An on-chain scheme of complex off-chain resource based on resource usage information

OwnershipLab

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1 Overview

One of the future trends of the development of public chain is: record the complex resources under the chain, such as computing resources, storage resources and network resources, on the chain in a unified description of resource measures.However, the current industry solutions for this resource measurement are not mature and perfect.

2 Data, computing power and algorithms

Data, computing power, and algorithms are complex off-chain resources.In the era of highly integrated data, data, computing power and algorithms have become important elements of information technology innovation,sharing these elements between different entities can open up new and richer forms of business,an important prerequisite for sharing these elements is to be able to trade these elements efficiently and reasonably,further speaking, it is indispensable to complete the element transactions to describe the reasonable measure of these resource elements.However, the measurement of complex resources is difficult to be modeled uniformly. Data, computing power and algorithms have market

value only after they are used, and their measurement is related to task requirements.It is therefore feasible to use price as a uniform measure of these complex resources (price is a response to supply and demand) and it makes commercial sense (easy to transact).Information about how data, computing power and algorithms are used reflects their intrinsic value and market acceptance.So how can this information be recorded reliably and credibly?

3 Composable Data Token

The composable data token CDT provides a reliable and credible way to record information about how complex resources are used.CDT reflects the trust transfer of data, computing power and algorithm in the process of usage,and record the related meta information on the chain credibly.The on-chain data task marketplaces, combined authorization between CDTs, and information from trusted institutions record the entire process through which these complex resources are used, enabling tracking.

4 Usage-based Proof of Value

With CDT, we can fully record the use and transaction of complex resources in the data market.Based on these reliable and comprehensive usage information, the price discovery mechanism of the market will eventually find the most reasonable resource price, that is, the most reasonable resource measurement.For example, if the data provided by data provider A is of good quality, it will be used more. Based on these usage records, the market will give a good price for this data as a measurement.Assuming the data provider B provides a similar data of better quality, sells at lower price, and the terms of use are more reasonable, then the market will soon tend to use B's data.Based on the usage of the data provided by the B, the market will dynamically find a new reasonable price of the data at the same level of quality.This is a set of dynamic price discovery mechanism based on complex resource usage information.For the provider that does not fulfill the corresponding obligation, its service will be used less and less, its measurement will be dynamically lowered by the market, and its transaction price will be lower and lower.

5 Future work

1.Completely decentralized efficient trading of complex resources,For example, a zero-knowledge proof approach based on big data is used to verify that a task algorithm does occur on a data/computing resource (rather than relying on the current CDT's on-chain trusted institution registration scheme).

2.A more reasonable price discovery mechanism, in which the data platform provides the recommended quotation according to the historical trading infor-

mation of related complex resources, assists the market to find the price more quickly and accurately.

3.New unified measures for complex resources. For the resource demander, the ultimate purpose of purchasing all kinds of resources is to complete a certain task, so the measurement of resources can be described as the completion of corresponding computing tasks.For example, whether to complete the calculation task within the specified time, whether to complete the transmission task within the specified time, etc.Therefore, we can abstract the measurement of all complex resources into task completion progress.