

The Force Protocol Whitepaper

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Authors: Aaron Liu¹, David Lei²

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1 Background

1.1 Problems in Today's Global Financial System

Finance is the blood of the modern economy and promotes the rapid development of various industries. However, finance has the nature of chasing interests and risk aversion, which makes global financial services extremely unbalanced.

- In 2008, the subprime mortgage crisis triggered by factors such as bank negligence in loan review was the largest financial tsunami in the world history;
- The principle of maximizing returns has prompted financial institutions to clearly prefer to serve large enterprises and middle-class consumer groups, leading to widespread financing difficulties for SMEs;
- There are predatory loans represented by payday loans, as well as serious problems such as usury and fraudulent loans;
- According to the World Bank report, approximately 1.7 billion adults worldwide do not have bank accounts;
- The International Monetary Fund (IMF) estimates that in 2018, 11 countries have inflation rates of 20% or higher.

In response to the problems exposed by the global financial system, the world's major countries, economies and international organizations have rethought the current financial regulatory system and proposed various reforms for their deficiencies. Among them, representative one is "Principles for Financial Market Infrastructures" (PFMI), which issued by the BIS (Bank for International Settlements). In 2005, the United Nations proposed the concept of "inclusive finance", claiming: "Providing appropriate and effective financial services to all sectors and groups of society with financial services needs at an affordable cost". Vulnerable groups, such as small and micro enterprises, farmers, low-income urban residents, etc., are the key service targets of "inclusive finance". At the same time, technology has also become a powerful driving

force for financial change.

1.2 From FinTech to OpFi

1.2.1 Development History of Financial Technology

Financial technology originated from the information construction of financial institutions, technology companies provide technical services for financial institutions, this is "Financial Technology 1.0". At this stage, the purpose of financial technology is to realize the electronic and automation of office and business, thereby improving business efficiency, technology companies usually do not directly participate in the company's business.

After the global financial crisis in 2008, financial technology entered a new period of development. Some technology companies have begun to engage in certain areas of traditional financial services and compete with traditional financial companies. By 2014, with the successful IPO of Lending Club, a large number of financial technology companies broke into the financial industry, and the financial technology industry gradually grew. At this stage, technology companies built online business platforms with de-intermediation as the main feature, using the Internet or mobile Internet to realize the interconnection of asset, transaction, payment and capital, and realize information sharing and business integration. Representative business including: Internet-based fund sales, P2P network lending, Internet insurance. We can call it "Financial Technology 2.0."

At present, new technologies such as big data, artificial intelligence and blockchain are promoting the development of "Finance Technology 3.0". Among them, blockchain technology is the most disruptive.

1.2.2 Open Finance

In 2014, Ethereum was born, and blockchain technology began to attract the attention of the global financial and technology industries. In December 2015, the Linux Foundation led the

Hyperledger project. By July 2019, Hyperledger had more than 270 members, including leaders in finance, banking, the Internet of Things, supply chain, manufacturing and technology. Traditional financial and technology giants have also tried cryptocurrency and blockchain applications. On February 14, 2019, JP Morgan announced the launch of a stablecoin, JPM Coin; on June 18, 2019, Facebook released a white paper on the stablecoin project Libra. Joining dozens of well-known financial institutions and multinational technology giants, it plans to launch a payment system based on cryptocurrency. In August 2019, the People's Bank of China announced that it would launch the Central Bank Digital Currency (namely Digital Currency Electronic Payment, DCEP).

We believe that all financial services using the blockchain distributed ledger technology which are available to users at any time and place can be collectively referred to as Open Finance (OpFi), which includes the following two aspects:

The first, purely distributed ledger technology application, namely the coinless blockchain application. For example, the characteristics of distributed storage, data tamper-proof, and traceability in blockchain technology are highly compatible with the needs of the financial industry in terms of information and data security, and traceability of transaction data. Therefore, blockchain technology is highly compatible with typical application scenarios in the financial industry such as trade finance, supply chain finance, asset securitization, cross-border payment and clearing.

Second, the blockchain application for cryptocurrency. These applications rely primarily on smart contracts to develop products based on cryptocurrency or cryptoassets, including product types such as loans, stablecoin, exchanges, forecasts, insurance, options, supply chain finance, cross-border payments, etc. The scope of these business partly overlaps with purely distributed ledger technology. At this stage, the DeFi applications in the Ethereum ecosystem are typical examples of such blockchain applications.

1.3 Prospects and Opportunities for Open Finance

Currently, the global cryptocurrency market value is about 200 billion US dollars, and the highest market value has reached 830 billion US dollars. However, compared with the assets outside the blockchain, this is only a drop in the ocean. The tokenization of digital assets and physical assets outside the blockchain is an important direction for the development of blockchain technology. We believe that as more and more assets are transferred to the blockchain, open finance will become the mainstream of the financial industry in the future.

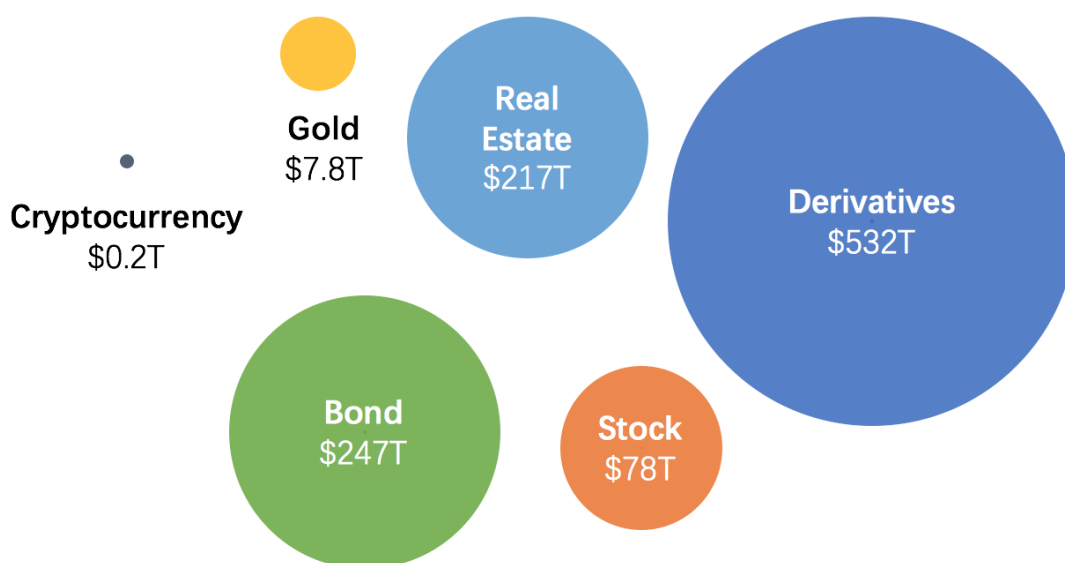


Figure 1 Comparison of various asset sizes

1.4 Problems and Challenges in Open Finance

At present, with reference to traditional finance, there have been some new attempts in the field of open finance, such as exchanges, loans, bonds, financial derivatives, and quantitative investments. However, these cases generally have problems such as small market, poor experience, and difficulty in development. Faced with complex blockchain technology, many potential participants are discouraged. There is a huge gap between the broad development prospects of open finance and the immaturity of blockchain technology solutions.

Specifically, open finance has the following technical problems:

- High technical threshold for developers due to complicated underlayer technology.
- Cross-chain transaction of cryptoassets is hard to realized on different blockchains.
- Financial contracts are difficult to construct due to complex products rules.
- Lack of reliable oracles to achieve on-chain and off-chain data communication.
- Lack of safe, reliable, high-performance blockchain financial service open platform.

2 Our positioning

The services of the traditional financial industry are lacking in early financing services, inclusive financial services, and financial services for small and medium-sized enterprises. There are also obvious opportunities for improvement in online lending, cross-border trade, supply chain finance, and asset securitization. Blockchain technology has the potential to solve these problems and deficiencies, this technology has begun to drive change in the financial industry. The Force Protocol believes in the broad prospects of distributed financial services and is committed to building a basic platform for technical services to promote the development of human inclusive finance and open finance.

The Force Protocol is a financial blockchain technology platform that provides a one-stop solution for distributed financial services application developers. The Force Protocol will be based on the current mainstream public blockchain system, through the abstraction and encapsulation of open financial business common module, providing external services in the form of SDK and API.

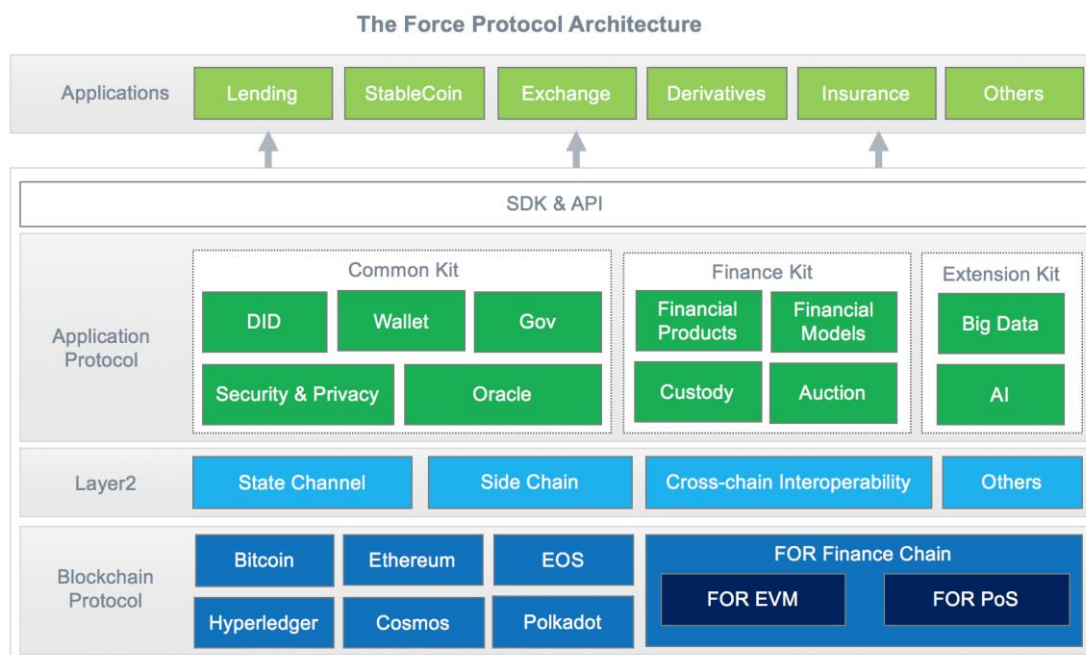


Figure 2 The Force Protocol Architecture

The Force Protocol is dedicated to the development of open financial application protocol stack, as follows:

Open Finance Protocol Based on the Mainstream Public Blockchain

At present, various blockchain systems such as public blockchains and consortium blockchains have their certain developers and users. The Force Protocol will first develop the financial application protocol based on mainstream public blockchains to incubate financial applications. Blockchain platforms supported by the financial application protocol will include Bitcoin, Ethereum, EOS, Hyperledger, Cosmos, Polkadot, RSK, etc.

Financial Public Blockchain

Although ecosystems such as DeFi have emerged based on the mainstream public blockchain, and various financial application solutions have emerged based on the consortium blockchain. However, existing solutions still do not meet global regulatory standards.

Taking PFMI as an example, like the regulatory requirements of “settlement finality” and “rolling settlement”, the existing blockchain solution can't do anything at all. Based on in-depth research and understanding of regulatory standards, The Force Protocol will design a proprietary underlying consensus protocol for open financial services, combined with Layer 2 support for scalability and cross-chain interoperability, providing security, compliance, reliability, and high performance for the open financial public blockchain/consortium blockchain solution.

Financial Application Protocol Stack

For different financial applications, the financial application protocol stack is responsible for formulating specific network communication standards, realizing the encapsulation of business functions in corresponding scenarios, facing upper-layer applications, and exposing friendly object-oriented functional interfaces. Based on this technical architecture, in terms of business

functions, developers of upper-level application services only need to interface-oriented programming, focusing on implementing business logic, without having to consider complex business rules, mathematical models, regulatory requirements, and underlying technology of blockchain.

There are many kinds of financial services and the rules are very complicated. Through the abstraction of various financial business processes and business logics, The Force Protocol has designed three basic modules in the financial application protocol stack, which includes basic components, financial components and expansion components.

- Basic components: Standardized and modular features, including distributed digital identity, wallet, security and privacy protection, governance, predictive machines, etc.
- Financial components: Standardized and modular functions, including financial products, financial models, asset custody, auctions, etc.
- Extended components: Provide interfaces to support internal and external functions calling such as big data and artificial intelligence.

Application Layer

By using The Force Protocol SDK and API, crypto-finance application developers can develop the following decentralized applications.

- Lending: Retail bank lending, P2P (point-to-point lending), consumption instalments, etc.
- Stablecoin: Cryptoasset mortgage model
- Exchange: Centralized Exchange, Decentralized Exchange
- Financial derivatives: Futures, options, swaps, CDS, TRS, etc.
- Insurance: Life insurance, property insurance, accident insurance, etc.
- Bonds: Zero-coupon bonds, interest-bearing bonds, etc.

3. Financial public blockchain

3.1 Financial Public Blockchain Architecture

The Force Protocol will develop a public blockchain network for open financial services, taking financial business needs and regulatory requirements into consideration in the design of the underlying platform of The Force Protocol public blockchain, and building an infrastructure for open financial services.

The design direction of The Force Protocol financial public blockchain is as follows:

- Enhance capabilities such as authorization management, security control, privacy protection, supervision/regulation, etc. for financial market needs;
- Meet the high throughput and high-performance requirements;
- Compatible with EVM and make full use of Ethereum ecological resources;
- Solve the problem of cross-chain value transfer.

After an in-depth comparison of the advantages and disadvantages of the current mainstream public blockchain technology solutions, we decided not to preset the technical implementation path of The Force Protocol financial public blockchain. In order to maximize compatibility with various financial applications of Ethereum, we consider adopting Tendermint Core and Cosmos SDK technology solutions to achieve the cross-chain function of The Force Protocol financial public blockchain. For the high-potential technology solution of Polkadot, The Force Protocol team will also pay attention.

The following are the main modules of The Force Protocol financial public blockchain:

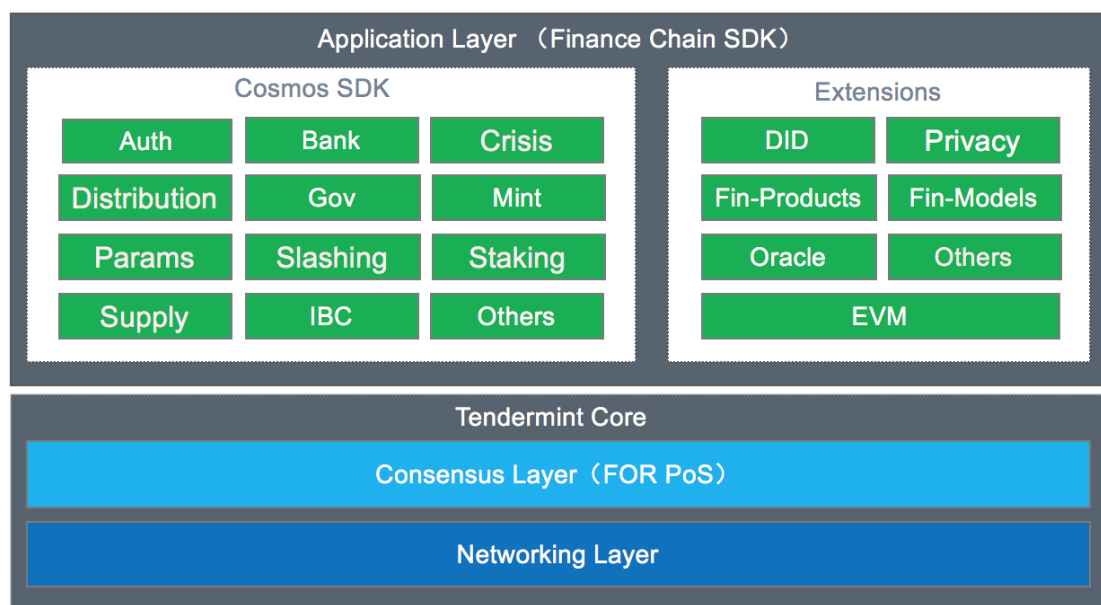


Figure 3 Financial public blockchain architecture

The Force Protocol Financial Public Blockchain Layered Structure:

Network layer: responsible for broadcast transactions and information related to consensus.

Consensus layer: Enables nodes to reach consensus on the current state of the system.

Application layer: responsible for updating the status of various transactions (i.e. processing transactions).

The Cosmos SDK Provides Following Modules:

- Auth: Multi-asset account model
- Bank: Transfer related
- Crisis: System Emergency Management
- Distribution: Allocation of fees between the certifier and the principal
- Gov: Governance
- Mint: Token issuance
- Params: System global parameter processing
- Slashing: Punish the evil node
- Staking: Equity pledge
- Supply: Token supply management
- IBC: cross-chain communication

The Force Protocol Extension Modules:

- DID: Decentralized identity
- Encryption: encryption tool
- Privacy: Privacy protection
- Fin-Products: Financial products
- Fin-Models: Financial module
- Oracle: Oracle module
- EVM: Ethereum virtual machine

3.2 Consensus Mechanism

The consensus mechanism is the process by which nodes in the network agree on the latest state of the distributed ledger. This process typically relies on encryption tools and rules or processes embodied by protocol, and economic incentives (for any network configuration) or governance architecture. Consensus usually involves two steps:

- **Verification:** Each verification node confirms that the state change conforms to the designed rules (for example, during the transaction, the initiator has ownership of the asset and the initiator and beneficiary have the right to exchange assets). Each verification node needs to rely on the record of the previous state and can use the "last agreed state" or "previous state chain" for verification.
- **The consensus of the distributed ledger update:** the nodes agree on the status update of the ledger. At this stage, the process of reaching consensus involves mechanisms or algorithms that address the conflicts of distributed ledger changes. For example, due to the distributed nature of the system, it is possible that a malicious participant attempts to transfer the assets it holds to two different participants simultaneously. If the system does not have a mechanism to agree which transaction to submit to the ledger, this system will enable the participants to "double spend". The key challenge is to ensure that there is one and only one change operation (changes are not missed or repeated) by synchronizing state

changes between distributed ledgers.

After considering the advantages and disadvantages of various consensus mechanisms, we plan to design a new POS consensus mechanism for financial applications based on Tendermint to enhance business capabilities.

Tendermint consists of two main technologies: the blockchain consensus engine and a common application interface. The consensus engine is the core module of Tendermint, which ensures that the same transactions are recorded in the same order in each node. The application interface, also known as the Application Blockchain Interface (ABCI), allows transactions to be processed by programs written in any programming language.

Due to the particularity of financial applications, even in the field of open finance, it is necessary to meet global regulatory standards and requirements. Specifically, the consensus mechanism must satisfy the need for the supervisory node to quickly find a specific account, verify the validity of a node, verify the transaction process record, punish malicious transactions/accounts, rollback/obsolete illegal transactions... This requires designing a new type of consensus that is different from existing consensus mechanisms. Therefore, in the consensus protocol layer, we will stick to originality and develop a new type of consensus agreement.

3.3 Smart Contract

Cosmos itself does not support smart contracts, so Cosmos officially developed Ethermint. Ethermint is a very fast PoS blockchain and is fully compatible with Ethereum. The Force Protocol financial public blockchain will integrate the Ethermint module into our own system to be compatible with public blockchain or consortium blockchain which support solidity, such as Ethereum, ETC and RSK. With the update of the EVM and the advancement of the smart contract programming language, The Force Protocol public blockchain will always track industry progress and integrate forward-thinking technology into the system.

Integrating Ethermint into The Force Protocol public blockchain helps reuse existing Ethereum tools such as Dapptools series development tools, web3j, web3js, and truffle. The components of our application layer developed based on the Ethereum system are also compatible with reuse.

3.4 Cross-chain Solutions

The cross-chain management of cryptoassets is currently a major research direction in the industry. Relevant attempts include Notary schemes, Sidechains/relays, Hash-locking, Distributed private key control, etc.

Among them, the Notary schemes are not decentralized; the implementation of Hash-locking is relatively simple, and it is applied in the payment channel such as Lighting Network, but the application scenario is limited because the cross-chain asset transfer cannot be realized. The distributed private key control uses secure multi-party computing and threshold key sharing technology. This scheme does not require two-way anchoring, does not need to modify the original blockchain mechanism, and has a certain amount of smart contract development workload. It is an alternative solution for our project.

Currently, sidechains/relays is the most mainstream cross-chain solution. Both Cosmos and Polkadot use this technology, but the implementation of this technology is very complicated. One of the main purposes of The Force Protocol financial public blockchain development based on the Cosmos SDK is to use Cosmos's Inter-Blockchain Communication (IBC) module to implement asset cross-chain functionality.

4. Application protocol layer

4.1 Basic Components

4.1.1 Decentralized Identity (DID)

Currently, once a user has a main net account for a public blockchain (such as ETH and EOS blockchain accounts), many decentralized applications can be used. However, for many financial application scenarios, identity certification is a must in accordance with relevant legal requirements, especially in anti-money laundering and counter-terrorism financing. In the traditional scheme, when we conduct KYC, we provide identity information to the platform, and there is a risk of disclosure of identity information. The Force Protocol will incorporate Decentralized Identifier (DID) in conjunction with biometrics and cryptography algorithms to ensure user identity data privacy and security. The Force Protocol authentication protocol will follow the W3C standard and will also seek to work with projects such as MicrosoftDID, Sovrin, and uPort.

4.1.2 Wallet

The wallet is the management tool of the user's cryptocurrency account. The account plays an important role. It is the starting point and end point of the cryptoassets flow, and is the basis of trading, clearing, settlement and accounting. According to different scenarios, The Force Protocol provides solutions that support a variety of mainstream public blockchain wallets, including:

- HD wallet: HD wallet supports multiple currencies, and only needs to back up mnemonics, which improves the ease of operation and compatibility.
- Centralized wallet: In order to reduce the cost of education for users, primary users of cryptocurrency are more likely to accept centralized cryptocurrency wallets.

4.1.3 Security and Privacy

Privacy protection of transactions is a basic requirement for financial applications. Technically, cryptographic methods such as data desensitization, zero-knowledge proof, secure multi-party calculation, ring signature, group signature, and blind signature can be used to perform high-intensity encryption protection on data. Information encryption and decryption authorization ensures that all data is encrypted by its owner and can only be delegated to its authorized participants. Zero-knowledge proof can go a step further. Under the premise that the data owner does not disclose sensitive information, it can verify and judge part of the information in the blockchain to improve the efficiency of the whole process. In terms of transaction privacy, in order to realize that the transaction initiator is not traceable to anyone, the ring signature technology can be used to hide the transaction initiator in a set of accounts; when using the smart contract transaction, the transaction initiator can use the one-time account technology to put the smart contract isolated from the original account.

4.1.4 Governance

Voting is an important mechanism for governance by a community or a cooperative coalition. The Force Protocol will provide a common functional module for voting and execution of voting results to ensure the security, transparency and universality of voting. Governance has two processes: first, governance voting, the purpose is to provide a solution, such as introducing a new oracle or modifying a certain parameter of the system. Second, the execution of the vote, the purpose is to change the state of the system, such as the actual change of risk parameters of a pledge.

4.1.5 Oracle

Implementing the financial business as a smart contract on the blockchain, the judgment of the contract state inevitably requires the use of information in the out-of-chain system. This combination of out-of-chain data and on-chain smart contracts requires a trustworthy channel for data access on & off the chain, which is the oracle.

For the oracle, the most important thing is to ensure that the oracle is trustworthy and does not tamper with the data. The oracle usually has two modes: the centralized oracle and the decentralized oracle. The centralized oracle has problems such as single point of failure and data source trust; the decentralized oracle has better stability and reliability, but generally has performance problems.

The Force Protocol proposes a co-existence mechanism of centralized and decentralized oracle, that is, introducing multiple data sources service nodes through certain reward and punishment mechanism, encouraging data source nodes to provide effective data on-chain services, and all faithful nodes will be awarded with The Force Protocol token. Conversely, the abnormal data source node may lose their staking tokens of The Force Protocol. In addition, considering the real business environment, The Force Protocol also supports the direct use of a centralized docking method for data provided by some trusted third-party authorities.

In the future, if there is a commercial grade, universally recognized decentralized oracle solution, The Force Protocol will be upgraded to introduce such oracle.

4.2 Financial Components

4.2.1 Financial Products

Financial products have complex business logic and rules that challenge the design of smart contracts. The following table lists the key elements and rules of main financial products.

Table 1 Elements and rules of common financial products

Financial products	Elements and rules
Lending	currency, interest, term, repayment method, etc.
Bond	currency, face value, interest payment period, repayment period, coupon rate, issuer, etc.
Futures	underlying assets, contract size (quantity and unit), delivery time, delivery price, etc.
Options	the underlying asset, quantity, exercise price, exercise time limit, type

	(European or American), etc.
Swap	currency, position, maturity, fixed interest rate, floating interest rate, etc.
Insurance	grace period, beneficiary, premium, insurance amount, claim conditions, etc.

In order to achieve a specific financial business, The Force Protocol will refer to the general standards of the financial industry, sort out the data structure according to the characteristics of each financial product, and extract a series of reusable product rule terms for use by developers. Such standards include basic terms, optional terms, and conditional terms.

- Basic terms: required fields for specific financial contracts, such as the currency of the loan product, interest, term, and repayment method.
- Optional terms: optional configuration items for financial contracts, such as whether bond products can be redeemed in advance, whether includes convertible bonds, etc.
- Conditional terms: Execution when certain conditions are met. For example, in a bond product, when the market interest rate is lower than a certain set value, the issuer has the right to force redemption of the bond to reduce the financing cost.

4.2.2 Asset Custody

According to different scenarios, the crypto asset custody mode has different forms such as smart contracts, transaction accounts, and multi-sign accounts. The Force Protocol will work with mainstream crypto asset custody providers to integrate technology interfaces to provide convenient asset custody services for exchanges, funds, lending platforms, asset management service platforms and OTC dealers, etc.

4.2.3 Financial Model

Financial products typically involve complex calculations and the need to dynamically monitor changes in market and risk factors, so The Force Protocol will provide a range of mathematical and financial model services.

- Mathematical models: probability statistics, analysis of variance, regression analysis, time

series, etc.;

- Pricing model: Dynamically calculate the price of financial products based on the latest data to ensure accurate transactions.
- Risk control model: Output risk analysis results based on risk control model, including market risk, credit risk, investment risk, liquidity risk, and counterparty risk.

4.2.4 Auction

Auctions are a common form of disposal of assets in real life, and open bidding ensures fair and equitable trading processes. There are often scenarios for handling crypto-assets in decentralized financial applications, so The Force Protocol will provide a practical set of auction features.

The implementation of the auction component will follow the principle of minimizing loss, i.e. seeking to dispose of the least crypto-assets and obtain the optimal disposal price. Therefore, the auction method includes the following three types:

Forward auction: fixed pledge, the highest bidder won the bid;

Reverse auction: fixed bid, the lowest number of pledges are required to win the bid;

Forward first and then reverse auction: first fix the pledge, and when the bid reaches the expected price, it will turn into the reverse auction, that is, the fixed bid is the expected price, the quantity of the pledge is reduced, and the lowest number of pledges are required to win the bid.

4.3 Expanding Components

4.3.1 Big Data

Data is the foundation of modern financial analysis. With the in-depth application of technologies such as quantitative analysis and machine learning in the financial field, data is known as “flowing gold”. Based on a distributed architecture, The Force Protocol provides a one-

stop big data solution for ETL processing and cleaning, data analysis and reporting services, and data visualization. At the same time, for specific financial application scenarios, external big data services can be introduced to improve the efficiency of the system.

4.3.2 Artificial Intelligence

The Force Protocol will introduce artificial intelligence technology, including machine learning, knowledge mapping, natural language processing, computer vision (such as face recognition), etc., to empower the financial industry's participating entities and business segments, highlighting the important role of AI technology in financial industry, such as product innovation, service upgrades and process reengineering.

5. BaaS platform

The Force Protocol's Blockchain as a Service (BaaS) platform is the interface between our financial application protocol stack and open finance application developers, which allows developers to leverage cloud-based solutions to build, host and use their own dApps, smart contracts and functions on mainstream public blockchains which linked by The Force Protocol network.

After authorization fee is paid (using The Force Token), developers can download source code of specific financial application scenarios from The Force Protocol BaaS platform, create their own financial dApp using our template, distributed the application on public blockchains which The Force Protocol supports; or more easily, just integrate according API interface into their own dApps or Apps, the powerful financial service function could be called immediately by the application.

Applications which built on The Force Protocol open platform, applications which call The Force Protocol service APIs are all part of The Force Protocol financial service network, all applications of same financial scenario and business principles share their customers, capitals, orders, etc. Which will bring following advantages:

- Increasing business scale
- Introducing liquidity
- Decreasing development workload
- Underlayer safety guarantee of service

For customized service of different project or business, The Force Protocol development team will help those developers to implement their specific applications under certain conditions, we will also build a global developer community to offer decentralized development supporting service, which will be incentive by The Force Token.

The operation mechanism of The Force Protocol cloud-based open platform has different stages: at its initial stage, the open platform service instance and all codes belongs to the platform will be running on mainstream cloud service platforms such as Amazon, Azure, etc. After the IPFS file sharing system and Filecoin is successfully operated, we may consider move our to user open platform service to IPFS ecology, for keep our service running with a decentralized mechanism and long life span.

6. Application cases

Following cases are open finance application examples for potential developers, showing what they can do with series tools provided by The Force Protocol development platform in near future. With the development of The Force Protocol project, more financial scenarios will be supported by us.

6.1 Network Lending Alliance

Internet lending refers to the business of using the Internet to issue loans, involving many participants.

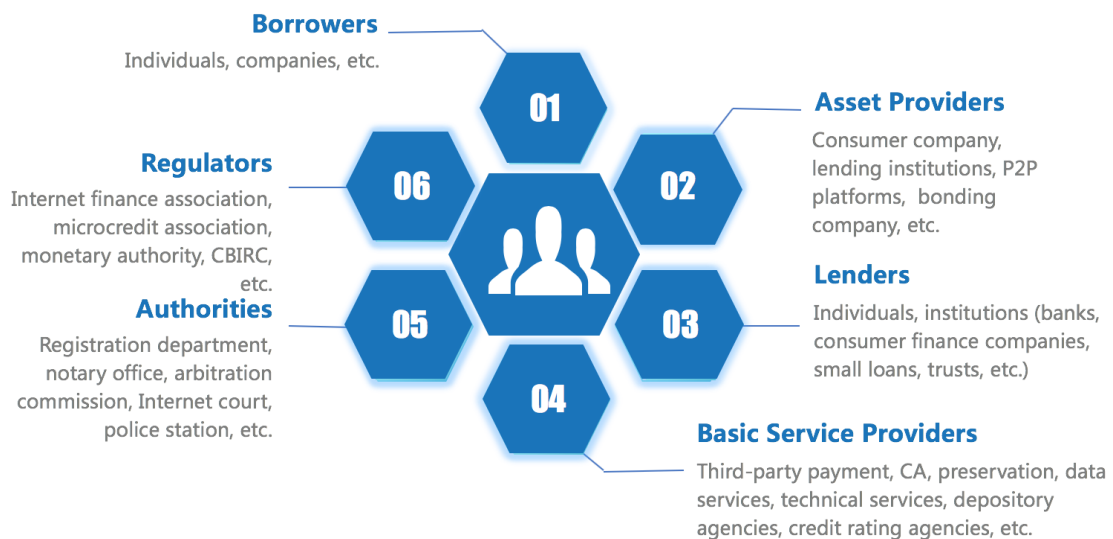


Figure 4 Network lending business participants

The solution provided by The Force Protocol is to build a consortium blockchain. Alliance members are strictly compliant, and all member nodes update data synchronously.

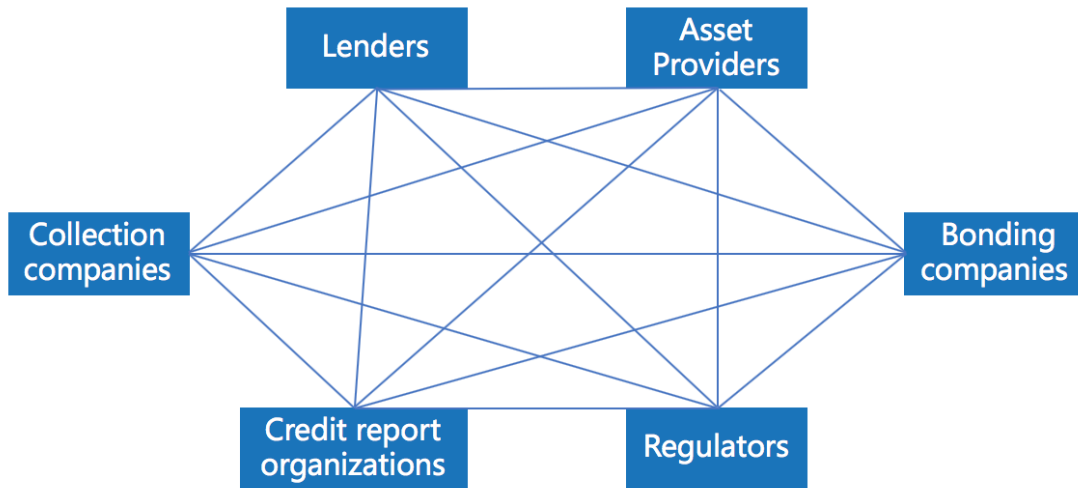


Figure 5 Network lending consortium blockchain

The blockchain has non-tamperable and traceable characteristics, so that all data successfully recorded by the blockchain cannot be modified by individual participants while deceiving other participants. This will greatly reduce the willingness of participants to falsify data and do evil, while improving the efficiency of audit inspections.

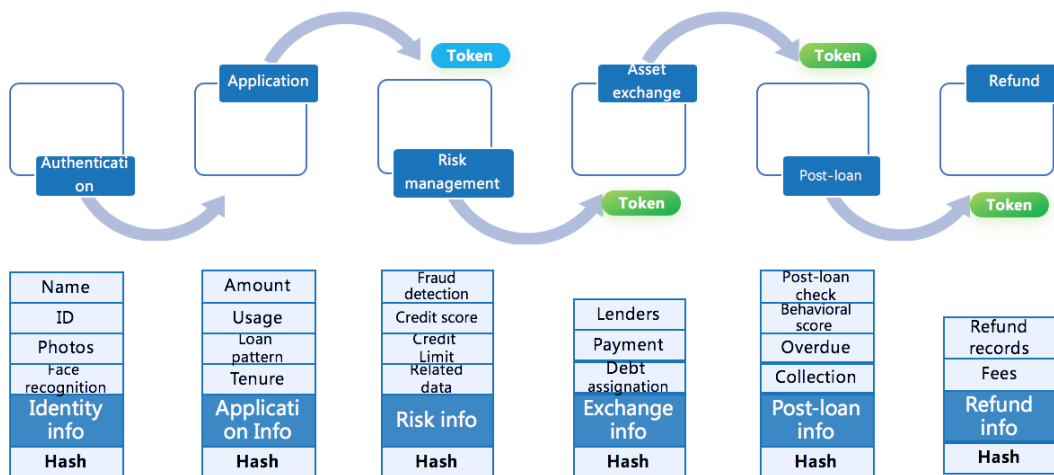


Figure 6 Network lending information on the chain

By introducing a series of smart contract applications in the standardization process, they automatically trigger when the conditions are met, and perform related services. Improve the degree of automation, increase efficiency, and to some extent avoid the risk of credit fraud and manual operation errors. Establish a stable and transparent mutual trust lending ecosystem, so

that all participants can work together for a win-win situation. Most importantly, the solution is regulatory friendly.

6.2 Decentralized lending - BiBi Dai

Based on The Force Protocol open source framework, BiBi Dai builds a global lending network, formulates exclusive programs based on different borrowing needs of all sectors and groups of society, provides appropriate and effective financial services, pays attention to vulnerable groups in less developed countries or regions, and practices human inclusive finance career.

BiBi Dai's decentralized lending service is a lending dApp based on the mainstream public blockchain such as Ethereum and EOS. It supports peer-to-peer pledge lending and fast lending (fund pool mode), and pledge assets are kept by smart contracts. The BiBi Dai business aims to improve the imbalance of financial services across the globe and to achieve global lending and resource sharing.

Table 2 BiBi Dai point-to-point pledge loan product introduction

Elements	Rules
Lending coins	USDT(ERC-20), DAI, etc.
Pledged coins	ETH, BNB, FOR, BAT, HT, MKR, LRC, etc.
Pledge rate	180% (= pledged coins market value / market value of lending coins)
Make up line	150%
Closed line	120%
Daily interest rate	0.1‰ to 0.8‰, set by the participants
Borrowing period	7, 14, 30, 60, 90 days, borrowing money users self-choose
Minimum borrowing amount	From 10 USD
Handling fee	The daily handling rate is 0.5‰ (subject to the page prompt), and the two-way fee is charged to the borrowing user and the lending user. The borrower pays the handling fee when repaying the loan, and the lender pays the handling fee when lending. When the pledge rate is down to 120%, it will be closed, of which 5% of the pledged coins will be transferred to the source channel of the borrowed coin order, 5% will be used as the closing fee, and 110% will be transferred to the borrower.
Order limited period	If the order is not filled within 5 natural days, the order will be cancelled by the system.

The borrowing user pledges the cryptocurrency to the smart contract, sets the borrowing rate and the borrowing period independently, and creates a borrowing order. Each loan order will enter the BiBi Dai Global Shared Order Book, which is open to all BiBi Dai partners, and any lender from any partner can choose any of the loan orders to lend.

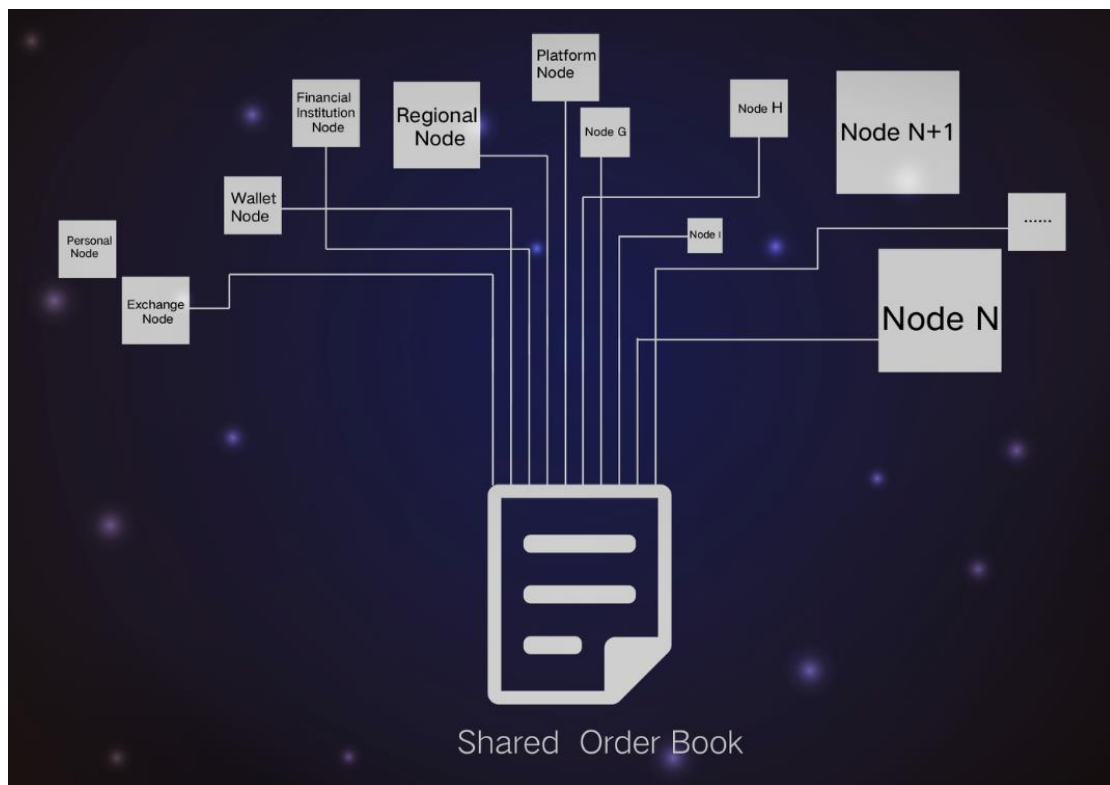


Figure 7 shared order book

Peer-to-peer lending allows both lenders and borrowers to freely determine the terms of lending, but it also brings a lot of inconvenience: to participate in peer-to-peer lending, users need to publish and manage loan orders independently. In the case of mortgage lending, both borrowers and lenders need to pay attention to the price changes of collateral at any time. At the same time, a point-to-point loan order often takes a long wait from the release to the final transaction. These shortcomings limit the scale and growth rate of the peer-to-peer lending business.

BiBi Dai's fast lending products create a pool of funds that focus on specific borrowing

conditions by pooling different funding sources, providing rapid funding to demanders. Through automated procedures (smart contracts) deployed on the mainstream blockchain system, funders can quickly obtain capital gains without friction, and borrowers with capital needs can quickly and easily obtain financial support after providing appropriate collateral.

BiBi Dai builds a global lending network through cooperative nodes to realize global lending and resource sharing. All partner nodes can enjoy the fee sharing.

- **Platform cooperation nodes:** cryptocurrency wallet, cryptocurrency exchange and other traffic platforms
- **Regional cooperation nodes:** regional financial institutions and individuals (subject to local laws and regulations).



Figure 8 Global Lending Network

For more details on BiBi Dai, please see the BiBi Dai product description on Github.

6.3 Decentralized Stablecoin – Qian

Qian is a stablecoin issued by cryptoassets through pledge. The principle of this model is to pledge cryptoassets on the smart contracts of the blockchain, thereby issuing cryptocurrency (stablecoin) that anchors the price of fiat currency. In this mode, each stablecoin issued has a corresponding cryptoasset for mortgage, such as BTC, ETH and other current mainstream cryptocurrency. However, due to the large price fluctuations of these cryptoassets, it is generally necessary to guarantee each stablecoin worth US\$1 through a risk control mechanism such as over-collateralization and compulsory liquidation. There is at least a collateral worth \$1, and the collateral can be liquidated. The process is obtained by the participants. Compared with fiat currency reserve model with the same collateral mechanism, Qian's main advantage lies in the decentralization of the blockchain. The pledge is locked in the smart contract, open and transparent, and cannot be misappropriated or frozen. No one or organization can directly control the issuance of stablecoin.

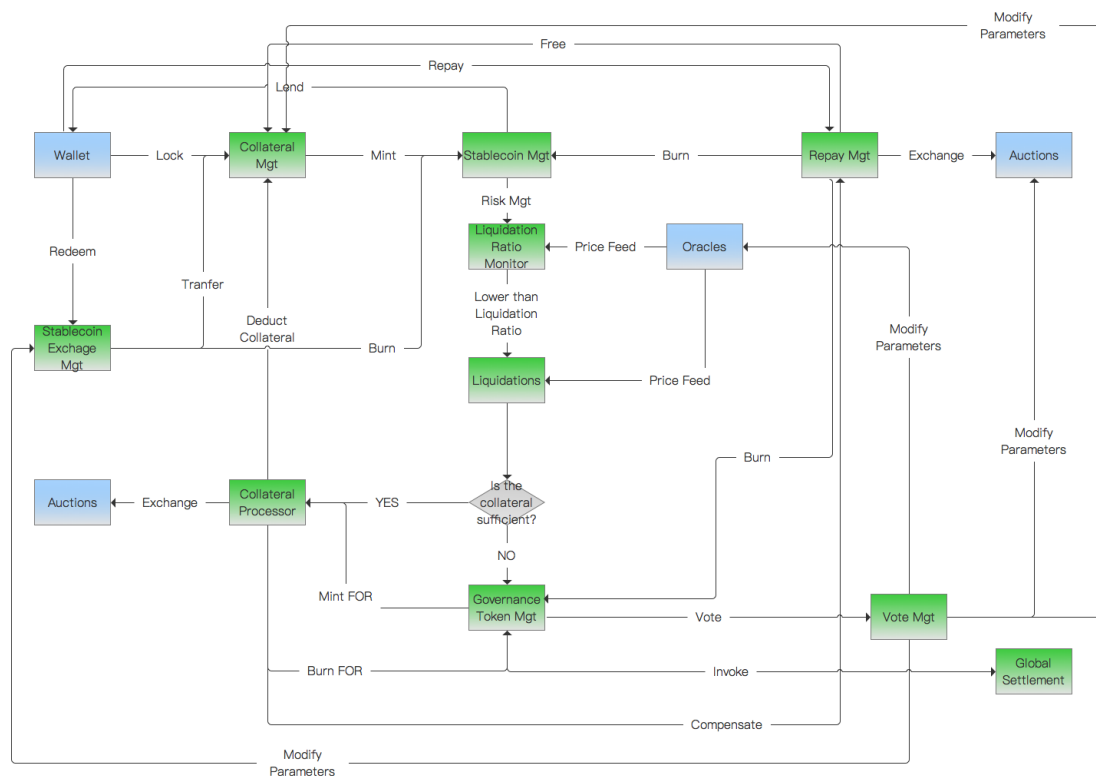


Figure 9 QIAN system architecture diagram

Basic points of QIAN

- QIAN uses crypto-assets as the underlying support assets;
- QIAN will initially maintain a 1:1 exchange rate with the US dollar, and will issue a 1:1 exchange rate with the international mainstream currencies such as the Euro, Japanese Yen, RMB and Libra in the future;
- The QIAN system is prioritized developing on RSK and Ethereum, and will be upgraded based on the mainstream cross-chain architecture;
- The QIAN system is committed to the ultimate decentralized operation, but this will be a gradual process;
- The QIAN system is based on the open-source framework of The Force Protocol and is part of The Force Protocol ecosystem.

Stability mechanism

- At least 100% cryptoasset support;
- Stablecoin holders can redeem collateral with market price at any time;
- Carefully select the underlying cryptoassets portfolio to reduce systemic risk;
- Dynamic interest adjustment mechanism to maintain and adjust QIAN's development and stability.
- Risk mitigation mechanism.

For more information of Qian, please check out The Force Protocol stablecoin project Qian on Github.

7. The Force Token

We issued an original ERC-20 token, code-named FOR, and token based on EOS, code-named EFOR. In the future, after the public chain of The Force Protocol is launched, the FOR and EFOR tokens will swap with the functional tokens on the main chain of The Force Protocol. FOR and EFOR are ecological tokens of The Force Protocol and will be the sole fuel for The Force Protocol ecosystem on corresponding public chain network.

7.1 Utility of Token

The tokens will not only promote operation of the ecosystem, but also serve as carrier for autonomy of decentralized organizations. The FOR or EFOR will play following roles in The Force Protocol ecosystem:

7.1.1 Transaction Fee Deduction

In The Force Protocol system, when the loan orders match, the smart contract will deduct a small amount of tokens from both parties, and send them to the supernodes submitting the orders of both parties as the service fee income. Under normal circumstances, the handling fee is 0.5%, which is charged on both borrower and lender. When user holds the FOR or EFOR token, the smart contract will calculate the commission amount base on user's FOR or EFOR holdings, and then deduct the calculated payment fee. In order to stabilize the FOR or EFOR token market price, prevent supernode from selling to the market immediately after collection of FOR or EFOR fee, The Force Protocol system will set a freeze period for each FOR or EFOR token obtained in the form of service fee. After freeze period is over, the supernode will get released FOR or EFOR fee.

7.1.2 Supernode Pledge Lock

Within The Force Protocol system, each supernode needs to pledge a certain amount of FOR or EFOR tokens when it joins in the system. This part of the token will be hosted by a special smart

contract. The main function is shown in the following section. The smart contract will also periodically scan the pledge level of supernode FOR or EFOR token. If the pledge is lower than minimum requirement of the system, supernode will receive a pledge notification. If supernode does not replenish the pledge FOR or EFOR within specified time, the system will submit information to the arbitrator according to the preset conditions to determine whether supernode can perform the function normally. If judgment result is negative, arbitrator will submit the deletion proposal for this supernode to community governance system.

For the loan service provider or supernodes, they need to pledge a specific amount of FOR or EFOR token to smart contract, in case they lunch malicious act in the system, for example, supernode may apply a fake loan request, or submit a large amount of small loan request to block the system, then bring loss to lenders. If this kind of issue happens, the system will submit information to the arbitrator according to the preset conditions to determine whether supernode actually lunch malicious act. If judgment result is supernode really did evil, arbitrator will submit proposal, then service provider's pledge token will be confiscated.

7.1.3 Community Governance

FOR or EFOR is the only tool for members of The Force Protocol community to participate in community voting on specific public blockchain. First, when there are any important issues that needs to be submitted to the Community Governance Committee for discussion, the proponent must hold FOR or EFOR and submit proposal to a dedicated smart contract, mortgage a certain number of FOR or EFOR before submitting the proposal to the community discussion board. Community holders can submit suggestions for changes to the content of proposal within a certain period of time. All changes will form an iterative version and be recorded by the blockchain. After the specified time limit is over, holder of FOR or EFOR will vote on the content of the proposal. All locking FOR or EFOR token will not be counted in the ticket, different proposals need to meet specific number of votes to be approved. All FOR or EFOR tokens for voting will be locked by a smart contract address for a certain period, during which these FOR or EFOR tokens are out of circulation system.

7.1.4 Other Functions

Along with the progress of The Force Protocol Project, FOR or EFOR tokens will have more application scenarios. At that time, community members and The Force Protocol foundation and other participants can submit corresponding proposals to the community to give FOR or EFOR token more useful features and usage scenarios.

7.2 FOR Token Distribution Plan

The total amount of FOR tokens is 1 billion, with no additional issuance forever. Directed by The Force Protocol initiative team, 85% of Tokens will be used for community building and community donation programs, of which community ecological construction accounts for 30%, The Force Protocol Foundation accounts for 25%, and strategic investors and community donations account for 30%. The remaining 15% will be reserved by the founding team, which can be used as reward for their early contribution to the project, and for new team members. The tokens allocated to founding team will be locked up for 3 years from first version of product online, of which 30% 12 months, 30% 24 months, and last 40% 36 months. The pie chart of allocation for FOR token is shown in the following figure.

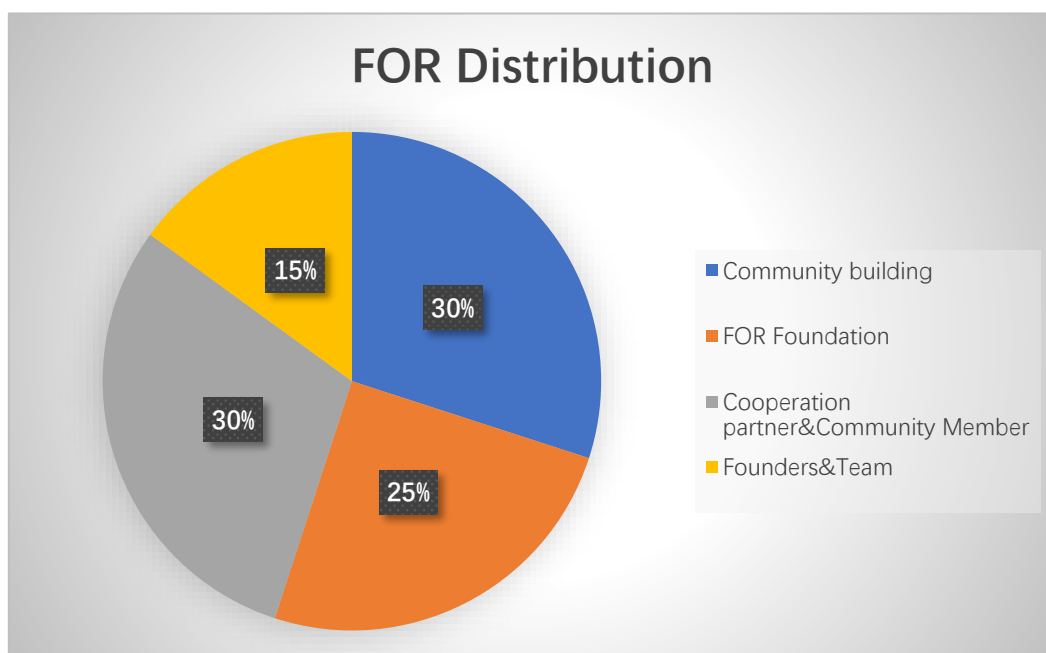


Figure 10 FOR Distribution

7.2.1 Community Ecological Construction

Construction of community ecological includes but not limited to: ecological incubation and incentives of The Force Protocol community decentralized application (DAPP), developer community construction, commercial and industrial cooperation, marketing promotion, academic research, education investment, laws and regulations, etc.

7.2.2 The Force Protocol Foundation

We have registered a non-profit Foundation in Singapore. The main tasks of the Foundation are: construction and operation of The Force Protocol Ecology, development of business direction, issuance and management of FOR tokens, and management of funds tokens obtained by donation.

7.2.3 Strategic Investors and Community Donations

Based on initiation and operational requirement of the project, 30% of the tokens will be reversed to reward strategic investors and community members.

Round	Token Price in USD	Sale ratio	Lock
seed round	0.018	5%	Never and ever
private round	0.030	17.5%	20% unlocked before TGE, after listing, ever 3 months 40% will be unlocked

Figure 11 Funding Financing statement

The seed round investment was completed by the founding members of the team. Due to the long-term optimism and self-motivation of the project, the team decided that the FOR tokens corresponding to the funds invested in the seed round would never be unlocked to market.

7.3 EFOR Token Distribution Plan

The total amount of EFOR tokens is 1 billion, with no additional issuance forever. Directed by The Force Protocol team, 10% of Tokens will be used for redemption and airdrops, as well as

marketing and community governance; 20% are used for EFOR ecological development; 70% are mined by the supernodes that maintain the EFOR ecosystem through DPOS mechanism (staking mode, mining start time to be notified).

7.3.1 Exchange and Qirdrops

Since we are not raising funds on EFOR, in the initial stage of project development, users can only obtain EFOR tokens through FOR exchange and random airdrops. 10% of the total EFOR will be reserved for FOR-EFOR exchange, eligible EOS holder airdrops and marketing. In this part of EFOR, 80% (8% of total EFOR) will be used for redemption. When the redemption is stopped, all tokens that have not been exchanged will be destroyed. 20% (2% of the total) will be used for project start-up, market promotion, ecological cooperation, and community governance.

7.3.2 Ecological Development

20% of the total EFOR token will be used for the ecological development of The Force Protocol on EOS public chain. This part of EFOR token will be used for transaction fee deduction, supernode pledge lock, community governance, etc. These part of tokens will be locked, unlocked time will be determined by The Force Protocol team follow specific situations.

7.3.3 Mining of Supernodes

Based on the underlying technical characteristics of the EOS public chain, 70% of the total EFOR tokens will be used for super node mining. Supernode pledges and locks the corresponding share of EFOR, accesses The Force Protocol financial network and contributes computing power, thereby obtaining the corresponding EFOR return.

For example, supernode can obtain EFOR during the process of updating/revising the shared order book, other mining scenarios will be updated as The Force Protocol network continues to improve.

8. Research and development roadmap

- **2018 Q2 ~ Q3:** Project launch, white paper design, official website online.
- **2018 Q4:** Lending smart contract and trading system development, BiBi Dai 1.0 platform is online.
- **2019 Q1 ~ Q2:** Distributed crypto financial services protocol design, white paper update.
- **2019 Q3 ~ Q4:** Based on the development of Ethereum's distributed crypto-financial service agreement, the BiBi Dai 2.0 will be launched.
- **2020 Q1 ~ Q2:** The Force Protocol issued a stablecoin and launched the development of The Force Protocol
- **2020 Q3 ~ Q4:** The Force Protocol was launched on the public blockchain, and the crypto-financial service platform based on The Force Protocol public blockchain was launched on version 1.0.
- **TBD:** Multi-chain protocol development, BAAS platform development, etc.

9. Other

For more project information acquisition channels, please refer to:

Official website: <https://www.theforceprotocol.com/en-us/index.html>

Github repositories: <https://github.com/theforceprotocolgroup?tab=repositories>

Medium: <https://medium.com/@theforceprotocol>

Twitter: https://twitter.com/Force_Protocol

LinkedIn: <https://www.linkedin.com/company/the-force-protocol/>

WeChat public account: theforceprotocol666

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