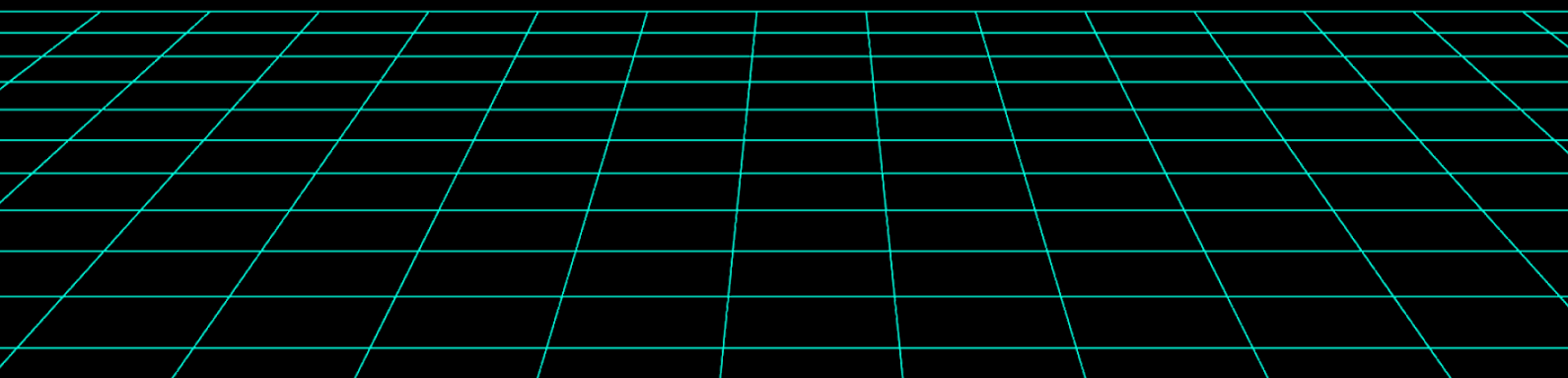


CRYPTO
NATIVE
ECONOMY
REPORT

2023

PWN



Abstract

This report investigates user-paid on-chain fees, covering blockchains like Ethereum, BNB Chain, Layer 2 solutions and Bitcoin, as well as some of the most-used decentralized Applications (dApps) and protocols such as AAVE or Uniswap.

The aim is to understand the economic demand for these services in the emerging cryptonative economy.

The report focuses on identifying the patterns and trends of on-chain service usage and revenue generation in the crypto industry.

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1. Introduction

The cryptonative economy report aims to reveal the true economic demand for using various blockchains and dApps as services, focusing on providing a detailed overview of on-chain fees generated in 2023.

1.1. Goals

The goal is to determine whether on-chain crypto exists as a self-sufficient economy. One that offers enough value for users to willingly pay fees for blockchain transactions and the use of on-chain protocols or services. These fees must be paid entirely on-chain, without being limited to any specific cryptocurrency or token.

1.2. Motivations

At PWN DAO, our focus is on understanding the on-chain economic behavior of cryptonatives, our primary user base. This understanding helps us distinguish between genuine protocol-generated revenue and user growth, and the temporary spikes caused by token hype or short-term incentives.

As part of the cryptonative community, we believe in sharing our findings and insights to contribute to the broader ecosystem.

1.3. Disclaimer

This report, based on Token Terminal's data as of January 1, 2024, analyzes trends rather than providing a full representation of the entire crypto ecosystem. It includes only selected projects with available data in each category.

Please note, this version of the report does not cover the value created by certain groups that might be considered part of the cryptonative economy, due to data limitations:

1. Centralized entities (such as Coinbase, Kraken, Binance, Circle etc.)
2. Crypto-related SaaS (such as Alchemy, Moralis, KYC services)
3. Security providers (such as miners, and smart contract auditors)
4. Contractors (such as developers or consultants)
5. On-chain merchants (physical or digital goods sales)

1.4. Limitations

Our analysis faces certain constraints:

1. The report is exclusively denominated in USD.
2. We have excluded the Gaming, Prediction, and Insurance categories due to a lack of sufficient projects to provide a well-rounded analysis.
3. The Lending category landscape is also limited as we do not differentiate between the types of collateral (ERC-20 vs. ERC-721) or lending mechanisms (Peer-to-Peer vs. Peer-to-Pool). Furthermore, not all actors in this category are included, such as PWN DAO.

1.5. Audience

This report is geared towards intermediate crypto enthusiasts and industry professionals, with an assumed basic understanding of protocols and dApps.

1.6. Data & Methodology

1. The report is based on data from Token Terminal as of January 1, 2024. Note that the public data for 2022 has been retroactively updated, leading to some discrepancies with our 2022 cryptonative economy report. We've also used data from Dune, DeFiLlama, and L2 beats to enrich our comparisons.
2. All figures are presented in millions of dollars.
3. The comprehensive data can be found in our public annex [\(1\)](#).
4. All the Layer 2s mentioned in this report are scaling solutions for Ethereum mainnet.
5. Our comparisons are formatted in three ways: tables, graphs comparing 2023 projects, and four-year comparisons from 2020 to 2023.

1.7. Definitions

1. Fees: Fees are monetary value paid by end users for using on-chain services. They reflect payments, not value earned through token issuance or incentives.
2. Active users: Unique addresses that interact with a protocol's smart contracts on any given day.

2. Overview of all Fees

This section focuses on the overall monthly variation of on-chain fees segment-wide. Figure 1 summarizes the monthly on-chain fees for each category [in \$M] and an annual comparison to 2022.

Overall \$m	Jan 23	Feb 23	Mar 23	Apr 23	May 23	Jun 23	Jul 23	Aug 23	Sep 23	Oct 23	Nov 23	Dec 23	SUM 2023	2023 vs 2022
L1s	187	266	309	381	700	305	317	269	216	224	508	861	4543	-17%
DEX	63	95	115	77	97	55	51	50	34	48	83	104	872	-51%
LSDs	35	38	51	53	67	51	59	56	49	53	66	78	655	93%
Derivatives	37	39	52	48	31	38	26	23	13	23	34	34	397	-5%
Lending	14	17	27	24	21	19	25	24	19	22	26	49	288	-36%
NFT marketplaces	67	56	37	27	19	17	13	10	7	7	10	13	283	-87%
L2s	3	5	11	21	30	15	19	21	15	12	23	31	207	411%
Asset Management	18	20	21	20	18	15	17	11	9	9	12	14	183	-57%
Stablecoins	4	4	4	4	4	5	7	19	14	26	31	17	137	-2%
Infrastructure	10	10	11	8	12	6	7	7	5	5	6	7	92	-35%
Liquidity Bridges	1	1	2	2	2	2	3	3	1	1	2	2	23	-14%
Total	438	550	641	664	1001	529	542	493	381	430	801	1210	7682	-33%

Figure 1: Monthly on-chain fee [in \$ M] by category

Key observations from Figure 1 include:

- Selected projects experienced a 33% reduction in fee generation in 2023 compared to the previous year.
- Lowest Fees: September marked the lowest fee generation.
- Highest Fees: December experienced the highest fee generation.
- Strong Growth: **Layer 2s (L2s)** and **Liquidity Staking Derivatives (LSDs)** showed significant growth in 2023.
- Consolidation: Categories like **Derivatives**, **Stablecoins**, and **Liquidity Bridges** are stabilizing rather than growing.
- Dominant Category: **Layer 1s (L1s)**, despite a slight decrease, remained dominant, accounting for 59% of all fees (compared to 48% in 2022).
- Highest Growth: **Layer 2s** recorded the largest growth at 411%, contributing to 2.7% of all fees (up from 0.35% in 2022).
- Significant Drop: **NFT Marketplaces** faced an 87% drop, the largest among all categories, and didn't show significant recovery or growth post-September.

In Figure 2, Layer 1s fees are excluded to enable a clearer comparison of other categories for 2023.

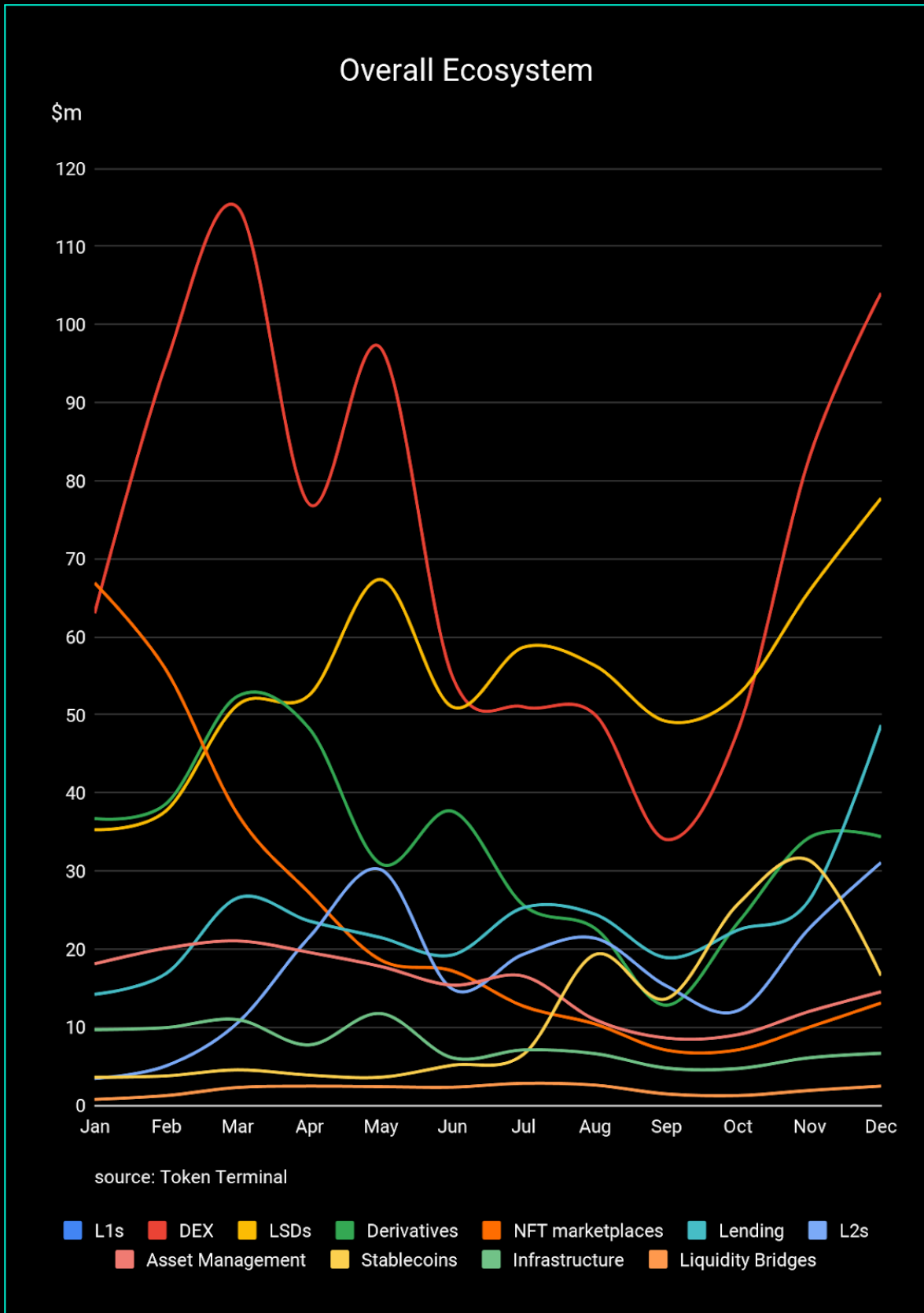


Figure 2: Monthly on-chain fee [in \$ M] by category for 2023

Figure 3 and Figure 4 illustrate the progression of fees generated from January 2020 to December 2023, each presented in distinct formats. Throughout this period, the categories that consistently generated the highest fees were Layer 1s (L1s), Decentralized Exchanges (DEXs), and NFT Marketplaces.



Figure 3: Annual overall fees [in \$ M] by category since 2020

\$m	2020	2021	2022	2023
L1s	1,136	13,678	5,442	4,543
DEX	199	3,257	1,780	872
LSDs	0	140	340	655
Derivatives	11	342	419	397
Lending	37	902	452	288
NFT Marketplaces	3	1,032	2,223	283
L2s	0	23	41	207
Asset Management	0	352	427	183
Stablecoins	25	183	140	137
Infrastructure	5	81	141	92
Liquidity Bridges	2	20	27	22

Figure 4: Overall fees [in \$ M] by category since 2020

Figure 5 presents a breakdown of the fee distribution by category for the years 2022 and 2023. There was a significant increase in the share of fees attributed to Layer 1s, rising from 48% in 2022 to 59% in 2023. This trend in Layer 1s is thoroughly analyzed in section 3.1. In contrast, Layer 2s, another key category competing for block space, is examined in detail in section 3.7. Additionally, a striking year-to-year shift is observed in the NFT Marketplaces category, which saw its share decrease from 19% to just 4%. This notable change is explored in depth in section 3.6.

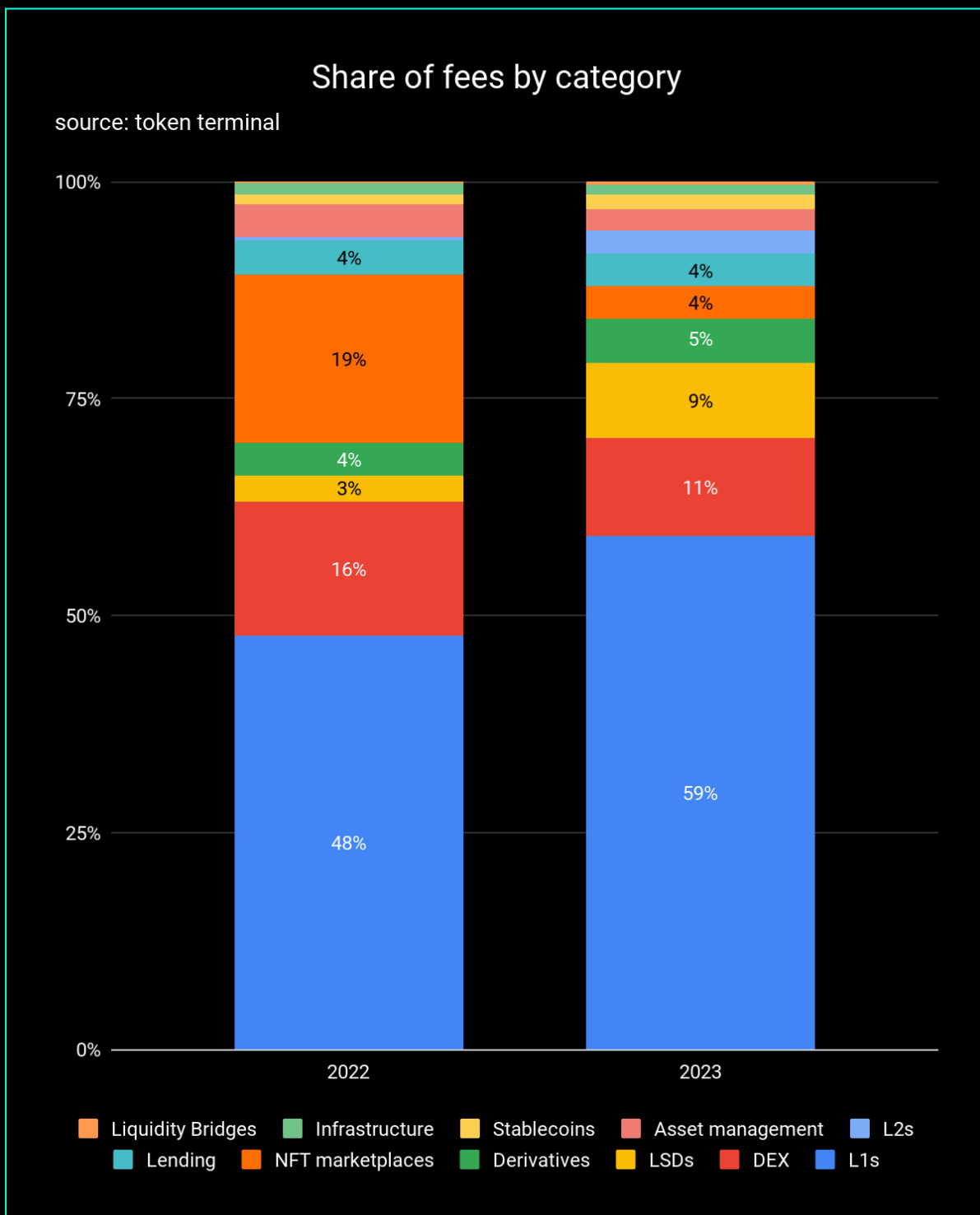


Figure 5: Share of fees [in \$ M] by category

3. Fees by category

This section elaborates on fees generated in the following categories: Layer 1s, Decentralized Exchanges, Liquid Staking Derivatives, Derivatives, Lending, NFT Marketplaces, Layer 2s, Asset Management, Stablecoin Issuers, Infrastructure, and Liquidity Bridges.

Protocols/dApps in section 3 are sorted by the amount of fees generated in 2023 from the highest to the lowest. Generated fees are compared from 2023 to 2022 in the column "2023 vs 2022". In this column, when projects are marked as "*", It is because year-to-year comparisons could not be carried out.

3.1. Layer 1s

L1s \$m	Jan 23	Feb 23	Mar 23	Apr 23	May 23	Jun 23	Jul 23	Aug 23	Sep 23	Oct 23	Nov 23	Dec 23	SUM 2023	2023 vs 2022
Ethereum	117	161	181	241	449	157	196	157	93	91	238	325	2406	-44%
Tron	39	62	72	82	95	86	83	80	85	99	104	108	994	198%
Bitcoin	8	14	23	23	126	38	19	17	26	21	142	337	796	461%
BNB Chain	17	20	21	20	19	13	12	11	8	9	12	18	179	-57%
Avalanche	1	1	1	2	1	1	1	1	0	0	3	53	65	-31%
Polygon	2	6	4	5	4	3	2	2	1	1	4	4	37	43%
Filecoin	2	1	5	5	4	4	2	1	0.5	1	0.5	0.3	25	-45%
Solana	1	1	1	1	1	1	1	1	1	2	3	9	25	-6%
Fantom	0.19	0.26	0.37	0.49	0.31	0.19	0.54	0.08	0.05	0.04	0.49	0.18	3	-86%
Polkadot	0.04	0.04	0.04	0.03	0.03	0.04	0.05	0.02	0.02	0.02	0.04	2.74	3	327%
Cardano	0.26	0.24	0.21	0.21	0.31	0.26	0.26	0.17	0.13	0.16	0.22	0.54	3	-64%
Cronos	0.17	0.14	0.15	0.11	0.09	0.08	0.08	0.07	0.06	0.07	0.17	1.42	3	-83%
Dogecoin	0.06	0.06	0.10	0.15	0.12	0.11	0.06	0.05	0.03	0.03	0.13	0.49	1	-16%
NEAR	0.04	0.04	0.04	0.04	0.03	0.02	0.02	0.03	0.06	0.07	0.11	0.58	1	-67%
Cosmos Hub	0.05	0.06	0.06	0.05	0.05	0.04	0.05	0.04	0.05	0.04	0.08	0.15	1	-20%
MultiversX	0.04	0.04	0.05	0.04	0.04	0.03	0.03	0.02	0.02	0.02	0.05	0.09	0.5	-76%
Litecoin	0.03	0.04	0.03	0.03	0.04	0.04	0.03	0.03	0.02	0.02	0.02	0.04	0.4	-15%
ICP	0.01	0.01	0.01	0.01	0.02	0.01	0.06	0.05	0.01	0.03	0.01	0.04	0.2	-82%
Gnosis Chain	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.05	0.06	0.2	-83%
Tezos	0.08	0.03	0.01	0.01	0.01	0.01	0.00	0.01	0.00	0.00	0.01	0.01	0.2	-83%
Total	187	266	309	381	700	305	317	269	216	224	508	861	4544	-17%

Figure 6: Monthly Layer 1s fees [in \$ M] by project in 2023

Here are the main trends related to blockspace in 2023 shown by Figure 6:

- The fees generated by **Layer 1s** decreased by 17% year-to-year.
- The top 3 projects (Ethereum, Tron, and Bitcoin) generated 92% of the fees for the category.
- The category leader, Ethereum mainnet, reported an annual 44% decline in generated fees. This can partly be explained by an overflow of activity from Ethereum mainnet to **Layer 2s**, that we will detail in section 3.7.1..
- Tron went from being the 3rd project in 2022 to being the 2nd project in 2023, generating almost \$1bn in fees in 2023.
- The projects with the largest annual growth in fee generated were Bitcoin (+461%), Tron (+198%), and Polkadot (+327%).
- There is a surge in **Layer 1s** transactions caused by an increased popularity of the ordinals (Nelson, 2023) (2).

From Figure 7 and Figure 8, we can see that from September to December, all the other **Layer 1s** combined generated more fees than Ethereum mainnet, which is in line with the 44% decline from Figure 6. Yet for the full year, Ethereum mainnet generated 13% more than all the other L1s combined (\$2,406m versus \$2,138m).

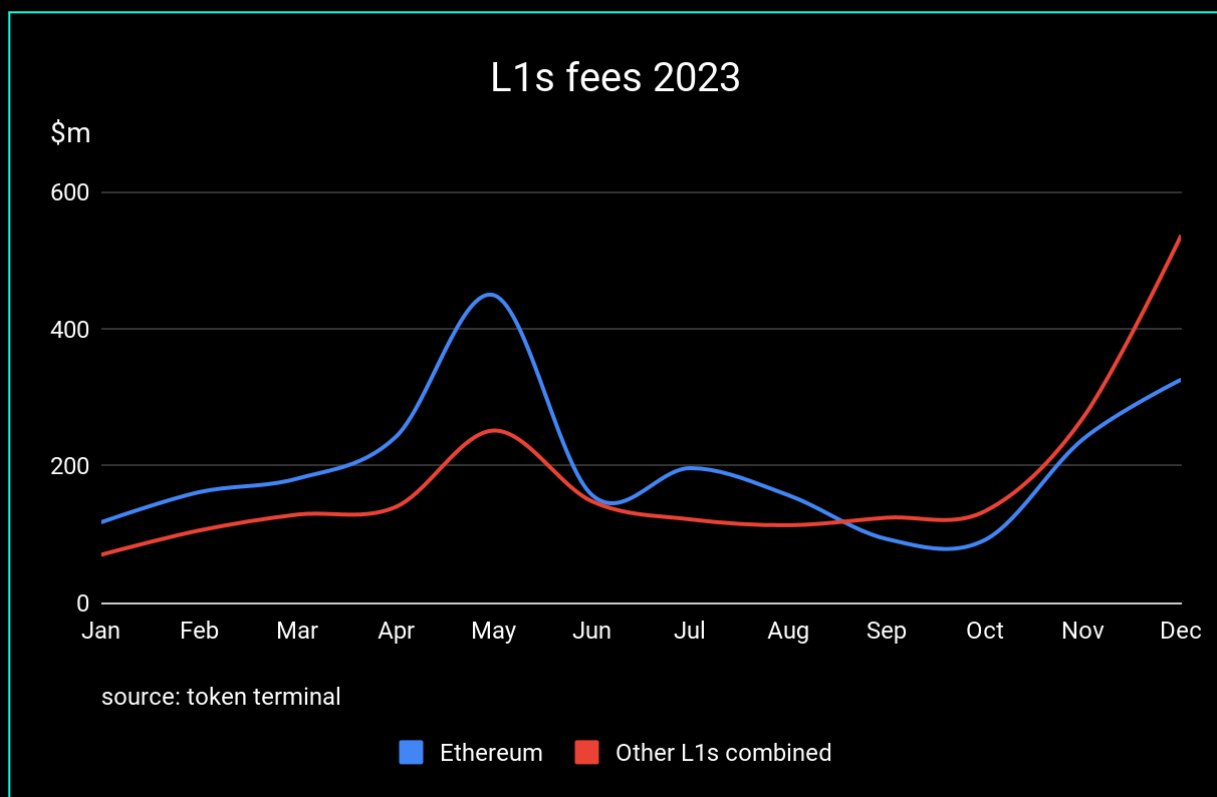


Figure 7: Ethereum compared to all other **Layer 1s** in 2023 [in \$ M]

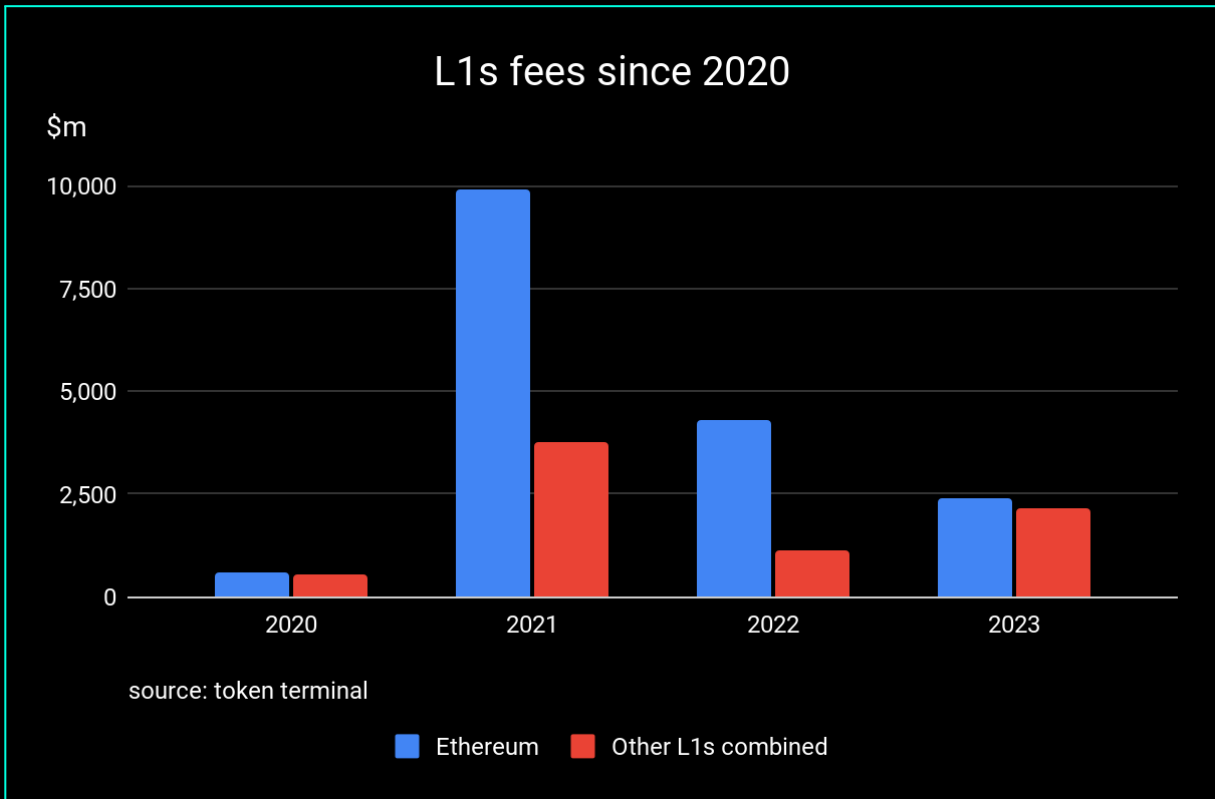


Figure 8: Ethereum compared to all other Layer 1s since 2020 [in \$ M]

To dig further into the leading category, let's zoom into the five Layer 1s that generated 98% of the fees within Layer 1s in 2023 (Ethereum, Tron, Bitcoin, BNB Chain, and Avalanche). The protocols are ranked by decreasing amount of generated fees.

3.1.1. Ethereum

Figures 9 and 10 show a consistent count of around 350,000 daily active users on the Ethereum mainnet, and that 2023 was the year with the lowest fees since 2021. Yet there is a steep increase compared to 2020.

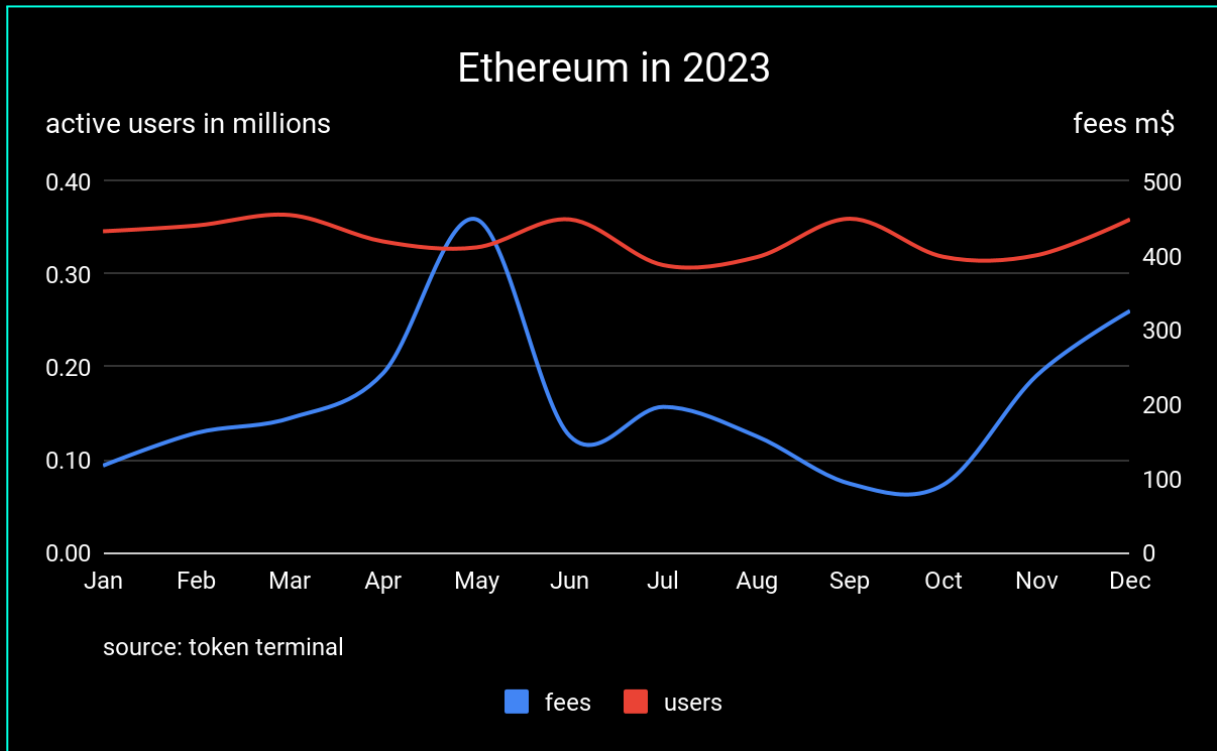


Figure 9: Ethereum in 2023 [in M]

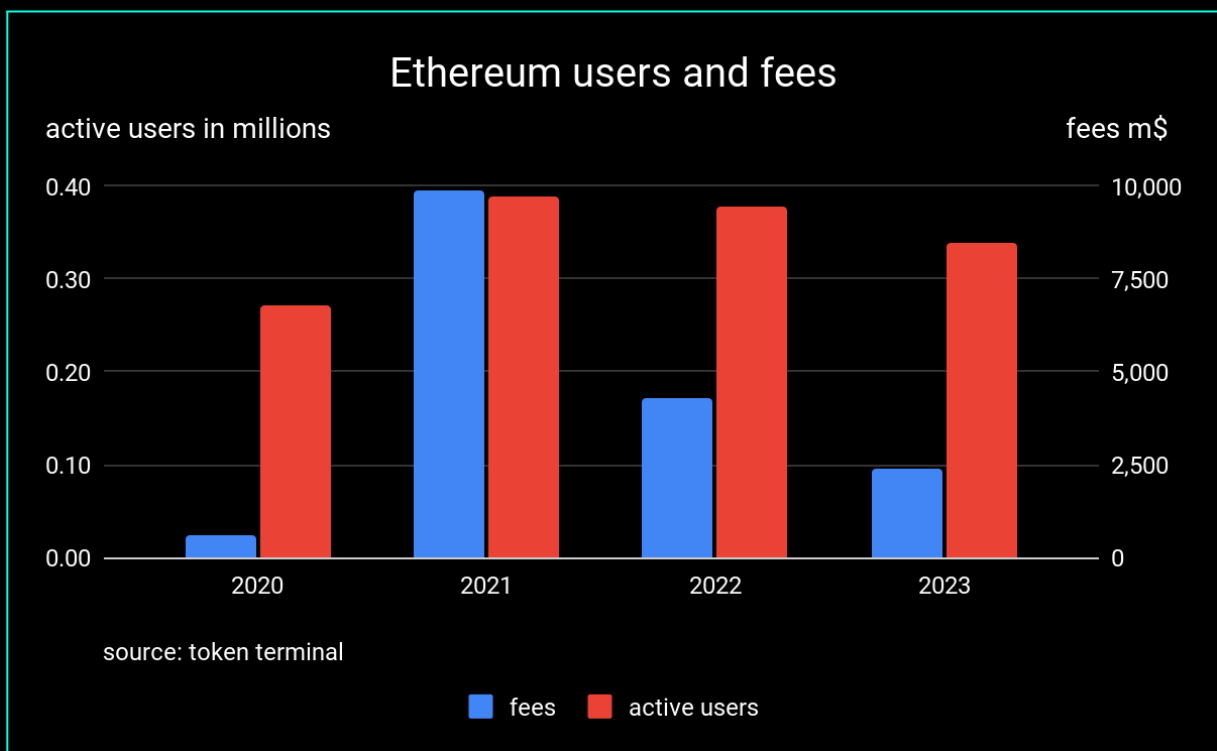


Figure 10: Ethereum daily active users and fees since 2020 [in M]

3.1.2. Tron

From Figure 11 and 12, we can see that the number of daily active users on Tron has been stable in 2023, yet the generated fees have increased tenfold since 2020, which is why Tron holds the second position in the category. Note: Tron was omitted in the cryptonative economy report 2022 (3) due to a missing reliable dataset.

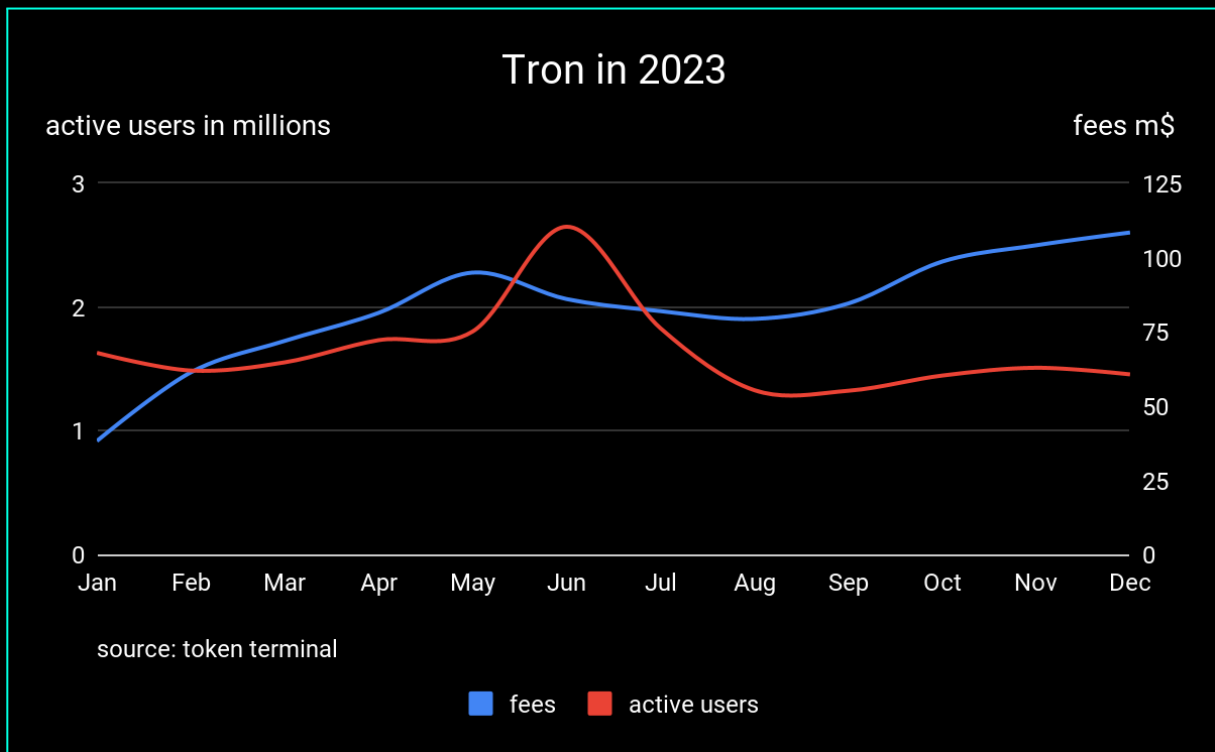


Figure 11: Tron in 2023 [in M]

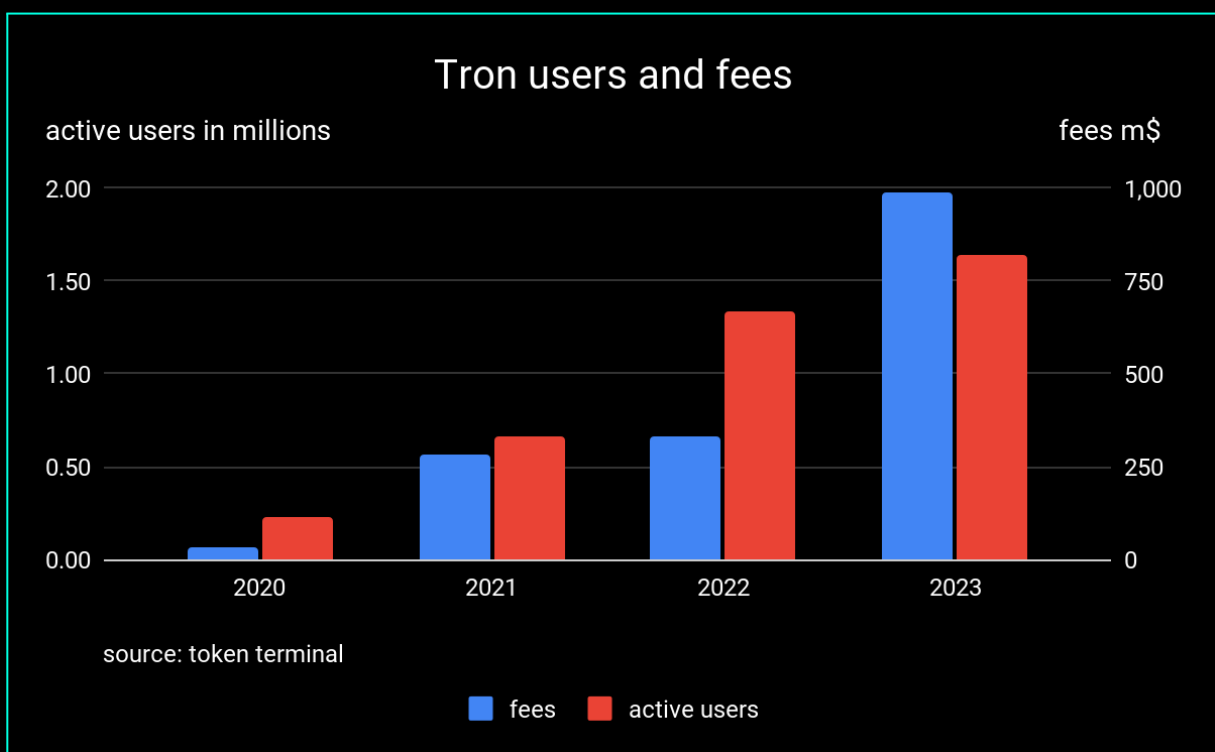


Figure 12: Tron daily active users and fees since 2020 [in M]

3.1.3. Bitcoin

Figures 13 and 14 reveal that the daily active user count on the Bitcoin network has remained consistent at around 600,000. However, there was a surge in generated fees in December, which brought Bitcoin's fee levels on par with Ethereum for that month. This increase was attributed to ordinals.

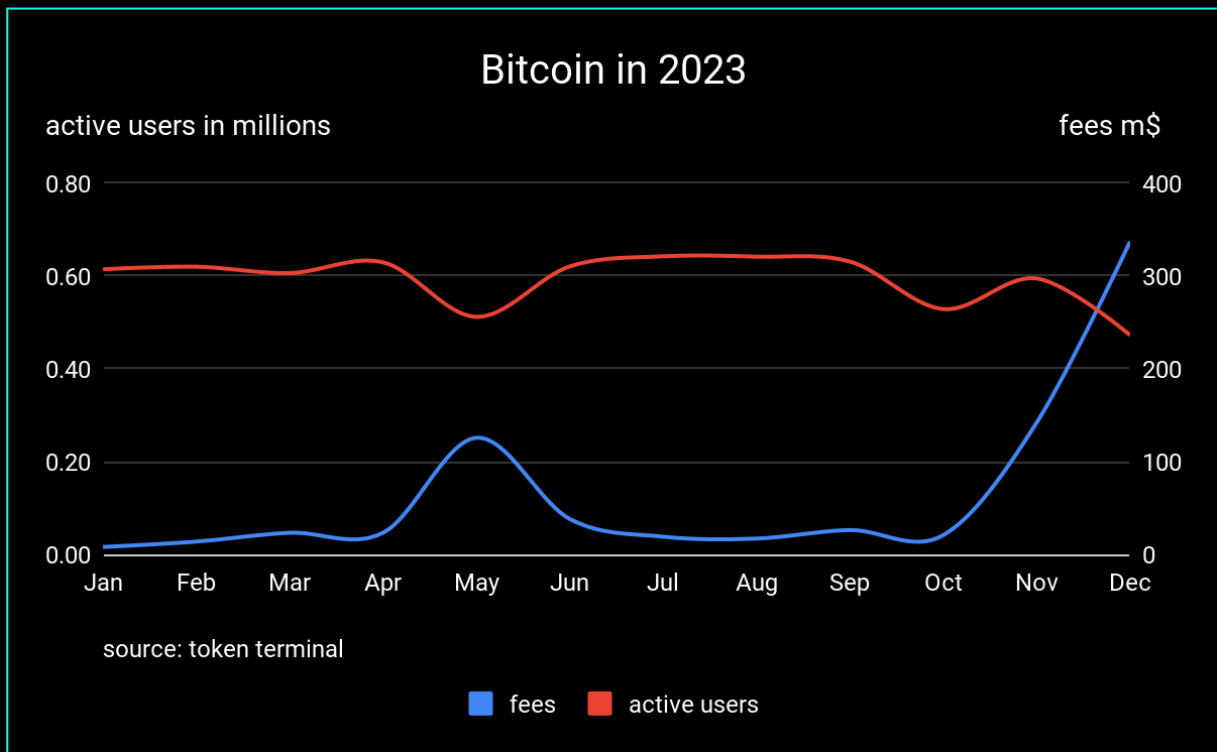


Figure 13: Bitcoin in 2023 [in M]

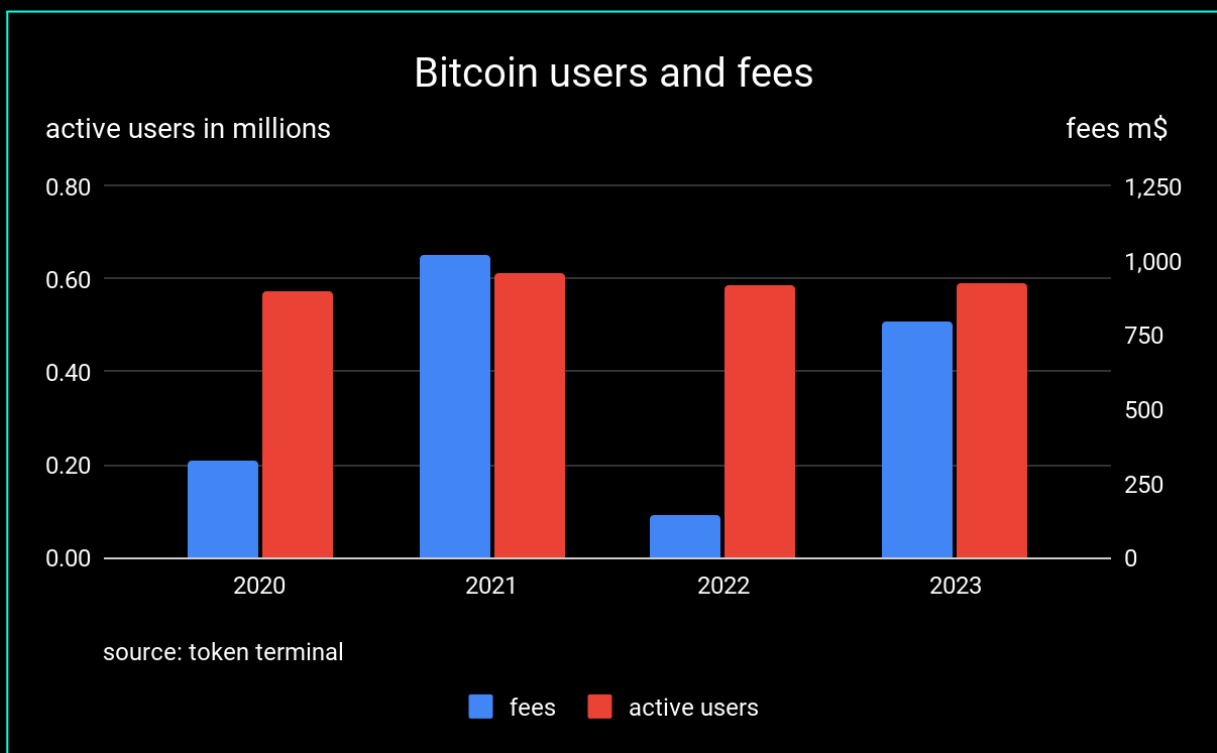


Figure 14: Bitcoin daily active users and fees since 2020 [in M]

3.1.4. BNB Chain

The SEC charges in June 2023 led to a token value drop and reduced fee generation (4). However, a November rebound, following the CEO's guilty plea (5), restored monthly generated fees to early 2023 levels, as seen in Figure 15, marking a significant turnaround. Figure 16 shows that daily active user growth could not offset fee loss from legal actions.

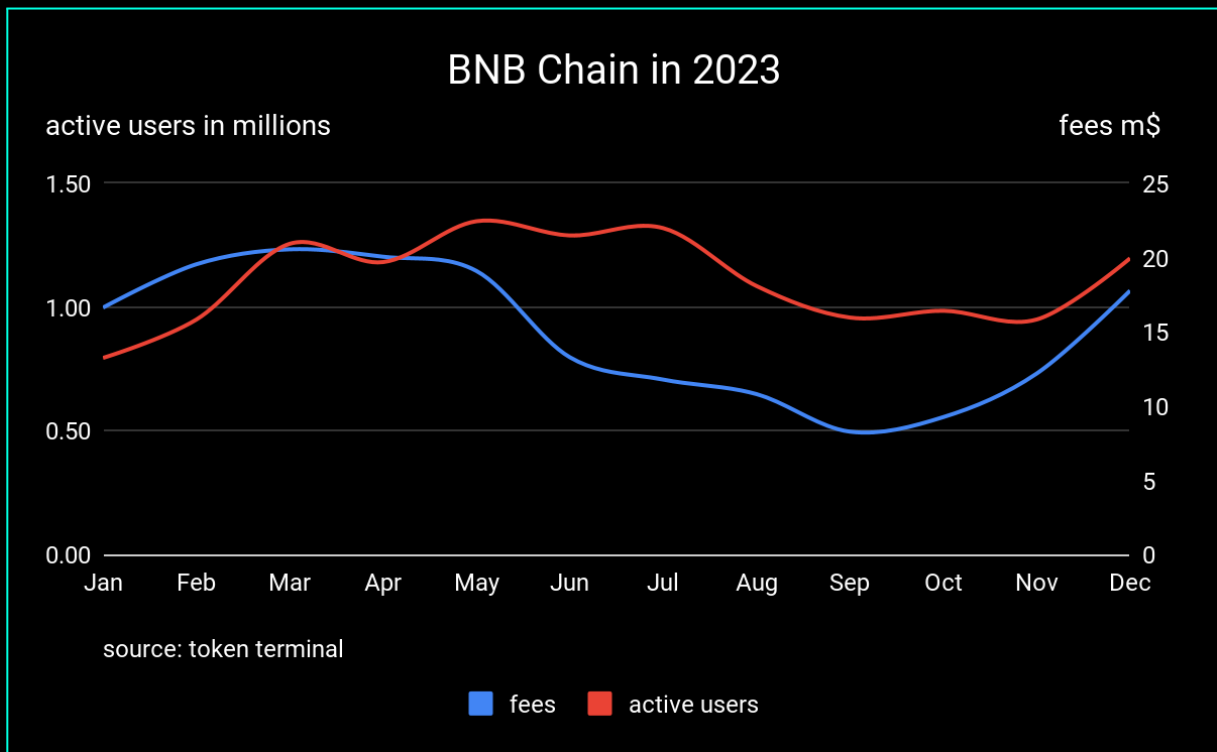


Figure 15: BNB Chain in 2023 [in M]

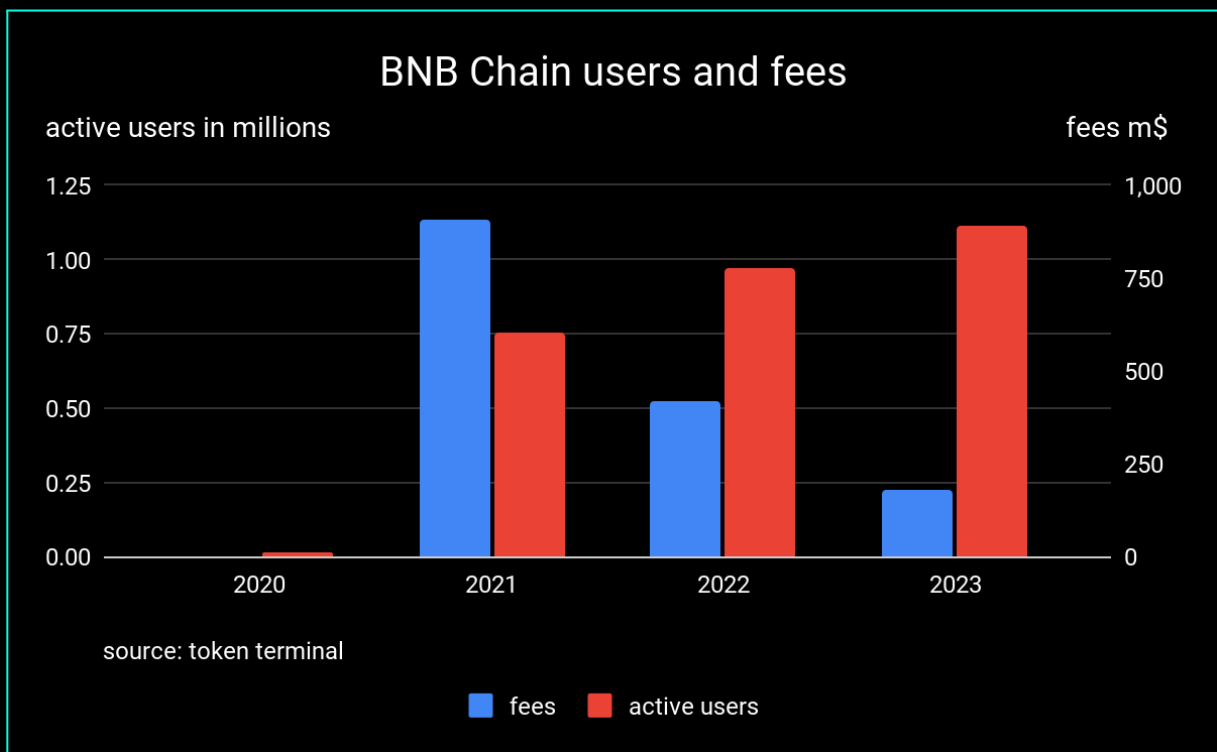


Figure 16: BNB Chain daily active users and fees since 2020 [in M]

3.1.5. Avalanche

From Figure 17 and 18, we can see that, even though 2023 is in a downtrend compared to 2022, the activity spiked in December 2023 both in terms of daily active users and fees. This activity is related to ordinals that were introduced to Avalanche during the summer of 2023 via ASC-20 tokens (Solimano) (6).

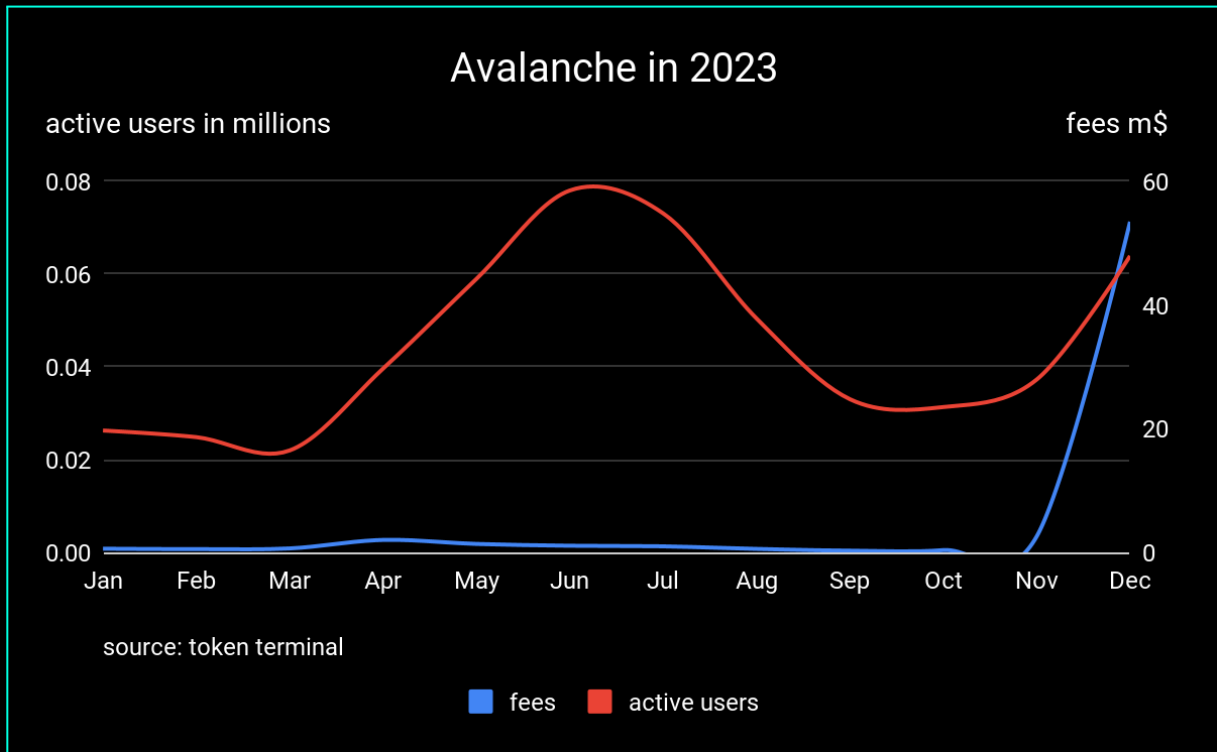


Figure 17: Avalanche in 2023 [in M]

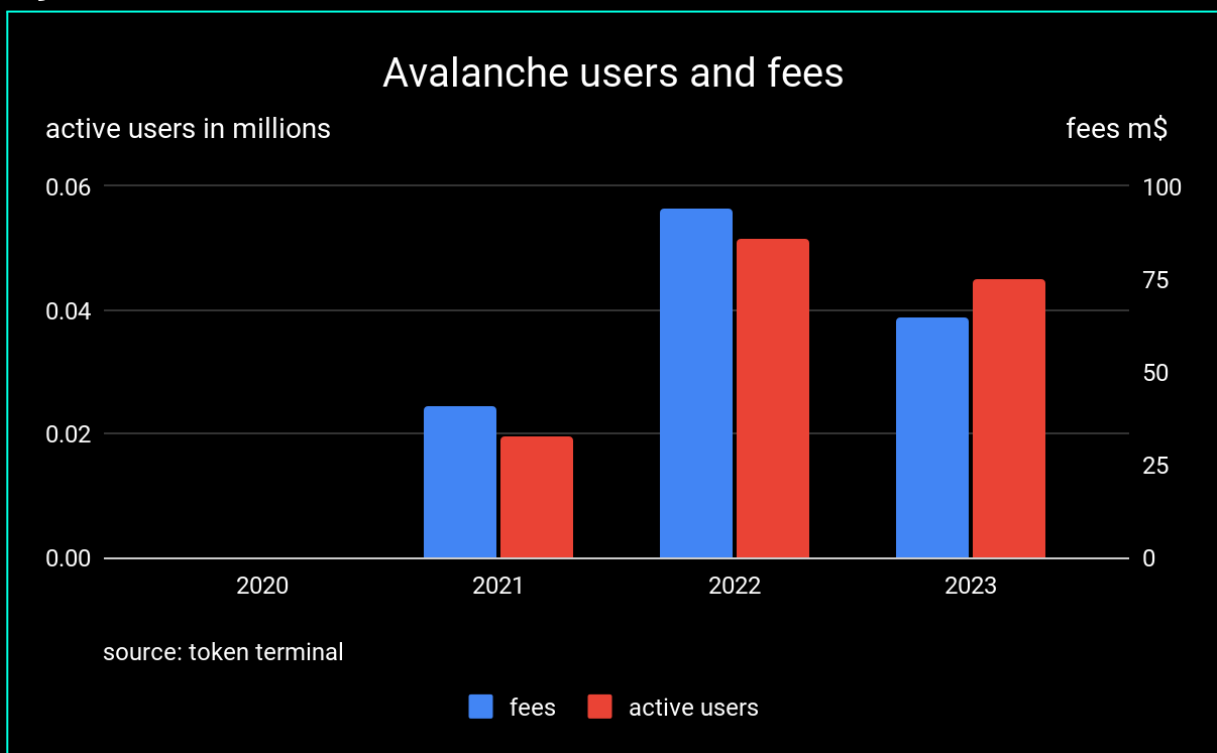


Figure 18: Avalanche daily active users and fees since 2020 [in M]

3.2. Decentralized exchanges

Figure 19 and 20 show the evolution of on-chain fees generated by Decentralized Exchanges (and aggregators). The category witnessed a 51% annual decline. Uniswap consistently dominated, securing 64% of DEX-generated fees in 2023 while experiencing one of the smallest year-to-year declines in the category. In 2023, the category faced two major hacks: one on the Curve protocol (7) and another one on KyberSwap (8).

DEX \$m	Jan 23	Feb 23	Mar 23	Apr 23	May 23	Jun 23	Jul 23	Aug 23	Sep 23	Oct 23	Nov 23	Dec 23	SUM 2023	2023 vs 2022
Uniswap	36	57	71	44	62	36	32	34	23	33	56	70	554	-29%
PancakeSwap	10	13	14	13	17	9	9	7	6	6	10	11	125	-60%
SushiSwap	3	7	9	5	6	1	1	2	1	1	2	2	41	-69%
Trader Joe	2	2	4	3	2	2	2	1	1	1	4	10	34	-63%
Balancer	3	4	4	3	2	2	1	1	1	1	2	2	25	-62%
Curve	2.7	2.5	4.2	1.8	1.4	2.0	1.6	1.6	0.9	1.1	1.9	1.6	23	-73%
QuickSwap	1.0	1.4	1.3	0.8	0.6	0.7	0.6	0.6	0.3	0.7	1.3	1.5	11	-71%
KyberSwap	0.6	0.9	1.2	0.6	0.5	0.8	0.7	0.5	0.4	0.6	1.0	0.3	8	73%
Osmosis	0.8	0.8	0.8	0.5	0.4	0.3	0.3	0.4	0.3	0.4	0.9	1.8	8	-80%
Tokenlon	0.6	0.6	0.9	0.8	0.7	0.7	0.6	0.7	0.5	0.5	0.6	0.5	8	-24%
CoW Protocol	0.3	0.6	0.7	0.6	1.2	0.3	0.4	0.4	0.1	0.2	0.9	1.2	7	-17%
Biswap	0.7	0.7	0.7	0.5	0.3	0.5	0.2	0.1	0.1	0.4	0.9	0.8	6	-87%
SpookySwap	0.74	0.81	0.66	0.31	0.23	0.19	0.37	0.05	0.03	0.04	0.08	0.15	4	-95%
Katana	0.43	0.38	0.40	0.32	0.16	0.22	0.16	0.11	0.09	0.18	0.36	0.79	4	-74%
DODO	0.36	0.41	0.56	0.27	0.15	0.24	0.14	0.20	0.11	0.21	0.21	0.28	3	-60%
Beethoven X	0.42	0.58	0.56	0.46	0.27	0.17	0.30	0.06	0.03	0.03	0.07	0.06	3	-86%
Bancor	0.17	0.18	0.21	0.15	0.08	0.08	0.06	0.64	0.09	0.53	0.66	0.08	3	-80%
1inch	0.50	0.31	0.71	0.34	0.33	0.09	0.00	0.00	0.00	0.00	0.00	0.03	2	-81%
Pangolin	0.26	0.23	0.20	0.11	0.06	0.08	0.08	0.05	0.03	0.06	0.25	0.45	2	-85%
ApeSwap	0.13	0.14	0.17	0.08	0.05	0.06	0.04	0.02	0.02	0.02	0.04	0.03	1	-87%
Total	63	95	115	77	97	55	51	50	34	48	83	104	871	-51%

Figure 19: Monthly Decentralized Exchanges fees per project [in \$ M]

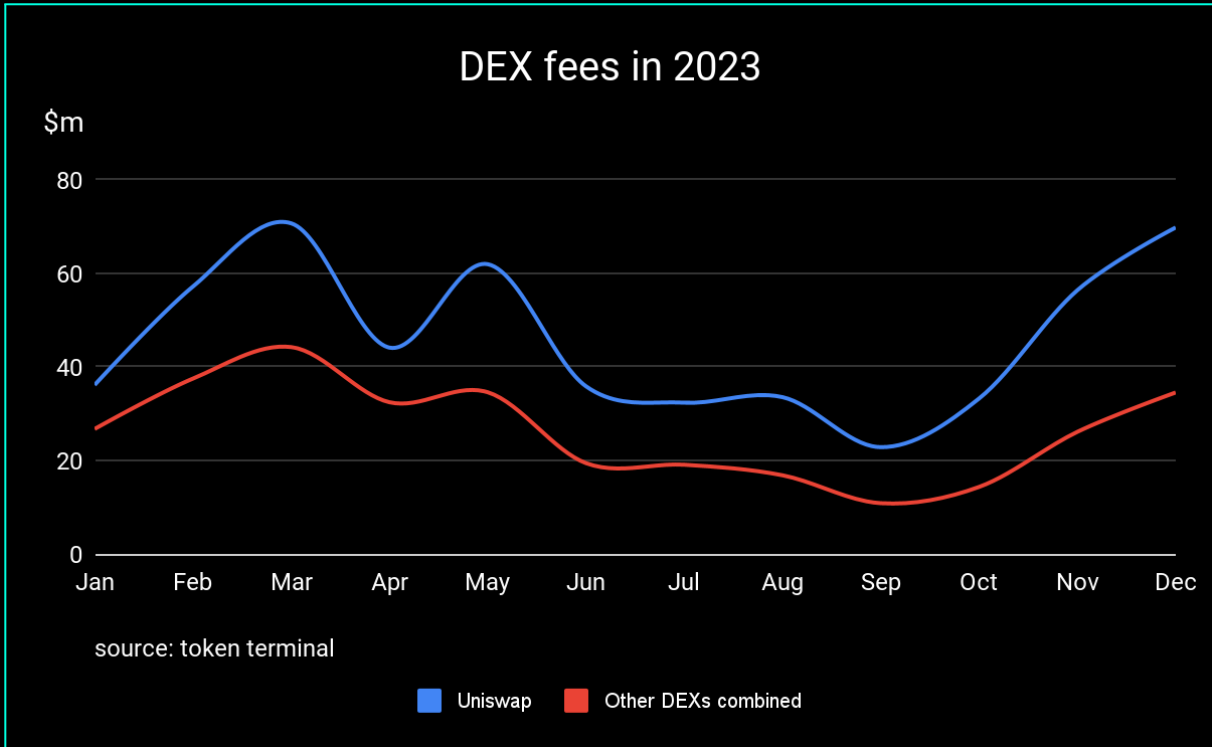


Figure 20: Monthly **Decentralized Exchanges** fees in 2023 [in \$ M]

Figure 21 emphasizes a notable trend in the DEX category, where there was a significant disparity between the decrease in collected fees and trading volume. In 2023, the fees generated by DEXs halved compared to 2022, yet the trading volume remained relatively stable over the same period.

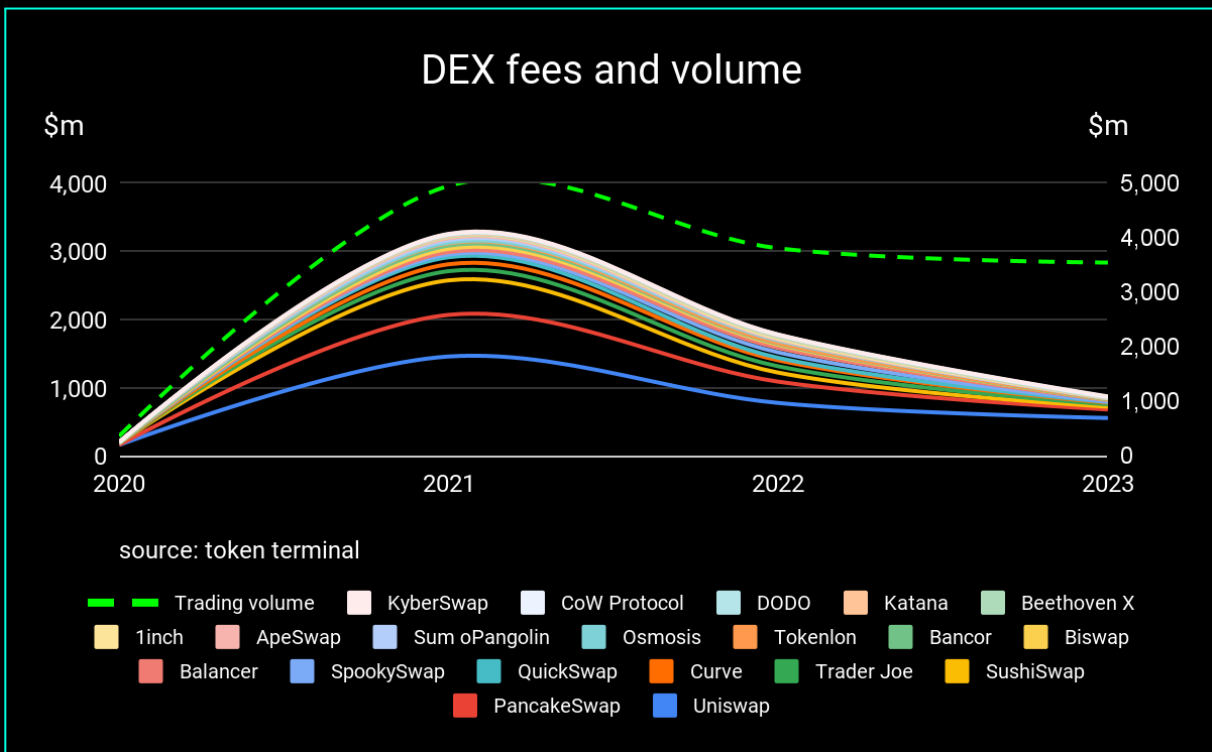


Figure 21: Yearly **Decentralized Exchanges** fees and volume since 2020 [in \$ M]

3.3. Liquid Staking Derivatives

Figure 22 underscores the robust performance of **Liquid Staking Derivatives**, with a 93% increase in generated fees from 2022 to 2023. This year saw the growth of Frax, and as depicted in Figure 23, the last months of the year were marked by a steep increase in BENQI's fee generation. In 2023, Lido collected 95% of generated fees among the selected projects. For better readability, Lido's fees are excluded from both Figure 23 and 24.

LSDs \$m	Jan 23	Feb 23	Mar 23	Apr 23	May 23	Jun 23	Jul 23	Aug 23	Sep 23	Oct 23	Nov 23	Dec 23	SUM 2023	2023 vs 2022
Lido	34	36	49	50	64	48	56	53	47	50	62	74	623	90%
Frax	0.3	0.5	1	1	1	1	1	2	1	1	2	2	14	*
BENQI	0.5	1	1	1	1	1	1	1	0.4	0.5	1	2	8	29%
StakeWise	0.5	0.5	1	1	1	1	1	1	1	1	1	0.3	7	88%
Stader	0.2	0.2	0.2	0.3	0.3	0.2	0.2	0.3	0.2	0.3	0.4	0.5	3	151%
Total	35	38	51	53	67	51	59	56	49	53	66	78	655	93%

Figure 22: Monthly **Liquid Stakers** fees per project [in \$ M]

*Year-to-year comparisons could have led to misleading conclusions.

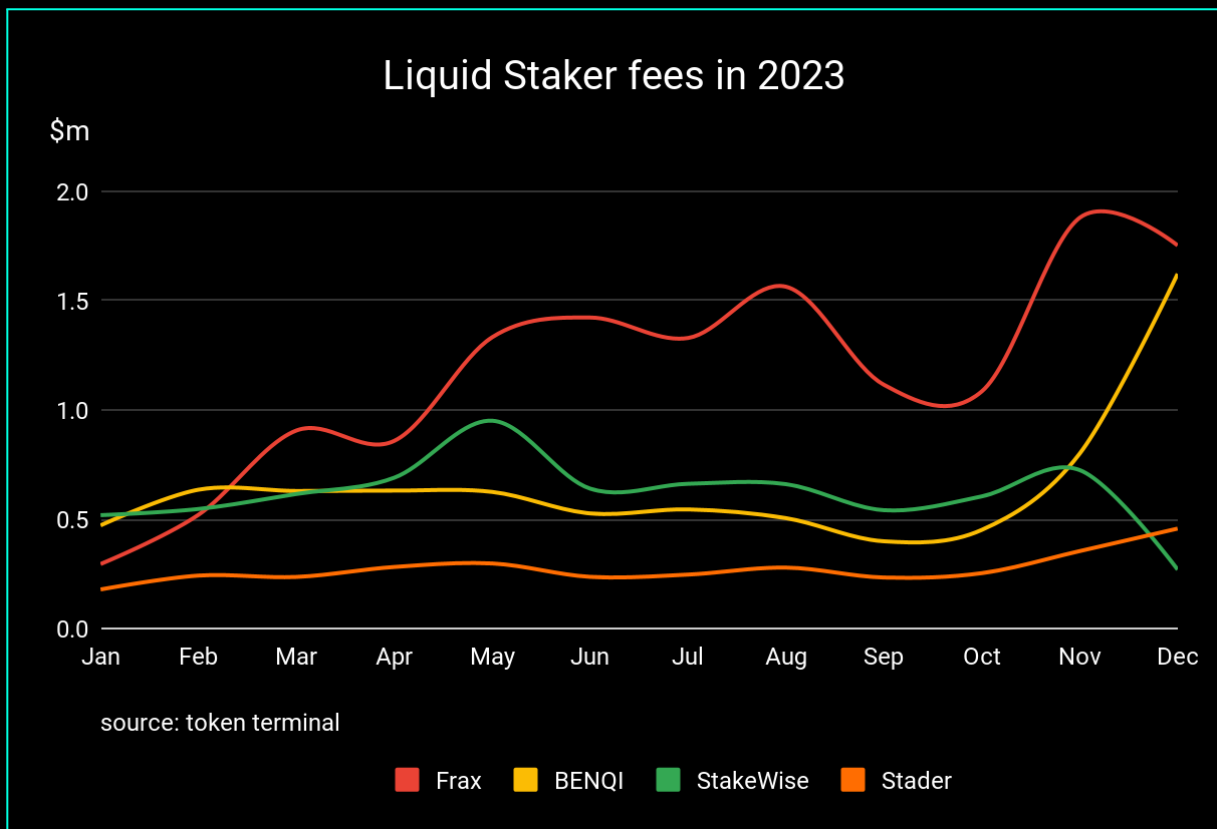


Figure 23: Monthly **Liquid Stakers** fees per project for 2023 [in \$ M]

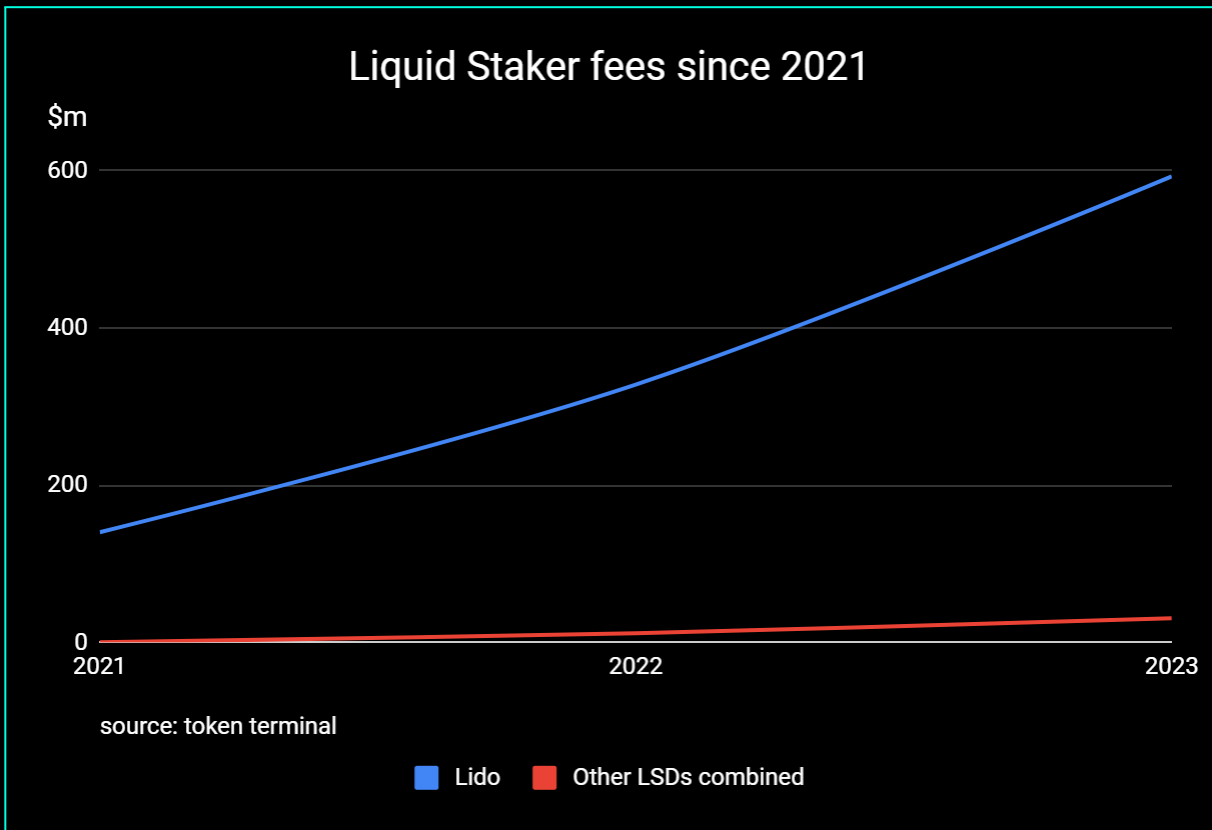


Figure 24: Yearly Liquid Stakers fees per project since 2020 [in \$ M]

Post-Merge, staking has become vital for Ethereum's economy, with "restaking" as the latest innovation. Eigenlayer, a leader in this field with first-mover advantage, plans its mainnet launch in 2024. Restaking allows users to earn fees by securing multiple chains simultaneously.

3.4. DeFi Derivatives

Figures 25, 26 and 27 indicate the fees generated by DeFi Derivatives projects. GMX experienced a 14% increase in generated fees, while dYdX saw a 36% decrease. MUX and Hegic demonstrated substantial growth, with MUX's fees increasing by 646% and Hegic's fees increasing by 707%.

DeFi Derivatives \$m	Jan 23	Feb 23	Mar 23	Apr 23	May 23	Jun 23	Jul 23	Aug 23	Sep 23	Oct 23	Nov 23	Dec 23	SUM 2023	2023 vs 2022
GMX	14	19	19	18	8	14	6	5	2	6	12	11	133	14%
dYdX	9	8	10	7	5	6	5	4	4	7	9	7	82	-36%
Synthetic	1	1	5	4	3	2	3	4	1	3	3	4	35	-7%
Level	0	3	5	8	5	5	3	2	0	1	0	0	32	*
Gains	2	2	3	2	2	2	2	1	1	1	1	1	20	87%
Kwenta	0.7	0.8	2.5	1.8	1.9	1.6	1.9	1.4	0.8	1.6	2.1	2.0	19	128%
Lyra	3.3	1.3	3.7	2.0	1.9	1.5	0.6	0.8	0.5	0.3	0.2	0.2	16	-44%
MUX	0.3	0.3	0.8	1.5	1.2	1.7	1.4	0.8	0.4	1.3	1.9	2.6	14	646%
Vertex	0.0	0.0	0.0	0.0	0.2	0.3	0.4	0.5	0.5	0.6	2.4	3.2	8	*
SynFutures	4.2	0.3	0.0	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.4	7	-86%
Perpetual	0.6	0.6	0.8	0.9	0.9	0.8	0.5	0.4	0.5	0.4	0.3	0.3	7	-68%
Hegic	0.9	0.7	0.7	0.6	0.4	0.3	0.2	0.2	0.2	0.5	0.4	0.6	6	707%
Mummy	0.2	0.5	0.8	0.7	0.6	0.3	0.2	0.2	0.1	0.1	0.1	0.2	4	*
ApolloX	0.0	0.0	0.0	0.0	0.2	0.6	0.4	0.4	0.4	0.5	0.6	0.6	4	*
Cap	0.1	0.1	0.6	0.6	0.4	0.3	0.1	0.1	0.0	0.1	0.1	0.1	3	97%
Premia	0.3	0.3	0.4	0.4	0.3	0.3	0.2	0.1	0.0	0.0	0.0	0.0	2	-75%
IPOR	0.0	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.4	0.7	2	*
Polynomial	0.0	0.0	0.0	0.1	0.0	0.0	0.3	1.1	0.2	0.1	0.0	0.1	2	*
Metavault	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.1	1	24%
Pika	0.2	0.2	0.1	0.1	0.1	0.1	0.0	0.1	0.0	0.1	0.1	0.1	1	-8%
Total	37	39	52	48	31	38	26	23	13	23	34	34	397	-5%

Figure 25: Monthly DeFi Derivatives fees per project [in \$ M]

*Year-to-year comparisons could have led to misleading conclusions.

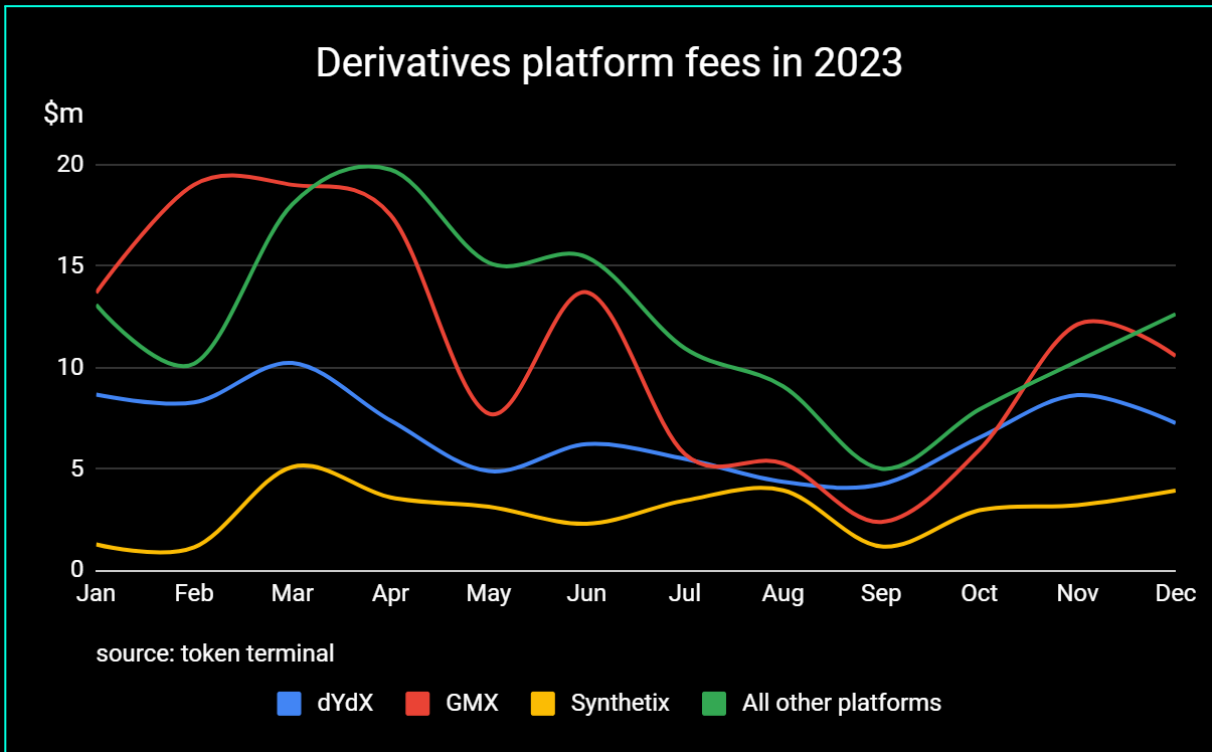


Figure 26: Monthly DeFi Derivatives platforms fees in 2023 [in \$ M]

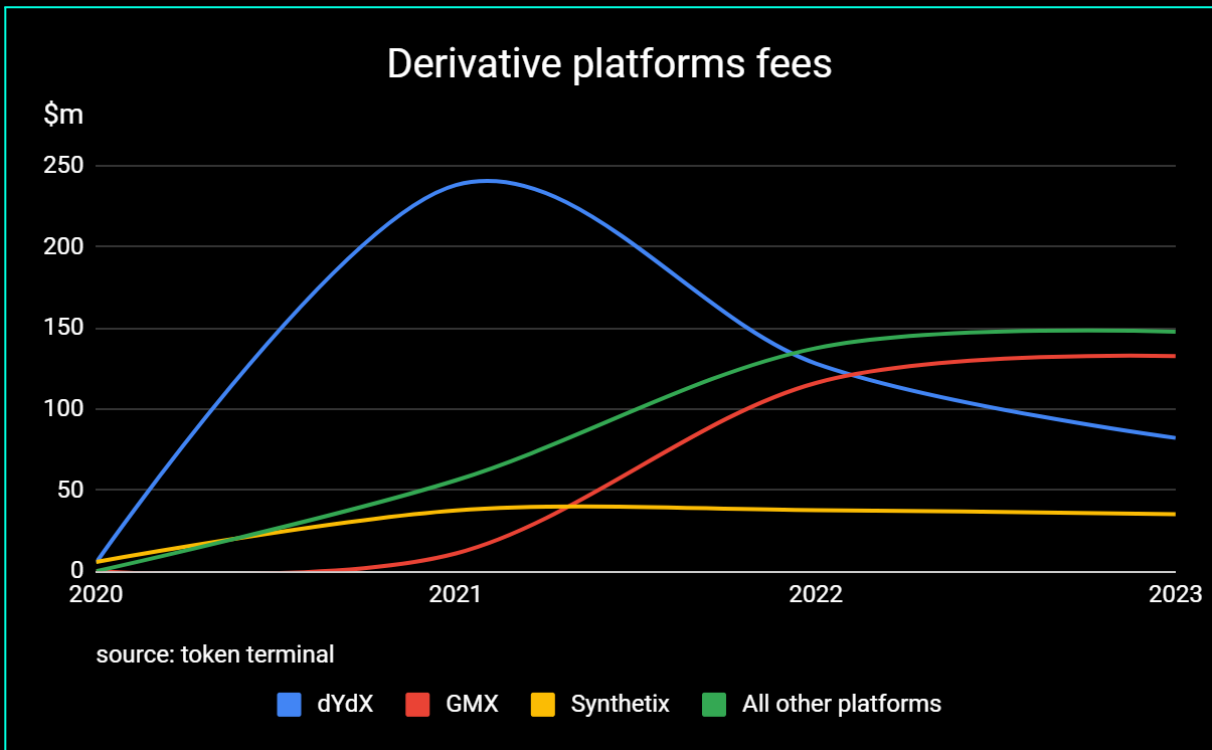


Figure 27: Yearly DeFi Derivatives platforms fees since 2020 [in \$ M]

The DeFi Derivatives platforms section underscores the fluctuating nature of fee generation, leading us to the next section on Lending and its market dynamics.

3.5. Lending

Figures 28 and 29 show a 36% drop in the **Lending** category in 2023 versus 2022. Aave, the category leader, also saw a similar decrease. Venus, a BNB Chain native project, secured the second position. Radiant, Morpho, and Sonne demonstrated robust performance, tripling their fees from 2022.

Lending \$m	Jan 23	Feb 23	Mar 23	Apr 23	May 23	Jun 23	Jul 23	Aug 23	Sep 23	Oct 23	Nov 23	Dec 23	SUM 2023	2023 vs 2022
Aave	6	6	10	7	8	8	10	10	8	10	13	24	121	-36%
Venus	2	2	6	6	4	2	6	3	2	3	2	11	48	31%
Compound	2	2	3	2	3	2	4	4	3	4	5	6	40	-42%
Radiant	0	1	2	2	2	2	2	2	2	2	2	2	23	479%
Morpho	1	1	2	2	2	2	2	2	2	2	2	2	22	804%
BendDAO	1.4	1.7	2.2	1.9	1.4	1.1	0.7	0.4	0.3	0.3	0.4	0.5	12	53%
Goldfinch	0.9	0.9	0.9	1.1	0.9	0.9	0.9	0.9	0.9	1.1	0.9	0.9	11	13%
Sonne	0.2	0.3	0.6	0.4	0.3	0.3	0.4	0.4	0.3	0.3	0.3	0.3	4.1	558%
BENQI	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.2	0.4	2.2	-94%
Euler	0.52	0.70	0.39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.6	-83%
Gearbox	0.06	0.09	0.32	0.13	0.12	0.15	0.21	0.13	0.05	0.07	0.03	0.22	1.6	65%
TrueFi	0.15	0.00	0.00	0.00	0.02	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.3	-99%
Maple	0.00	0.03	0.01	0.01	0.01	0.03	0.01	0.03	0.03	0.04	0.04	0.03	0.3	-99%
Notional	0.01	0.00	0.02	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.1	-89%
Total	14	17	27	24	21	19	25	24	19	22	26	49	288	-36%

Figure 28: Monthly Lending fees per project [in \$ M]

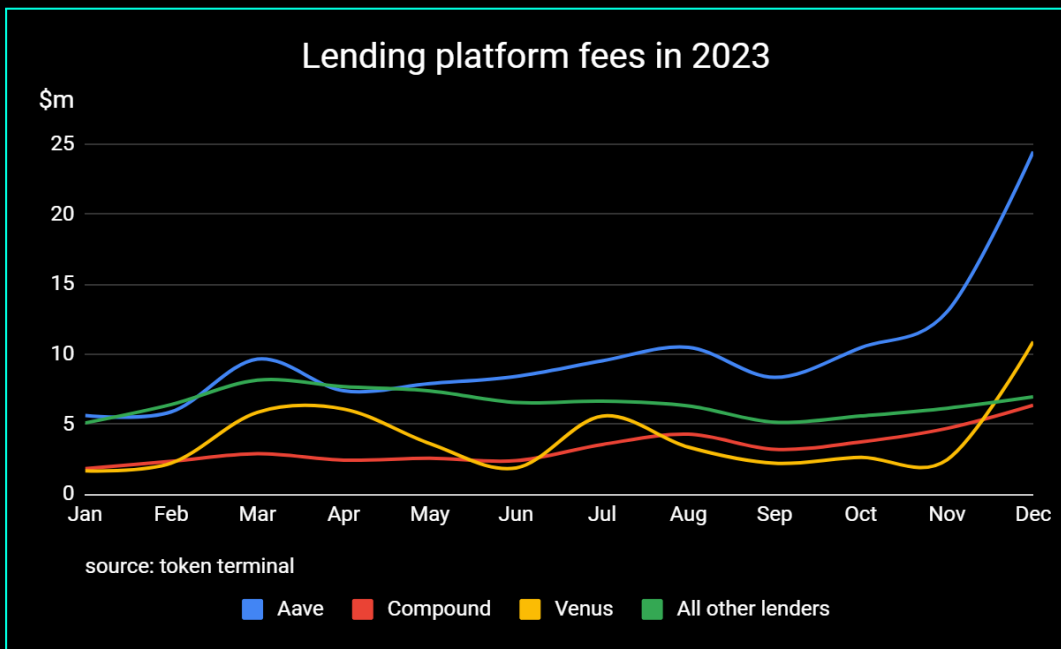


Figure 29: Monthly Lending fees in 2023 [in \$ M]

From Figure 30, we see that **Lending** fees and volume vary synchronously, which means that lenders are able to capture a stable percentage of their category volume year-to-year. Volume from the lenders detailed in Figure 28 were considered, minus Notional volume.

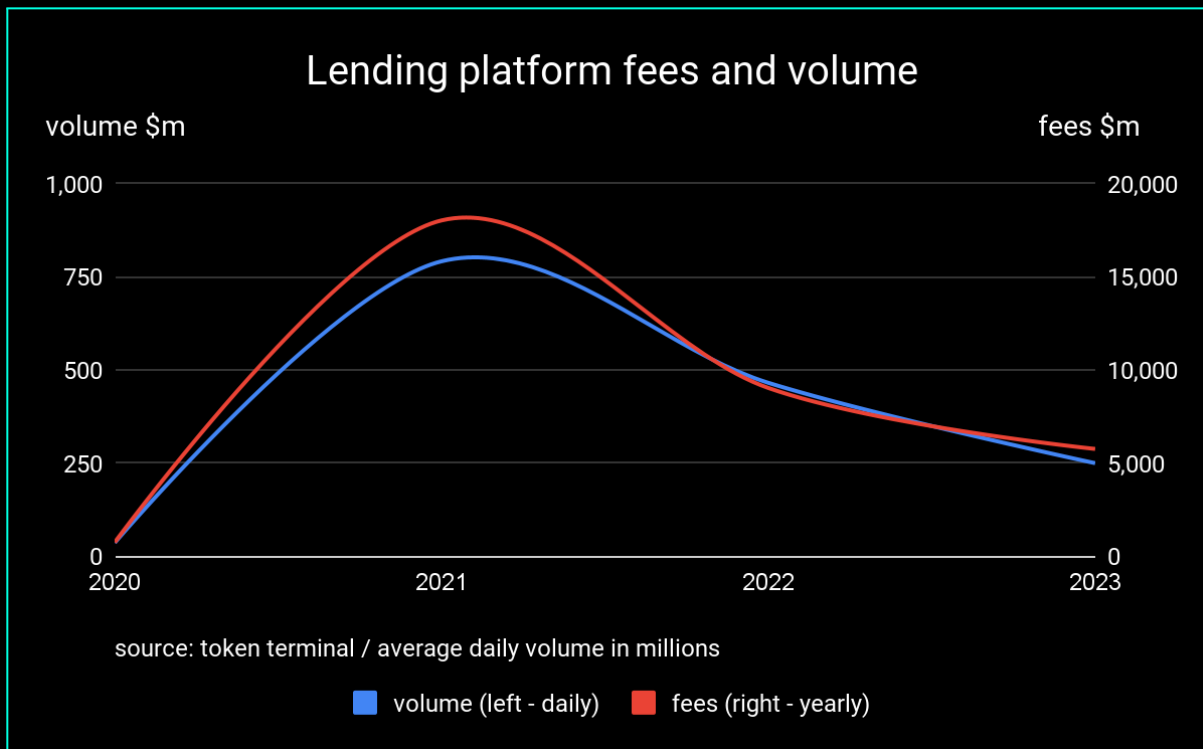


Figure 30: Yearly **Lending** fees since 2020 [in \$ M]

The **Lending** landscape is evolving with the emergence of the **NFT Lending** subcategory. Figure 31 shows that **NFT Lending** volume grew at least fivefold in 2023 (0x1168)(9). The category leader is Blend. Other players included in this Figure are: Zharta, X2Y2, Pine, Paraspace, Drops, Bend dao, NftFi.

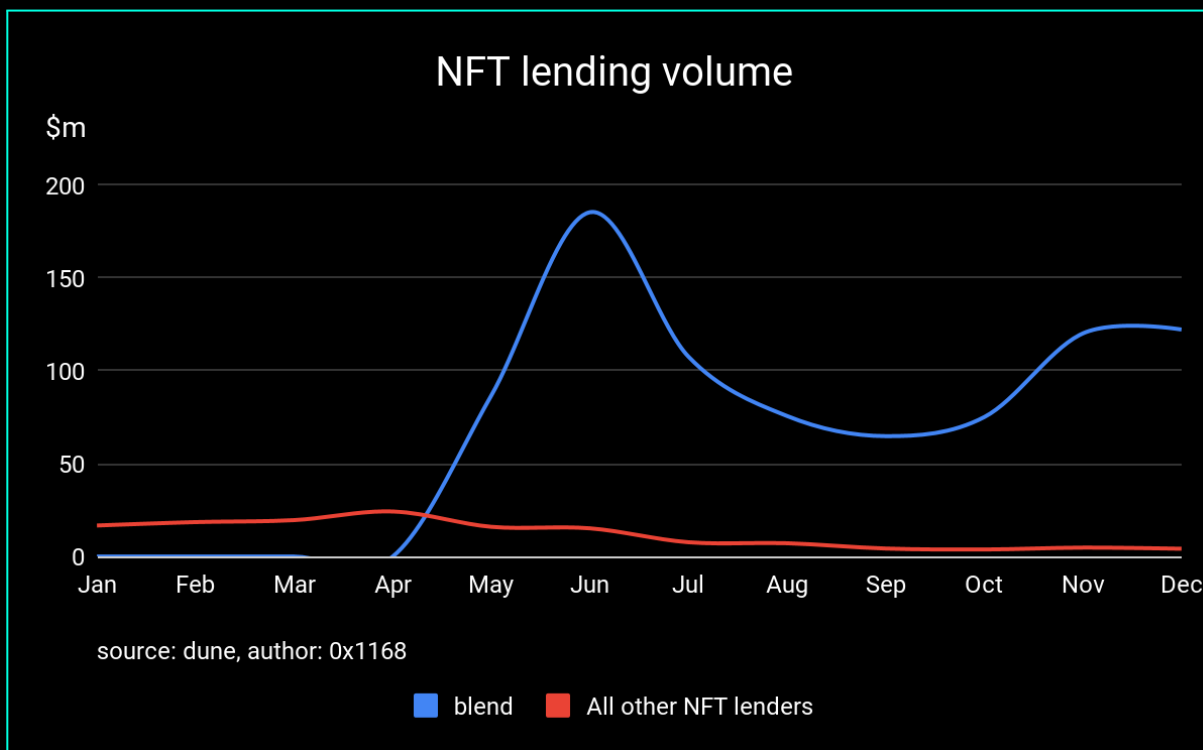


Figure 31: Monthly **NFT Lending** volume in 2023 [in \$ M]

3.6. NFT Marketplaces

Figure 32 shows that **NFT Marketplaces** are transitioning their economic models. In 2023, this category saw an 87% decrease in generated fees compared to the previous year. This category became more dynamic with the launch of Blur and the subsequent changes in Opensea’s pricing (Reeves) (10). It primarily led to a reduction in fees and a change in the structure of royalties. Looksrare, with strong incentives in 2022, experienced a 98% year-over-year decline in generated fees. The category leader remains Opensea, despite a 91% reduction in collected fees.

NFT marketplaces \$m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	SUM 2023	2023 vs 2022
OpenSea	35	23	11	12	8	8	6	5	3	4	5	7	126	-91%
Manifold.xyz	22	14	8	4	4	2	2	2	1	1	1	1	64	-22%
Blur	3	11	13	7	4	5	3	1	1	1	2	3	53	*
LooksRare	2.0	2.3	1.5	1.0	0.7	0.5	0.4	0.4	0.4	0.0	0.0	0.0	9	-98%
Zora	0.9	2.1	1.2	0.9	0.9	0.7	0.6	0.3	0.2	0.2	0.2	0.7	9	563%
X2Y2	2.3	1.7	0.8	0.6	0.4	0.3	0.3	0.2	0.1	0.2	0.2	0.2	7	-72%
Immutable	0.3	0.5	0.6	0.5	0.5	0.5	0.5	0.4	0.4	0.5	0.5	0.5	6	0%
SuperRare	0.6	0.5	0.5	0.3	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	3	-76%
Sound.xyz	0.17	0.31	0.19	0.17	0.08	0.12	0.22	0.14	0.06	0.02	0.01	0.00	1	-59%
Foundation	0.25	0.22	0.20	0.11	0.11	0.08	0.08	0.05	0.05	0.06	0.09	0.07	1	-78%
Sudoswap	0.31	0.27	0.11	0.08	0.10	0.05	0.06	0.03	0.02	0.03	0.08	0.07	1	-60%
XOXNO	0.15	0.13	0.13	0.13	0.09	0.07	0.09	0.07	0.05	0.05	0.09	0.08	1	-31%
NFTX	0.13	0.07	0.08	0.09	0.14	0.05	0.06	0.04	0.03	0.02	0.03	0.03	1	-88%
Rarible	0.01	0.01	0.01	0.00	0.01	0.00	0.01	0.01	0.04	0.02	0.02	0.06	0.2	-87%
Total	67	56	37	27	19	17	13	10	7	7	10	13	283	-87%

Figure 32: Monthly NFT Marketplaces fees per project [in \$ M]

*Year-to-year comparisons could have led to misleading conclusions.

In Figure 33, we can notice a light pick up of the generated fees in the months of November and December.

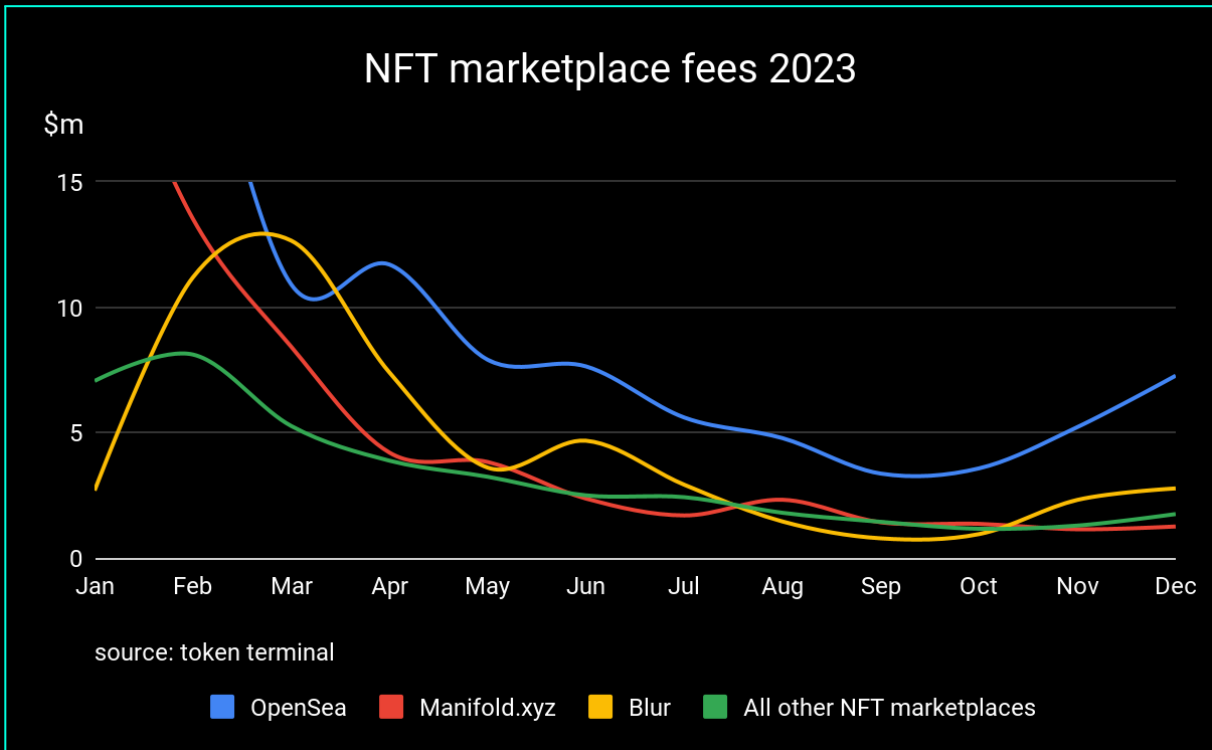


Figure 33: Monthly NFT Marketplaces fees in 2023 [in \$ M]

Figure 34 highlights an important point: despite a market correction in 2023, generated fees (right axis) have still increased more than 100-fold, reaching \$283 million in 2023 compared to \$2.6 million in 2020. In opposition to the Lending category, the NFT Marketplaces did not maintain their fee structure, fees for NFT Marketplaces are decreasing faster than the volume year-to-year. This is mostly due to strong incentives from new market players to gain market shares.

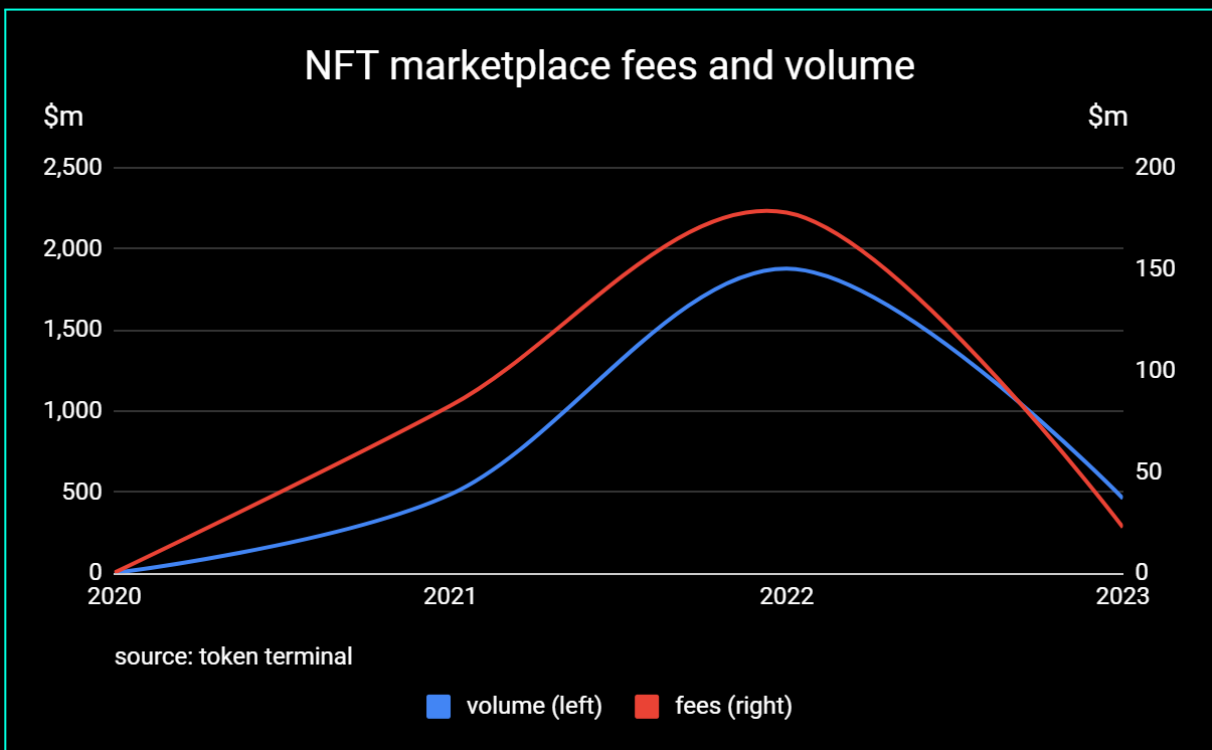


Figure 34: Yearly NFT Marketplaces fees since 2020 [in \$ M]

3.7. Layer 2s

3.7.1. Layer 2s activity

Figure 35 displays the year-to-year increases in gas usage for **Layer 2s'** settlements on Ethereum mainnet (funnyking) (11). It is signaling a 'Cambrian explosion' in L2 development. Please note that all the **Layer 2s** mentioned in this report are scaling solutions for Ethereum mainnet. The rising fees generated by **Layer 2s** signal widespread adoption and a significant impact on user experience.

Gas spent on Ethereum mainnet to settle L2 activity	2021 vs 2020	2022 vs 2021	2023 vs 2022
year-to-year variation	1443%	280%	465%

Figure 35: Gas spent on Ethereum mainnet to settle **Layer 2s** activity

The included prover contracts are from Arbitrum, Optimism, dYdX, ZkSync Lite, StarkNet, Arbitrum Nova, Apex, ZkSpace, ZkSwap, DiversiFi, Boba Network, Metis, Andromeda, Rhino.fi, Aztec, PolygonHermez, ImmutableX, Sorare, Loopring, Polygon zkEVM, ZkSpace, Aztec Connect, Linea, Zora Network, Base, Mantle, and Scroll.

Figure 36 shows that the monthly number of transactions on the selected **Layer 2s** went from 25 million to 100 million, a four fold increase which explains the 465% increase of Figure 35. While the number of transactions on the settlement layer (Ethereum mainnet) is stable throughout 2023, around the 30 million monthly transactions mark. From this, we can deduce that the overall demand for blockspace is growing.

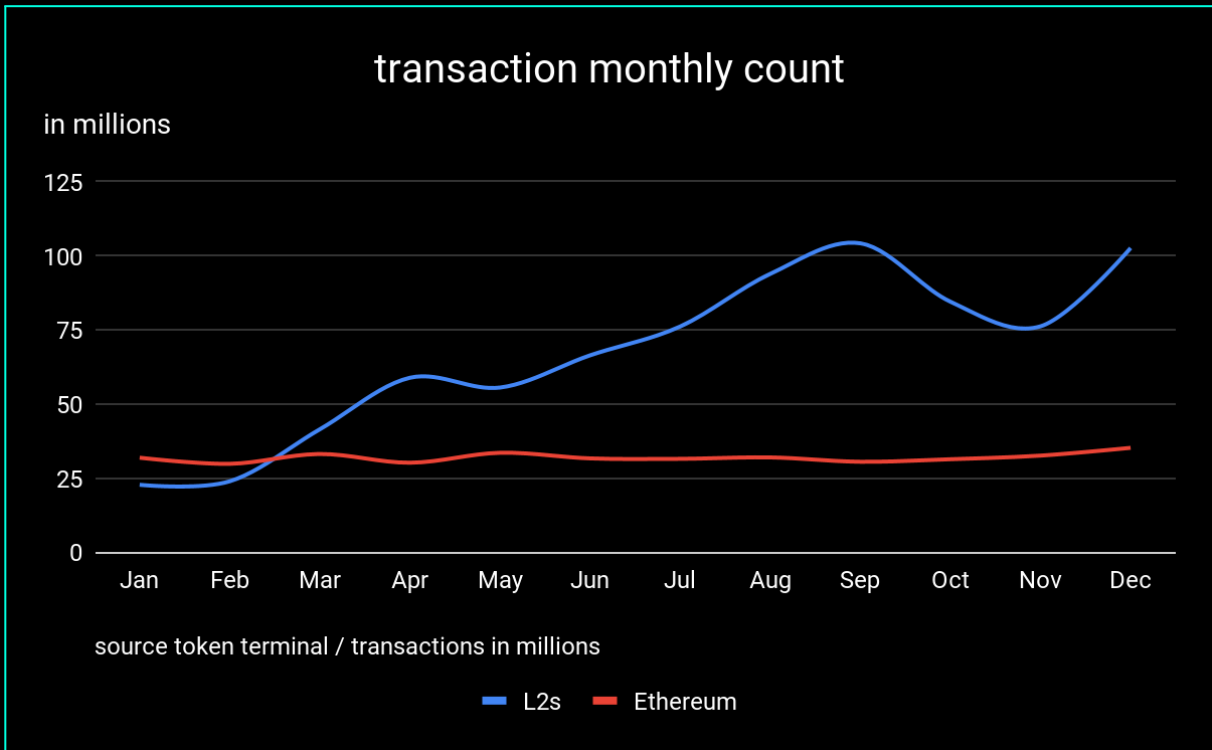


Figure 36: Monthly count of L2 transactions in 2023 [in M]

3.7.2. Layer 2s fees

Figure 1 indicates that **Layer 2s** ranked seventh in fee generation for 2023, and recorded the strongest growth of all categories with a 411% year-to-year variation. Figures 37, 38, and 39 are looking at the fees generated by the players in this category. Arbitrum is leading with 63 M\$ generated in fees in 2023, followed by zkSync which generated 60 M\$.

L2s \$m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	SUM 2023	2023 vs 2022
Arbitrum	1	3	6	9	10	4	4	3	2	2	6	12	63	190%
zkSync	0	0	1	6	10	6	8	7	5	4	5	8	60	*
OP Mainnet	2	2	2	4	6	2	3	3	2	2	3	5	37	103%
Starknet	0.1	0.2	0.8	2.3	4.5	2.1	2.9	3.9	3.7	2.5	6.3	3.9	33	*
Base	0.00	0.00	0.00	0.00	0.00	0.00	0.89	4.20	2.29	1.29	1.60	2.49	13	*
Manta	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.08	0.17	0.52	1	*
Total	3	5	11	21	30	15	19	21	15	12	23	31	207	411%

Figure 37: Monthly **Layer 2s** fees per project in 2023 [in \$ M]

*Year-to-year comparisons could have led to misleading conclusions.

See graphs below:



Figure 38: Monthly Layer 2s fees in 2023 [in \$ M]



Figure 39: Yearly Layer 2s fees since 2021 [in \$ M]

3.8. Asset Management

Asset Management platforms incentivize depositors with rewards, they are non-custodial yield platforms. In the Asset Management category there has been a 57% year-to-year decline as shown in Figure 40 in between 2022 to 2023. Despite a 61% year-to-year decrease in generated fees, Convex continues to lead the category in 2023.

Asset Management \$m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	SUM 2023	2023 vs 2022
Convex	15	16	16	16	14	12	13	9	7	7	9	11	146	-61%
Aura	2	2	3	2	2	2	2	2	1	1	1	2	23	78%
Gamma	0.0	0.4	1	1	1	1	1	1	0.3	1	2	2	9	413%
Ribbon	0.4	1	1	0.3	0.3	0.2	0.2	0.1	0.2	0.1	0.1	0.1	4	-89%
Thetanuts	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	1	105%
Index Coop	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.1	0.1	1	-65%
Unipilot	0.065	0.074	0.169	0.101	0.054	0.023	0.039	0.009	0.007	0.011	0.010	0.014	0.6	61%
PoolTogether	0.029	0.019	0.018	0.026	0.014	0.023	0.007	0.005	0.017	0.004	0.004	0.004	0.2	-92%
Tokemak	0.022	0.027	0.027	0.018	0.010	0.004	0.004	0.001	0.001	0.000	0.001	0.000	0.1	-99%
Alongside	0.001	0.002	0.002	0.002	0.002	0.000	0.002	0.002	0.002	0.004	0.000	0.004	0.02	*
Cryptex	0.000	0.000	0.001	0.000	0.001	0.002	0.001	0.001	0.001	0.002	0.004	0.004	0.02	-57%
Total	18	20	21	20	18	15	17	11	9	9	12	14	183	-57%

Figure 40: Monthly Asset Management fees per project [in \$ M]

*Year-to-year comparisons could have led to misleading conclusions.

Figures 41 and 42 show the dominance of Convex over the rest of the category.



Figure 41: Monthly Asset Management fees in 2023 [in \$ M]



Figure 42: Yearly Asset Management fees since 2020 [in \$ M]

3.9. Stablecoin Issuers

According to Figure 43, the yearly fees generated by **Stablecoin Issuers** decreased by 2% in 2023 compared to 2022. Even though this category is stagnant in terms of generated fees, it is vibrant when it comes to technological innovation. Yield bearing stablecoins that are backed by bonds are growing in popularity. Real world assets is an innovation that has a growing positive impact on several of the categories mentioned in this report. Given the enormous size of the bonds market (\$133tn), this category is the first one benefiting from real world yield.

The fees of the emitters of USDC (Circle) and USDT (Tether) are not included in Figures 43, 45, and 46. But the volume of USDC and USDT are included in Figure 44. It is also important to note that MakerDAO is a **Stablecoin Issuer** and a **Lender**, yet this report categorizes MakerDAO as a **Stablecoin Issuer**.

Stablecoins \$m	Jan 23	Feb 23	Mar 23	Apr 23	May 23	Jun 23	Jul 23	Aug 23	Sep 23	Oct 23	Nov 23	Dec 23	SUM 2023	2023 vs 2022
MakerDAO	3	3	3	3	3	4	5	18	13	25	30	16	126	22%
Abracadabra	0.3	0.3	0.5	0.4	0.4	0.5	0.4	0.2	0.1	0.1	0.1	0.1	3	-88%
Liquity	0.4	0.1	0.8	0.2	0.1	0.1	0.2	0.3	0.5	0.6	0.4	0.3	4	-2%
Origin DeFi	0.1	0.1	0.3	0.1	0.2	0.3	0.6	0.4	0.4	0.4	0.4	0.6	4	-15%
Reflexer	0.02	0.01	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.1	-83%
Vesta	0.07	0.09	0.06	0.02	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.3	-57%
Angle	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.02	0.03	0.03	0.1	*
Total	4	4	4	4	4	5	7	19	14	26	31	17	137	-2%

Figure 43: Monthly **Stablecoin Issuers** fees per project in 2023 [in \$ M]
 *Year-to-year comparisons could have led to misleading conclusions.

Figure 44 highlights the stagnation in total stablecoin supply, from 2022 to 2023.

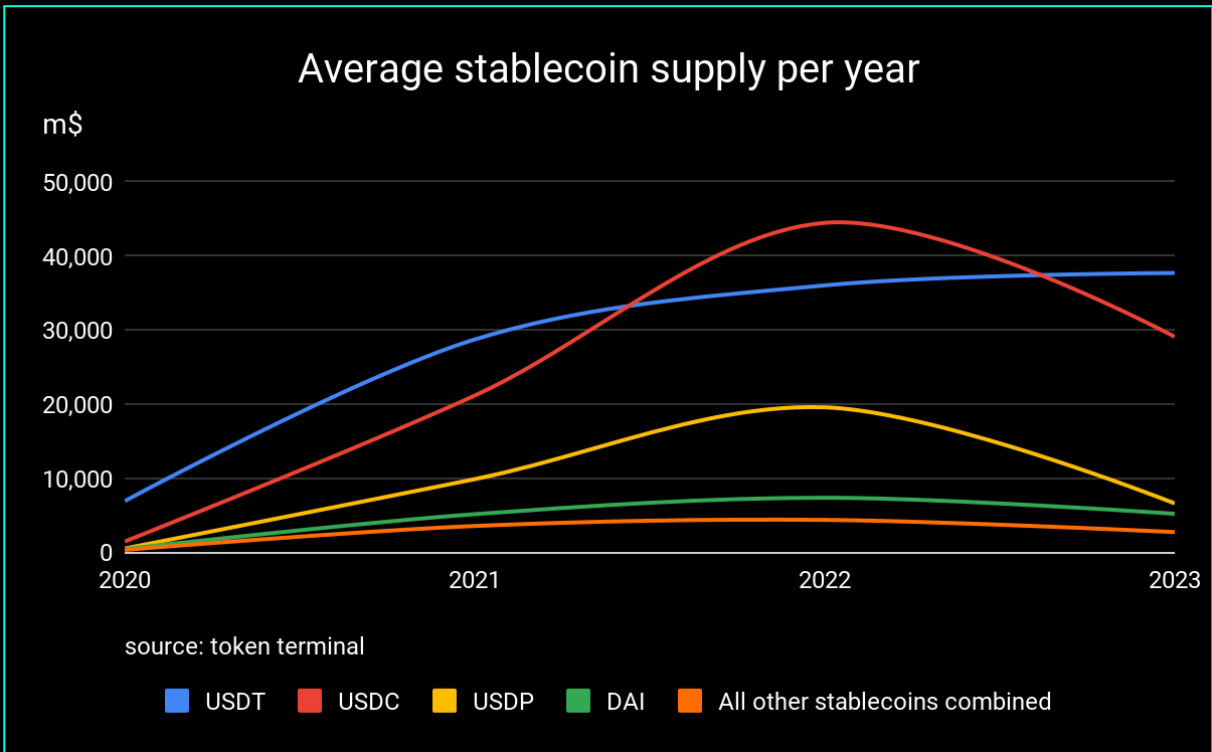


Figure 44: Yearly Stablecoin supply [in \$ M]

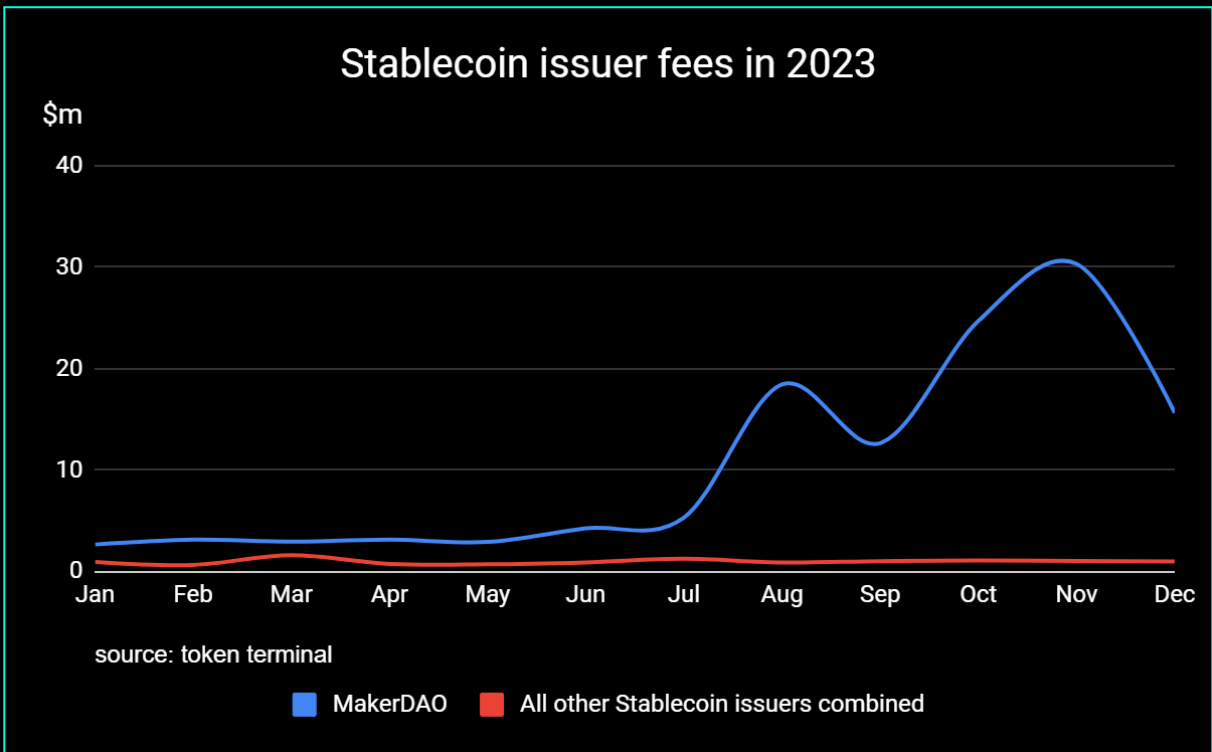


Figure 45: Monthly Stablecoin Issuers fees in 2023 [in \$ M]

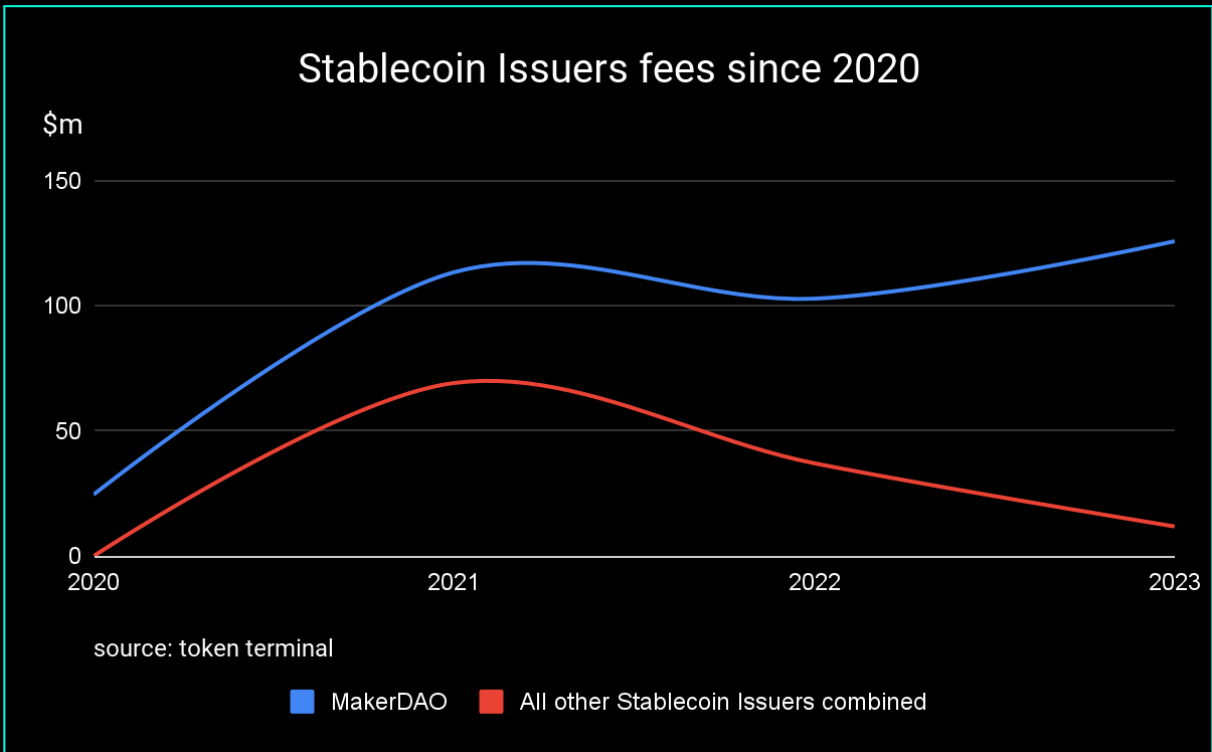


Figure 46: Yearly **Stablecoin Issuers** fees since 2020 [in \$ M]

3.10. Infrastructure

In Figures 47, 48 and 49; we can note a 35% decrease in fees generated by the **Infrastructure** category from 2022 to 2023. The significant developments in this category are:

- The rise of the fees generated by Flashbots, the leader in the MEV space, with a 113% increase in generated fees.
- ENS, the domain name leader, had a 66% decline in 2023, compared to 2022.
- Following the arrest of several team members, Tornado Cash experienced an 83% reduction in collected fees.

Infrastructure \$m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	SUM 2023	2023 vs 2022
Flashbots	7	7	8	5	9	3	4	3	3	3	4	4	58	113%
ENS	1.9	2.3	1.7	1.9	1.4	1.5	1.4	2.1	1.0	1.2	1.2	1.4	19	-66%
Instadapp	0.4	0.4	0.5	0.5	0.7	0.4	0.6	0.5	0.4	0.4	0.5	0.6	6	-2%
DeFi Saver	0.1	0.1	0.2	0.2	0.2	0.3	0.1	0.3	0.1	0.2	0.2	0.3	2	-60%
Tornado Cash	0.1	0.1	0.2	0.2	0.3	0.2	0.2	0.2	0.2	0.1	0.2	0.2	2	-83%
Helium	0.3	0.2	0.3	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.3	2	-94%
The Graph	0.04	0.08	0.06	0.08	0.07	0.06	0.03	0.03	0.09	0.02	0.11	0.05	1	-34%
Livepeer	0.03	0.03	0.03	0.03	0.02	0.02	0.03	0.04	0.03	0.02	0.02	0.03	0.3	-24%
Swarm	0.00	0.01	0.04	0.00	0.00	0.01	0.01	0.04	0.04	0.04	0.06	0.00	0.2	*
Pocket	0.00	0.00	0.00	0.00	0.04	0.02	0.03	0.03	0.03	0.03	0.01	0.01	0.2	*
Zerion	0.01	0.01	0.03	0.03	0.03	0.02	0.02	0.01	0.01	0.01	0.01	0.02	0.2	20%
Total	10	10	11	8	12	6	7	7	5	5	6	7	92	-35%

Figure 47: Monthly **Infrastructure** fees per project [in \$ M]

*Year-to-year comparisons could have led to misleading conclusions.

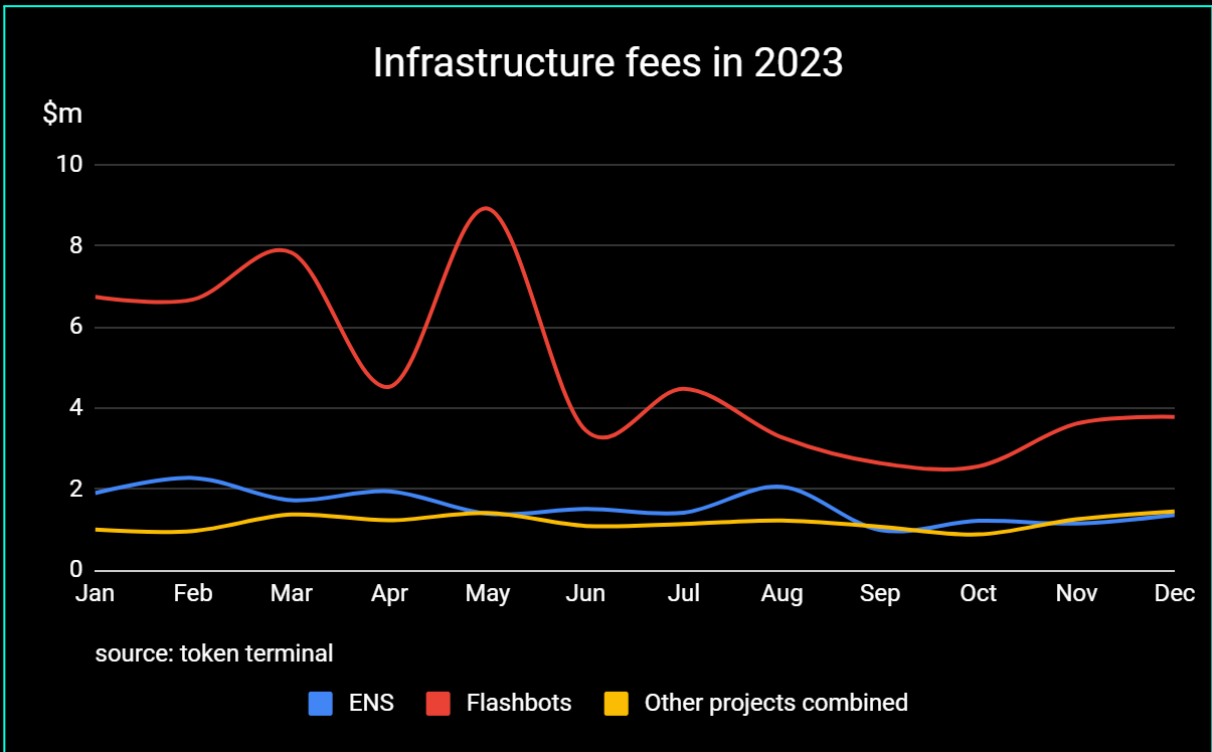


Figure 48: Monthly Infrastructure fees in 2023 [in \$ M]

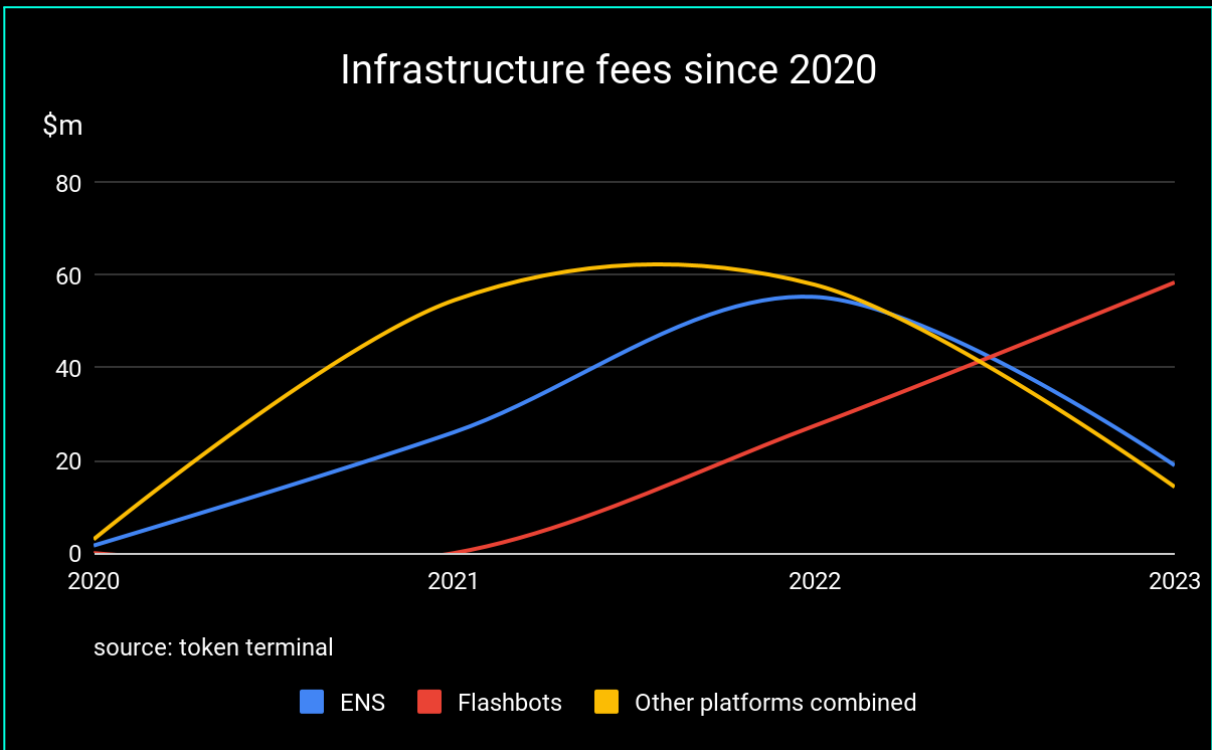


Figure 49: Yearly Infrastructure fees since 2020 [in \$ M]

3.11. Liquidity Bridges

As shown by Figures 50 and 51, the category has witnessed a 14% decline in generated fees. Leading the category is the Stargate bridge which saw a 373% increase in fees generated in 2023 compared to 2022. The Ren bridge generated fees decreased dramatically after being accused of money laundering last year (Katte) (12).

Liquidity Bridges \$m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	SUM 2023	2023 vs 2022
Stargate	0.1	0.2	1	1	1	2	2	2	1	1	0.5	1	11	373%
Hop Protocol	0.2	0.3	0.7	0.6	0.6	0.2	0.2	0.3	0.2	0.2	0.6	0.6	4.7	-10%
Synapse	0.3	0.6	0.6	0.5	0.4	0.2	0.2	0.3	0.1	0.2	0.2	0.3	3.9	-63%
Across	0.1	0.1	0.3	0.2	0.2	0.1	0.2	0.2	0.2	0.3	0.5	0.7	3.2	68%
AllBridge	0.00	0.01	0.03	0.00	0.00	0.01	0.01	0.01	0.01	0.02	0.04	0.26	0.4	*
Connex	0.00	0.01	0.01	0.01	0.02	0.01	0.01	0.01	0.00	0.01	0.01	0.01	0.1	-72%
Ren	0.0016	0.0011	0.0021	0.0005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0053	-100%
Total	0.7	1.2	2.3	2.4	2.4	2.3	2.8	2.5	1.4	1.2	1.9	2.4	23.5	-14%

Figure 50: Monthly Liquidity Bridges fees per project [in \$ M]

*Year-to-year comparisons could have led to misleading conclusions.

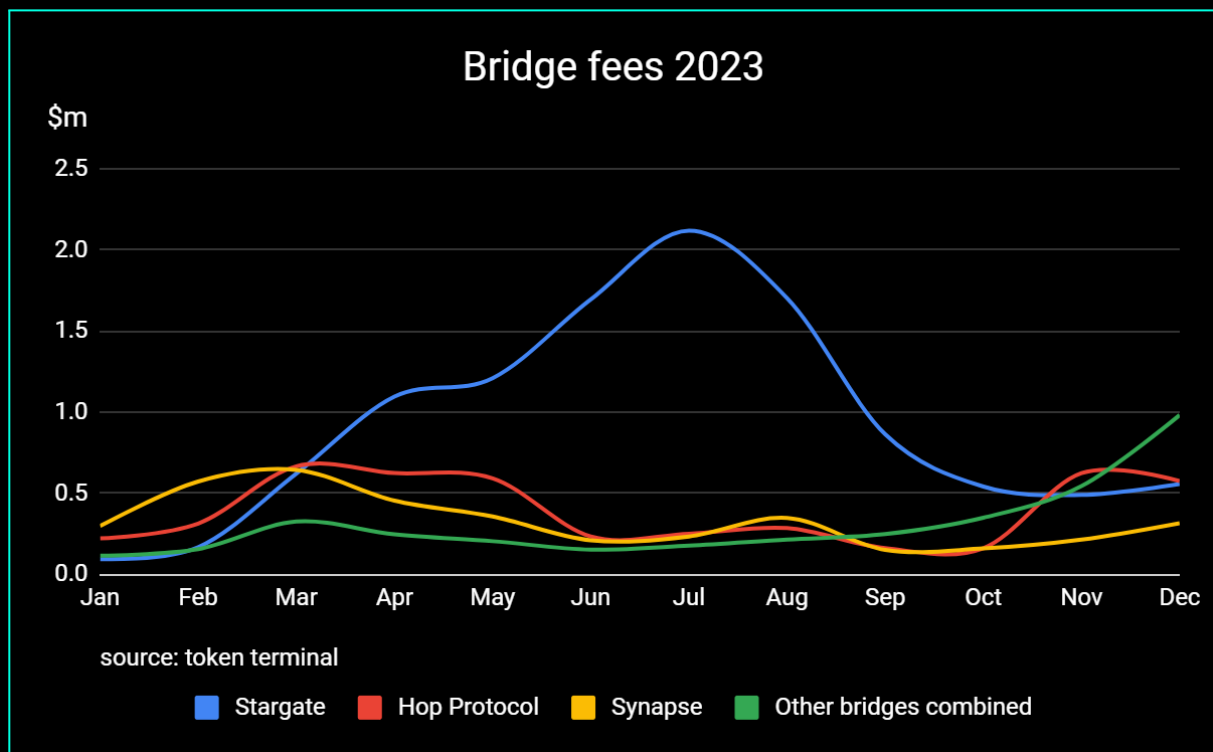


Figure 51: Monthly Liquidity Bridges fees in 2023 [in \$ M]

As shown in Figure 52, a new leader emerges each year among Liquidity Bridges.

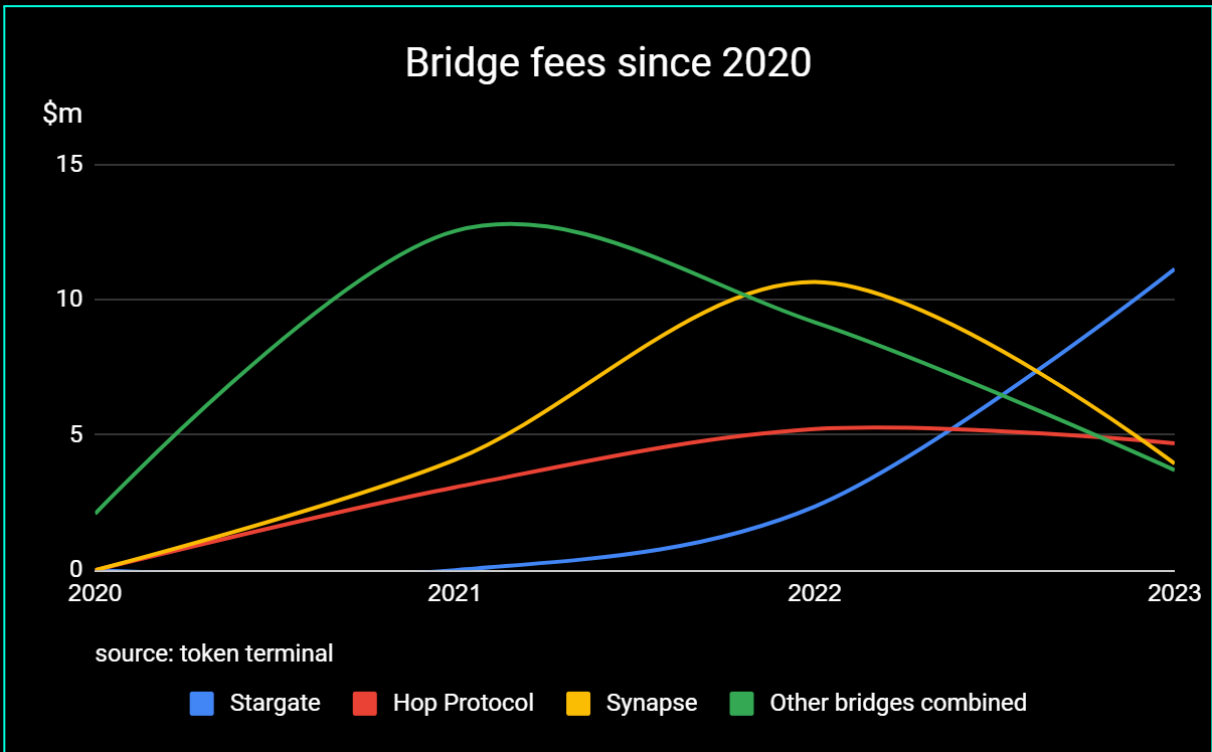


Figure 52: Yearly Liquidity Bridges fees since 2020 [in \$ M]

4. Conclusion

To conclude the report, let's summarize the key trends:

- The year 2023 witnessed the lowest annual fees generated since 2021.
- September recorded the lowest fee generation, while December exhibited the highest.
- **Layer 2s** saw the most growth, with a 411% year-to-year increase in fees generated.
- **NFT Marketplaces** category registered the largest drop, by 87%.
- **Layer 1s** category retained its dominance, although there has been a notable shift in distribution among the top leaders.

The total on-chain fees amounted to \$7.7 billion, marking a decrease of \$3.8 billion from 2022, and a stark 64% drop from the 2021 peak. Figure 53 outlines the crypto economy contraction in 2023.

Year	2020	2021	2022	2023	2023 vs 2022	2023 vs 2021
Fees from selected projects M\$	1,415	21,364	11,432	7,682	-33%	-64%

Figure 53: Annual Fees generated by the cryptonative economy (2020-2023) [in \$M]

The year 2023 was marked by a 33% reduction in fees from selected projects compared to 2022. Despite this overall contraction, the **Layer 2** sector witnessed a remarkable 411% increase in fee generation, underscoring its growing significance. **Liquid Staking Derivatives** also showed robust growth, with a 93% rise in fees, reflecting the sector's increasing relevance in the cryptonative economy.

Layer 1s maintained their prominence, with Ethereum, Tron, Bitcoin, BNB Chain, and Avalanche leading the pack. A notable shift occurred in September 2023 when Ethereum's dominance in fee generation was surpassed by the combined fees from all the other **Layer 1s**. This change was not due to a decline in Ethereum's user base, which remained stable at 350,000 daily active users, but rather an increase in transactions on other L1 platforms. Tron, for instance, experienced a 198% increase in fees and a 23% rise in its user base. Bitcoin's fee surge (461%) was attributed to the adoption of ordinals, while BNB Chain, despite growing its user base, experienced a fee reduction of -57%.

The top 10 dApps in terms of fee generation in 2023 were Lido, Uniswap, Convex, GMX, MakerDAO, Opensea, PancakeSwap, Aave, dYdX, and Manifold.xyz.

This list remained largely consistent from 2022, with the exception of LooksRare and SushiSwap being replaced by MakerDAO and Manifold.xyz. DEXs maintained their transaction volume at a similar level to 2022, yet their generated fees decreased by 51%, likely due to increased competition and the growth of L2s.

The Merge catalyzed a surge in **Liquid Staking**, with LSDs experiencing a 93% year-to-year fee increase. Lido benefited significantly, capturing 95% of the fees in this category, although competitors like Frax and Stader are emerging.

In the **DeFi Derivatives** sector, GMX notably dethroned dYdX. Overall, in terms of fees, this category consolidated.

In the **Lending** category, competition intensified with BNB native Venus rising as a strong contender against Aave. Despite this, the total volume and fees in the lending sector fell by about a third.

NFT Marketplaces recorded the largest drop (-87%) in terms of generated fees. The launch of Blur and changes in Opensea's pricing led to an overall fee reduction and change in royalties structure. OpenSea surprisingly kept the lead in the category despite a 91% year-over-year collected fees reduction. The same was achieved by Convex in the **Asset Management** category, which recorded a 57% annual drop in generated fees.

This year's report not only highlights the industry's resilience but also showcases its dynamic innovation. Despite the decline in total fees, the industry has demonstrated consolidation, introspection, and even selective growth, setting the stage for more affordable services and a self-sufficient economic landscape.

In conclusion, the ultimate beneficiary of these developments is the user, who stands to gain from an increasingly diverse and sophisticated cryptonative economy.

In other words, we are looking forward to 2024.

The PWN team

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