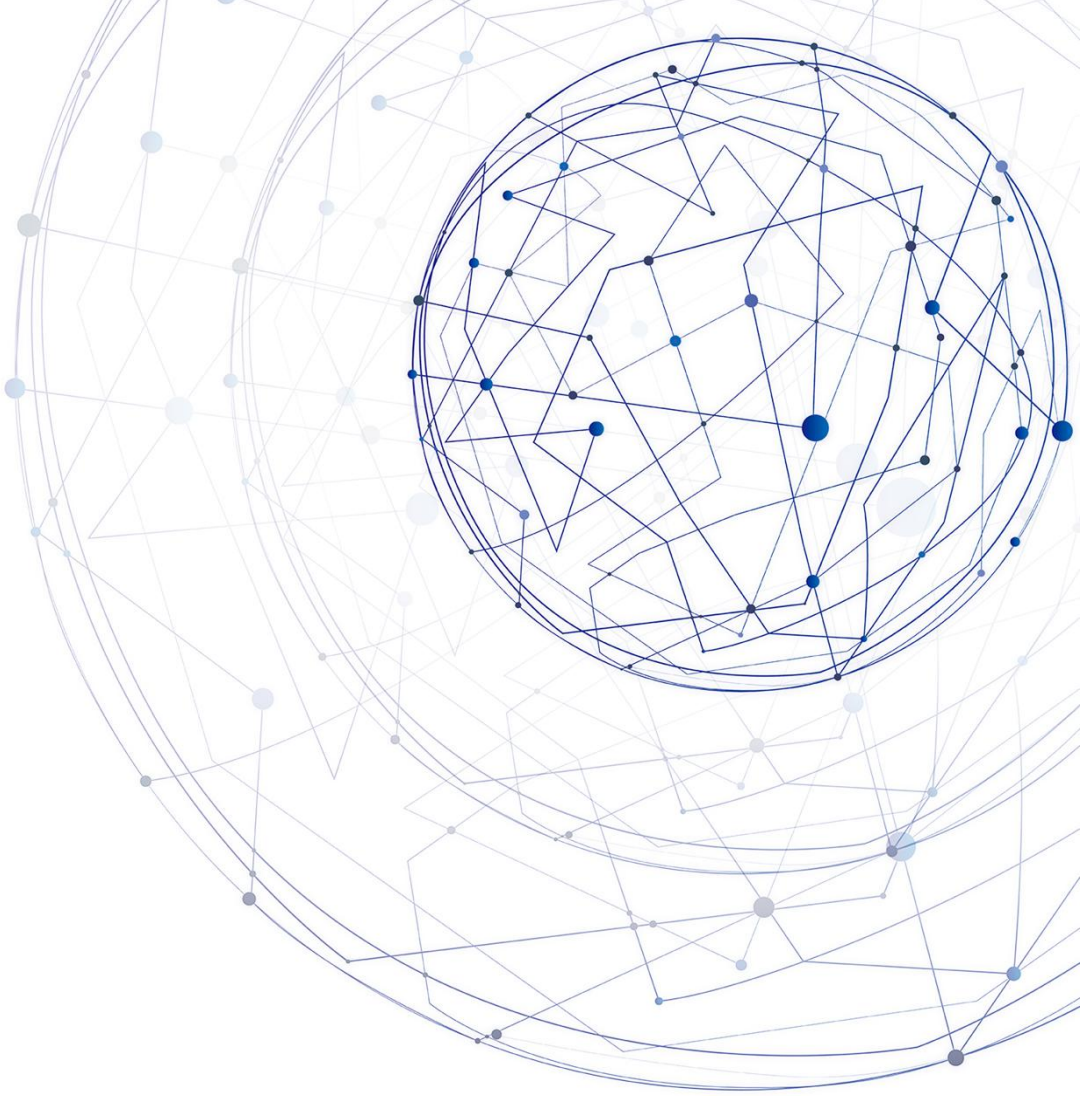

ATT

White paper

2019.01

AFRICA TRADING CHAIN

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1. The Belt and Road

1.1. Basic concept

The Belt and Road is a huge plan proposed by China about building a large number of global political and economic infrastructure along the ancient land and Maritime Silk Road. All highways, railways, oil and gas pipelines, routes, inland waterway ports and seaports will become China's pipelines connecting to other countries to promote economic and trade cooperation and expand influence. In short, it will be a new Eurasian order dominated by China, which will make China become a world power from a regional power.

At present, the friends circle of The Belt and Road has been expanding, covering Asia Europe and Africa, more than 100 countries. For other countries, "The Belt and Road" means natural gas pipeline to Azerbaijan; for Oman, it means new railways and ports; for Burma, it means power plants; for Pakistan, it means new roads and power facilities. It brings a lot of benefits to many developing countries.

Over the past five years, the goods trade volume between China and the countries along "The Belt and Road" has totaled more than US $5 trillion, and foreign direct investment has exceeded US $70 billion. Chinese enterprises have promoted 75 economic and trade cooperation zones in the countries along the road, tax and fees paid to the host countries is up to 2 billion 200 million US dollars, and 210 thousand jobs have been created.

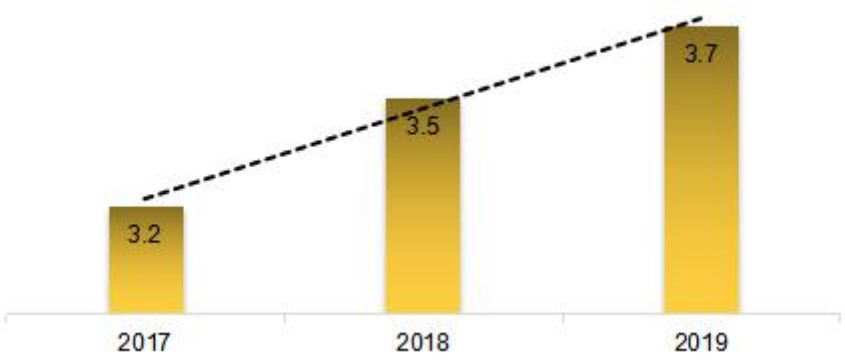
Adam Smith said that trade is human nature. The reason why the Silk Road has a history of thousands of years with many dynasties is because it provides a platform for material and cultural exchanges between the East and the West, thus meeting people's needs for the exchange of different goods. Commodity trade naturally derives currency circulation and financial exchanges, such as the circulation of metal money between different regions, and the maintenance of financial order by the rulers of different countries etc.

The financial power of "The Belt and Road" is from the instinctive development of capital integration, and the open concept of globalization governance, the determination of pluralistic international co construction, and the innovative ability that transcends history and reality. All of these become the support for the steady development of "The Belt and Road" construction.

The prosperity of the Silk Road trade promoted the development of finance, which also promoted the prosperity of the Silk Road trade.

1.2. Current situation in Africa

According to the United Nations Economic Commission for Africa, Africa's economy grew by 3.2% in 2017. Africa's economy is expected to grow at a rate of 3.5% in 2018 and 3.7% by 2019. Africa's economy is expected to grow at the rate shown in the following chart from 2017-2019.



East Africa is the fastest growing region on the African continent so far, according to the estimate, its economy growth rate reached 5.3% last year. It is still the fastest growing region in Africa so far despite the fact that this is a little slower than 6.5% the year before last year. Ethiopia is firmly in the lead in East Africa with an 8% growth rate, while Kenya, Rwanda, Tanzania and Djibouti also maintained growth rates of more than 6% in 2016.

Rank	Country	Total GDP in 2017 (unit: billion US dollars)	Per capita GDP in 2017 (unit: dollars)
1	Nigeria	3948.18	2092
2	Egypt	3494.3	3051
3	South Africa	3440.64	6089
4	Algeria	1754.93	4225
5	Angola	1240.34	4401
6	Sudan	1189.79	2917
7	Morocco	1107.08	3177
8	Ethiopia	797.35	861
9	Kenya	783.97	1678

China-Africa bilateral trade is convenient. According to Chinese Customs statistics, from January to November 2017, the total import and export volume between China and Africa was 154.57 billion US dollars, increased by 14.8% compared to the previous year, which is 2.8 percentage points higher than the overall growth of foreign trade in the same period. Among which, China's exports to Africa amounted to US$85.83 billion, increased by 2.3%, imports from Africa amounted to US$68.74 billion, increased by 35.4%, and surplus of US$17.09 billion, declined by 48.4% over the same period of last year.

In recent years, African imports mainly consumer goods, machinery and equipment, transportation and construction materials from China.

Cooperation between China and Africa is an important topic in the construction of "The Belt and Road". Over the past few years, some new features have shown in the process of globalization: with the development of new technologies and e-commerce, the expansion of international investment scale, the main players of globalization are quietly changing.

China became Africa's largest trading partner for nine consecutive years since 2009 after surpassing the United States. Africa has also become China's third largest overseas investment market and the second largest overseas project contracting market. At present, the annual trade volume between China and Africa has exceeded 200 billion US dollars, and China's investment stock in Africa has exceeded 100 billion US dollars, covering almost every country in Africa, with more than 350 Chinese enterprises investing and operating in Africa.

Under the "The Belt and Road" framework, the railways and highways under construction will maximize the trade level in the African region, expand the import and export scale of African countries, and promote the integration of African economies into the global economy. In the long term, The Belt and Road will help promote the development of the Au 2063 agenda, which aims

at achieving fair and sustainable development of African countries, perfecting legislation, safeguarding peace and security, and achieving interconnectivity among African countries.

With the rapid development of the construction of "The Belt and Road ", there are also many problems that cannot be ignored.

1.2.1. Weak economy and imperfect financial system

Many African countries have weak economies, few foreign exchange reserves, high external dependence, weak anti-risk ability of financial institutions, unstable currency value, high inflation in some countries, which makes it easy for currency credit and financial risks generation, and foreign exchange control is strict. Especially for those countries that rely on resource exports to generate foreign exchange a lot, slight international economic situation changes may lead to fluctuations in exchange rates.

In addition, the current global economic downturn and the sharp decline in international bulk commodity prices have directly affected African energy and mineral exports and the international community's enthusiasm for investment in Africa, seriously impacted the development momentum of African countries.

1.2.2. Lack of infrastructure

Limited local resources, lack of infrastructure, inadequate supporting services, especially immature logistics conditions. Compared with other countries, the current logistics situation in Africa is indeed a major shortcoming in the development of cross-border e-commerce. In addition to dedicated channels of Kenya, Nigeria and other major countries, some non-platform dedicated channel transportation will encounter many problems. At present, the logistics experience in most African countries is very poor. On the one hand, the infrastructure of logistics distribution based on Africa is not particularly perfect. Many links that already can be operated intelligently need manual operation, and the time effectiveness is low. On the other hand, there are very few third party logistics service providers integrated into Africa.

1.2.3. Low work efficiency in local governments

The low efficiency of administration in many African countries has seriously hindered the operation and development of enterprises. On the one hand, the process of signing, approving and implementing contracts is handled manually by the administrative departments with complicated and long processes, which results in a great waste of resources and low efficiency. On the other hand, the government departments lack an effective supervision mechanism and officials are corrupt in all aspects, which makes it difficult for some Chinese-funded enterprises to

promote projects.

2. The possibility of combining "The Belt and Road" with blockchain technology.

2.1. Reducing currency risk

Currently, the US dollar is widely used in international monetary settlement, which has high cost and is subject to exchange rate fluctuation, credit, devaluation and other risks. To mitigate or avoid these effects, a digital monetary system is developed through the technology of "blockchain". This system, which is formulated by all parties with the credit established on the joint agreement, provides a reliable legal basis for the effectiveness and security of its operation. The system can provide a common currency for the countries along "The Belt and Road".

2.2. Cross-border settlement

Blockchain technology can build a decentralized global settlement system, which can automatically complete settlement in real time through intelligent contracts without consuming too much time. Through blockchain technology, it can realize decentration and the third-party intermediary link is omitted. Payment, settlement and liquidation can be carried out directly between two cross-border payment banks.

The traditional cross-border payment model has four costs: processing cost, receiving cost, financial operation cost and accounting cost. The recorded transaction data of blockchain transactions with simply procedures and without hidden costs also helps to reduce the risk of cross-border e-commerce, meet convenient demands and achieve financial interconnection between "The Belt and Road" countries.

2.3. Credit system

For overseas investment, Chinese enterprises are often unfamiliar with a series of problems such as tax, law, culture and the actual situation of the enterprises to be invested in the country. They are afraid of being deceived. As a result, many enterprises wish to "go out" to find opportunities, but also fear that "go out" will be difficult.

To digitalize the data of investees in some countries along The Belt and Road, such as agriculture, energy, resources and so on by using blockchain technology. Through the "blockchain" technology, the relevant information will be broadcasts to global investors, including Chinese enterprises, for reference by potential investors.

On the other hand, credit endorsement through the advantages of "blockchain" technology, high security, mutual monitoring and verification, and openness and transparency can enhance the mutual trust foundation between investors and investees, facilitate investors to make investment choices and sign contracts with credit endorsement, without fear of fraud.

2.4. Digitalization of assets

The characteristics of blockchain technology, such as universal review and verification, non-tampering and transparency, provide credit endorsement for potential trade, enhance the trust foundation of both parties: trader and investor, and reduce the risk of fraud. At the same time, the point-to-point transaction on the blockchain also reduces the transaction and marketing costs required for cross-border trade and investment, and improves the convenience.

2.5. Upgrade Logistics

The blockchain may realize the logistics automation, in fact, the blockchain can also play a bigger role in the transnational field. For example, when we transfer goods from a country, we will encounter a lot of problems, such as losses that cannot be investigated, and it takes a long time to finish the declaration formalities, long logistics business chain leads to the insufficient use of resources, and it even gets involved in corruption.

3. The Solution of Africa Trading Chain (ATC)

The ATC has accumulated for many years in the field of international trade, cross-border e-commerce, cross-border payment, and transaction settlement, etc. The important purpose of the blockchain platform provided by the TRON is to realize the three-dimensional output of these core contents, and the dynamic integration of these core contents with the blockchain technology. Users can apply the most advanced cloud technology and blockchain technology to their superior business through the ATC based on the TRON, so as to response to the call of national policy "The Belt and Road", and bring new opportunities to business innovation. The ATC service adopts the alliance chain mode, centralizes technical service mostly. All multinational trading enterprises can easily build blockchain service on the ATC platform through defining uniform standards and specifications, thus providing more development space for partners in various fields.

3.1. Overview of TRON Blockchain

TRON is an open source decentralized content protocol based on blockchain, which is dedicated to constructing a global free content system by using blockchain and distributed storage technology. This protocol allows each user to publish, store, and possess data freely, and determine the distribution, subscription, push, and enable content creators through a decentralized, autonomous form of digital asset distribution, circulation, and trading. Form a decentralized content ecology. Through a decentralized form of autonomy, the distribution, subscription, and promotion of content are determined by means of digital asset issuance, circulation and transaction, so as to enable the content creators, and form a decentralized content ecology. Core algorithm: Based on the mining difficulty of Open Source Decentralization of blockchain. Monetary aggregate: 100000000000TRX is the circulating currency of TRON system. TRON combines the dual advantages of social networks and value networks, and puts the ecological boom of protocol first. In any community, economy, free market economy, a system of incentives that fairly and reasonably reflects the contributions of participants is fundamental to the community. TRON will use digital assets for the first time to try to accurately and transparently measure and motivate ecological participants and contributors, so as to enable content ecology.

As a decentralized content protocol, TRON has the following four basic features compared with the centralized Internet structure: 1. The data is free. It can realize the free and uncontrolled uploading of data, and can also store and disseminate the content, such as text, pictures, audio and video, etc. 2. Content enabling can get the benefits of digital assets through the contribution and dissemination of content, and economic incentives enable the content ecology.3.Individuals are free to issue digital assets, while others can enjoy the benefits and services brought by the continuous development of data contributors by purchasing digital assets.4.Infrastructure distributed digital assets will match a complete set of decentralized infrastructure, which includes distributed exchanges, autonomous games, forecasting, and game systems.

3.2. Advantages and Characteristics

The ATC will issue the token ATT, based on the TRON Public chain. The TRON has the characteristics of high throughput, extend easily, high reliability (Hi-Rel), low cost, easy to use, etc. It is a trusted public chain developed independently by China and a powerful technical guarantee of the ATC.

1) High throughput

Due to the low efficiency of the consensus mechanism and limited by the single-thread performance of CPU, the performance and throughput of Ethereum is always one of the directions of the subsequent public chain efforts to improve. Ethereum's early testing network implemented 25 transactions per second and (TPS), currently stands at more than 20 TPS. Because of poor performance problems, Ethereum has encountered network congestion for many times in the history.

Under the consensus mechanism of TRON, the limited high computing performance node is selected by the user as the network maintenance node, thus maintaining the TPS of the whole network at an acceptable level, and realizing the characteristics of high throughput. The unique consensus mechanism of TRON makes the TPS of TRON network far exceed Bitcoin, Ethereum and so on. High TPS indirectly guarantees a low delay in all operations on the TRON, which can make the transfer faster, and catch up with existing payment methods such as VISA,SWIFT. This makes daily payments possible.

2) Extend easily

Extendibility is the biggest constraint for Ethereum (Ethereum) networks to undertake more traffic. Ethereum plans to increase network expansibility through fragmentation, but deploying such a working system on the main network may take years. Ethereum will have to migrate from a fully replicated global state to a fragmented state. This will be an extremely difficult project for the workshop of Ethereum, which has a large volume of blocks today.

Thanks to efficient intelligent contracts and the infinite possibilities of smart contracts, TRON is highly extensible, and a variety of applications can be deployed on TRON. In addition, with the combination of excellent database structure and account system, TRON can more conveniently realize complex model and design. It is very friendly to development, and also guarantees the possibility of extremely high TPS. It also enables the TRON network to support a large number of users. All kinds of applications, websites, and services that are now mature and running can easily be transferred to the TRON network, so as to enable the existing patterns to be upgraded in the field of blockchain technology, and it makes it more likely to compete with existing institutions.

3) High reliability (Hi-Rel)

Ethereum is more vulnerable to attacks because of the diversity of transactions in the network than in digital currency projects. The core design philosophy of Ethereum in reducing attacks remains to prevent a few from doing evil through economic incentives: (1) In order to avoid DDoS attacks, all transactions should provide transaction costs. (2) Program running

instructions is limited by the Gas, and consumption excess balance will be canceled, thus avoiding the malicious circular contract.

TRON is committed to building a more decentralized consensus mechanism. The higher the degree of decentralization, the more reliable the overall network structure, user assets, and intrinsic value are. At the same time, TRON's consensus mechanism can greatly save energy compared with POW mode.

4) Low cost

TRON network will adopt the design of polar operation cost, which makes the various applications deployed on the TRON easier to expand users and have more commercial maneuverability. Ethereum adopts leasing mode, using fuel (Gas) to control the upper limit of a transaction execution order, and Gas uses Ethereum currency to exchange. Each execution of a contract command consumes a fixed fuel, The contract will terminate and roll back if the execution is not finished and the fuel is exhausted. The purpose of Gas is to ensure that the network does not get stuck with a lot of intensive work. But the problem with this approach is that developers on the Ethereum network will continue to pay for fuel at all stages, with high costs and volatility. If the average developer wants to test their application at Ethereum, the initial fuel cost will be enough to bankrupt the developer. This is extremely detrimental to ecological construction and chain applications with complex logic.

Regarding to this shortage, the TRON has improved the economic mechanism and adopted the leasing mode. It supports for ultra-low fee transfers. Only 10 minus 6 power of TRX is required to complete a single transfer. The third party program users do not have to pay any network fees directly, which greatly reduces the economic cost of developers, and the low cost is very suitable for the development of the network ecosystem.

5) Easy to use

The TRON team fully investigates user needs and expectations and focuses on building more easy-to-use blockchain products. Due to its earliest release, Ethereum has accumulated a large number of DApp resources after several years of rapid development, thus resulting in a large number of user groups. However, due to its performance constraints, the user experience of Ethereum can only be said to be not so good. Moreover, there has long been no big project built on the chain, and the most widely used features are fundraising.

TRON not only pays attention to the underlying technologies of the blockchain, but also attaches great importance to the application experience of the products of the blockchain. Another highlight of TRON is that the killer application will be released on the main network on the basis of the high performance main chain, which can be called the self-contained ecology. It

can be said that the public chain of the TRON at the beginning has its own orientation, which is different from the large and complete workshop of Ethereum. Self-quality DApp features will be very conducive to the promotion of the main network of TRON, which provides a great deal of possibilities for the successful transcendence of TRON. If the Internet is to break the barrier of information transmission, then the blockchain is to break the barrier of value transmission, and technological innovation is the core driving force for the further development of the blockchain industry. The emergence of new things must be accompanied by countless doubts. Being questioned by peers is the driving force for progress, and the best response to doubt is to show their own strength.

3.3. Design principle of ATC

1) Independent innovation

The ATC pays attention to independent innovation, especially in the field of transnational trade informatization. It can realize the reliable storage and safe sharing of transnational trade information through integrating the technologies such as of blockchain, cryptography, distributed accounting, and cross-chain, etc.

2) Safety

The ATC attaches great importance to the security of information, it can realize real-time monitoring of data in terms of the standardization of data, reading, calling, and updating, thus making the data on the chain safe and reliable.

Support the commercial cryptographySM1, SM2, SM3, SM4 algorithm.

Hardware accelerated encryption / decryption.

Support the digital certificates issued by authoritative agencies.

System data redundancy filing, which is safe and reliable.

Add reply technology and speed up user data recovery.

3) Augmentability

The augmentability of the ATC is reflected in the user. It can continuously expand the number of data contributors and help more users to participate in the construction of the Belt and Road through reasonable incentives.

4) Share

The sharing of the ATC is reflected in the sharing of trade data. It can eliminate information isolated islands, so that more resources can match with the "Belt and Road" policy.

Multilingual support.

5) Automatic deployment

One-stop customization and deployment of blockchain services can meet users' needs. It offers the services that nodes access and exit blockchain.

Actively upgrade the underlying platform and patches of the blockchain.

Multi-role node member dynamic join / exit service.

6) Information visualization

It can realize the visualization of distributed account Information and data, and be compatible with multiple protocols and components.

It can realize intelligent monitoring and provide three-dimensional data monitoring, intelligent data analysis, real-time data failure alarm and personalized data report configuration, which achieves real-time, accurate control of the business.

7) One-stop management of intelligent contract

The register, trigger, execute and log off of one-stop management of intelligent contract.

Filing of standard contracts and customized contracts.

8) Fast docking of application service

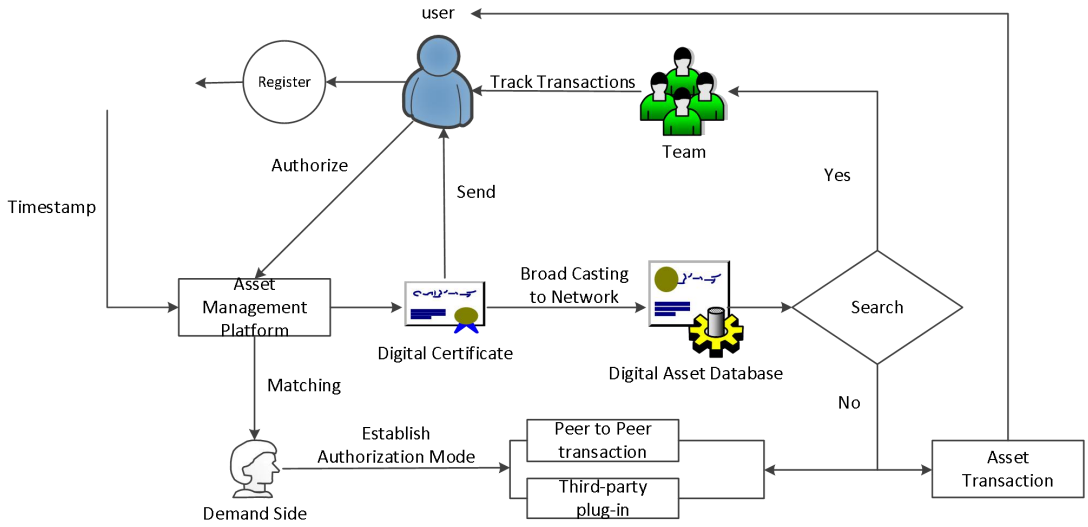
It can realize the fast docking of the existing service on the chain. It can complete 2000+ TPS on the single chain, and meet the concurrent requirements of high throughput of most enterprises.

3.4. Application Scenario of the ATC

The ATC aims to combine the blockchain technology in launching the “One Belt, One Road” scenario, provide a better service platform for countries along the route, empower the real economy, promote the connections between the “The Belt And Road” blockchain financial technology professional committee and the entire industry and the cooperation between these two parties in science, technology and economic technology, promote the cultivation of blockchain technical talents, the incubation of high-quality projects, and open auditions, and promote the international exchange and cooperation between scientific research institutions, scientific research personnel and enterprises including both state-owned and private enterprises. In addition, it helps with the investment and financing of the blockchain economic industry and the R&D of the blockchain technology, and at the same time it can promote the economic development along the “Belt and Road”.

3.4.1. Trade

China's banking industry has a place in the international market in terms of its overall capital size, number of users, and market share, etc., but there are still many shortcomings in its infrastructure construction. For example, the delivery of inter-bank business messages is still relying on international organizations such as Swift, EDI, etc. These international organizations control the platform, data, users, and especially the international trade with banks and data on the balance of payments.



1) Letter of Credit

The ATC links multiple buyer and seller banks to realize real teletransmission, and to achieve quasi-real-time delivery. The subjects on the chain establish money position management and netting mechanism through mutual credit granting to realize real-time writing and reading on the letter of credit chain, and real-time verification and seal identification, thus reducing the transmission time of the bills and letters of credit, and speeding up the turnover of funds. At the same time, changes in the letters of credit can be obtained in real time by other relevant banks or enterprises and third parties, which can ensure the transparency of information of all parties and ensure the interests of relevant parties. Through the introduction of the blockchain technology, information about the letters of credit can be transmitted securely, quickly and traceably in the chain, and can support Chinese messages, which can replace SWIFT in the settlement of domestic letters of credit, thus realizing independent and controllable domestic letter of credit exchange system.

2) Letter of Guarantee

Most of the traditional letter of guarantee business needs manual participation, and the low efficiency leads to high labor costs for banks. The security of the letter of guarantee is not high.

There is the possibility of fraud, the difficulty of re-issuing it if losing it, the lack of a trust mechanism, the inconvenience of claiming compensations, and the difficulty in protecting the interests of the beneficiaries. The business processes for the relevant parties of the guarantee letter are independent of each other, and there is a situation in which the information is not equal.

The ATC constructs a blockchain management platform for the guarantee letter business, and attracts the relevant parties of the guarantee letter business to join. During the entire process ranging from the initial bidding, to the issuance of the guarantee letter, to the cancellation of the guarantee letter, the key information is generated into blocks and is saved in the blockchain. The originally isolated business process and all business information of the related parties of the Unicom business are stored in the blockchain to ensure that the information is secure, transparent and can't be tampered. With the blockchain technology, information sharing can be realized, information flow can be accelerated, and risks caused by information inequalities can be reduced. The procedures of the related parties of the Unicom business can improve the efficiency of all parties and effectively reduce costs, and thereby can create a whole-new application pattern of the guarantee letter business.

3) Factoring

The ATC platform can realize the sending of seller information or credit limit application information including initial credit limit application or formal credit limit application by an exporter or export factor. The import factor approves the initial credit limit or the formal credit limit and quotes based on the exporter information sent by the export factor. The export factor can initiate an application for credit limit adjustment according to the limit in actual use, and the import factor replies after receiving the application. The exporter or export factor registers or cancels the transfer information of the invoice or credit note, and the import factor sends it to the importer for confirmation after receiving it. The import factor sends the importer's payment or approved payment information to the export factor, and the export factor can also send the indirect payment information to the import factor through the system. If there is any dispute in the trade process, the import and export factor can initiate a dispute or send the dispute notification and resolution information to the other party. The import factor can send the sterilisation information, information about the receivable reverse transfer, factoring commission and other fee information to the export factor. After the import and export factors' business relationship is terminated, the export factor may initiate a negotiation or termination of the factoring agreement. Both import and export factors can send remittances or other freely formatted message information to each other.

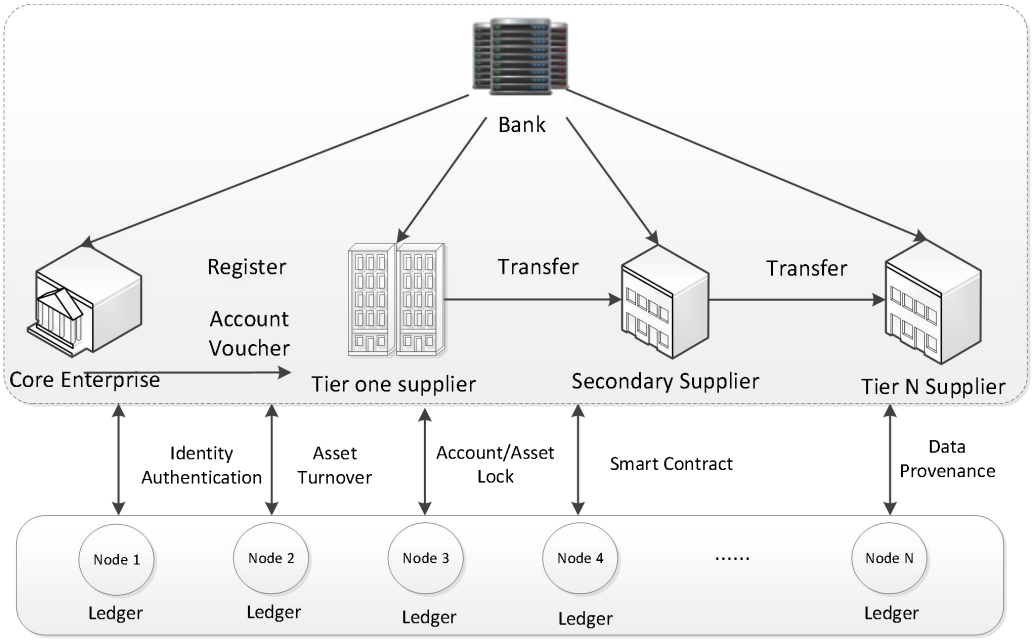
4) Bills

Bills are a kind of value paper that always requires a hidden “third party” role in the transmission to ensure the security of both parties. With the aid of the programmability of the blockchain and data transparency, the balance between the asset end and the liability end of the participants can be effectively controlled, and a more realistic market price index can be formed to better control the market risk. Through the information record and backtracking of the blockchain, it is easy to establish information retrieval and reminders based on keywords or other smart methods, improve the effectiveness of information, and use its openness to allow information to be transmitted to demanders more quickly and to reduce the asymmetry of market information. Since the blockchain does not require a centralized server, the optimization or change of the system does not need to pass through the time span of multiple links. It is a great optimization for the bill system that relies on the system to handle the business, making the decision of the operation simpler, more direct and effective and improving the efficiency of the entire bill market. Based on the use of smart contracts in the blockchain, the programmable features can be used, and the value definition and direction of the flow can be controlled by compiling programs while the bills are flowing. The non-tamperable time stamps formed by the blockchain data connected to each other make the cost of retrieval for the supervision greatly reduced. The completely transparent data management system also provides a reliable tracing pathway. At the same time, for the regulatory rules, the sharing constraint code can also be established through programming in the chain to achieve full coverage and control of the regulatory policies.

3.4.2. **Supply Chain Finance**

Supply chain finance is a financing model in which banks connect core enterprises with upstream and downstream enterprises to provide flexible financial products and services.

The ATC plays two roles in it. The first is the right verification process of core enterprises, including the verification and confirmation of the authenticity and validity of the entire bill. Secondly, it proves the authenticity and validity of the credit certificate circulation, ensures that the credit certificate itself cannot be fraudulent, realizes an open credit system, and thereby solves the problem of credit financing for secondary suppliers.



3.4.3. **Cross-Border E-commerce**

There are many shortcomings in the traditional foreign trade e-commerce model, such as transaction guarantees, high platform fees, inconvenient payment channels, exchange rate changes in China and Africa, inconvenient logistics systems, the authenticity of goods and other problems. The technology of point-to-point data transmission, asymmetric encryption and smart contracts that are part of the blockchain technology can solve the problems in cross-border logistics, cross-border payment and cross-border product quality that are faced by traditional cross-border e-commerce.

The blockchain technology establishes a reliable database through multiple parties, which increases the reliability of information transmission, improves the synergy efficiency of the entire chain, and reduces the commercial cost. In addition, the blockchain technology can build a traceable and identifiable system for product management ranging from production, to warehousing, to distribution, for the logistics industry, providing an application space for cross-border logistics and other secure communication and effective communication in the China-Africa supply chain system.

1) Reduced payment costs

In the traditional cross-border e-commerce field, goods are transferred from the supplier to the buyer through many middlemen. Each transfer requires the use of flat money for settlement. It also involves the exchange rate issue between China and Africa, time costs and the cost related to disputes arising from fraud.

With the confirmation of business smart contracts based on ATC, the settlement process

becomes instant and safe, the commercial supply chain is efficient, and the token cash flow and product flow are synchronized. The buyer and the seller can trade directly, the transaction is based on cryptography but not based on trust so that any agreed parties can directly pay for the transaction without the participation of a third party, saving the cost of the buyer and the seller.

2) Supply chain management and traceability

The blockchain technology can be used as a large-scale collaborative tool to supply chain management. By concatenating suppliers, manufacturers, distributors, and users within the industry, many types of data can be transmitted through blockchains, including insurance, invoices, consignment and shipment, and bills of lading. Therefore it can effectively manage logistics, information flow, and capital flow.

In addition, the advantage of ATC is that it can maintain the authenticity of the goods. When manufactured from a manufacturer, a smart contract creates a true proof for each product. These transparent, non-tamperable proofs can be directly queried with regard to the process ranging from the production to the sales so that buyers can buy the goods without any worries.

3) Transaction transparency

Blockchain can increase the transparency of transactions and thus promote trust. The shared distributed ledger of the blockchain provides security, transparency, and traceability.

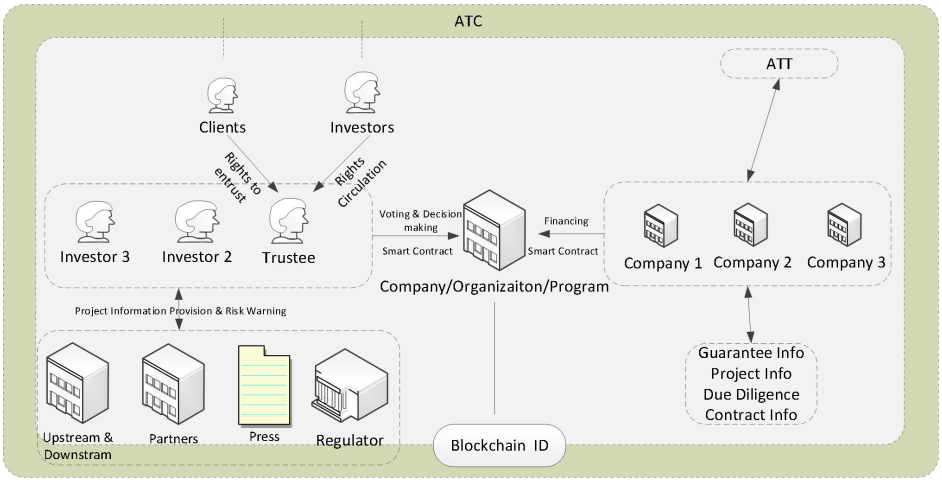
4) Data security and value

Data is quickly becoming the most valuable asset of this era. When users use social media, search engines and shop on e-commerce platforms, a large amount of data can be generated every day. E-commerce platforms based on the blockchain technology do not need to store the personal data and payment data of tens of millions of users, instead, they help consumers establish their own digital identity, let users manage their own data, help consumers win back data sovereignty, reward the aggregation network with points, and enable users' data to be more valuable.

Cross-border e-commerce platforms based on the blockchain technology can help more enterprises to destock, can revitalize corporate capital chain, and can support many small and medium-sized enterprises. At the same time, through consumer value-added methods and data points and rewards, consumers can add value to their points and thereby gain huge profits. In the case of making profits for both parties, consumers are encouraged to purchase small and medium-sized enterprise goods by part of the points earned through the platform so as to jointly support the development of small and medium-sized enterprises and jointly help the development of the Chinese and African economic entities.

3.4.4. Credit Investigation

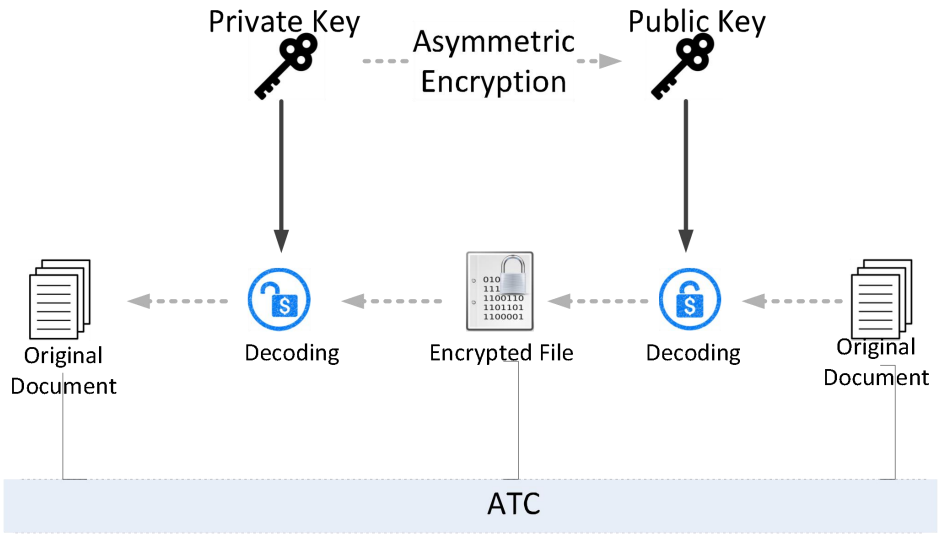
The blockchain technology is used to connect the blacklist business systems of each alliance organization to establish a blacklist certificate platform for the alliance organizations, the blacklist data dispersed among the various credit investigation agencies is integrated to realize data sharing, and a virtuous circle is established to realize system autonomy. The benefits of this solution are low cost, limited changes in the existing system, and low cost in platform deployment. The data is traceable and blacklist data is shared by all agencies. Data are synchronized in a real-time manner, the update efficiency of blacklist data is high, and data availability is high. In addition, the commonality is high, and the system provides a common API service that can interface with various banking and credit investigation agencies.



3.4.5. Electronic Deposit Certificate

Electronic evidence refers to evidence information stored in digital form. For example, electronic contracts, electronic invoices, electronic articles, emails, etc. Blockchain has its own non-tamperable and traceable characteristics, which is very suitable for combination with electronic deposit certificates. Therefore, deposit certificates are one of the typical scenarios of the blockchain application.

The blockchain technology has two main application advantages in the field of electronic evidence: secured deposit certificates and improved evidence collection efficiency. The traditional electronic evidence is stored in its own server or cloud server. Files are easily damaged during backup, transmission and other processes, resulting in incomplete or corrupt evidence. In addition, except the electronic contracts with electronic signatures that are non-tamperable, other forms of data and evidence are subject to attacks and tampering in the process of being transmitted to the cloud server, and thereby the credibility of electronic evidence is reduced.



The use of the blockchain technology to store electronic evidence can effectively solve the security problems faced by traditional deposit certificates. When the electronic evidence is generated, a time stamp is given. When the electronic evidence storage is fixed, the data integrity can be verified by comparing the hash value. In the transmission process, an asymmetric encryption technique is used to encrypt the electronic evidence to ensure the transmission security and to fully guarantee the authenticity and safety of the evidence.

3.5. ATC Applied Ecology

ATC actively responds to the national call of “the Belt and Road”. It is committed to opening up trade and financing links between China and other overseas companies, providing a better service platform for countries along the Belt and Road and empowering the real economy. Users who want to invest in various projects of “the Belt and Road” in ATC can use the token ATT of the Africa Trading Chain to make payments. ATT represents the holder's investment right in “the Belt and Road” project. In the future, both business users and individual users need to hold ATT to participate in the project investment of “the Belt and Road”.

Every investment of the user will be recorded on the chain, and the core data will be saved through the smart contract. At the same time, fund raising, investment, dividends, fee calculation etc will be implemented automatically. All the behaviors are recorded in the chain to assure openness and transparency.

In addition, part of the income from invested project and corporate will be used to repurchase the ATT token and will be destroyed. Moreover, long-term holders of ATT tokens will receive regular dividends from various projects.

The following are some of the activated projects in the current ATC ecosystem:

3.5.1. Mbalam & Nabeba Iron Ore Project

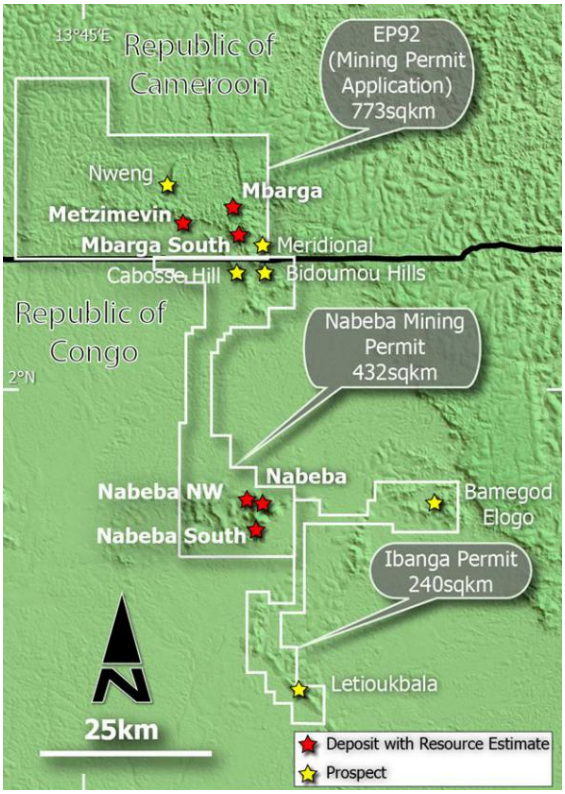
1) Background Introduction

This project is leaded by Sundance Resources LTD, which mainly includes Mbalam & Nabeba mining and transportation equipment and related infrastructure (rail & port). At least 40 million tons of iron will be produced annually from the two ores, which will last for more than 30 years, in two stages：

Stage 1: High grade hematite (DSO), which can last for more than 13 years.

Stage 2: After mining, the grade reaches 66% to 68%, which can last for more than 20 years.

The project will also build a new railway from Congo to Cameroon and a bulk transport terminal in Cameroon.



High quality iron ore is equivalent to the best ore in Pilbara and is the best iron ore outside Australia. According to the report of AXS on May 2015 , There are total 517 million tons of high-grade hematite in the mine, with a content of 62.2% and low impurity content. The average grade level in the first 10 years was 63.1%, and the resources of high-grade hematite reached 805.7 million tons, with a grade of 57.3%.

Cameroon's GDP in 2016 was 32.217 billion US dollars. After this project is completed and go into operation, it can bring in sales revenue of 2.76 billion US dollars, almost accounting for 8.6% of its annual GDP. At the same time, mining, rail transportation and port operations will provide local residents with a large number of employment opportunities and bring a rapid development of related industries.

On the other hand, the potential reserves of high-quality iron ore in the project reaches 5 billion tons, which will provide a powerful guarantee for the import of raw materials in Chinese steel manufacturing industry.

2) Project Progress

SUNDANCE entered Cameroon in 2008 and entered Congo in 2009. During this period, it invested 400 million US dollars in developing projects to make today's achievements. Through

years of operation, it developed and established a very strong database of geology, engineering, technology and environment, and has also established a strong social network in both countries.

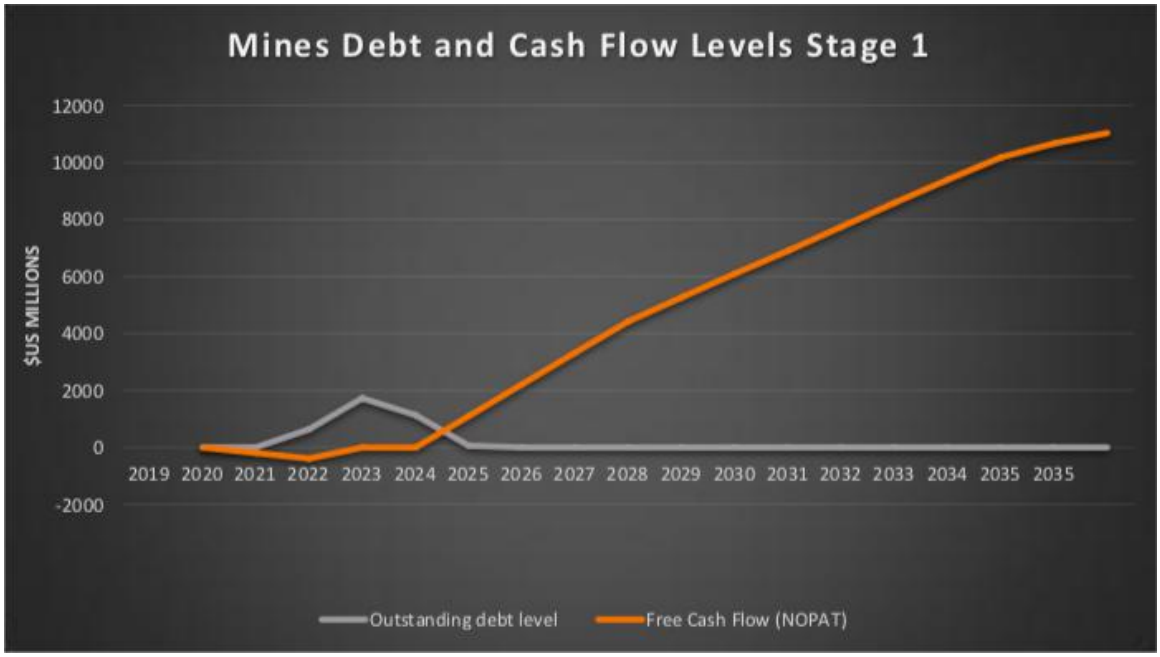
This project has passed all the necessary approvals, and the fiscal system merger treaty between Cameroon and Congo has been passed (tax exemption, tax rate, royalties, etc.). Congo issued a paper of 25-year mine development permit and has signed a transfer agreement with the Cameroonian government to transfer rail and port ownership and capital and construction obligations to the Cameroonian government; once the funds are in place, the project construction can be in progress.

	吨位 (Mt)	Fe (%)	SiO_2 (%)	Al_2O_3 (%)	P (%)	LOI (%)
Reserves						
Probable	**517**	**62.2**	**4.46**	**2.80**	**0.09**	**3.3**
Resources						
Indicated	776.8	57.3	8.9	4.4	0.10	3.9
Inferred	28.8	56.6	16.4	2.9	0.08	1.3
共计	**805.7**	**57.3**	**9.2**	**4.3**	**0.10**	**3.8**

3) Investment Estimation and Return

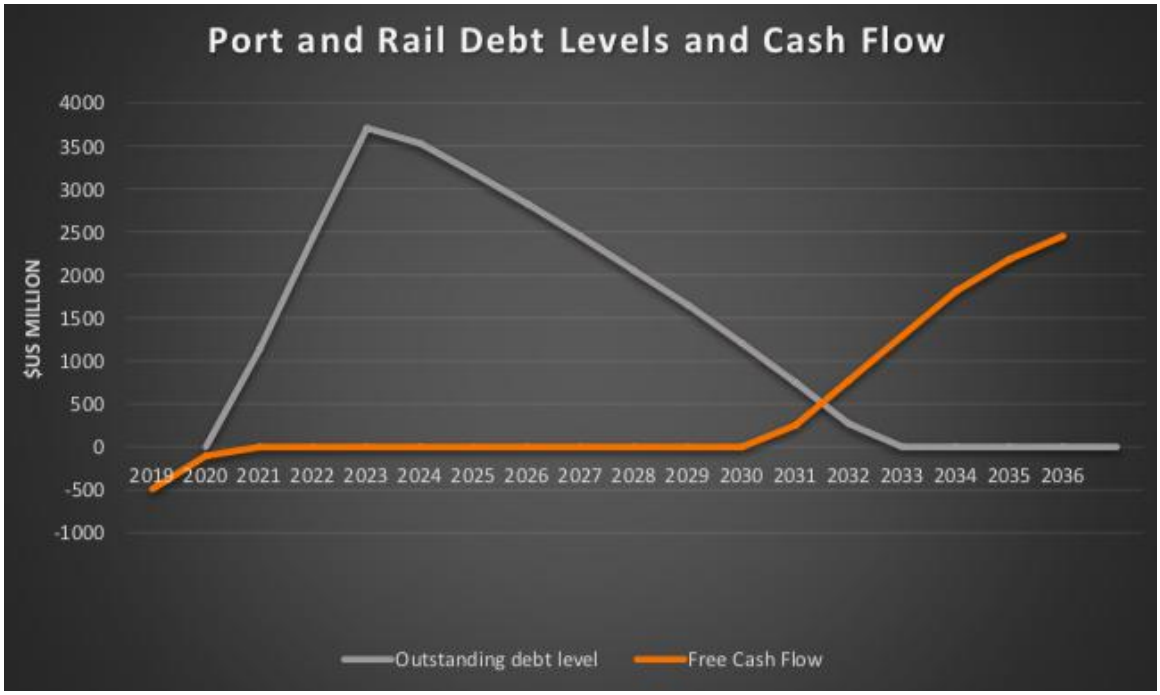
Mine investment:

The project has a estimated net present value of $2.572 billion and an internal rate of return of 38%.



Port and railway investment:

Estimated payback period is ten years



3.5.2. **The polymetallic deposit project of lithium, tin and tantalum in Zimbabwe**

1) Background Introduction

The new Zimbabwean government plans to make the country to be the fifth largest exporter of “white oil” lithium ore products in the world. The lithium ore resource in the Tin-lithium-tantalum deposit is the reserve ore of the Zimbabwe government and is regarded as the national treasury. The mine was once used as the mining of tin ore . It started in 1936 and was shut down in June 1994. It has a mining history of 58 years and has been produced by companies such as the United Kingdom, the Netherlands and Germany. After 1994, it was stagnant due to the international overall decline in tin prices, and was subsequently withdrawed by the Zimbabwe government. In 2015, it signed a joint venture with the state-owned company of Zimbabwe government and won the bid in a series of bidding competitions. The joint venture company holds the right of a permanent mining license (mining lease) right for the large mineral resources including the lithium mine resource.

The deposit is located in the western part of Zimbabwe, about 290 km from Bulawayo and about 750 km from the capital Harare (highway). It is connected to the main national highway and is about 40 km from the railway transfer station. The railway can directly reach the Beira port in Mozambique. It is less than 200 kilometers away from the Victoria Airport, having a

convenient transportation.

The resources are divided into two parts, one part is historical tailings, the other part is unmined ore.

Historical tailings: According to historical production conditions and sampling analysis of the tailings, the current tailings resources are about 23.892 million tons, the average lithium oxide grade is 0.74%, tin is 0.043%, cerium oxide is 15 g/ton, and cerium oxide is 0.045%. It contains about 176,800 tons of lithium oxide, 10,273 tons of tin, 358 tons of antimony oxide and 10,751 tons of antimony oxide, which is equivalent to a large open-pit mining of lithium polymetallic mine. This part will be the first mining resource of this project. According to the report of 2017, a systematic survey of lithium resources in tailings was conducted, and three-dimensional modeling was performed to estimate the amount of resources. The tailings resource is about 23.892 million tons, and the average lithium oxide grade is 0.74%. After a study on concentration test, the lithium concentrate grade can reach 5.46% and the recovery rate is 75%.

Unmined ore: According to a brigade of the Sichuan Metallurgical Geological Exploration Bureau, there are 41.183 million tons of ore in the current mine, including 56286 tons of tin with an average grade of 0.137%, 5061 tons of tantalum (Ta2O5) with an average grade of 0.0123%, 9145 tons of tantalum-niobium(Ta2O5 +Nb2O5) with an average grade of 0.0222%; 341824 tons of lithium (Li2O) with an average grade 0.83%; 37065 tons of bismuth (BeO) with an average grade 0.09%; 86,489 tons of bismuth (Rb2O) with an average grade 0.21%. It belongs to a very large class mine.

Resource prospects: In addition to the above-mentioned proven resources, there are a large number of target areas for exploration within the mining rights to further increase reserves. The exploration prospect is huge, which can be defined as lithium-tin-tantalum super large polymetallic ore.

2) Investment Estimation and Return

The first phase of construction: focused on mining historical tailings resources, the annual processing capacity of the flotation plant is 3 million tons (with simple Gravity separation plant): the estimated investment amount is about 10 million US dollars, the construction period is 8-10 months; the tailings resources can be produced for 8 years.

The products contains 150,000 tons of lithium concentrate (lithium oxide grade 5.5%) 200 tons of antimony concentrate (grade 20%), and 1000 tons of tin concentrate(grade 50%).

The cost of raw ore processing and mining is about US$10/ton, which is equivalent to the production cost of US$170/ton;

The transportation cost from the mining area to the Wanji Railway Station is USD 10/ton.

The transportation and storage cost from Wanji Railway Station to the port of Mozambique is USD 100/ton, and the shipping cost from the Maputo port in Mozambique to Chinese sea is USD 25/ton. The total cost of the product landing is USD 305. /Ton.

The onshore sales price is about 670 US dollars / ton.

The profit is 365 US dollars / ton, and the income tax is 25%. The RMB exchange rate against the US dollar is 7.5. The annual output value is about 120 million US dollars. The total annual profit is 55 million US dollars, and the annual net profit is about 40 million US dollars.

Benefit calculation table (10,000 tons per day, 3 million tons per year)

Work	item	unit	spodumene	tantalum	tin	Total
Raw ore	daily processing quantity	ton	10000	10000	10000	10000
	Grade	%	0.69	0.003	0.042	
	Metal quantity	ton	69	0.3	4.2	
Concentrate	Concentrate quantity	ton	627.27	0.6	3.36	
	Grade	%	5.5	20	50	
	Metal quantity	ton	34.5	0.12	1.68	
	Yield	%	6.27	0.01	0.03	
Recovery rate		%	50	40	40	
Benefit	Tax-free unit price	yuan / ton	5000	200000	100000	
	Total output value	10,000 yuan	313.64	12	33.6	325.64
	Unit ore output value	yuan / ton	313.64	12	33.6	325.64
	Unit production cost	yuan / ton				60
	Unit Value of Raw Mine	yuan / ton				265.64
Unit profit of raw ore		yuan / ton				265.64
Total Profit		10,000 yuan				265.64

The Second Phase of Construction: Mine and Heavy Floating Combined Concentration Plant. :

In the production stage of the first phase, the exploration of mining resources will be further carried out to increase the quantity and level of resources. We will consider starting construction after the first stage is put into operation for five years. We will mainly start

open-pit mining and then carry out underground mining of lithium-tin-tantalum ore and build gravity Concentration+ flotation plant with a mining scale of 2 million tons per year. The products are lithium concentrate, tin concentrate and tantalum concentrate, with an estimated investment of US$100 million and an annual benefit of not less than US$30 million. Mountains can be mined for more than 20 years.

The Third Phase of Construction: Lithium Carbonate Plant

After the second phase of production, the production line of lithium carbonate is studied and constructed in combination with market price and construction conditions. It is planned to start construction of lithium carbonate plant after three years of production: annual production of lithium carbonate is about 33,000 tons. It is expected to invest US$100 million with an annual benefit of no less than US$33 million.

With the vigorous development of the new energy automobile industry, lithium, which is an indispensable core material for new energy batteries, is becoming more and more important. The demand for lithium carbonate will increase by 1-3 times in the next few years. Especially in the Chinese market, the demand for lithium carbonate is getting bigger and bigger.

China is the world's largest consumer of lithium, and consumption in countries such as Japan and South Korea is also growing year by year.

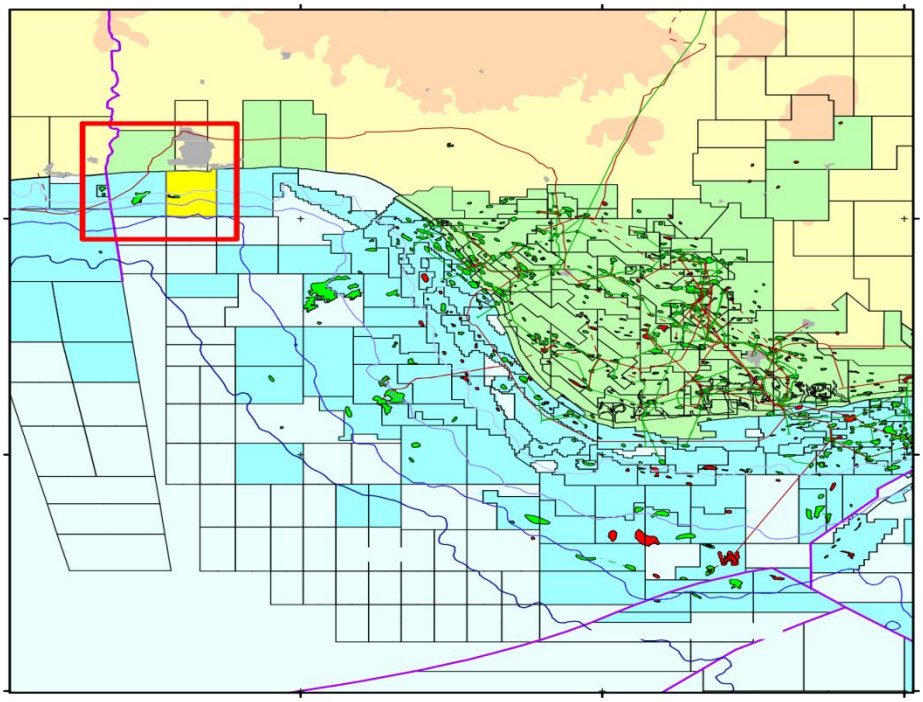
In 2017, China's imports of lithium carbonate increased by 40.7% and exports of lithium hydroxide increased by 97.1%. China imports spodumene concentrate 940,000 tons and lithium ore 183,000 tons; and exports lithium hydroxide, metal lithium, lithium ion cathode materials and lithium batteries etc.

The world's major lithium producers include China, Chile, Argentina, the United States, Australia, Russia and so on. In 2017, world lithium and its derivatives yielded about 2354 lithium carbonate equivalent (190,000 tons in 2016).

3.5.3. PROJECT OASIS OPL 310 Investment Opportunity

1) Background Introduction

- OPL 310 block is 1,850 km2 in water depth of 10-200m
- Location: Offshore, Dahomey Basin, Lagos
- Ogo Discovery: Ogo-1 well drilled
- 1,657km2 of 3D seismic & 2,000km2 2D seismic
- 2C Oil Reserves: 700 mmbbls
- Prospective Resources: 8453 mmbbls
- Gas Reserves: 2.0 TCF



Optimum Petroleum is the operator with 82.86% interest. Following years of delays due to issues of its partner, Optimum Petroleum Development Limited, the Operator of OPL 310 in Nigeria, is re-asserting itself by directly raising capital for the rapid appraisal drilling and early production of the field and conversation to an OML. Medium term plans for farm-out are also being initiated. Significant external capital will be required to unlock the latent value within OPL 310. However, the early stage nature of OPL 310 means that traditional debt financing may be an unsuitable or unavailable source of capital for the early drilling stage albeit the logical lowest cost of funding for development longer- term. Current market sentiment suggests equity capital may be available but strict clarification on participating ownership with no legal challenges would be required. Hence, it is likely a combination and number of non-traditional financing options will have to be employed by Optimum to fund this appraisal drilling stage of its growth.

OPL 310 is highly prospective and on trend with the Aje and Seme fields located in the adjacent Oil Mining Lease OML 113 and in offshore Benin respectively. OPL 310 boasts of a

number of prospects with potential for oil and gas accumulations.

The three play types identified on the block include: AJE-look-alike closed structure over basement highs; SUBCROP-stratigraphic on lap and truncation traps; and FANS-deep-water submarine fans. The (Ogo) structure in OPL310 is exactly analogous to Aje field (currently producing), and on trend 25 km to the east. OPL 310 has total potential recoverable reserves estimated at more than 2.2 billion barrels of oil and over 2.2 TCF of gas, which could be used in the new regional gas market. Ogo 1 and 2 were drilled in 2013.

Well Name	Spudded	TMD(m)	Result	Discovery Field	Comment
Type	Completed	WD(m)			
Ogo-1	23 Apr 2013	3,205 *	Oil & Gas	Ogo	The well encountered 160 metres of light oil accumulation, with 65 metres of net pay.
Exploration	25 Jun 2013	90			
Ogo-1ST	01 Oct 2013	5,482	Oil		
Appraisal	19 Nov 2013	90			

2) Key Investment Highlights

- **World-class and low-cost production assets** with predictable cash flows
- **Attractive fiscal terms** allows for return optimization and risk mitigation (cost-recovery mechanism)
- **Strong growth pipeline** through development of existing discoveries and other exploration targets within existing assets
- **Deep knowledge of African O&G** landscape and opportunities for inorganic growth
- **Strong relationships** with operators, local partners, governments and regulatory bodies
-

3.5.4. WEST AFRICAN POLARIS INVESTMENTS LIMITED

1) Background Introduction

West African Polaris Investments Ltd (WAPIL) has commissioned Geoprobe Ltd to undertake geological investigations within a prospect situated about 13.5 km northwest of Ejiba town, Yagba West LGA, Kogi State, Nigeria covered by exploration license No. 12694EL. The

exploration license has an area of 63.51 km2 (Cadastral Units).

The area is within the Isanlu schist belt of southwestern Nigeria. It comprises a complex mixture of mica schists, amphibolites and banded iron formation partly masked by superficially developed ferricrete. Within these rocks are a series of northeast trending quartz and quartz-feldspar-muscovite (pegmatite) veins which carry gold-tantalum mineralization along the 1.2 km long intermittent strike length. Rock chip sampling of vein quartz, in-situ or in form of float or mine waste, from current artisanal workings shows gold enrichment of up to 36 g/t, averaging 8.5 g/t over about 400m strike length. This has given a resource base of 67,000 oz of gold inferred down to 30m depth, exploitable by open pit and shallow underground mining. Gold extraction will be by gravity separation and cyanide leaching where necessary.

A Pre-feasibility evaluation has established a viable gold mining project at a rate of 40t/hr ore processing yielding 21,120 oz/year over 3 years. The mining project will require a capital investment (capex) of about USD 2.02 million (₦ 323.4 million) and an annual operating expenditure (opex) of ₦ 162 million. This will generate a projected positive net cash flow and Payback Period in the third year of operation.

Banka drilling of surficial eluvial-alluvial (placer) deposits, on the other hand, revealed very low grade gold enrichment with an average value of 0.02 g/t, despite the significant visibility of gold grains in panned concentrates. However this is largely attributed to severe 'nugget' effect of gold distribution in the mineralization and will require special sampling approach. This is not, at the moment, considered a resource for mining. The distribution of gold grades in the Banka drilling samples, however, has shown relatively higher values clustering in zones that are easily correlated with the main artisanal vein workings.

Two gold targets have been identified in the exploration license 12694EL that can support a mining project and offer additional potential for further exploration and development. The license area also hosts zones of banded iron formation which is a potential iron ore resource

worthy of further investigation.

It is, therefore, recommended that further work be carried out to better define the gold mineralization and evaluate its full economic potential and that of the banded iron formation. This should involve geophysical survey, trenching, proof of concept drilling, bulk sampling and metallurgical testing of the ores.

2) ECONOMIC EVALUATION AND FINANCIAL ANALYSIS

The fundamental aim of an evaluation is to determine whether or not the mining project is worthwhile in financial terms. The project is examined and compared with pre-determined standards. Those projects reaching or exceeding the standard are considered financially worthwhile. However, the analysis and evaluation presented here are by no means exhaustive and can only serve as a guide as other issues may also be taken into consideration in implementing the mining and extraction plans. There are many financial evaluation techniques for planned mining projects such as the following:

Payback period Return on capital employed Discounted cash-flow (net present value, NPV internal rate of return, IRR)

The first two methods are traditional approaches, and are widely used despite their disadvantages, although the current trend is towards one of the discounted cash-flow variants. This is due to the recently developed computer-based packages which remove much of the long calculations associated with these methods. The following parameters and assumptions will be used in the financial evaluation.

Revenue Profile

Table below shows the projected mine production and accompanying revenue expected from the extracted gold in the project area.

	Day	Week	Month	Year	Remarks
Ore processing (tonnes)	320	1,600	6,400	76,800	@ 40t/hr
Gold Production (oz)	88	440	1,760	21,120	@ 8.5g/t Au
Gold Revenue (US$)	105,600	528,000	2,112,000	25,344,000	@ 1,200 US$/oz
Gold revenue (₦)	16,896,000	84,480,000	337,920,000	4,055,040,000	@ ₦160 = 1US$
MINE LIFE @ 40t/hr (21,120 oz/yr) = 3 YEARS RESOURCE BASE = 67,000 oz Au					

Gold Price/Market

The current gold price in the world market is about US$ 1,300 per ounce (oz). However, US$ 1,200/oz is used for cash flow analysis of the proposed tin mining project. Gold has witnessed a phenomenal increase in price since 2009 (Table Below) when it sold above US$ 1,000/oz. All indicators point to steady and even increase in gold price in the coming years.

Year	USD	EUR	GBP
1999	290.2	289.6	180.1
2000	274.5	292.3	183.7
2001	276.5	310.5	189.9
2002	347.2	330.9	215.7
2003	416.3	330.0	232.5
2004	435.6	320.5	226.9
2005	513	434.9	298.8
2006	632	479.3	322.9
2007	833.8	570.3	418.8
2008	869.8	625.7	604.9
2009	1087.5	757.9	673.4
2010	1405.5	1047.7	897.7
2011	1531	1179.4	985.1
2012	1657.5	1257.2	1019.7
2013	1316.7	974.6	819

Capital Costs

The capital costs for the proposed gold mining and processing in the Prospect have been estimated in Table 6. The capital costs are the costs of plant and machinery for mining and processing of the gold ore and costs of infrastructure and other amenities (e.g., water reservoir/supply, electric power, roads, dressing mill, buildings etc).

ITEM	QUANTITY	UNIT PRICE (Million ₦)	TOTAL PRICE (Million ₦)
Excavator	1	25	25
Front-end Loader	1	12	12
Dump Truck	2	8	16
Modular Gravity Separation Plant with crushing and grinding unit	1	56 (eqv. US$ 350,000)	56
4x4 Pickup vehicle	2	5	10
Electric Generator	1	5	5
Drilling/Blasting Gear/Explosives	-	10	10
Shaft construction	2	15	30
Water Reservoir	1	5	5
Land compensation and CSR	-	-	50
Staff Housing, Offices, Warehouse and Other facilities	-	-	50
Roads, Pipeline, Power line etc	-	-	10
Additional Exploration	-	-	15
	Contingency @ 10% of total		29.4
	TOTAL		**323.4 (eqv, US$ 2.02 Million)**

Operating Costs

The major operating cost item is the fuel needed for the different machinery to be used in the project. There is no electricity to be used in the area, all equipment will be run by fuel, directly or indirectly. It is estimated that about 500 litres of fuel will be required every working day and ₦150/litre rate is used. This gives a total of about 120,000 litres per year or ₦ 18 million per year (i.e., ₦ 1,500,000/month). Maintenance cost of ₦ 12.0 million (i.e., ₦ 1,000,000/month) is added to the operating costs. The sum of ₦1,500,000/month (i.e., ₦ 18,000,000/year should be set aside for other consumables (explosives, chemicals, medicines etc). This brings the total operating costs to ₦ 48 million per year.

Overhead Costs

This cost covers all the labor costs of managers, engineers, skilled and unskilled workers. This is estimated to ₦ 114.0 million/year

Royalty

The Federal government of Nigeria charges a royalty of 3% on the production and export of gold.

Cash Flows

Cash flow measures the change in cash "level" of a project over a particular period. Table below shows the projected cash flow calculations for the first four years of gold production from the initial resource base determined in the Prospect.

Year	0	1	2	3
Gold Production *(oz)*	-	21,120	21,120	21,120
Gold Price/oz (USD)	1,200	1,200	1,300	1,400
CASH IN (+ve) Revenue (₦)	-	4,055,040,000	4,392,960,000	4,730,880,000
CASH OUT (-ve) (₦)				
Operating costs	-	48,000,000	52,800,000	58,080,000
Overhead costs	9,500,000	114,000,000	125,400,000	137,940,000
Capital costs	323,400,000	-	-	-
Royalty (₦)	-	121,651,200	131,788,800	141,926,400
TOTAL CASH OUT (₦)	332,900,000	283,651,200	309,988,800	337,946,400
NET CASH FLOW (₦)	(332,900,000)	(49,248,800)	260,740,000	598,686,400

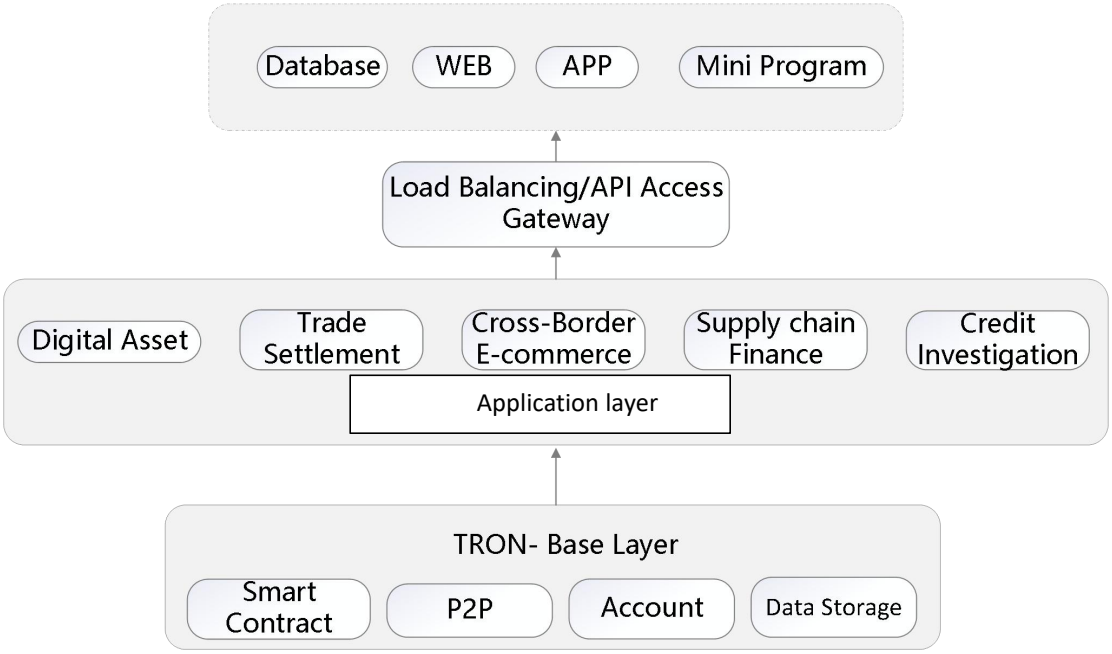
Payback Period

As its title suggests, this technique simply determines the time taken for the initial capital invested in the project (a negative cash flow) to be recovered by the stream of annual positive cash flows, these being the annual surplus over revenue expenditures after deduction of taxes. It will be noted that this method utilizes cash flows and not profits, therefore there is necessity to estimate depreciation rates. The net cash flow is the difference between the total cash-in and the total cash-out. Cumulative cash flows can be used to determine the payback period. It can be shown from Table 8 that the payback period for the proposed gold mining project is 3 years, corresponding to the life of the mine if no additional exploration and development are done to increase the gold resource.

Time (Years)	0	1	2	3
NET CASH FLOW	(332,900,000)	(49,248,800)	260,740,000	598,686,400
CUMULATIVE CASH FLOW	(332,900,000)	(382,148,800)	(121,408,800)	477,277,600

4. Technology framework of ATC

The technical framework of ATC mainly focuses on the direction of digital assets and cross-border transactions, and how to store, transfer, invoke and motivate digital assets on the chain, as well as all the protocols designed for it.



4.1. Smart contract management

4.1.1. The type of contract

The contract part of enterprise service chain includes two types: "standard contract" and "custom contract".

Standard contracts include common services used by the enterprise in the context of standards, such as data storage, invocation, modification, update, and so on. Standard contracts, which are built into the chain and can be directly invoked, can implement relatively simple logic such as checking the consistency of medical data assets, automatic deal matching and automatic liquidation upon expiration.

Customized contracts can include the transactions between enterprises in the chain, promote the development of more business logic in ecology, and create more specific and more adaptable customized contracts around the business logic and business logic of the enterprises. Because of the data security and concealment requirements on the link of the ATC, the custom contract must be carried out under strict supervision.

4.1.2. Contract operation

Smart contract includes four parts: contract registration, triggering, execution and cancellation:

Registration: users will write good smart contract, through security management, into the process of enterprise-level service chain, the future enterprise-level service chain will support multiple languages to write smart contract.

Triggering: the process of triggering contract execution through external conditions after contract registration, supporting timing, event, transaction, and other contract triggers.

Execution: the complete process by which the contract code runs in a separate environment, including the construction of a mirror environment for the contract, the execution of the code, the consensus to perform state changes in the code, and the consensus exception handling.

Cancellation: the contract that has been executed, expired or cancelled, or the business requirement is changed and no longer needs to be transferred for storage. The process of clearing can only be completed after the consensus of multiple nodes.

4.1.3. Contract Gas

The maximum energy limit for deploying and triggering smart contracts is a function variable that USES TRX as a gas consumption token:

- The dynamic energy of frozen 1 TRX is 50,000,000,000
- The gas limit is the daily gas limit that freezes TRX's account
- The cost of TRX limits in the set of the smart contract deployment/trigger call. TRX left in the account 。if will be bought directly, the energy of every TRX（10 SUN = 1 Energy）= 100,000， SR will be motivated.

There are two consumption scenarios that calculate the maximum energy limit trigger for deployment.

The logic can be expressed as follows：

```
const R = Dynamic Energy Limit
const F = Daily account energy from freezing TRX
const E = Remaining daily account energy from freezing TRX
const L = Fee limit in TRX set in deploy/trigger call
const T = Remaining usable TRX in account
26
const C = Energy per TRX if purchased directly
// Calculate M, defined as maximum energy limit for deployment/trigger of
```

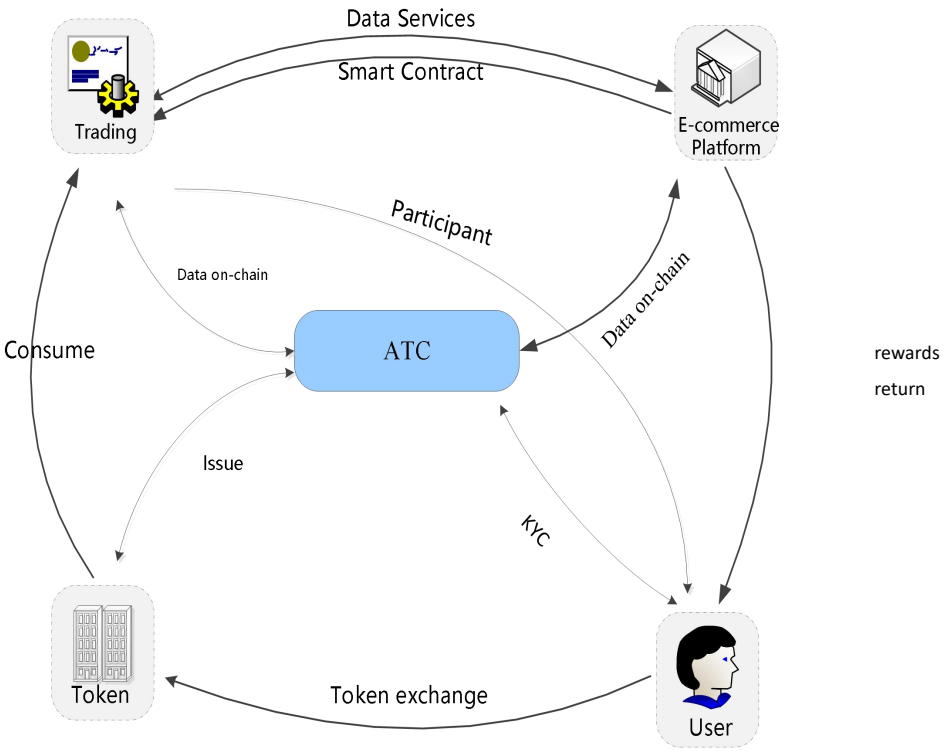
```
        smart contract
        if F > L*R
        let M = min(E+T*C, L*R)
        else
let M = E+T*C
```

4.2. Token circulation system

ATC aims to build an autonomous blockchain cross-border trade ecology, introduce reasonable incentive mechanism, and return the value to the participating contributors of "The Belt and Road".

The vision of ATC is to break the business model of traditional trade with blockchain technology, enable traditional trade and real economy with blockchain, respond to the call of national "The Belt and Road" policy, and complete the business closed loop of the whole trade through incentive mechanism.

We know that all transactions users participate in can be paid with ATT and users will be encouraged by the platform and rewarded with points. Points also play the role of tokens in transactions, which promotes users' secondary consumption and thus completes the business closed loop of the entire trading system.



4.3. Cross and side chains

Cross-chain technology serves multiple public chain ecology, and gets through the obstacle of value transmission between chains. In essence, it realizes the exchange of currency assets on two chains. For ATC -- a decentralized asset management platform, we need to realize the decentralization of asset management, the de-trust of investors and the de-trust of asset security. Intelligent contracts based on cross-chain technology can better help us build ATC.

1) mainstream cross-chain technology

- notary mechanism
- aim Haxi
- side chain/relay
- distributed private key control

2) the cross-chain principle of ATC

- between chain and chain transfer of assets is free, can from a chain transfer to another chain, and also can turn back;
- between assets transfer, cannot have the third party to interfere;
- trading across the chain need to satisfy the atomicity, either happen or not happen, can't create out of thin air loss and assets;
- across the stability of the chain agreement, which requires a chain external attack can not affect the other chain assets security.

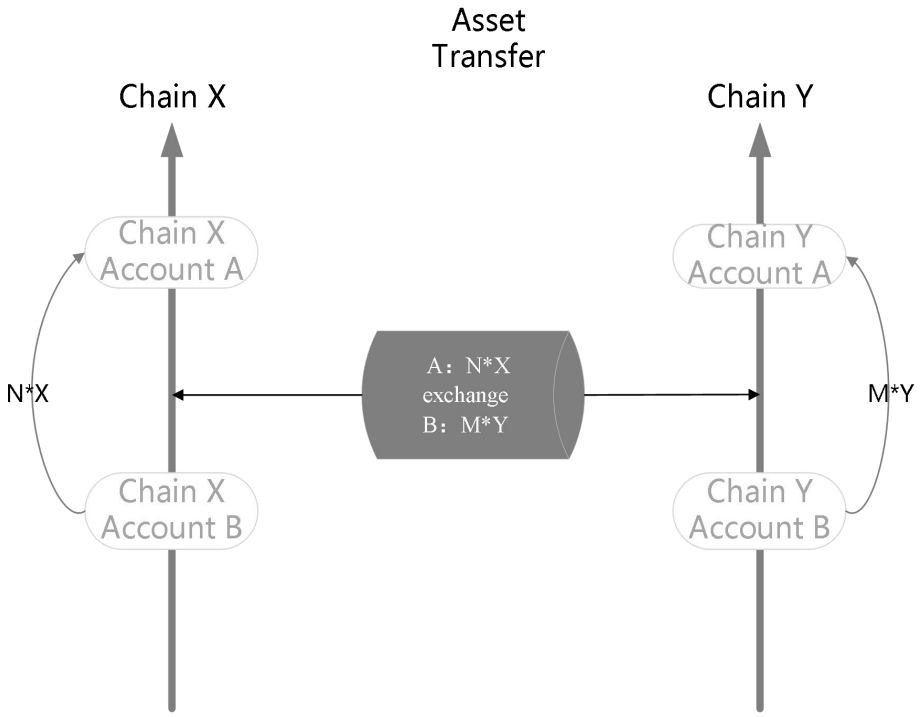
3) Representation across chains

There are two main forms of cross - chain: inter - chain asset transfer and inter - chain asset swap.

Asset transfer between chains: the exchange of assets on two chains without increasing or changing the total value of assets on two chains.

Asset swaps on the chain are similar to bitcoin exchanges on a centralized exchange, but the process takes place on the chain.

If A and B want to exchange digital assets, but do not want to do it in A centralized exchange, A only needs to transfer the assets on the X chain to the address of the X chain of B, while B needs to transfer the equivalent assets on the Y chain to the address of A.

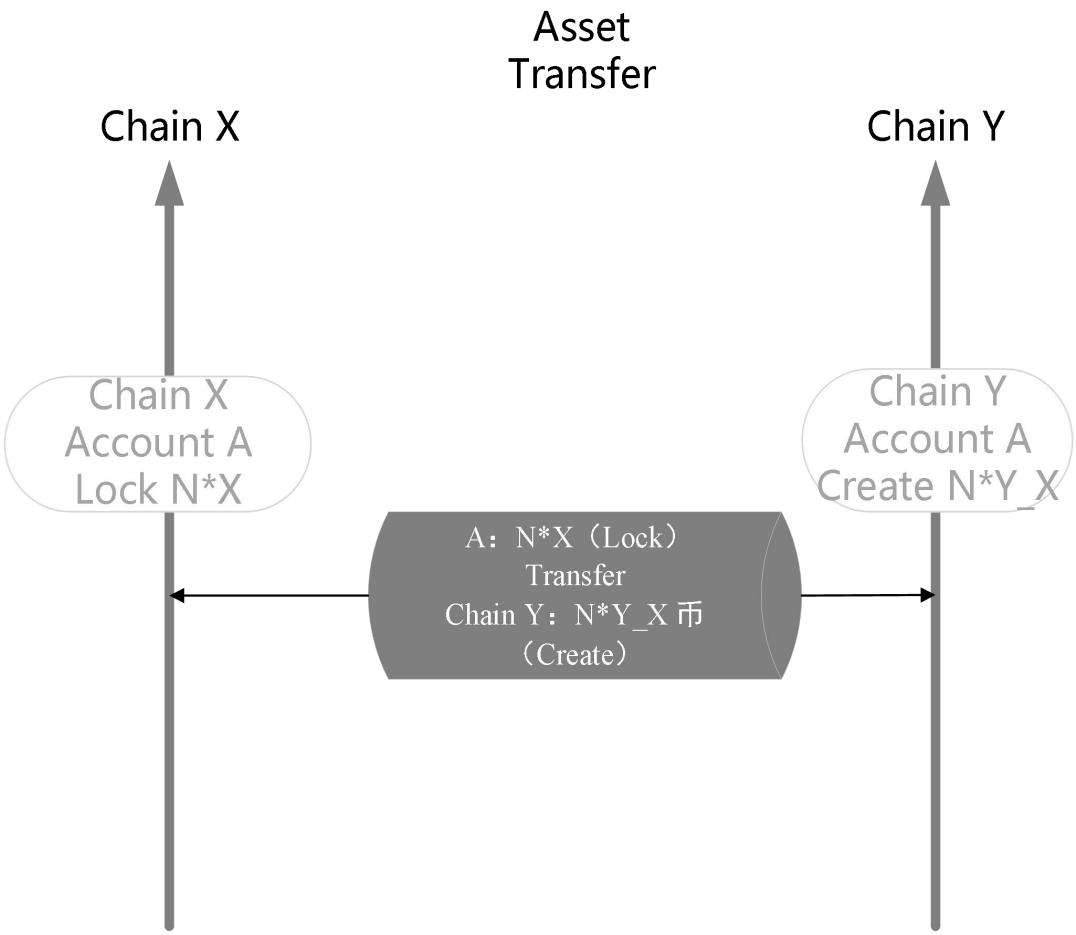


Interlinked asset swaps: unlike interlinked asset swaps, interlinked asset transfers actually change the number of assets on the chain.

It's the transfer of an asset from one chain to another, like a digital asset from X to Y, it's the transfer of an x-linked asset to a specific address where the currency is locked.

In the Y chain, the transfer of assets is realized by sending the generated COINS from a specific address that was previously locked due to the activation of some protocols to an address that can be used flexibly.

The transfer of assets between chains can be unidirectional or bidirectional.



4.4. Multi-party negotiation mechanism

In the communication network, in order to ensure the security of data transmission, the identities of both sides of communication can be authenticated and the data of communication can be encrypted.

For open networks, asymmetric encryption is generally used.

Asymmetric encryption technology is the underlying technology to ensure the security of blockchain data.

In asymmetric encryption technology, public key and private key are included.

The following is a simple three-party negotiation agreement. The specific process is as follows:

1) A，B，C To know the public key of each participant, g^a , g^b , g^c .

2) A Pick a random number x，calculate g^{xb} , g^{xc} sent to B and C respectively.

3) B Pick a random number y，calculate g^{ya} , g^{yc} sent to A and C respectively.

4) C Pick a random number z, calculate g^{za}, g^{zb} sent to A and B respectively.

5) A, B, C After receiving messages from other participants, the session keys are calculated separately $K_A = e(g^{yaa^{-1}}, g^{zaa^{-1}})^x = e(g,g)^{xyz}$,

$K_B = e(g^{xbb^{-1}}, g^{zbb^{-1}})^y = e(g,g)^{xyz}$,

$K_C = e(g^{xcc^{-1}}, g^{ycc^{-1}})^z = e(g,g)^{xyz}$ apparently, session key

$K_{ABC} = K_A = K_B = K_C = e(g,g)^{xyz}$。

Because the ATC involves many subjects, including overseas users, suppliers, trading subjects, Banks, regulatory departments, etc., the tripartite negotiation protocol may not be able to meet all the application scenarios of ATC. Therefore, it is necessary to extend the tripartite key negotiation mechanism to the multi-party key negotiation mechanism.

The following is the specific process of the multi-party key negotiation mechanism applied to the ATC.

Let the sum be a multiplication cycle group with two orders of prime q, and let g be the generator of;

Represents user signature;

Represents the user's public key encryption algorithm;

H is a Hash function.

1) The user USES the random number generator to generate a random number as the private key of his choice and saves it. The message sent to other users is calculated and, where.

This is equivalent to the user sending the public key of his choice to each user in the system, which is invisible to the unauthorized user, and one of them should be written to the blockchain ledger.

2) U_i After receiving the message sent in the previous round, verify the signature first and then decrypt it to get each user's g^{s_i}, then choose a random r_i calculate $Z_i = g^{r_i s_{i-1}}$, $M_i = g^{r_i s_{i-2}}$ make $sig_i(H(m_i'))$ and $H(Z_i)$, $sig_i(H(m_i''))$ and $H(M_i)$, $m_i' = E_{PK_{i-1}}(Z_i)$, $m_i'' = E_{PK_{i-2}}(M_i)$ send them to users U_{i-1}, U_{i-2}。This is in addition to the transaction records to be written into the blockchain ledger, $H(Z_i)$, $H(M_i)$ will also be written in the ledger.

3) the user U_i get the number from the second method. $Z_{i+1} = g^{r_{i+1} s_i}$,

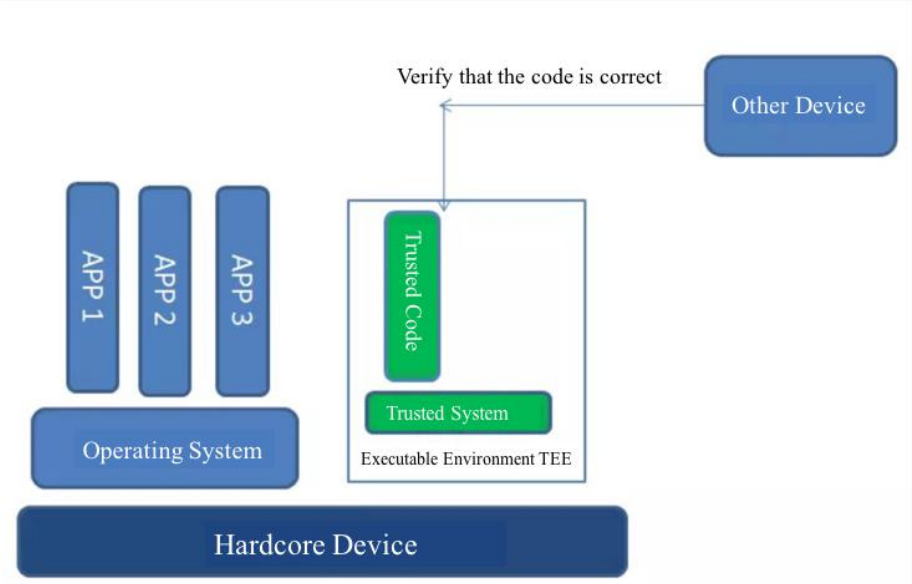
$M_{i+2} = g^{r_{i+2}s_i}$, calculate theirs shares $k_i = e(g^{r_{i+1}s_i s_i^{-1}}, g^{r_{i+2}s_i s_i^{-1}}) = e(g,g)^{r_i r_{i+1} r_{i+2}}$, then $sig_i(m_i^{'''})$ and $H(k_i)$ $(i \neq j, i, j = 1, 2, \ldots, n)$, $m_i''' = E_{PK_j}(k_j)$ sent to the users $U_j (1 \leq j \leq n, j \neq i)$。

4) after users get U_i to find k_i , the key from computer is $K = \prod_{i=1}^{n} k_i = e(g,g)^{r_1 r_2 r_3 + r_2 r_3 r_4 + \ldots + r_n r_1 r_2}$ 。

4.5. Trusted execution environment

（Trusted Execution Environment） A secure area on the main processor of a mobile device (including a smart-phone, tablet, set-top box, smart TV, etc.) that guarantees the security, confidentiality, and integrity of the code and data loaded into the environment.

TEE provides an isolated execution environment, providing security features including: isolated execution, integrity of trusted applications, confidentiality of trusted data, secure storage, and so on.



TEE technology provides three functions:

1. Security. TEE is an isolated area that cannot be operated by an unauthorized device or operating system.

2. Confidentiality: the program running in TEE is in an encrypted state, and the unauthorized device or operating system cannot view the program running in TEE.

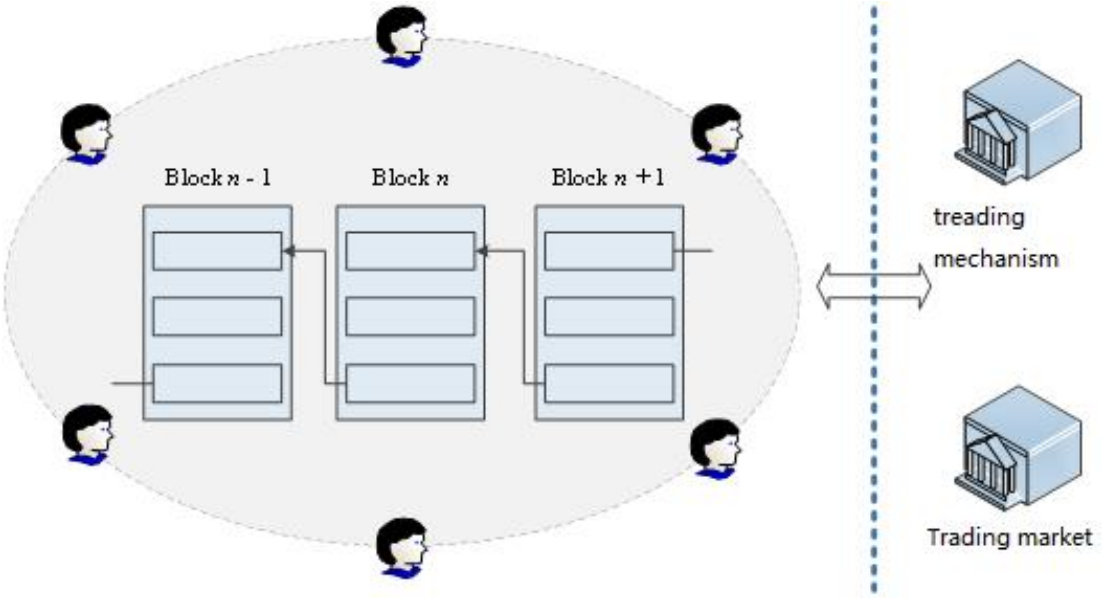
3. Verifiable. Under the premise of confidentiality, the code running in TEE can receive external verification.

For example, if a piece of code runs inside the TEE of a device, other devices can verify that the code being run is consistent with the code being exposed.

4.6. Incentive mechanism

The book of ATT needs to be maintained by users who are involved in mining ATT, and the correctness of transactions and blocks can be verified by their trading behavior. Each transaction generates new points to reward trading users. In the incentive mechanism, we distribute a certain proportion of the bonus from the winning exchange in the new block to trading users to motivate their trading behavior.

The ATC, trading market and trading project we proposed together constitute a complete trading ecosystem, as shown in the figure.



Step 1: The accounting node receives the transaction information and writes the transaction information into the block.

Step 2: The bookkeeping node decides whether the block is full or whether the writing process is timed out. If it decides that "Y" goes to step 3, otherwise it goes to step 1.

Step 3: The accounting node agrees on the transaction information and calls the intelligent contract to calculate the value of the transaction $V = M - C$, in which M is the transaction amount and C is the transaction cost.

Ste p4: The accounting node judges whether the total amount of money RMB issued is greater than or equal to the total amount of money W, and if it judges that "Y" goes to step 9, otherwise it goes to step 5.

Step 5: Accounting nodes reward customers and suppliers according to the value of transactions. The formula of reward calculation is as follows $R = V * K_i$: for the total number of rewards granted to suppliers and users, the allocation ratio between them can be set according to the actual situation, such as setting the allocation ratio of 1:1, which is the reward coefficient of the current cycle;

Step 6: Accounting node updates the total amount RMB and the actual amount RMBC of the current cycle according to the awards issued. The formula for calculating the total amount of money is as follows: $RMB = RMB + R$ the formula for calculating the actual amount of money in the current cycle is as follows; $RMB_C = RMB_C + R$

Step 7: Judge whether the actual amount of RMBC in the current cycle is greater than or equal to the amount of RMBR in the preset cycle. Judge Y, then turn to step 8 or step 3.

Step 8: Accounting node updates the reward coefficient according to the actual amount of money issued in the current cycle, and clears the actual amount of money issued in the current cycle. The update formula of the reward coefficient is as follows: $K_{i+1} = \frac{T_i}{T} * K_i * \frac{RMB_R}{RMB_c}$ T_i is the time from the last reward coefficient updating to the current reward coefficient updating, and T is the preset period of money issued.

Step 9: End.

4.7. Exchange of tokens

After broadcasting to the network, all transactions are placed in blocks. After 19 blocks were mined on TRON (including its own blocks), the transaction was confirmed. Each block is one of the top 27 superdelegates in the round robin. Each block takes about three seconds to mine on the blockchain. Due to network reasons, each superdelegate may have slightly different time conditions and machine configuration. Generally speaking, a transaction is considered to be fully confirmed after one minute.

The APIs for Tron trading are as follows:

```
message Transaction {
message Contract {
enum ContractType {
AccountCreateContract = 0; // Create account/wallet
TransferContract = 1; // Transfer TRX
TransferAssetContract = 2; // Transfer TRC10 token
VoteWitnessContract = 4; // Vote for Super Representative (SR)
WitnessCreateContract = 5; // Create a new SR account
AssetIssueContract = 6; // Create a new TRC10 token
WitnessUpdateContract = 8; // Update SR information
ParticipateAssetIssueContract = 9; // Purchase TRC10 token
AccountUpdateContract = 10; // Update account/wallet information
FreezeBalanceContract = 11; // Freeze TRX for bandwidth or energy
UnfreezeBalanceContract = 12; // Unfreeze TRX
WithdrawBalanceContract = 13; // Withdraw SR rewards, once per day
UnfreezeAssetContract = 14; // Unfreeze TRC10 token
UpdateAssetContract = 15; // Update a TRC10 token's information
ProposalCreateContract = 16; // Create a new network proposal by any SR
ProposalApproveContract = 17; // SR votes yes for a network proposal
ProposalDeleteContract = 18; // Delete a network proposal by owner
CreateSmartContract = 30; // Deploy a new smart contract
TriggerSmartContract = 31; // Call a function on a smart contract
GetContract = 32; // Get an existing smart contract
UpdateSettingContract = 33; // Update a smart contract's parameters
ExchangeCreateContract = 41; // Create a token trading pair on DEX
ExchangeInjectContract = 42; // Inject funding into a trading pair
21
ExchangeWithdrawContract = 43; // Withdraw funding from a trading pair
ExchangeTransactionContract = 44; // Perform token trading
UpdateEnergyLimitContract = 45; // Update origin_energy_limit on a
smart contract
}
}
}
```

5. ATT Token Issuance Plan

The tokens issued by the ATC are Africa Trading Token, or ATT, with a total of 990 billion tokens issued.

The sale of ATT will be in strict accordance with laws and regulations all over the world, and in an appropriate manner for the appropriate groups of mushrooms. The total number of ATT issuance is 990 billion, with the following allocation ratios:

type	ratio	instruction
Crowd funding	10%	According to 1 TRX= 15ATT to exchange, locking positing for 6 months (only TRX holders can participate)
Market exchange	10%	According to 1 TRX=10 ATT to exchange , locking positing for 3 months (only TRX holders can participate)
Replacement	60%	Some TRX holder accounts will be gradually replaced with ATT holding accounts with a replacement ratio of 1TRX=1ATT~5ATT
team	10%	Locking position for 4 years , then begin to release for 25% every year
Partners and consultants	10%	Locking position for 4 years , then begin to release for 25% every year

TRC-20 tokens:

TRC-20 is a technical standard for implementing a token-enabled intelligent contract TRON virtual machine. It is fully compatible with ERC-20.

Code as follow

```
contract TRC20Interface {
function totalSupply() public constant returns (uint);
function balanceOf(address tokenOwner) public constant returns (uint
balance);
function allowance(address tokenOwner, address spender) public constant
returns (uint remaining);
function transfer(address to, uint tokens) public returns (bool success);
```

```
function approve(address spender, uint tokens) public returns (bool
success);
function transferFrom(address from, address to, uint tokens) public
returns (bool success);
event Transfer(address indexed from, address indexed to, uint tokens);
event Approval(address indexed tokenOwner, address indexed spender, uint
tokens);
}
```

6. Road map

7. Team

1) Emmanuel Uwechue, Cultural Ambassador of China and Nigeria and famous singer

Emmanuel Uwechue also known as Hao Ge (郝歌) in Chinese, is a Nigerian born musician singer/songwriter who rose to fame through a performance with Han Hong on the CCTV New Year's Gala and has emerged as one of the most notable foreign singers in China.

As a Nigerian living outside of his home country ,having enjoyed this incredible opportunity, opened astonishing wealth of connections for him among top government officials ,kingdoms, dignitaries and celebrities in his home land.

The main performance is：

- He was giving the prestigious Global tourism music icon awards a one of a kind award by the (Travel lougue communication satellite TV) Nigeria .
- In 2017, Emmanuel gained the confidence of the President of the Federal republic of Nigeria Muhammadu Buhari where he was the main connecting factor that brought the TIDFORE HEAY EQUIPMENT GROUP to revamp the decaying Nigerian Calabar Port.
- His team and partners are currently working on the construction of sea port in Ondo state ,a south south geo- political zone in Nigeria with Governor(Oluwarotimi Odunayo Akeredolu).

2) Godwin Emefiel, the Governor of the Central Bank of Nigeria

Godwin Emefiele has been Governor of the Central Bank of Nigeria since June 3, 2014. He served as Chief Executive officer and Group Managing Director of Zenith Bank Plc. Emefiele served as Deputy Managing Director of Zenith Bank Plc. since 2001. He served as Executive Director in charge of Corporate Banking, Treasury, Financial Control and Strategic Planning of Zenith Bank Plc and has been on the Management team since inception. Emefiele has over eighteen years of banking experience. Emefiele served as director at Zenith Bank Plc and Zenith Bank (Gambia) Limited. Before commencing his banking career, he lectured Finance and Insurance at the University of Nigeria Nsukka, and University of Port Harcourt, respectively. Emefiele serves as Director of ACCION Microfinance Bank Limited.

3) Abike dabiri Erewa, The Senior Special Assistant to President Muhammadu Buhari on Foreign Affairs and Diaspora.

Abike Kafayat Oluwatoyin Dabiri-Erewa, born in Jos, Plateau State, is a Nigerian politician and former member of the Nigeria Federal House of Representatives representing Ikorodu Constituency in Lagos State. She was the Chairman of the House Committee on Media & Publicity.

She was also the former Chair of the House Committee on Diaspora Affairs. She was elected for the first time in 2003, and re-elected in 2007 and 2011.

In 2015 She was appointed as the Senior Special Assistant to President Muhammadu Buhari on Foreign Affairs and Diaspora.

4) Oluwarotimi Odunayo Akeredolu, SAN, the Governor of Ondo State

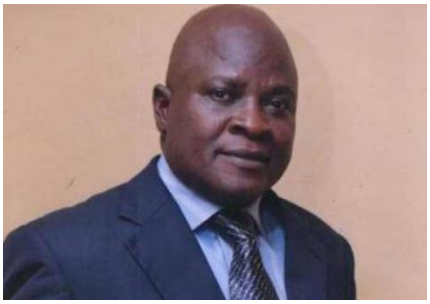
(born 21 July 1956) is a Nigerian politician and lawyer who is the Governor of Ondo State,Nigeria and also a Senior Advocate of Nigeria (SAN) who became president of the Nigerian Bar Association in 2008. Akeredolu was also a Managing Partner at the Law Firm of Olujinmi & Akeredolu, a Law Firm he co-founded with Chief Akin Olujinmi, a former Attorney General and Minister for Justice in Nigeria.

5) Akinwunmi Ambode, the Governor of Lagos State

(born June 14, 1963) is the Governor of Lagos State. He was a civil servant for 27 years and a financial consultant before running for public office as Governor of Lagos State in 2015.

Ambode ran for office of the Governor of Lagos State in April 2015 as a member of the All Progressives Congress, the state's ruling party. He won the election, just defeating the second-place candidate Jimi Agbaje of the People Democratic Party by 150,000 votes.He began his tenure as the governor of Lagos on 29 May 2015, succeeding former governor Babatunde Fashola.

6) Rotimi Ogunleye



Honourable Commissioner, Ministry of Commerce, Industry and Cooperatives, Members Of The Nigeria House Of Representatives By State.

8. Disclaimer

This is a conceptual document ("White Paper"). The sole purpose of this white paper is to introduce ATT tokens to potential token holders and provide relevant and reasonable information so that they can determine whether to conduct in-depth analysis of the project when purchasing ATT tokens. The information in this article may not be exhaustive and does not imply any elements that constitute a contractual relationship. This white paper does not constitute a recommendation as to whether you should participate in the purchase of any ATT tokens, nor should it serve as a basis for any contract or purchase decision.

Please read in detail and pay attention to the following items:

1. ATC Team will continue to make reasonable attempts to ensure that the information in this white paper is true and accurate. During the development process, the platform may be updated, including but not limited to the platform mechanism and the distribution of ATT tokens. Some of the content of the document may be adjusted in the new white paper as the project progresses. The team will publish the updated content to the public by publishing announcements or new white papers on the website. Participants should get the latest white paper in time and adjust their decision-making according to the updated content.

2. Nothing in this white paper shall be deemed to constitute any kind of prospectus or investment solicitation, nor shall it in any way constitute an offer or solicitation for the purpose of purchasing any securities in any jurisdiction or any other controlled product. This document is not based on or compiled in accordance with laws or regulations designed to protect investors in any jurisdiction and has not been examined by the regulatory bodies in any jurisdiction.

3. ATT tokens can only be used for the purposes specified in this white paper and shall not be used for other purposes, including, but not limited to, any investment, speculation or other financial purposes. As a digital encryption product, ATT tokens do not fall into the following categories: (a) any kind of currency; (b) securities; (c) equity of legal entities; (d) stocks, bonds, bills, warrants, certificates or other instruments granting any rights.

4. ATT tokens will not be sold or used in any jurisdiction that prohibits the sale or use of digital tokens (including, but not limited to, China, the United States, etc.). ATT tokens are not open to everyone (including, but not limited to, prohibiting nationals from buying ATT tokens in China, the United States and other countries). Participation may require a series of steps, including the provision of specific information and documents.

5. Whether the value of ATT tokens increases or not depends on the market rules and the demand after application. It may not have any value. The team will not make a commitment to its value-added and will not be responsible for the consequences of its value increase or decrease. To the maximum extent permitted by applicable law, the team shall not be liable for any damage

or risk arising from participation in the swap, including, but not limited to, direct or indirect personal damage, loss of business profits, loss of business information or any other economic loss. The project complies with any regulatory regulations conducive to the healthy development of the swap industry and the self-discipline declaration of the industry. Participants participating in the project will fully accept and comply with such inspections. At the same time, all information disclosed by participants to complete such inspections must be complete and accurate. The project clearly conveys the possible risks to the participants. Once the participants participate in the exchange, they will accept the potential risks of the platform and bear the consequences on behalf of the provisions of the rules that they have confirmed, understood and approved.

6. Certain statements, estimates and financial information in this white paper constitute forward-looking statements or information. Such forward-looking statements or information involve known and unknown risks and uncertainties, which may lead to significant differences in actual events or outcomes from predictions or outcomes implied or indicated in such forward-looking statements.

7. The English version of the white paper is the main official source of information related to ATT tokens. From time to time, the information contained in the text can be translated into other languages or used in written or oral communication with existing and potential customers, partners, etc. During such translation or communication, some information in the text may be lost, damaged or untrue, and the accuracy of such alternative communication cannot be guaranteed. Any conflicts or inconsistencies in such translation and communication shall be governed by the original terms of the English version of this white paper.

Final Tip: You must listen to all necessary professional advice, including tax and accounting related matters. We are very confident that the ATT project will be very successful. But we can't guarantee success, and both digital assets and platforms involve risks. You must assess the risks and your affordability.

非带链

AFRICA TRADING CHAIN

中非一带一路贸易区块链

ATT

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1. “一带一路”

1.1. 基础概念

“一带一路”是一项中国提出的沿着古代陆上和海上丝绸之路，新建大量全球性政治和经济基础设施的庞大计划。在这个计划中，所有的公路、铁路、油气管道、航线、内陆水道港口和海港都将成为中国通往其他国家，促进经贸合作并拓展影响力的管道。简而言之，这将是一个由中国主导的欧亚大陆新秩序，将使中国从一个地区强国成长为一个世界强国。

当前，“一带一路”的朋友圈不断扩大，已经覆盖亚欧非拉，扩容至 100 多个国家，对其他国家来说，"一带一路" 对阿塞拜疆来说意味着天然气管道；对阿曼来说意味着新的铁路和港口；对缅甸来说意味着发电厂；对巴基斯坦来说意味着新的公路和电力设施……对许多发展中国家来说有许多好处。

近五年来，中国与“一带一路”沿线国家货物贸易额累计超过 5 万亿美元，对外直接投资超过 700 亿美元，中国企业在沿线国家推进建设 75 个经贸合作区，上缴东道国的税费 22 亿美元，创造就业岗位 21 万个。

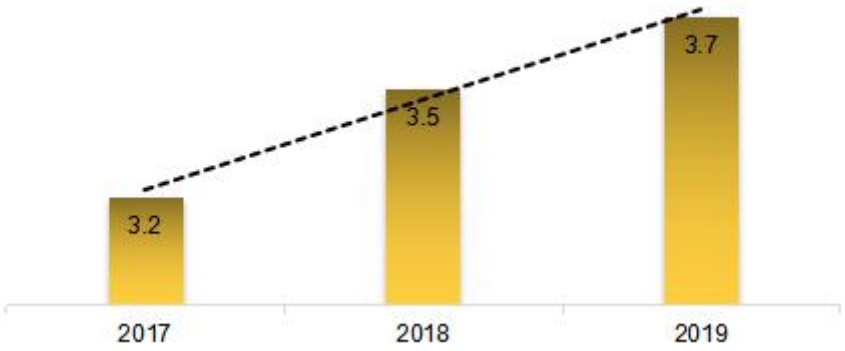
亚当·斯密说，贸易是人类的天性。丝绸之路横跨千年历史、历经王朝更迭而长盛不衰，正因为它为东西方物质文化交流提供了平台，从而满足了人们对不同物品的交换需求。商品贸易自然衍生出货币流通与金融往来，如金属货币在不同地区之间流通、各国统治者各自维护金融秩序等。

“一带一路”上的金融力量，既源自资本融通的本能开拓，也源自全球化治理的开放理念，多元国际共建的决心，以及超越历史和现实的创新能力，正是这些，支撑着“一带一路”建设稳步推进，落地开花。

丝绸之路贸易繁荣促进了金融发展，金融发展也促进了丝绸之路的贸易繁荣。

1.2. 非洲现状

据联合国非洲经济委员会，2017 年，非洲经济增速为 3.2%。非洲经济有望在 2018 年实现 3.5%的增长速度，到 2019 年，增速预计可达 3.7%。2017-2019 年非洲经济预计增长速度如下图所示。



东非是迄今为止非洲大陆经济增长最快的地区，据估计，去年东非经济增长了 5.3%。虽然这比上一年的 6.5%慢了点儿，但到目前为止，它仍是非洲经济增长最快的地区。埃塞俄比亚以 8%的增长率稳妥占据东非领头地位，同时肯尼亚，卢旺达，坦桑尼亚和吉布提在 2016 年的增长率也维持在 6%以上。

排名	国家	2017年GDP总量（单位：亿美元）	2017年人均GDP（单位：美元）
1	尼日利亚	3948.18	2092
2	埃及	3494.3	3651
3	南非	3440.64	6089
4	阿尔及利亚	1754.93	4225
5	安哥拉	1240.34	4401
6	苏丹	1189.79	2917
7	摩洛哥	1107.08	3177
8	埃塞俄比亚	797.35	861
9	肯尼亚	783.97	1678

中非双边贸易方便，中国海关统计，2017 年 1 至 11 月，我国与非洲进出口总额 1545.7 亿美元，同比增长 14.8%，超出我同期外贸总体增幅 2.8 个百分点。其中，我对非出口 858.3 亿美元，增长 2.3%，自非进口 687.4 亿美元，增长 35.4%；顺差 170.9 亿美元，同比下滑 48.4%。

近年来，非洲从中国进口商品以消费品、机械设备、交通运输工具、建筑材料为主。

中国与非洲合作是"一带一路"建设的一项重要议题。在过去的数年，全球化进程呈现出新特点：随着新技术和电子商务的发展，国际投资规模的扩大，全球化的主要玩家在悄然生变。

中国自 2009 年超越美国连续 9 年成为非洲第一大贸易伙伴国，非洲也成为中国第三大海外投资市场和第二大海外工程承包市场。目前，中非之间的年贸易额已超过 2000 亿美元，中国对非各类投资存量超过了 1000 亿美元，几乎遍布非洲每一个国家，有 3500 多家中国企业在非洲投资经营。

在“一带一路”框架下，在建的铁路和公路将最大限度地提高非洲域内的贸易水平，扩大非洲国家的进出口规模，促进非洲经济融入全球经济。从长远看，“一带一路”将有利于推动《非盟 2063 议程》的发展，该议程旨在实现非洲国家的公平、可持续发展、健全法治、维护和平安全，实现非洲国家内部的互联互通。

在“一带一路”的建设带领下飞速发展的同时，也面临着许多不容忽视的问题：

1.2.1. 经济薄弱，金融体系不完善

非洲不少国家经济薄弱，外汇储备少，且经济对外依赖程度高，金融机构抗风险能力较弱，货币币值不稳定，一些国家通货膨胀较高，容易产生货币信用与金融风险，并且外汇管制严格。尤其是对那些创汇严重依赖资源出口的国家来说，每当国际经济形势稍微有些变化，就可能导致汇率波动起伏大。

另外，当前全球经济持续低迷，国际大宗商品价格大幅下降，直接影响非洲能矿产品出口和国际社会对非投资的积极性，严重冲击了非洲国家发展势头。

1.2.2. 基础设施欠缺

当地资源有限，基础设施欠缺，配套服务不足，尤其是物流条件不成熟。对比其他国家，非洲地区的物流现状确实还是发展跨境电子商务的一大短板，除了肯尼亚、尼日利亚等主要国家的专线渠道，部分无平台专线渠道的运输将遇到许多问题。目前非洲大多数国家物流的体验非常差，一方面基于非洲当地的物流配送基建还不是特别完善，很多已经本可以智能操作的环节还需要人为操作，时效性低；另一方面，融入非洲当地的第三方物流服务商很少。

1.2.3. 当地政府办事效率较低

非洲不少国家行政效率低下，严重阻碍企业的经营发展。一方面，行政部门对于处理合同的签署、审批、实施等流程均由人工办理，且链条冗长，造成极大的资源浪费，办事效率低下；另一方面，政府部门缺少有效监督机制，官员在各个环节均存在比较普遍的腐败现象，导致一些中资企业在非的项目推进困难。

2. “一带一路”和区块链技术结合的可能性

2.1. 降低货币风险

目前国际货币结算广泛采用美元，成本高，受汇率波动、信用、贬值等风险。要减缓或避免这些影响，通过“区块链”的技术开发一个数字货币系统，这种由各方共同拟定规则，信用建立在联合协议上的系统，为其运作的有效性、安全性提供了可靠的法律依据，该系统可以为“一带一路”沿线国家提供通用的交易货币。

2.2. 跨境结算

区块链技术可以建立一个去中心化的全球结汇系统，通过智能合约可实时自动完成结算，无需耗费太多时间。并通过区块链技术，实现去中心化，省去第三方中介环节，跨境支付的两个开户行之间可以直接进行支付、结算和清算。

传统跨境支付模式有四块成本：支付处理成本、接收费用、财务运营成本和对账成本。而区块链交易数据有记录、手续简便以及没有隐形成本，也有助于降低跨境电商资金风险及便捷性需求，实现“一带一路”国家的金融互联互通。

2.3. 信用系统

中国企业到海外投资，往往由于对投资所在国家当地的税务、法律、文化和拟投资的企业实际情况等一系列问题感到陌生，担心上当受骗，导致不少企业既想“走出去”寻找机遇，但又怕“走出去”寸步难行。

利用区块链技术将“一带一路”沿线国家中一些拟出售的农业、能源、资源等被投资者的资料数字化，通过“区块链”技术一方面把相关讯息广泛地、迅速地向包括中国企业在内的全球投资者传播，供潜在的投资者参考。

另一方面，则是通过“区块链”技术高安全性、互相监察验证和公开透明等的优势作信用背书，可以增强投资者和被投资者的互信基础，方便投资者作出投资选择及签订具有信用背书的合同，而无须担心遭遇欺诈问题。

2.4. 资产数字化

在非洲国家，跨境电商的潜力不可估量。可以将这些国家拟出售的能源，或者包括农产品和其他资源，以及中国的过剩产能都数字化，通过区块链技术搭建交易平台，将这些贸易需求公布给全球潜在投资者。区块链技术的全民审查验证、不可篡改和公开透明等特性为潜在贸易提供了信用背书，能够增强贸易和投资双方的信任基础，减少欺诈风险。同时，区块链上的点对点交易，也减少了跨境贸易和投资所需要的交易和营销成本，提高了便捷性。

2.5. 升级物流

区块链实现物流自动化，在跨国领域，其实区块链还能够起到更大的作用，比如说我们将一个国家的货物进行流转的时候，都会遇到很多的损耗无法追究，报关手续等耗时较长，物流业务链条长导致资源没有充分利用，甚至还牵扯到贪

污腐败的问题。

3. 非带链的解决方案

非带链在国际贸易、跨境电商、跨境支付、交易结算等方面有多年的积累，波场提供的区块链平台的重要目的就是把这些核心内容立体化输出，和区块链技术进行有机结合。用户通过基于波场的非带链，可以把最领先的云端技术和区块链技术一起应用到自身的优势业务中，响应国家“一带一路”政策的号召，为业务创新带来新的机会。非带链服务，采用的是联盟链的方式，深耕技术服务，通过定义统一的标准规范，任何跨国贸易企业都可以在非带链平台上轻松地构建区块链服务，为各个领域的合作伙伴提供更多的发展空间。

3.1. 波场区块链概述

波场 TRON 是基于区块链的开源去中心化内容协议，致力于利用区块链与分布式存储技术，构建一个全球范围内的自由内容体系，这个协议可以让每个用户自由发布，存储，拥有数据，并通过去中心化的自治形式，以数字资产发行，流通，交易方式决定内容的分发、订阅、推送，赋能内容创造者，形成去中心化的内容生态。核心算法：基于区块链的开源去中心化挖矿难度：货币总量：100,000,000,000TRX 是波场 TRON 系统的流通币。TRON 结合了社交网络与价值网络的双重优点，将协议生态繁荣置于首位。在任何一个社区，经济体，自由市场经济中，一个公平并合理反映参与者贡献的激励系统是社区立足之本。TRON 将首次利用数字资产去尝试准确透明的衡量与激励生态的参与者与贡献者，赋能内容生态。

TRON 作为去中心化的内容协议，与中心化的互联网结构相比，具有以下四个基本特征：1、数据自由而不受控制的上传、存储并传播包括文字、图片、音频和视频在内的内容 2、内容赋能通过内容的贡献和传播获得应有的数字资产收益，经济激励赋能内容生态 3、个人可以自由的通过发行数字资产， 他人则可以通过购买数字资产享受数据贡献者不断发展所带来的利益与服务。4、基础设施分布式的数字资产则会匹配一整套完整的去中心化基础设施， 包括分布式交易所，自治性博弈，预测，游戏系统。

3.2. 优势和特色

非带链将基于波场公链发行代币 ATT，波场有着高吞吐、易扩展、高可靠性、易于使用等特性，是中国自主研发的可信公链，也是非带链强大的技术保障。

(1) 高吞吐

以太坊（Ethereum）由于共识机制的低效、受限于 CPU 的单线程性能等问题，性能及吞吐一直是后续公有链致力提升的方向之一。以太坊早期的测试网络实现了每秒 25 个交易（TPS），目前维持在 20 多 TPS 的水平。因为糟糕的性能问题，以太坊历史中曾经多次遭遇网络拥堵。

在 TRON 的共识机制下，有限的高计算性能节点被用户选为网络维护节点，从而保证了整体网络的 TPS 维持在可接受的程度之 上，实现了高吞吐的特点。TRON 独有的共识机制使得 TRON 网络的 TPS 远远超出 Bitcoin、Ethereum 等。 高 TPS 间接保证了 TRON 上所有运算的低延迟，可以使转账速度更快，赶上现有支付方式例如 VISA、SWIFT 的速度，从而使得日常支付成为可能。

(2) 易扩展

可扩展性是以太坊（Ethereum）网络承接更多业务量的最大制约。以太坊计划通过分片机制来提高网络的扩展性，但要在主网上部署这样一个工作系统可能还需要几年时间。以太坊将必须从完全复制的全局状态迁移到分片状态。对于现今区块体量巨大的以太坊，这将是一个执行难度极大的工程。

得益于高效的智能合约，以及智能合约的无限可能性，TRON 具有极大的可扩展性，丰富多彩的各种应用可以部署于 TRON 上。另外优良数据库结构和账户系统的结合，TRON 能更加方便的实现复杂的模型、设计，对开发十分友好，且保证了极高 TPS 的可能性。同时还使得 TRON 网络能够支持大量用户，对于现在已经成熟运行的各种应用、网站、服务等，能够轻松地转移到 TRON 网络上，使得已存的模式获得区块链技术领域的提升，从而更加具有与现存机构进行竞争的可能性。

(3) 高可靠性

以太坊（Ethereum）由于网络中交易较之数字货币类项目更加多样化，也就更容易遭受到攻击。以太坊在降低攻击方面的核心设计思想仍然是通过经济激励机制防止少数人作恶：（1）所有交易都要提供交易费用，避免 DDoS 攻击。（2）程序运行指令数通过 Gas 限制，消耗超出余额就会被取消，避免了恶意的循环合

约。

TRON 致力于打造更加去中心化的共识机制。去中心化程度越高，整体的网络结构、用户资产，及内在价值也就更加可靠，更加值得信赖。同时，TRON 的共识机制相比 POW 模式，能够极大地节省能源。

(4) 低费用

TRON 网络将会采取极地运算费用的设计，从而使得部署于 TRON 上的各种应用更加容易扩展用户，更加具有商业操控性。以太坊（Ethereum）采用租赁模式，通过燃料（Gas）控制某次交易执行指令的上限，Gas 使用以太币进行兑换。每执行一条合约指令会消耗固定的燃料，若未执行完毕燃料已消耗完时，合约将终止并回滚。收取 Gas 的目的是确保网络不会因为进行大量密集的工作而陷入僵局。但这样的做法带来的问题是：以太坊网络上的开发者将在各个阶段持续的支付燃料，所需费用较大且波动性高。如果普通开发者想要在以太坊上测试他们的应用，研发初期的燃料费用就足以让开发者破产。这对生态构建以及拥有复杂逻辑的链上应用都是极为不利的。

波场（TRON）针对这一点进行了经济机制的改进，采用租赁模式。支持超低手续费转账，完成单次转账只需 10 的负 6 次方 TRX。且第三方程序的用户无需直接支付任何网络费用，这样大大降低了开发者的经济成本，并且低廉的手续费非常适宜网络生态的发展构建。

(5) 易于使用

TRON 团队充分调研了用户的需求和期望，专注于打造更易于使用的区块链产品。以太坊（Ethereum）由于最先发布，经过几年以来的长足发展，已经积累了众多的 DApp 资源，从而带来了大量的用户群。但由于受限于性能问题，用户体验只能说是一般。并且长久以来以太坊没有大型项目可以构建于链上，最为人广泛使用的功能也无外乎募资。

TRON 不仅关注区块链的底层技术，还非常重视区块链的产品的应用体验，它的另一大亮点是在高性能主链的基础上，随着主网上线会发布杀手级的应用，堪称自带生态。自带优质 DApp 的特性将非常有利于波场主网的推广，为后来居上提供了极大的可能。如果说互联网是打破了信息传递的障碍，那么区块链就是打破了价值传递的障碍，技术创新就是区块链行业深入发展的核心驱动力。新事物的出现必定伴随着无数的质疑，被同行的质疑就是进步的动力，并且面对质疑

最好的回应就是秀出自己的实力。

3.3. 非带链设计原则

(1) 自主创新

非带链注重自主创新，尤其在跨国贸易信息化方面，然后通过融合区块链、密码学、分布式账本、跨链等技术，实现跨国贸易信息数据的可靠储存和安全共享。

(2) 安全性

非带链十分注重信息的安全，从数据的标准化、读取、调用、更新等方面实时监控数据，做到链上数据的安全可靠。

支持国密 SM1、SM2、SM3、SM4 算法；

硬件加速加密/解密；

支持权威机构颁发的数字证书；

系统数据冗余备案，安全可靠；

增加回复技术，加快用户数据恢复；

(3) 扩展性

非带链的扩展性体现在用户上，不断扩展数据贡献者的数量，通过合理的激励帮助更多的用户参与到“一带一路”的建设。

(4) 共享

非带链的共享体现在贸易数据共享上，消除信息孤岛，让资源更多在“一带一路”上进行匹配。

多语言支持；

(5) 自动化部署

满足用户的需求，一站式定制及部署区块链服务；节点的加入和退出区块链服务；

主动升级区块链底层平台和补丁；

多角色节点成员动态加入/退出服务；

(6) 信息可视化

分布式账本信息和数据的可视化，兼容多协议和组件；

智能监控，提供立体化数据监控、智能化数据分析、实时的数据故障告警和个性化数据报表配置，实时、精准掌控业务；

(7) 智能合约一站式管理

一站式管理智能合约的注册、触发、执行及注销；

标准合约的备案和定制化合约；

(8) 应用服务快速对接

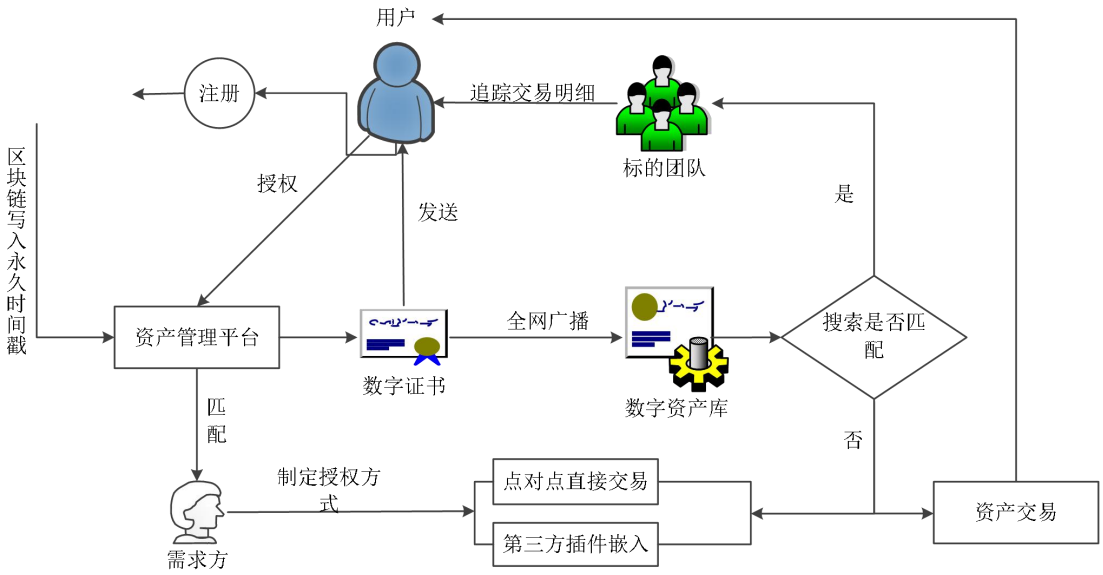
快速对接链上已有服务；单链完成 2000+TPS，满足大部分企业的吞吐高并发需求。

3.4. 非带链的应用场景

非带链旨在结合区块链技术发力“一带一路”场景，“一带一路”沿线的国家提供更好的服务平台，赋能实体经济，促进“一带一路”区块链金融科技专业委员会与全产业之间的联系与科技经济技术合作，区块链技术人才的培养、优质项目的孵化、海选，促进科研机构、科研人员与企事业单位的国际交流与合作；帮助区块链经济产业投融资与区块链的科技研发；同时促进“一带一路”沿线的经济贸易发展。

3.4.1. 贸易

中国银行业从整体资金规模、用户数量、市场份额等方面在国际上都有一席之地，但是在基础设施建设方面还有很多欠缺。比如银行间业务报文的传递还在依靠国际组织 Swift、EDI 等，这些国际组织控制了平台、数据、用户，尤其是与银行之间国际贸易、国际收支数据。



(1) 信用证

非带链链接多个买方行和卖方行，实现真正意义上的电开，并作到实时送达，链上主体通过相互授信建立头寸管理和轧差机制，实现信用证链上实时写入，实时读取以及实时验证验押，从而降低票据、信用证的在途时间，加快资金周转速度。同时，信用证的变化可以实时被其他相关行或企业及第三方获取，可保证各方信息透明，确保相关方利益。通过区块链技术的引入，信用证信息可以在链上实现安全、快速、可追溯的传递，并且可支持中文报文，在国内信用证结算中可以取代 SWIFT，从而实现自主安全可控的国内信用证交换体系。

(2) 保函

传统保函业务大多数流程需要人工参与，效率低导致银行人力成本高。保函安全性不高，存在造假的可能，遗失后补办困难，缺乏信任机制，索偿不便，受益人利益有时难以保障。保函相关方业务流程相互独立，存在信息不对等的情况。

非带链建设保函业务区块链管理平台，吸引保函业务相关方加入，从招标开始、开具保函到保函撤销过程中关键信息生成区块保存在区块链中，联通业务相关方本来孤立的业务流程、所有业务信息都存储在区块链上，保证信息安全、透明、不可篡改。用区块链技术，可以实现信息共享，加快信息流通，减少信息不对等造成的风险；联通业务相关方的流程提升各方工作效率，有效降低成本；打造全新的保函业务应用模式。

(3) 保理

非带链平台可以实现出口商或者出口保理商发送卖方信息或信用额度申请

信息，包含初步信用额度申请或正式信用额度申请。进口保理商根据出口保理商发来的出口商信息进行初步信用额度或正式信用额度批复并且报价。出口保理商根据实际使用中的额度情况可发起信用额度调整申请，进口保理商收到申请后进行回复。出口商或出口保理商进行发票或贷项清单的转让信息登记或取消，进口保理商收到后发至进口商进行确认。进口保理商将进口商的付款或核准付款信息发送至出口保理商，出口保理商也可通过系统将间接付款信息发送至进口保理商。贸易过程中如有争议，进出口保理商均可发起争议或将争议情况通知及解决信息发送给对方。进口保理商可将冲销或应收反转让信息及保理佣金及其他费用信息发送给出口保理商。进出口保理商业务关系终止后，出口保理商可发起保理协议的磋商或终止信息。进出口保理商双方可互发汇款或其他自由格式的报文信息。

(4) 票据

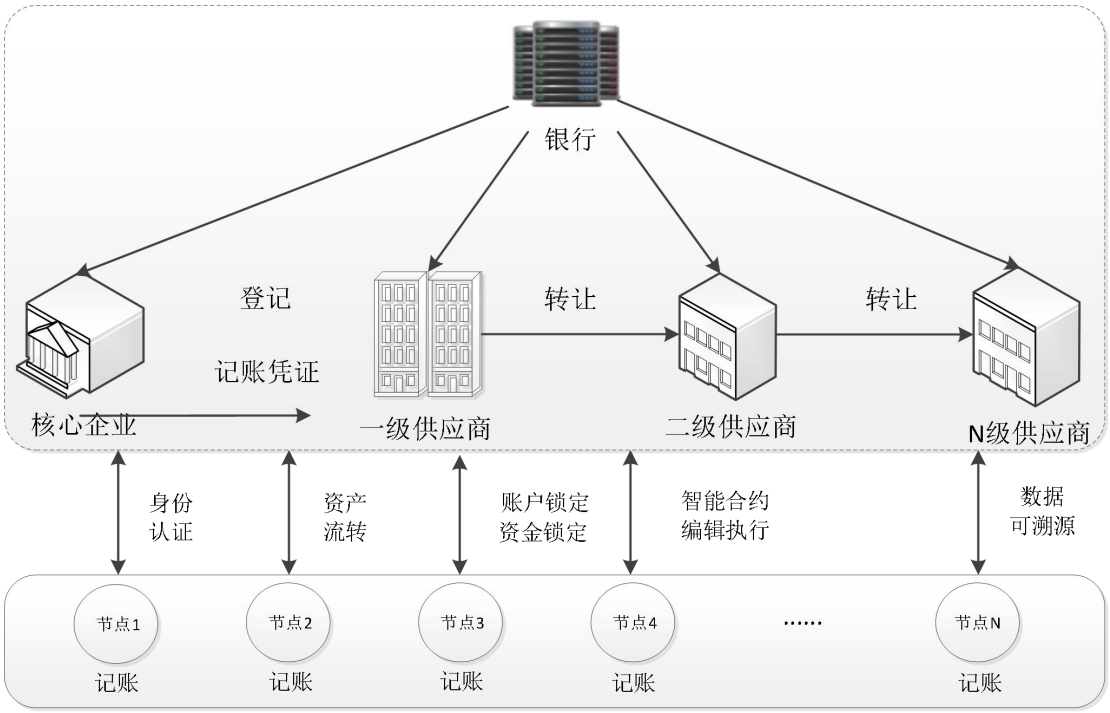
票据是一种有价凭证，其在传递中一直需要隐藏的“第三方”角色来确保交易双方的安全可靠。借助区块链的可编程性以及数据透明性，可有效控制参与者资产端和负债端的平衡，形成更真实的市场价格指数，从而更好地把控市场风险。通过区块链的信息记载和回溯，易于建立基于关键字或其他智能方式的信息检索和提醒，提升信息的有效性，并可借助其开放性的优势让信息更加快速传导至需求者，减少市场的信息不对称。由于区块链不需要中心化的服务器，系统的优化或变更不需要通过多个环节的时间跨度，对于现在依赖系统来办理业务的票据体系来说是极大优化，让经营的决策更加简单、直接和有效，提高整个票据市场的运作效率。基于区块链中智能合约的使用，利用可编程的特点在票据流转的同时，通过编辑程序可以控制价值的限定和流转方向。区块链数据前后相连构成的不可篡改的时间戳，使得监管的调阅成本大大降低，完全透明的数据管理体系也提供了可信任的追溯途径。同时，对于监管规则也可以在链条中通过编程来建立共用约束代码，实现监管政策全覆盖和控制。

3.4.2. 供应链金融

供应链金融是银行将核心企业和上下游企业联系在一起提供灵活运用的金融产品和服务的一种融资模式。

非带链在其中发挥两个作用，首先是核心企业确权过程，包括整个票据真实有效性的核对与确认；其次是证明债权凭证流转的真实有效性，保证债权凭证本

身不能造假，实现信用打通，进而解决二级供应商的授信融资困境。



3.4.3. 中非跨境电商

传统外贸电商模式当中存在许多不足，如交易担保、平台高额手续费、支付渠道不便、中非汇率变化、物流系统不方便及货品真实度等问题。而区块链技术的点对点数据传输方式、非对称加密、智能合约等技术可以解决传统跨境电商在跨境物流、跨境支付以及跨境产品质量方面所存在的问题。

区块链通过多方共同建立可靠数据库，增加了信息传递可靠性，提升全链条协同高效性，降低商业成本成为可能。此外，区块链可以为物流行业构建从生产、仓储到配送全环节产品管理的可追溯和可识别系统，为跨境物流等在中非供应链体系中安全交易、有效沟通提供了应用空间。

(1) 支付成本降低

传统的跨境电商领域，物品从供应商到买家手上，经过多次转手，每次转手需要用法币进行结算，还涉及到中非汇率的问题，其中有时间成本和诈骗产生的争端成本。

采用基于非带链通证进行商业智能合约的确认，结算过程变得即时并且安全，商业供应链高效化成为可能，代币现金流和产品流同步进行。买方和卖方可以直接交易，交易基于密码学原理而不基于信任，使得任何达成一致的双方，能够直

接支付交易，无需第三方参与，节省了买家和卖家的费用。

(2) 供应链管理及物品溯源

区块链技术可作为一种大规模协同工具，适配供应链管理。将行业内的供应商、制造商、分销商、用户串联在一起，许多类型的数据可以通过区块链传输，包括保险、发票、托运和运输以及提货单。从而有效的管理物流、信息流、资金流。

此外，非带链的优点在于可以保持商品的真实性。从生产厂家生产的时候，智能合约就为每一个产品创建真实的证明，这些透明的不可篡改的证明从生产到售出的历史记录的过程都可以被直接查询到，买者完全可以放心的进行购买。

(3) 交易透明度

区块链可以提高交易的透明度，从而促进信任。区块链的共享分布式账本提供安全性，透明度，以及可追溯性。

(4) 数据的安全和价值

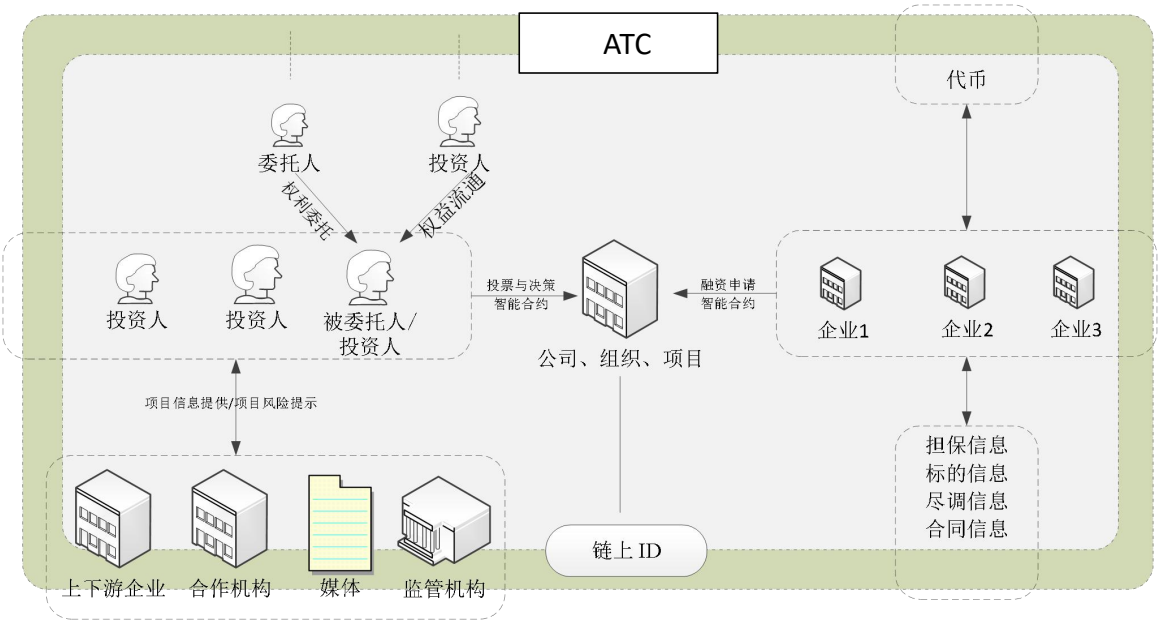
数据正迅速成为这个时代最具价值的资产，用户每天使用社交媒体、搜索引擎和在电商平台购物时，都会产生大量数据，而基于区块链技术的电商平台无需再去存储数千万用户的个人数据和支付数据，而是帮助消费者建立自己的数字身份，让用户自主管理自己的数据，帮助消费者赢回数据主权，同时以积分奖励聚合网络，让用户的数据变得更有价值。

基于区块链技术的跨境电商平台帮助更多企业去库存，盘活企业资金链，扶持众多中小型企业；同时，通过消费增值方式、数据积分奖励的方式又让消费者积分增值，产生巨大收益。在这种双方收益的情况下，鼓励消费者通过平台收益的部分积分，购买中小型企业商品，共同扶持中小型企业发展，共同助力中非经济体发展。

3.4.4. 征信

利用区块链技术对接各个联盟机构黑名单业务系统建立联盟机构黑名单存证平台，将分散在各个征信机构间的黑名单数据整合在一起实现数据共享，建立良性循环实现系统自治。这种方案带来的好处是成本低，对现有系统改造小、平台布设成本低。数据可追溯，黑名单数据所有机构共享。数据实时同步，黑名单数据更新时效高，数据可用性高。通用性强，系统提供通用的 API 服务，可以对

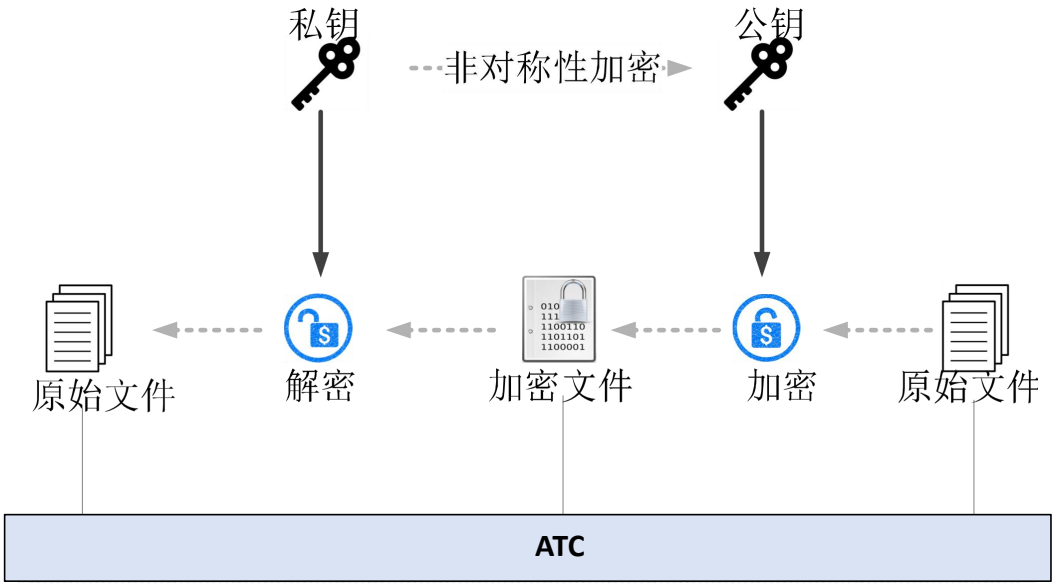
接各种银行和征信机构的应用系统。



3.4.5. 电子存证

电子证据是指以数字形式存储的证据信息。例如电子合同、电子发票、电子文章、电子邮件等。区块链因其本身具备不可篡改、可追溯特征，极适合与电子存证相结合，存证也因此成为区块链应用的典型场景之一。

区块链技术在电子证据领域主要有两个应用优势：安全存证和提高取证效率。传统电子证据被存储在自有服务器或云服务器中，文件在备份、传输等过程中容易受损，导致证据不完整或遭到破坏。此外，除了加盖电子签名的电子合同具有不可篡改性，其他形式的数据和证据在被传输到云服务器的过程均有遭受攻击和篡改的风险，降低了电子证据可信度。



利用区块链技术存储电子证据可有效解决传统存证面临的安全问题。在电子证据生成时被赋予时间戳，电子证据存储固定时通过比对哈希值来验证数据完整性，在传输过程中采用不对称加密技术对电子证据进行加密保障传输安全，充分保障了证据真实性和安全性。

3.5. 非带链的应用生态

非带链积极响应国家“一带一路”号召，致力于打通国内与海外企业贸易融资链接，为“一带一路”沿线国家提供更好的服务平台，赋能实体经济。用户想要投资非带链生态中“一带一路”的各类项目及企业都可以使用非带链的代币 ATT 进行支付。ATT 代表了持有人拥有“一带一路”项目的投资权，未来无论企业用户或是个人用户都需要持有 ATT 才有权参与“一带一路”项目投资。

用户的每一笔投资都将记录在链上，并通过智能合约保存核心数据，同时实现资金的募集，投资，分红，手续费计算等自动执行，所有行为记录在链上，公开透明。

另外，被投项目及企业收入的一部分会用作回购非带链的代币并销毁。并且，非带链代币的长期持有者都会定期得到各项目的利润分红。

以下为目前非带链生态中的部分已启动项目：

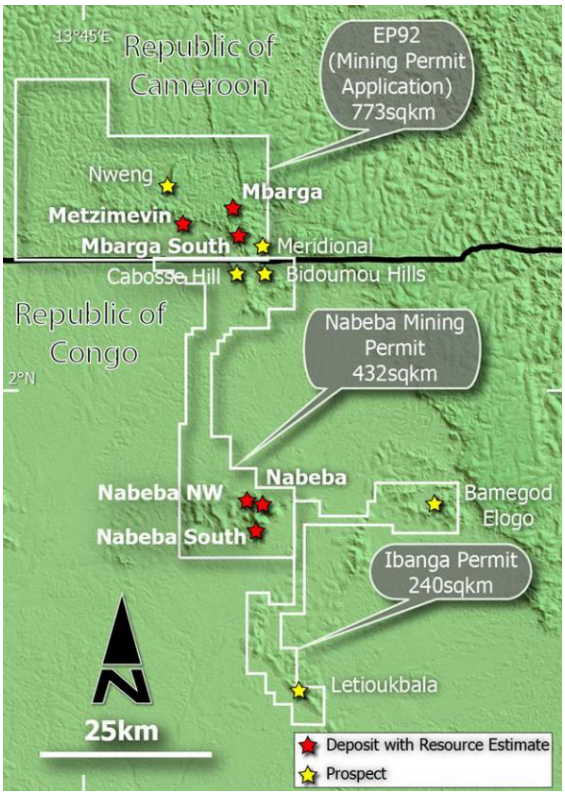
3.5.1. 喀麦隆港口、铁路、矿山项目

(1) 背景介绍

该项目由 Sundance Resources LTD 主导，主要包含以 Mbalam 和 Nabeba 矿区开采运输设备及相关基础设施（铁路、港口）组成，从两个矿山每年产生至少 4000 万吨，可持续 30 年以上，将分两个阶段：

阶段 1：高品位赤铁矿直运矿石（“DSO”），可至少开采 13 年

阶段 2：开采选矿后达到 66% - 68% 的品位，可持续开采 20 多年



该项目还将建设一条从刚果经喀麦隆到达海岸的新铁路及一个喀麦隆散料输送码头。

高品质的铁矿石相当于皮尔巴拉最好的矿石，是澳大利亚之外最优质的铁矿石。根据 2015 年 5 月 AXS 的报告，该矿山高品位赤铁矿储量总计 5.17 亿吨，含量 62.2%，杂质含量低。前 10 年平均品位等级 63.1%，高品位赤铁矿预估资源达到 8.057 亿吨，品位 57.3%。

喀麦隆 2016 年 GDP 为 322.17 亿美元，本项目建成投产后能带来 27.6 亿美元的销售收入，约占其年度 GDP 的 8.6%。同时，矿山开采、铁路运输以及港口运营将为当地居民提供大量的就业机会以及带来关联行业的高速发展。

另一方面，该项目优质铁矿石潜在储量达 50 亿吨，这将为中国钢铁制造行业的原料进口提供有力的保障。

	吨位 (Mt)	Fe (%)	SiO_2 (%)	Al_2O_3 (%)	P (%)	LOI (%)
Reserves						
Probable	**517**	**62.2**	**4.46**	**2.80**	**0.09**	**3.3**
Resources						
Indicated	776.8	57.3	8.9	4.4	0.10	3.9
Inferred	28.8	56.6	16.4	2.9	0.08	1.3
共计	**805.7**	**57.3**	**9.2**	**4.3**	**0.10**	**3.8**

(2) 项目进展

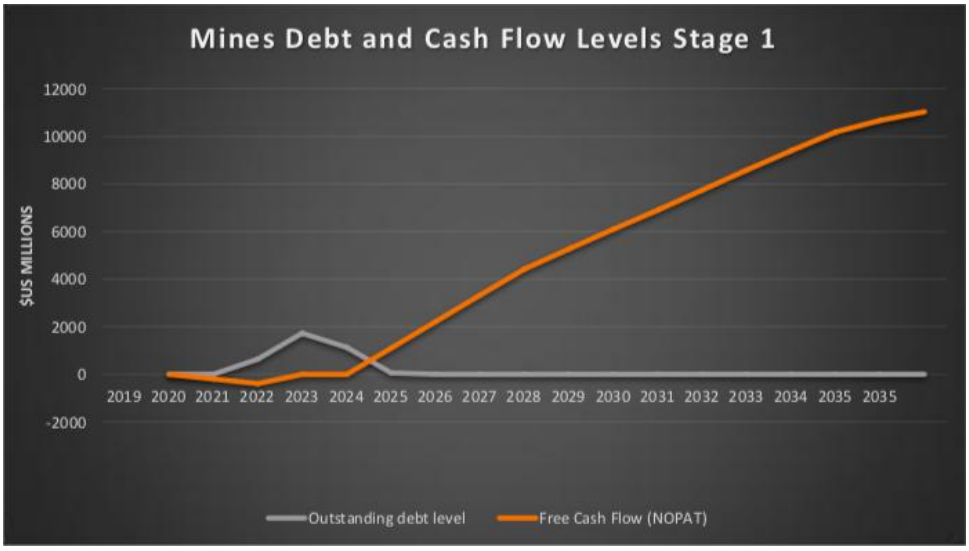
SUNDANCE 从 2008 年开始进入喀麦隆，从 2009 年开始进入刚果;在此期间投入了 4 亿美金开发项目，才取得了今天的成果。通过这么多年的运作，发展建立了一个非常强的地质、工程、技术和环境数据库，同时也在两国建立起了强大的社会关系网。

此项目通过了所需的一切审批，喀麦隆和刚果两国的财政制度合并条约已通过(免税期，税率，特许权使用费等)。刚果出具了 25 年矿山开发许可，并已与喀麦隆政府签署了转让协议，用于转让铁路和港口所有权以及资金和建设义务给喀麦隆政府；一旦资金到位，即可开始项目建设。

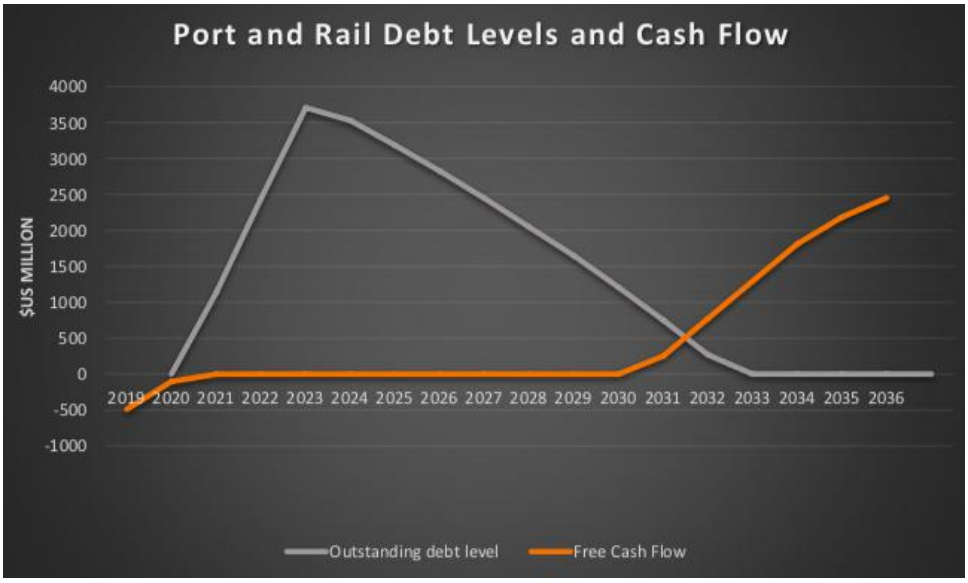
(3) 投资估算及回报

矿山投资：

预计项目净现值为 25.72 亿美元，内部收益率为 38%



港口和铁路投资：预计投资回报期为十年



3.5.2. 津巴布韦锂锡钽多金属矿床项目

(1) 背景介绍

津巴布韦新政府计划把本国打造成全球第五大“白色石油”锂矿系列产品出口国。该锡锂钽矿床中的锂矿资源，是津巴布韦政府的储备矿，被视为国家的金库。该矿历史上曾作为锡矿开采，于 1936 年开工，1994 年 6 月停工，开采历史达 58 年，先后被英国、荷兰和德国等公司生产。1994 年后因国际锡价整体下跌而停滞，其后被津巴布韦政府收回。在 2015 年，与津巴布韦政府国有公司签署并成立合资公司，并在一系列的招标竞争中，成功中标。合资公司持有包括该锂矿资源在内的该大型矿产的永久采矿许可（采矿租约）权。

该矿床位于津巴布韦西部，距离布拉瓦约市约 290 公里，距离首都哈拉雷约 750 公里（公路距离），均为国家主要公路相连，距铁路中转站大约 40 公里，铁路可直达莫桑比克贝拉港。维多利亚机场不到 200 公里，交通方便。

资源分为两部分，一部分是历史尾矿，另一部分是未开采的矿石。

历史尾矿：根据历史生产情况和对尾矿的采样分析估算，目前保有尾矿资源约 2389.2 万吨，平均氧化锂品位为 0.74%、锡 0.043%、氧化钽 15 克/吨、氧化铍 0.045%，含氧化锂约 176800 吨，锡 10273 吨，氧化钽 358 吨，氧化铍 10751 吨。相当于一个大型可露天开采的锂多金属矿，这一部分将做为本项目的首采资源。根据 2017 年报告，对尾矿中的锂资源有较为系统的调查，并进行了三维建模来估算资源量。保有尾矿资源约 2389.2 万吨，平均氧化锂品位为 0.74%、经选矿试验研究，锂精矿品位可达 5.46%，回收率 75%。

未开采矿石：根据四川省冶金地质勘查局某大队核实，目前矿区保有矿石量 4118.3 万吨，锡金属量 56286 吨，锡平均品位 0.137%；钽（Ta_2O_5）金属量 5061 吨，平均品位 0.0123%；钽铌（Ta_2O_5 +Nb_2O_5）金属量 9145 吨，平均品位 0.0222%；锂（Li_2O）金属量 341824 吨，平均品位 0.83%；铍（BeO）金属量 37065 吨，平均品位 0.09%；铷（Rb_2O）金属量 86489 吨，平均品位 0.21%。属于特大型级别矿山。

资源前景：除以上探明的资源量以外，采矿权范围内还有大量可供勘查的靶区，以进一步增加储量，勘探前景巨大，可以定义为锂锡钽特大型多金属矿。

(2) 投资估算及回报

一期建设：主要开采历史尾矿资源，浮选厂年处理量 300 万吨（附带简易重选厂）：估算投资金额 1000 万美元左右，建设周期 8-10 个月；尾矿资源可生产约 8 年。

产品是锂精矿（氧化锂品位 5.5%）15 万吨及 200 吨钽精矿（品位 20%）、1000 吨锡精矿，（品位 50%）。

原矿加工采选成本约 10 美元/吨，折合产品*生产成本 170 美元/吨*；

矿区到万基铁路站运输费用 10 美元/吨，万基铁路站到莫桑比克港口运输及储存费用 100 美元/吨，莫桑比克马普托港到中国海运费 25 美元/吨，合计*产品*

到岸成本 305 美元/吨。

到岸销售价格约 670 美元/吨；

利润 365 美元/吨，所得税 25%，人民币对美元汇率按 7.5 计算，*年产值约*

效益测算表（日处理 10000 吨，年总计 300 万吨）

作业	项目	单位	锂 辉石	钽	锡	合计
原矿	日处理量	吨	10000	10000	10000	10000
	品 位	%	0.69	0.003	0.042	
	金属量	吨	69	0.3	4.2	
精矿	精矿量	吨	627.27	0.6	3.36	
	品 位	%	5.5	20	50	
	金属量	吨	34.5	0.12	1.68	
	产 率	%	6.27	0.01	0.03	
回收率		%	50	40	40	
效益	不含税单价	元/吨	5000	200000	100000	
	总产值	万元	313.64	12	33.6	325.64
	单位矿石产值	元/吨	313.64	12	33.6	325.64
	单位生产成本	元/吨				60
	原矿单位价值	元/吨				265.64
原矿单位利润		元/吨				265.64
总利润		万元				265.64

1.2 亿美元 ，年利润总额：5500 万美元，年净利润约 4000 万美元。

二期建设：矿山及重浮联合选矿厂：

在一期生产阶段进一步开展矿区资源勘探工作，提高资源量和级别，一期投产 5 年后考虑开始建设，主要先露天开采后地下开采锂锡钽矿石及建设重选厂+浮选厂，采选规模 200 万吨/年，产品是锂精矿、锡精矿、钽精矿；预计投资 1 亿美元，年效益不低于 3000 万美元；矿山可开采 20 年以上。

三期建设：碳酸锂厂

二期投产后结合市场价格和建设条件研究建设碳酸锂生产线，计划在投产 3 年后开始建设碳酸锂厂：年产碳酸锂约 33000 吨。预计投资 1 亿美元，年效益不

低于 3300 万美元。

(3) 未来前景

伴随新能源汽车行业的蓬勃发展，作为新能源电池不可或缺的核心原料的锂越来越成为重中之重，碳酸锂的需求未来几年将有 1-3 倍的增长，特别是中国市场需求量越来越大。

中国是世界上最大的锂消费国，日韩等国家的消费量也在逐年增长。

2017 年，中国碳酸锂进口量同比增长约 40.7%，氢氧化锂出口同比增长约 97.1%。 进口锂辉石精矿 94 万吨和锂原矿 183 万吨；出口氢氧化锂、金属锂、锂离子正极材料及锂电池等。

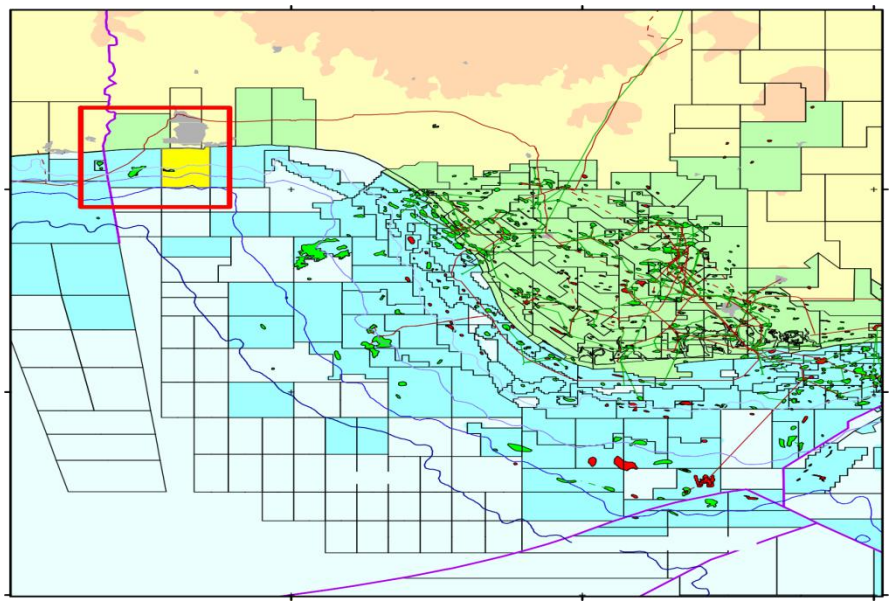
世界主要锂生产国包括中国、智利、阿根廷、美国、澳大利亚、俄罗斯等。2017 年，世界锂及其衍生物产量折合碳酸锂当量约 23.54（2016 年 19 万吨）。

3.5.3. **OPL 310 绿洲项目**

(1) 项目简介

OPL 310 平台面积 1850 km²，水下深度 10-200 米，位于拉各斯达荷美盆地近海。

2C 石油储量 700 MbBLs，远景资源储量 8453 MbBLs，天然气储量 2 TCF。



Optimum Petroleum 是平台运营者，出资比例为 82.86%。OPL 310 由于其公司自身问题而延误多年，并通过直接筹集资金用于快速评价钻井和油田的早期生产以及与 OML 的对话来重整自己的业务。由于石油服务市场价格疲软，特别是在半潜水市场，这种延迟给 OML 的转换带来了风险，造成了早期的生产收入的延迟，并增加了开发成本。

基于这些原因，Optimum Petroleum 已决定通过宣布快速现场开发计划和相关的资本筹集来带领 OPL 310 的技术和金融发展。牌照到期日期为 2019 年 2 月 10 日，并计划撤出 OPL 310 的 22.75%的股权。任务分包的中期计划正在启动，需要大量的外部资本来解锁 OPL 310 内的潜在价值。

然而，OPL 310 的早期特性意味着，传统债务融资对于早期钻探阶段可能是不适当或不可用的资本来源，尽管从理性上讲对于长期发展而言是最低的资金投入。目前的市场意见表明，股权资本可能是适用的，但是所有权必须清晰，无法律争议。需要对参与所有权进行严格澄清，而无需提出法律挑战。因此，Optimim 可能采用联合一些非传统融资方案来为其增长的这个评估钻探阶段提供资金。

OPL 310 具有广阔的前景和发展趋势，分别位于邻近的石油开采租赁公司 OML 113 和贝宁近海的 Aje 和 Seme 油田也是如此。OPL 310 拥有许多潜在的油气聚集前景。在该区块上识别出的三种地层类型包括：AJE 型似地下高空闭合构造；圈闭和截断圈闭上的 SUBCROP 地层；FANS 型深水海底扇。OPL310 中的（Ogo）结构正好类似于 AJE 场，并且在向东 25 公里的趋势上。OPL 310 具有总可采储量超过 22 亿桶石油和 2.2TCF 天然气，可用于新的区域天然气市场。OGO 1 和 2 在 2013 进行了钻探。

(2) 投资亮点

井的类型	开井	TMD（m）WD(m)结果	研发领域	评论
Ogo-1勘探	2013/4/23 2013/6/25	3205石油和天然气 90	Ogo	井遇轻质油160种，净65元
Ogo-1ST评估	2013/11/1 2013/11/19	5482石油 90		

OPL 310 被评为世界级、低成本的生产资产，具有可预见性的现金流，且具有有吸引力的财政条款：允许收益优化和风险缓解（成本恢复机制），通过对现有开采的开发和其它已发现的目标开采会形成强劲的管道增长。

另外，Optimum Petroleum 深入了解非洲的 O＆G 地形和探究无机生长的机遇，并与运营商、本地合作伙伴、政府和监管机构的紧密关系。

3.5.4. 西非北极星投资有限公司

(1) 背景介绍

西非北极星投资有限公司(WAPIL)委托 Geoprob 有限公司在尼日利亚科吉州 Yagba West LGA Ejiba 镇西北 13.5 公里处进行地质勘探，勘探许可证 12694EL，勘探许可证面积 63.51 平方公里。该地区位于尼日利亚西南部的 Isanlu 片岩带，由云母片岩、角闪石和部分被浅层铁榴辉岩掩盖的带状铁形成的复杂混合物组成。在这些岩石内部是一系列东北走向的石英和石英长石-莫斯科岩(伟晶灰岩)脉，沿 1.2 公里长的间歇走向带金钽矿化。

从目前的手工工作中，对脉状石英、原地或浮子或矿山废料的岩屑取样显示，金的富集量可达 36 g/t，在约 400 米的走向长度内平均为 8.5 g/t。这就为地下 30 米以下的 67000 盎司黄金提供了资源基础，可供露天开采和浅层地下开采。金的提取将通过重力分离和必要的氰化物浸出。

可行性前期评估确定了一个可行的金矿开采项目，该项目以每小时 40 吨的速度进行矿石加工，在 3 年内每年可生产 21,120 盎司黄金。采矿项目将需要大约 202 万美元的资本投资和年度运营开支。这将在业务的第三年产生预期的正的净现金流和回收期。

另一方面，Banka 钻探的地表残积冲积(砂矿)矿床显示出极低品位的金富集，平均值为 0.02 g/t，尽管在淘金精矿中可见明显的金粒。然而，这在很大程度上归因于金在成矿过程中分布的严重“金块”效应，需要采用特殊的取样方法。目前还不认为这是一种采矿资源。然而，班卡钻探样品中金矿品位的分布在容易与主要手工脉工作面相关的区域内显示出相对较高的聚类值。

勘探许可证 12694EL 确定了两个黄金目标，它们可以支持采矿项目并为进一步勘探和开发提供额外的潜力。该矿区还具有带状铁成矿带，是一种值得进一步研究的潜在铁矿资源。

因此，进一步开展工作，以便更好地确定金矿化，评价其全部经济潜力和带状铁层的经济潜力。这应包括地球物理调查、开挖、概念钻井的证明、大量取样和矿石的冶金试验。

(2) 财务分析

评价的基本目的是确定采矿项目在财务上是否值得。对项目进行审查，并与预先确定的标准进行比较。那些达到或超过标准的项目被认为是有经济价值的。但是，这里提出的分析和评价绝不是详尽的，只能作为指导，因为在执行采矿和

开采计划时也可以考虑到其他问题。计划中的采矿项目有许多财务评价技术，例如:

投资回报期

已投资资本回报

净现金流(净现值，NPV 内部收益率，IRR)

前两种方法是传统的方法，尽管有缺点，但仍被广泛使用，尽管目前的趋势是倾向于贴现现金流量的变体之一。这是由于最近开发的基于计算机的软件包消除了许多与这些方法相关的长时间计算。财务评价将采用下列参数和假设:

收入概况：

下表显示了项目地区开采金的预计产量和收入。

	Day	Week	Month	Year	Remarks
Ore processing (tonnes)	320	1,600	6,400	76,800	@ 40t/hr
Gold Production (oz)	88	440	1,760	21,120	@ 8.5g/t Au
Gold Revenue (US$)	105,600	528,000	2,112,000	25,344,000	@ 1,200 US$/oz
Gold revenue (₦)	16,896,000	84,480,000	337,920,000	4,055,040,000	@ ₦160 = 1US$
MINE LIFE @ 40t/hr (21,120 oz/yr) = 3 YEARS RESOURCE BASE = 67,000 oz Au					

黄金价格/市场：

目前世界市场上的黄金价格约为每盎司 1,300 美元。但是，拟议的锡矿项目的现金流量分析用了$ 1 200/oz。自 2009 年金价突破 1000 美元/盎司以来，金价出现了惊人的上涨(见下表)。所有指标都表明，未来几年金价将稳定甚至上涨。

Year	USD	EUR	GBP
1999	290.2	289.6	180.1
2000	274.5	292.3	183.7
2001	276.5	310.5	189.9
2002	347.2	330.9	215.7
2003	416.3	330.0	232.5
2004	435.6	320.5	226.9
2005	513	434.9	298.8
2006	632	479.3	322.9
2007	833.8	570.3	418.8
2008	869.8	625.7	604.9
2009	1087.5	757.9	673.4
2010	1405.5	1047.7	897.7
2011	1531	1179.4	985.1
2012	1657.5	1257.2	1019.7
2013	1316.7	974.6	819

资本成本：

下表估计了拟议中未来金矿开采和加工的资本成本。资本费用是开采和加工金矿的厂房和机械的费用，以及基础设施和其他便利设施(例如水库/供水、电力、道路、选矿厂、建筑物等)的费用。

ITEM	QUANTITY	UNIT PRICE (Million ₦)	TOTAL PRICE (Million ₦)
Excavator	1	25	25
Front-end Loader	1	12	12
Dump Truck	2	8	16
Modular Gravity Separation Plant with crushing and grinding unit	1	56 (eqv. US$ 350,000)	56
4x4 Pickup vehicle	2	5	10
Electric Generator	1	5	5
Drilling/Blasting Gear/Explosives	-	10	10
Shaft construction	2	15	30
Water Reservoir	1	5	5
Land compensation and CSR	-	-	50
Staff Housing, Offices, Warehouse and Other facilities	-	-	50
Roads, Pipeline, Power line etc	-	-	10
Additional Exploration	-	-	15
	Contingency @ 10% of total		29.4
	TOTAL		**323.4 (eqv, US$ 2.02 Million)**

运营成本：

主要的操作成本是项目中使用的不同机器所需的燃料。该地区没有电力供应，所有设备将直接或间接由燃料驱动。据估计,大约每年的总运营成本为 4800 万。

管理费用：

这一费用包括管理人员、工程师、熟练工人和非熟练工人的所有劳动力成本。预计总计₦1.14 亿/年。

专利税：

尼日利亚联邦政府对黄金的生产和出口收取 3%的特许权使用费。

现金流：

现金流量衡量的是一个项目在特定时期内现金“水平”的变化。下表显示了从预期中确定的最初资源基础开始的头四年黄金生产的预计现金流量计算。

Year	0	1	2	3
Gold Production *(oz)*	-	21,120	21,120	21,120
Gold Price/oz (USD)	1,200	1,200	1,300	1,400
CASH IN (+ve) Revenue (₦)	-	4,055,040,000	4,392,960,000	4,730,880,000
CASH OUT (-ve) (₦)				
Operating costs	-	48,000,000	52,800,000	58,080,000
Overhead costs	9,500,000	114,000,000	125,400,000	137,940,000
Capital costs	323,400,000	-	-	-
Royalty (₦)	-	121,651,200	131,788,800	141,926,400
TOTAL CASH OUT (₦)	332,900,000	283,651,200	309,988,800	337,946,400
NET CASH FLOW (₦)	(332,900,000)	(49,248,800)	260,740,000	598,686,400

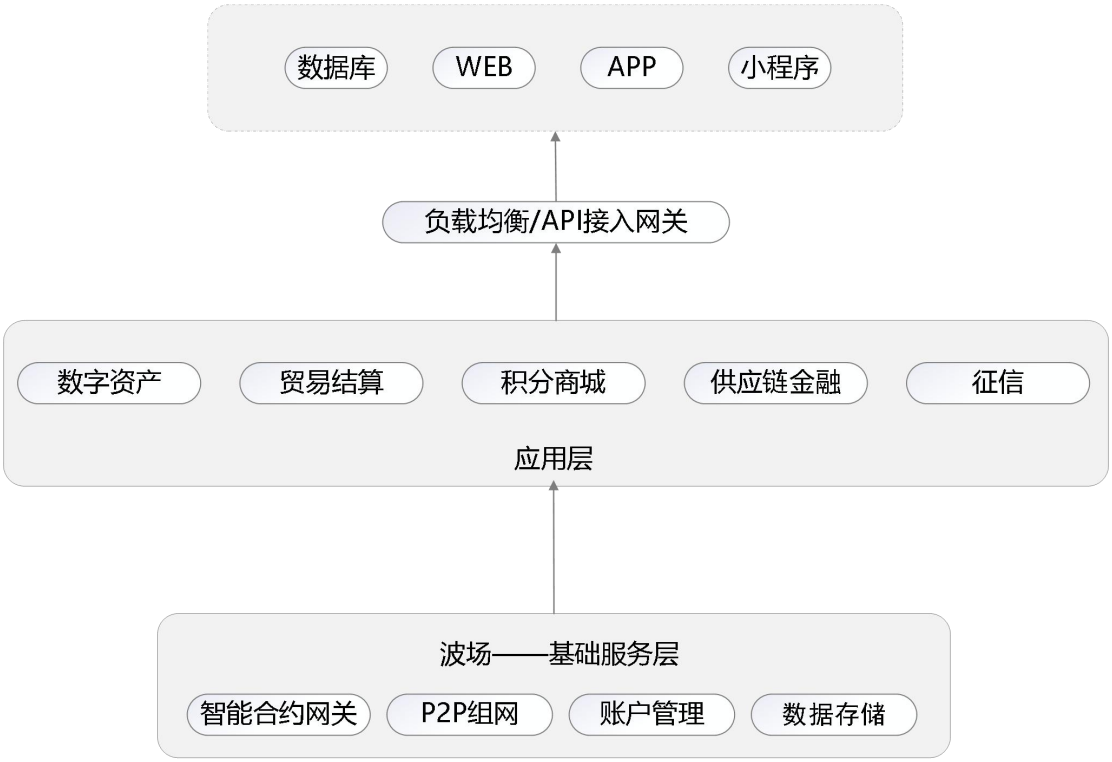
回报期：

正如其标题所示，这种技术只是确定了在项目中投资的初始资本(负现金流)通过年度正现金流流收回所花费的时间，即扣除税收后的年度收入支出盈余。值得注意的是，这种方法利用的是现金流而不是利润，因此有必要估计折旧率。净现金流量是现金流入总额和现金流出总额之间的差额。累计现金流量可以用来确定回收期。从下表可以看出，拟采金项目的回收期为 3 年。

Time (Years)	0	1	2	3
NET CASH FLOW	(332,900,000)	(49,248,800)	260,740,000	598,686,400
CUMULATIVE CASH FLOW	(332,900,000)	(382,148,800)	(121,408,800)	477,277,600

4. 非带链技术框架

非带链的技术框架主要围绕数字资产、跨境交易方向，数字资产在链上如何储存、流转、调用、激励等，以及设计它的所有协议。



4.1. 智能合约的管理

（1）合约类型

企业级服务链的合约部分包括“标准合约”以及“定制合约”两种类型。

标准合约包括企业在标准情况下使用常用服务，如数据存储、调用、修改、更新等。标准合约可以实现医疗数据资产一致性检查、自动成交撮合、到期自动清算等逻辑相对简单的合约，属于链上的内置合约，可以直接调用。

定制合约可以包括链上的企业与企业间达成的交易，促进生态开展更多的业务逻辑，围绕入驻企业各自的业务逻辑和商业逻辑，打造更具体、适配性更强的定制合约等。因为非带链的链上的数据安全性和隐匿性要求，定制合约必须在严格监管下进行。

（2）合约运行过程

智能合约包括合约的注册、触发、执行以及注销四个部分：

注册：用户将编写好的智能合约，通过安全管理后，进入企业级服务链的过程，未来企业级服务链将支持多语言编写智能合约。

触发：在合约注册之后，通过外部条件来触发合约执行的过程，支持定时触发、事件触发、交易触发和其他合约触发的方式。

执行：合约代码在独立的环境中运行的完整过程，包括对合约构造镜像环境、代码执行、执行代码中状态修改的共识以及共识的异常处理。

注销：对已经执行过、过期作废或者业务需求变更不再需要的合约进行转存，清理，清理的过程需要多节点共识之后才能完成。

（3）合约燃料

部署和触发智能合约的最大能量限制是函数变量，使用 TRX 作为燃料消耗代币：

- 冻结 1 TRX 的动态能量为 50,000,000,000
- 燃料限制是冻结 TRX 的每日帐户燃料的限制
- TRX 中的费用限制在智能合约部署/触发呼叫中设置
- 帐户中剩余可用的 TRX。如果直接购买，每个 TRX 的能量（10 SUN = 1 Energy）= 100,000，SR 可以投票调整

有两种消耗方案可以计算部署的最大能量限制触发。 逻辑可以表示如下：

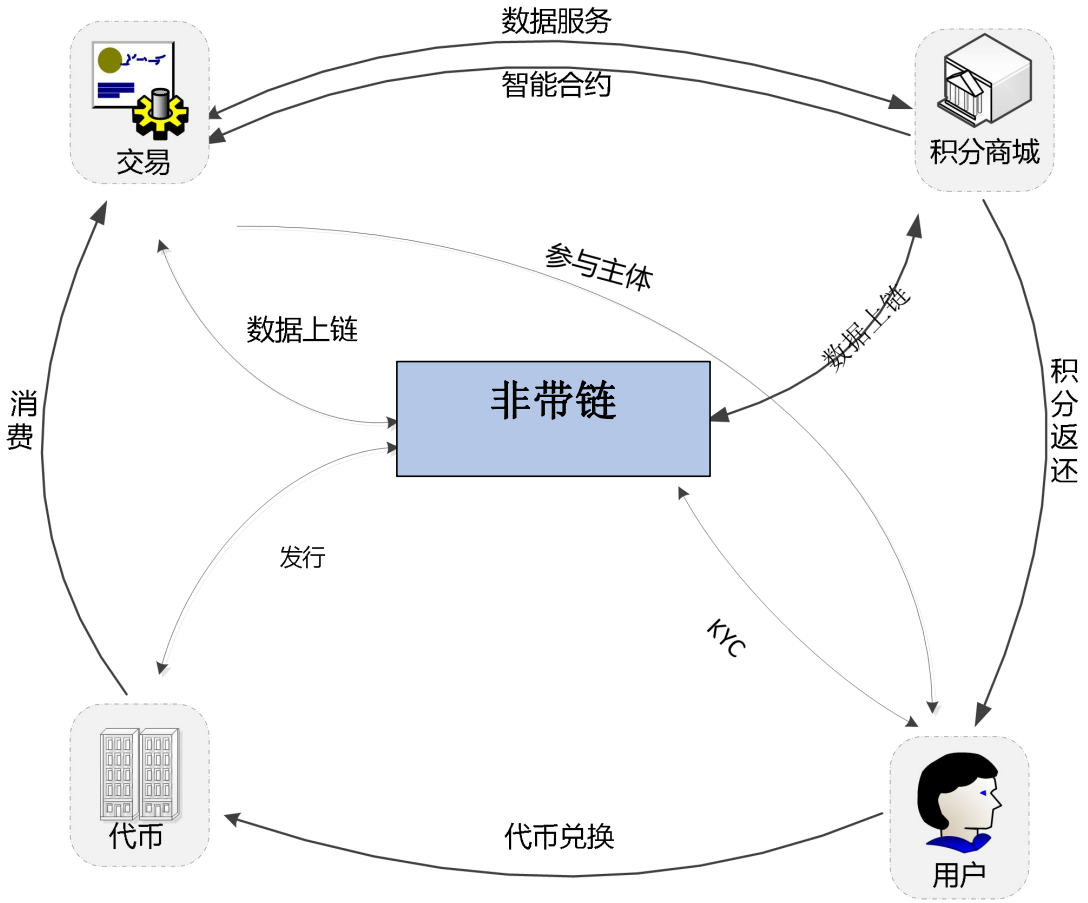
```
const R = Dynamic Energy Limit
const F = Daily account energy from freezing TRX
const E = Remaining daily account energy from freezing TRX
const L = Fee limit in TRX set in deploy/trigger call
const T = Remaining usable TRX in account
26
const C = Energy per TRX if purchased directly
// Calculate M, defined as maximum energy limit for deployment/trigger of
smart contract
if F > L*R
let M = min(E+T*C, L*R)
else
let M = E+T*C
```

4.2. 通证流转体系

非带链旨在构建一个自治的区块链跨国贸易生态，引入合理的激励机制，将价值返还给“一带一路”的参与贡献者。

非带链的愿景是用区块链技术打破传统贸易的商业模式，用区块链赋能传统贸易和实体经济，响应国家“一带一路”政策的号召，通过激励机制完成整个贸易的商业闭环。

我们了解到用户参与的所有交易都可以用非带链的代币 ATT 进行支付，同时，用户进行交易可获得一定的积分奖励，这样就促进了用户的二次消费，从而完成了整个贸易体系的商业闭环。



4.3. 跨链与侧链

跨链技术是服务于多条公链生态的，打通了链与链之间的价值传递的障碍，本质上来说是实现了两条链上的货币资产进行兑换。对于非带链——去中心化的资产管理平台，我们需要实现资产管理的去中心化、投资者的去信任化、资产安

全的去信任化，基于跨链技术的智能合约可以更好地帮助我们建设非带链。

(1) 主流的跨链技术

- 公证人机制
- 哈希锁定
- 侧链/中继
- 分布式私钥控制

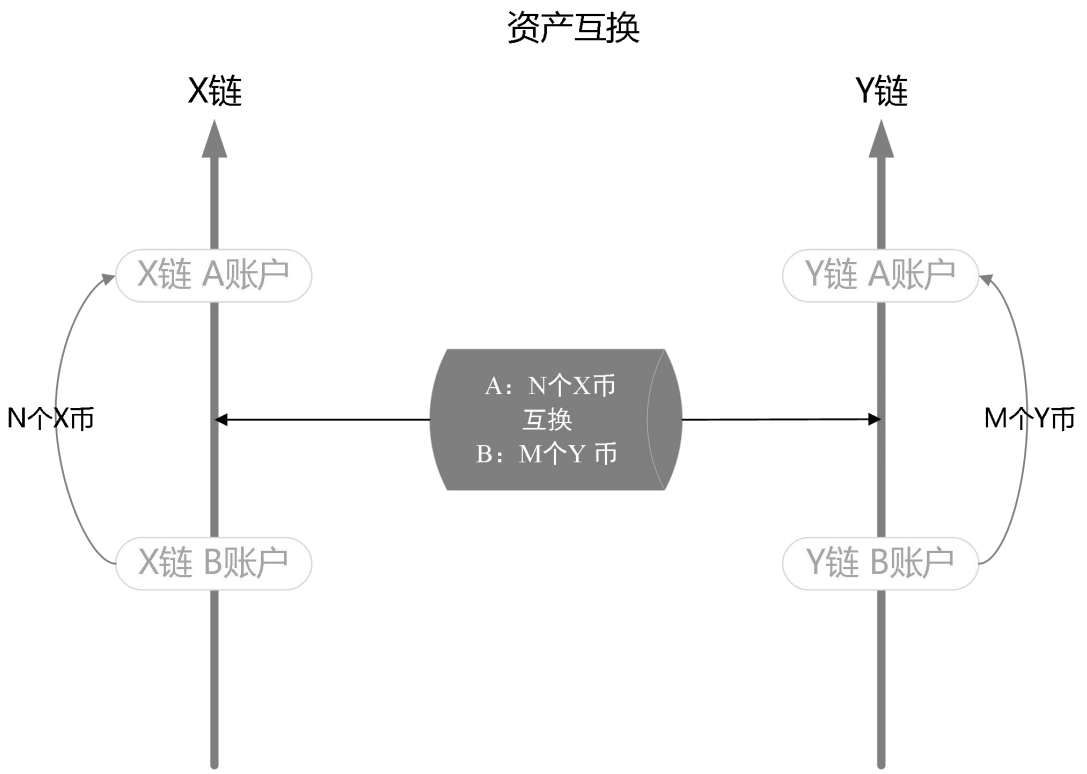
(2) 非带链的跨链原则

- 链与链之间的资产转移是自由的，可以从一条链转移到另一条链，并且还能够再转回来；
- 资产之间的转移，不能有第三方进行干扰；
- 跨链交易需要满足原子性，要么发生，要么不发生，不能凭空损失和创造资产；
- 跨链协议的稳定性，要求一条链遭到外部攻击不能影响到另一条链上的资产安全。

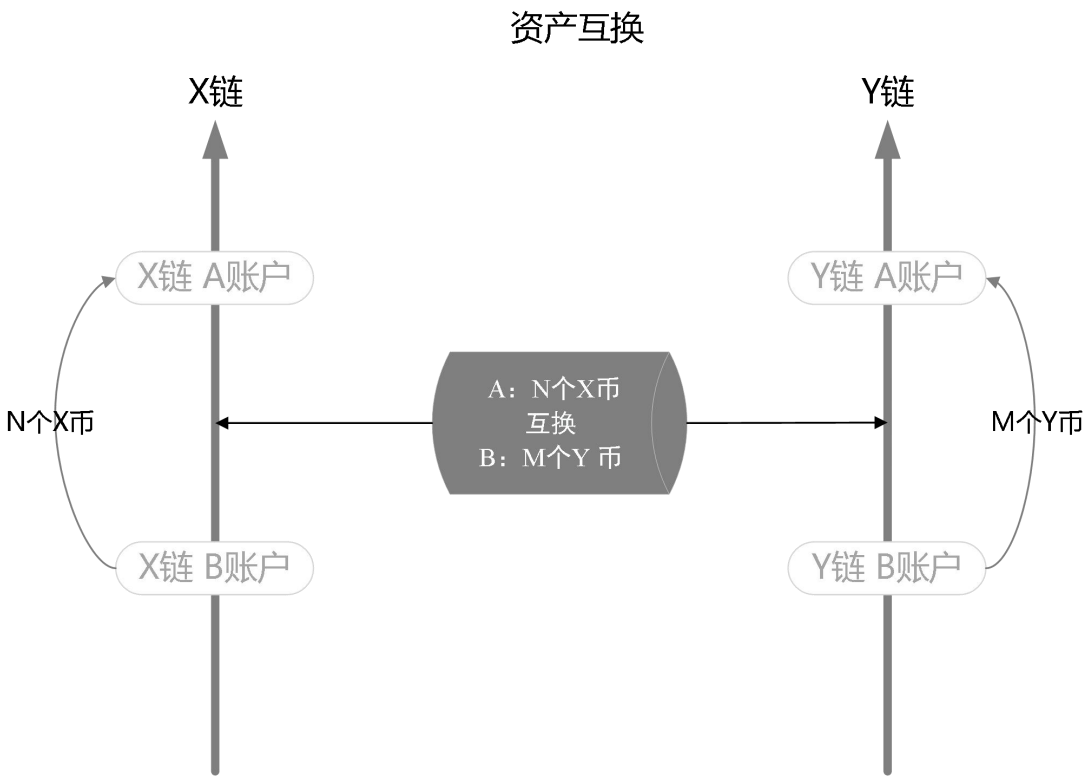
(3) 跨链的表现形态

跨链的主要两种表现形态：链间资产转移和链间资产互换。

链间资产转移：即两条链上的资产进行互换，在这个过程中并不增加与改变两条链上的资产总值。链上的资产互换与中心化交易所中的币币兑换类似，但是这个过程却是在链上进行。加入 A、B 二人想进行数字资产的交换，又不想在中心化交易所进行，A 只需要把 X 链上的资产转移到 B 的 X 链的地址中，而 B 则是把 Y 链上等值的资产转移到 A 的地址中即可。



链间资产互换：与链间资产互换不同的是，链间的资产转移实际上起到了改变链上资产数量的效果。相当于资产从一条链转移到了另一条链，比如一种数字资产从 X 链转移到了 Y 链，相当于将 X 链资产发送到某个特定地址中，这个地址中的币是锁定的。而在 Y 链中，从一个特定的地址，这个地址之前是锁定的由于激活了某些协议，而生成的币发送到可以灵活使用的地址中，便实现了资产的转移。链间资产转移可以是单向也可以是双向的。



4.4. 多方协商机制

在通信网络中，为了保证传输数据的安全，一般可以采用对通信双方的身份进行认证和对通信的数据进行加密。对于公开网络，一般采用非对称加密技术。非对称加密技术是保证区块链数据安全的底层技术。在非对称加密技术中，包含公钥和私钥两个密钥，密钥的产生式通过密钥协商体制来完成。下面先介绍一个简单的三方协商协议，具体流程如下：

1）A，B，C 能够知道每个参与者的公钥 g^a，g^b，g^c。

2） A 选取一个随机数 x，计算 g^{xb}，g^{xc} 分别发送给 B 和 C。

3） B 选取一个随机数 y，计算 g^{ya}，g^{yc} 分别发送给 A 和 C。

4） C 选取一个随机数 z，计算 g^{za}，g^{zb} 分别发送给 A 和 B。

5）A，B，C 在收到其他参与者发送的消息后，分别计算会话密钥 $K_A = e(g^{yaa^{-1}}, g^{zaa^{-1}})^x = e(g,g)^{xyz}$，$K_B = e(g^{xbb^{-1}}, g^{zbb^{-1}})^y = e(g,g)^{xyz}$，$K_C = e(g^{xcc^{-1}}, g^{ycc^{-1}})^z = e(g,g)^{xyz}$。很明显，会话密钥 $K_{ABC} = K_A = K_B = K_C = e(g,g)^{xyz}$。

由于非带链涉及的主体较多，包含海外用户、供应商、交易主体、银行、监管部门等，三方协商协议可能无法满足非带链的所有应用场景，因此，有必要将三方密钥协商机制扩展为多方密钥协商机制。下面是应用于非带链的多方密钥协商机制的具体流程。

令 G_1 和 G_2 是两个阶为素数 q 的乘法循环群，令 $e: G_1 \times G_1 \rightarrow G_2$，g 是 G_1 的生成元；$sig_i(m)$ 表示用户签名；E_{PK_i} 表示用户的公钥加密算法；H 为 Hash 函数。

1）用户 U_i 利用随机数生成器生成随机数当做自己选择的私钥 s_i 且保存，计算 g^{s_i} 发送给其他用户 $U_j(1 \le j \le n, j \ne i)$，发送的消息为 $sig_i(H(m_i))$ 和 $H(g^{s_i})$，其中 $m_i = E_{PK_j}(g^{s_i})$。这里相当于用户把自己选择的公钥发送给了系统中的每个用户，没有授权的用户是看不到的，其中 $H(g^{s_i})$ 一样要写入区块链账本。

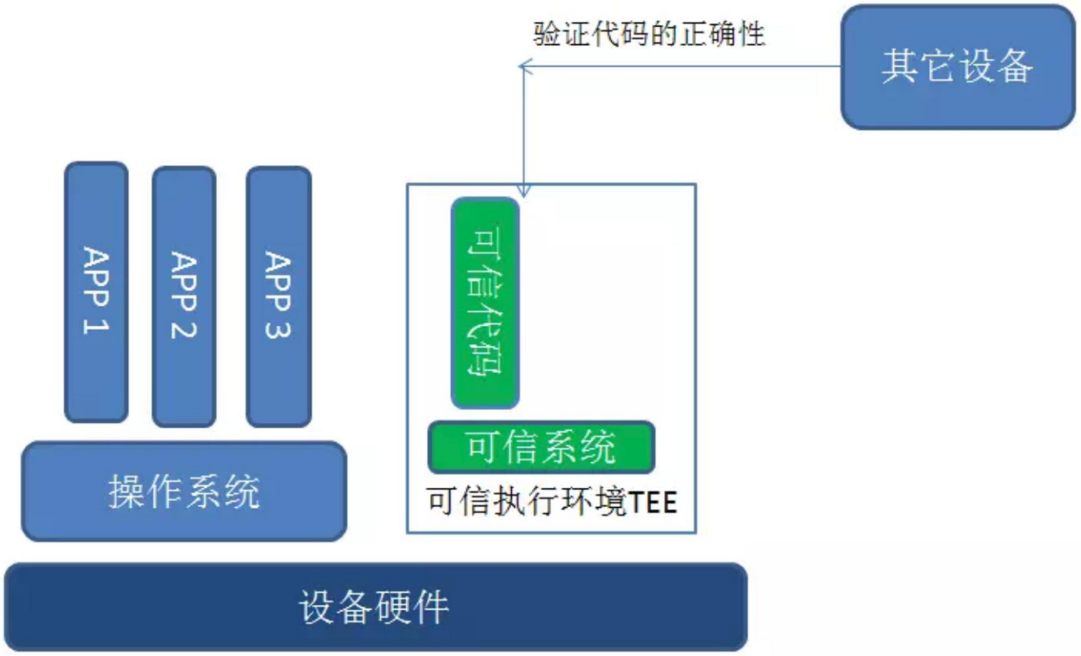
2）U_i 收到上一轮发来的消息，先验证签名，再解密得到每个用户的 g^{s_i}，然后选择一个随机数 r_i 计算 $Z_i = g^{r_i s_{i-1}}$，$M_i = g^{r_i s_{i-2}}$ 将 $sig_i(H(m_i'))$ 和 $H(Z_i)$，$sig_i(H(m_i''))$ 和 $H(M_i)$，其中 $m_i' = E_{PK_{i-1}}(Z_i)$，$m_i'' = E_{PK_{i-2}}(M_i)$ 分别发送给用户 U_{i-1}, U_{i-2}。这里除了交易记录要写进区块链账本，后面的 $H(Z_i)$，$H(M_i)$ 也要写入账本当中。

3）用户 U_i 按照第二轮的方式得到 $Z_{i+1} = g^{r_{i+1}s_i}$，$M_{i+2} = g^{r_{i+2}s_i}$ 后，分别计算自己的份额 $k_i = e(g^{r_{i+1}s_i s_i^{-1}}, g^{r_{i+2}s_i s_i^{-1}}) = e(g,g)^{r_i r_{i+1} r_{i+2}}$，将消息 $sig_i(m_i''')$ 和 $H(k_i)(i \ne j, i, j = 1, 2, \ldots, n)$，其中 $m_i''' = E_{PK_j}(k_j)$ 分别发送给用户 $U_j(1 \le j \le n, j \ne i)$。

4）用户 U_i 得到 k_i 后，计算会话密钥 $K = \prod_{i=1}^{n} k_i = e(g,g)^{r_1 r_2 r_3 + r_2 r_3 r_4 + \ldots + r_n r_1 r_2}$。

4.5. 可信执行环境

可信执行环境（Trusted Execution Environment）是移动设备（包含智能手机、平板电脑、机顶盒、智能电视等）主处理器上的一个安全区域，其可以保证加载到该环境内部的代码和数据的安全性、机密性以及完整性。TEE 提供一个隔离的执行环境，提供的安全特征包含：隔离执行、可信应用的完整性、可信数据的机密性、安全存储等。

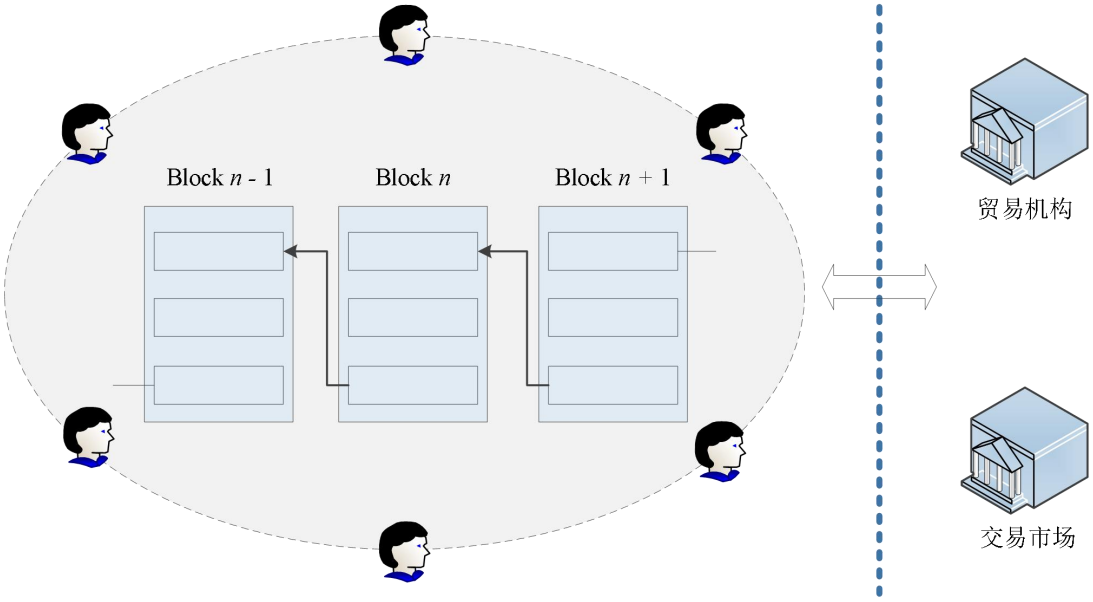


TEE 技术提供了三个功能：1. 安全性，TEE 是一个隔离区域，非授权设备或操作系统都无法对其进行操作。2. 机密性，TEE 内运行的程序是处于加密状态的，非授权设备或操作系统无法查看 TEE 内运行的程序。3. 可验证，在保密的前提下，TEE 内运行的代码可以接收外界验证。比如某设备的 TEE 内部运行一份代码，其它设备可以验证运行的代码是否与其公开的代码一致。

4.6. 激励机制

非带链的账本需要参与挖 ATT 的用户来共同维护，通过他们的交易行为来验证交易和区块的正确性。每通过交易产生新的积分以奖励交易用户，在激励机制中，我们从新块中的中奖的交易所获得奖金中分配一定比例的奖金给交易用户以激励他们交易行为。

我们提出的非带链、交易市场和交易项目共同构成一个完整的贸易生态系统，如图所示。



步骤 1：记账节点接收交易信息，并将交易信息写入区块中；

步骤 2：记账节点判断区块是否写满，或写入过程是否超时，判断为“Y”则转入步骤 3，否则转入步骤 1；

步骤 3：记账节点对交易信息进行共识，并调用智能合约计算交易的价值量 $V = M - C$，其中 M 为交易金额，C 为交易成本；

步骤 4：记账节点判断目前已发放货币总量 RMB 是否大于或等于货币总量 W，判断为“Y”则转入步骤 9，否则转入步骤 5；

步骤 5：记账节点根据交易的价值量为客户和供应商奖励，奖励的计算公式为 $R = V * K_I$，其中 R 为发放给供应商和用户的奖励总数，二者之间的分配比例可以根据实际情况进行设定，例如设定而这分配的比例为 1：1，K_I 为当前周期的奖励系数；

步骤 6：记账节点根据发放的奖励更新发币总量 RMB 和当前周期实际发币量 RMB_C，其中发币总量计算公式为 $RMB = RMB + R$，当前周期实际发币量计算公式为 $RMB_C = RMB_C + R$；

步骤 7：判断当前周期实际发币量 RMB_C 是否大于等于预设周期内的发币量 RMB_R，判断为 Y，则转入步骤 8，否则转入步骤 3；

步骤 8：记账节点根据当前周期实际发币量 RMB_C 更新奖励系数 K_I，并将当前周期实际发币量 RMB_C 清零；奖励系数的更新公式为 $K_{I+1} = \frac{T_i}{T} * K_i * \frac{RMB_R}{RMB_c}$，其中 T_i 为上次更新奖励系数到本次更新奖励系数的时间，T 为预设的发币周期。

步骤 9：结束。

4.7. 代币的交易

交易在广播到网络之后，所有交易被放到区块中。经过 19 个区块后在 TRON（包括其自己的区块）上开采，交易得到确认。 每个区块都是由循环赛中排名前 27 位的超级代表之一。 每个块需要约 3 秒钟在区块链上开采。 由于网络的原因，每个超级代表的时间可能略有不同条件和机器配置。 一般而言，交易被认为是完全确认在 1 分钟之后。

波场交易的 API 如下：

```
message Transaction {
message Contract {
enum ContractType {
AccountCreateContract = 0; // Create account/wallet
TransferContract = 1; // Transfer TRX
TransferAssetContract = 2; // Transfer TRC10 token
VoteWitnessContract = 4; // Vote for Super Representative (SR)
WitnessCreateContract = 5; // Create a new SR account
AssetIssueContract = 6; // Create a new TRC10 token
WitnessUpdateContract = 8; // Update SR information
ParticipateAssetIssueContract = 9; // Purchase TRC10 token
AccountUpdateContract = 10; // Update account/wallet information
FreezeBalanceContract = 11; // Freeze TRX for bandwidth or energy
UnfreezeBalanceContract = 12; // Unfreeze TRX
WithdrawBalanceContract = 13; // Withdraw SR rewards, once per day
UnfreezeAssetContract = 14; // Unfreeze TRC10 token
UpdateAssetContract = 15; // Update a TRC10 token’s information
ProposalCreateContract = 16; // Create a new network proposal by any SR
ProposalApproveContract = 17; // SR votes yes for a network proposal
ProposalDeleteContract = 18; // Delete a network proposal by owner
CreateSmartContract = 30; // Deploy a new smart contract
TriggerSmartContract = 31; // Call a function on a smart contract
GetContract = 32; // Get an existing smart contract
UpdateSettingContract = 33; // Update a smart contract’s parameters
```

```
        ExchangeCreateContract = 41; // Create a token trading pair on DEX
        ExchangeInjectContract = 42; // Inject funding into a trading pair
        21
        ExchangeWithdrawContract = 43; // Withdraw funding from a trading pair
        ExchangeTransactionContract = 44; // Perform token trading
        UpdateEnergyLimitContract = 45; // Update origin_energy_limit on a
        smart contract
        }
        }
}
```

5. 代币发行计划

非带链发行的代币为非带币（Africa Trading Token），简称 ATT，总共发行 9900 亿枚。

非带币（ATT）的发售将严格按照世界各地的法律法规，以恰当方式面向合适人群进行发售。ATT 的发行总量为 9900 亿枚，分配比例如下：

类型	比例	说明
众筹	10%	按照 1 TRX= 15ATT 兑换，锁仓 6 个月，仅限 TRX 持币账户参与
兑换	10%	按照 1 TRX=10 ATT 兑换，锁仓 3 个月，仅限 TRX 持币账户兑换
置换	60%	部分 TRX 持有者账户，将会逐步置换为 ATT 持有账户，置换比例为 1TRX=1ATT ~ 5ATT
团队	10%	锁仓 4 年，4 年后开始释放，每年释放 25%
合作伙伴和顾问	10%	锁仓 4 年，4 年后开始释放，每年释放 25%

TRC-20 代币的发行：

TRC-20 是一种技术标准，用于实施由支持令牌的智能合约 TRON 虚拟机。它与 ERC-20 完全兼容。

代码如下：

```
contract TRC20Interface {
function totalSupply() public constant returns (uint);
function balanceOf(address tokenOwner) public constant returns (uint
balance);
function allowance(address tokenOwner, address spender) public constant
returns (uint remaining);
function transfer(address to, uint tokens) public returns (bool success);
function approve(address spender, uint tokens) public returns (bool
success);
function transferFrom(address from, address to, uint tokens) public
returns (bool success);
event Transfer(address indexed from, address indexed to, uint tokens);
event Approval(address indexed tokenOwner, address indexed spender, uint
tokens);
}
```

6. 发展路线图

7. 核心团队

(1) 伊曼纽尔·乌韦丘(音)，中文名郝歌

中尼文化大使，著名歌手

郝歌，是尼日利亚出生的音乐家歌手/词曲作家，在央视新年晚会上与韩红一起演出后成名，是中国最著名的外国歌手之一。作为一个住在国外的尼日利亚人，在享受了这一令人难以置信的机会之后，他在政府高级官员、王国、政要以及他家乡的名人之间建立了惊人的丰富关系。

- 他被授予著名的全球旅游音乐偶像奖，这是尼日利亚(旅行卢格通信卫星电视)颁发的同类奖项之一。
- 2017 年，伊曼纽尔获得了尼日利亚联邦共和国总统穆罕默杜·布哈里的信任（他是泰富运输设备集团改造衰败的尼日利亚卡拉巴尔港的主要连接因素）
- 他的团队和合作伙伴目前正与尼日利亚州长 Oluwarotimi ODunayo Akeredolu 合作，在尼日利亚南部地缘政治区翁多州建造海港。

(2) 戈德温·埃梅菲尔

现任尼日利亚中央银行行长

戈德温·埃梅菲尔德自 2014 年 6 月 3 日以来一直担任尼日利亚中央银行行长。他曾任天顶银行首席执行官兼集团董事总经理。埃米菲尔德担任副部长天顶银行老年董事。从 2001 年开始。他曾担任天顶银行执行董事，负责公司银行业务、财务控制和战略规划。管理团队自成立以来。埃米菲尔德有超过十八年的银行经验。Emefield 曾担任 Zenith Bank Plc 和 Zenith Bank(冈比亚)Limited 董事。在开始他的银行业务之前职业生涯中，他分别在尼日利亚 Nsukka 大学和哈科特港大学讲授金融和保险课程。埃米菲尔德是 ACCION 小额信贷银行有限公司的董事。

(3) 阿比克·达比里·埃雷瓦

现任总统外交事务和侨民问题高级特别助理

埃雷瓦生于高原州若泽，尼日利亚政治家，前尼日利亚联邦众议院议员，代表拉各斯 Ikorodu 选区。她是众议院媒体与宣传委员会主席。她还曾任众议院侨民事务委员会主席。于 2003 年第一次当选，并于 2007 年和 2011 年再次当选。

2015 年，她被任命为穆罕默杜·布哈里总统外交事务和侨民问题高级特别助理。

(4) 穆罕默杜·布哈里

现任尼日利亚翁多州州长

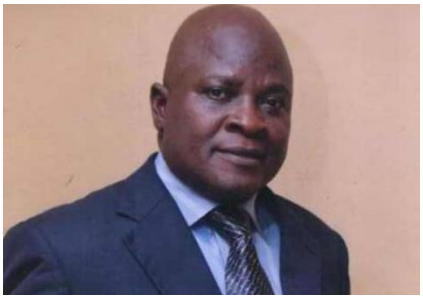
1956 年 7 月 21 日出生。是尼日利亚政治家和律师，现任尼日利亚翁多州州长，也是尼日利亚高级律师，于 2008 年成为尼日利亚律师协会主席。Akeredolu 还是 Olujinmi&Akeredolu 律师事务所的管理合伙人，Olujinmi&Akeredolu 律师事务所是他与尼日利亚前司法部长兼司法部长 Akin Olujinmi 酋长共同创办的一家律师事务所。

(5) 阿金文米·安博德

现任尼日利亚拉各斯州长

出生于 1963 年 6 月，在竞选拉各斯州长之前，他做了 27 年的公务员和财务顾问。2015 年 4 月，安博德竞选拉各斯州长，成为拉各斯州执政党全进步派代表大会的一名成员。他赢得了选举，以 15 万票击败了人民民主党的第二名候选人吉米·阿格巴耶。他于 2015 年 5 月 29 日开始担任拉各斯州长，接任前州长巴巴顿德·法绍拉。

(6) 罗帝米-奥贡雷耶



尼日利亚商业、 工业和合作联合会委员，州级尼日利亚众议院议员。

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