

PWN Finance

P2P loans backed by arbitrary collateral

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Abstract

This paper describes the thesis and implementation of the PWN finance protocol. The market thesis describes early use cases and example scenarios of taking a collateralized loan via the PWN platform. Technical functionality and implementation is described on a high level, leaving out contract examples as a separate resource. A rationale is provided for various components of the platform to give the reader a good glimpse of the PWN business case. Business model and market size estimations are left out from this paper completely.

1 Introduction

PWN Finance is a p2p lending protocol functioning without a necessity of price oracles and systemic liquidity pools. This means arbitrary assets like Non-Fungible Tokens (NFTs), low cap tokens or token bundles are allowed to be used as collateral. The functionality of PWN gets to the very basics of lending. On one side there is a borrower who wants to leverage their assets without losing exposure to the upside of value appreciation (eg. holding a valuable NFT) and on the other side a creditor who is willing to offer credit against a portion of value of the underlying collateral either receiving interest or risking a contract default which will result in gaining full ownership of the collateral - effectively acting as a pawnbroker.

PWN allows borrowers and creditors to utilize its platform and smart contracts to take a short or mid-term loan against any type of a transferable asset - like ERC20, ERC721 or ERC1155 standard tokens. The platform doesn't act as an intermediary, rather it provides an interface for a neutral and verifiable on-chain initialization, lockup and settlement of the lending contracts.

The DeFi & NFT ecosystem has captured outstanding value, first enabling permissionless on-chain swaps, over collateralized loans, stable coin generation or now even wide acceptance of digital assets like art or virtual properties to accrue value. PWN is the next component which will enable leveraging the value of arbitrary assets (like NFTs) and thus further boost liquidity of on-chain capital. We envision the system to cause following effects in the ecosystem:

1. Unlocking value locked in digital property - through leveraging valuable assets against credit
2. Creating opportunities for a sustainable high yield for creditors (100% *APY Annual Percentage Yield+*) without issuance of an ad hoc token - through providing high interest short term loans
3. Increased price flexibility of NFTs since creditors will be able to profitably sell gained collateral under their last recorded market price - through defaulted contracts

We believe in a future where most assets of value are digitized in a form of an on-chain token. Soon the digital asset class will be the go-to solution for creation of new financial instruments. More over ownership of an increasing number of real world assets will be tokenized and transferred on-chain. We think the change is inevitable. Generations of millennials and especially Generation Z has grown up in an era where digital assets have an indisputable value and a significant portion of net-worth of this demographic will be bound to digital assets. First through in-game items and lately through increasing adoption of cryptocurrencies and novel on-chain assets the market is slowly shifting towards accepting digital value as a fact.

2 Use cases

2.1 Non-Fungible Token leverage

The primary and earliest use case of the PWN platform will be focused on *Non-Fungible Token* (NFT) collateralization. Assets like Digital Art, Game collectibles, VR platform parcels or ENS ¹ domains all already encapsulate outstanding value. However, their owners are taking large opportunity risks when they lock up portions of their capital in these assets. The common thesis of NFT collections suggests high expectation of value appreciation over time, so effectively the NFT holders are speculating on price increase of these assets. Enabling temporarily pledging these assets as collateral for loans can unlock huge amounts of capital currently being locked in NFTs and thus it can remove the downside of making a long term bet on this asset class.

In Q1 2021 the value locked in NFTs was estimated to reach ca. 1 billion USD (2) - not counting valuations of the various NFT focused startups. The NFT market is still in its early inception with a very few trivial use cases like collectibles ownership. The potential of NFTs however goes far beyond collectibles. We expect the majority of value to be encapsulated in non-fungible financial contracts like Uniswap's liquidity positions NFTs (1). PWN can unlock a large portion of this capital for further use.

Example 1: Leveraging NFTs

Alice wants to buy 2 NFTs (X & Y) each for 10000 DAI ² (or ETH equivalent), however she only has 15000 DAI at her disposal and she doesn't want to sell any of her other assets to lose exposure. To buy both NFTs Alice decides to buy the NFT X and immediately offer it as collateral through PWN to secure the other 5000 DAI to buy the NFT Y.

A lender Bob spots Alice's inquiry, offering Alice a loan of 5000 DAI for 3 months with 20% interest. Alice accepts the offer, temporarily locking the NFT X as collateral, while immediately obtaining 5000 DAI in credit. She can now buy the NFT Y, yet in 3 months she will have to pay back 6000 DAI to Bob in order to maintain ownership of NFT X.

Alice was given time to adjust her portfolio without missing out on the opportunity to secure the two assets she wanted effectively paying only a 10% premium on the cost of the asset & Bob made 20% return on his stable coin in only 3 months (by extrapolation this would be an equivalent of 107% APY if he continues providing credit on PWN).

¹Ethereum Name Service - see <https://ens.domains>

²Etheruem native USD-pegged stablecoin

2.2 Collateral bundles

Given the simplicity of the contract setup, PWN doesn't require a price oracle - the current and future potential value of the collateral is assessed once at the beginning of an offer creation. Given the price action doesn't play a technical role later in the process - it can only influence a likelihood of a contract default. An entire portfolio of a mix of ERC20, ERC721 and ERC1155 standard tokens can be locked as a collateral effectively allowing similar diversification effects as an MCD³ contract.

Although technically not forbidden, we don't anticipate a median duration of a loan will exceed 3 months - which is an acceptable time-line for individual value estimation.

2.3 Low-cap ERC20

Since the PWN model doesn't require a governance decision or a liquidity pool, there is no reason to prevent any token from being used as collateral. On one hand this increases credit risks but also the profit upside on the side of a lender. Basically any compliant token would be admissible for usage enabling new token issuers to use PWN to obtain a convertible loan while kick-starting a project.

The platform UI will protect users from mistaking scam/imposter token contracts for common tokens like wETH, DAI etc. by validating contract addresses against popular coinlists.

Example 2: Community tokens

Alice holds 10000 DAI worth of a just released ERC20 community token with a market cap below 10M DAI. The token isn't accepted on any major centralized exchange given its niche relevance, but has a relatively decent liquidity available over decentralized exchanges like Uniswap. Alice doesn't want to sell the token as she is very involved with the community and she strongly believes the project is here to stay.

Alice has zero chance to leverage her holdings over one of the existing services and for a small community it wouldn't be worthy to fork and reuse any of the existing platforms. However, given PWN is permission-less, Alice can simply create an inquiry over PWN and post the credit inquiry within her own community - among people who value the collateral in a similar way - so she can receive direct offers from her peers. Few members of the community spot the opportunity to make a decent return and help someone within their community. Alice gets multiple offers enabling her to receive 2500 - 7500 DAI in credit with varying interest.

³MultiCollateral Dai - governed contract enabling only selected collateral assets like ETH,

Example 3: Novel platforms tokens - convertible bonds

A group of open source developers has formed a new DAO which is aiming to cooperatively deliver a next generation of *something*. The project has a very successful Proof of Concept and is able to bootstrap a community. To grow the team decides to fundraise. Instead of going the usual route and starting an ICO to raise funds for their entire roadmap, they decide to lock a decent proportion of their DAO shares in a convertible bond through PWN.

They set the expiration of the bond for 1 year having a chance to prove the new business model is able to generate enough revenue to pay back the bond. In case they succeed they will have to pay relatively high interest but in return they didn't have to give up nor dilute a portion of their shares.

2.4 Deed token

The entire engagement between the borrower and the lender itself is tokenized as a right to obtain either the credit + interest, or the right to claim collateral in the case of a default. The Deed token is issued as an ERC1155 token which is minted at a time a new deed inquiry is published. Once an offer is accepted, the Deed token is transferred to the lender - from this point on, the token is freely transferable and anyone who holds it can burn it after a deed was paid in full or defaulted.

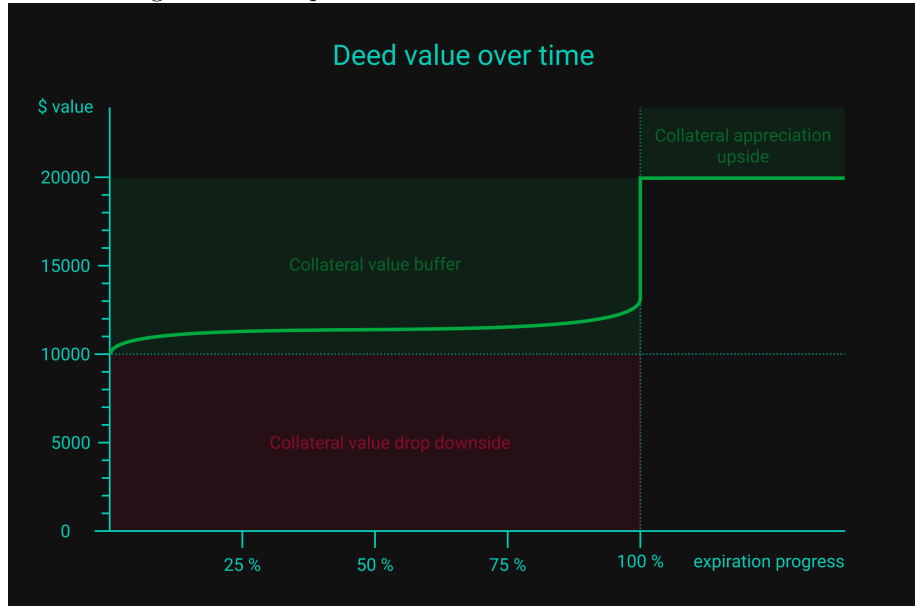
This creates a opportunity for lenders to quickly move out a locked-in loan, not having to wait for its expiration, yet still being able to make some profit on their right to future interest. We expect an entire opportunity market to emerge around well picked lending contracts/collateral assets where lenders which are quick enough to price a particular inquiry can win lending contracts deciding to immediately to sell the deed tokens for smaller immediate profit to other participants who are willing to wait buy our rights for future interest.

Example 4: Deed token value

Let's consider a scenario when a lender offers 10000 DAI against an NFT which has a market price of 20000 DAI, asking 13000 DAI to be paid back when the contract expires in 3 months (effectively achieving 120% APY). If the lender comes across another opportunity he can decide to sell the Deed token on any NFT market.

The value of the Deed token is anywhere between 10000 - 13000 DAI before the expiration or even close to 20000 DAI if the expiration is inevitable.

Figure 1: Example scenario of Deed token value evolution



2.5 Future use cases

The use cases above will be available at the PWN platform immediately. Although the initial target audience undeniably is the cryptocurrency community and especially then the Ethereum community as natural early adopters, the untapped potential is in the assets that are yet to be tokenized.

Bootstrapping a market of individually leveraged assets is essential for creation of advanced instruments like mortgages, pay-to-day loans or consumer loans in the context of Islamic finance.

A mortgage case would *only* require extending the current functionality of PWN to add a deposit of let's say 50% of the item and then triggering an asset purchase by accepting an offer resulting in the desired asset (a "Property NFT") being locked into the Deed token.

The advanced use case will however still require acceptance of additional token/rights standards, which we will likely see emerging in the ecosystem in the foreseeable future.

3 Platform features

3.1 Interface

The interface is not only a gateway to functions of the underlying contracts but also an aggregator of data relevant for pricing estimates of the future collateral.

The non-interactive section consist of asset detail views - pulling in information about the asset such as:

- Data obtainable on-chain from token interfaces (ERC20, ERC721, ERC1155)
- Name, symbol, owned amounts, asset history etc.
- Token bound metadata obtainable from a token issuer APIs (MetaDataURI)
- visuals and token properties
- Pricing details pulled from exchanges, marketplaces & other 3rd party APIs

The interactive components of the UI will allow users to display their portfolio, create new inquiries, cast and accept offers or settle their contracts. All of the interactive components are directly bound to an on-chain backend.

Users will have the liberty of choosing to use an alternative front-end or use the contracts directly, however the PWN interface will guide them to make sensible offers to avoid the platform being cluttered with unrealistically priced assets & offers.

3.2 Borrowing

Users can select any asset owned by their user account. By initiating a credit seeking inquiry a new paused non-fungible ERC1155 token will be minted. The token will represent the creditor rights and will be unpaused and transferred upon accepting an credit offer.

The borrowing party sets an expiration date at creation. A recommended duration of a deed is 1 - 3 months. The duration won't be adjustable based on when an offer is accepted creating an incentive to accept offers rather sooner than later.

Given a fixed duration of the deed, by prolonging acceptance of a pending offer the borrower shortens the duration of credit availability. This effectively increases interest over time.

Making an inquiry will result in the collateral being locked in the contract, opening it up to creditors to submit their credit offers.

For making an inquiry borrower has to provide the following:

- An asset - ERC20/ERC721/ERC1155 token address
- Amount (fungible tokens) or ID of a non-fungible token
- Expiration date - a fixed UNIX timestamp setting a deadline after which the contract will default (and collateral will be claimable by the lender)

Once an offer is accepted the credit is forwarded to the borrower's address and collateral remains locked within the contract. The NFT representing the creditor rights is transferred to the creditor while being unpaused enabling the creditor to further utilize his claim.

In order to claim back the collateral, credit + interest has to be paid in full before the contract expires. Otherwise the contract will be defaulted, resulting in the lender claiming the collateral and the debt being nullified.

3.3 Lending

The lending functionality assumes existing borrower inquiries on the platform. Lenders can simply pick any of the existing inquiries. Initially they will have to decide the pricing on their own. At a later stage of development the interface will pull suggested pricing based on historical price evolution of the asset and similar category of assets.

Once an inquiry is selected, a borrower can make multiple offers with different setups of an asset provided as credit or interest.

To make an offer a lender has to specify the following:

- An asset - address a ERC20 or ERC1155 compliant fungible token
- Amount to lend - simply an amount of funds to be lend (the account MUST have a sufficient balance)
- Amount to be paid back - effectively setting the interest depending on the expiration date

The interface will guide the lender to make a realistic offer - offer with unrealistic setups will be filtered away from the interface.

Once an offer gets accepted, the credit will be withdrawn from the lender's balance and the NFT representing a right to claim either the paid back credit or the collateral after expiration will be transferred to the lender.

Once a lending contract is settled by the credit + interest being paid back in full, the "Deed NFT" will be burned, credit + interest - fees will be returned to

the lender and the collateral asset will be returned into custody of the borrower.

If the expiration deadline is passed, the owner of the Deed token can trigger a contract default causing unlocking of the collateral, setting the token owner as the beneficiary, and burning the Deed token.

Interest to APY calculation:

Given all loans on PWN have are time-constrained there is an required activity on the lender side to technically achieve a perpetual yield generation (at least in the early versions of the protocol). However, the fact that pawnage usually means high risk and quick turnover, enables lenders to earn significant yield multiple times a year, utilizing the the same capital. For the purpose of comparing the achievable APY with other perpetual lending platforms, assuming a loan would be shorter than a year, the APY will be calculated as follows:

$$APY = (ToBePaid/CreditProvided)^{12/DurationInMonths} - 1$$

3.4 Asset profiling

An important component of the entire platform is providing all of the necessary details for enabling simple asset pricing. Initially the platform will pull data from core NFT marketplaces like Rarible, OpenSea and SuperRare and will link to asset pages of these platforms. In the later version of the UI, a strong emphasis will be put on the Asset detail component basically turning it into a public good sub-product of its own.

The PWN contracts are not using asset whitelists, this means that any token compliant with a standard interface can be leveraged. To prevent look-alike and scam tokens to be falsely advertised as their legitimate counterparts, the platform interface will verify contract addresses in case of naming similarities against popular coinlists. Only tokens verified this way will be shown on in the PWN UI unless disabled in advanced settings. Even then, the discrepancies will be highlighted as warnings.

The assets owned by the logged in users will be cached on the platform creating an asset profile. The listed data will include:

- Asset type
- Asset name
- Asset symbol
- Contract address
- Token balance or TokenID
- Total supply

- NFT Metadata
- Token price
- Token price history
- Token holder magnitude

3.5 Pricing mechanism

Initial pricing of the assets is to a large extent left to the lender. The platform will suggest a price estimate based on the last recorded price of the asset if the asset was sold through one of the popular marketplaces. In future versions the pricing suggestions will be influenced by multiple factors including performance of the entire asset class.

The following parameters will be considered in the price point evaluation:

- Author & Legacy
- Scarcity
- Novelty
- Applicability / Usage
- Asset market price traction
- Existing offers
- Addressable market
- Asset class performance
- Expert opinion
- Market cycle

3.6 Offer crafting

Finding a feasible price point is a basis for creating an acceptable and competitive offer of credit to the borrower. *Loan To Value* (LTV) is defined as follows:

$$LTV = \frac{\textit{Credit value}}{\textit{Collateral value}}$$

Lenders will compete for getting their offer accepted on multiple fronts. The basic competing layer consists of: Collateral pricing (the higher the more competitive) & Credit value (the higher the more competitive). Simply put, the

more credit a lender provides and the higher LTV she is willing to accept the better for a borrower. Assuming the asset pricing will be anchored at a similar target, lenders are basically competing for the better LTV ratio provided.

Different asset classes are expected to vary in average LTV. For instance novel NFTs might reflect the associated risk in lower average LTV (ca. 50%) whereas proven and widely recognized assets like Beeple's (3) NFTs will hint towards less risk price drop or a contract default and thus will attract offers with a higher LTV.

A new class of future revenue tokens also falls into a category of high LTV loans. Uniswap's Liquidity provider tokens are a good example of an asset which very likely won't depreciate on value, rather it will even accrue value over the course of a loan-lifespan.

Another competing parameter is the offered credit asset - which can be any ERC20 token with the platform UI preferring wETH, DAI and other stablecoins.

4 Fee structure

The PWN platform aims to benefit from its position of an enabler in the borrower - lender engagement. Although not being a de facto intermediary or a direct trustee between the parties, PWN will collect a success fee on usage of its contracts.

Given the PWN architecture requires open sourcing the key component, the smart contracts layer, we fully acknowledge the opportunity for competing products to copy these and roll out a version of PWN changing or removing the fees. However, a significant portion of the value provided to its users will be off-chain functionality like asset pricing, opportunity matchmaking & asset liquidation.

4.1 Platform success fees

The PWN contracts include a success fee and a withdrawal fee.

A success fee is charged to the borrower at the time a loan is paid back - the borrower will pay extra 2% on top of the interest paid to the lender. This will effectively increase the interest for the borrowed by 2%.

A withdrawal fee is charged to the lender when collateral is removed from its Deed after a contract has defaulted - the fee will be an equivalent to 2% of the credit amount provided against that collateral. This will effectively decrease the potential profit of the lender by 2%, yet at that point the lender still had made close to 100% ROI depending on price appreciation of the collateral, assuming the credit was provided with 50% LTV.

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