HR-diagram Protocol: First NFT Standard Circulation Protocol Based on the Perpetual Combinatorial Auction

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Abstract

HR-diagram Protocol is an NFT standard circulation protocol based on the perpetual combinatorial auction, which uses an independently developed algorithm of adjusting combinatorial price to innovate in the conventional NFT pricing model and to equip the NFT price with a high-dynamic perpetual auction mechanism. During the realization of this perpetual algorithm, the conventional auction model is defined to be unsuitable for complicated transactions scenarios. Therefore, a decentralized perpetual bidding model is developed and it is also a reversed pricing model based on the circulation of HRD tokens in the secondary market. In the HRD perpetual pricing protocol, NFT fission can result in the stable acquisition of HRD tokens, and then the continuous bidding with HRD in the secondary market provides bases for the NFT pricing, thus forming a POA (Proof of Auction) consensus mechanism. In addition, the provided NFTs automatically flow into the liquidity pool, facilitating the NFT circulation and exchange.

This article will provide an introduction to HRD (an open and prospective protocol based on the perpetual combinatorial auction for the standard pricing and circulation of NFTs) in a combined way of abstraction and vividness.

It should also be noted that HRD is an advanced financial technology on the basis of numerous previous studies and is expected to further expand the scale and broaden the application scenarios for DeFi. For this reason, the sincere gratitude will also go to the fragmented NFT transactions, synthetic assets of DeFi, decentralized lending and other project schemes for their attempts and contributions.

1. Related background

Ever since January 2021, the NFT market has witnessed great growth, indicating that numerous users are attracted to get deeply involved in this field now, and the market keeps providing new prices and definitions for NFT.

From the perspective of sales volume, the NFT market seems to feature the impulse type fluctuation rather than a stable change defined by the trend. This is because a mature and long-term secondary market is void for NFTs currently; while CryptoPunk, CryptoKitties and other rare products nearly occupy all shares of the NFT transfer market. Under such circumstances, the unfamous artworks may be unsalable for months on Opensea and other platforms. However, these long tail assets need to be circulated in the market, which can make investors recognize the value of NFTs and build a benign cycle from NFT minting, sales to circulation.

2. Theoretical bases

The pricing and circulation of NFTs have always been problematic. The conventional pricing methods, e.g. the single auction mechanism and fragmented NFT mechanism have been proved false. Under the single auction mechanism, NFTs are subject to the one-time price as the conventional artwork auction. But no matter on-chain or off-chain auction, the transaction price is limited by the promotion effect and participants.

The fragmented NFT mechanism may apply to the AMM model and effectively improve the liquidity. However, it will harm the integrity of NFTs. The omission or damage during the circulation process and hoarding and profiteering of individual investors may cause the NFT impossible to be restored. Guaranteeing the basic liquidity, rationality and integrity of an NFT is the fundamental point in pricing and a reliable pricing model should take the three aspects into account.

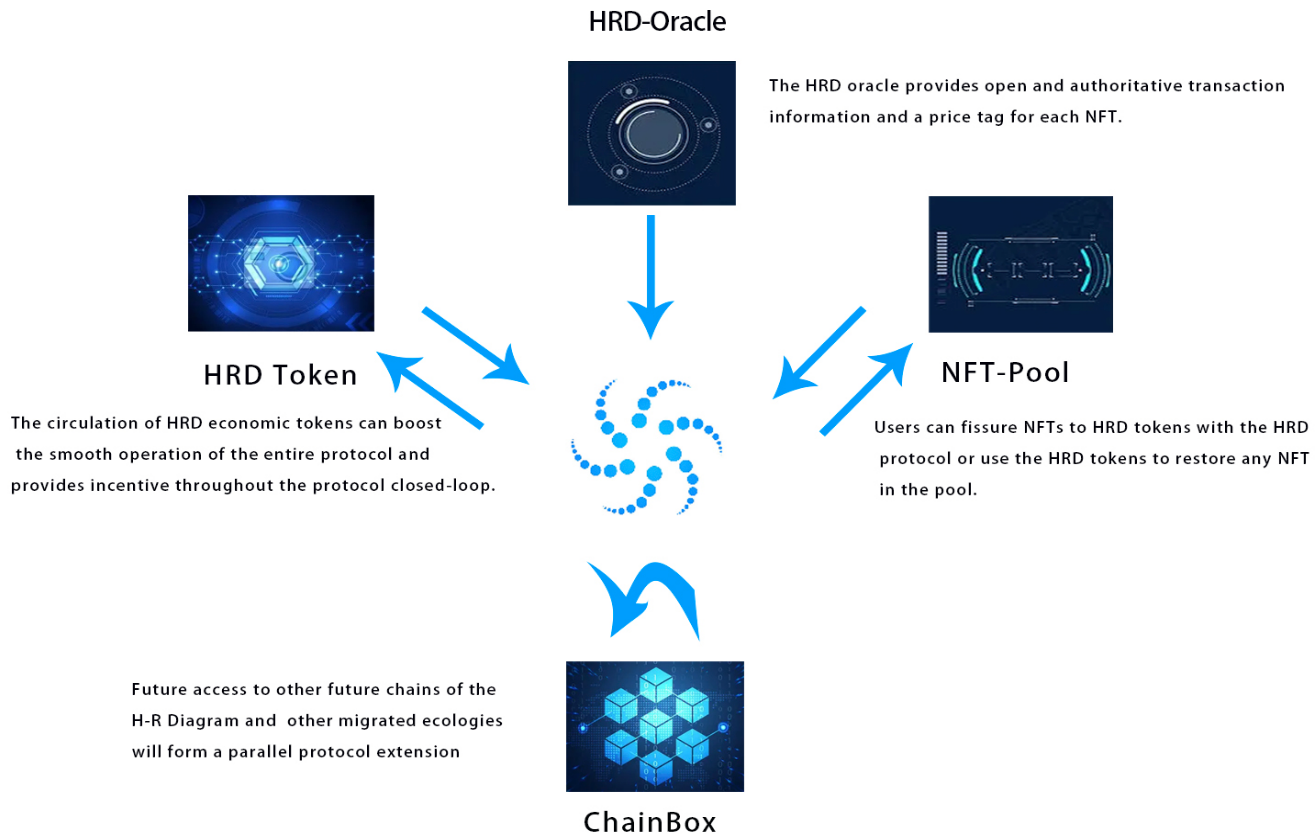
As mentioned above, NFT resembles conventional commodities in nature and application. Therefore, most assets are salable in the primary market but a mature and stable secondary market is needed. Traditional economics also argue that money is a commodity derived from commodities and acting as universal equivalence. Common fungible token features the complete properties of division, combination and undifferentiation, equal to traditional money in measure value, circulation and payment function. So, fungible token is equipped with strong liquidity and wide application scenarios.

However, NFTs are also characterized by uniqueness and cannot be divided or combined in payment. Their measure value performance cannot be realized as well. For this reason, NFTs seem to be not comparable to money acting as universal equivalence but a common commodity instead. Within this context, NFTs need to be converted to FTs and enable their monetary attribute, which may address the liquidity problem of NFTs. At that time, the pricing of NFTs will become easier with high liquidity.

3. HRD core protocol: perpetual combinatorial auction of NFT

HRD protocol is an initiative tool to turn NFTs to FTs, which will allocate the weight for each product entering the NFT liquidity pool through various over-the-counter methods and utilize the high liquidity of the fungible token HRD to price the entire liquidity pool. Ultimately, the protocol is able to take advantage of the arbitrage behaviors of the market to price and circulate all NFTs. The following figure shows a simplified model of the HRD protocol.

Figure 3-1 Simplified Model of HRD Core Protocol



3.1 HRD oracle

In principle, the HRD protocol can accept any valuable NFT product. The HRD oracle will test these entry NFTs first and present a price tag for each NFT product. The tag directly decides the weight of the product in the liquidity pool and its further perpetual auction price.

The mode of operation of the HRD oracle can be considered diversified, including but not limited to public auction, project sales, crowdfunding and allocation and other mainstream market transaction methods. At the same time, the module features full compatibility and almost can accept the issue price or fair value acquired through any reasonable channels.

The module is the precondition for the entire HRD protocol. It can pre-process the information related to NFT products, to avoid the possible product quality defects and eliminate the severely non-conforming single transaction behaviors. The severe defects of a traditional auction are therefore prevented. As in traditional auctions, the owner can agree with some bidders to raise the price of the auction item and this price manipulation harms the rights and interests of other investors.

For the HRD oracle, all transaction information is available to the public and authoritative. The source of NFT price information is repeatedly certified and screened to protect related rights and interests of investors to the highest extent.

3.2 NFT-Pools

After great attempts in all applications of the DeFi field, the world of blockchain seems to be equipped with a basically formed structure – Pool, which indicates the spontaneous upgrading and transformation in the history of blockchain to realize the “purposiveness”. Firstly, the market-making model of the liquidity pool is a success in on-chain transactions and even changed the habit of users in the service of traditional order books; in the lending field, the lending poor is also a success; concerning synthetic assets, the debt pool similar to Synthetix and CDP models exist; for derivatives, the options trading pool of Hegic and perpetual contract transaction pool that is applied in several protocols with distinct targets realized are under planning.

Therefore, a pool consisting of strengths from all nodes of the blockchain will constitute additional advantages because the pool model can eliminate the centralized monopoly and manipulation risks as well as the difference among points. Moreover, the Pool is a loose structure, allowing the free flow among points without restrictions. This will remove the barrier to obstruct the liquidity at most.

HRD protocol introduces the liquidity pool concept in the NFT field in the first place. The passivating treatment is adopted, that is, the NFTs in the liquidity pool are treated as fungible objects with complicated pricing methods to obtain corresponding weights. At the same time, the liquidity will generate HRD tokens regularly. So, the weight decides the number of HRD tokens that NFT can generate, which lays a key foundation for the HRD pricing of NFTs.

3.3 Enclosed-loop token incentive

The NFT-Pool mechanism offers the HRD pricing bases for NFTs and the transaction of HRD in the secondary market directly provides the value anchoring for NFTs. This is because HRD tokens are generated due to the block burst and all tokens are distributed in the NFT liquidity pool. So, the shareholder of the NFT liquidity pool can win the HRD awards according to the weight. HRD can be used for matchmaking trading in large exchanges as fungible tokens. Therefore, the market price of HRD is intended for pricing the liquidity pool.

In addition, the HRD holders may use HRD to purchase the share in the NFT liquidity pool and re-construct the weighted NFT of any grade. According to the non-arbitrage opportunity model in traditional economics, the total discounted value of HRD generated due to NFT fission should equal the current value of this NFT. When the total discounted value differs from the current value, the market may adjust the HRD price or re-construct the NFT for value return. For this reason, the generation and application scenarios of HRD should form an enclosed loop and ensure no arbitrage space for users in NFT circulation and HRD transactions. At this time, the current value of NFT products can be discounted and estimated according to the fixed rate of output and price.

The enclosed-loop token incentive mechanism poses the last step for protocol pricing. It provides NFT products with the direct price anchoring with mainstream digital currency and legal tender. Meanwhile, HRD under the non-arbitrage opportunity model will force the NFT to return to its real fair value. Then, it can be declared that the HRD perpetual matchmaking auction mechanism applies to all NFT products.

3.4 Compatibility and interoperability of the protocol

The HRD protocol does not exist based on any chain and is open source and requires no permission. So, it is equipped with absolute compatibility and interoperability. This indicates that any public or side chains can access the HRD protocol and any intelligent contracts may call the protocol with assets on the original public chains subject to seamless pricing and circulation. Many long tail assets are now available for trading. In fact, the transparency and accessibility of the HRD protocol have re-configured the free transaction and union model with the price defined in the kindest way to realize the maximum positive externality.

4 Summary of advantages

The HRD protocol features completely disruptive NFT pricing. The form of the protocol ensures its compatibility and interoperability as well as many advantages.

1) Massive applicable assets. Theoretically, all NFTs available for on-chain circulation and other non-standard assets may apply to the H-R diagram pricing;

2) Complete NFT ownership. When involved in the H-R diagram pricing, the NFT holders should put the entire product in the liquidity pool and then trade the share in the pool or mine for dividends. The violent division of NFT held is not required, so the NFT product will not be omitted, damages or even destroyed;

3) Pricing continuity. The matchmaking trading of token HRD in the secondary market ensures the H-R diagram protocol to price the liquidity pool of NFTs. The monetary nature of HRD and the development of the secondary market decides that there will be almost no circulation problems for HRD. Therefore, the price of the NFT liquidity pool will be reliable and continuous;

4) Complete in/out mechanism. Users can implement the fission to acquire HRD after injecting NFTs or purchases shares through HRD and redeem the NFTs. As a result, the NFT liquidity pool is equipped with strong liquidity;

5) High compatibility. The existence of the H-R diagram protocol does not depend on any single public chain and can be inserted into any public chain and inherit the NFT eco-value on the chain theoretically.

5 About

The term HRD protocol refers to the Hertzsprung–Russell diagram (referred to as H–R diagram, HR diagram or HRD) created by Ejnar Hertzsprung and Henry Norris Russell in 1910. All fixed stars are painted on the diagram with their temperature (color) and luminosity measured daily, indicating important progress towards the understanding of stellar evolution in human science.

Each and every NFT shares the same uniqueness and price fluctuation in the market as the stars in the universe. The HRD protocol is prepared based on the “H-R diagram” concept. Through the perpetually combinatorial auction and POA (Proof of Auction) consensus mechanism, the value evolution of any NFT at any moment is mapped in the HRD protocol to realize the NFT standard pricing and circulation. This also marks a key step towards the concept of “everything involved with DeFi” in the blockchain field.