Props: A Scarce Loyalty Network

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Abstract. In this paper, we introduce our vision for a decentralized protocol for a network of apps that imbue value into a shared digital asset and use it to create better alignment with their communities of users.

1. Introduction

The internet has given rise to a proliferation of networked businesses whose success depends in large part on the efforts of their users. Social networks, peer to peer marketplaces and content platforms would be worthless without communities of users adding value through participation, interactions and contributions. Despite this rapid innovation, not much has changed in the relationship between app operators and users. Apps benefit from increased involvement by users and use a variety of methods to increase user participation, but they have failed to provide long-tail users with any tangible, long term, benefit for their efforts. This imbalance presents an opportunity to create even more powerful network effects through an alignment of interests between a platform and its users, which would benefit both parties alike.

Traditional forms of loyalty and status have been successful in motivating customers and users to perform more of the actions that are valuable to a business (e.g. referrals, repeat usage and increased spending.) However, users benefitting from traditional loyalty points have little vested interest in the success of the business. These users don't gain additional value if they were, for example, an important early adopter of a platform that grew and succeeded. This results in a mostly transactional relationship between apps and users, rather than one in which the users are financially and emotionally aligned, with incentives to help bootstrap and make a business successful.

One way to create this alignment is through scarcity. Loyalty points traditionally have a stable value and an unlimited supply: as more users join an app, more points are created, and early users continuously hold a smaller and smaller percentage of the overall points. However, if the loyalty points were scarce, then an app would be forced to give out less points over time, giving early contributors increased value and power. This creates a direct incentive for the user to help an app succeed, supercharging their engagement and loyalty.

Props is an implementation of scarce loyalty points, designed to run on the Ethereum blockchain. Props consists of a token, used to quantify loyalty value, and a decentralized protocol, which incentivizes apps to adopt Props as a universal and trusted form of loyalty.

2. Core Concepts

2.1 Props Token

The Props Token (Props) is a digital asset that derives its value from a collective of apps choosing to offer benefits to those who hold it. These Participating Apps (Apps) join forces to imbue value in the Props Token, earn it from the Props Protocol (see below) and in turn reward their users with it. The Props Token benefits from network effects, becoming more useful and valued as more Apps recognize it and more users demand it.

2.2 Props Protocol

The Props Protocol (the Protocol) is a smart contract that allows a decentralized group of actors (the Network) to coordinate towards the common goal of growing adoption of the Props Token. It's a central hub where data can be stored and key participants can discover and interact with each other. The Props Protocol uses rewards to incentivize these participants to come together and align interests.

2.3 Staking

Users wishing to participate in the Props Protocol, may do so through Staking. Staking involves transferring Props Tokens to the Protocol, which decreases the Staker's balance of Props and increases their Staked balance. In return, the Staker can influence various aspects of the Protocol, based on their proportion of the total amount staked.

While Staked, a User's Props Tokens remain locked with the Protocol, however at any point the user is free to unstake and get their tokens back immediately. There is also no way to transfer or lose users' Staked Props, so they are guaranteed to get them back 100%. See Section 4 for implementation details.

2.4 App Points

Each App will be enabled with its own app-specific App Points (Points), serving to unlock loyalty benefits within that App alone. Based on the amount of Props earned and staked by a User towards a certain App, the user will be granted App Points of that certain App, the amount of which determines which benefits the user unlocks. Users can also earn App Points through actions like Staking. Unlike Props, which can be earned and utilized in any participating App, Points are specific to each App and are not transferable.

2.5 App Rewards

At the heart of the Props Protocol is a system for incentivizing Apps to provide benefits to Props Token holders. By unlocking benefits for Props Token holders Apps drive demand for the Props Tokens. This impacts the entire Props community and adds overall utility to Props. As a result, Apps can earn Props rewards for the benefits they offer (and the utility they add to the token.) Apps can then distribute a portion or all of their Props rewards to their users. This creates a powerful feedback loop between the Apps and the Protocol, with each driving value for the other.

2.6 Staking Rewards

When Staking, a Props Token holder must specify how to allocate the “weight” of their Stake to various Apps, effectively evaluating the utility value contribution of each App. In return, Stakers earn two types of rewards from the Protocol.

First, Stakers earn Props, which incentivizes their general participation, and ensures that over time influence accrues to those who are active with the Protocol, rather than just passively holding Props.

Second, Stakers earn App Points from the Apps they stake to, which incentivizes the Staker to stake to the Apps which they believe are offering the most valuable benefits. Stakers act out of self-interest, trying to maximize the value of their rewards. This behavior provides, in the aggregate, the data enabling the Protocol to determine which Apps are most effective in driving utility value for Props. This data then drives, on a daily basis, the exact App Rewards allocation to each App.

2.7 In-App Rewards

The vast majority of Props activity happens inside Apps, when Users are rewarded for performing actions valuable to the App. Given that these are micro-payments, happening multiple times a day across millions of Users, it’s critical to make these transactions frictionless. Users should not need to set up a blockchain wallet, fees must be near zero, and Apps need the flexibility to revoke rewards if fraud is discovered.

The solution is that Apps issue “Pending Props” to Users, which act as an IOU, giving the User immediate access to benefits inside an App, while buying time for the User to earn enough to warrant claiming their Props on-chain. This “temporary trust” between the App and the User solves both for scalability and usability issues, enabling a seamless “Web 2.0” experience that Users have come to expect.

2.8 Controller

Certain core parameters of the Protocol, such as the rate of rewards distribution, can only be changed by a privileged wallet address, known as the Controller. The Controller itself can be a smart contract, making it compatible with different forms of governance, such as a multi-sig wallet, or fully decentralized community voting. See Section 5 for more details on governance.

2.9 App Whitelist

Any App is free to join the Network by submitting a transaction to the Protocol. But in order to be eligible for App Rewards, the App must be whitelisted by the Controller. This allows open permissionless participation, while preventing spam and limiting abuse, as the joining App needs to prove it adds utility and demand value on an ongoing basis.

2.10 App Points Distribution

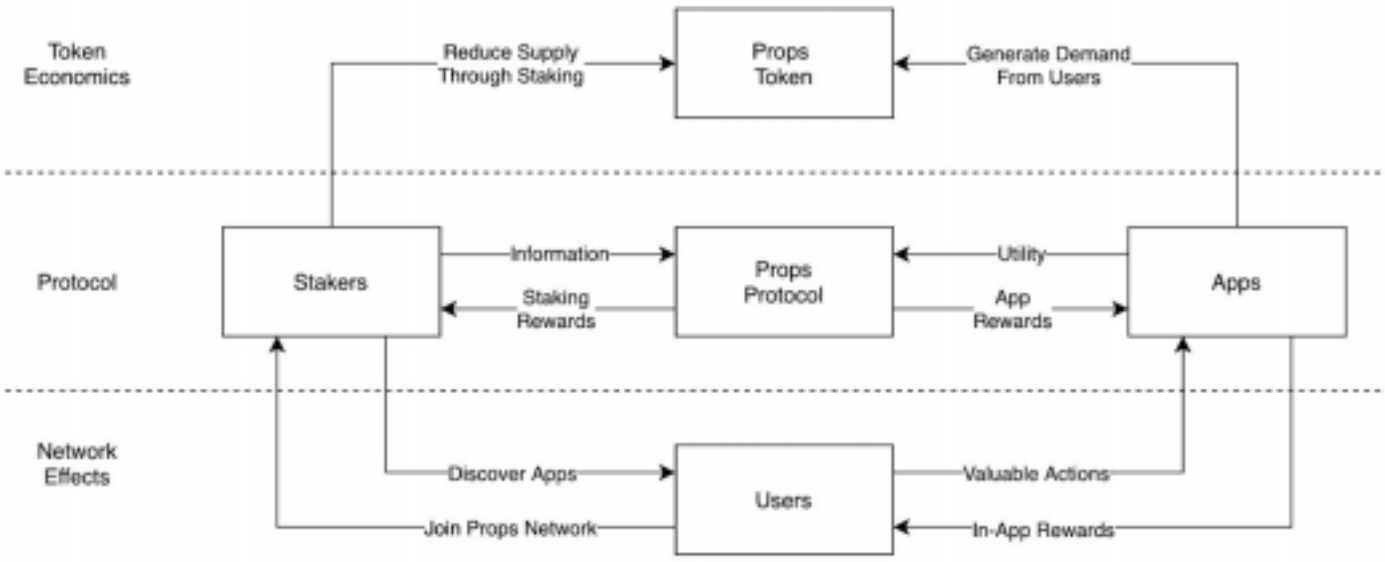
When an App joins the Network, it chooses the amount of App Points to mint and to be used for Staking Rewards, to incentivize Stakers to stake to that App. Additionally, 5% of all minted App Points are sent to the Props Protocol, for the community to decide how to use in the future. The remaining Points are used by the App to distribute to their users or keep in its treasury.

2.11 Progressive Participation

The Props Protocol is targeted at mainstream consumer applications, whose users are not expected to have previous experience with digital assets. As such, the Protocol is designed to be as lightweight as possible. Only Apps and Stakers, who are more technical, need to interact with the Protocol directly. Users interact indirectly through Apps, and thus can be offered a more traditional Web 2.0 / mobile UX. Over time, Users can become educated and choose to participate in Staking. Additionally, Stakers who earn Props and App Points through the Protocol are incentivized to become Users of the Apps, which acts as a source of user acquisition, providing further value to the apps.

3. Token Economics

The Props Protocol is designed to coordinate unrelated actors in order to maximize value capture for the Props Token.



3.1 Demand from App Users

Apps are incentivized to offer benefits to Users who Stake Props to them. This in turn generates

demand for Props from Users who acquire and hold Props in order to access a specific App's benefits. The demand that an App generates is visible on-chain, allowing Stakers to evaluate the performance of each App, and direct the Protocol to allocate App Rewards accordingly.

3.2 Supply Sink from Stakers

In order to participate in Staking, Stakers must lock their Props, taking them out of circulation. Stakers are motivated to stake for a number of reasons:

1. Getting more utility in the App/s they stake
2. Getting more Props as yield
3. Influencing the allocation of App Rewards, which impacts the health of the Props Network and by extension, the value of their Props

3.3 User Acquisition

Once a person earns Props through Staking or In-App Rewards, they are well-positioned to begin using other Apps in the Props Network, making them prime targets for those Apps to acquire. This creates a future opportunity for the Protocol to facilitate the acquisition of users between Apps, in exchange for fees.

3.4 App Points

5% of all minted App Points accrue to the Protocol. These App Points can be used in the future to drive incentives and capture further value for the Props Token. The aggregate utility value of these tokens functions as a fundamental value for the Props Token, ensuring that it grows as more Apps join the Network.

4. Protocol Implementation

4.1 Stake Weight Allocation

When a User calls the "Stake" method in the Props Protocol, they specify which Apps they want to stake to, and specify how many Props Tokens to assign to those Apps. The "weight" of their Stake is then allocated between various Rewards Pools, which calculate how many Props and App Points to distribute to each Staker.

4.2 Rewards Distribution

Each Rewards Pool holds tokens (Props or App Points), which are split based on the stake weight allocations. Distribution happens perpetually, with a fixed percentage of the remaining tokens being distributed each day.

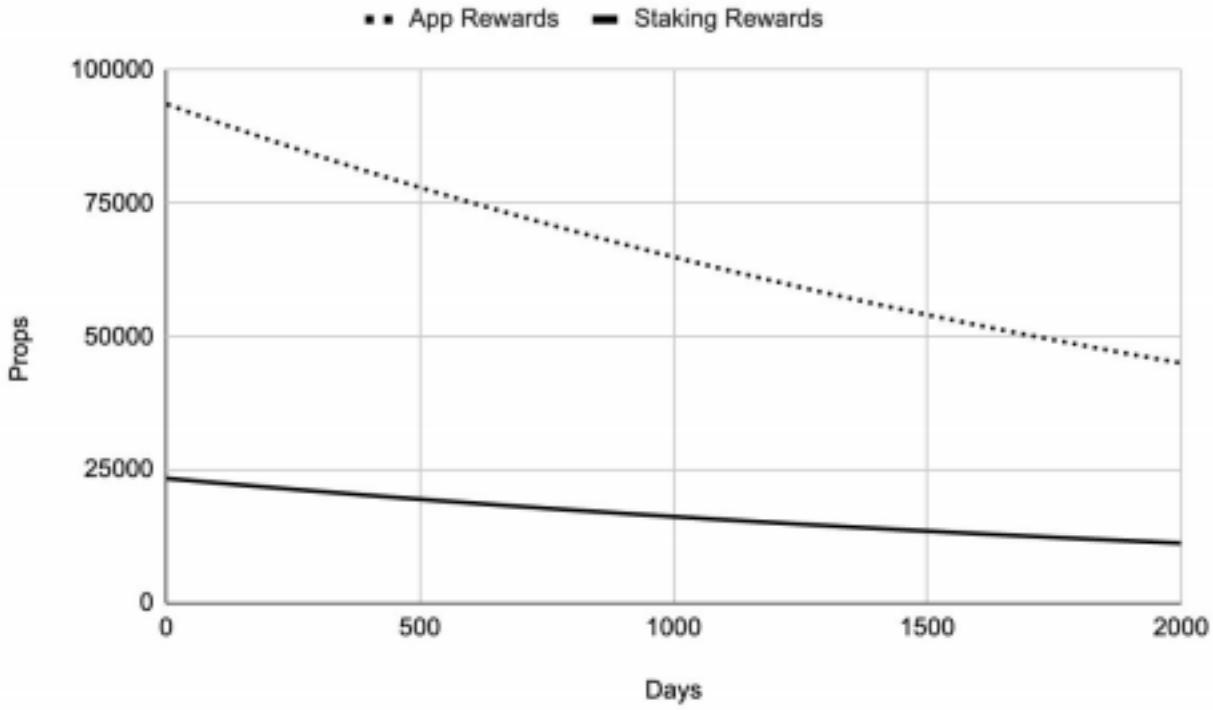
In order to be efficient, and save on transaction fees, Staking Rewards are not "pushed" to recipients on any regular basis, but instead are dynamically tracked in a smart contract. At any

time, the recipient can “pull” their earned Staking Rewards out of the contract. Staking Rewards continue accruing in the contract until the recipient collects them, and there is no requirement on how frequently they are collected.

4.3 Props Rewards

The Max Supply of Props is 1 Billion Tokens. Each day, more Props are minted for rewards, with 80% going to App Rewards and 20% to Staking Rewards[1]. As of Jan 7, 2020, ~330,000,000 Props Tokens are yet to be minted. These Props Tokens are allocated at a rate of 12.5% of the remaining pool per year (or 0.03658% per day), resulting in the following distribution:

[1] These parameters may change



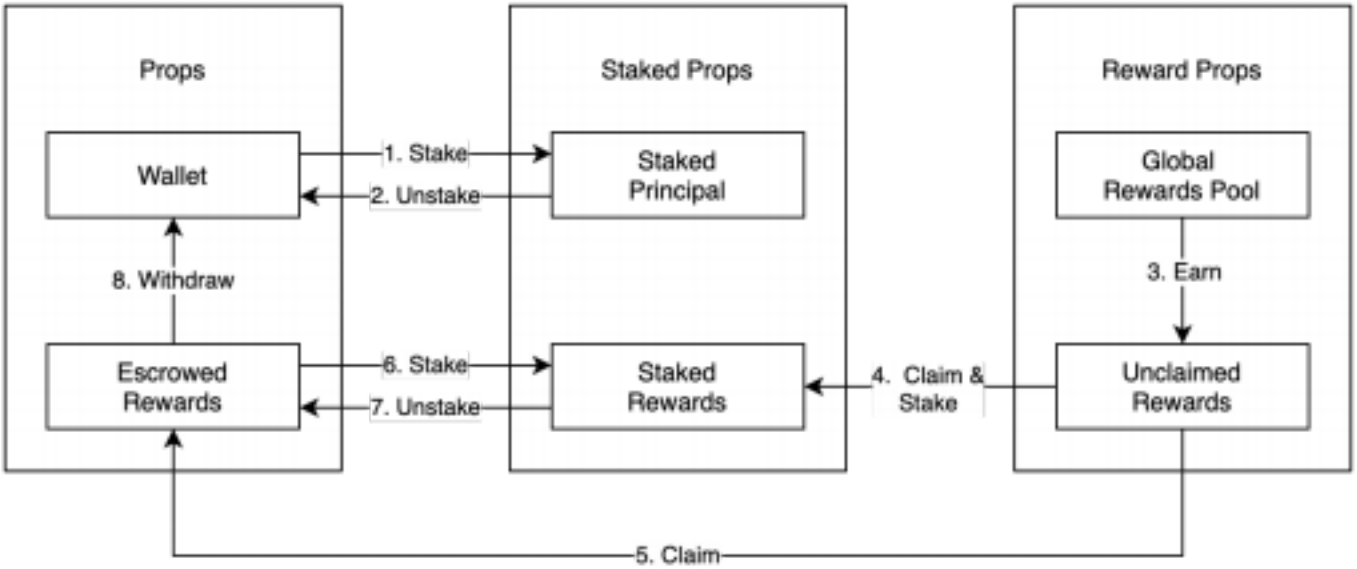
4.4 App Points Staking Rewards

Staking Rewards of App Points follow a similar distribution curve, except that Apps are free to choose parameters, such as the number of App Points in a rewards pool, and the rate of distribution, in order to incentivize Stakers.

4.5 Staking Lifecycle

Staked Props are divided into two buckets: The amount that a user explicitly Stakes is referred to as the Principal, and can be immediately unstaked, allowing the user to freely enter and exit

the system. Meanwhile, any Props Staking Rewards are subject to an escrow period of 90 days before they can be withdrawn. This encourages participation by users who have a long term commitment to the Protocol. App Points Staking Rewards are not subject to an escrow period.



1. Stake Props Tokens from a wallet
2. The Principal amount can be immediately unstaked (withdrawn) to wallet
3. Over time, the user earns a portion of the Staking Rewards pool
4. Upon claiming Staking Rewards, they can be immediately Staked
5. Alternatively, the Props Staking Rewards get escrowed for 90 days
6. Users can Stake their Staking Rewards instead of waiting for escrow to complete
7. When unstaking Staking Rewards, they go back into escrow
8. After 90 Days of escrow, Staking Rewards can be withdrawn to Wallet

5. Governance

The long term goal is for the Props Protocol to be fully governed by the community of Props Token holders. As such, various components are designed to facilitate this.

5.1 Checkpointed Stake

Every time a User stakes, a historical reference of their Staked balance is kept on-chain, not just their current balance. This makes it possible to implement an on-chain voting system where voting weight is based on Staked balance at a particular point in time, avoiding scenarios where Props are transferred and used to vote twice.

5.2 Delegation

Anyone can “delegate” the weight of their Stake to another address. Not only does this make it safer to actively participate, by delegating from a secure cold wallet to a less-secure hot wallet, it

also allows Stakers to delegate their voting power to a community member that is more active and knowledgeable. This enables representative forms of governance.

5.3 Upgradeable Controller

The Controller Address, which has the authority to make changes to the Protocol, can be upgraded over time, and set to any smart contract. This allows the governance to evolve as different methodologies are tried and best practises develop. Today, simple on-chain weighted voting frameworks like Aragon and Governor Alpha are most popular, but it is likely that more sophisticated designs will emerge, and it's important for resiliency to be able to migrate to them.

5.4 Parameters

The following parameters can be changed by the Controller:

- App Whitelist
    - Add / Remove Apps that are eligible for Props Rewards
- App Rewards Rate
    - % of remaining pool distributed to Apps each day
- Staking Rewards Rate
    - % of remaining pool distributed to Stakers each day
- Escrow Cooldown Period
    - Time that must pass before Staking Rewards can be claimed
- App Points % To Protocol
    - Portion of App Points that accrue to Protocol
- Contract Addresses
    - Upgrading contracts to include new functionality

6. Conclusion

By leveraging a scarce digital asset, and bringing together a decentralized network of participants, Props offers a novel way for Apps to align with their users and drive the sorts of behaviors that lead to successful outcomes. It aims to combine the best of traditional loyalty programs with the powerful incentives of decentralized token networks. And importantly, it is designed to overcome the common shortcomings of current blockchain-based systems, facilitating the seamless user experiences that consumers have come to expect from the mainstream apps they engage with today.

7. Supplementary Material

1. Token Supply Information
2. Live Protocol Metrics