The Co:Create Protocol: A Primitive for Fostering NFT Application Ecosystems

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1   Introduction

Non-fungible tokens are a powerful web3 primitive; they enable something to be, at the same time, digital and unique. This carries a broad set of implications, including, at base, the ability for artists to access global markets, and the ability for artists to benefit from the resale of their work.

However, NFT projects thus far have faced a number of limitations, notably:

- The absence of a governance token means that decisions must be made centrally, without the participation of the project community.
- The absence of a token economic model makes it difficult to incentivize a diverse set of contributors to the project. Effectively the only participants incentivized to contribute are creators, buyers, and marketplaces.
- The benefits of the success of the ecosystem accrue centrally to the projects rather than to the communities of artists and buyers who have bootstrapped the network effects of the projects.
- The tight coupling between smart contracts and interfaces orients network effects around a single client, decreasing variety and innovation around clients.

Ultimately, this has meant that while NFT projects have several benefits of web3 (e.g. access to global markets, versatility of smart contracts to encode different royalty structures), they also have many of the drawbacks of web2.

What would be more powerful if NFTs natively had a mechanism where (a) participants who bring value to the project benefit in accordance with the value they bring, (b) multiple independent clients exist with access to the same listings, allowing interface innovation and serving different niches, (c) the underlying smart contracts and clients are open source and composable with other applications, (d) a broad swath of participants are involved in governance.

We propose a mechanism that makes this possible, that we call Protocol-Controlled NFTs. The core of this mechanism is to have a protocol that controls the minting of NFTs, with a token economic model that accrues demand for limited supply of the token if the NFTs minted by the protocol become popular, all governed by a DAO through a native governance token. Such a mechanism allows communities to form organically around NFT projects, and for these communities in turn to create vibrant ecosystems around those projects – ecosystems including, for example, alternative marketplaces, games, events that require NFTs for access, etc.

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We describe this mechanism in the context of a reference protocol that we call the Create Protocol. We later describe how several instances of the Create protocol (for several different NFT communities) can be combined to form what we call the Co:Create protocol, allowing each NFT community to benefit from not only the success of their community, but also the success of other communities.

2   The Create Protocol

2.1   The Base Protocol

The Create Protocol has four components: the NFT minting mechanism, a native utility and governance token, a DAO, and a treasury.

Any creator may propose minting an NFT drop to the DAO by staking a certain amount of token. The DAO then votes on whether that NFT drop should get minted by the protocol. Members of the DAO use staked tokens to vote. If the vote doesn't pass, then the proposer loses their stake. If it does pass, then the proposer earns a fee, denominated in the native token, taken from block rewards.

Once the vote passes, the NFT drop is minted, and the protocol auctions off the NFTs in a Dutch auction. The protocol sets a royalty rate for resales (default 10%), and a royalty split (for both the initial sale and resales) between the creator, the purchaser, and the protocol. All proceeds from the initial auction and resales are sent to the protocol, which swaps the proceeds for the native token on a DEX, and then sends the native token to the creator, purchaser, protocol, and client, according to the royalty split determined by the protocol. The proceeds that are sent to the protocol are held in the DAO's treasury. The proceeds that are sent to the purchaser are locked for a certain time period.

This mechanism ensures two things: first, from a governance perspective, that governance tokens are distributed to those who participate in the bootstrapping of the network – the creators and purchasers. Second, that the more popular the NFTs minted through the protocol, the higher the demand for the native token.

2.2   Protocol-Directed Purchases

So far, the protocol allows for minting NFTs through the protocol. While this handles a number of use cases, it's useful also to enable purchasing NFTs through the protocol. We do so in the following manner.

Block rewards, denominated in the native token, accrue to the treasury according to a regular schedule. The DAO may use the treasury to purchase existing NFTs, rather than minting them through the protocol. A voting threshold for purchasing would be set, similar to the voting threshold for minting, and a proposer would propose a purchase (or sale) in the same manner that they would propose a mint, by staking a certain amount of token and putting the proposal up for a vote.

An instance of the Create protocol may choose to enable protocol-directed purchases.

3   Use Cases

3.1   Collective Governance and Incentives around an NFT Collection

NFT Collections currently have no collective governance mechanisms. In many ways, they don't need them – applications (for example games using the NFTs) can be introduced permissionlessly. However, this is limiting – one can imagine a number of scenarios in which collective governance is useful. The issuance of new NFTs in the collection, for example, has impact on the broader community. Too few new drops would lead to too exclusive a community to be meaningful except as a status symbol. Too many new drops would lead to inflation. Similarly, the licensing of the brand and imagery of the collection for things like t-shirts or video games should ideally be a community decision.

Similarly, NFT collections have no native incentive mechanisms for ecosystem creation. If somebody creates a game that requires players to own an NFT from a collection in order to level up, it would benefit the NFT holders but not the game developer. To create a vibrant ecosystem, it is useful to have incentive mechanisms by which developers would benefit from making games that require the collection's NFTs.

Both of these issues can be addressed through instantiating the Create protocol with a high voting threshold for minting (ensuring that the only NFTs minted through the protocol are authentic), and a 30/30/30/10 royalty split between creator/purchaser/protocol/client. This gives NFT creators and NFT holders a large governance say, and fosters a diversity of clients (including games, etc). that make use of NFTs in the collection. Licensing decisions can be made by the community, and licensing fees can be paid in the native token to the DAO's treasury.

3.2   Creating a Community around a Marketplace

Let's imagine there is a decentralized version of a marketplace like OpenSea that would like to share the benefit of its success with the contributors who were responsible for that success, the artists and purchases on the platform.

The marketplace can implement the Create protocol with a zero-vote threshold for minting, a 96.5%/1%/1%/1.5% royalty split between the creator, purchaser, protocol, and client. In this split, while the OpenSea client would receive a 1.5% fee rather than a 2.5% fee, they would hold a number of OSEA tokens, and would benefit as the token appreciates (as would the artist and purchasers who hold the token).

A marketplace like OpenSea that is already in existence could choose to airdrop tokens onto artists and purchasers who have already participated in the network, in accordance with how early they participated and the extent to which they participated, retroactively rewarding those who helped build the network and giving them a say in governance.

3.3 Influencer Networks

Let's say you have an NFT marketplace that creates and markets collectible for influencers. Here, one can deploy an instance of the Create protocol with a medium voting threshold for minting (to ensure that the influencers deploying NFTs to the network are high quality), and a 45/5/45/5 split between the creator/purchaser/protocol/client, recognizing in this instance that (a) the platform will play an outsized role in bringing influencers onto the platform and building their collectibles (as compared to a less curated marketplace like OpenSea), so the protocol take should be high, and (b) the influencers will be more influential in bootstrapping the network than the purchasers.

One can imagine having the voting threshold for minting change linearly over time, so that at the beginning, there is a high threshold for what NFTs get minted, and over time, it becomes more like an OpenSea.

3.4 Interspecies DAOs

Let's imagine a group that has purchased a forest, and wants to sell the forest while enforcing certain rights of the forest itself – for example, the right to remain free from human tampering. We can imagine doing so by minting an NFT for each acre of the forest through the protocol, where the NFT represents ownership of that acre. Let's also presume that we can recognize deforestation in that acre through satellite imagery and machine learning.

In this case, the voting threshold could be set high for minting (to ensure that the forest NFTs are legitimate), and the royalty fee could be set in a variable, sensor-dependent manner. If there is no history of deforestation since minting, resales of the forest could go 97% to the seller and 1% to the protocol, purchaser, and client. If there is a deforestation event, all resales would go 100% to the protocol and 0% to the seller[1].

Such a mechanism creates a strong disincentive for deforestation, while allowing forest owners to still benefit from stewardship of the forest through earning ecological service credits (for example, on-chain carbon credits).

3.5 Crowdfunding a Single NFT and Cooperative Museums

So far, none of the use cases that we have explored have used the Protocol-Directed Purchase feature. The simplest use of this feature would be to enable a group purchase of a single NFT. Let's imagine that 1000 people wanted to get together to buy an NFT representing an acre of forest (or a Bored Ape). In this case, an instance of the Create protocol could be instantiated wherein protocol-directed purchases are enabled. The voting threshold could be set high, and the royalty split could be set to be 100% to the protocol. The collective would purchase tokens in a presale (or on the open market presuming another

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[1] another way to implement this would be to have a deforestation event trigger an automatic transfer of the NFT to the protocol

way to bootstrap liquidity for the token), and then would use the tokens in the treasury to purchase the NFT.

It's straightforward to imagine this mechanism being extended to multiple NFTs, forming a cooperatively-governed museum or art gallery.

4   Additional Considerations

4.1   Variable Staking

For high-volume instances, one challenge will be the attention of the DAO to different minting proposals. We can address this in part as follows. The protocol would set a default staking amount required to propose an NFT mint. However, proposers may choose to stake more than that. The higher the staked amount, the higher up on the voting queue the proposal goes. This allows proposers who have high confidence that their NFT mint will pass to receive expedited voting.

4.2   Continuous Threshold Voting

In the base example, the protocol would set both a quorum threshold and a voting threshold for NFT votes. For example, an instance may set that at least 30% of token holders need to vote, and of those, 90% need to vote yes in order for a mint to pass. One can collapse these into a single threshold variable as follows: one can calculate the odds of the yes/no breakdown at the end of the voting time period, presuming a 50% prior probability of each token voting yes, divide that by the probability of a 50/50 vote given the same number of voters. In other words, if s is the score, y is the number of yes votes, n is the number of no votes, and t is the total number of votes, then:

$$s = \frac{(t!/y!n!)/2^t}{(t!/(.5t)!(.5t)!))/2^t} = \frac{(.5t!)^2}{y!n!}$$

Intuitively, s will give you a sense of how unlikely it is for the final vote to have been the result of random chance. The lower s (presuming $y > n$), the more strongly the community is expressing their preferences to mint. A benefit of this score is that it makes it possible to compare a scenario in which 50 people vote yes and 10 people vote no, with a scenario in which 600 people vote yes and 300 people vote no, eliminating the need for setting quorum thresholds.

4.3   A Judicial Review Model for DAO Moderation

In addition to voting mechanisms, a DAO should be able to set forth ground rules for NFTs they mint. For example, DAOs are likely to want to prohibit the minting of NFTs that violate somebody's copyright or trademark rights, or that contain illicit content. One can see these ground rules as a constitution; in the same way that voters may not vote in a way that violate the Constitution, DAO voters may not vote in a way that violates these ground rules.

This analogy suggests the following moderation mechanism, based on the concept of judicial review. Anybody may flag a proposal as potentially violating the ground rules. If an NFT is flagged, n members of the DAO judiciary are notified at random, and those n need to vote on whether the NFT does indeed violate the ground rules. Each of those members must stake some native token in order to vote. If their vote matches the consensus vote, they earn a reward from block rewards. If their vote does not match consensus, or if they abstain or do not vote in time, their stake gets slashed.

Members of the DAO judiciary can be selected in any one of three ways. They may be appointed by the initiators of the DAO. They may be elected by the DAO. Or any member of the DAO could choose to be a member of the judiciary. (The analogies here are: appointed judges, elected judges, and juries). An instance of the protocol would choose one of these methods at the time of instantiation.

5   The Co:Create Protocol

5.1   The CoCreate Factory Method

Because each instance of the Create Protocol is the same set of smart contracts except with different parameters, one can set up a factory method to create new instances of the Create Protocol. This is similar in spirit to Uniswap's factory method that sets up new liquidity pools. This factory method defines the Co:Create Protocol.

This has two benefits. First, the smart contracts for each instance of the Create protocol don't need to be written from scratch and maintained independently. Rather, they are written once and generated for each new instance.

Second, it can provide a mechanism by which NFT communities can not only contribute to (and benefit from) their own success, but also to the success of other NFT communities. We describe how this works in the CO token economics section.

The native token of the protocol, CO, operates similarly to the UNI token. It gives governance rights to the Co:Create protocol and governance rights to management of the Co:Create treasury.

5.2   CO token economics

CO is a governance token, and holders of the CO token vote on core protocol features (such as parameter settings) as well as how to spend the treasury. From a good governance perspective, one wants to distribute governance of the Co:Create protocol to those who contribute most to the protocol, in other words, those who set up successful instances of the Create protocol (weighted by how early they set up their instance).

We do this by introducing a hub-and-spoke exchange. Each instance, rather than retaining 100% of the tokens they receive, retains most of the tokens, and

sends a small amount to the Co:Create treasury. In exchange, the Co:Create treasury will grant the instance treasury CO tokens, equivalent in value to the CO token exchanged, minus a small protocol fee. With this mechanic, the more active instances get more governance voice on the Co:Create protocol, and the Co:Create protocol is able to bootstrap a diversified treasury.

Just one more thing is needed: to find a way to recognize that early instances have more impact on bootstrapping the Co:Create network than later instances. The protocol does this by adjusting the protocol fee charged in the swap over time. The earliest instances therefore get slightly more CO tokens for the same amount of total activity, giving them more governance power in the network[2].

6   Conclusion

We have defined a new pattern that uses NFT collections and a fungible token associated with the NFT collection, to bootstrap application ecosystems, incentive mechanisms, and governance paradigms around NFT communities. This pattern is applicable to a wide variety of use cases, from NFT marketplaces to cooperative museums.

We also introduce a factory method, that creates new instances of this pattern. Spiritually, this is similar to Uniswap, which introduced a new pattern around constant factor liquidity pools, and then created a factory method to create new instances of that pattern.

NFTs have been useful as ways to own digital art, as ways to create community, as new modalities for identity, and as ways to maintain digital ownership of real assets like forest. We believe that adding the functionality associated with fungible tokens – as a means of payment for utilities, as an incentive mechanism to reward participants, and as a way to distribute governance to community – will be useful for NFT communities that currently do not have these mechanisms. The Co:Create protocol provides a flexible way by which to do so.

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[2] It is even possible to have the fee be negative initially, creating an incentive rather than a fee at the beginning of the network.