INTRAMO

INTRAMO WHITE PAPER

INTRAMO

THE KEY TO GROWTH IS TO INTRODUCE HIGHER DIMENSIONAL CONSCIOUSNESS INTO OUR CONSCIOUSNESS

preface

"The key to growth is to bring higher dimensional awareness into our consciousness.”

-Lao Zi (604-531 BC)

The invention of Bitcoin in 2008 symbolized the emergence of a cryptocurrency. The years that followed have witnessed the rapid development of blockchain technology. The launch of Yifang opens the way to support the complex business practices of cryptocurrencies.

However, the overall momentum now faces a number of key challenges.including:

(1) Slow trading speed;

(2) The program design obstacle of smart contract;

(3) Lack of security of smart contracts;

(4) Flexibility in managing and updating the blockchain.

Intramo Aiming to become a new generation of blockchain, it is using the latest artificial intelligence technology to address these challenges. The convergence of blockchain and artificial intelligence technology enables Intramo to build a revolutionary cryptocurrency that supports significantly improved transaction speed, superior access to ordinary users, enhanced security under malicious attacks, and highly flexible operations.

INTRAMO

catalogue

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1. The target of the Intramo

The challenges facing blockchain today must be realized

Cryptocurrencies can really happen. We believe that AI technology has seen unprecedented growth over the past decade, providing out-of-the-box solutions to the challenges. MATRIX It aims to become a smart chain, unleashing the potential power of blockchain technology. In this section, we briefly review the goals of the MATRIX.

1.1 Automatic generation of intelligent contracts

Although smart contracts provide blockchain with the basic ability to deal with scale business behavior, they require users to be able to given

Program and design language. With Intramo, design smart contracts no longer require program design expertise. Intramo The unique code generation technology allows for the automatic conversion of abstract descriptions of smart contracts into executable programs. Intramo Users are only required to enter the core elements of the contract using the instruction code language (e. g., input, output, and transaction terms). The deep neural network-based code generator is then able to automatically convert the script to equivalence equation.

1.2 Safe and smart contract

Smart contracts can call the functionality provided by the host system and / or covendor library. Furthermore, programs running on different computers in a distributed framework do not guarantee execution time. This openness and decentralization embodies the essence of blockchain, but it also gives birth to various sources of security threats. In fact, the lack of security is troubling smart contracts. Intramo Blockchain is equipped with a powerful AI security engine, consisting of four main components,

1) A rule-based semantic and syntactic analysis engine for smart contracts.

2) A formal validation toolkit used to prove the security content of smart contracts.

3) An AI-based detection engine used for transaction model identification and security inspection.

4) A dynamic security verification and enhancement platform based on deep learning.

1.3 High-speed trading

Nowadays, all public chains are facing the problem of long transaction delay and low transaction transmission. Specifically, bitcoin takes more than 30 minutes to complete a transaction, while Yifang's transaction throughput is only 10 transfers per second (TPS). In fact, blockchain relies on P2P networks to verify transactions. Since the transaction needs to be broadcast to all the nodes in the network, the total latency must be added whenever more nodes join the network. Intramo This problem is solved by dynamically selecting a committee network, in which all nodes are voted as committees for the other nodes. All proof of work (PoW) processing is assigned only within within the delegated network, which only results in smaller delays due to the small number of nodes. The selection process is random because the selection probability of a node is proportional to its proof of interest (PoS). The online version of Intramo will support the delivery capacity of 100000 TPS.

1.4 Flexible blockchain management

Intramo Is designed to be a highly flexible blockchain. Flexibility is twofold. First, Intramo provides access control and routing services to seamlessly integrate the private chain into the public chain. Such functions meet the licensing requirements of many industry and government players, while allowing the necessary information to flow from public chains to private chains, and vice versa. Second, Intramo uses the reinforcement learning framework to optimize its parameters (e. g., consensus mechanisms and trading schemes). The optimization paradigm ensures dynamic updating of parameters for near optimal efficacy without the risk of hard forks.

1.5 Value-added mining

Perhaps the most responsible part of cryptocurrencies is energy "waste" in mining calculations. Although cryptocurrencies must have physical value, the mining process makes no sense in the world of digital currencies. Now, more than 70 percent of the world's computing power is devoted to mining bitcoin and other currencies. Intramo Introduce a new mining mechanism, in which miners perform Markov Chain Monte Carlo (MCMC) calculations, which is an important tool for Bayesian inference. Bayesian computing based on MCMC plays an important role in many big data applications, such as gene regulatory network, clinical diagnosis, video analysis, and structural modeling. Therefore, the distributed network of MCMC computing nodes provides the ability to solve the computation-intensive problems in the real world, thus building a bridge between the values of the physical world and the virtual world.

2. Intramo Technological innovation

Intramo The project uses big data to rely on artificial intelligence and fast calculation to predict the price. Intramo The project provides investors with investment advice through top AI developers and quantitative analysis to build forecasting systems and trading models. It will also provide technical analysis of various crypto assets and use 28 icons to analyze models for user parameters.

Tokens can also be used in the platform's Learn 2 Earn function, allowing users to access the transaction content and conduct tests to earn tokens. Intramo Reward users through user participation, including building trading models, predicting price trends, etc.

Table 1 summarizes the basic technologies of the Intramo. Thanks to these technologies, Intramo is different, ushering in a new generation of blockchain.

Table 1: Technological innovation of Intramo

class	science and technology	Innovation goal
Basic agreement	1. Random clustering-based voting on the network	Reduce transaction latency
	2. to introduce separate chains of control	Realize the interaction between the public chain and the private chain and the deployment of security control
	3. Optimization of the evolutionary parameters	Adapt the blockchain design to external usage patterns and environments
Smart contract generation	1. Automatic generation of smart contract programs	Break through the program design barriers, so that ordinary users can access the smart contract
Safe	1. Formal verification and deep learning-based audit, including intelligent review of contract, relationship review of contract elements, formal verification of contract security, and transaction arbitration	Identify potential vulnerabilities and malice
	2. Two-bit program code check	Identify potential vulnerabilities and malice
	3. Trusted gateways and agents based on credit scores, including online-offline data agent transmission (ORACLE), public user credit scores, and multi-chain-based data routing	Maintain the reputation record of the network
	4. Use the generative adversarial network to conduct dynamic security verification and enhancement of smart contracts	Ensure the robustness under high-intensity attacks
	5. The contract management guaranteed by AI, mainly used for	Realize long-term financial derivatives trading

class	science and technology	Innovation goal
business	1. Pattern matching	Matching contracts that allow data exchange and identification of multi-party transactions
	2. Transaction data search engine, which supports license right-based index, privacy-based user transaction tracking, and intelligent grouping based on multiple user behaviors	Assisted with historical data tracking and data mining
mining	1.Bayesian and deep learning as the PoW calculations	Mining creates universal value

3. Key technology of Intramo

Artificial intelligence plays a crucial role in building Intramo into a smart blockchain. In addition, Intramo is also the product of the extensive optimization and expansion of blockchain technology. In this section, we review the key technological breakthroughs made by Intramo.

3.1 Hybrid PoS + PoW consensus based on stochastic network shrinkage

The root cause of the excessive delay of blockchain transactions today is that the transmission overhead in the P2P network cannot scale with the number of nodes. This problem is inherent to the PoW consensus based on P2P, because every transaction is required

Broadcast to the entire network. In fact, as long as the node adds new. The recent lightning network is designed to solve these problems, but what it does is to create a private path, receiver, and transmission node for the payer, so that the consensus can be completed once the transaction has been reached. Such a process lacks security, especially for malicious attacks when the channel is underwater, because it occurs outside the blockchain.

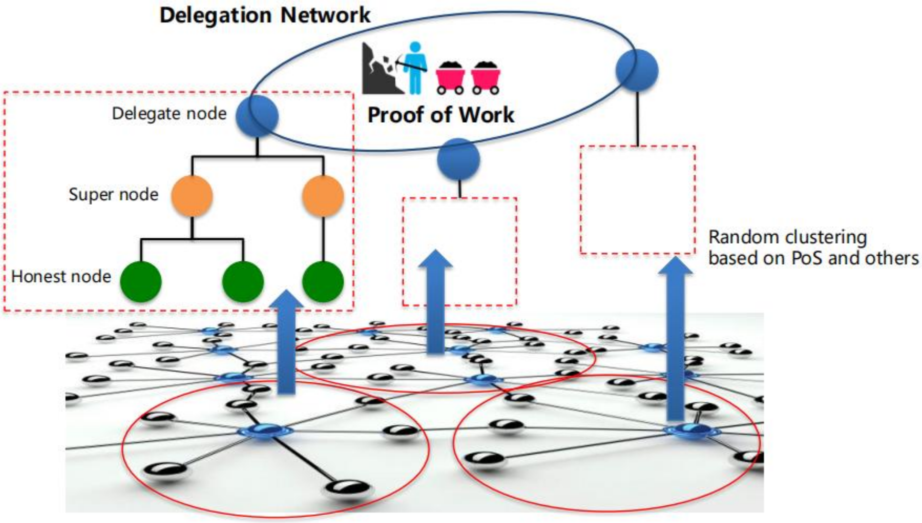


Figure 1: A PoS + PoW consensus based on random clustering

An effective out-of-the-box solution is to introduce a hierarchy into a P2P network that can control the broadcast overhead. The key idea is to shrink the network into smaller networks (i. e., create a hierarchy) and perform PoW calculations in a small number of contracted networks, honest nodes, supernodes, proof of work, random clustering based on PoS and other delegated network nodes.

Intramo The basic idea of proprietary calculation is shown in Figure Figure 1. This hierarchy is created through a distributed random clustering process without centralized control. After the cluster is complete, each node will have its own committee. The selected representatives constitute a new network, called the representative network, which has an adjustable number of nodes. The transaction is assigned to the representative node only on the delegated internal broadcast network PoW, and one such node can be further divided. It divides work into smaller jobs and assigns them to nodes that vote for it. Note that reverse operation performs clustering. The probability that the node is selected as an agent is proportional to its PoS and other factors.

The Intramo consistency calculation based on distributed random clustering is designed as follows:

1. Nodes are based on the PoS or other factors.

2. The node sends requests to adjacent nodes, asking them to join the node as a cluster, as well as the link list and deposit request for the certification certificate used for login. If other nodes agree to join the cluster, the certificate will be used for validation, they will be marked as "submitted dependency". If they disagree, they will be marked as "competitors" and will not receive information from the cluster.

3. After joining the cluster, the nodes calculate the connectivity nodes of adjacent nodes and select a set of candidates according to certain rules.stochastic

Method The best candidate is selected and the corresponding messages are distributed to other nodes.

4. When a node has a sufficient number of accessory nodes, it will be marked as "fully loaded". These nodes will compete to merge the other clusters.

5. The node sends invitations to adjacent nodes, asking the latter to join. Through a multiple signature mechanism, they together generate a random seed that can be used to initialize the Mararkov chain process. Independent partners will judge who wins by reviewing the published seeds, public keys and private keys, and Markov calculations. The parties must confirm the result and sign the result, and then publish it for bookkeeping.

6. Nodes will continue to merge other nodes until they are "fully loaded" (i. e., the number of nodes reaches 255 or exceeds the previous round) or until all other nodes in their adjacent regions are fully loaded. It is then mark as "quarantine".

7. The next round of absorption begins when there are only "full" and "isolated" nodes in the network."Full load" will absorb only the "isolated" nodes, and vice versa. The "full load" node will become a "super" node (meaning they are more than 2 ^ 16 nodes in the corresponding cluster, or greater than the total number of nodes in the cluster N / 128 last round), or an "isolated super absorption node" (indicating nodes below 32768, or more than "full load" nodes remaining than 128).

8. When the "super" nodes or more than 255 "isolated super absorption" nodes begin, the nodes will become core nodes, meaning that they cluster more than 2 ^ 24 nodes, or have a number of nodes more than nodes N / 128. When the number of core nodes exceeds the total number of nodes in the previous round N / 128, the absorption process ends.

The above procedure continues until less than 255 clusters exist. These clusters then become "proxy nodes"

3.2 Intelligent contract code generation based on deep learning

One significant advantage of Intramo is that users of smart contracts no longer need to know. How to encode in a program design language. In fact, the matrix only requires the user to type the purpose of the contract, namely, input, output and transaction terms, as the script. A deep neural network-based code generator will then identify basic transaction patterns and convert them into programs that capture the behavior of target intelligent contracts.

In the future, we will use pure natural language as the input front end.

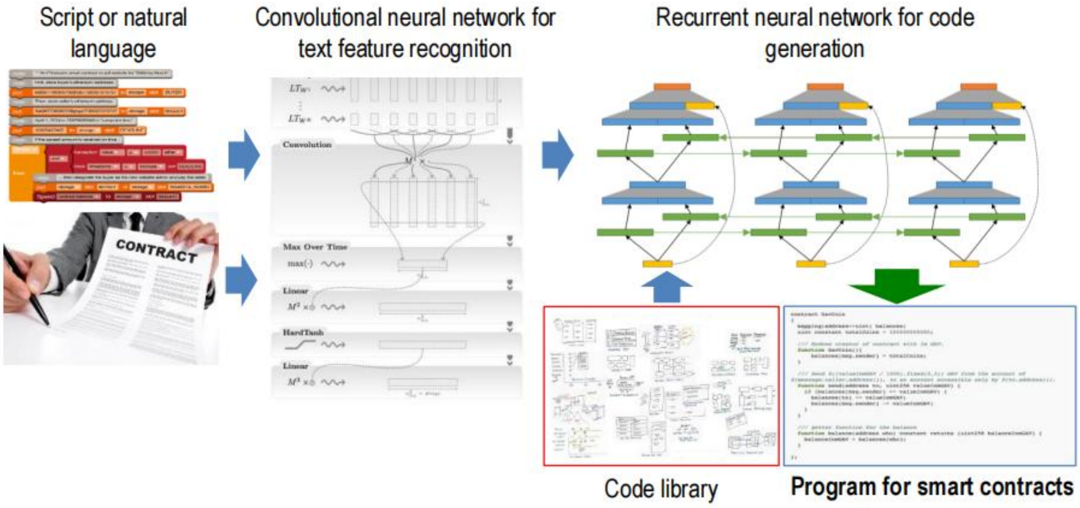

Script or natural language
Convolutional neural network for text feature recognition
Recurrent neural network for code generation
CONTRACT
Convolution
Max Over Time
max(·)
Linear
HardTanh
Linear
Code library
Program for smart contracts

Figure 2: Automatic generation of intelligent contract program based on deep learning

Recent developments in deep learning technology prove the feasibility of automatic generation of program codes.

First, the maturity of the convolutional neural network (CNN) makes it possible to select high-quality features from language and text.

Second, the recurrent neural network (RNN) proved mathematically to be a Turing-complete computer capable of generating any sequence. These deep neural networks provide key technologies to analyze the purpose of contracts and generate corresponding programs.

The code generation process of smart contract is shown in Figure 2.

Scripts for capturing contract purposes are fed into convolutional neural work trained using a large number of labeled samples to identify potential transaction patterns and data content.

The patterns found are organized into a sequence and then given back to the recurrent neural network. The parameters of the RNN use a typical wisdom model for the training contract. It converts input patterns into a target code base containing various design patterns of a smart contract.

In addition to providing significantly enhanced accessibility, Intramo's code generation technologies can be easily integrated with automated security validation and enhanced technologies.

In fact, the whole process can serve as a closed loop for improved improvement.

During the operation of Intramo blockchain, the underlying model can be constantly updated to obtain better quality of code generation.

3.3 Artificial intelligence security verification and enhancement

Intramo It aims to raise the security of blockchain to an unprecedented level.

Intramo The overall safety framework consists of four main components,

1) Rule-based intelligent contract semantic and syntactic analysis engine;

2) Formal verification toolkit to prove the security of smart contracts,

3) An AI-based detection engine used for transaction model identification and security inspection,

4) A dynamic platform for security verification and enhancement based on deep learning.

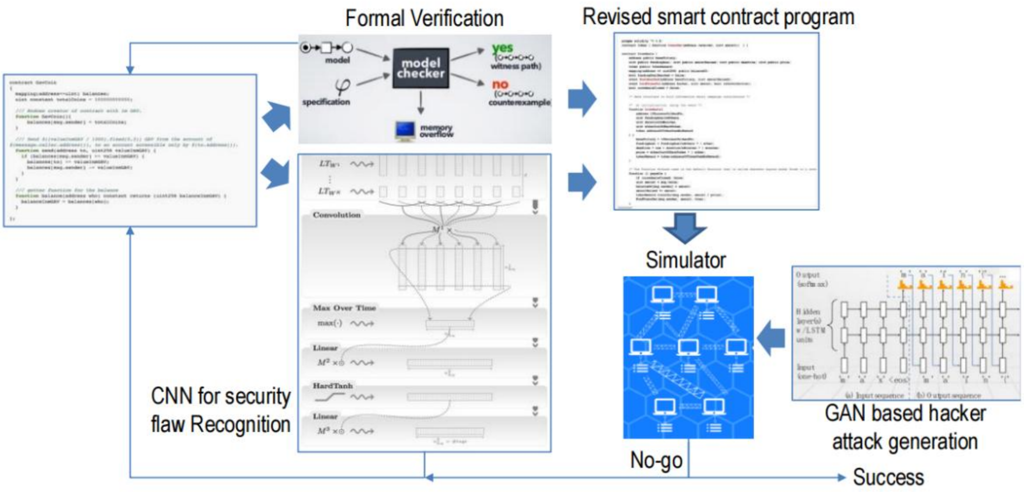


Figure 3: Security verification and enhancement based on deep learning

3.3.1 Syntax and semantic analysis

Given a smart contract program, Intramo's internal compiler builds a BNF-based AST as an internal representation.

For smart contracts that have been compiled into tuple code files, Intramo first disassemthe binary code and then generates the corresponding INTO.

The compiler, based on a rule base built using domain knowledge and historical experience, uses recursive descent parsing to check for any security vulnerabilities in AST.

At the syntax level, the Intramo compiler identifies the corresponding finite state machine and data flow chart from the program. It then performs rule-based checks and program code revisions.

Typical examples include:

(1) Supplement all conditions to prevent execution problems due to incomplete conditions;

(2) Analyze all the called public members and functions to determine the exposure degree of the contract;

(3) Check whether the transaction steps are complete to ensure that the condition description is complete. At the semantic level, the Intramo's compiler provides context checks to determine operations that do not meet the rules or are unsafe.

Typical examples include:

(1) Check the objects and methods that must be exposed to the external environment to check their necessity and potential defects;

(2) Verify whether the contract branch or processing of ORACLE has been completed, and whether there are other abnormal operations when calling the contract;

(3) Check the same conditions in different options to avoid abnormal sequences due to different calls.

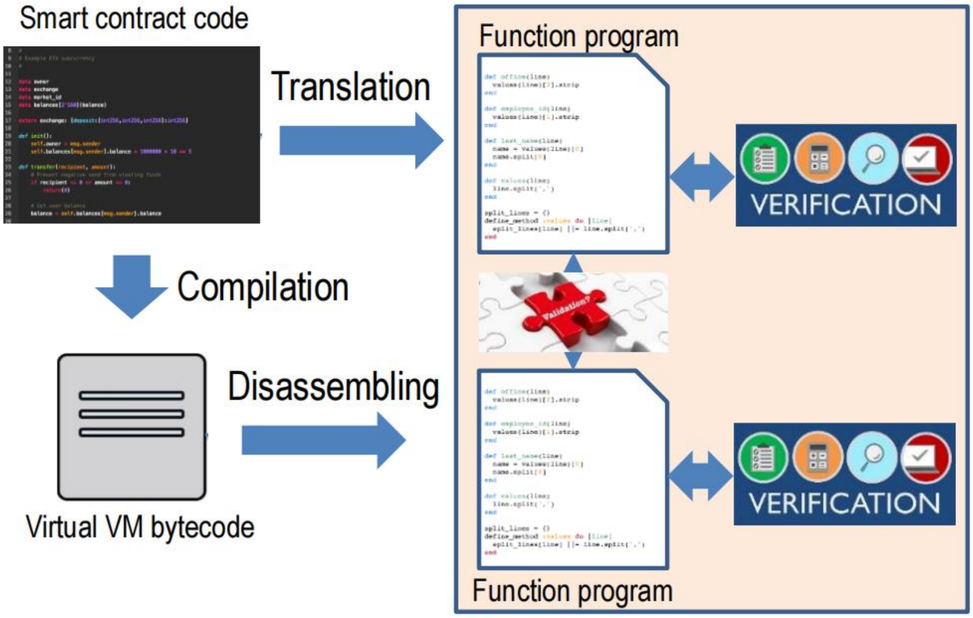
- ### 3.3.2 Formal verification of smart contract

The above static syntax and semantic analysis can identify the logical defects caused by human factors.

However, no logical problem in the runtime. For example, when the target contract is under complex constraints, the user can define the contract condition.

Furthermore, since the contract is executed in a distributed environment, and each node sees a unique execution sequence, a security vulnerability may occur. Therefore, the abnormal execution of a contract may leave holes for other programs to change their internal status.

Intramo The blockchain is equipped with a formal validation framework for verifying the security content of smart contracts. The framework is based on the functional programming design language, integrates SMT solvers, and has multiple models and tools. Has been used to validate various software and encryption procedures.



```
#
# Example ETX subcurrency
#

data owner
data exchange
data market_id
data balances[2^160](balance)

extern exchange: [deposit:[int256,int256,int256]:int256]

def init():
    self.owner = msg.sender
    self.balances[msg.sender].balance = 1000000 * 10 ** 5

def transfer(recipient, amount):
    # Prevent negative send from stealing funds
    if recipient == 0 or amount == 0:
        return(0)

    # Get user balance
    balance = self.balances[msg.sender].balance
```

```
def office(line)
  values(line)[2].strip
end

def employee_id(line)
  values(line)[1].strip
end

def last_name(line)
  name = values(line)[0]
  name.split(?)
end

def values(line)
  line.split(',')
end

split_lines = {}
define_method :values do |line|
  split_lines[line] ||= line.split(',')
end
```

```
def office(line)
  values(line)[2].strip
end

def employee_id(line)
  values(line)[1].strip
end

def last_name(line)
  name = values(line)[0]
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def values(line)
  line.split(',')
end

split_lines = {}
define_method :values do |line|
  split_lines[line] ||= line.split(',')
end
```

Figure 4: Formal verification of smart contracts

Figure 4 shows the formal verification process of smart contracts. Verify that the tool chain handles contracts at the raw program code and bit group code level. The original program code will be translated into the equivalent of the functional program design language. The model is designed with functional programs to expose the hidden logic and simplify the subsequent formal operation. The bit group code to run on the Intramo virtual machine is decomposed and converted to equivalent functionality. Both functions are available for equivalence checks and other consistency checks. With function programs, you can apply a set of content checkers and theorem provers to verify various security contents (for example, whether the return value of the send () function is checked).

• 3.3.3 Intelligent contract verification based on artificial intelligence

The above formal validation finds vulnerabilities and bugs that can be captured through explicit formal rules. On the other hand, it is challenging to define a complete set of security content covering all possible situations. Here, Intramo has a deep learning-based framework to discover the hidden intentions of smart contracts and to detect complex security vulnerability patterns.

Intramo A convolutional neural network is used to extract text features and detect interesting patterns. These patterns can be syntactic patterns or structural patterns (or a combination of both). The former often contains grammatical and functional features, while the latter contains structural features. CNN is trained in open source smart contracts, which are manually marked.

A key feature of Intramo is that it uses artificial intelligence to automatically identify program syntax to detect typical models, and then automatically generate content that meets security requirements. Given a smart contract program, Intramo's AI engine will automatically detect similarity partial matches and complete matches to predict the behavior model of the program code. Based on such a model, the AI engine will produce a relevant set of constraints for in-depth formal validation.

• 3.3.4 Dynamic verification and security optimization based on deep neural network

To solve these problems, Intramo uses two dynamic methods, namely, security verification based on generative adversarial network (GAN) and dynamic model verification based on distributed concurrency.

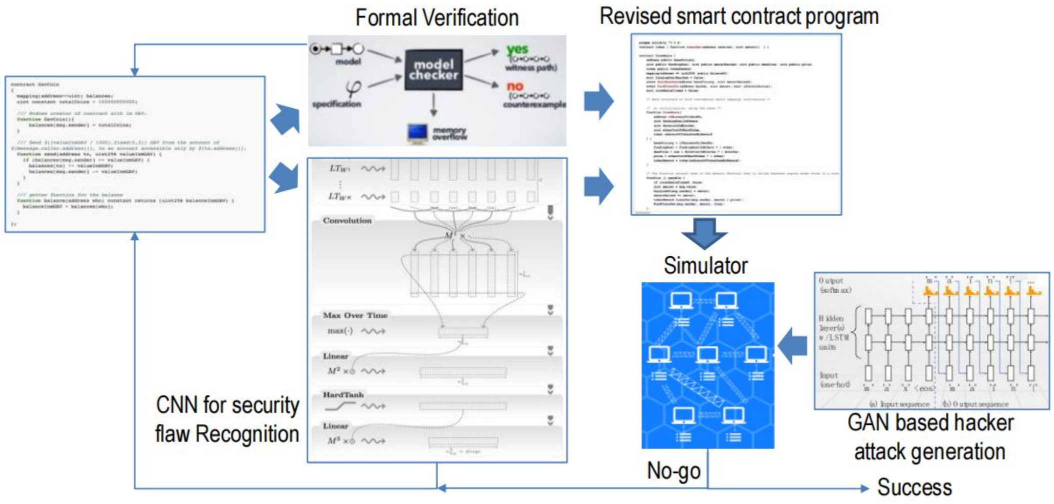


Figure 4: Formal verification of smart contracts

• 3.3.4.1 Security verification based on generated adversarial networks

Intramo Adopt the recently developed generative adversarial networks for dynamic security validation. As shown in Figure 5, the dynamic validation process can be coupled as a closed loop to the code generation framework. The GAN framework is composed of two RNN. One RNN is used to modify existing programs for smart contracts, while the other learns to generate hackers from a random sample of a given probability distribution. After the smart contract program is generated, it will be deployed together with the corresponding hacker code in the "sandbox analogy network (a blockchain analogy network, where it can be experimented with a controllable pipeline)". The cost functions of the two networks are linked together so that the overall optimum can be achieved when the whole system reaches a Nash equilibrium. At this point, the revised Smart Contract Plan has the highest level of security.

• 3.3.4.2 Dynamic model validation based on distributed concurrency

In addition to the above general security verification and enhancement technologies, Intramo also deploys customized attack tools as follows.

(1) Contract sequence attack

This attack takes advantage of the fact that the execution of smart contracts is not synchronous and changes dynamically. Even if the contract is statically secure, it is still vulnerable to dynamic attacks, unless the contract is designed to be dynamically immutable. Intramo Use machine-learning technology to protect contracts from such attacks. These technologies include relational checks of contract sets to identify relational contract transactions. Intramo Also provides a non-synchronous simulator to help identify exception spots for such attacks

(2) Time-stamp-dependent attack

The root cause of this attack is the excessive caution of the miners. Intramo Use AI to dynamically check timestamp dependence or scrambling dependence to avoid such behavior.

(3) Error handling exceptions and reentrant attacks

These attacks are essentially caused by an exception triggered by the function call of the smart contract. Intramo Use a deep neural network to find the encoding patterns that lead to such vulnerabilities.

.4 Highly flexible blockchain architecture

Intramo To achieve superior flexibility in blockchain management and operations. Figure 6 illustrates the reference architecture of the Intramo. As shown in the dashed box, Intramo blockchain is composed of six types of network nodes, including standard Intramo node, cloud access node, cloud storage node, Intramo trusted gate, external data source storage node and AI service node

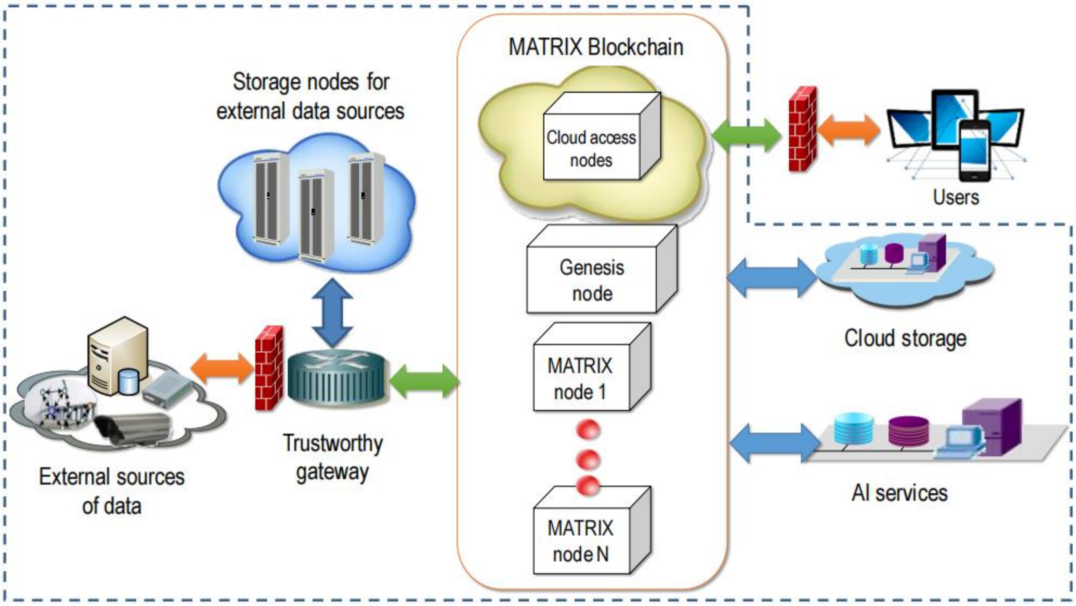


Figure 6: Intramo System structure and deployment model

The standard Intramo nodes constitute a distributed collaborative control chain and at least one data chain. Each node should have the computing power to run a virtual machine. The distributed collaborative control chain, hereinafter referred to as the control chain, is designed by the standard Intramo nodes to form a distributed collaborative control link and at least one data chain. Each node should have the computing power to run a virtual machine. The distributed collaborative control chain, hereinafter referred to as the control chain, is designed completely following the distributed and decentralized principles of blockchain.

Cloud access nodes are designed to facilitate mobile devices to access Intramo's cloud services, giving all devices connected to Intramo sufficient computing power. Intramo The block data of the blockchain is copied to the cloud storage node in real time. Cloud storage is not designed to reach a consensus, but to make it easier for users to view data offline. Users can obtain transactions used for validation, data mining, and other purposes.

Intramo The trusted gate is the key interface for communication with external data sources. The device will obtain all external sources required by the Intramo and determine its credibility. When using these data, the Intramo node checks the consistency of the data to determine the confidence of each source and to credit each external node.

Intramo The trusted gate is also organized by P2P topology. Storage node gates of external sources in the data pool reliably obtained through Intramo. Data must pass an AI-based validation program before check-in. The pool will also store users' private data, but that data is encrypted to ensure that only authorized users can access it. All the data in the pool can be verified by checking its signature without access to its content to prove whether they have been returned. The AI service node has two functions, one is to support the optimization of the whole system, and the other is to launch various AI services on the Intramo. It can serve external users by launching Intramo as a service provider, or arrange Intramo nodes to serve internal users. AI service nodes rely on ancillary hardware to provide computing power.

- ### Multichain structure of 3.4.1 Intramo

Seeing the strong need to run both public and private chains on the same platform, Intramo is a blockchain that supports multi-chain integration. It allows for the integration and interoperability of completely public public chains and private chains coordinated with multiple secure access and control mechanisms. Figure 7 depicts a reference multi-chain platform supported by Intramo technology. It consists of a single control chain and multiple data chains.

Intramo Support for both public and private chains is mainly achieved through the control chain to achieve the specified access control and security mechanisms. The control chain consists of control blocks for access control, data storage security, and multi-user security. The decoding pipeline of each data chain block and its parameters are determined by the matching of the control block. There are also control blocks that define the matching parameters of the P2P network. Thanks to the control chain, Intramo adopts a three-layer security guarantee mechanism consisting of block storage key, node security key and user security key. It uses group keys and node keys to encrypt the transmitted information, and supports the distribution, management, and secure authentication of security keys in the form of private chains.

The idea of integrating multiple interactive operational chains greatly increases the freedom of Intramo to support real-world scale commercial applications. For example, it is now feasible to have a data chain and a Pacific data chain. The two chains can exchange data and tokens through the Intramo's secure intelligence contract.

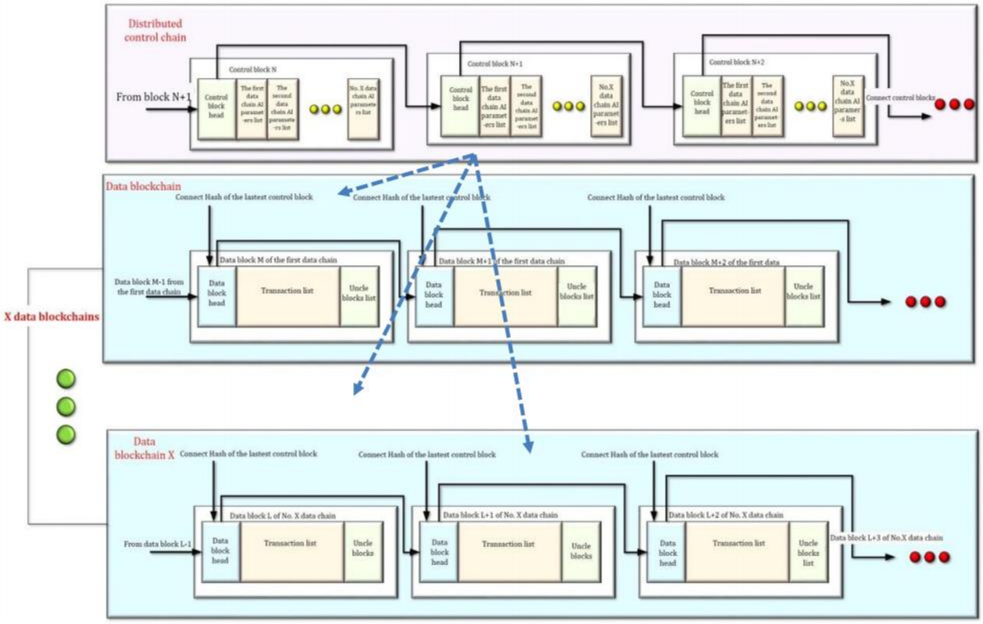

Distributed control chain
From block N+1
Control block N
Control block head
The first data chain AI paramet-ers list
The second data chain AI paramete-rs list
No. X data chain AI paramete-rs list
Control block N+1
Control block head
The first data chain AI paramet-ers list
The second data chain AI paramet-ers list
No.X data chain AI paramet-ers list
Control block N+2
Control block head
The first data chain AI paramet-ers list
The second data chain AI paramet-ers list
No.X data chain AI paramer-s list
Connect control blocks
Data blockchain
Connect Hash of the lastest control block
Connect Hash of the lastest control block
Connect Hash of the lastest control block
Data block M of the first data chain
Data block M+1 of the first data chain
Data block M+2 of the first data
Data block M-1 from the first data chain
Data block head
Transaction list
Uncle blocks list
Data block head
Transaction list
Uncle blocks list
Data block head
Transaction list
Uncle blocks list
X data blockchains
Data blockchain X
Connect Hash of the lastest control block
Connect Hash of the lastest control block
Connect Hash of the lastest control block
Data block L of No. X data chain
Data block L+1 of No. X data chain
Data block L+2 of No. X data chain
From data block L-1
Data block head
Transaction list
Uncle blocks
Data block head
Transaction list
Uncle blocks
Data block head
Transaction list
Uncle blocks list
Data block L+3 of No.X data chain

Figure 7: Multi-chain structure of the Intramo

• 3.3.2 The natural evolution of the blockchain parameters

Blockchain usually has many parameters, such as block size, permission calculation, consensus mechanism, and mining calculation. The allocation of these parameters has a significant impact on the overall effectiveness of the blockchain. It is usually not possible to select the best set of parameters for all cases. However, the drastic changes in these parameters can pose a huge risk to the hard fork of cryptocurrencies. The introduction of multi-chain integration complicates the problem because the consensus mechanisms and other parameters of different chains can vary substantially. A parameter optimization engine based on reinforcement learning is embedded in the Intramo blockchain. The so-called value networks constantly learn to fine-tune the long-term rewards of the various parameters. After learning, the network can generate the best parameter tuning decision given the current structure and context of the blockchain. Figure 8 shows the natural evolutionary process of Intramo. Since the Intramo chain learns to self-optimize, the entire process is designated as natural evolution.

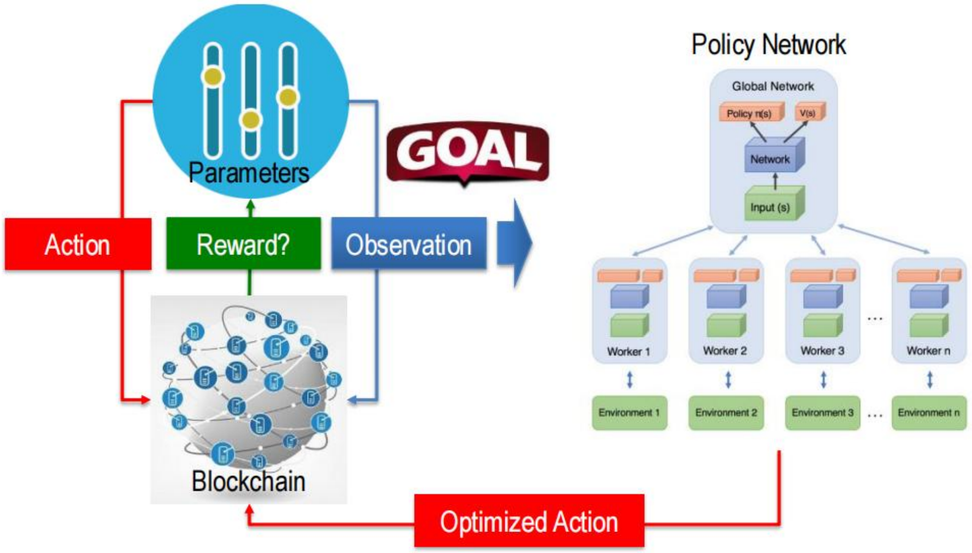


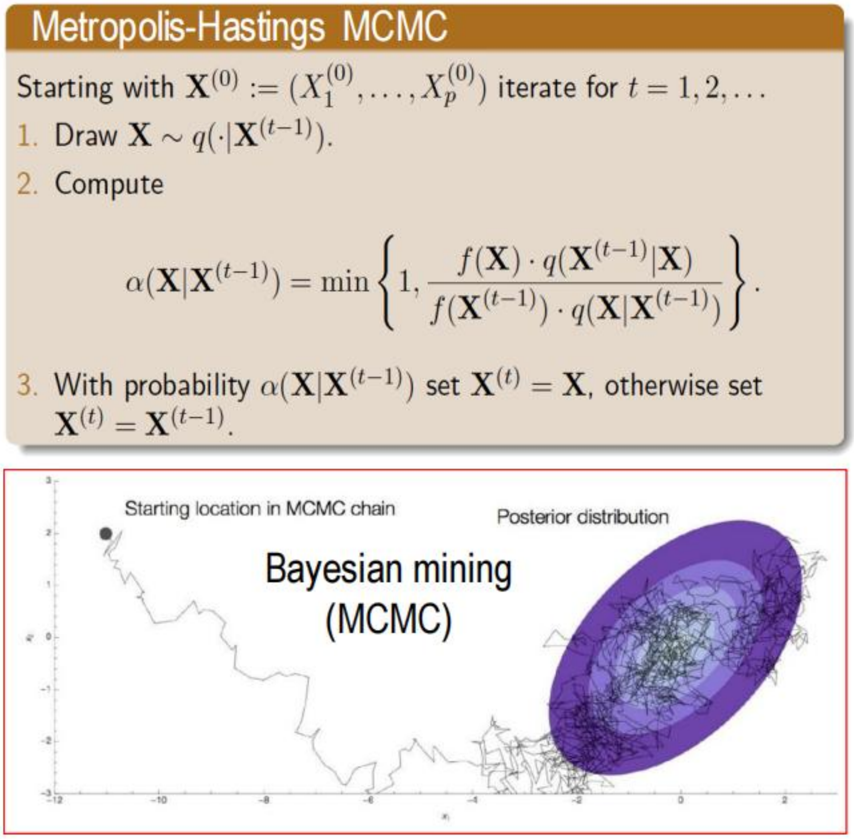
Figure 7: Multi-chain structure of the Intramo

3.5 proof of work for Markov chain Monte Carlo calculations

Intramo Using a hybrid PoS + PoW consensus mechanism, a value-added computing to replace the conventional miscellaneous calculation. The idea is to use Markov Chain Monte Carlo (MCMC) calculations as a proof of work. MCMC has extensive applications in scientific and engineering applications such as personalized medicine, financial modeling, human cognitive modeling, and social network analysis. Thus, the mining process can be used for real-world applications and generate added value. In fact, we believe that MCMC-based mining provides a stronger bridge between the virtual world and the assets in the physical world.

MCMC constructs a Mararkov chain to sample from the target probability density. As one of the most influential calculations invented in the 20th century, it opens the way to Bayesian inference using real-world data. The MCMC is actually a family of sampling calculations, and the upper half of Figure 9 lists a pseudo-code for the famous derivative Metropolis Hastings (MH) calculation, which is used to sample the posterior distribution (i. e., the hypothetical distribution given the observed data). MCMC computing has a basic set of essential features that make it suitable for use as a mining workload. First, it is computationally intensive. Convergence of the complex distributions may require tens of millions of samples. Structural learning problems require sampling a large number of graph topologies and can take several days

And even done on a supercomputer. Second, the distribution of the samples after convergence is a priori unknown. Such characteristics make it extremely difficult to fake the final result of cheating. Third, the extent of near-final convergence can be assessed, although the final result is unknown. The lower half of Figure Figure 9 shows a sampling trajectory. The shaded rings in Figure 9 represent the target posterior distribution



Metropolis-Hastings MCMC

Starting with $\mathbf{X}^{(0)} := (X_1^{(0)}, \ldots, X_p^{(0)})$ iterate for $t = 1, 2, \ldots$

1. Draw $\mathbf{X} \sim q(\cdot|\mathbf{X}^{(t-1)})$.
2. Compute

$$\alpha(\mathbf{X}|\mathbf{X}^{(t-1)}) = \min\left\{1, \frac{f(\mathbf{X}) \cdot q(\mathbf{X}^{(t-1)}|\mathbf{X})}{f(\mathbf{X}^{(t-1)}) \cdot q(\mathbf{X}|\mathbf{X}^{(t-1)})}\right\}.$$

3. With probability $\alpha(\mathbf{X}|\mathbf{X}^{(t-1)})$ set $\mathbf{X}^{(t)} = \mathbf{X}$, otherwise set $\mathbf{X}^{(t)} = \mathbf{X}^{(t-1)}$.

Figure 9: Markov chain Monte Carlo calculation

The MCMC calculation mode is not friendly to either the CPU or the GPU. Indeed, MCMC involves various probability calculations, such as scrambling generation and sampling probability distributions. Current computers do not support this calculation, which causes significant overhead. In our previous work, we developed a Bayesian computational architecture for highly efficient MCMC computation. The overall hardware architecture is shown in Figure Figure 10. It is organized as multiple random multiprocessors to support multiplex processing. One or more random multiprocessors can be assigned to perform a single task of Bayesian inference. The random multiprocessor is equipped with a set of 8 sampling units. Note that these sampling units can be invoked in the SIMD pipeline. The sampling unit consists of a random number buffer and a random logic circuit designed to draw a random sample of a given common distribution set (such as uniform and binomial distribution). The commercial IP core is used to generate real random numbers.A. A programmable design controller is designed to coordinate parallel sampling. The architecture is equipped with an on-chip example memory, which is actually a hybrid computing / memory module for operating example operations. Each random multiprocessor also has a transient memory for quick access to common data. The above architecture is used as a prototype for mining hardware and can be implemented as a dedicated integrated circuit.

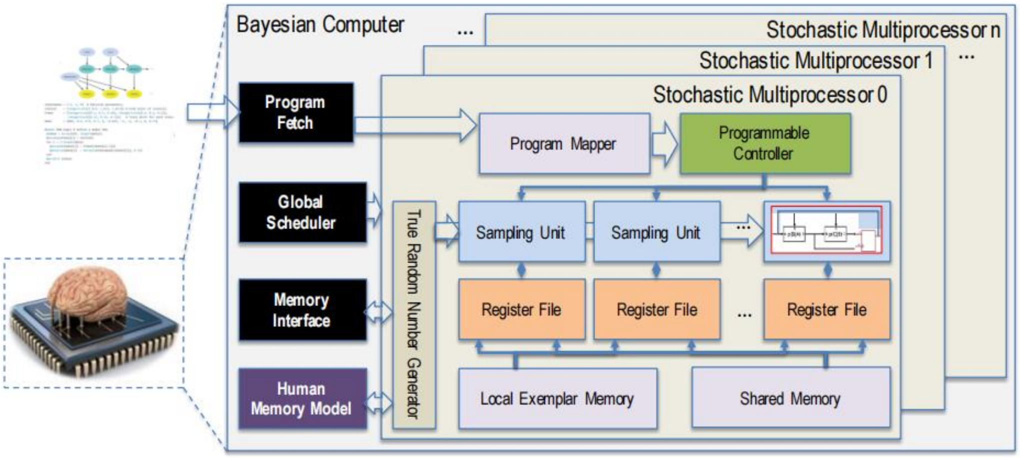


Figure 10: Hard work for Markov chain Monte Carlo calculations

4. Intramo Economics

4.1 Distribution mechanism

Project name: Intramo

Token name: INTO

Total issuance: 150 million units

4.2 Token allocation

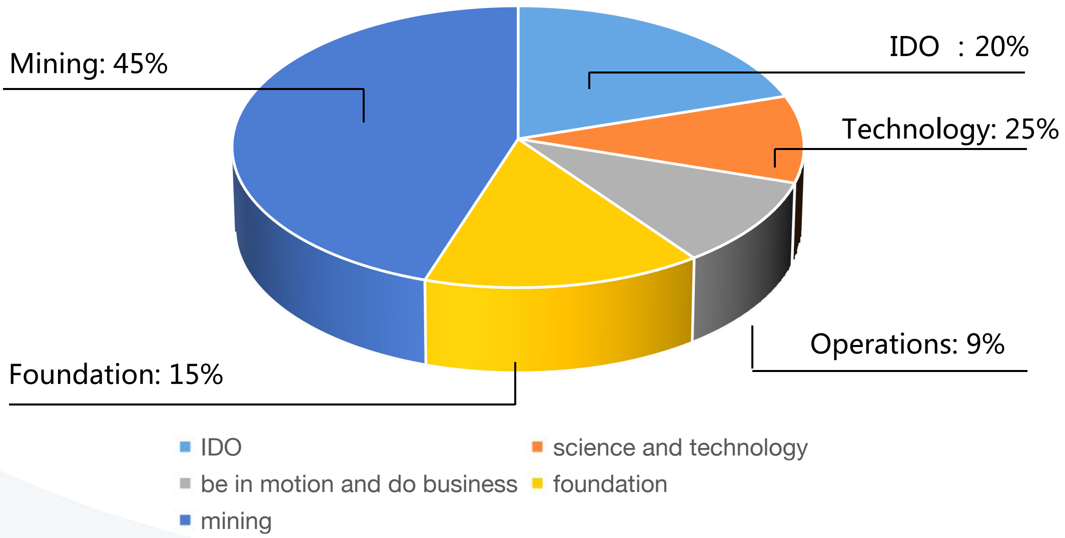
IDO: 20% (all output by the market IDO, without locked warehouse, all released before the line)

Technology: 10% (lock up for 4 years, then 2% released every year until all released)

Operation: 10% (audited by the foundation and issued from time to time, the specific release ratio will be publicized in the community)

Foundation: 15% (locked up for 3 years, then released 1% quarterly, mainly for public relations processing and reward users and institutions that contribute to the platform)

Mining: 45% (mined from user data)



6. Intramo Conclusion

Intramo It integrates cutting-edge technology and embodies the spirit of ancient Chinese sages. Lao Tzu, the great Chinese philosopher, once said, " The key to growth is to introduce a higher dimensional consciousness into our consciousness."We have introduced artificial intelligence into the world of blockchain and cryptocurrencies. As blockchain technology has connected the world, Intramo's AI-smart blockchain will provide us with an unparalleled ability to understand the past and predict the future.

VI. Disclaimer

6.1 Disclaimer

This white paper is only used for the purpose of conveying information. The above information or analysis does not constitute an investment decision, and this file does not constitute any investment advice, investment intention or instigated investment. This white paper does not constitute and should not be understood as providing any trading or inviting to buy or sell any form of securities, nor any formal contract or commitment; Intramo believes that there are numerous risks in the development, maintenance and operation of INTO and other cryptocurrency and blockchain systems, many of which are beyond the control of the Foundation. In addition to the other elements described in this white paper, each INTO buyer should also carefully read, understand, and carefully consider the following risks. The investor should identify the risks of the INTO tokens, participate in the investment and accept the project risk, and be willing to personally bear all corresponding results or consequences; the team should not bear any direct or indirect asset loss resulting from participating in the project; each INTO purchaser should pay special attention to the fact that Intramo exists only in the network virtual space and does not belong to or involve any particular country.

6.2 Risk warning

To participate in the purchase of INTO (i. e., digital asset exchange), please read the Intramo white paper carefully, have a comprehensive understanding of the scientific and technological characteristics of Intramo, the risk and return characteristics of green seeds, and make it clear that the Intramo project will not provide the return or selected cash of the exchanged digital assets under any circumstances. Intramo The team will make reasonable use of the digital assets raised by the tokens as disclosed in the white paper. Although the Intramo team works diligently and diligently and performs the obligations of the council, the buyers still have the risk of loss, including possible policy risks, economic cycle risks, liquidity risks, information security risks, and public welfare chain fluctuations, etc. Buyers should fully consider their own risk-bearing ability, rational judgment and prudent decision-making.