DeFi Pool SHARE

# Protocol Whitepaper
V0.5

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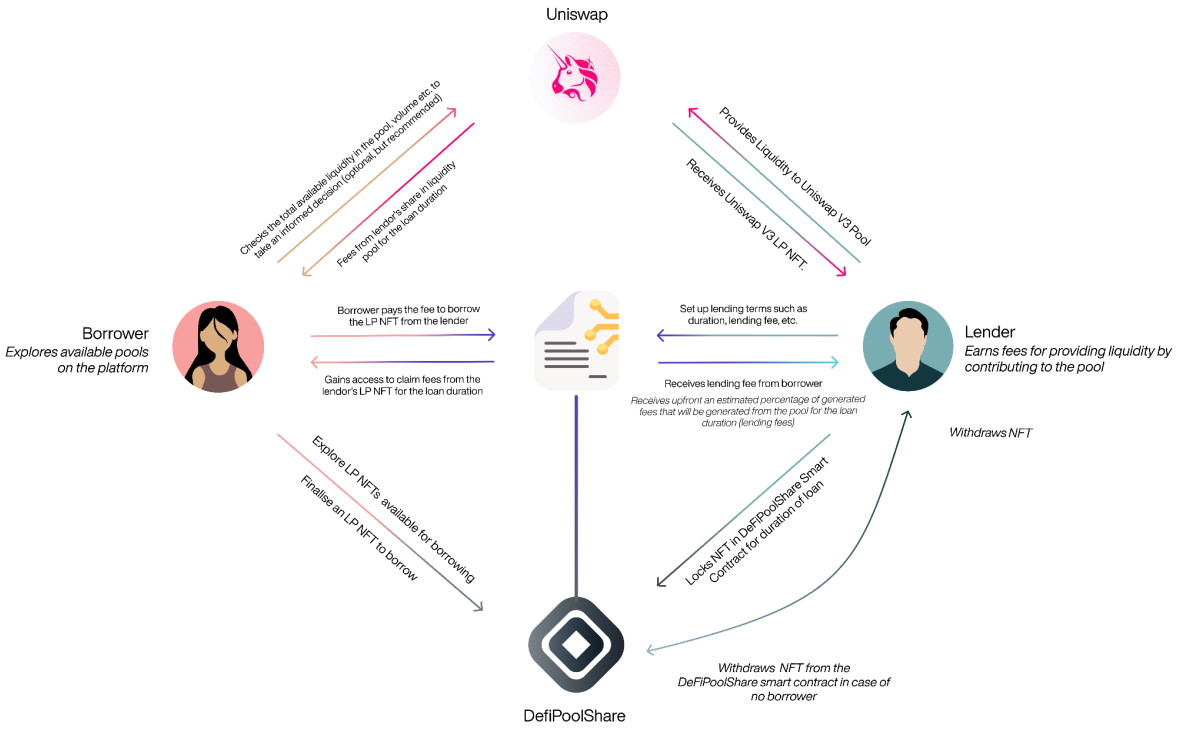
## Abstract

This paper outlines the concept and implementation of the DeFi Pool Share protocol. It explains the working of the platform, including the lending & borrowing of Liquidity Providers' Positions on Uniswap V3, and the benefits it offers to users

# 1. Introduction

DeFi Pool Share is a lending protocol built on the Ethereum network that allows Liquidity Providers to lend their Uniswap V3 Positions NFTs to interested borrowers.




The platform provides liquidity providers with predictable returns on their position by lending it to the borrowers in exchange of a lending fee based on estimated fees generated by the pool for loan duration, while also allowing borrowers to bid on these Position NFTs and gain access to the position's claim fees.

This smart contract-based protocol is designed to increase the efficiency and accessibility of lending and borrowing in the DeFi space. By leveraging the liquidity on the Uniswap v3 pools, DeFi Pool Share enables users to easily and securely lend & borrow assets, while also mitigating some of the risks associated with DeFi like impermanent loss and lp management.

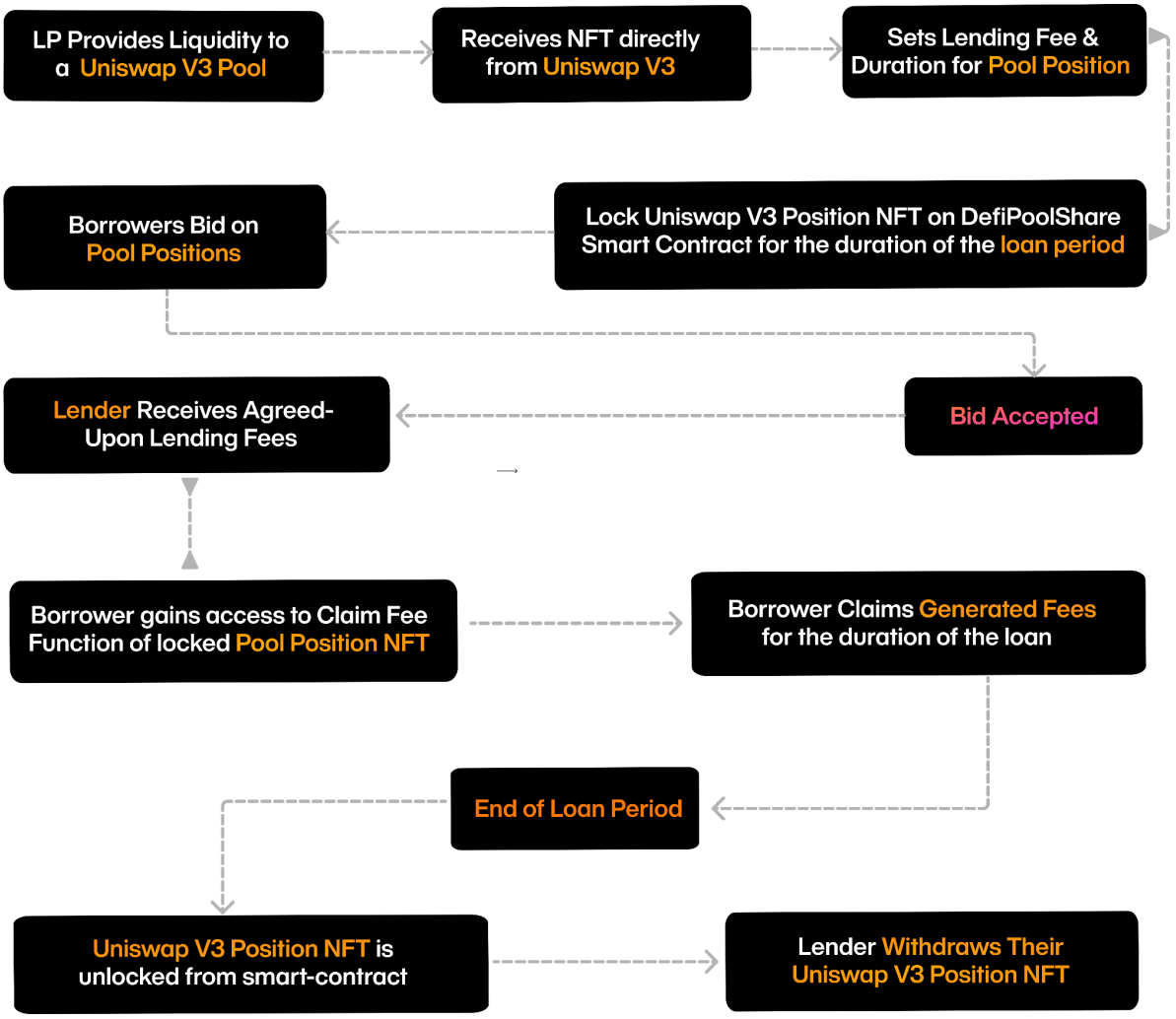
In this paper, we will provide an overview of how DeFi Pool Share works, as well as the benefits and risks of using the platform. We will also explain the role of lenders and borrowers in the process, and provide guidance on how to get started using DeFi Pool Share. Additionally, we will cover some of the technical aspects of the platform, including how lending/borrowing and smart contracts work in DeFi Pool Share.

We hope this documentation will serve as a valuable resource for anyone interested in using DeFi Pool Share, and we welcome any feedback or suggestions for improvement. Let's dive in!

## 1.1 How DeFi Pool Share works?

DeFi Pool Share enables liquidity providers on Uniswap V3 pools to lend their position from Uniswap V3 Positions NFTs and loan them to interested borrowers for a set period, in exchange for a lending fee

Here's a step-by-step breakdown of how the process works:




1. A Uniswap V3 LP gets an NFT from Uniswap smart-contract for providing liquidity to a pair (Read more:

https://support.uniswap.org/hc/en-us/articles/7423194619661-How-to-provide-liquidity-on-Uniswap-V3)

2. Then the owner locks their Uniswap V3 pool position NFT into a smart contract for a specified period of time. The NFT represents the owner's position in a Uniswap V3 pool that contains a specific combination of assets, such as ETH and DAI.
3. The owner sets a lending fee for the pool position NFT, which is a percentage of the estimated fees that the position is expected to generate during the loan period.
4. Potential borrowers can then bid on the pool position, offering a price to borrow it for the specified period.
5. Once a bid is accepted, the lender receives the agreed-upon amount as lending fee and borrower gains access to the claim fee function of Uniswap V3 pool position. The borrower can then claim the fees generated by the particular position in the pool during the loan period.
6. At the end of the loan period, the NFT is unlocked on the smart-contract and the lender can withdraw their Pool Position NFT.

## 1.1.1 Key Components

**Loan struct:** Contains information about each loan, such as the lender, borrower, tokenId, loan amount, creation time, start and end time, accepted token, and loan status.

**Whitelisting tokens**: DPS allows the contract owner to whitelist tokens that can be used for loan repayments.

**Depositing NFTs**: Lenders deposit their Uniswap V3 NFT positions and set the loan terms. Borrowing NFTs: Borrowers can take the available NFT positions on loan, paying the loan amount to the lender in the accepted token.

**Claiming Fees**: Borrowers can claim the trading fees generated by their borrowed NFT positions.

**Technical Details**

DPS employs algorithms to handle the complexities of Uniswap V3 liquidity provision. The protocol leverages the OpenZeppelin library for ERC20 and ERC721 token standards and interfaces with Uniswap V3's

Position Manager. By using algebra and various algorithms, DPS simplifies the process of managing Uniswap V3 LP positions, making it easier for users to participate in liquidity provision. More technical details are discussed deeply further in the paper.

## 1.2 Understanding Uniswap V3 Pools

Uniswap V3 is a decentralized exchange that utilizes an automated market-making (AMM) system to allow users to swap ERC-20 tokens without the need for a centralized order book. Uniswap V3 uses a unique system of liquidity pools, which are pools of tokens held in smart contracts on the Ethereum blockchain. These pools are used to facilitate trading between different ERC-20 tokens.

In Uniswap V3, liquidity providers (LPs) add liquidity to these pools by depositing an equal value of two different ERC-20 tokens. In return, LPs receive NFT that represent their share in the liquidity pool. These NFT's can be held as a representation of the LP's contribution to the pool.
The liquidity provided by LPs is used to facilitate trades between different ERC-20 tokens in the pool. Traders can swap tokens by depositing one token and receiving the other token in exchange at a price determined by the ratio of the two tokens in the pool. This ratio is automatically adjusted based on the amount of each token in the pool.

Uniswap V3 uses a unique bonding curve algorithm that allows for more precise price ranges and lower slippage than previous versions. The bonding curve algorithm allows for a range of prices to be set for a specific token pair, and trades can be executed within this range. The algorithm ensures that trades occur within the specified price range, reducing slippage for traders.

Overall, Uniswap V3 pools and LPs play a critical role in the decentralized exchange ecosystem by providing liquidity for traders and enabling efficient price discovery for different ERC-20 tokens. DeFi Pool Share steps in here to enable Uniswap V3 Liquidity providers with predictable returns on their positions, avoiding impermanent loss and lp management by lending their Positions to interested borrowers. The borrowers borrow the Position NFT from the lender for a specific period of time for a fraction of the total liquidity provided by the LP (based on a percentage of the estimated fees the position will collect within the loan duration) and gain access to claim fee function of the position NFT. This enables the borrower

to earn the fees the position will make within the loan duration, whereas on the other hand the lender gets upfront instant ETH without worrying about impermanent loss and lp management.

### 1.2.1 Concentrated Liquidity

In Uniswap V3, LPs have the ability to concentrate their capital within custom price ranges, which means they can provide more liquidity at desired prices. This is done by creating individualized price curves that reflect the LP's preferences. However, if the market prices move outside of an LP's specified price range, their liquidity is effectively removed from the pool and they won't earn any fees until the price comes back in range or they update their price range.

In Uniswap V3, fee earnings are stored separately as tokens in which the fees are paid because of the non-fungible nature of positions. The custom liquidity provision feature in Uniswap V3 allows for the collection and holding of fees by the pool as individual tokens, instead of automatically reinvesting them as liquidity in the pool. Moreover, trading fees are no longer automatically reinvested back into the pool on LPs' behalf.

This allows LPs to have more control over their liquidity provision and fee collection, which in turn enables greater customization of trading strategies and potentially higher returns.

**Risk**

It is important for liquidity providers to carefully consider and set their price range when providing liquidity to a pool. If the market price moves outside of their specified range, their liquidity becomes concentrated in the less valuable asset, and they will not earn fees until the price moves back into their range or they update their range to account for current prices.

Read more on Uniswap:
https://docs.uniswap.org/concepts/protocol/concentrated-liquidity

## 2. Lending

Lenders on DeFi Pool Share are LPs of Uniswap V3 Pools that are lending their contribution in the pool to interested borrowers for a specific period of time in exchange of a lending fee.

Here's how it works:

**Step 1: Set up a compatible wallet**
The first step is to set up a wallet that supports Ethereum and ERC-20 tokens. We recommend using wallets such as MetaMask or MyEtherWallet, but you can also use any other Ethereum-compatible wallet.

**Step 2: Add liquidity on Uniswap V3**
Load your wallet with the tokens of a pair you want to provide liquidity to (for example. ETH & DAI). Here's how you can add liquidity to an existing or a new pair on Uniswap V3 easily:
https://support.uniswap.org/hc/en-us/articles/7423194619661-How-to-provide-liquidity-on-Uniswap-V3

Once you've added liquidity to Uniswap V3, based on the pool and your parameters selected on the liquidity providing interface a unique NFT will be minted representing & backing your position in that specific pool. As the owner of this NFT, you can modify or redeem the position.

**Step 3: Connect your wallet on DeFi Pool Share**
Once you have set up your wallet, you can connect it to DeFi Pool Share by visiting our app and connecting your wallet through the "Connect Wallet" button. This will allow you to view your Uniswap V3 Position NFTs and available pools.

**Step 4: Set up lending terms & lock your Uniswap V3 position NFT**
Most of the users have step 1,2 & 3 already in place. For providing liquidity to a Uniswap V3 Pool, you receive an LP NFT. Now that you have a Uniswap V3 LP NFT, you can set up lending terms like lending fees & duration of the loan and then lock it into our lending smart-contract for the loan duration. Borrowers will then start bidding for borrowing your position.

**Step 5: Accept a bid from a borrower**

Once a borrower has placed a bid on your Uniswap Position NFT, you can review the bid and decide whether to accept or reject it. If you accept the bid, the borrower will need to pay the lending fee and gain access to the claim fee function of your Uniswap V3 position NFT, and you'll receive upfront the agreed-upon lending fees. In case you don't accept any bid, you're free to withdraw your locked NFT from the smart-contract irrespective of loan duration since the loan hasn't actually begun on-chain.

**Step 6: Withdraw Uniswap V3 Position NFT**
At the end of the loan duration, the lender will get an option to withdraw their Uniswap V3 Position NFT.

# 3. Borrowing

Borrowers on DeFi Pool Share are the users who are renting a Liquidity Provider's contribution in Uniswap V3 Pools (*A Uniswap V3 Position NFT owner*) to get access to Uniswap V3 Position NFT's claim fee function for the duration of loan by paying rent.

Here's how it works:

**Step 1: Set up a wallet**
The first step is to set up a compatible wallet that supports Ethereum and ERC-20 tokens. We recommend using wallets such as MetaMask or MyEtherWallet, but you can also use any other Ethereum-compatible wallet.

**Step 2: Connect your wallet to DeFi Pool Share**
Once you have set up your wallet, you can connect it to DeFi Pool Share by visiting our website and connecting your wallet through the "Connect Wallet" button. This will allow you to view available pool shares.

**Step 3: Borrow a Uniswap V3 Position NFT**
If you are interested in borrowing a pool position, you can browse available pool positions NFT and place a bid on a specific position that matches your needs. Once your bid is accepted by the owner, you will gain access to the claim fee function of the Pool Position for the duration of the loan.

**Step 4: Claim fees**

As a borrower, you will be able to claim your share of the fees generated by the Uniswap V3 pool during the loan period. This is done through our platform, and the fees will be claimed directly on your wallet.

# 4. Risks

**Market Risks**: DeFi Pool Share operates on the Uniswap V3 platform, which is a decentralized exchange that operates without a central authority. This means that the liquidity of the pool can be affected by changes in market conditions and investor sentiment. Additionally, as the lending fee is based on estimated fees generated by the pool, there is a risk that the actual fees generated may be lower than expected, resulting in lower earnings for the lender.

**Liquidity Risks:** When lending your Uniswap V3 pool share NFT, there is a risk that there may not be enough liquidity in the pool to allow for easy exit from the loan. This can occur if there are no borrowers willing to bid on the pool share or if market conditions make it difficult to sell the underlying assets in the pool.

**Regulatory:** Even though DeFi Pool Share operates in the decentralized finance space, the users are however encouraged to do their own diligence about local laws before using the platform.

**Concentrated Liquidity:** When considering renting a Positions NFT on DeFi Pool Share, it is important for borrowers to check the current price range and the liquidity concentration of the NFT before making a bid. This information can be viewed directly on Uniswap (Uniswap pool links are linked on every Positions NFT available for borrowing on DeFi Pool Share) and is helpful to make an informed decision about the potential risks and rewards of borrowing a particular Position.

# 5. Why Use DeFi Pool Share?

**Reasons for Uniswap V3 Pools Position NFT owners to use our protocol?**

1. **Instant access to cash:** Liquidity providers can receive immediate cash by lending their LP NFT (liquidity positions) to borrowers, rather than having to wait for the fees to accumulate over time.

2. **Risk mitigation:** By locking their LP NFT for a specified period of time, lenders can mitigate the risk of impermanent loss that comes with providing liquidity to Uniswap V3 pools.

**Reasons for Borrowers to use our protocol:**

1. **Access to claim fees function:** Borrowers can gain access to claim fees function on provided liquidity on Uniswap V3 pools by just paying a small fraction (rent) of the entire liquidity provided
2. **Discounted Rate:** Borrowers can potentially borrow at a lower cost as the lending fee is based on the estimated fees that will be generated by the pool within the loan duration.
3. **Flexible borrowing terms:** Borrowers will be able to negotiate the terms of their loan.

# 6. Fees

Protocol Fees on Lending: 5% (Total Fees)

**Fee Allocation:**

- Operations: 0.5%
- DPST Stakers: 1%
- Marketing: 0.5%
- Net Profit: 3%

The total fee structure is 5%, and it is divided into four parts, with 0.5% going towards operations, 1% towards DPST stakers, 0.5% towards marketing, and 3% towards profit.

This fee structure and allocation are designed to ensure the sustainability and growth of the DeFi Pool Share ecosystem.

The operations fee covers the cost of running and maintaining the protocol, while the DPST stakers receive a share of the fees as a reward for their support and contribution to the platform.

The marketing fee is used to promote and raise awareness about the platform, and a portion of the net profit is used for incentivizing stakeholders as well as reinvested into the platform to fuel its growth and development.

This fee structure and allocation are designed to ensure the sustainability and growth of the DeFi Pool Share ecosystem.

# 7. Smart Contract

**Protocol Overview:** DPS is built on top of the Ethereum blockchain and interacts with Uniswap V3's Position Manager. The protocol allows lenders to deposit their Uniswap V3 NFT Liquidity positions, setting the loan amount, loan duration, and accepted token for repayment. Borrowers can then take these positions on loan, earning trading fees generated by the underlying liquidity.

Our protocol utilises our open-source non-custodial DeFi Pool Share.Lending Smart Contract to facilitate lending/borrowing of Uniswap V3 Pool Positions.

The smart contract for DeFi Pool Share (DPS) protocol is built using Solidity and is designed to manage the lending and borrowing of Uniswap V3 LP positions (represented as NFTs). It interacts with Uniswap V3's Position Manager and leverages OpenZeppelin's contracts for ERC20 and ERC721 token standards. Here's a technical explanation of the core components and functions in the smart contract:

## 7.1 Data Structures and State Variables

**Loan struct**: A data structure that holds information about each loan, such as lender, borrower, tokenId, loan amount, creation time, start and end time, accepted token, and loan status.
**Arrays and mappings**: The contract maintains arrays to store all loans (_loans) and mappings to keep track of loans by lenders (_loanByLenders) and borrowers (_loanByBorrowers). It also uses a mapping (_whitelistedTokens) to store the list of tokens allowed for loan repayment.
**Position Manager**: The contract initializes an instance of the Uniswap V3 Position Manager (INonfungiblePositionManager) to interact with Uniswap V3.

## 7.2 Functions

**whitelistToken()**: Allows the contract owner to add or remove a token from the whitelist of tokens allowed for loan repayment.
**depositNFT()**: Enables lenders to deposit their Uniswap V3 NFT positions and set the loan terms (tokenId, loanAmount, loanDuration, and acceptedToken). The function transfers the NFT from the lender to the contract and stores the loan information in the _loans array. It also updates the _loanByLenders mapping.
**borrowNFT()**: Allows borrowers to take available NFT positions on loan by paying the loan amount to the lender in the accepted token. It updates the loan information in the _loans array and the _loanByBorrowers mapping.
**canClaimFees()**: A view function that checks if the borrower can claim the fees generated by the NFT position.
**claimFees()**: Enables borrowers to claim the trading fees generated by their borrowed NFT positions. It calls the *collect() function from the Uniswap V3 Position Manager* to collect the fees and transfer them to the borrower.
**_getTokenForPosition()**: A private view function that retrieves token0 and token1 addresses for a given NFT tokenId.
**withdrawNFT()**: Allows lenders to withdraw their NFT positions once the loan period has ended or if the position has not been borrowed. It transfers the NFT from the contract back to the lender and updates the loan information in the _loans array and the _loanByLenders mapping.
**reactivateLoan()**: Enables lenders to reactivate a loan by setting new loan terms and depositing their NFT position back into the contract. It updates the loan information in the _loans array and the _loanByLenders mapping.

## 7.3 Events

**LoanCreated**: Emitted when a new loan is created.
**LoanUpdated:** Emitted when a loan is updated, such as when it's borrowed, withdrawn, or reactivated.
**ERC721 Receiver**: The contract implements the IERC721Receiver interface to handle the receipt of ERC721 tokens (Uniswap V3 positions NFT). It defines the onERC721Received() function, which returns a specific bytes4 value to indicate successful receipt of an ERC721 token.

Overall, the DeFi Pool Share.Lending smart contract simplifies the lending and borrowing of Uniswap V3 LP positions, enabling users to earn yield from Uniswap V3 trading fees without actively managing their positions.

# 8. Roadmap

### Q1 2023

- Begin marketing and outreach efforts to attract early adopters and liquidity providers.

### Q2 2023

- Launch the DeFi Pool Share platform MVP, with initial support for Uniswap V3 pool positions and lending.
- Launch a token associated with the DeFi Pool Share protocol to provide users with additional benefits and features.
- Introduce a staking mechanism to allow users to earn additional yield on their Pool Positions NFT.
- Expand the platform to support additional lending protocols, such as SushiSwap and Curve.
- Introduce a governance mechanism to allow users to vote on important platform decisions.

### Q3 2023

- Begin building partnerships with other projects in the DeFi space to expand the platform's reach.
- Expand the platform to support additional DeFi services, such as margin lending and decentralized insurance.

### Q4 2023

- Launch a mobile app for DeFi Pool Share to make the lending process even more accessible and user-friendly.
- Continue building partnerships with other projects in the DeFi space to expand the platform's reach and capabilities.
- Launch a marketing campaign to attract a wider audience of Defi users.

# 9. Token Economy

**DeFi Pool Share Token |** DPST
Total Supply: **10,000,000 DPST**

- 60% of the total supply is reserved for private/public sale and liquidity provision
- 20% of the total supply is reserved for team members and advisors, with a vesting period of 2 years
- 10% of the total supply is reserved for future development and marketing
- 5% of the total supply is reserved for strategic partnerships and collaborations
- 5% of the total supply is reserved for early adopters and liquidity providers, to be distributed through a reward system

# 9.1 Token Utility

**Governance**: DPST holders can participate in the governance of the DeFi Pool Share platform by voting on proposals related to changes in the lending fee structure, the addition of new features or services, and other important decisions

**Premium access**: DPST holders can also access premium features and services such as discounted lending fees.

**Staking**: DPST holders that stake their DPST will also be eligible to receive a portion of the platform's revenue through a fee-sharing mechanism. This mechanism will distribute a portion of the platform's revenue to DPST stakers, providing a potentially significant source of passive income for long-term token holders.

**Rewards**: In order to provide an incentive for early adoption and liquidity provision, the DeFi Pool Share platform will distribute 5% of the total supply of DPST tokens to early adopters and liquidity providers through a reward system. This will help to bootstrap liquidity and adoption of the platform in the early stages of its development.

## 10. Disclaimer

The information provided in this paper is not intended as financial or investment advice and should not be construed or relied upon as such. The creators of DeFi Pool Share and the authors shall not be held liable for any damages or losses arising from the use of or reliance on the information contained herein.

This whitepaper may contain statements that are subject to risks and uncertainties. Actual results may differ materially from those projected in these statements and projections due to a variety of factors.

Interacting with DeFi protocols involves significant risk and should only be done after conducting thorough research and seeking the advice of a qualified professional. The creators of DefiPoo Share and the authors of this paper shall not be held responsible for any financial decisions made based on the information provided herein.

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