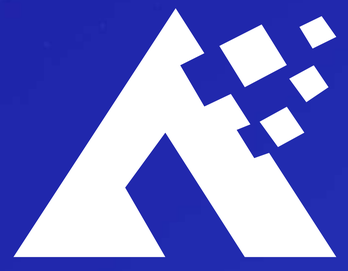


APron

Apron Network

Overview

Blockchain technology not only enables everyone to have their own asset controllability, but it also drives people into the flexibility of providing personalized service. Apron Network is a decentralized infrastructure service network based on Blockchain Technology initiated by Apron Labs, which makes it possible for everyone to freely provide and obtain personalized services through the network. As the foundation of the Web 3.0 world, Apron Network can ensure the freedom of individual choice and become the new entrance of the Web 3.0 world in the new generation, making the Web3.0 world accessible.

Introduction

It has been a miracle for the history of computer internet that Bitcoin has been operating safely for more than 11 years since Jan 3rd, 2009. Satoshi Nakamoto, a developer of bitcoins, ushered in a new era of digital encryption by creatively proposed blockchain technology and built a well-functioning decentralized P2P network. The Blockchain is like a fast-running machine, influencing and changing wherever it goes, and stimulating people's innovative vitality with the continuous release of energy.

Blockchain is a decentralized trust mechanism that has become a new model and important methodology of data protection and value exchange.

Blockchains are inherently tamper-proof and traceable due to their chain-like structure and decentralized implementation, which helps to solve the problems under traditional and centralized implementation, making it the cornerstone of blockchain applications.

Ethereum made it possible for the wide use of Blockchain technology brought by Bitcoin. The smart contracts of Ethereum can implement all logic on decentralized networks, which not only bring more applications the tamper-proof and traceability features, but it also makes DAO (decentralized autonomous organization) an important type of future organization.

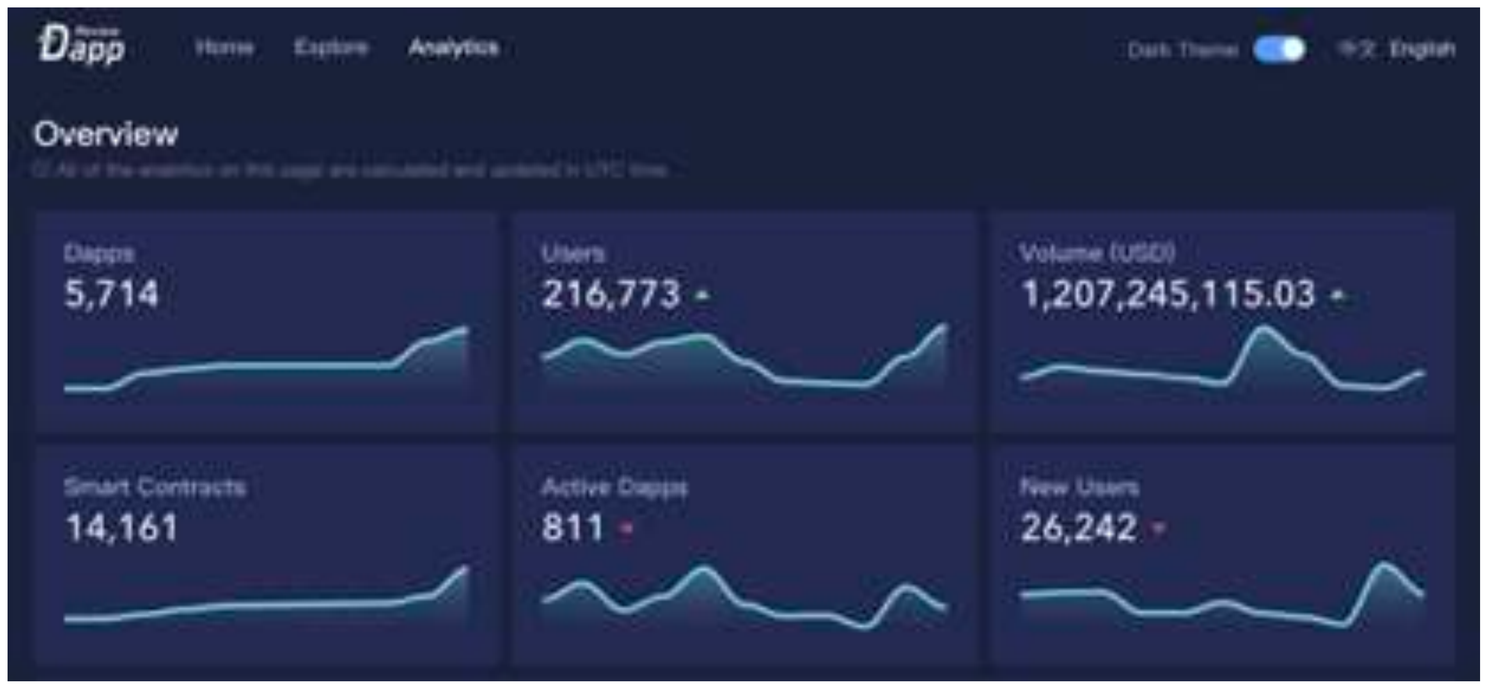


Figure-A DApp Review December 1st, 2020

With the development of Ethereum and the enhancement of the smart contracts, increasing amount of developers are involved in the construction of the open-source community, and achieved their ideals using the smart contract. In just a few years since Ethereum Network launched, DApp (Decentralized Application) has exploded rapidly. As of December 1st, 2020, there were in total of 14,161 smart contracts on Ethereum, 5,714 of DApps, and $1.2 billion in one-day transactions of DApps.

In addition to the many application developers involved in DApp development, there are also some blockchain ecosystem participants who have made huge contributions that contributes to the boom in Ethereum DApp. They are the node operators who support the operation of the entire Ethereum. Ethereum miners keep the Network safe and DApp developers keep the network thriving. Both two sides boost the entire Ethereum Network growth, which makes sure all participants of the Ethereum ecosystem can connect to the Ethereum Network.

Operating Ethereum nodes have always been an energy and money consuming work. Initially, most Ethereum nodes were able to provide public services for the community, and now most Ethereum nodes are exclusively serving their specific business of operators. Due to the restriction of public operation and maintenance cost, and the lack of the ecosystem for Ethereum node service operators finding the corresponding community developers, less and less Ethereum node operators are willing to make node services public. It became increasingly challenging for those DApp general developers who simply want to operate an Ethereum node or find a stable and usable Ethereum node service (access point) is getting harder.

Having noticed this phenomenon, a few commercial companies chose to provide generic Ethereum node services through commercial operation.

A few commercial companies have noticed this phenomenon and they provided generic Ethereum node services through commercial operation. By offering a basic-level service, DApp developers can get the opportunity to develop Dapp. Following that, a small number of companies that can provide Ethereum node services have gradually emerged in the ecosystem, i.e. Infura (infura.io), funded by Consensys, is the largest Ethereum node service provider in the world that provide basic Ethereum node services to millions of developers. App Developers invoke the Ethereum API service provided by Infura in their own code, so that the Application has access to everything on the Ethereum network. So far, most of the applications of open source community and commercial products nowadays are extremely dependent on the Ethereum node service of Infura, including some leading companies in the blockchain field.

Figure-B Infura service status information

On November 11, 2020, the Ethereum service of the Infura became inaccessible due to a breakdown which results in some serious accidents in a wide range of applications, services, and exchanges. This is one of the most influential events in the history of the blockchain. It seems like a contradictory joke for the blockchain world which we called ‘decentralization’.

Our staff of Apron Labs have been developing DApp in the Ethereum ecosystem and have experienced this blockchain accident as well. After that, we are aware of the awful status existing in the Web 3.0 world that people have been immensely counted on the centralized service. Thus, we decide to establish a decentralized infrastructure service network to change this situation.

It was then that we became aware of the situation in the Web3.0 where people relied extensively on the centralized service. Therefore, we decided to establish a decentralized infrastructure service network to change this situation.

Current Works

Many projects have been tried or are running in the field of the blockchain infrastructure service, contributing to both centralized and decentralized mode, on-chain data query and off-chain data on-chain.

Infura provides API services for developers by building its own Ethereum and IPFs nodes, keeping developers accessing Ethereum and IPFs node data through API services.

Nownodes operates in a similar way to Infura, but provides more blockchain network API services. For now, it claims to have provided 45 chain API services.

Api3 constructs a public blockchain and provides Oracle Network, and governs the Network through DAO and Kleros. Api3 builds the Oracle Network by submitting Oracle to the data source provider and providing cross-blockchain aggregation data for DAPP.
By submitting Oracle to the data source provider, Api3 builds the Oracle Network and provides cross-blockchain aggregation data for Dapp.

BitQuery is a blockchain data engine that provides the data API on the blockchain to users by aggregating the data on the blockchain, BitQuery also provides simple data analysis capability and GraphQL API on the blockchain.

The Graph proposes Ethereum and IPFs on-chain service index protocol. By using SubGraph’s definition, the index information is retrieved and established in the smart contract, and GraphQL API is served for users to obtain the data information corresponding to DAPP.

Problems

During the existing modes, each project focuses on its specific field in the existing methodologies. There is no commonly used technical solution connecting to each field.

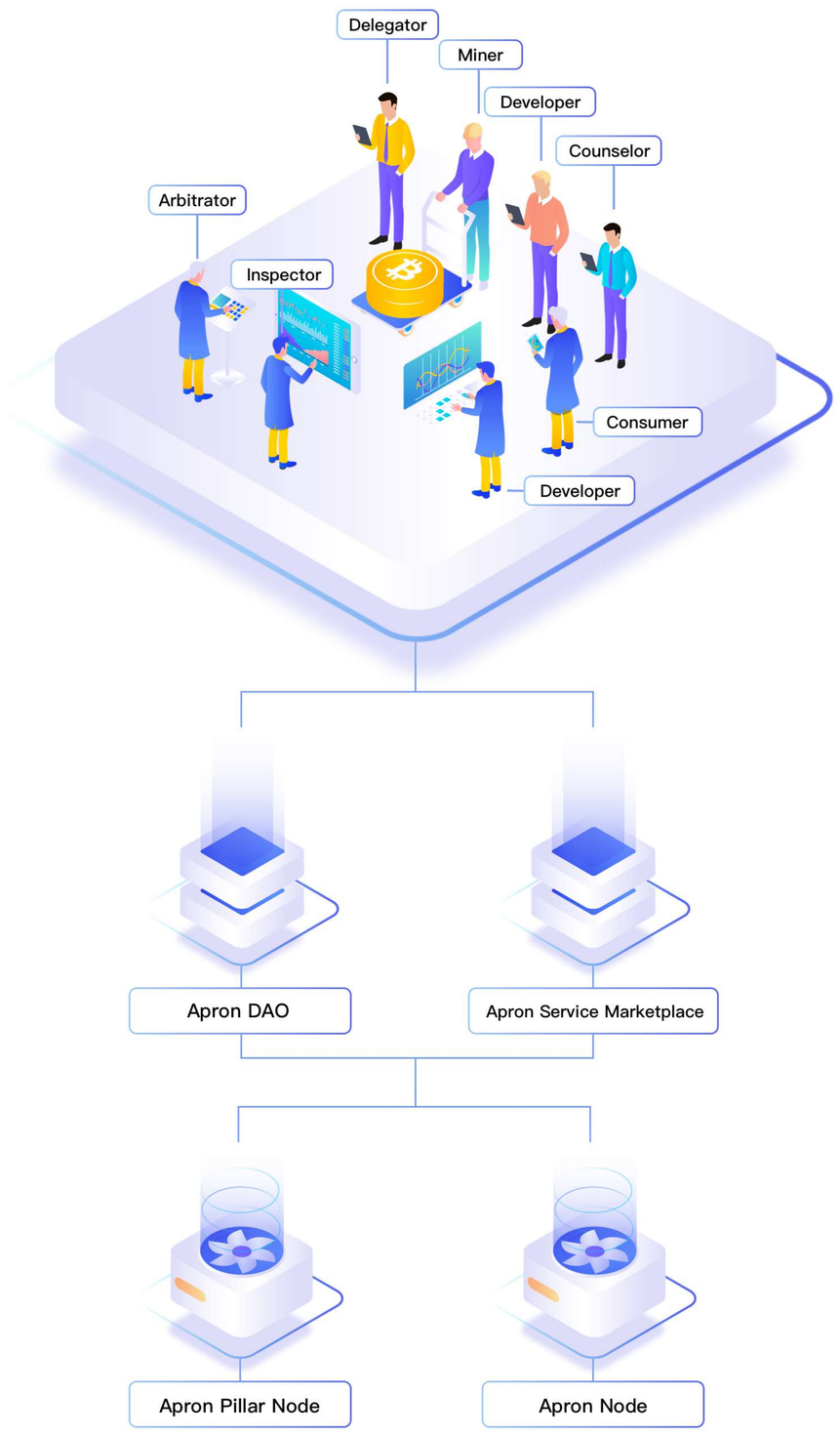
Both Infura and NOWnodes adopt a centralized approach to provide API services for blockchain nodes or browsers. Api3 offers off-chain data on-chain aggregation service by using the way of submitting by Oracle to the data source provider. BitQuery and the graph focus on the aggregation and indexing of data on the chain, which makes DAPP and offline applications can obtain the data on the chain. Both services are providing GraphQL API.
For infrastructure services, the type of services is diverse. In terms of traditional infrastructure services, there are OCR (optical character recognition), SMS (short messaging service), SNS (simple notification service), VPN (virtual private network), etc. For the infrastructure services in the field of blockchain, there are blockchain node API services, blockchain browser API services, blockchain data aggregation, DAPP data aggregation, off-chain data aggregation on-chain, cross-chain data API services, etc. There are more service types waited to be exploded.

Summarizing the above service types, there are three critical parts of infrastructure services: Service Discovery, Service Call and Service Billing. These parts are very mature in the centralized IT infrastructure architecture, but they are controlled by operators, which causes the damage of choosing freely for infrastructure service providers and users. We can see how the centralized infrastructure service platforms are controlled by commercial companies such as AWS, Azure, AliCloud and Google Cloud control developers. In the decentralized Web 3.0 world, the situation becomes more complex, and these three critical parts are missing and imperfect.

In order to solve the problems of infrastructure service discovery, Service Call and Service Billing in the infrastructure service of Web 3.0 world, Apron labs proposed Apron Network as a solution to improve the infrastructure service ecology of the Web 3.0 world. In the Web 3.0 era, it is possible for developers to freely provide and use any infrastructure services, which will make the real world connect to the Web 3.0 world, returns freedom to everyone!

Overview in System Design

Apron Network is based on substrate framework and can be a parachain of Kusama / Polkadot. The nodes running in Apron Network are divided into two types: Apron Pillar Node, Apron Node. On top of the nodes that can run, Apron DAO manages Apron Network. The entire Apron Network will be composed of Apron Pillar Node, Apron Node, Apron Service Marketplace and Apron SDK.



Figure–C Apron Network hierarchical structure

The roles involved in the network construction include Provider (Service Provider), Miner (Node Miner), Delegator (client), Arbitrator (Arbiter), Inspector (Inspector), Consumer (User), Developer (Service Developer) and Counselor (Service Consultant). All the roles of Network construction work together through Apron DAO to ensure the stable and continuous operation of the entire Apron Network.

System Design

Apron Pillar Node

Apron pillar node is developed by substrate framework, which provides security guarantee for Apron Network and ensures the stable operation of the network. It is the basic network node of Apron Network. Apron pillar node will be initially launched by Apron labs and will be run by community participants.

Apron Node

Apron Network consists of the Apron Node which is based on the Substrate framework with OCW enabled. The basic service provider provides service publicly through Apron Node which synchronizes the basic service on– chain, and synchronizes the information of service usage and billing on the chain through OCW module.

Any infrastructure service provider can provide its infrastructure services to the public through Apron Node. Whether it is a block link point operator or a provider of information technology services in the traditional Internet and other fields, all you need to do is to deploy the Apron Node in any network that can connect to the Internet and access your own infrastructure services, which are provided to the public. By adding the corresponding service information to the configuration, it allows the public to discover and use the infrastructure services, receiving service usage fees at the same time. Individuals, teams or companies that have been or will be able to provide infrastructure services can become Apron Network participants. They will also be able to provide infrastructure services for the Apron Network and the Web 3.0 world and obtain corresponding benefits by running Apron Node.

Any infrastructure service provider can publish its infrastructure services through Apron Node, this happens whether the blockchain node operators or providers of traditional Internet and other information technology services. The existing infrastructure services can be provided to the public by deploying the Apron Node in any network that can connect with the Internet and access its own infrastructure services. By adding corresponding service information in the configuration, the public can discover and use the infrastructure service and obtain the service usage fee. Everyone who ever provided infrastructure services or plans to provide infrastructure services can be a participant of the Apron Network. All participants can provide infrastructure services by operating the Apron Node for the Apron Network and the Web 3.0 and benefit from it.

Apron Service Marketplace

Apron service marketplace matches the services provided by infrastructure service providers with the needs of DAPP developers. Infrastructure service providers can implement the up–chain of infrastructure services by deploying Apron Node with one click. Apron Node will provide infrastructure services to the Apron Market smart contract through OCW, and synchronize the infrastructure service usage data into the smart contract, and the Apron Market smart contract will charge the service usage.

The Apron Market smart contract will use the data provided by OCW to calculate the revenue obtained by the infrastructure service provider and deduct the usage fee that should be paid by the service user. Apron Market is not only smart contracts, but also a web–based service discovery platform. Service users can search for the infrastructure services they want to use on Apron Market, and they can also post their infrastructure requirements on Apron Market to find a match between demand and supply.

Apron Market smart contract will use the data provided by OCW to calculate the income of infrastructure service providers and deduct the usage fees that service users should pay. Apron market is not just a smart contract, but also a web-based service discovery platform. Service users can find the infrastructure services they want to use on the Apron Market, and they can also publish their required infrastructure needs through Apron Market, and realize the matching between demand and supply.

Apron SDK

In addition to the ability to migrate services from the existing infrastructure service usage to the Apron Network in a seamless transfer, Apron SDK is also used to realize the dynamic balance of connection applied to Apron Nodes and the encryption of communication data. Application developers can quickly encrypt application network access and communications data by simply integrating with the Dynamic equilibrium, not just can be used on the Web, but also in the PC, mobile integration in a native way.

In addition to directly migrating services from the original infrastructure service to the Apron Network, the services of Apron Network also provide the Apron SDK which maintains the dynamic balance of the link between the application and the Apron Node and the communication data encryption. All application developers need to do is to integrate Apron SDK in the application. It can not only be used on the Web but also be integrated on the PC and mobile terminals in a native way.

Roles

Provider (Service Provider) is a provider of infrastructure services. It provides its capabilities to developers and users through Apron Node and It is one of the key participants of Apron Network. Any person or organization that can provide services can become a provider in Apron Network.

Miner (node miner) is an important maintainer of the Apron Network network. It runs Apron Node to ensure that the services provided by the Provider can be used and obtains rewards by maintaining the network at the same time. It is one of the key participants of the Apron Network.

Miner (node miner) is an important maintainer of the Apron Network. Running Apron Node to ensure that the services provided by the provider can be used, and at the same time obtain rewards by maintaining the network, is one of the key participants of Apron Network.

Delegator does not directly participate in network construction. Instead, it provides a token to the miner, provider and other roles for the pledge, assisting the provider and miner to participate in the network construction and obtain profits from it.

Arbitrator (arbiter) will resolve the conflicts or request for arbitration in the network in the decentralized arbitration court, which is an important part of DAO and decentralized arbitration court.

Inspector supervised the operation of the registered services on the network and inspects the registered services in the meantime. Once a problem or spam pops upin the service, the inspector will provide information to the arbitrator and request forarbitration. When someone else request forarbitration, the inspector will provide relevant information to the arbitrator so that arbitrator can assess the arbitration case.

Developer (service utilization developer) is one of the key participants in the Apron Networkwhodevelops applications based on the infrastructure services existing in Apron Network, and pays service usage fees to service providers.

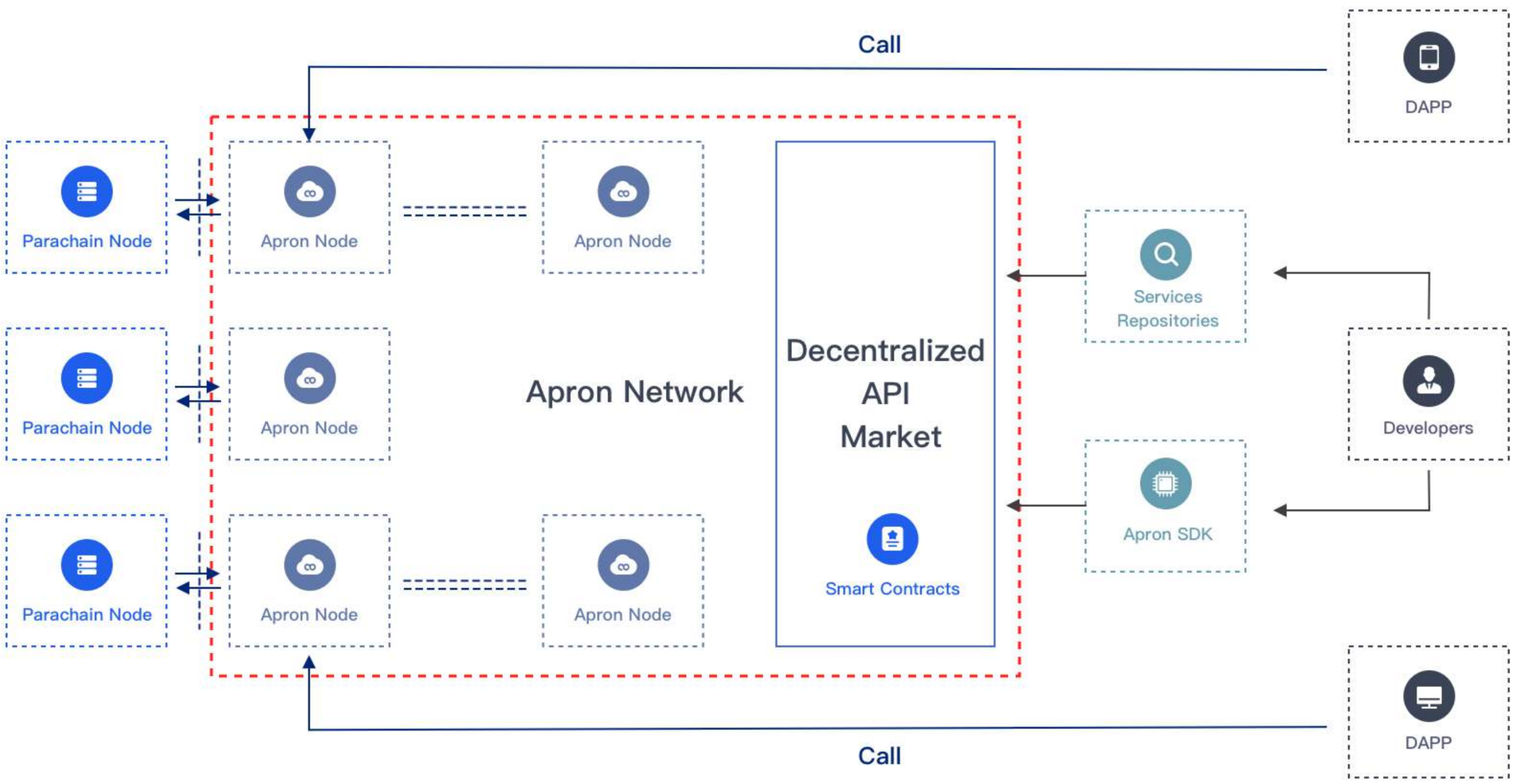
Counselor (Service Consultant) assists the provider to register infrastructure services on Apron Network, checks service status, and initiates a request to include the services provided by the provider into Apron service marketplace. Counselor will also mark and rank the services in Apron service marketplace according to the statistical data, so as to provide references for developers who would like to select infrastructure services.

Apron DAO

Apron DAO is the governance organization of Apron Network. Members of Apron DAO will be composed of participants from the Apron Network community, including not just the members of Apron labs, community developers and community contributors, but also application developers, users and Apron Network asset holders. Apron DAO will make decisions on the future development plan of Apron Network, the function development progress of Apron Network, the upgrade of the Apron pillar node, and the community promotion scheme. Meanwhile, there is a decentralized arbitration court in Apron DAO, which can resolve/ settlethe problems between all parties in Apron Network and maintain the stable development of Apron Network. The founding node in Apron Network will be operated and maintained by Apron labs, and then the operation and maintenance will be passed on to the community through community governance.

Scenarios

The decentralized infrastructure service market based on Apron Network is consisted of three parties, including infrastructure service providers, DAPP developers and Apron Network builders. Infrastructure service providers have infrastructure service capabilities, which need to be transported to the market for the use of the service demanders. DAPP developers are application developers. and application development needs to rely on infrastructure services. As DAPP developers themselves do not have the abilities or funds to develop corresponding infrastructure services, DAPP developers need to find the infrastructure services they need. Apron Network Builder mainly refers to the operator of the Apron Node. In Apron Network, the identity of the infrastructure service provider and Apron Network Builder can overlap.



Figure–D Apron Network overview scenario

The decentralized infrastructure service market mainly consists of two parts: market smart contract and market front end. Market smart contract is a smart contractthat is the core of the market. It deals with the demand of infrastructure service chain, discovery, call and billing. The market front–end provides market information display, query, developer information maintenance and other auxiliary functions on the Internet.

Service Registration

After connecting to the Apron Node, the infrastructure service provider can register all the available service information on the Apron service marketplace, including call mode, access address, fee description, permission and etc., through Apron Node. All service-related information is recorded by the Apron service marketplace, and the service information is presented to all developers and users on the front-end page. Any information regarding infrastructure services will be transferred to/ uploaded to the chain through the Apron Node.

Service Discovery

It is very important for both service providers and service demanders to find services in the market. In the Apron service marketplace, all infrastructure services are presented to service consumers on the front-end pages. Service demanders can also retrieve corresponding services in the market or offer a reward for service requirements to find service providers.

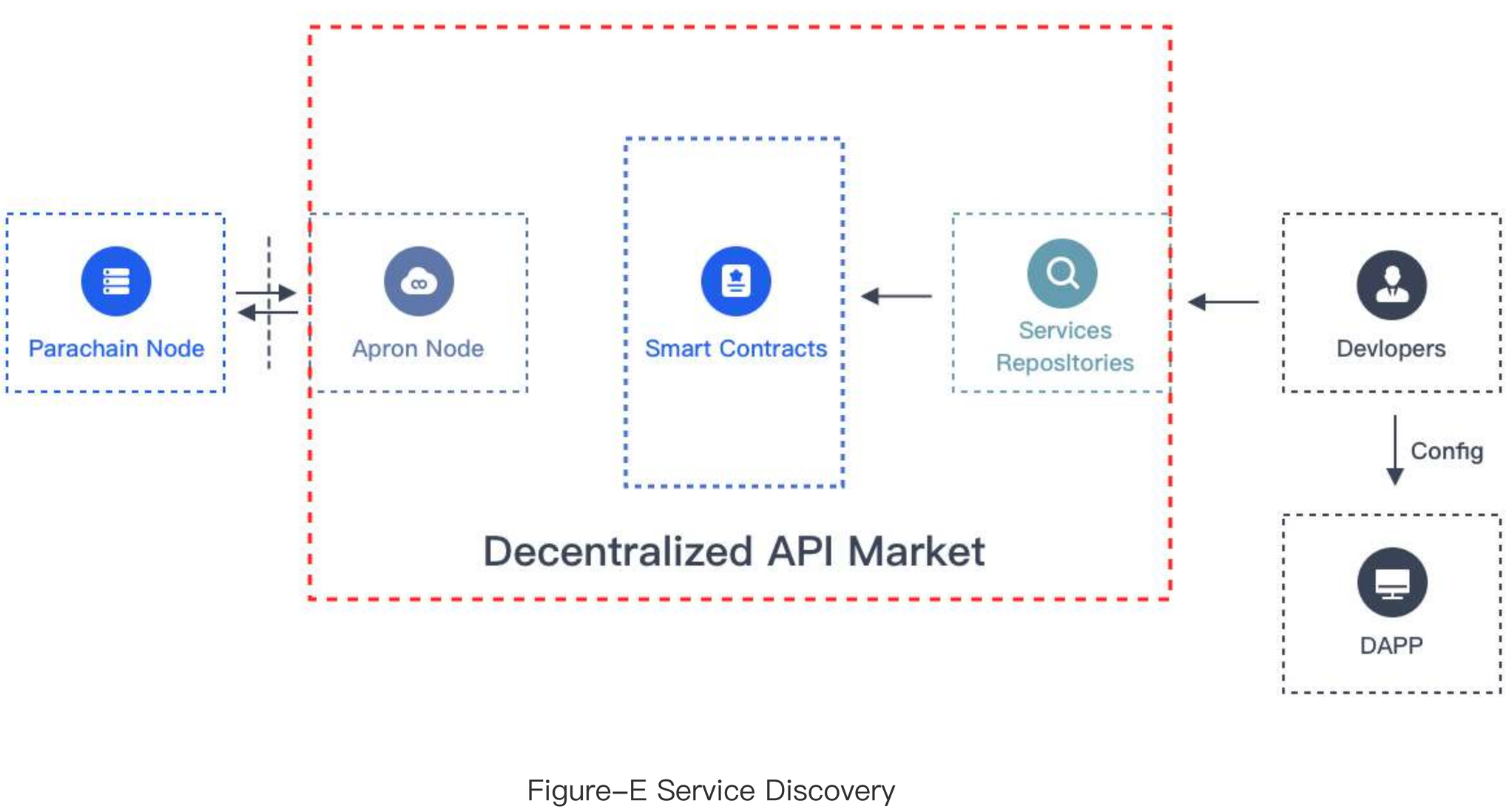
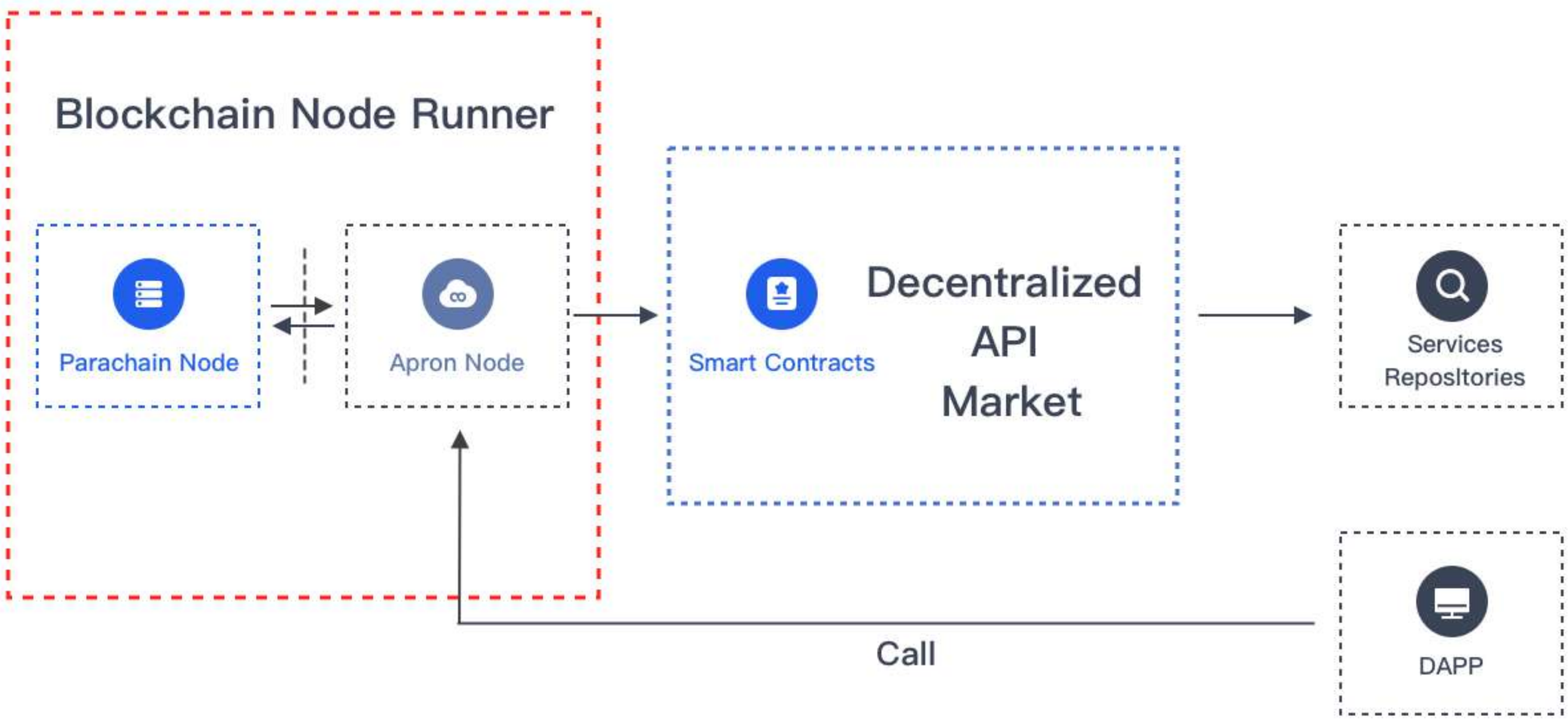


Figure-E Service Discovery

Apron Network will search and check the status of infrastructure services in all markets by introducing the role of the inspector, providing relevant service information to users in Apron Network, and giving reference to maintaining dynamic balance function in Apron SDK.

Service Calling

After the application has been developed, users use the Apron Node to invoke the services in the application .



Figure–F Service Calling

As is shown in the figure, all applications the services provided by the service provider through the Apron Node. Apron Node provides service call modes including JSON RPC, restful API and GraphQL. Developers can choose the appropriate service call mode according to different scenarios.

Service Billing

Every service call is recorded by Apron Node. Apron Node will aggregate the service call information and synchronize it to the chain through the OCW (off–chain worker) feature when it reaches a fixed cycle. The pricing information of the service is available on apron service marketplace, and the service usage fee will be calculated based on the pricing information, service call times and service caller information. The developer will pay the usage fee to the service provider based on the billing information. Once the developer finds out that there is a problem with the service or the billing information, the developer can request for arbitration with the Dao's central arbitration court and ask the service provider to compensate for the losses.

Service Ranking

The ranking rules are introduced into the Apron service marketplace, and services are automatically evaluated from multiple dimensions by the inspector and the Counselor. The current frequency of calls is the major measuring criteria. If the current service node is called too few or too many times, its ranking will be affected. When the number of calls is too much, the system will reduce its time of display and ranking. We hope that each service node can maintain a reasonable frequency of calls., The service will be excluded from the leaderboard when the service is unavailable. The ranking list serves as a way to recommend infrastructure services to DApp developers,making it more convenient for DApp developers to quickly locate the infrastructure services they need in the market, without taking the apps off the shelves or banning any infrastructure services.

Service Penalty Policy

The inspector inspects the services in the network. When the infrastructure service provider or the infrastructure service user has been found of having malicious behaviors, the inspector will automatically request the punishment measures to DAO, and the members of the DAO will assess the behavior and implement the punishment measures. If the penalty arbitration initiated by the inspector is determined to be tenable by the decentralized arbitration court, the inspector will be able to obtain a part of the fine as a reward. The same set of rules applies to the infrastructure service provider if they find malicious behaviors.

Token Economics

APN is introduced into the Apron Network as a native token. The service provider obtains APN rewards through the actual service provided. The APN holder reward algorithm introduces difficulty adjustment and rewards attenuation mechanism to stimulate the real demand and maintain the long-term stability of the system. The service call will charge a certain Gas fee and service usage fee in order to enhance the user's interest in APN and anchor the intrinsic value,. The gas fee will be automaticallycharged according to the network usage and the service usage fee will be set by the service provider. The cost may be destroyed to ensure the stability of APN value after it is summarized.

As the basic token in Apron Network, APN is introduced mainly in the following scenarios:

Service Assurance

Apron Network needs Apron pillar node and Apron Node to maintain network stability. For the Apron pillar node and Apron Node, APN serves as the asset that the node needs to mortgage to provide services. When there is something wrong with theservice node or if the service has issues, the security fund will be confiscated according to the arbitration. Service nodes will also receive corresponding rewards according to the pledge proportion and service duration.

Service Usage

Developers need to pay a certain amount of service fee for their applications in the Apron service marketplace in order to have access to the services in the market.

Community Governance

Apron DAO is the organization of governance of the Apron Network. Only by holding APN can you participate in community governance on Apron Network. It supports protocol upgrade and community governance through voting.

Apron Network will implement the service reward mining mechanism to better motivate the early participants, The award mechanism is designed according to the dimensions of time, service quality and pledge proportion. The service provider can apply to startthe pledge channel. After starting the pledge channel, the APN holder can assist the service provider to pledge, and the APN holder can obtain the reward sharing of the service according to the proportion of pledge. The APN holder will vouch for the service provider, and the assets pledged by the APN holder will be forfeited if the service provider breaks the rule.

The incentive attenuation of APN is not a radical design. The initial-stage miners and APN holders enjoy absolute contribution input-output ratio, and at the same time, they can make more contributions to the development of the Apron Network in the future.

The Future

Apron Network came to our attention when we found out that not only the Web 3.0 world needs Apron Network, but the traditional IT infrastructure services also need decentralized infrastructure network to protect the rights and freedom of service providers and service users.

Most of the infrastructure services are deployed on cloud services., the world's leading cloud service providers such as AWS, Azure and AliCloud all have their own service markets. It is in these markets where service developers implement their own ideas and transfer these ideas into services and put them on the service market. These services are limited by the service market provided by cloud service providers. The services developed must be subject to the audit and supervision of cloud service providers, and the developers may lose the opportunity to provide services to users . Worse still, they may even lose the remuneration for providing services at any time due to the adjustment of service market policies of cloud service providers.

The construction of the Apron Network enables infrastructure operators to provide their own infrastructure services to the public on Apron Network without having to pay a lot of maintenance costs, Moreover, it will not be necessary for them to spend time on doing the corresponding promotion and operation. It enables application developers to quickly discover and have access to various infrastructure services from the decentralized network on Apron Network without having to invest a lot oftime and money to find infrastructure service solutions. It enables application users to use the application based on decentralized infrastructure services without having to worry about the possible failure of using the infrastructure services. Apron Network allowsall basic service providers, application developers and basic service users to cooperate safely and freely!

Anyone can provide VPN services, face recognition, network storage, instant messaging, etc.through Apron Network without being restricted and regulated by the centralized business platform.

In the era of Web 3.0, the decentralized Apron Network, which belongs to the community, will replace the centralized infrastructure service platform controlled by commercial companies.It provides infrastructure services for developers, and give everyone freedom.

Road Map

1 2021 Q1

Complete the Web3 Open Grants application

Complete the Apron Network White Paper

Establish the foundation of Apron Network

Release ERC20 token and complete private placement

Complete the development of Apron Network POC version

2 2021 Q2

Release the Apron Network Beta 1.0 version

Connect to the Ethereum and provide the node service of Ethereum

Connect to the Polkadot and provide the node service of Polkadot

Release Apron market

3 20211 Q3

Connect to multi-public blockchain node service

Release the ApronSDK

Start public BETA

4 2021 Q4

Release the Apron Network

Start to build DAO

Connect more traditional infrastructure service for Apron Network.

Hand over Apron Network

Declaimer

As blockchain technology continues to evolve, the Apron Labs team will continue to work on projects commissioned and supervised by the foundation and will continue to update white papers as the technology evolves and needs. The Apron Labs development team is not responsible for any notification or future development of the Apron Network.

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- **The Graph**

  https://thegraph.com

- **NOWNodes**

  https://thegraph.com

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