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The State of Decentralized Perpetual Protocols

FULL REPORT

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The Origins of Decentralized Perpetuals

Crypto perpetuals were first introduced and popularized by BitMEX in 2016 with a novel funding rate mechanism to ensure that it traded as close as possible to the spot rate

What are Perpetual Contracts?

First proposed by economist Robert Shiller in 1992, perpetual contracts are essentially **physically-settled futures contracts with no expiration and delivery dates**.

BitMEX

On 13 May 2016, centralized crypto exchange BitMEX launched the **first crypto perpetual product for Bitcoin**, the XBTUSD perpetual swap, allowing leveraged trades of up to 100x. Using funding rates incentivizes traders to open or close positions to **ensure perpetual contracts follow the price movement of the underlying assets**.

Since then, many centralized and decentralized protocols have introduced their own perpetual products for various assets, including crypto, stocks, and commodities. These perpetual contracts may be denominated in stablecoins such as **BitMEX's COINUSDT perpetuals which are settled using USDT**. On the other hand, products such as Bybit's BTCUSD Inverse Perpetuals, are **settled using the underlying asset**, which is Bitcoin.

Perpetual contracts are now **by far the most widely traded derivative in the crypto space**, with volumes up to 2.6x of spot market volume in Q1 2023.

The first iteration of decentralized perpetuals were **launched on Ethereum as early as 2020**, while transaction costs were still low.

As gas fees crept upwards in 2021, projects began to build perpetual exchanges natively on **altchains and Layer-2 rollups** which offered **higher transaction throughput at a much lower cost.**

dYdX Chain

As the popularity of decentralized perpetuals continued to grow exponentially, so did their need for liquidity. In a continuous effort to attract more users, decentralized perpetuals exchanges started **going multi-chain** and **migrating to their own app-chains** to boost order execution speeds.

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Why the Need for Decentralized Perpetuals

The decentralized version of centralized perpetuals allows anyone to trade using high leverage, while maintaining control over their own funds

Centralized Perpetuals

More Crypto Trading Pairs
CEXs tend to offer a larger variety of trusted assets, with different leverage ratios and trading pairs.

Higher Liquidity
Easier for users to open large leveraged positions without heavily impacting asset prices.

User-friendly with additional features
Trading interfaces with detailed information, along with various services and support for complex orders.

Centralized Custody
User funds are held on a centralized platform, which may be susceptible to fraud and exploits.

Market Manipulation and Abuse
Centralized exchanges sometimes operate opaquely, and can be open to market manipulation practices such as spoofing.

Decentralized Perpetuals

Permissionless
Traders are in control of their own funds and can execute trades without the need of a centralized entity.

Wider Range of Assets
Besides offering perpetuals for more long-tail crypto assets, most decentralized perpetual exchanges also offer perpetuals for stocks, commodities and currencies.

Higher Leverage
Decentralized perpetuals tend to offer a higher range of leverage compared to centralized exchanges, with some protocols offering up to 1000x leverage.

Smart Contract and Oracle Exploits
Like most decentralized protocols, bugs or vulnerabilities of a platform's smart contract allow hackers to drain funds and manipulate prices for profit.

Higher Fees
Decentralized platforms often charge higher fees compared to their centralized counterparts, with users paying higher transaction fees during network congestion.

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Timeline Of Decentralized Perpetuals

Decentralized perps only have a short history, with the first protocols launching in mid-2020; however, they have quickly evolved into a competitive DeFi segment with multiple models

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Evolution Of Decentralized Perpetual Models

From order-books to liquidity pools, decentralized perpetual protocols have gone through multiple evolutions to provide more efficient trading and other earning possibilities for users

Central Limit Order Book

- The first iteration of decentralized perpetuals largely **mimic those of centralized perpetuals**, by aggregating orders and matching buyers and sellers on an order book.
- While trades and liquidations are executed and settled on the network, the **order book and order matching are handled off-chain**.

Virtual AMMs (vAMMs)

- Introduced by Perpetual Protocol, vAMMs **utilize the same constant product formula as traditional AMMs** such as Uniswap.
- **No real assets are stored on the vAMM**. Instead, they are stored on a smart contract vault which then acts as the collateral backing the vAMM.

The Great Layer 2 Migration

- The first decentralized perpetuals were built on Ethereum, but **network congestion and high transaction fees hampered their viability**, which relied on high throughput and lower costs.
- As such, protocols began **migrating to alt chains and Layer 2 rollups**. Perpetual Protocol V2 launched on Optimism, while dYdX V3 launched on Starkware.

Protocol Fees To Token Holders

- As trading volume grew, these protocols also earned **trading fees which could be distributed to governance token holders** via staking mechanisms as a **form of incentive**.
- These fees were **paid out in ETH or stablecoins instead of more governance tokens**, offering a **"real yield"** to holders unlike other typical DeFi yield farms.

Liquidity Pool Model

- Popularized by GMX, newer decentralized perpetuals began utilizing a liquidity pool model, allowing **liquidity providers (LPs) to become the counterparty for traders**. If traders profit from their trades, **losses are socialized by the liquidity pool**, and vice versa.
- LP tokens increase in value as **trader losses are added back into the pool**.

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Comparison Of Features Between Decentralized Perpetual Protocols

The top 6 decentralized perpetual protocols each operate with a different model and have different offerings, particularly when it comes to supported assets and maximum leverage

	Supported Markets	Native Tokens	Market Cap of Governance Tokens**	Liquidity Model	Supported Networks	Supported Collateral	Maximum Leverage
dYdX	Crypto	DYDX*	$328M	DYDX uses off-chain messages to establish an orderbook	Ethereum (StarkEx) Native blockchain on Cosmos (Q3 2023)	USDC	BTC, ETH: 20X All other markets: 10X
GMX	Crypto	GMX* GLP	$472M	Liquidity Pool, where GLP holders provide liquidity to traders	Avalanche Arbitrum	BTC, ETH, WETH, LINK, UNI, USDC, USDT, DAI, FRAX	50X on all supported assets
GAINS	Crypto, Forex, Stocks, Commodities & Indices	GNS* gDAI	$150M	Liquidity Pool, which is supplied from the platform's gDAI vault	Polygon Arbitrum	DAI	Crypto: 150X Forex: 500-1000X Stocks: 20-50X Commodities: 150-250X Indices: 35X
KWENTA	Crypto, Forex & Commodities	KWENTA*	$40M	Liquidity on Kwenta is supplied from the Synthetix Debt Pool	Optimism	sUSD	Crypto: 25-50X Forex: 50X Commodities: 50X
LEVEL FINANCE	Crypto	LVL LGO* LLP	$19M	Liquidity Pool which is separated into various tranches with different risk profiles	BNB Chain Arbitrum	BTC, ETH, BNB, USDT	50x on all supported assets
Perpetual Protocol	Crypto	PERP*	$42M	Uses a virtual AMM model (vAMM) where trades are processed through Uniswap V3	V1: Ethereum (Trades are settled on Gnosis) V2: Optimism	ETH, WETH, OP, USDT, USDT, FRAX	10X on all supported markets

**Governance tokens are highlighted in green*

***Market Cap as of 1st June 2023*

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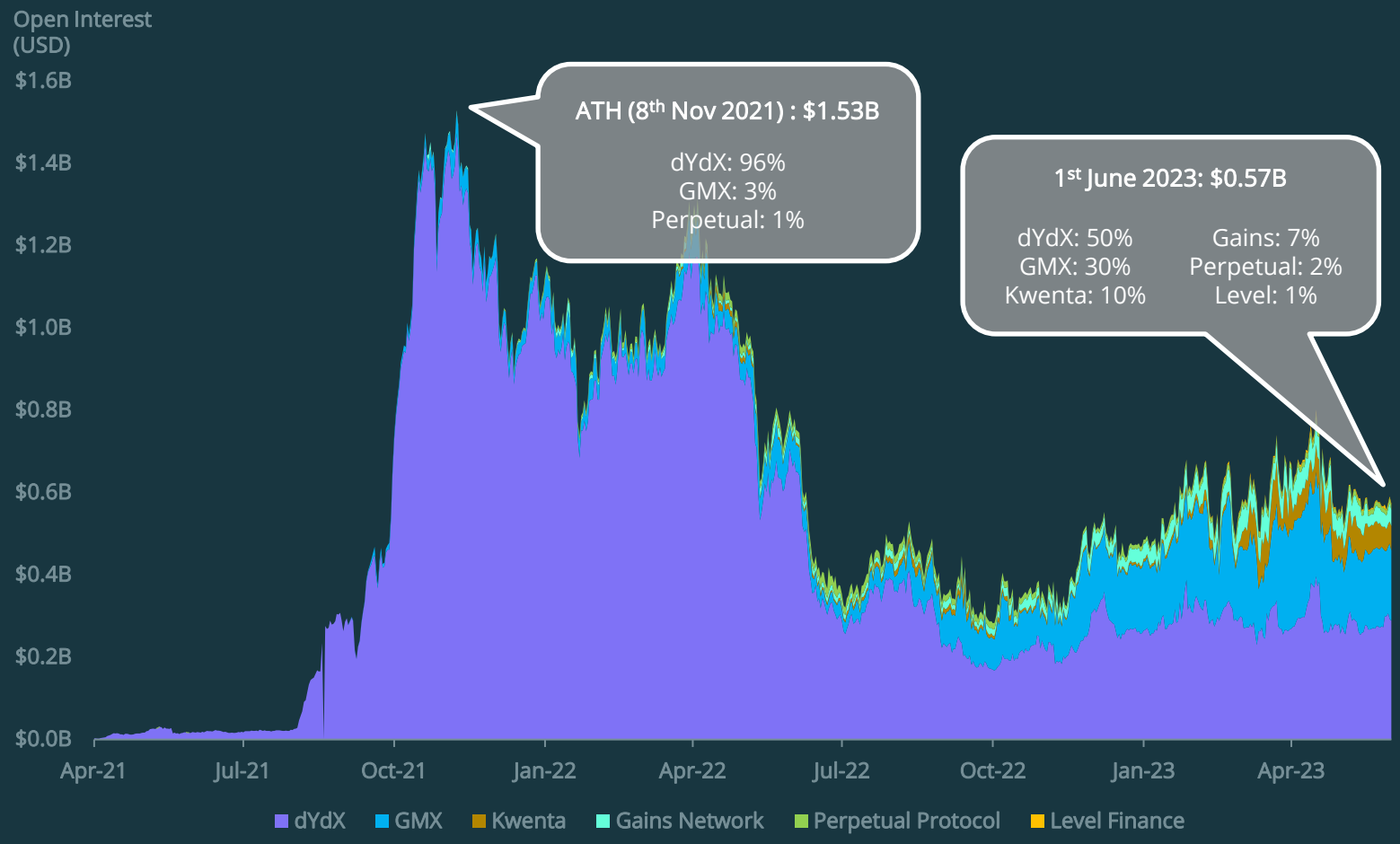
Open Interest Across Top 6 Decentralized Perpetual Protocols

Since hitting its all-time high in November 2021, open interest across top 6 decentralized perpetuals has fallen significantly by over 65%, with dYdX still controlling 55% of OI

Top 6 Decentralized Perpetuals Protocols Open Interest (Apr 2021 – June 2023)



In line with the **65.5% surge in BTC futures open interest (OI) in the latter half of 2021 from $8.76B to $14.5B*** on centralized exchanges, OI on decentralized perpetuals also saw a meteoric rise. After reaching an **all-time high of $1.53B in November 2021**, OI plummeted drastically in 2022, **reaching lows of $0.28B** before steadily **recovering to $0.57B** as of June 2023.

In 2021, dYdX had a monopoly on the sector, **with OI surging by 540x from $2.8M to $1.4B** on their platform. However, they have gradually ceded OI share to new competitors such as GMX.

As of June 2023, dYdX has 50% share of OI, with GMX in second place with 30%.

It's interesting to note that more recent protocols have **started to compete for share of OI, despite the crypto downturn in 2022**. Cumulatively, Gains Network, Kwenta and Level Finance **make up 18% of aggregate OI** among the 6 exchanges in June 2023.

However, the total OI on decentralized perpetuals comes up to just **3% of the $20B of OI on centralized exchanges**.

Source: CoinGecko, Dune Analytics, GMX Analytics, Level Finance Analytics
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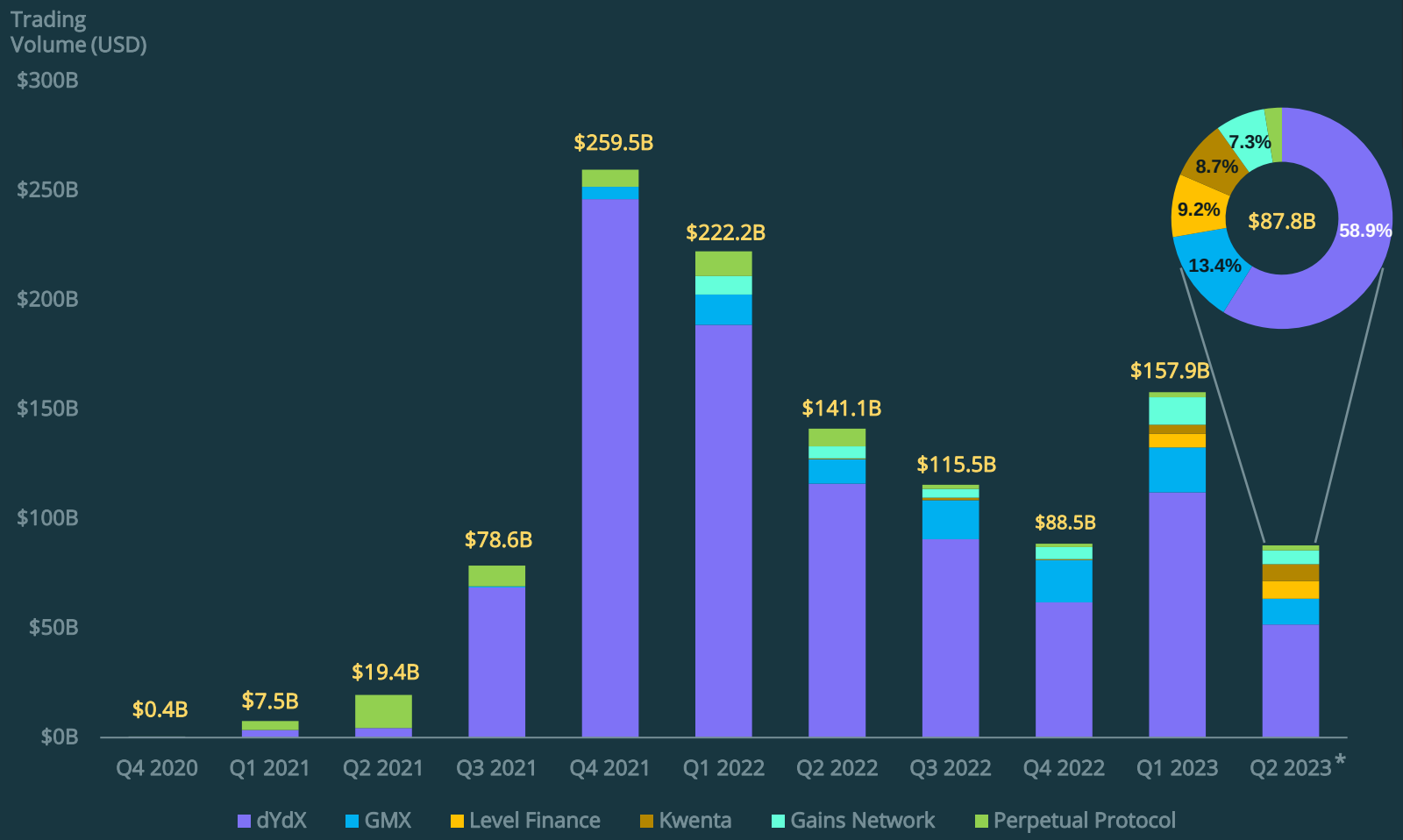
Trading Volume Across Top 6 Decentralized Perpetual Protocols

In line with OI, trading volumes have also fallen significantly by 66.2% since the peak in Q4 2021, as dYdX still dominates with 58.9% share

Top 6 Decentralized Perpetuals Protocols Trading Volume (Q4 2020 – Q2 2023*)



Trading volume on decentralized perpetual platforms skyrocketed in the DeFi run of 2021, reaching a peak of $259.5B in Q4 2021. Volumes have since been on a downtrend except for a spike in Q1 2023 in line with a broad market rally. Yet, total volumes on decentralized perpetuals represent just 2.2% of the $7 trillion in quarterly trading volume on CEXs in Q1 2023.

In the first half of 2021, trading volume on Perpetual Protocol once represented the majority, reaching a peak of 77.8% of total volume in Q2. However, in the second half of the year, dYdX took a strong lead in volume, which reached a peak market share of 94.8% in Q4.

Unfortunately, since then, both dYdX and Perpetual Protocol have had to cede market share to newer protocols such as GMX, Level Finance, Kwenta, and Gains Network.

Cumulatively, emerging protocols Gains Network, Kwenta, and Level Finance made up 25.2% of volume in Q2 2023.

Notably, newcomer Level Finance which launched in Dec 2022, made up 9.2% of trading volume in Q2 2023*.

Source: Dune Analytics, GMX Analytics, Token Terminal
**Data up to June 1st*

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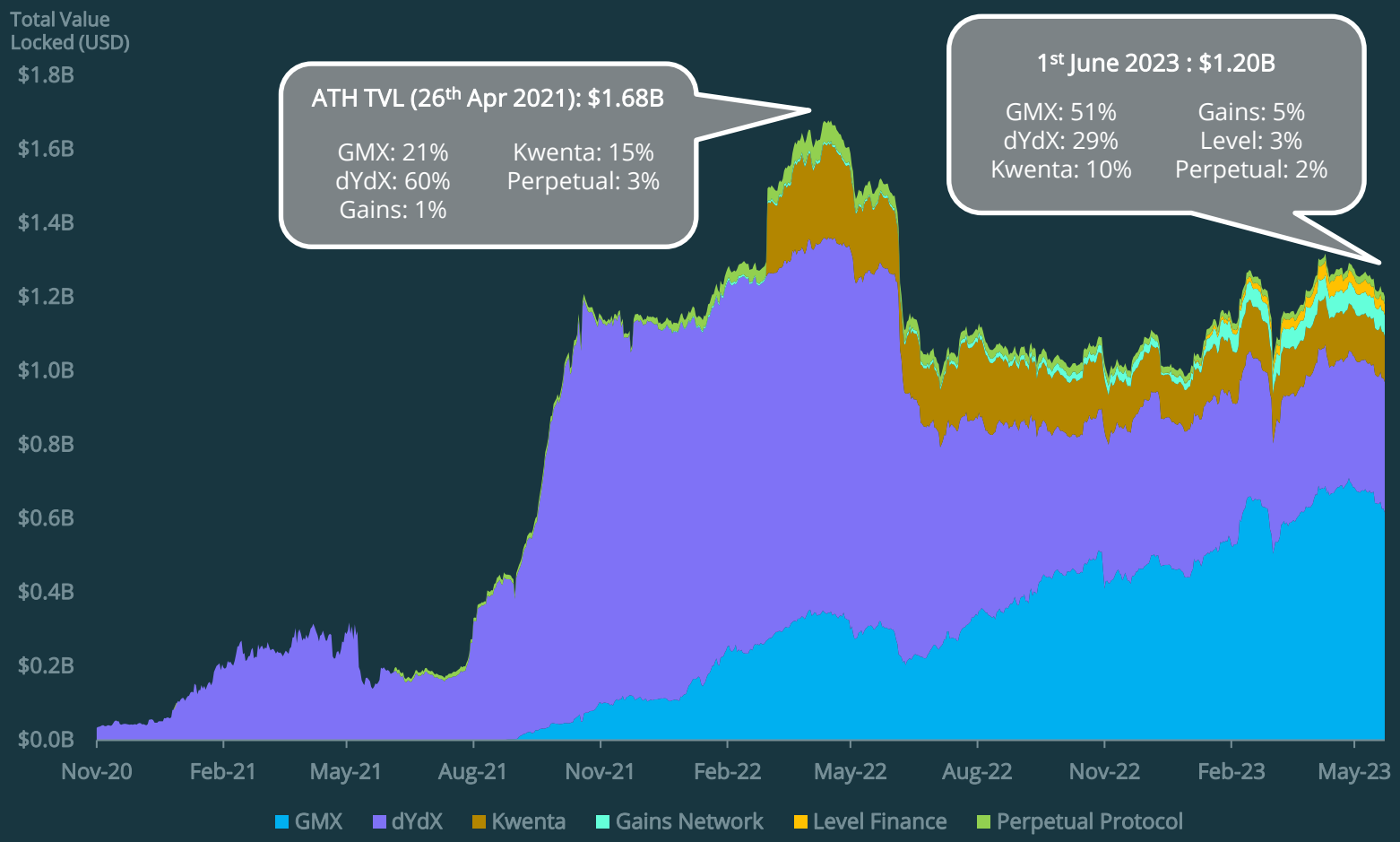
Multichain TVL Across Top 6 Decentralized Perpetual Protocols

TVL has increased by 35.7x since 2020, with dYdX and GMX combined having 80% share of TVL; GMX has benefited from having depositor rewards

Multichain Total Value Locked (TVL) Breakdown (Nov 2020 – June 2023)



As one of the forerunners of the decentralized perpetuals space, dYdX controlled most of the TVL during the DeFi run of 2021. Towards the end of 2021, **dYdX controlled 88% of multichain TVL** across decentralized perpetuals exchanges, having **increased its TVL by 16.5x, from $612M to $1B** in December 2021.

In 2022, TVL share between decentralized perpetuals rapidly shifted after the **launch of GMX on Arbitrum** in late 2021. The new protocol ate through dYdX's market share in 2022, increasing its **TVL from $1.0B to $4.6B**. As of June 2023, GMX currently **dominates 51% of multichain TVL** across Arbitrum and Avalanche.

Although total TVL on decentralized perpetuals has decreased throughout 2022, Kwenta provided a healthy boost of liquidity, **facilitating trades using Synthetix"s $125M debt pool**.

The increasing popularity of GMX also resulted in the **emergence of protocols with similar mechanics, such as Level Finance and Gains Network** carving out their own userbase on other altchains.

Source: DeFiLlama, Dune Analytics (@Synthetix_Community)
**TVL for Kwenta is derived from the Synthetix Debt Pool*

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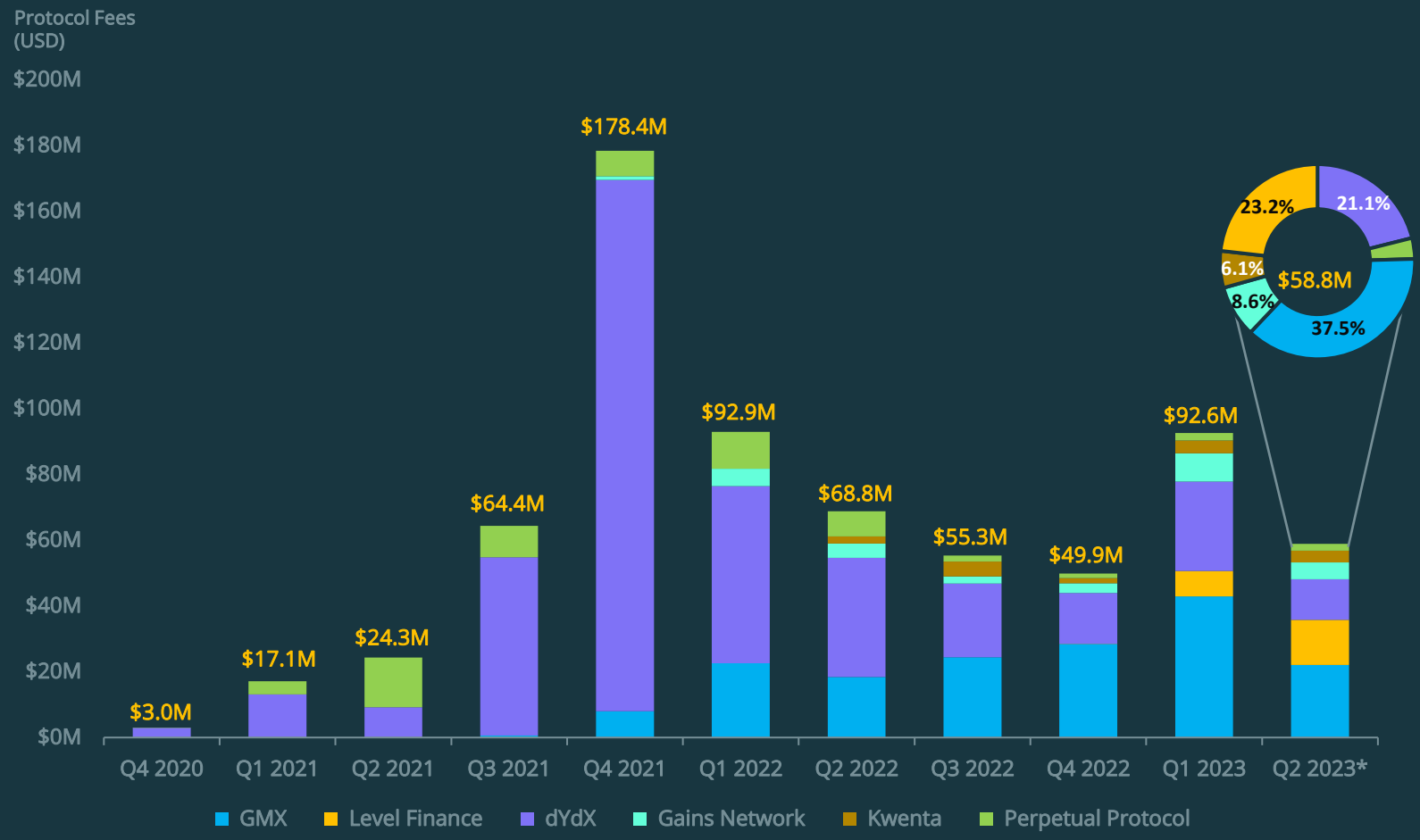
Protocol Fees Generated Across Top 6 Decentralized Perpetual Protocols

Protocol fees has fallen significantly from the highs of 2021 in line with decrease in trading volume, with dYdX having to significantly reduce its fees to maintain volume market share

Protocol Fees across Top 6 Decentralized Perpetual Protocols (Q4 2020 – Q2 2023*)



In line with trading volume, **protocol fees peaked at $178.4M in Q4 2021** and has been on a downward trend until Q4 2022 whereby we see a spike in Protocol Fees in Q1 2023 due to the change in market sentiment early this year.

Although dYdX still dominates the majority of market share trading volume, **the protocol fees it collects have decreased by 92%** from $161.5M in Q4 2021 to $12.0M in Q2 2023. This is due to the implementation of **fee reduction holidays and free trading up to $100,000 a month** to compete with centralized exchanges.

Newer Protocols such as **GMX and Level Finance have overtaken dYdX in terms of protocol fees** generated in Q2 2023. These come from trading fees that range between 0.02% to 0.1%.

At the top end, these fees are much higher than dYdX and centralized exchanges, but users are given various incentives such as trading fee discounts, rebates and loyalty program, attracting them to use these protocols.

Sources: Dune & TokenTerminal
**Data up to June 1st*

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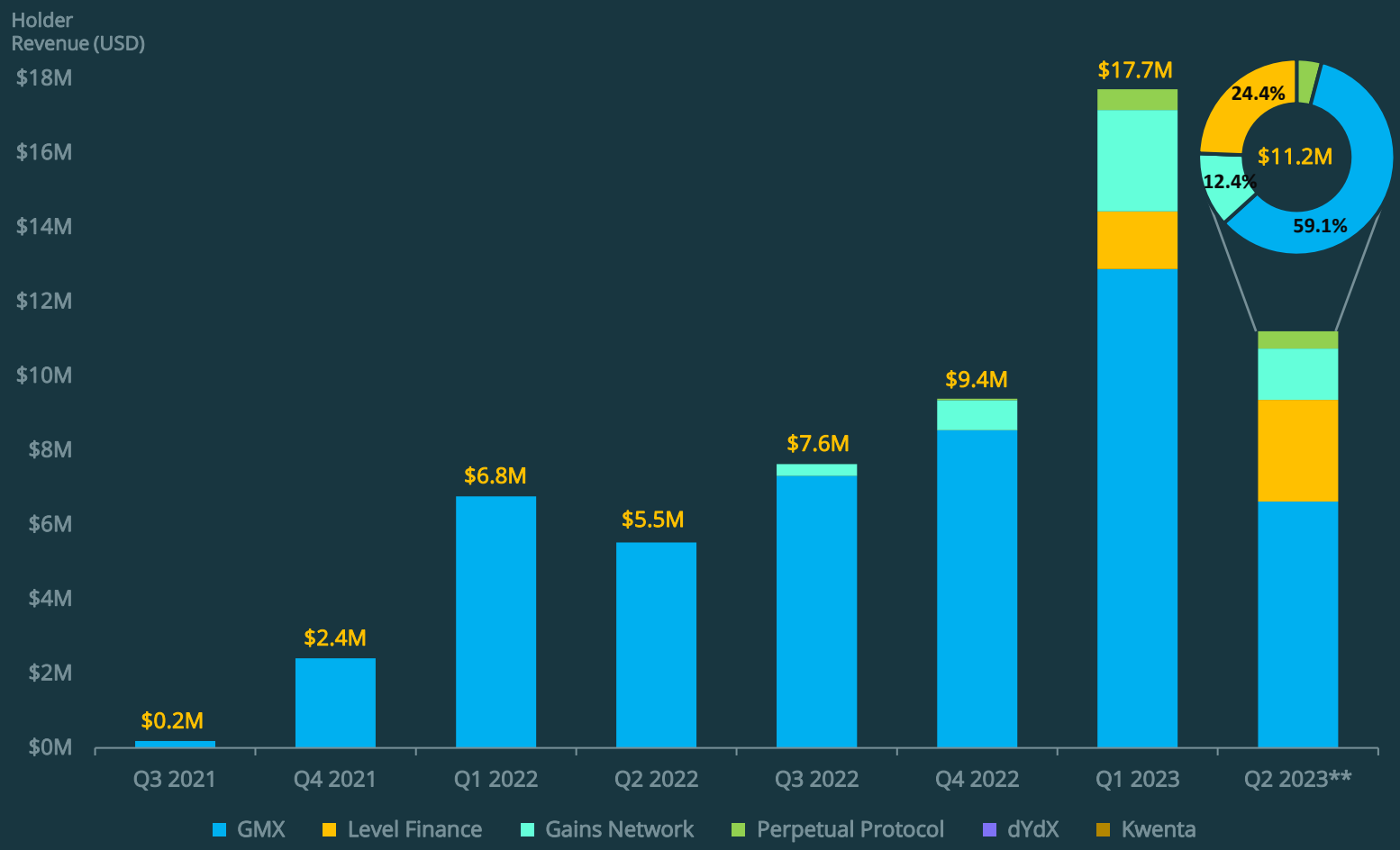
Holder Revenue Across Top 6 Decentralized Perpetual Protocols

Holder revenue* distributed by decentralized perpetual protocols to their governance token holders kickstarted the "real yield" narrative, and caused demand for these tokens to skyrocket

Holder Revenue across Top 6 Decentralized Perpetual Exchanges (Q3 2021 – Q2 2023**)



As part of its Liquidity Pool mechanism, **GMX introduced a fee-sharing structure** whereby **30% of all fees are distributed to staked GMX** while the other 70% is distributed to GLP holders.

These rewards for governance token holders, along with liquid staking tokens (LSTs), kickstarted the **"real yield" narrative** in DeFi, as they were **paid out in ETH or stablecoins** instead of the protocol's native tokens.

The **fee-sharing structure was mimicked by later decentralized perpetual protocols**, though they differed slightly in the actual fee-sharing calculation. Total holder revenue distributed by these protocols reached $17.7M in Q1 2023.

This **fueled significant demand for these governance tokens,** sending prices skyrocketing.

Interestingly, despite **dYdX** having the highest volume market share, it **has never redistributed any of its fees** to dYdX holders. However, further utility for dYdX may be coming with their migration to their own Cosmos chain. Similarly, Kwenta follows the same approach and **instead gives trading fee discounts** for holding its native token.

Sources: Dune & TokenTerminal
**Holder Revenue refers to the fee revenue that is redistributed to holders holding the native tokens of the protocols. It does not include rewards paid out to LP holders.*
***Data up to June 1st*

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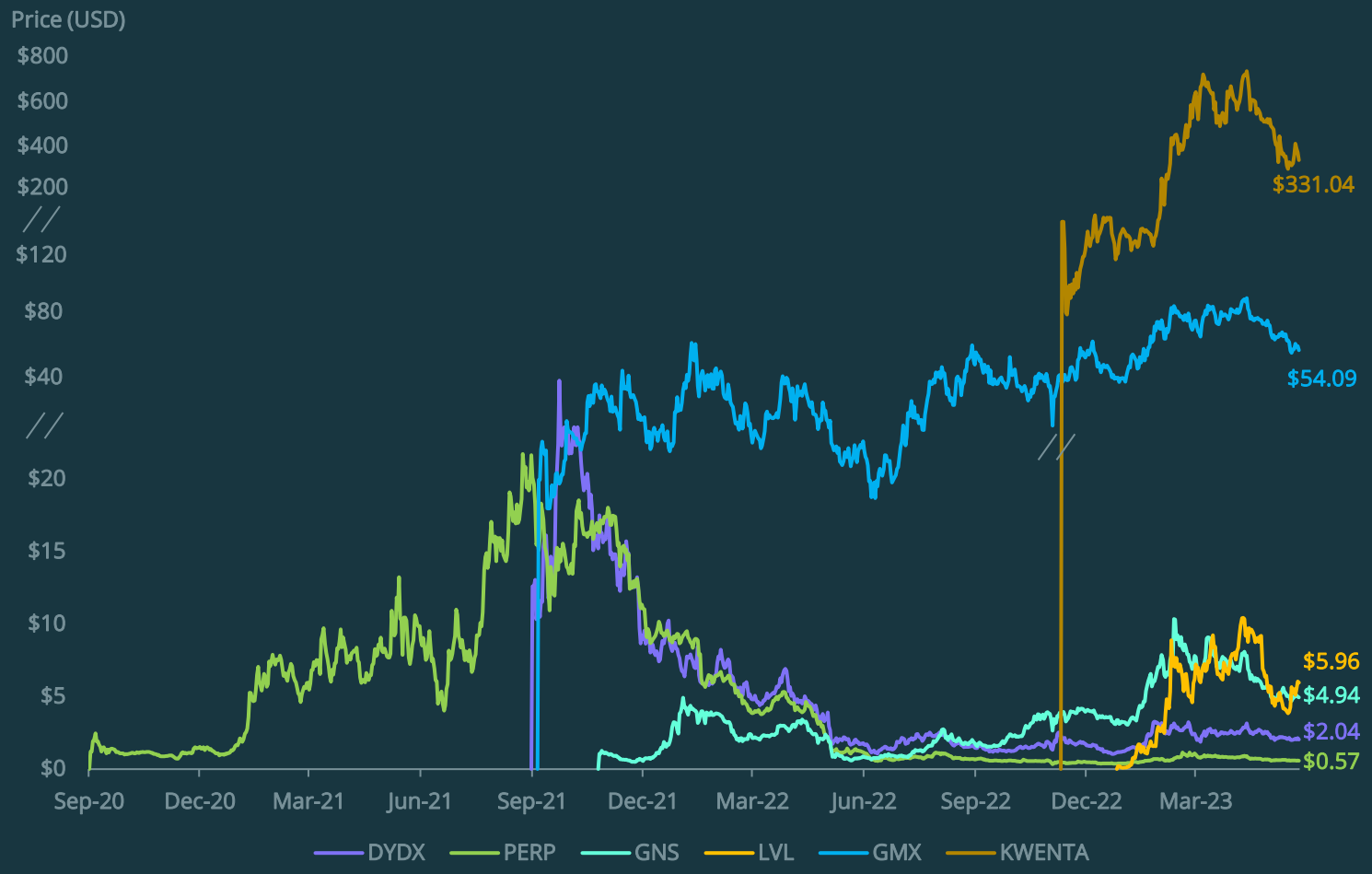
Price Returns of Top 6 Decentralized Perpetual Protocol Tokens

While DYDX and PERP saw encouraging movements in the few weeks after their token launch, prices have continued to plunge throughout 2022, while newer tokens showed better resilience

Top 6 Decentralized Perpetuals Protocols Price (Sep 2020 – June 2023)



	Circulating Supply*	Market Cap*	Fully Diluted Valuation*	FDV / Monthly Trading Volume*
DYDX	164M	$328M	$2B	0.1
GMX	8.8M	$472M	$713M	0.19
GNS	30.4M	$150M	$150M	0.05
PERP	72.6M	$42M	$86M	0.08
KWENTA	130K	$40M	$212M	0.04
LVL	6.7M	$40M	$298M	0.12

Launching back in 2020, the PERP token saw a 7.9x increase from $1.10 to $8.71 during the DeFi run of 2021. Similarly, dYdX's native token climbed steadily upwards since its launch in September 2021, reaching an all-time-high of $26.80. However, since 2022, prices for both PERP and DYDX have plunged by 93% and 75% respectively.

Interestingly, despite launching towards the end of 2021, GMX and GNS are faring much better, with GMX recording a 2.5x price increase since 2022. Tokens from newer protocols such as KWENTA and LVL have shown resilience throughout 2023 thus far.

Source: CoinGecko
**Data up to June 1st*

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Decentralized Apps on Decentralized Perpetual Protocols

In the spirit of DeFi's lego-like composability, other projects have also utilized decentralized perpetuals to build structured products or auto-compounders

Principal-Protected & Delta-Neutral Vaults

Vovo Finance

Rage Trade

GND Protocol

- Using the core leveraged trading feature of decentralized perpetuals, projects have developed **structured products** that cater to a variety of risk profiles.
- For example, **Vovo Finance's** principal-protected vaults uses its deposits to earn yield from Curve's farming pools. **The yield earned from Curve is then used to open weekly long or short positions on GMX,** while the original principal remain untouched in Curve.
- On the other hand, platforms such as **GND Protocol** and **Rage Trade** make use of **liquidity tokens** from decentralized perpetuals, such as GLP, to **earn yield while maintaining the value of deposited assets**. While GND uses a **'pseudo-delta-neutral' rebalancing mechanism** to mimic the composition of GLP, Rage Trade uses USDC deposits to borrow and sell ETH and BTC, hedging price exposure in GLP.

Auto-Compounders & Leveraged Yield

Jones DAO

Plutus DAO

Yama Finance

Volta Protocol

- Similar to yield aggregators such as Yearn and Beefy, platforms such as **Plutus DAO** accepts liquidity tokens from perpetual platforms, e.g. GLP and **automatically compounds protocol rewards** back into the pool. For instance, Plutus DAO converts GLP into plvGLP, which accrues values as ETH rewards are converted into GLP and re-added to the pool.
- For users who are willing to use leverage to earn more rewards from GLP, protocols such as **Jones DAO borrows USDC from its sister vaults to mint additional GLP.** The earned rewards are then split between the GLP and USDC vaults. Other protocols such as **Yama Finance** and **Volta Protocol** allow users to obtain leveraged yield by using their deposited GLP as collateral to **borrowing the respective protocol's native stablecoin and converting them into more GLP**.

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Future Challenges to be Overcome

Despite a strong start, there are still significant challenges that decentralized perpetual protocols need to overcome in order to be competitive against centralized exchanges

More Trading Pairs	▪ While decentralized perpetuals offer permissionless trading, the **creation of new trading pairs are still largely gatekept** either by the project teams or governance. This is due to two existing challenges:
	  ○ The **availability of oracles** to provide reliable reference prices for a particular trading pair
	  ○ The **risk of low liquidity which will place the pool at risk to price manipulation**, particularly when protocols offer high leverage multiples.
	▪ These are **challenges that are part and parcel of a still developing Layer 2 /altchain landscape**, which is growing but still nowhere near Ethereum in terms of liquidity and oracle availability. As Layer 2s and altchains mature these challenges should be resolved, but it also highlights the **importance of choosing the "right" stack to build on**.

More Order Types	▪ Most perpetual protocols currently offer the **most basic market and limit orders**. As the space matures and attract more sophisticated traders, more sophisticated order types will eventually be required. ▪ This will also help in **levelling the feature set** offered by decentralized perpetual protocols vs centralized exchanges.
More Collateral Types	▪ Similar to more trading pairs and order types, **more collateral types will provide greater convenience and flexibility to traders**. However **similar limitation on price oracles persist**, as well as the **heightened risk of accepting low liquidity assets as collateral**. ▪ Expect protocols to eventually introduce more collateral types, perhaps in the form of isolated pools, but in a more gradual manner.
Lower Trading Fees	▪ Compared to centralized perpetual exchanges, **fees on decentralized perpetual protocols are still relatively high**. This is primarily due to protocols utilizing the liquidity pool model having to reward liquidity providers, effectively making the trader bear both taker and maker fees. ▪ The dynamics of this is unlikely to change – LPs are taking on both counterparty risk and risk of impermanent loss, and will expect to be rewarded for doing so. Certain **protocols are subsidizing trading fees with token rewards or rebates**, but those will eventually run out. ▪ In the long run **a balance will need to be found if decentralized protocols are to compete more effectively** against their centralized counterparts. **Alternatively, other protocol models beyond liquidity pools will need to be explored.**

Conclusion and Key Takeaways

- Since it first took off in 2020, **decentralized perpetual protocols have grown from strength-to-strength, led initially by dYdX**. As traction picked up, the early projects quickly **migrated to Layer 2s or altchains** for better performance and efficiency.
- The segment **reached its peak in terms of open interest (OI) and volume in October 2021** at the tail end of the bull market, before falling off in 2022.
- September 2021 also saw the **launch of GMX with a novel protocol model which utilizes liquidity pools**. Its subsequent success spawned a series of other protocols with similar mechanisms such as Gains Network and Level Finance. Meanwhile older protocols such as dYdX, Synthetix and Perpetual Protocol continued to evolve.
- **Despite the entry of new competitors, dYdX has thus far been able to maintain their lead over OI and volume**, with ~55% share of both metrices. GMX is in second place with ~30% of the OI but only 13% of volume.
- GMX also had a structure where it **redistributed a portion of its protocol fees back to governance token holders**, paid out in ETH or stablecoins. This holder revenue created significant demand for these governance tokens, kickstarting the **"real yield" trend in DeFi** alongside LSTs.
- **Despite strong growth, decentralized perpetual protocols still lag behind their centralized counterparts**, with the DEX:CEX standing at 3% for OI and 2.2% for volume. Compared to spot exchanges the DEX:CEX ratio stands at ~10%. Several challenges need to be overcome before decentralized perpetual protocols can more effectively challenge their centralized counterparts for market share.

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$26M+

FEES GENERATED

$24M+

USERS AND COUNTING

34K

DAO TREASURY

$120M+

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