NFT Perps on Tezos blockchain

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1 INTRODUCTION

This paper describes a possible implementation of perpetual futures contracts for NFTs on the Tezos ecosystem. Although the concept of perpetual futures has been introduced in 1992, its first implementation was for the cryptocurrencies market in 2016. Perpetual futures are well suited to enable derivatives markets for illiquid asset. Therefore, NFTs, which tend to be less liquid than regular tokens is a great usecase for perpetual futures.

The mechanism behind perpetual futures isn't particularly complex but some challenges need to be addressed for it to work properly and securely on a decentralized system.

In part 1.1, perpetual futures and NFTs will be defined. Then on part 2, I'll describe the different elements needed in order to build a perpetual futures market for NFT before concluding.

1.1 BACKGROUND

PERPETUAL FUTURES Proposed by the economist and Nobel Laureate Robert Shiller in 1992, perpetual futures contracts, or perpetual swaps, are designed to enable derivatives markets for illiquid assets. In 2016, BitMEX introduced it for cryptocurrencies trading, and it remains the only type of asset for which perpetual futures markets were developed. It's a future contract which doesn't expire. And for it to work properly, a daily settlement has to be done from one side of the contract to the other. In our usecase the price shorts would have to pay to longs would be:

$$d_t = (m_t - f_t)$$

Where m_t is the price of the asset on the perp exchange and f_t the actual floor price.

NFT FA2 (TZIP-12), is a token standard on Tezos blockchain. It consists of a unified token contract interface and addresses two important aspects of token standards: token type and permission standardisation. Notably, the creation of NFTs was added to FA2 standard. NFT stands for Non Fungible Tokens - hence, tokens don't have the same values and cannot simply be traded one against another. NFT tokens are usually created as being part of a collection (a set of NFTs having common characteristics), the most popular ones include CryptoPunks, Parallel, CoolCats, etc. Each NFT, even within a collection, has an individual price reflecting its scarcity or its popularity. However, with collections come the concept of "floor price" which is the lowest price of an item in a collection.

2 MECHANISM

In this part I will describe the mechanism of each part individually.

2.1 NFT Market place

We previously described in 1.1 that FA2 token allowed user to create NFTs. However, in order to monetize those token, creators and buyers need to go through a market place where sellers can meet buyers and exchange NFTs - usually against a fungible token. We also defined the concept of "floor prices". These prices can fluctuate over time and came the idea that traders might want to speculate on those floor prices and get an exposure to some NFTs collections without actually having to buy any of these.

Hence, for this project - we created a NFT marketplace with an additionnal functionnality. NFT owners would be able to lock their NFTs against a new token which should track the floor price of the locked NFT collection. For simplicity, from now we'll call "NFT_{fp}" a token which is supposed to track the floor price of a given NFT's collection. Being able to create such a NFT_{fp} token would doable thanks to the help of market makers and arbitrageurs.

2.2 EXCHANGE

Our NFT perps exchange would have two main features, first a traditionnal AMM (autonomous market maker) which allows our users to both create liquidity pools and exchange between various assets.

In addition to that, we would also have a perpetual futures market where users could short/long the floor price of any NFT_{fp} token we would add. As perpetual futures market, our protocol should take care of regular settlement in order to make sure our market tracks the effective floor price of the traded NFT_{fp}.

One difficulty would be to correctly get the floor price of the NFT. So far, it's been decided that the oracle will be the NFT market place we described in the previous part. Indeed, since the NFTs are supposedly traded there it should be a good candidate for reflecting the real floor price.

To do the intermediary between this and the exchange, we'll create an Oracle contract that should be activated every 8 hours. It will lookup the floor price value of every collections on the market place and send it the the AMM contract, which will subsequently proceed to the funding process:

If the floor price is lower than the price of NFT_{fp} on our market, long will have to pay shorts the difference. On the contrary, if the market price is higher, shorts will pay longs the difference. This would allow arbitrageur to maintain the price stable between the floor price and the market price.

Also, traders will have to provide cash (Tezos) into a clearing house in order to be able to use the platform.

vAMM We're using a Virtual Automated Market Maker (vAMM). Which means that it doesn't require liquidity and the price is updated only depending on opened/closed positions.

Exemple: a pool has been created with the following parameters:

- NFT_{fp} amount: 100
- NFT_{fp} value (actual floor price): $200tz$

The initial state of the pool will be:

- $NFT_{fp} = 100$
- Tezos $= 100 * 200(floorprice) = 20,000$

Also, similarly as Uniswap, we have a constant product formula:

$$x * y = k.$$

For the example above, that would mean $100 * 20,000 = 2,000,000$.

Then, let's say Alice deposit 100tz in the clearing house. She then can take long or short positions. The position she'll take will impact the price of the asset.

Let's say she take a long position of 100tez, the new state will be:

- Tezos: $20,000 + 100 = 20,100$
- NFT_{fp}: $x = \frac{k}{y} = \frac{2,000,000}{20,100} = 99.5$

Then, on our pool the new NFT_{fp} price will be: 202.01tz (it has increased by 2.01tz).

Similarly, if Bob also deposits tezos and takes a long position of 100 tez, the new state will be:

- Tezos: $20,200$
- $NFT_{fp} = \frac{2,000,000}{20,200} = 99.01$

And the price of our NFT_{fp} will be $\frac{20,200}{99.01} = 204.0198$. We can see that naturally, the price increases since users tend to take long position. Taking shorts position would lead the price to be reduced.

Funding For the market price (price of the perp on our exchange) to be aligned with the actual floor price of the asset, we need to add a funding step. Let's say that every 8 hours, depending on the floor price and the market price, traders who have a position will have to take part of the funding mechanism of the perp contract.

If market price ¿ floor price is positive, the long position holder will have to pay the short position holder. This would encourage arbitrageur to take a short position and receive the payment from the longs and hence will ensure the price on our market not to diverge too much from the floor price we want to track.

On the contrary, if market price ¡ floor price, shorts will pay longs the funding payment.

The funding payment is equal to $abs(marketprice - floorprice)$ each trader pay/receive payment depending on their position size. They pay/receive payment in tezos and that would increase/decrease the amount of tezos they have in the clearing house.

3 CONCLUSION

I described a way to implement a NFT floor price perpetual market with 3 key elements: 1) A marketplace where users can lock their NFT against a tradable asset tracking the floor price of their NFT. 2) An exchange with a virtual AMM where trader can take long/short position on this tradable asset. 3) An oracle used to send actual floor price of the NFTs to the exchange.

It's still work in progress - please take a look at https://github.com/Jebq/NFT-Perp in order to stay updated.

References

1. https://tezos.b9lab.com/fa2