

The logo features a white triangle on the left, composed of a solid white shape and a white outline. To its right, the word "APRON" is written in a bold, white, sans-serif font.

APRON

Apron Network

A large, faint watermark of the APRON logo is visible at the bottom of the page, rendered in a light blue color. It consists of the same triangle and text elements as the main logo above.

APRON

Overview

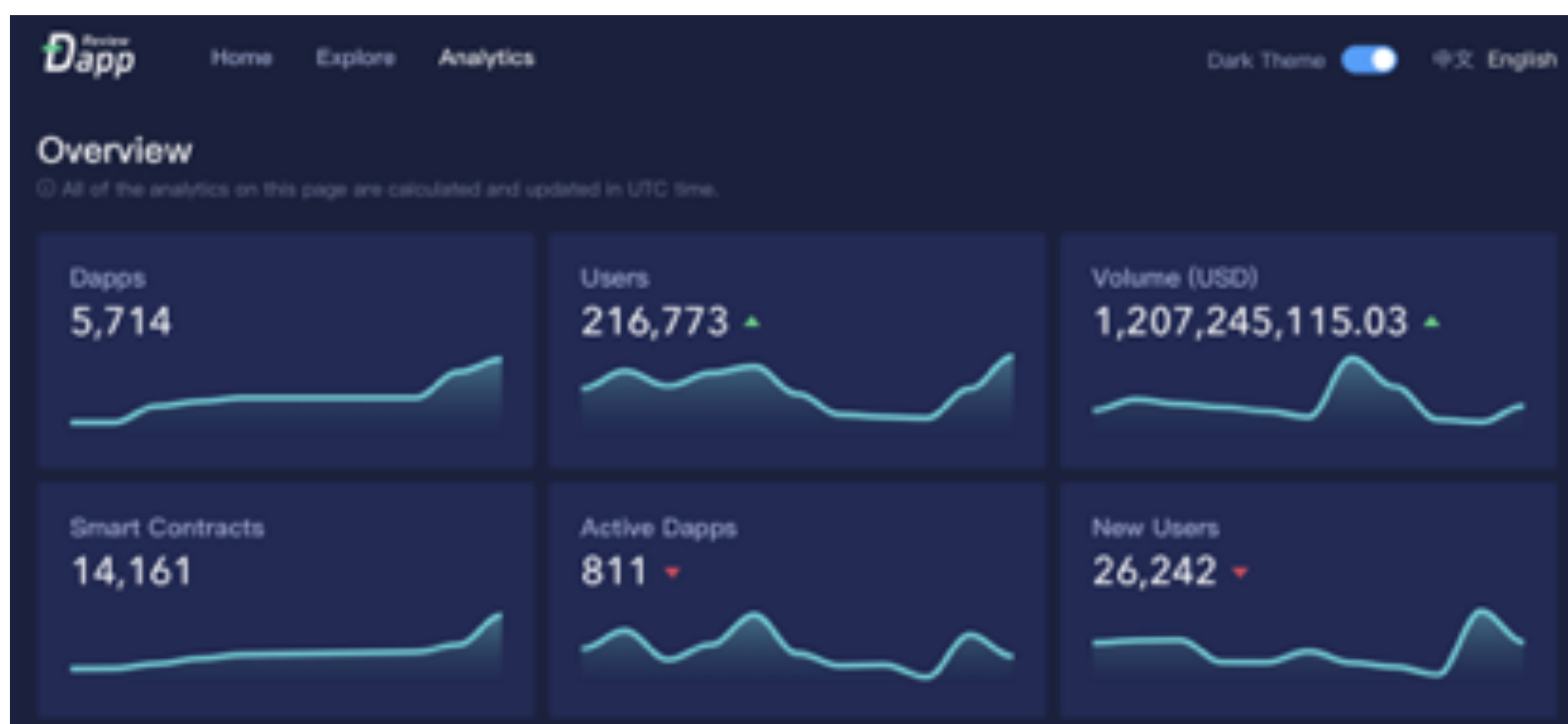
Blockchain technology has enabled users to own and transact digital assets in a trustless and decentralized manner, verifiable on a distributed and immutable ledger. As we move toward the fully decentralized future imagined by the creators of Web 3.0, we uncover the centralized artefacts of Web 2.0 on which we unfortunately still rely. Apron Labs has created the Apron Network to address and radically transform the foundational layer of this future by providing a decentralized infrastructure service network for DApp developers.

Introduction

Bitcoin has been operating for more than 11 years, since its release on January 3rd, 2009. Satoshi Nakamoto, the developer of Bitcoin, ushered in a new era of digital encryption by solving the Byzantine generals' problem through the creation of blockchain technology as a functional decentralized P2P network. blockchains are like digital rivers, influencing and changing the technical landscape wherever they go, while stimulating people's innovative imaginations with their limitless potential.

The structure of decentralized blockchains make them inherently tamper-proof and traceable, which helps to solve many of the problems associated with traditional centralized systems.

Ethereum revolutionised blockchain technology by laying the foundation for smart contracts on which decentralized applications (DApps) can be built. Furthermore, this immutability and traceability allow for DAOs (decentralized autonomous organizations) which have the potential to become the standard for organisations in the future.



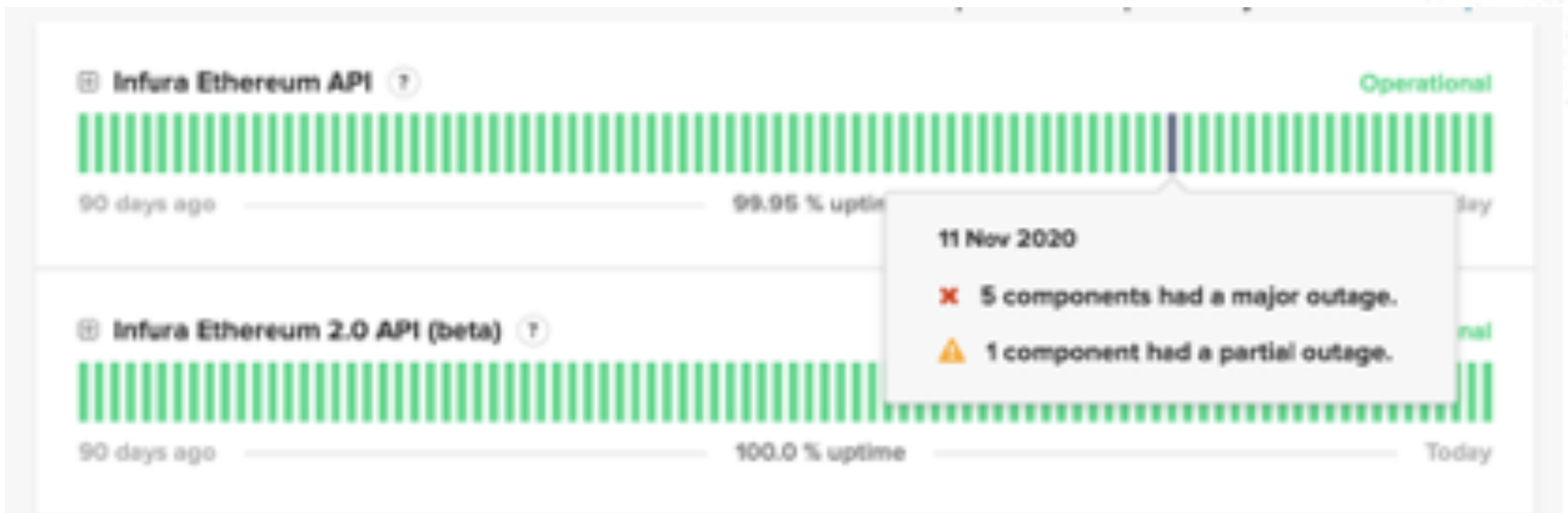
With the development of Ethereum and the enhancement of the smart contracts, an increasing number of developers are getting involved in the construction of an open-source community, and are realising their ideals using smart contracts. Since the Ethereum Network launched, DApps have exploded in popularity. As of December 1st, 2020, there have been a total of 14,161 smart contracts executed and 5,714 DApps deployed on Ethereum with daily volume reaching upwards of \$1.2 billion.

In order to maintain the integrity of the DAppss deployed on the Ethereum network, node operators and miners are required. These node operators, in tandem with DApp developers, work to keep the network secure and thriving.

Operating Ethereum nodes has always been an expensive and energy intensive task. Initially, most Ethereum nodes were able to provide public services for the community. Now, however, most Ethereum nodes are exclusively serving the specific business interests of operators. Due to the restrictions of public operation and maintenance costs, and the lack of an ecosystem for Ethereum node service operators to find corresponding community developers, fewer and fewer Ethereum node operators are willing to make node services public. Consequently, it has become increasingly difficult for DApp developers to operate an Ethereum node or find a stable and usable Ethereum node service.

Having noticed this phenomenon, a few commercial companies have chosen to provide generic Ethereum node services through commercial operations.

By offering this basic-level service, DApp developers now have the opportunity to create their applications. Following this, a small number of companies that can provide Ethereum node services have gradually emerged in the ecosystem. For example, Infura (infura.io), funded by Consensus, is the largest Ethereum node service provider in the world that provides basic Ethereum node services to millions of developers. DApp developers invoke the Ethereum API service provided by Infura in their own code, so that their Applications have access to everything on the Ethereum network. So far, most of these applications are extremely dependent on the Ethereum node service of Infura including some leading companies in the blockchain field.



On November 11, 2020, the fundamental issue with this centralized support structure revealed itself when the Infura node network failed and became completely inaccessible. Not only did this failure affect a wide range of applications, services and exchanges in the immediate aftermath, but it also harmed user confidence that these services could be relied upon in the future. This was perhaps one of the most influential events in the history of the blockchain which served to highlight the absolute necessity for decentralized infrastructure.

Our team at Apron Labs had been developing dApps in the Ethereum ecosystem and experienced this catastrophe first hand. From then on, we vowed to overhaul the archaic and centralized service network and created the solution, Apron

Current Works

Many projects have attempted to solve the issues of blockchain infrastructure services, contributing both centralized and decentralized solutions.

Infura provides API services for developers by building its own Ethereum and IPFS nodes, allowing developers to access Ethereum and IPFS node data through API services.

NOWNodes operates in a similar fashion to Infura, but provides more blockchain network API services. It claims to have provided 45 chain API services.

API3 constructed a public blockchain that provides an oracle network, governed in a DAO structure with Kleros. By submitting an 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-chain to users by aggregating the blockchain data, BitQuery also provides simple data analysis capabilities and GraphQL API on the blockchain.

The Graph proposes a novel 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 the GraphQL API is served for users to obtain the data information corresponding to the DApp.

Problems

With these current models, each project focuses on their own specific field using their own methodologies. There is currently no commonly used technical solution connecting each solution.

Both Infura and NOWNodes adopt a centralized approach to provide API services for blockchain nodes or browsers. API3 uses the oracle machine run by the data source provider to provide off-chain data with on-chain aggregation services. BitQuery and The Graph focus on the aggregation and indexing of data on-chain, which allows for d DApps and offline applications to obtain the data on-chain. Both these services use GraphQL API.

For infrastructure services, there is a diversity of options. In terms of traditional infrastructure services, there is OCR (optical character recognition), SMS (short messaging service), SNS (simple notification service), VPN (virtual private network) and more. In terms of blockchain-based infrastructure services, 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 and more. Yet even still, there are countless more service types waiting to be explored.

To summarise the service types above, there are three critical parts of infrastructure services: Service Discovery, Service Calling and Service Billing. These parts are very mature in the centralized IT infrastructure architecture, but are controlled by centralized operators. As a result, infrastructure service providers and users must sacrifice their freedom of choice. We can now see how worrying it is that these centralized infrastructure service platforms are controlled by commercial companies such as AWS, Azure, AliCloud and Google Cloud. In the decentralized Web 3.0 world, the situation becomes more complex, and these three critical parts are imperfect or missing

In order to solve the problems of infrastructure Service Discovery, Service Call and Service Billing, Apron Labs proposed Apron Network as a solution to improve the infrastructure service ecosystem of the Web 3.0 world. The Web 3.0 era makes it possible for developers to freely provide and use any infrastructure services, which will connect the real world to the Web 3.0 world and return freedom to the individual.

Overview in System Design

Apron Network is based on the Substrate framework and can be a parachain of both Kusama and Polkadot. The nodes running in Apron Network are divided into two types: the Apron Pillar Node and the Apron Nodes. In addition to the nodes, Apron DAO will manage Apron Network. The entire Apron Network will be composed of the Apron Pillar Node, the Apron Nodes, Apron Service Marketplace and Apron SDK.

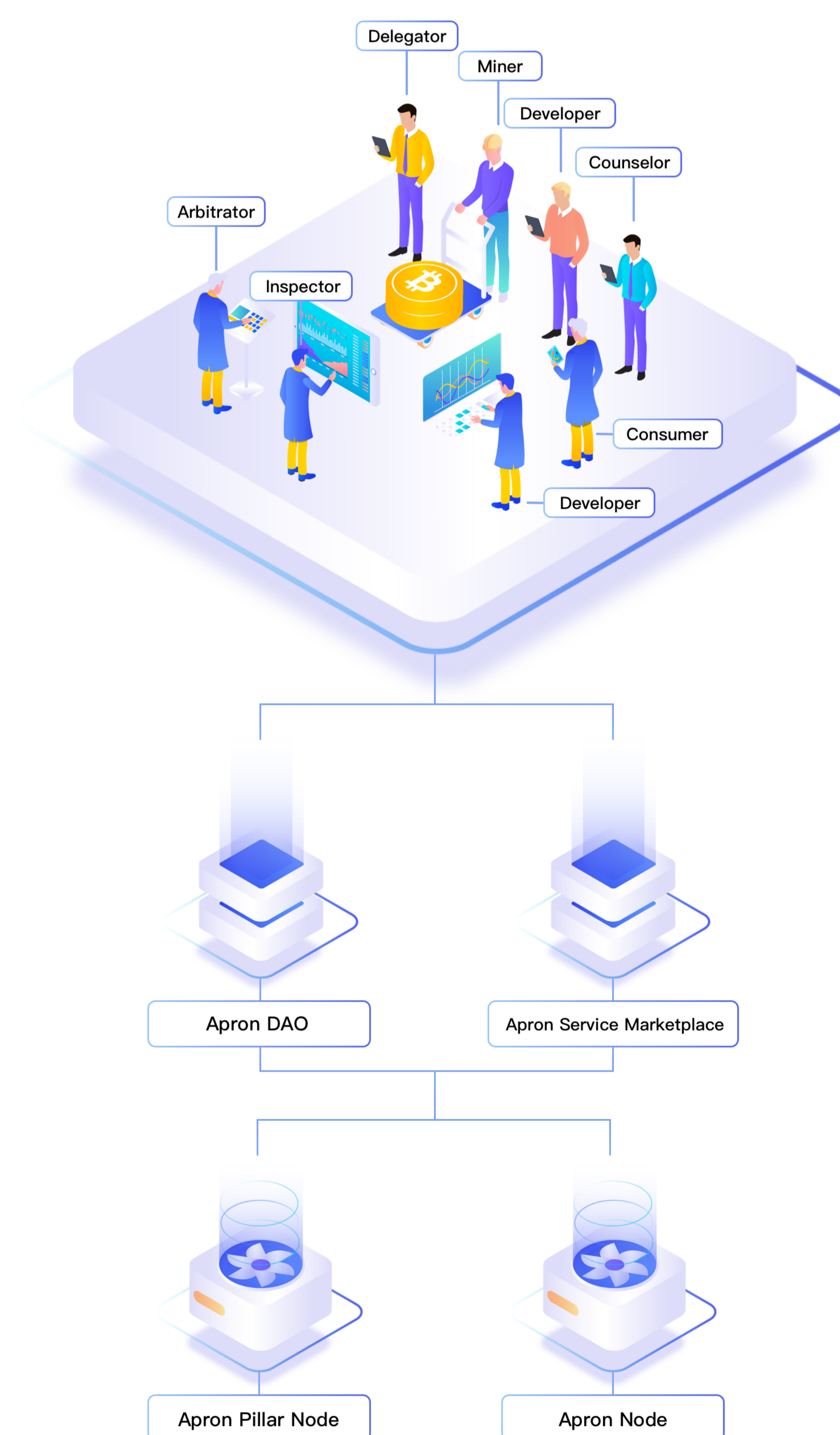


图 c Apron Network 层次结构图

The roles involved in the network construction include Providers (service provider), Miners (node miner), Delegators (client), Arbitrators (arbiter), Inspectors, Consumers (user), Developers (service developer) and Counselors (service consultant). All of the network construction roles work together through Apron DAO to ensure the stable and continuous operation of the entire Apron Network.

System Design

Apron Pillar Node

The Apron Pillar Node is developed on the Substrate framework, which provides a security guarantee for Apron Network and ensures the stable operation of the network. It is the basic network node of Apron Network. The Apron Pillar Node will be initially launched by Apron labs and will be run by community participants.

Apron Node

Apron Network is made of Apron Nodes, which are based on the Substrate framework with OCW (off-chain worker) enabled. The basic service providers provide service publicly through the Apron Node, which synchronizes the basic service up-chain, and synchronizes the information of service usage and billing on the chain through the 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 while also receiving service usage fees. 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 Nodes.

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 up-chain infrastructure services by deploying an Apron Node with one click. The 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. The Apron Market smart contract will also charge for 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 a smart contract, 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 SDK

In addition to directly migrating services from the original infrastructure service to the Apron Network, the Apron SDK will also maintain the dynamic balance between the application and the Apron Node, and handle the encryption of communication data. All application developers need to do is integrate Apron SDK into their application. Not only can Apron SDK be used on the Web, but can also natively integrate with PCs and mobile terminals.

Roles

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

The Miner (node miner) is important to the maintenance of Apron 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.

The Delegator (client) does not directly participate in network construction. Instead, it will provide tokens 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.

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

The Inspector supervises the operation of the registered services on the network and inspects the registered services in the meantime. If problems, such as technical issues or spam that appear in the service, the Inspector will provide information to the Arbitrator and request for arbitration. When someone else requests for dispute resolution, the Inspector will provide relevant information to the Arbitrator so that they can assess the case.

The Developer (service developer) is one of the key participants of Apron Network, creating applications based on the infrastructure services existing on Apron Network and paying service usage fees to service providers.

The Counselor (service consultant) assists the Provider to register infrastructure services on Apron Network, check service statuses and initiate requests to include the services provided by the Provider on Apron Service Marketplace. The Counselor will also score and rank the services on the Apron Service Marketplace according to the statistical data, so as to provide references for developers who would like to select infrastructure services.

The Consumer is the user of the service.

Apron DAO

Apron DAO is the governance organization of Apron Network. Members of Apron DAO will be participants from the Apron Network community, including the members of Apron labs, community developers and contributors, application developers, users and Apron Network asset holders. Apron DAO will make decisions on the future development plans of Apron Network, the functional development progress of Apron Network, the upgrade of the Apron Pillar Node and the community promotion scheme. On top of this is a decentralized arbitration court run by Apron DAO members, which will settle the disputes between all parties in the Apron Network and maintain its stable development. The founding node in Apron Network will first be operated and maintained by Apron labs. From there the responsibility for operation and maintenance will be passed on to the community through community governance.

Scenarios

The decentralized infrastructure service market based on Apron Network consists of three parties. These are the infrastructure service providers, the DApp developers and the Apron Network Builders. Infrastructure service providers have infrastructure service capabilities, which need to be transported to the market for the use of the Developers. DApp developers are application developers and application development relies on infrastructure services. As DApp developers themselves may not have the resources to develop corresponding infrastructure services, they are required to find the infrastructure services elsewhere. Apron Network builders are mainly the operators of the Apron Nodes. In Apron Network, the identity of the infrastructure service provider and Apron Network Builder can overlap.

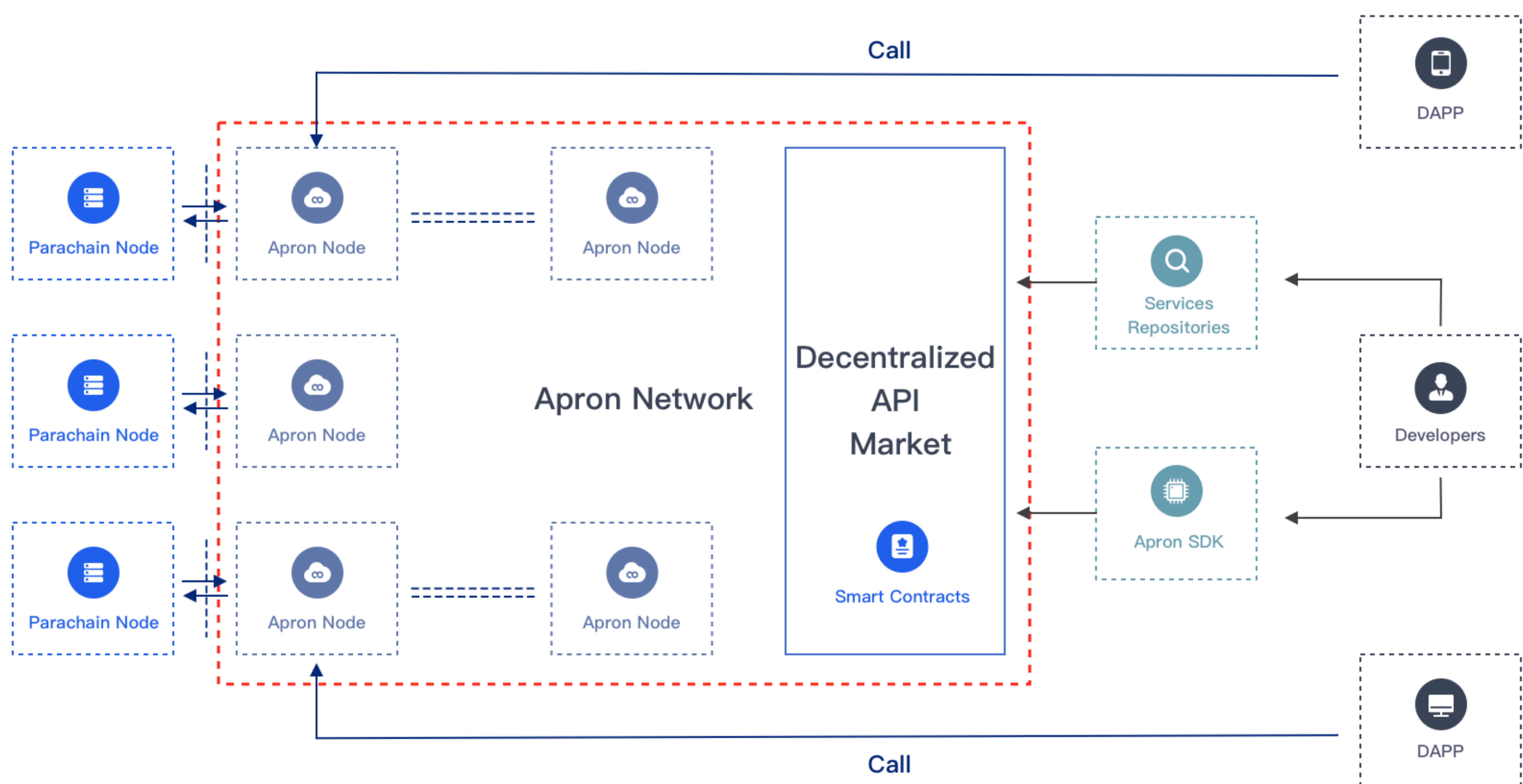


图 d Figure–D Apron Network overview scenario

The decentralized infrastructure service market consists of two main parts: the Apron Market smart contract and the Apron Market front–end. The Apron Market smart contract is a smart contract that is at the core of the Marketplace. This smart contract deals with the requests to the infrastructure service up–chain, discovery, calling and billing. The market front–end provides market information display, queries, developer information maintenance and other auxiliary functions on the network.

Service Registration

After connecting to Apron Node, the infrastructure service provider can register all the available service information on the Apron Service Marketplace, including call modes, access addresses, fee descriptions and permissions. 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 call information regarding infrastructure services will be transferred to the chain through the Apron Node.

Service Discovery

It is very important for both Providers and Developers to find each other in the market. In the Apron Service Marketplace, all infrastructure services are presented to service users on the front-end pages. Developers can also retrieve corresponding services in the market or offer a reward to find service providers that fit their requirements.

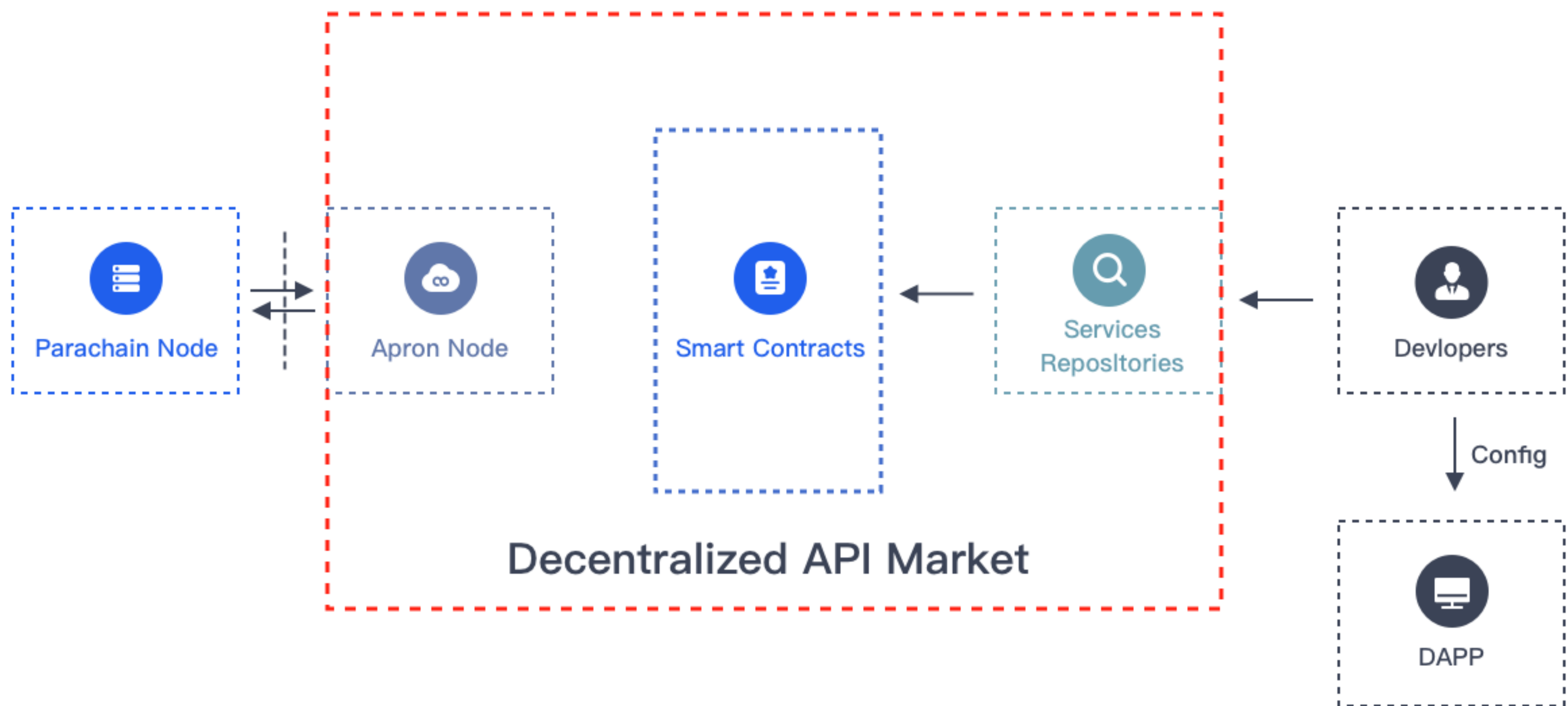


图 e Service Discovery

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 on Apron Network and offering a reference for the dynamic balance functions in the Apron SDK.

Service Calling

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

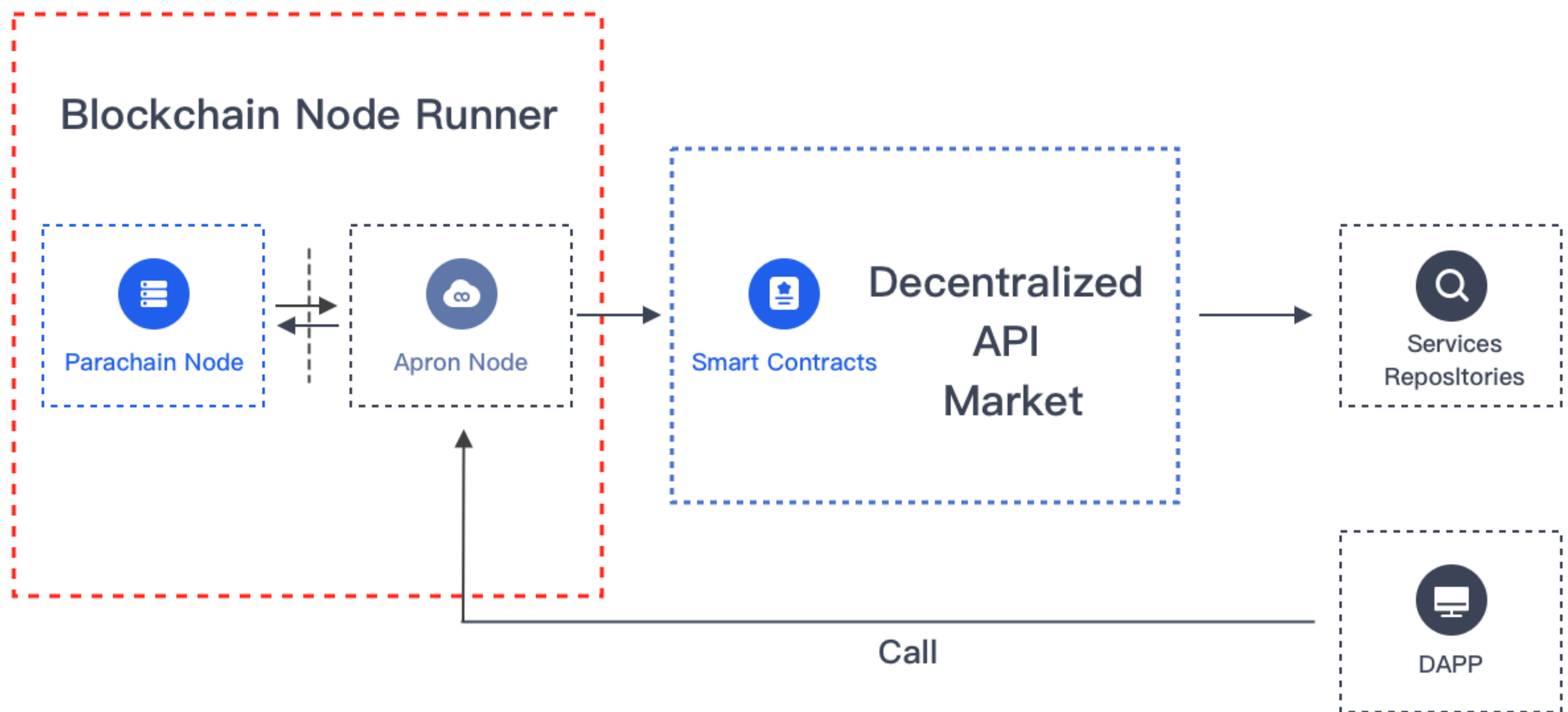


图 f Service Calling

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

Service Billing

Every service call is recorded by the Apron Node. The Apron Node will aggregate the service call information then synchronize it to the chain through the OCW feature when it reaches a fixed point. The pricing information of the services 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. If the Developer discovers a problem with the service or the billing information, the Developer can request arbitration with the DAO's central arbitration court and ask the service provider to compensate for losses.

Service Ranking

The ranking rules are introduced into the Apron Service Marketplace, and services are automatically evaluated from multiple angles by the Inspector and the Counselor. The current frequency of calls is the main 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 high, the system will reduce its time of display and ranking. We hope that each service node can maintain a steady 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 find the infrastructure services they need in the market without taking their DApps off-shelf or banning any infrastructure services.

Service Penalty Policy

The Inspector is responsible for checking the services in the network. When an infrastructure service provider or an infrastructure service user has been found to have acted maliciously, the Inspector will automatically request for punitive action to the DAO. Members of the DAO will then assess the incident and if the Inspector is found to be correct, action will be taken. When the decentralized arbitration court deems the Inspector to be correct, a portion of the fine will be delegated to the Inspector. The same set of rules apply to the infrastructure service provider in the case that they come across malicious behaviors.

Token Economics

APN is the native token of Apron Network. The service provider obtains APN rewards through the services it provides. The long-term stability of the system is maintained by the APN holder reward algorithm, which introduces difficulty adjustments and reward attenuation mechanisms to stimulate real demand.

The service call will charge a certain gas fee and service usage fee in order to enhance the user's interest in APN and to anchor its intrinsic value. The gas fee will be automatically charged according to the network usage, while the service usage fee will be set by the service provider. A portion of the total fee may be burnt to ensure the stability of the APN token.

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

Service Assurance

Apron Network uses the Apron Pillar Node and Apron Nodes to maintain network stability. For the Apron Pillar Node and Apron Node, APN is the asset pledged by a node to provide services. When there is something wrong with the service node or if the service has issues, the security fund will be confiscated according to the arbitration protocol. Service nodes will also receive corresponding rewards according to the pledge proportion and service duration.

Service Usage

Developers need to pay a certain service fee for their applications in the Apron Service Marketplace in order to have access to the services on the market.

Community Governance

Apron DAO is the governance organization of the Apron Network, and only through holding APN can you participate in community governance of the network. It supports protocol upgrades and community governance through voting.

Apron Network will implement a service reward mining mechanism to better motivate early participants. The mechanism is designed to reward participants on the variables of time, service quality and pledge proportion. First, a service provider can apply to start a pledge channel. After starting the pledge channel, an APN holder can assist the service provider by pledging tokens, in doing so obtaining a portion of the reward according to the proportion of pledge. In effect, the APN holder will be vouching for the service provider, and the assets pledged by the APN holder will be forfeited if the service provider breaks the rules.

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

The Future

When we first started working on this project, we quickly came to see that it wasn't just the Web 3.0 world that needed Apron Network. We realized that, in fact, the entire traditional IT infrastructure service industry needs Apron Network in order to protect the rights and freedoms of their users through decentralization.

Most of the existing infrastructure services are deployed on cloud services.. The world's leading cloud service providers, such as AWS, Azure and AliCloudall 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 are then subjected to the auditing and supervision of cloud service providers, wherein 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 Apron Network enables infrastructure operators to provide their own infrastructure services to the public on Apron Network without having to pay excessive maintenance costs. Moreover, it will no longer be necessary for them to spend time on any related promotional or operational activities that may be required. 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 of time and money to find infrastructure service solutions. It enables application users to use the applications based on decentralized infrastructure services without having to worry about the possible failure of using that infrastructure service. Apron Network allows all basic service providers, application developers and basic service users to cooperate safely and freely!

This means anyone can provide VPN services, face recognition, network storage, instant messaging and more through Apron Network without being restricted and regulated by a 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 gives everyone the freedom to explore the limitless potential of decentralization.

Road Map

- 1 2021 Q1**
- Complete the Web3 Open Grants application
 - Complete the Apron Network Whitepaper
 - Establish the foundation of Apron Network
 - Release ERC20 token and complete private allocation
 - Complete the development of Apron Network POC version

- 2 2021 Q2**
- Release the Apron Network Beta 1.0 version
 - Connect to the Ethereum network and provide the node service of Ethereum
 - Connect to the Polkadot network and provide the node service of Polkadot
 - Release Apron Market

- 4 2021 Q4**
- Connect to multiple public blockchain node services
 - Release the ApronSDK
 - Start public BETA

- 3 2021 Q3**
- Release the Apron Network
 - Start to build DAO
 - Connect more traditional infrastructure service for Apron Network
 - Hand over Apron Network to the DAO

Disclaimer

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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Aliyun Market Place

<https://market.aliyun.com/products/>

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BitQuery

<https://bitquery.io>

API3

<https://www.api3.org>

The Graph

<https://thegraph.com>

NOWNodes

<https://thegraph.com>



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