknowledged the terms and conditions in the detailed rules, and accept the potential risks of the platform at their own risk.

“ AGREED VALUE SHARED BENEFIT ”