



# **Cultural-relics Bank Chain Whitepaper**



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## **I. Project Overview**

CRBC, short for Cultural-relics Bank Chain, is a digital asset chain that uses art treasures as a collateral and credit guarantee and it is jointly developed by Royal Treasure Museum, China Art Festival Foundation Zhongbao Fund and Walden International Investment. It is a digital asset developed based on the blockchain ERC2.0 as the underlying technology. It uses smart contracts to build a consensus mechanism, then to create a traceable and decentralized ancient cultural art exchange or bank. Through the CRBC block confirmation and the nature of blockchain distributed billing, a converged SDK database is constructed, and RFID Radio Frequency Identification technology is used to construct the trading ecosystem of the CRBC Ancient Culture Art Exchange.

## **II. Cultural Background**

In recent years, with the rapid economic growth and the general improvement of people's cultural quality, a new investment method has gradually become visible to people——the investment in ancient cultural art. Studies have shown that in just over ten years, the international art bank started very smoothly. It first originating in Canada, was established by non-governmental cultural organizations at their own expense, and

operated under the government's provision of certain financial support or policy guarantees. Afterwards, Australia, Norway, Japan, Korea, India, and the United States have thousands of art banks. For example, there are more than 300 branches of a German company that have publicly collected ancient cultural works from all parts of the world; while China, is also a country of ancient culture and art, a great power with thousands of years of civilization and history. However, China is indeed inferior to other countries in this respect. Therefore, we must implement the important instructions given by national leaders for cultural relics work. We must emphasize that cultural relics carry a splendid civilization, inherit historical culture, and maintain the national spirit. The wealth legacy left to us is a profound nourishment to strengthen the building of socialist spiritual civilization. The protection of cultural relics is in the present age, which will benefit the future. Therefore, protection is not final objective. Good use of cultural relics, it is only meaningful to “live the heritage” to pass on its internal spirit.

### **III. Analysis of Ancient Cultural Art Industry**

Over the past 30 years of reform and opening up, with the development of our country's economy, the consumption of ancient cultural works has become an increasingly visible feature of people's internal cultural needs. “The prosperous world is full of antiques, and

gold is bought in times of trouble”. The upsurge in the collection and investment of ancient culture and art has risen for a while. However, counterfeiting and speculation have become prominent issues that have hindered the further development of the market.

## **1. Unbalanced Development of Primary and Secondary Markets**

The primary market directly obtains ancient cultural works of art from artists, connects artists through agency or cooperation mechanisms, introduces them to collectors in the form of exhibitions, and converts artworks into collections. Art brokers, galleries and art fairs all belong to the primary market. The collectors, after collecting works of art from the primary market, sell the art work into the market, that is, the market for secondary circulation. Due to the lack of effective support from artists and the trust of artists, the primary market has always been no more than survival, and it cannot be expected to play an effective role in stimulating the development of the entire industry. There is no economic benefit but bubbles which is of no benefit for the development of the entire market.

## **2.The Integrity Problem of Ancient Cultural Arts Market**

The rapid development of the market has attracted a large amount of capital inflows, and it has also induced some speculators to seek counterfeiting for profiteering and the trend of counterfeiting has

intensified, while the fake makes investment collectors hard to prevent. In order to gain interest, some auction companies ignore the appearance of counterfeit goods, give up emphasize business integrity, even not say to keep the interests of investment collectors into consideration.

## **IV. Analysis of transforming ancient cultural and artistic works into collections**

### **1. Analysis of the Scattered-to-collection Method**

The scattered-to-collection method is off-market and off-line markets. It is dominated by individual and unit behavior and is suitable for the converted collection of single and scattered items. Scattered as this collection, it is difficult to form a large-scale industry, and it cannot standardize supervision. Intermediaries have mixed pros and cons; assessment and authentication are not authoritative enough; the authenticity of the artworks is hard to identified; and economic values cannot be effectively reflected. Preservation and management of artworks are not professional and can easily destroy artistic values. In physical, property rights appraisal, assessment, contract decentralization, there are repeated actions, and it is easy to counterfeit and lack of credibility. Financial applications and settlement units cannot participate and financial elements cannot be integrated into artworks. Values of artworks

cannot be transformed into economic benefits, so cultural industries cannot be formed.

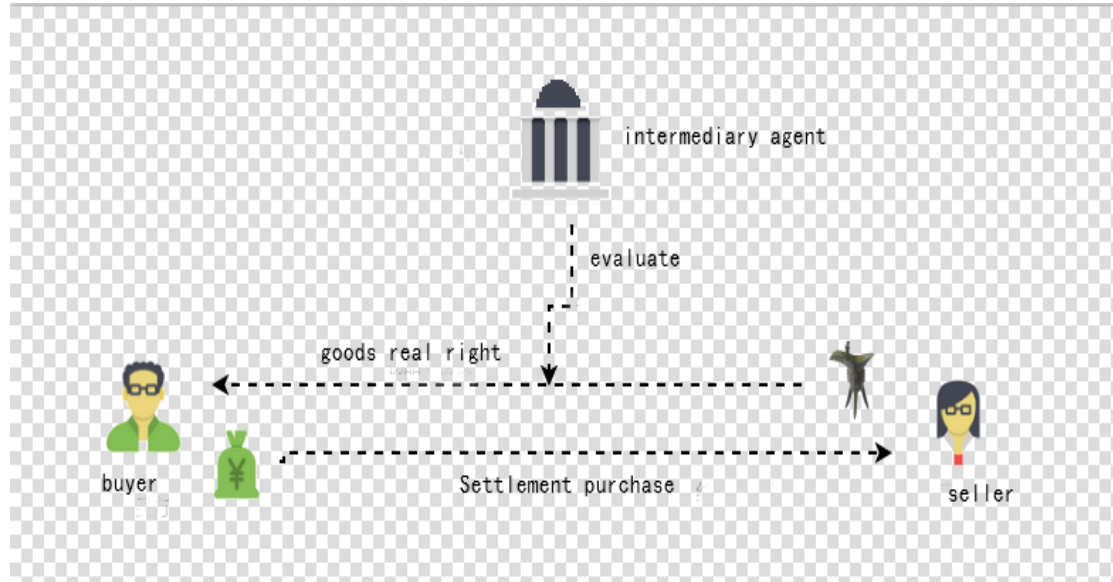


Figure 4.1 Scattered-to-collection Method

## 2. Analysis of the Centralized-to-collection Method

The centralized-to-collection method is the on-site market and online market. The collection platform is divided into cultural exchange, auction house, and electronic mall, which is suitable for the conversion of large-ticket items and whole sale goods. It can form a large scale and generate the market effects. It is more less transparent and difficult to standardize supervision. There are a large number of false artworks in the electronic exchange collection of the Art Exchange, and the hype is serious. The online and offline price gaps of the same item are huge. Market share in the converted collections is too concentrated; there are

many monopolistic practices; and there is a lack of fair participation opportunities for small to medium-sized collection agencies. In physical, property rights, appraisals, assessments, decentralized contracts, there are repeated actions, and it is easy to counterfeit and lack of credibility. Appraisal and evaluation data cannot be used all the way through the entire industry chain. The authenticity of the goods is hard to identified, and economic value cannot be effectively reflected. Financial applications and settlement units cannot participate in and financial elements cannot be integrated into artworks. Values of artworks cannot be transformed into economic benefits, so cultural industries cannot grow bigger and stronger.

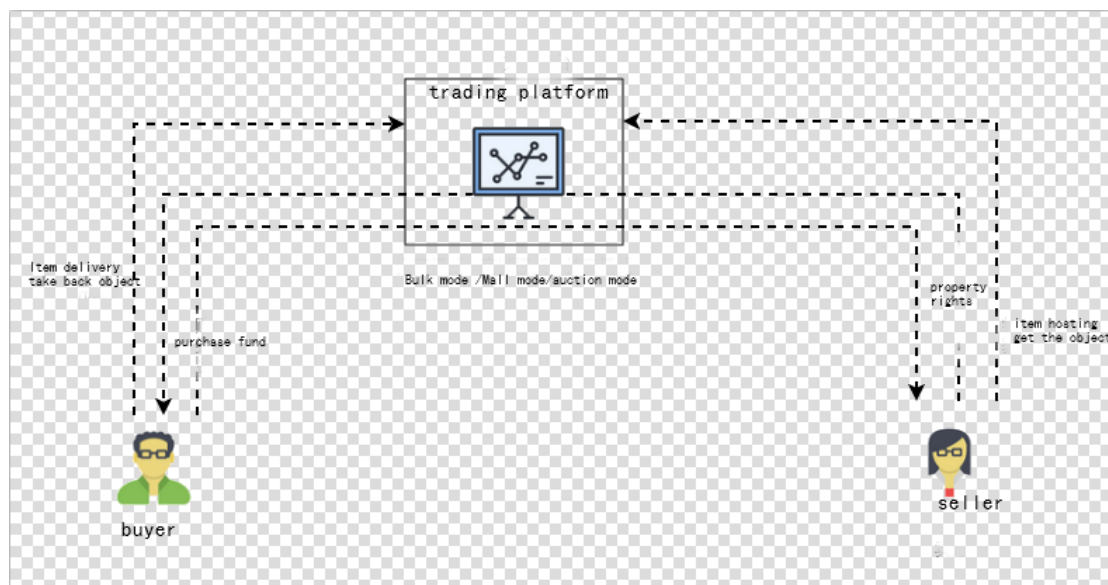


Figure 4.2 Centralized-to-collection Method

### 3. Analysis of the Collateral Market

Under the traditional financial system, small and micro enterprises



are faced with the lack of asset for pledge, financing difficulties and costly financing. Moreover, in traditional antique market where exists the obstacles in circulation and realization, many investors in collection of artwork, such as antiques and paintings are enormously troubled. But these problems indeed provide an unprecedented opportunity for the combination of antiques and finance. The integration of ancient cultural works and financial innovation aims to speed up the circulation of works of art and promote investment in financing. This is an industrial chain that requires multiple aspects of integration and also requires a set of scientific and normative modes of operation and processes. To integrate a piece of art or antiques into a financial channel, first of all, it needs to be evaluated by a team of authoritative experts, and detailed procedures should be established in the process of transferring collections and loans so that each piece of collectibles has a relatively fixed and visible value space.

## **V. Design Concepts and Application Scenarios of CRBC**

### **1. Design Concept of CRBC**

CRBC is called Culture-relicsBankChain, which is an international cultural relics chain. It employs the natural art collection value and financial attributes of antique cultural relics as a credit collateral, and

builds a chain of value-based 400 billion worth of art collections as a credit endorsement. Based on the underlying technology of the blockchain, ancient cultural works of art are identified, traded, and traded on CRBC's chain, creating an open, honest and healthy CRBC ancient cultural arts trading ecosystem.

## **2. Application Scenarios of CRBC**

### **2.1 Ancient Cultural Artwork Identification Platform**

CRBC will inspire the professional appraisers certified by authoritative organizations all over the world to build a “global antique cultural relic identification platform” to provide highly efficient, comprehensive and professional appraisal services for high-end artworks that require identification, and to complete the identification of high-end artworks → Registration → valuation → winding. Through the unstoppable modification of blockchains and smart contracts, absolute authentic guarantees have been created for high-end art collectors, traders and investors.

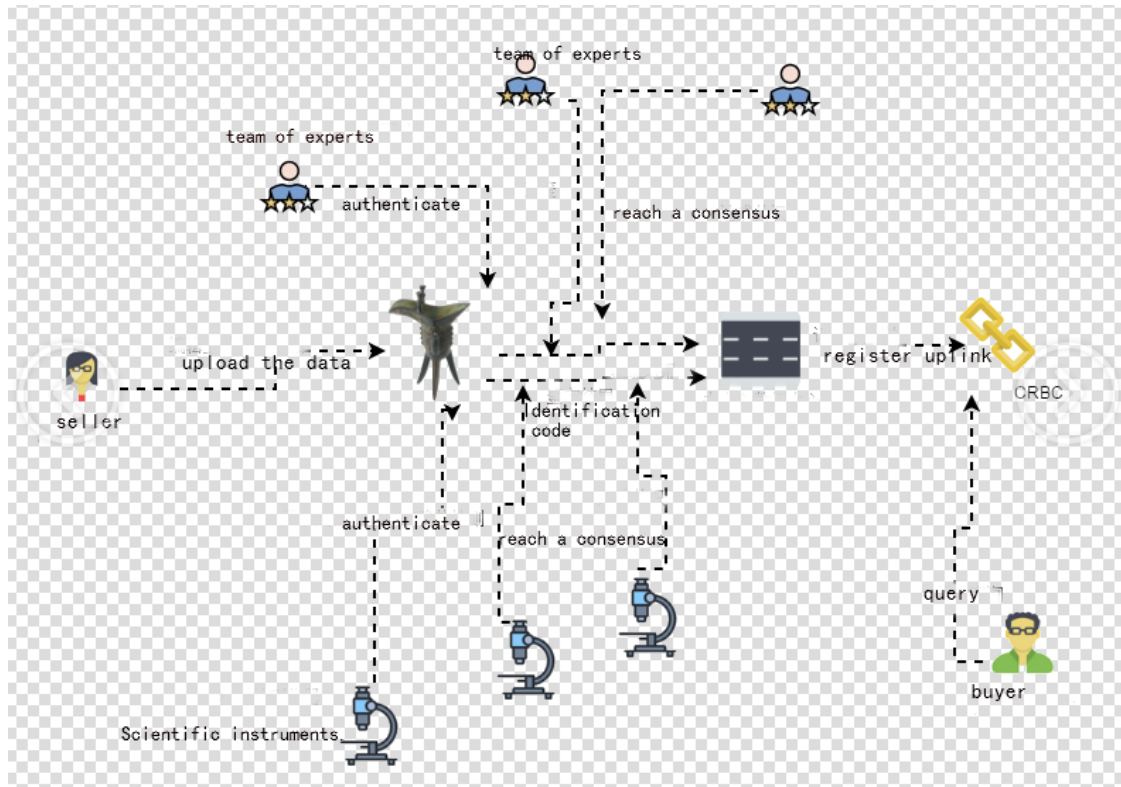


Figure 5.1 Ancient Cultural Artwork Identification Process

## 2.2 Ancient Cultural Art Trading Platform

CRBC builds an open and honest ancient-cultural art trading platform based on smart contracts. The open, transparent, traceable and irrevocable blockchain technology ensures the authenticity of ancient cultural artworks purchased and sold on the CRBC trading platform. After the ancient cultural and artistic works are on the chain, realizing the digitization of assets can ensure that the prices are relatively uniform and prevent the single market from controlling prices.

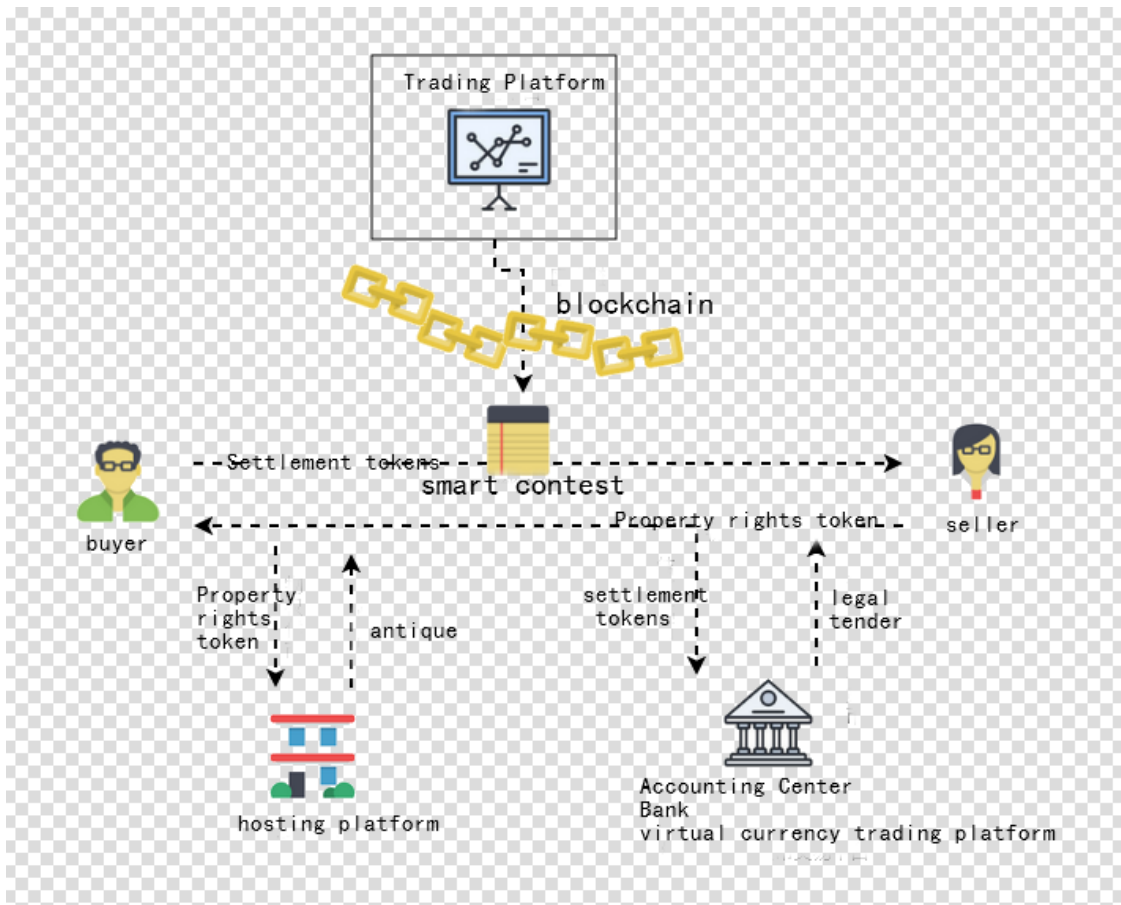


Figure 5.2 Trading Platform

### **2.3 Small and Micro Enterprise Financing Platform**

The financial system constructed by CRBC as a blockchain technology will further change the financial credit guarantee mechanism. Traditional third-party platforms will serve as trust underwriters, and will upload all data to the main chain, which will be jointly monitored by all participating nodes. In order to replace the single trust mechanism for human nature with algorithm consensus, and then to provide credit guarantees for innovative small and micro enterprises with good reputation and development potential in the form of exchanges or art banks, to integrate domestic and foreign capital, and to solve Small and micro enterprises are difficult to finance and expensive to finance.

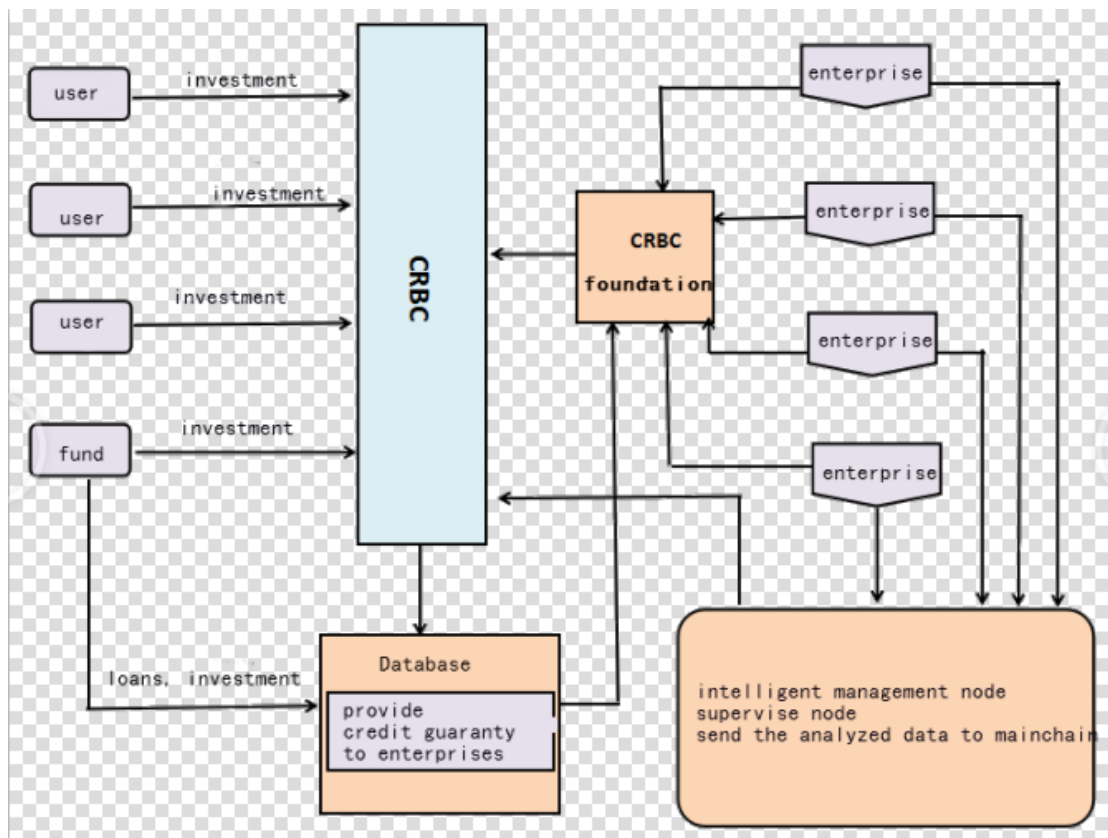


Figure 5.3 CRBC Enterprise Application Flow Chart

## 2.4 Building Blockchain Plus Ancient Cultural Artwork Ecosystem

Through the Belt and Road, CRBC has made it possible for more than 700 Institutes and more than 9,000 collectors in the world to improve CRBC, which can make world's civil cultural relics be digitized, valued, and transparent, and make CRBC circulate through ancient art exchanges or art banks. The industry's ecosphere will host exhibitions, exhibitions, auctions, acquisitions, transactions, payments, and tickets. All other activities are implemented through CRBC.

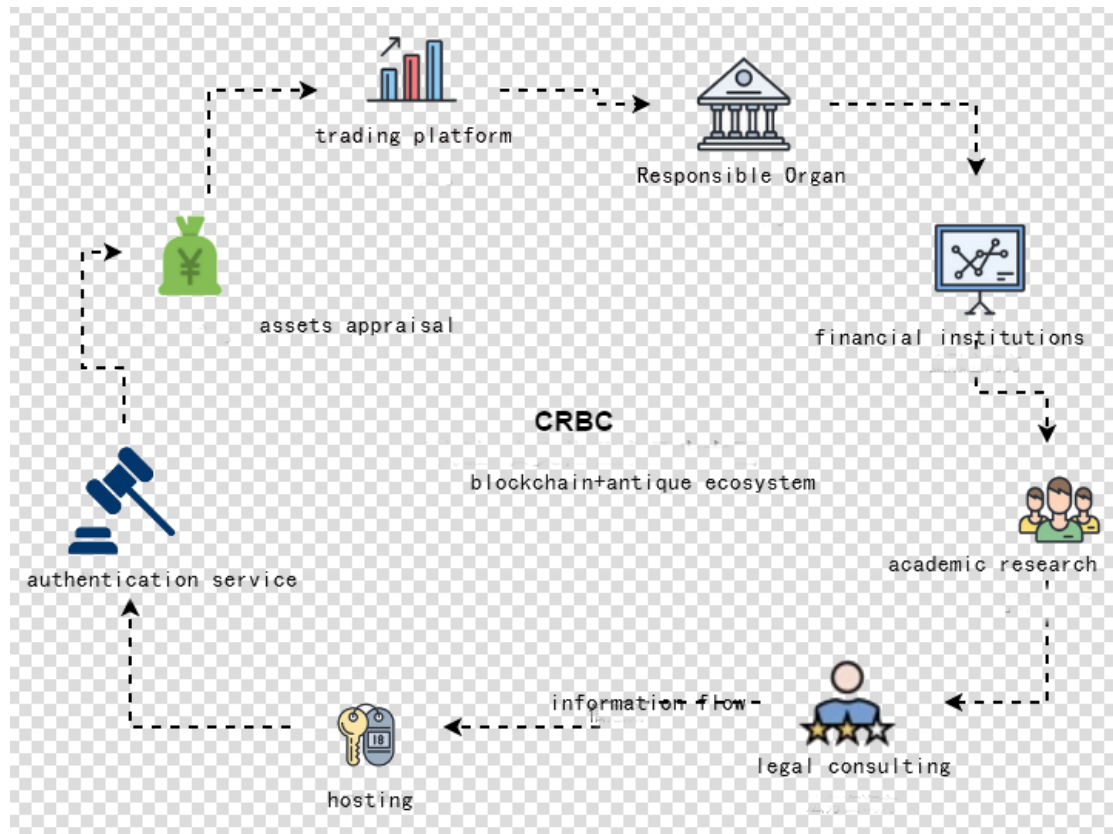


Figure 5.4 CRBC Ancient Cultural Art Ecological Circle

## VI. Features and Advantages of CRBC

### 1. Unified Standard of Evaluation

Some undesirable phenomena are ubiquitous in appraisal industry, such as, lackage of regulation, arbitrary charges, non-refund of appraisal fee and etc. For the same collection, the appraisal result given by experts and institutions is completely different from the value estimation, and even the same expert will present different results at different time.

The CRBC combines or separates objects, property right, evaluation, and contract randomly through block chain technology, which can unify

credibility and make it hard to counterfeit.

## **2. Integration of Cultural Relics Exchange Market**

CRBC's cultural relic exchange platform can integrate the scattered, centralized, pledged-style exchange market; meet the needs of single, scattered trading pattern and transactions in large quantity and in large size and etc.

## **3. Fund Circulation and Market Animation**

CRBC changes the traditional credit guarantee mechanism, provides access for new type of small enterprises with good reputation, domestic and foreign capital, exchange institutions and art banks to CRBC as nodes, which improves the integration of financial elements into the cultural relics trade market. It also makes artistic value reasonably transform into economic value, producing good market effect.

# **VII. CRBC Technical Overview**

## **1. Technical Principle**

The CRBC is primarily based on Ethereum to issue its own digital assets, compile smart contracts and achieve cross-chain transfer of value. Ethereum is a decentralized platform where DApp can be deployed on it.

DApp is created with one or more smart contracts using the Solidity programming language to write smart contracts. Smart contracts operate in accordance with the program, and they prevent machine halt, censorship, fraud and interference from the third party. In Ethereum, a number of programming languages can be used to compile smart contracts, including Solidity, LLL and Serpent, where Solidity is most popular. There is an internal currency called Ether in Ethereum, which can be used to deploy a smart contract or invoke its method. Like any other DApp, there can be multiple instances in a smart contract, and each instance has its own specific address. Both user accounts and smart contracts can hold Ether. Ethereum employs block chain data structure and workload to demonstrate consensus protocol. A smart contract can be invoked through a transaction or by other contracts. There are two nodes in the network: ordinary nodes and miners. The common node only backs up the data on the block chain, and the miners create block chain by digging up ore.



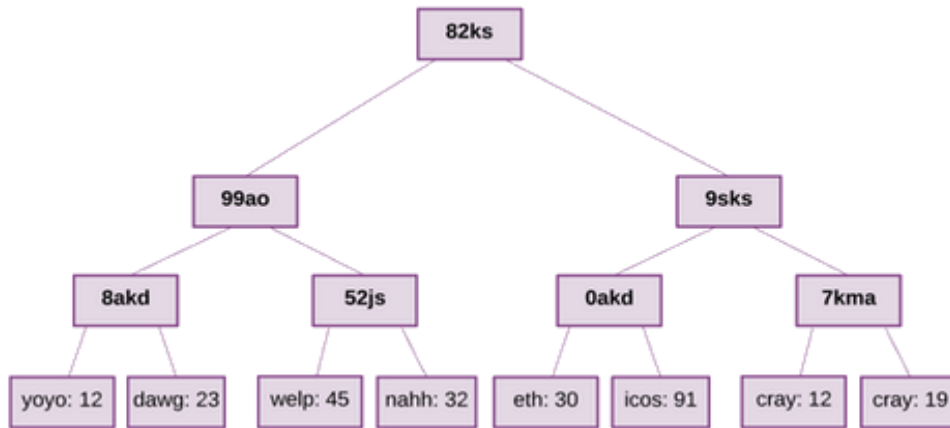


Fig. 7. 1 Working Principle of Ethereum

### (1) Accounts of the Ethereum

To create the Ethereum account, only one asymmetric encryption key pair is required generated by different algorithms (e.g. RSA, ECC, etc.). The Ethereum uses Elliptic Curve Cryptography (ECC), and ECC has multiple parameters to regulate speed and security, and secp256k1 parameter is applied. In-depth study of ECC and its parameters require certain mathematical knowledge, but the use of DApp created by Ethereum doesn't require it.

### (2) Transaction

A transaction is a packet with signature used to transfer Ether from an account to another or to a contract, to invoke method or deploy a new contract. The transaction is signed by Elliptic Curve Digital Signature Algorithm (ECDSA), and it is a digital signature algorithm based on ECC. The transaction includes the recipient of the information, the identification initiator and its signature, the amount of the Ether to be

transferred, the maximum computing resources within execution scope( known as gas top limit), and the cost paid by the transaction initiator for computing resource per unit( known as the gas price). If the purpose of the transaction is to invoke the contract method, then the input data is included; if the purpose is to deploy a contract, the initialization code can be included. Multiplying the gas consumed by gas price, we can work out the transaction fee.

Character	UXTO model	Account model
status inquiry and state change	need to backtrack the data	Direct Access
Storage Spaces	large	small
usability	difficult to deal with	Easy to deal with
security	higher	lower
traceability	support	nonsupport

Fig. 7.2 UXTO Model and Account Model

### (3) Consensus Mechanism

Ethereum is currently adopting a variant algorithm Etheash protocol based on a mature PoW consensus as a consensus mechanism. In order to prevent the calculation force attack of ASICs, unlike the calculation-intensive Hash operation of the original PoW, Etheash needs to consume a large amount of memory while executing, having little relation with the calculation efficiency. This means it is hard to make an

Etheash-oriented chip, that is to say, a general-purpose machine is likely to be more effective. This means it is hard to make an Etheash-oriented chip, that is to say, a general-purpose machine is likely to be more effective. Compared with the PoW mechanism, the PYP mechanism does not need to consume a lot of useless Hash calculation, but the complexity of the consensus process is higher and further tests are needed.

## 2. Technical framework

The CRBC is constructed and realized at the technical level, with its main core divided into three parts:

- ✧ Smart contract
- ✧ Distributed storage and data analysis system
- ✧ Data traceability system

### (1) Smart contract

- Build-up test block chain test network

As Ether is consumed when the smart contract test is conducted on Ethereum public chain, the developers can build their own test chain locally when develop test scenarios. The smart contract already be developed can easily switch interfaces to the public chain.

- Create and compile smart contracts

Take the smart contract written by Solidity as an example. To

compile the contract code to EVM binary, you need to install Solidity compiler solc:

```
$app-getinstall solc
```

Create a Solidity smart contract file, name it as testContract.sol, which contains a method multiply, which is used to multiply the entered integer by 7 and then output it.

Deploy the smart contracts in Geth's JavaScript environment command line interface. First unlock your account with the following command; otherwise, you will fail to send out the transaction:

```
>personal.unlockAccount(myAddress)Unlockholder0x11b6e5c016af9a3d7549c8679966311183f129ePassphrase:true.
```

Second, send out the transaction of contract deployment.

```
>myContract=eth.contract(abi)>contract=myContract.new({from:my Address,data:code,gas:1000000})
```

If there is no mining at this point, the txpool.status command may see a transaction to be confirmed in the local transaction pool. Then invoke the smart contract with the following command to send out transaction, among which the former parameters of sendTransaction method should accord with the input parameters of multiply method in contract. In this way, the trade can be recorded in the block chain through mining. If there are any changes in state, it will also obtain a full-network consensus.

## (2) Distributed storage and data analysis system

CRBC will not provide centralized data storage center for verification data of cultural relics recorded on the main chain, financial operation and capital flowing on enterprise node, and the capital management data on the fund node of users and investment, user and investment. The storage center, working as value incentives for the use of CRBC, constructs a distributed storage and data processing system to ensure the safety, openness and transparency of the system operation.

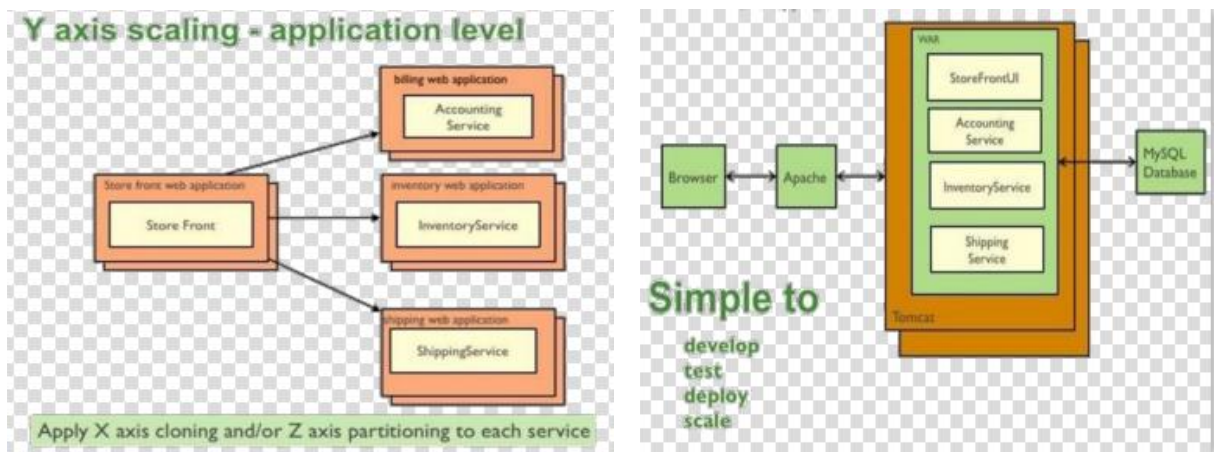


Figure 7. 3 Schematic Diagram of Distributed System Structure

When the CRBC distribution node is bonded to a distributed object, it was called proxy. Then the proxy will be loaded into the address space of the customer. Proxy is similar to the clientstub in the RPC system. What it is doing is to marshal the method invoking into the message, and to unmarshal the response message, and return the method invoking result to the customer. The actual object resides on the server computer, which

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provides the same interface as it provides on the client. The incoming invoking request is first passed to the server stubs and the server stubs decode them.

### (3) Data traceability system

The data traceability system is the credit lifeline of the whole ecology of CRBC. It involves value guarantee.

The data traceability system is the credit lifeline of the whole ecology of CRBC. It involves in guaranteeing the ingenuity of the collection in value estimation, and the enterprise's financial management data and flowing of fund. After setting up your own aggregated SDK database, the information of art items can be recorded on the block. Each new appraisal result can be recorded on the block, in the first time. It will be witnessed by all CRBC holders. CRBC culture relics Exchange institution will synchronize information from verification to auction, as well as collection channels within 24 hours, making every piece of information become transparent, query-able, and fast-flowing.

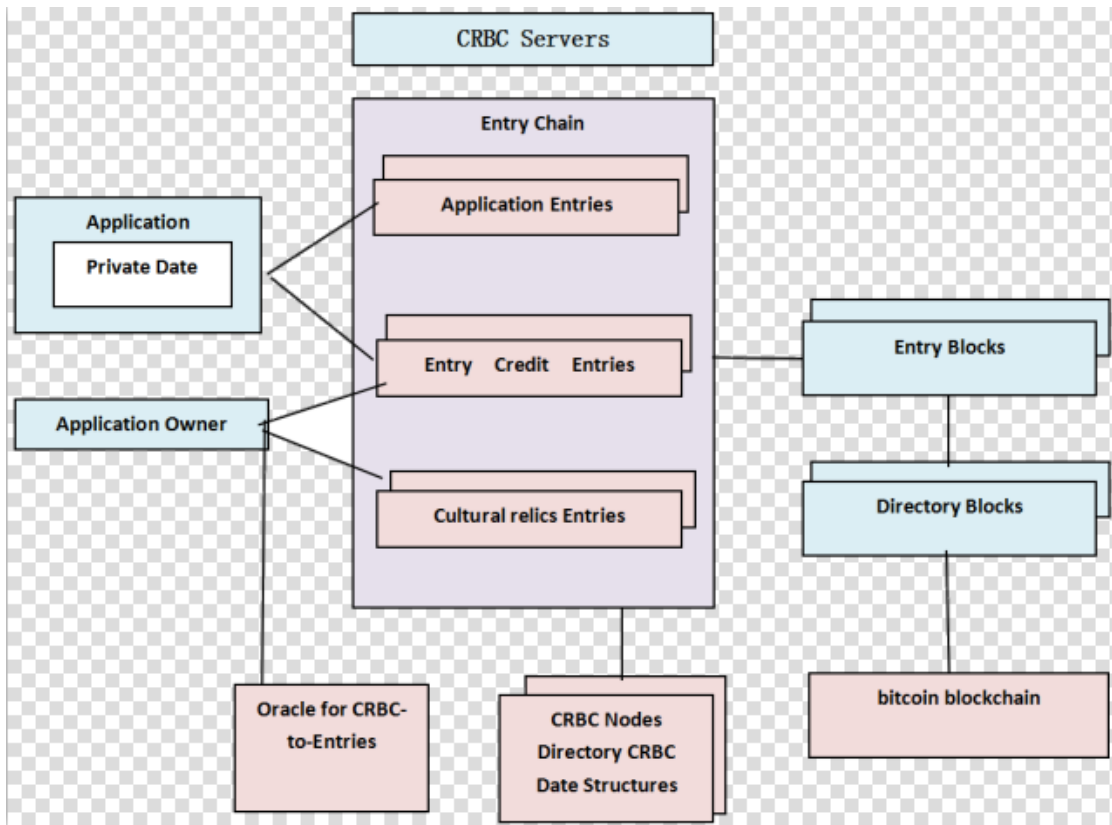


Figure 7.4 Schematic Diagram of Data Traceability System

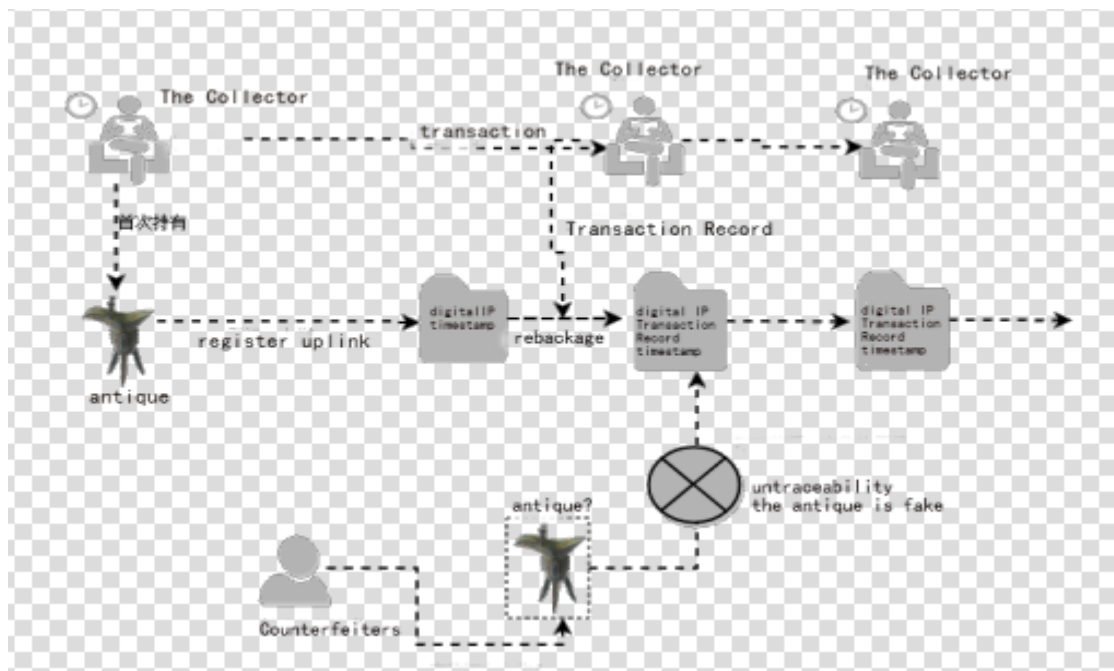


Figure 7.5 Traceability of Forgeries

#### (5) Value of token and combustion

Each art identification needs to be finished by consuming partial CRBC to generate hash codes. Each validator also needs to consume a portion of the CRBC to obtain a key to complete the inspection of the artwork. CRBC will be the sole confirmation of all phases in the CRBC cultural exchange institution.

### **VIII. The Proportion of Issuance**

1. Digital Assets: Cultural-relics Bank Chain
2. Technical Version: ERC2.0
3. Issue total: 5 billion
4. Distribution ratio:
  - Team holds 15%
  - Technology Development 20%
  - Community Promotion 30%
  - Foundation 35%



## IX. Introduction to the Team



R&D Supervisor: Kinder Brent

He graduated from Rice University in the United States with a bachelor's degree in computer engineering. After graduation, he worked on security system design, development, and maintenance management at Fannie Mae. In 2013, he came into contact with Bitcoin and began research on the combination and transformation of blockchain technology and financial applications, and have the ability to independently develop financial DAPP. The current CRBC R&D Supervisor and Jerome Flora are responsible for the design of CRBC's entire technical architecture and the development of related applications.



Director of Risk Control: Lambert Adela

A well-known investor in the Internet field, one of the heads of the Henderson & Dit Investment Foundation, has participated in the early investment of several successful technology companies such as Lending Club and Braintree. Now he is Director of Risk Control at CRBC.



Chief Operating Officer: Michal Gryko

Born in the United Kingdom, he graduated from the economics and management major at the University of Tokyo in Japan, and was a former executive of Walden International in the Asia-Pacific region. He is also a special advisor to Nomura Holdings, assisting in handling financial transactions with China. He is good at capital operation and management, has rich working experience in financing and investment field, especially has many years of research on economic development and financial markets among different regions in Asia, and now serves as the chief operating officer of CRBC.



Technical Director: Jerome Flora

He graduated from the Department of Computer Science and Technology at the University of Sydney. He has a deep theoretical foundation and technical experience in computer asynchronous communication and system security. Since 2012, he has been exposed to the system development and architecture design of the blockchain, and has five years of development experience, Current CRBC Technical Director.



CRBC Chief Consultant: Zhang Fangshuo

China's collectors elite, China's top ten collectors

Famous Chinese Collection Appreciation

Master

Chinese collectors celebrities

The most influential figure in Chinese collectors

Senior Director of the China High Level Policy Association in East

China

Executive Director of China Baoli International Auction Company

Hong Kong Global News Agency invited art consultants

Director of Royal Treasure Museum of World Ancient Art Museum



CRBC Special Advisor: Lei Congyun

National Museum Research Fellow, Vice President of the International Collectors Federation, Deputy

Director of the Appraisal and Evaluation

Committee, Director of the Chinese Society of Shang Culture, Director of

the Chinese Ancient Ceramic Society, Vice President of the Chinese

Ancient Jade Culture Research Association, Executive Director of the

China Collectors Association, etc. .

## **X. Disclaimer**

The document is intended to be used only as a technical and architectural description of CRBC and is only used as a means of conveying information. At the same time, this document does not constitute any investment advice, investment intentions, or investment in securities. This document does not constitute or understand to provide any sale or purchase, or any invitation to buy or sell securities of any kind, nor is it any form of contract or commitment. It does not constitute relevant opinions on the purchase and sale of CRBC's digital assets. Any similar offer or offer will be conducted under a trustworthy term and with applicable laws and regulations.

The CRBC team made it clear that it did not assume any direct or indirect losses caused by participating in the CRBC project including:

1. This document provides the reliability of all information
2. Any resulting errors, negligence or inaccurate information
3. Or any resulting behavior

CRBC is not a deterministic investment behavior

We cannot guarantee - indeed we have no reason to believe that CRBC will add value, but it is also possible that under certain circumstances there may be a drop in value. Those who do not use CRBC

correctly may lose all rights to use CRBC and may even have May lose their CRBC.

CRBC is not a kind of ownership or control.

Controlling CRBC does not represent ownership of the CRBC team trading platform and related personnel, and CRBC does not grant any individuals any right to participate in, control, or make any decision regarding the trading platform of the CRBC team.