3Jane Protocol: Unlocking Crypto-Native Derivatives Yield

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Abstract

Ethereum is witnessing a cambrian explosion in crypto-native yield-bearing assets enabled by EigenLayer's restaking primitive. At time of writing over 15% of all staked ETH has been restaked equating to $15.75B TVL [1]. 3Jane is a crypto-native derivatives protocol built on restaking and cash-and-carry. At its core, 3Jane revolutionizes the way Ethereum is utilized by enabling the collateralization of cryptoeconomic security of any Proof-of-Stake (PoS) based system in derivatives contracts. This approach maintains the security of these systems whilst weaving them seamlessly into a vibrant derivatives market. Through composability, 3Jane unlocks the potential to generate substantial yield from options contracts all while contributing to the overarching security and robustness of the crypto economy.

1 Context

	ETH	BTC
2023	ETH PoS	N/A
2024	ETH PoS EigenLayer PoS AVS 1 →n	Babylon PoS Chains 1 →n

Table 1: PoS Yield Sources

In 2023, there was effectively 1 PoS yield source between ETH and BTC - you can stake your ETH on the Beacon Chain. Today, staked ETH and BTC can be re-pledged across an **infinite** number of cryptoeconomic systems and by doing so one can earn more yield in exchange for providing security. Specifically, this scales with the number of Actively Validated Services (AVS's) [2] live on EigenLayer (ETH) and the number of PoS chains live on Babylon Chain [3] (BTC).

ETH security can now not only be used to secure ETH mainnet, it can now be re-pledged to secure AVS's such as sidechains, data availability layers, new virtual machines, keeper networks, oracle networks, bridges, threshold cryptography schemes, trusted execution environments, etc.[2] [1]Operators [4] secure AVS applications by running their software and in return receive AVS rewards. Operators are subject to slashing conditions of each AVS that it is securing.

Let's imagine a scenario where there are 2 Operators $\{O_1, O_2\}$ and 3 AVS's $\{A_1, A_2, A_3\}$ live on EigenLayer. The power set of AVS's represents all the possible combinations of AVS software that a Node Operator may run simultaneously, ranging from 1 AVS (isolated security) to all 3 AVS's (pooled security). As a result, there are 7 (2^3-1) possible combinations per Operator, and 14 in total between O_1 and O_2. Note that an Operator re-pledges the same ETH delegated to it across every AVS that it is running simultaneously.

[1]Similar to EigenLayer, Babylon Chain enables staking idle BTC towards securing PoS chains and earning yield. Babylon allows you to lock directly on the Bitcoin network and leverages extract one-time signature (EOTS) to enforce slashing.

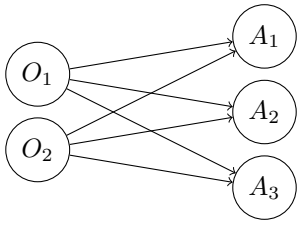

Figure 1: Node Operator to AVS's run

$$
\begin{aligned}
\text{ETH}_{O_1,A_1} &= \text{Restaked ETH delegated to Operator 1 running AVS 1} \\
\text{ETH}_{O_2,A_1} &= \text{Restaked ETH delegated to Operator 2 running AVS 1} \\
\text{ETH}_{O_1,A_1,A_2} &= \text{Restaked ETH delegated to Operator 1 running AVS 1, 2} \\
\text{ETH}_{O_2,A_1,A_2} &= \text{Restaked ETH delegated to Operator 2 running AVS 1, 2} \\
&\vdots \\
\text{ETH}_{O_k,A_1,A_2,\ldots,A_n} &= \text{Restaked ETH delegated to Operator } k \text{ running AVS 1 to } n
\end{aligned}
$$

So, in this example with just 2 Node Operators and 3 AVS's we have effectively gone from **1 asset (staked ETH)** to **14 yield-bearing exotic variants of ETH**, all with their own *yield* and *risk* profile based on the delegated operator and AVS's secured. Now, scale this to the current number of Node Operators (P2P, Chorus One, EtherFi, 01 Node, Ankr, etc.) [5] and current number of AVS's (EigenDA, Ethos, Lagrange, Espresso, Fhenix, etc.) [6] and we get thousands of possible {Operator, AVS_1, ..., AVS_n} combinations. In theory we can spawn an **infinite** number of exotic yield-bearing ETH and BTC variants which all have diverse yield sources.[2]

2 Introduction

3Jane [7] is a crypto-native derivatives protocol leveraging restaking and cash-and-carry to unlock a novel layer of derivatives yield. 3Jane enables the collateralization of all exotic yield-bearing ETH and BTC variants across EigenLayer, Babylon Chain, and Ethena in options contracts [8].

Through 3Jane, users can earn additional *options premiums* yield on top of their natively restaked ETH, eETH, ezETH, rswETH, sUSDe, and sDAI by selling options contracts and collecting premiums denominated in-kind.

3 Traditional vs. 3Jane Options

3.1 Traditional Options

Options contracts are a type of derivative that grants options buyers access to leverage in crypto without getting liquidated, unlike perpetuals contracts. However, just like perpetuals traders must pay a funding rate to be able to trade on leverage, options buyers must pay something equivalent to options sellers called a *premium* to get access to leverage. As a result, selling options is commonly used as a way to earn yield by collecting premiums in exchange for being short volatility. Globally, options are a multi-trillion dollar market in equities.

[2] In practice we are constrained by what AVS's the Node Operators decide to run. We can also narrow down further by the operators that the liquid restaking protocols delegate to. Capital will and has gravitated towards liquid restaking protocols - more than 75% of restaked ETH is done via liqiud restaking proxies.

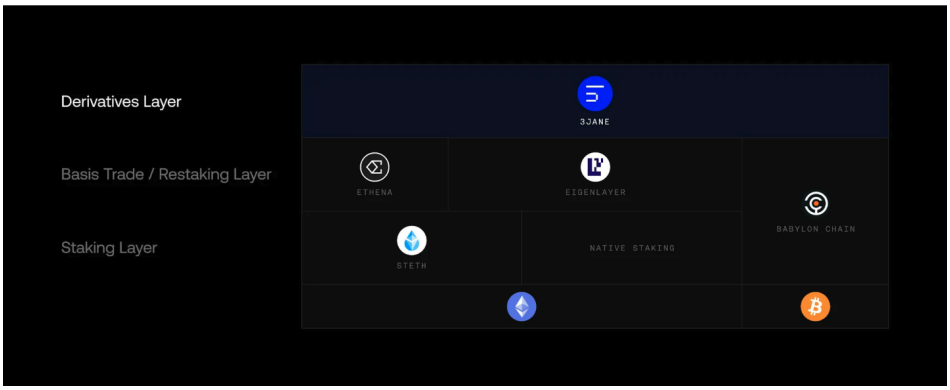

Figure 2: 3Jane Money Legos

Historically, ETH call options are collateralized by ETH and ETH put options are collateralized by stablecoins. By doing so we can always ensure that the position is sufficiently collateralized at all times.

3.1.1 ETH Calls

In the case of an ETH call option, the value of the collateral (ETH) moves upwards with the underlying asset and thus can sufficiently pay out the profits (# of contracts * (∞ - strike price)) if ETH goes to infinity.

3.1.2 ETH Puts

In the case of an ETH put option, the value of the collateral (USDC) does *not* move downwards with the underlying asset and thus can sufficiently pay out the profits (# of contracts * (strike price - 0)) if ETH goes to 0.

However, it does not *have* to be the case that calls are collateralized with *vanilla* ETH and puts are collateralized with stablecoins.

3.2 3Jane Options

3Jane is built on a simple yet powerful insight:

1. Call options can be collateralized by any *yield-bearing variant* of the *underlying* asset.
2. Put options can be collateralized by any *yield-bearing variant* of *stablecoins*.

	ETH Calls	ETH Puts
Traditional Options	ETH	USDC, USDT, DAI, etc.
3Jane Options	ETH natively staked ETH, stETH natively restaked ETH, eETH, ezETH, rswETH, etc.	USDC, USDT, DAI, etc. sUSDe, sDAI

Table 2: Option Collateral Assets

3.2.1 3Jane Calls

Any arbitrary exotic ETH {Operator, AVS_1, ..., AVS_n} construction as well as liquid restaking tokens such as Etherfi *eETH* or Renzo *ezETH* are yield-bearing ETH variants that *track* the ETH price whilst earning staking + restaking yield. These assets can sufficiently *collateralize* ETH call options whilst posing no additional *market risks* to the option buyer since they are ETH denominated assets.

3.2.2 3Jane Puts

Ethena's *sUSDe* and MakerDAO's *sDAI* are yield-bearing stablecoin variants [3] that *track* the USD price whilst earning cash&carry yield and Dai Savings Rate (DSR) respectively. These assets can sufficiently *collateralize* ETH put options whilst posing no additional *market risks* to the option buyer since they are USD denominated assets.

3.3 YieldMaxxing

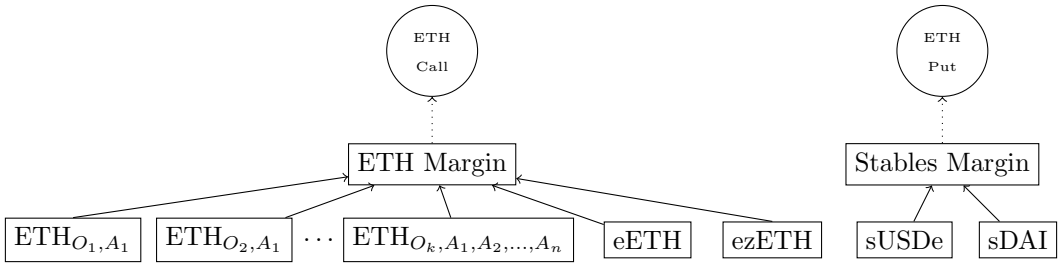

Figure 3: 3Jane Options Collateral Stack

Users simultaneously earn:

1. *collateral* yield (ex: beacon chain staking, AVS restaking, cash&carry, DSR)
2. *options yield* (ex: call option premiums, put option premiums)

By collateralizing derivatives contracts with re-pledged cryptoeconomic security and cash&carry, users can earn additional *options yield* on eETH, sUSDe, and sDAI deposits by selling options contracts and collecting premiums, enhancing overall returns on the original capital.

	Yield Sources
Etherfi 3Jane eETH-C	staking yield restaking yield call options premium yield
Ethena 3Jane sUSDe-P	staking yield cash&carry yield put options premium yield
MakerDAO 3Jane sDAI-P	DSR yield put options premium yield

Table 3: 3Jane Vaults Yield Stack

4 Implementation

3Jane vaults[4] generate yield as option premiums accrue into the vault. 3Jane vaults are tokenized and yield-bearing. Each vault is enshrined at the protocol level with:

1. a non-upgradeable option delta [9] which the vault subscribes to when deriving the *strike price* for the options contract. This is a good approximation for how likely the option is to expire

[3] sUSDe is backed by a delta-neutral long spot stETH / short ETH perp position. sUSDe increases in value as long as funding rates are *positive*. However, historically there are times when funding is *negative*, in which case Ethena will begin subsidizing sUSDe losses with reserve funds. Once those are exhausted, sUSDe may begin to lose value and as such would be insufficient collateral for longer maturity options contracts.

[4] fully on-chain smart contracts

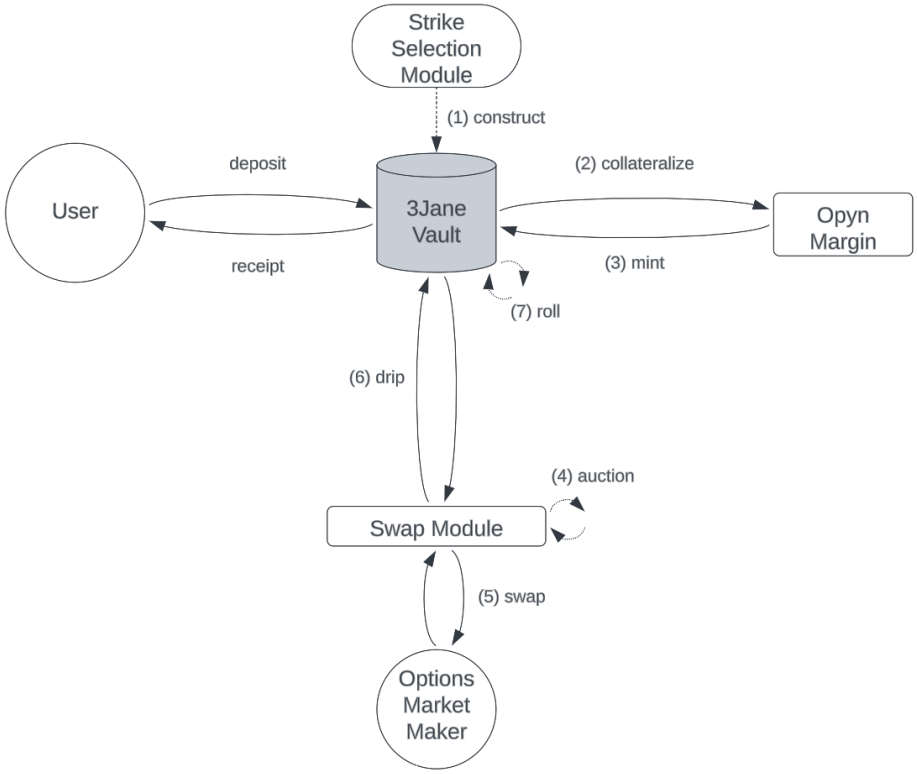

Figure 4: 3Jane Architecture

in-the-money [9], and by extension the APY and risk level of the vault. These will always be out-of-the-money.

2. a non-upgradeable *cycle* duration which the vault subscribes to when setting option *expiry* for the options contract. This determines the maturity of the vault. This may be anywhere from daily to yearly.

4.1 Usage

Users can *deposit* into the vault and may begin to earn yield on their deposits.

4.2 Actions

3Jane on-chain vaults perform the following actions each *cycle*:

- *construct*: set option parameters (always deep out-of-the-money, cash-settled) via strike selection module
- *collateralize*: deposits collateralized in opyn [10]
- *mint*: option tokens (oTokens) minted against the collateral by opyn
- *auction*: blind auction the option tokens off-chain to network of institutional market makers
- *swap*: atomically swap option tokens to highest bidder for option premiums via swap module
- *drip*: socialize the option premiums across vault depositors to make 3Jane receipts yield-bearing
- *roll*: rolls the position over to the next option

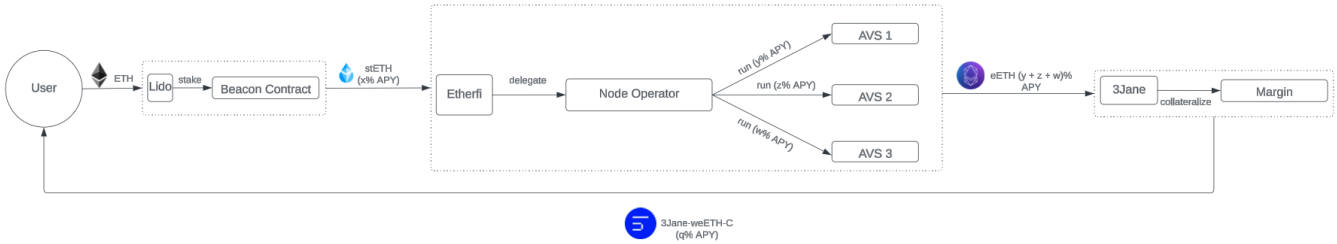

Figure 5: Etherfi 3Jane eETH-C Yield Map

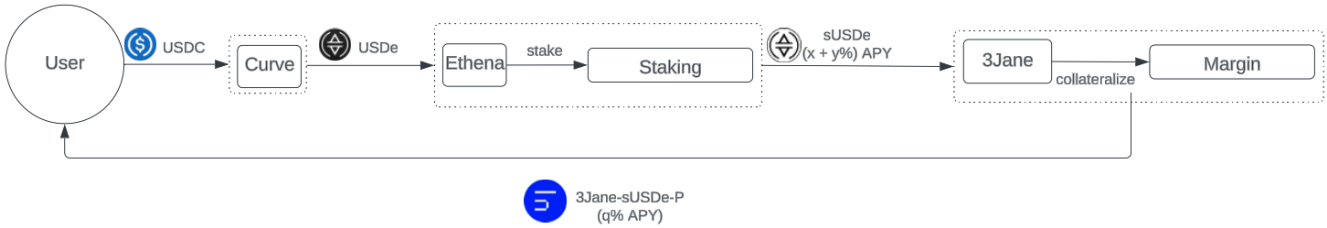

Figure 6: Ethena 3Jane sUSDe-P Yield Map

4.3 Premiums

Premiums paid by options market makers will be denominated in-kind. For example if a vault accepts USDC, premiums will be denominated in USDC.

5 Examples

5.1 Etherfi 3Jane eETH-C

Alice holds 10 ETH and is seeking yield:

1. She stakes her 10 ETH with Lido (+x% APY) and receives stETH.
2. Alice restakes her 10 stETH by depositing into Etherfi to receive eETH. Under the hood, the EtherFi operator delegates to several operators securing AVS 1 (+y% APY), AVS 2 (+y% APY), and AVS 3 (+w% APY).
3. Alice then deposits her 10 eETH in the 3Jane eETH-C vault. Under the hood, the vault mints 10 eETH-collateralized ETH call option oTokens. These 10 oTokens are atomically sold to market maker Bob in exchange for the option premiums paid in eETH (+q% APY). Bob is willing to accept eETH as collateral because it is an ETH-denominated asset.

ETH Buy&Hold: 0% yield
Stake on Lido: +x% staking yield
Restake on Etherfi: +(y% + z% + w%) restaking yield
Collateralize on 3Jane: +q% options yield

In the end, Alice is earning (x% + y% + z% + w% + q%) APY in *real yield* from staking yield, restaking yield, and options yield on her initial principal of 10 ETH. On top of that, she will earn farming yield in $ETHFI, $EIGEN, and additional tokens from AVS's secured.

5.2 Ethena 3Jane sUSDe-P

For this example, lets assumne that the price of ETH is $100, the price of sUSDe is 1.05 USDe, and the price of USDe is $1. Alice holds 1000 USDC and is seeking yield:

1. She swaps her 1000 USDC for 1000 USDe on curve
2. She stakes her 1000 USDe and receives 952 sUSDe (1000 / 1.05) and begins to earn the stETH staking yield (x% APY) + basis trade yield (y% APY)
3. Alice then deposits her 952 sUSDe in the 3Jane sUSDe-P vault. Under the hood, the vault mints 10 (952 * 1.05 * $1 / $100) sUSDe-collateralized ETH put option oTokens. These oTokens are atomically sold to market maker Bob in exchange for the option premiums paid in sUSDe (+q% APY). Bob is willing to accept sUSDe as collateral because it is backed by a delta-neutral position and as such is a USD-denominated asset.

USDC Buy&Hold: 0% yield
Swap and Stake on Ethena: +x% staking yield and +y% cash&carry yield
Collateralize on 3Jane: +q% options yield

In the end, Alice is earning (x% + y% + q%) APY in *real yield* from staking yield, cash & carry yield, and options yield on her initial principal of 100 USDC. On top of that, she will earn farming yield in $ENA.

6 Options Pricing

Although market makers do not assume *market* risk by purchasing options contracts backed by yield-bearing ETH and USD variants, they may assume a host of other tail counterparty risks including but not limited to *slashing* risk, *smart contract* risk, *depeg* risk, etc. These risks may be priced into the option premiums and will improve as the market matures and institutions become more crypto-savvy. It is important to note that the counterparty risk is as follows: (% chance of being ITM) * counterparty risk. So for example if there is a 5% chance that the option is ITM, then the market maker will price the risk as (5% * counterparty risk).

7 Options Risk

Selling options is **not** a risk-free yield source. This is a trade – in the case that the options are in-the-money, the option buyer is profitable and may choose to exercise at the strike price. The option seller may lose principal as a result.

8 Conclusion

> Imagine being able to buy a claim on the substrate for all future economic activity in the lightcone for a lower market cap than Coca Cola
>
> Ethereum.
>
> -Matt Klein

3Jane allows users to generate more on their on-chain capital by unlocking *novel* options yield. 3Jane is a proof-of-concept of the power of tokenizing basis trades (Ethena), cryptoeconomic security (EigenLayer), banks (DAI), and derivatives all on a shared ledger. Imagine a world where a user can delegate staked ETH securing data availability layers, ZK co-processors, shared sequencers, and other cryptoeconomic systems, and then collateralize those ETH positions in on-chain derivatives contracts. There's nothing more cyberpunk than that.

9 Disclosures

3Jane will **not** be offered to persons or entities who are U.S. Persons, Restricted Persons, or Sanctioned Persons. Access and use by such persons is expressly prohibited.

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