

Web3 Development Report

Ethereum Ecosystem and Beyond in 2023



TL;DR

The state of web3 development

EXECUTIVE SUMMARY



EVM development grows

The last five years of EVM development have shown consistent growth with SDK installs reaching ATHs each year.



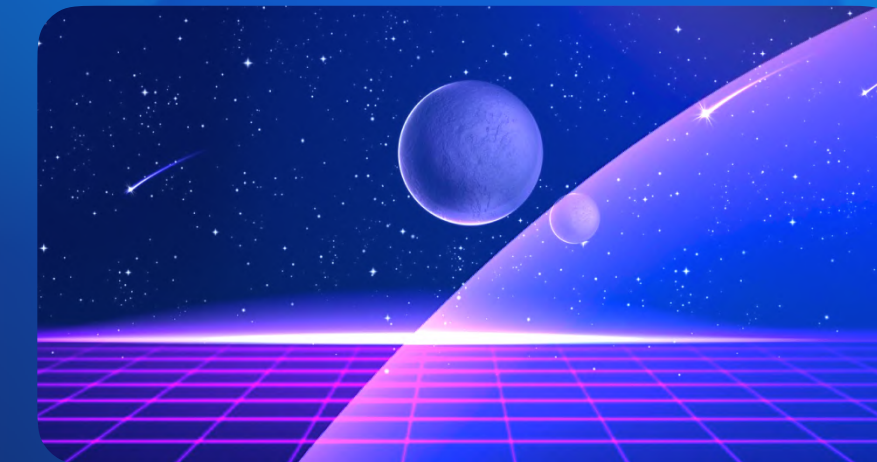
Solana regains momentum

Solana activity quickly gained momentum, competing with Ethereum's DEX and NFT volume in Q4.



ERC-4337 gains adoption

1.8 million total accounts deployed in just two quarters.



NFT market share shifts

Solana and Polygon chip away at Ethereum's long-held market share, snagging 8% of NFT volume.



L2s create new rollup frameworks

The OP Stack, Arbitrum Orbit and Polygon's CDK allowed new chains to launch as either L2s (settling to Ethereum) or L3s (settling to the layer 2).

Web3 devs
drive activity to new
ATHs in 2023

106.4M

+31% Y/Y
Ethereum SDK Installs

254.54M

+303% Y/Y
EVM Smart Contracts created across Ethereum Mainnet,
Arbitrum, Optimism and Polygon

40.4M

+126% Y/Y
Wallet SDK Installs

NFTs and DeFi fell while tokens rebounded

NFTs

-76% Y/Y

Trading volume to **\$12.78B USD**

DeFi

-30.28% Y/Y

DeFi trading volume to **\$862.63B**

Token Prices



+154% Y/Y
BTC



+91% Y/Y
ETH



+931% Y/Y
SOL

Exciting **Web3** Use Cases in Action



NFT

[Pudgy Penguins](#) launched its toy and collectible line in collaboration with Walmart and zkSync, generating new licensing opportunities for Pudgy holders.



Loyalty

[Boba Guys](#) launched its onchain loyalty program using Solana and plans to integrate NFTs and token-gated experiences to drive consumer engagement.



Supply Chain

[WiPro](#) deploys Falcon, a new supply chain platform incubated by Shell and powered by Polygon PoS and Alchemy's account abstraction stack, allowing manufacturers, buyers and operators to track heavy equipment through its full life-cycle.



Auth

[Fox Corporation](#) released Verify, its product for content authentication that allows media companies to register content and grant usage rights to AI platforms, and allow consumers to verify the content is authentic



TradFi

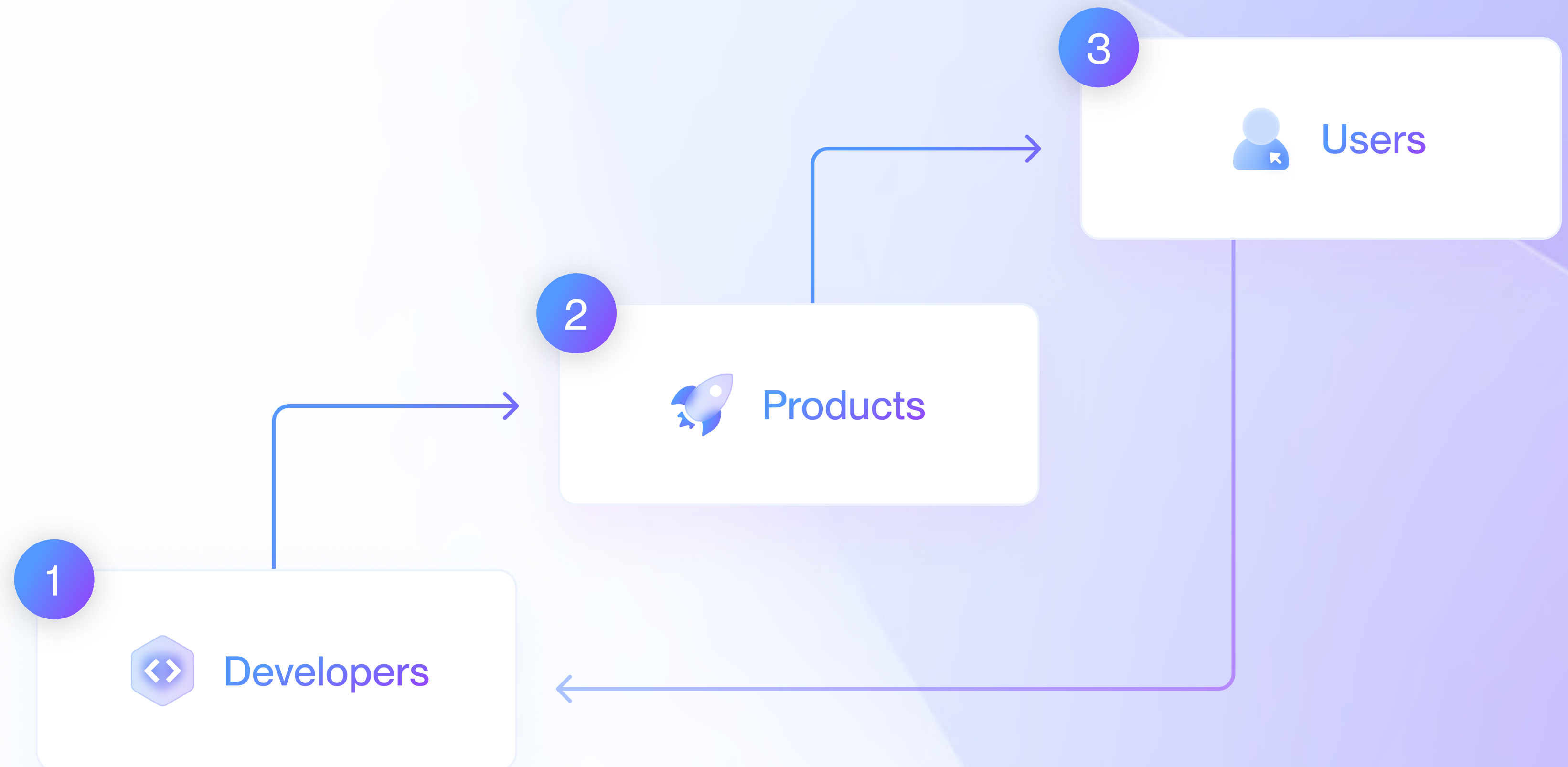
[Franklin Templeton](#) launched the Franklin OnChain U.S. Government Money Fund on Polygon, the first U.S.-registered mutual fund to use a public blockchain to process transactions and record share ownership.

Our approach

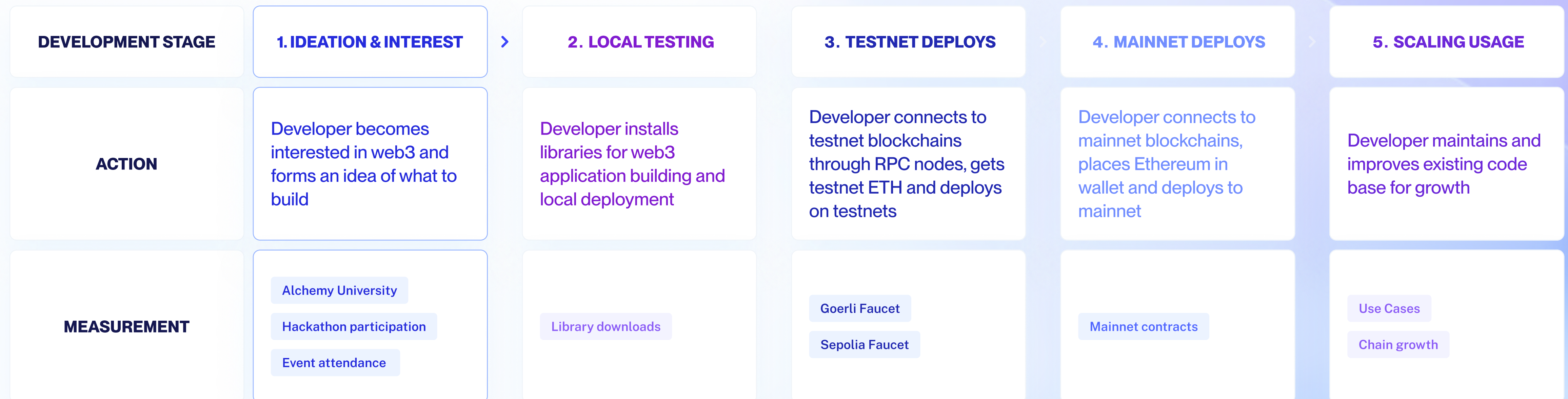
Understanding the builder ecosystem

The development cycle

Developers build new products, which onboard more users, which then attract more builders to the web3 space



5 stages of developer activity



Measuring builder momentum

These 3 indicators show us how devs are **building**, **deploying**, and **scaling**

Libraries

Developer tools to easily read/write to the blockchain



Smart contracts

Computer programs stored on a blockchain



Dapps

End-user ready applications with decentralized backends

1 Ideation & interest

2 Local development

3 Testnet developer activity

4 Mainnet developer activity

5 Scaling usage

6 Trends and insights

Developer sentiment and increasing desires to learn about blockchain development signals growing interest in building web3 products.



Developers **leveled up** their skills

Students used Alchemy University to learn web3 basics including Javascript, Solidity, and EVM fundamentals.

More than
69,000
students enrolled in Alchemy University

Students completed more than
674,000
lessons

JS for Ethereum was by far the most popular course with
359K
lessons completed

Events and hackathons drew huge crowds

The industry's top events and hackathons logged record attendance:

- **Solana's 2023 Hyperdrive hackathon** received **900+ final projects**, a 63% increase compared to Solana's Riptide Hackathon in 2022
- In 2023, **ETH Denver's attendance grew 50%**, recording its largest attendance in history with a total of **48,000 attendees**
- More than **6,000 developers** competed in ETH Denver's #BUIDLathon.

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Before launching projects on testnets or mainnet blockchains, devs build on their personal computers (i.e. locally) to test and iterate before shipping.

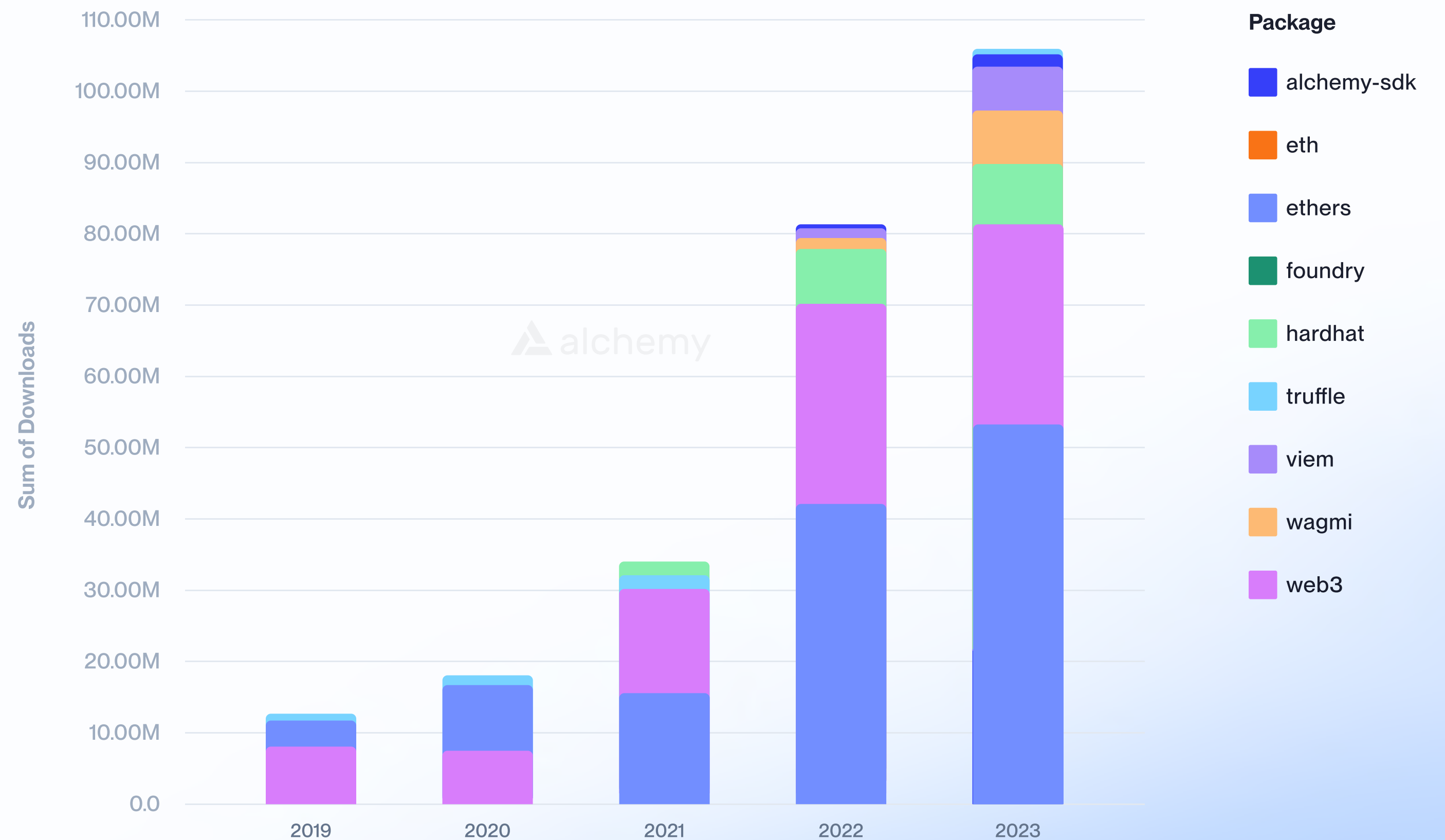
Total Ethereum SDK installs have consistently increased for the past 5 years

Ethereum SDKs include ethers, web3, hardhat, truffle, foundry, eth, alchemy-sdk, viem, userops, and wagmi

Ethereum SDK Installs by Year

2019	13.2M	
2020	18.1M	37% Y/Y
2021	33.4M	85% Y/Y
2022	81.4M	144% Y/Y
2023	106.4M	31% Y/Y

Source: npmjs.com



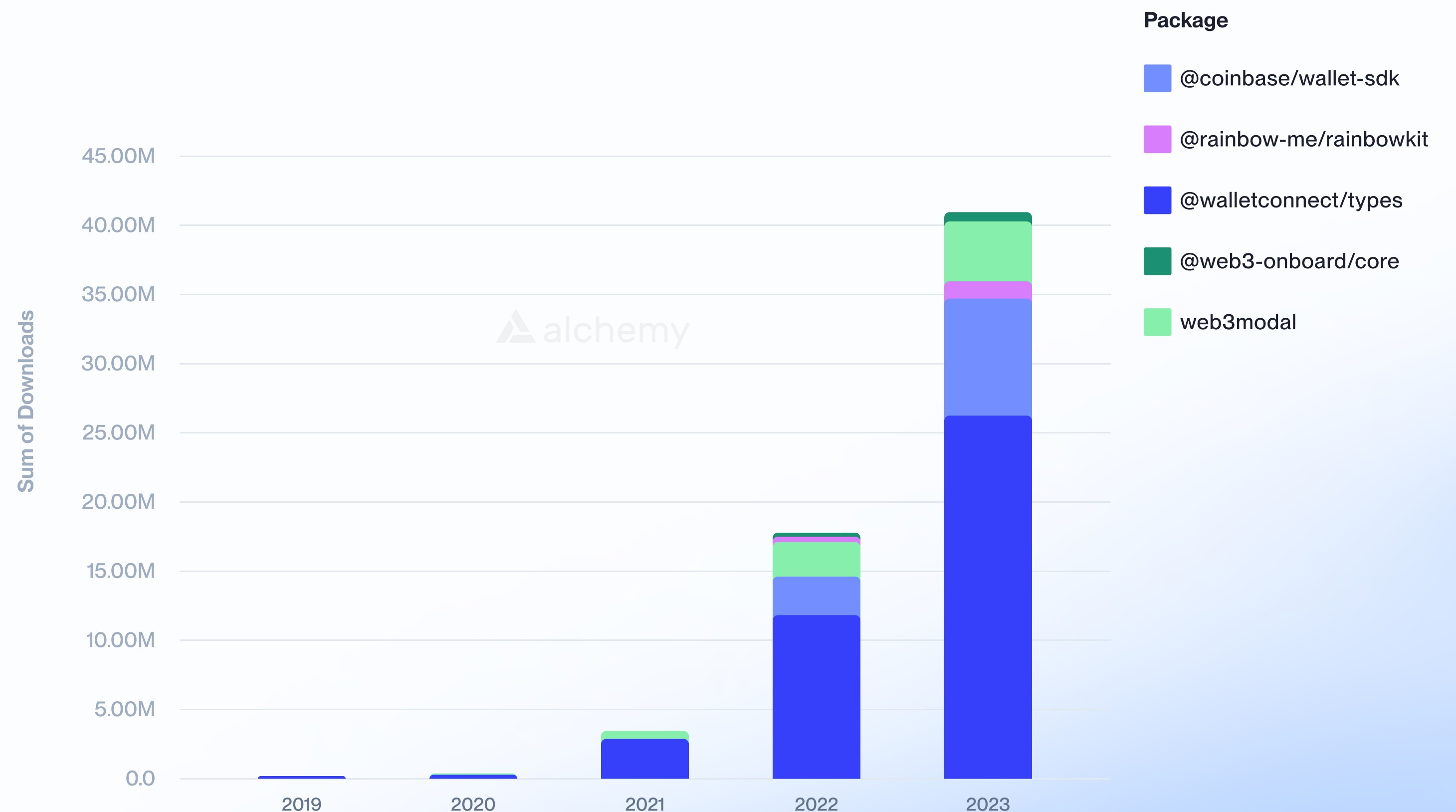
And weekly wallet SDK installs followed suit

Wallet SDKs include Coinbase Wallet, Rainbow, Web3 Onboard, and Web3 Modal which developers use to connect consumers to the Ethereum blockchain, signaling more dapps added wallet support.

Wallet SDK Installs by Year

2019	44.5K	
2020	440.6K	+891% Y/Y
2021	3.1M	+608% Y/Y
2022	17.9M	+474% Y/Y
2023	40.4M	+126% Y/Y

Source: npmjs.com



Developers deploy applications to testnets to refine their product on a blockchain that mirrors the mainnet environment without spending real ETH.

1 Ideation & interest

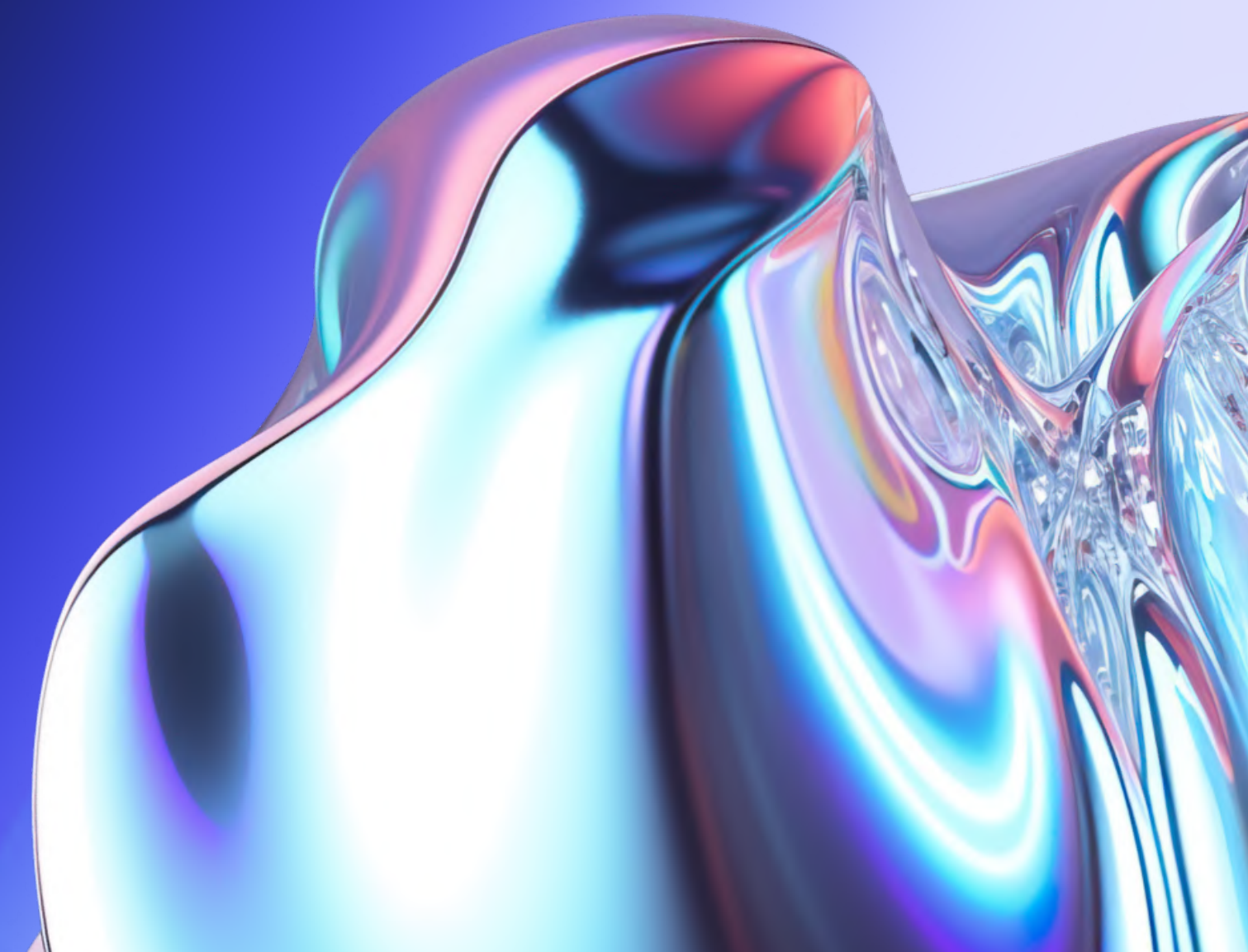
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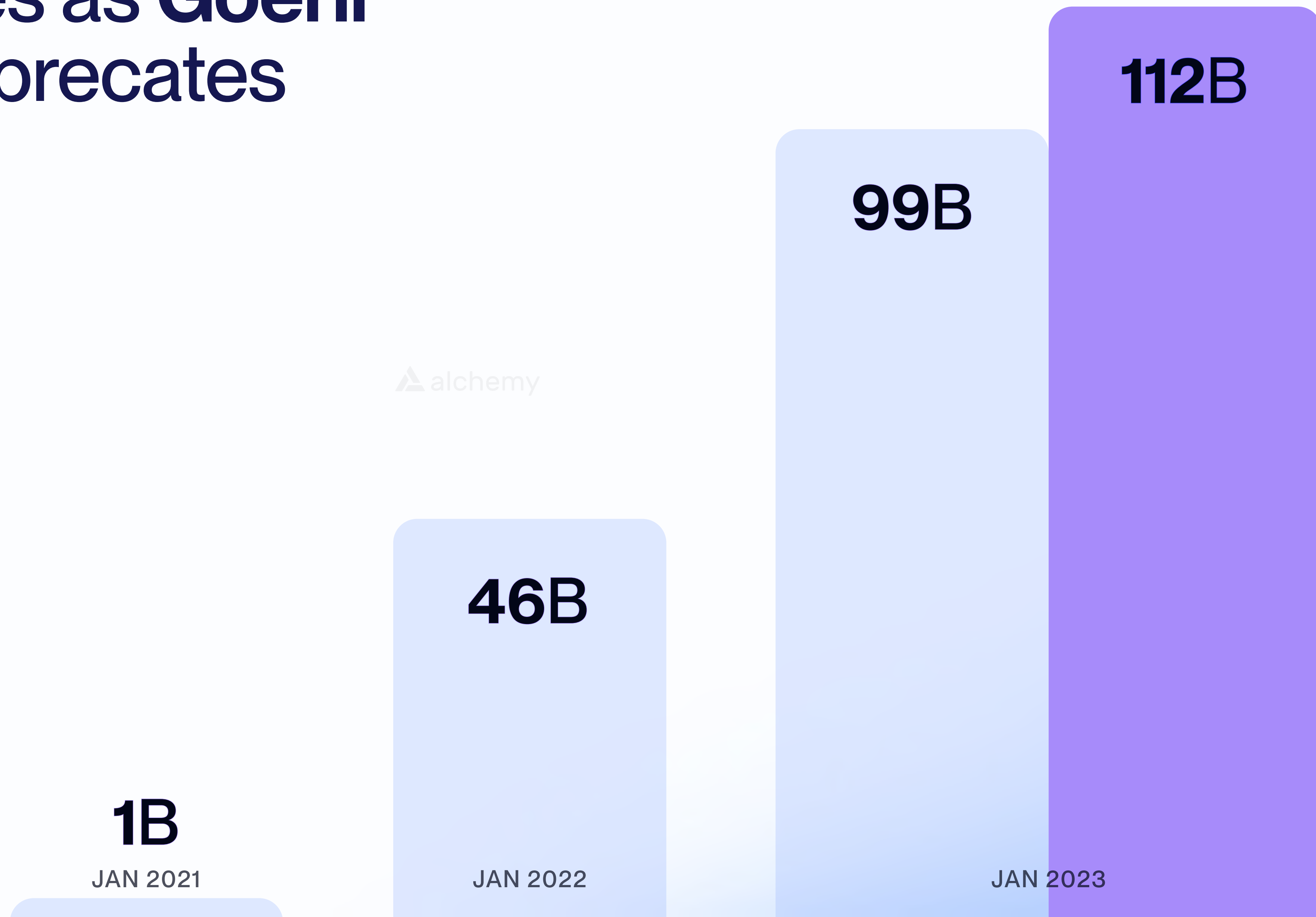
Sepolia rises as Goerli officially deprecates

Blockchain network:

■ ETH_GOERLI ■ ETH_SEPOLIA

alchemy

Source: Alchemy



Continued evolution of Ethereum testnets

Goerli leaves the stage;
Sepolia and Holesky enter



Image source: [eth-clients Github](#)

1 Ideation & interest

2 Local development

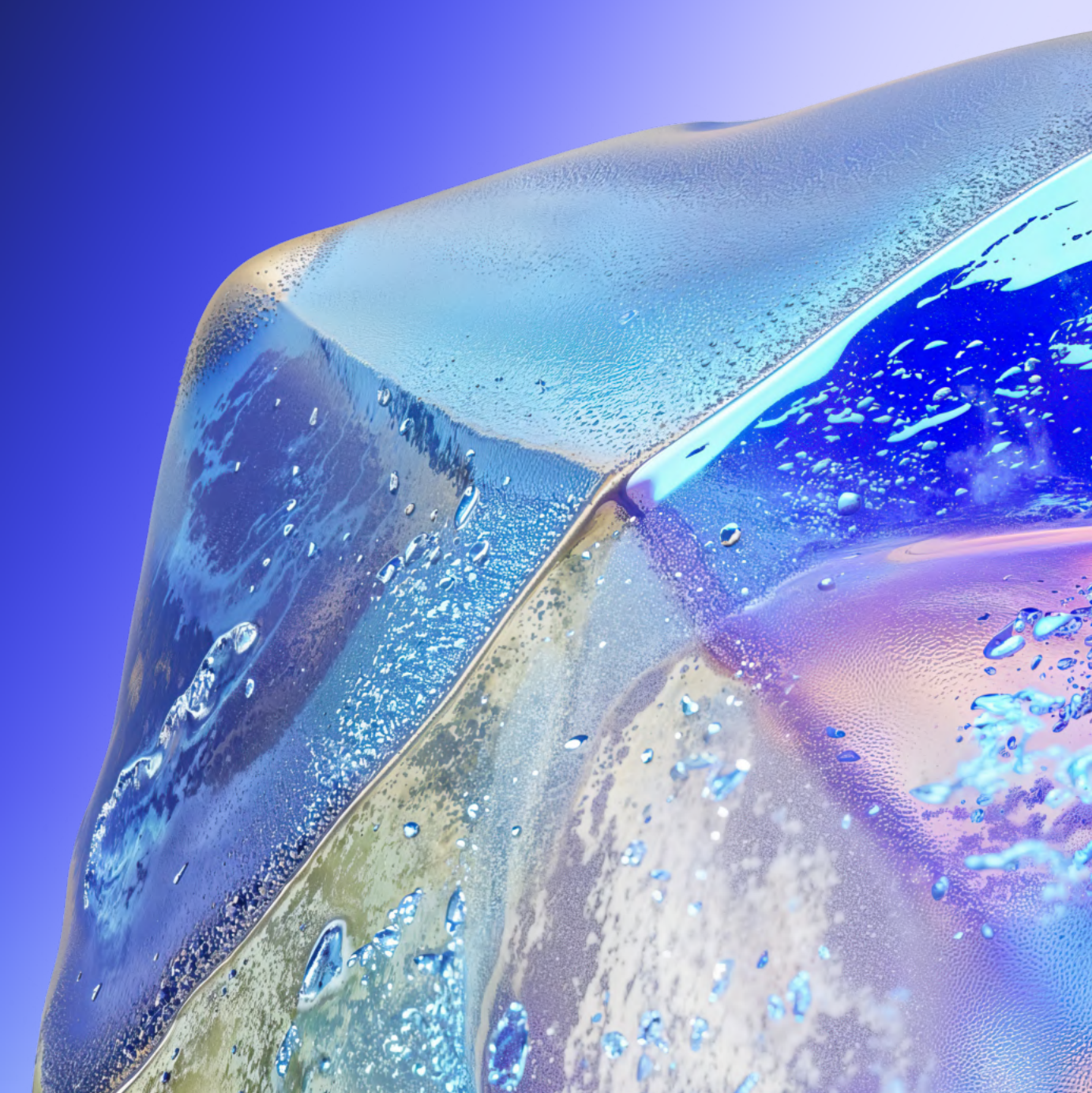
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Developers deploy tested applications to the mainnet when their product is ready to serve real users in a live environment.





Ethereum Milestones

- **Ethereum validators** withdrew staked ETH after the Shapella **upgrade in April**, contributing to growing interest in liquid staking and restaking.
- **EIP-4844**, and the **Dencun upgrade**, were a major focus for **Ethereum** core developers in 2023 and will make **data storage** and **transactions** more efficient for L2s.
- **The rollup-centric roadmap** came to fruition, as new rollup frameworks from **L2s** like the **OP Stack**, **Arbitrum Orbit** and **Polygon's CDK** allowed new chains to launch as either L2s (settling to Ethereum) or L3s (settling to the layer 2).



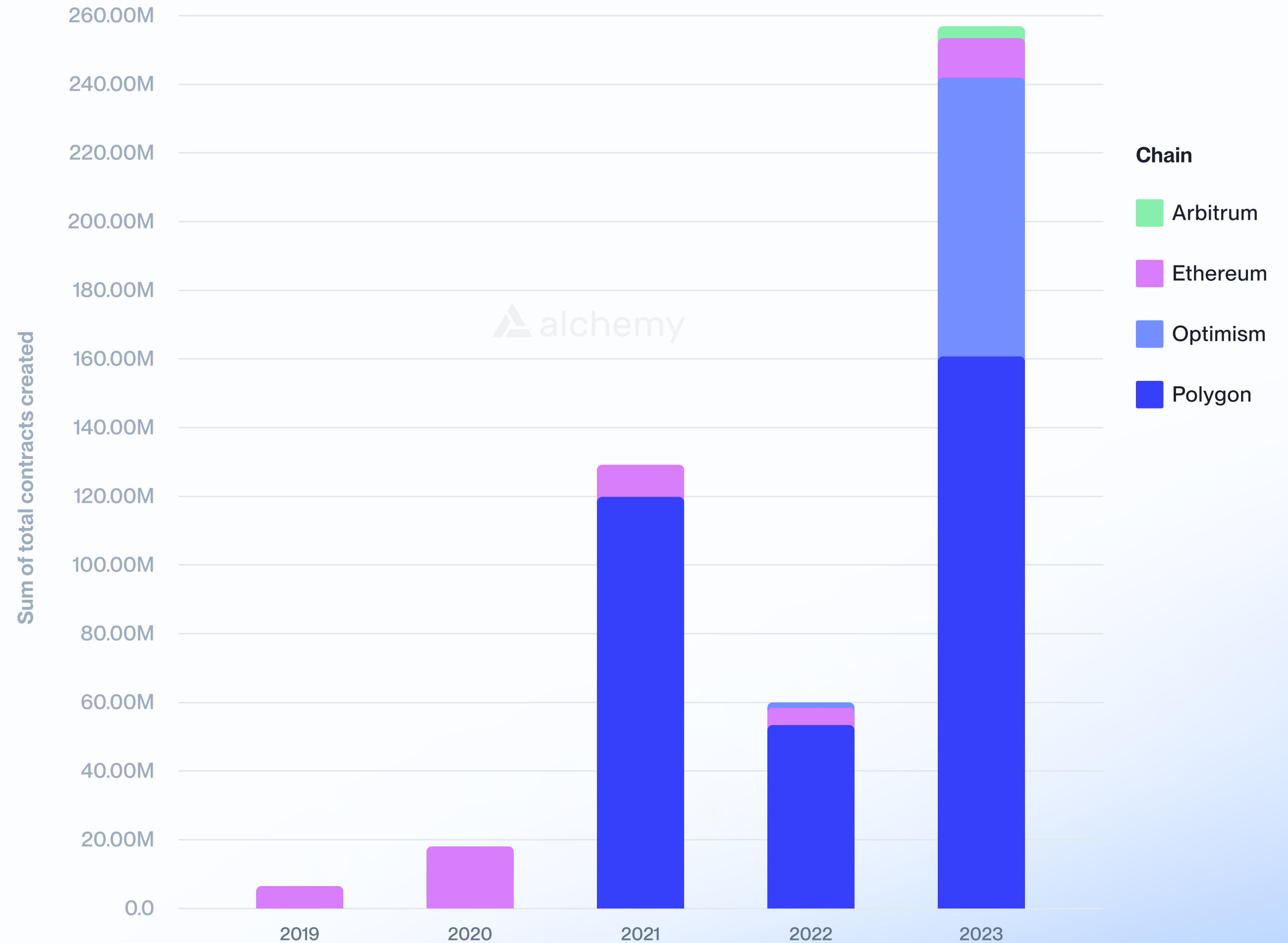
EVM L2 contracts grew 303.42% Y/Y

254.54M

contracts created in total

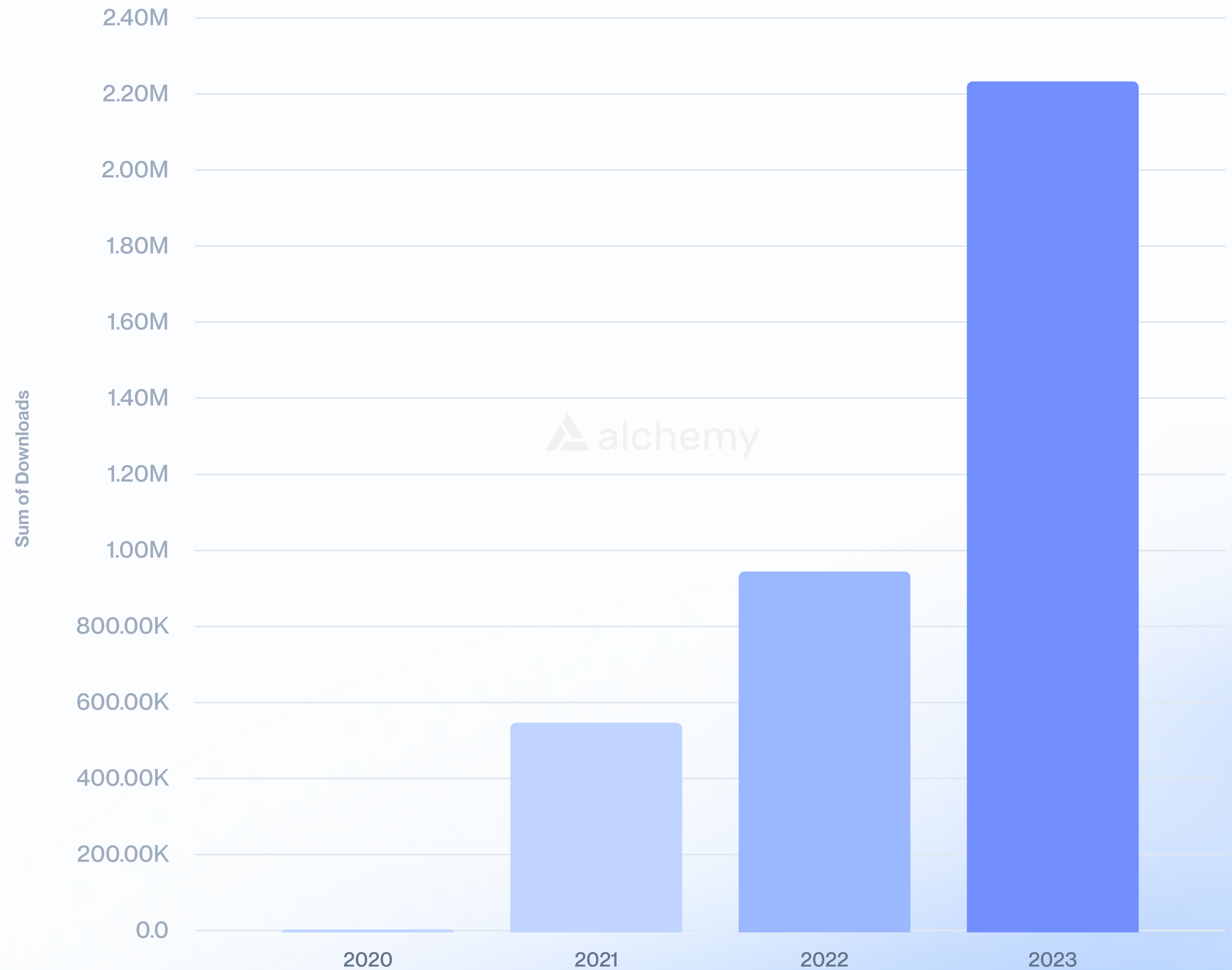
158.34M

created on Polygon alone



L2 bridging up 138.15% Y/Y

Total Unique Bridgers Ethereum to L1 Ethereum Mainnet to Abridum, Optimism, Starknet, and zkSync L2s



Source: Dune

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As web3 products attract real users and find product-market fit, developers need to scale their systems to support the increased consumer demand.



Polygon redefined web3 use cases for NFTs and DeFi

2023 Highlights:

Transitioned to **Polygon 2.0**, which included transforming Polygon PoS into a zero-knowledge validium counterpart to zkEVM rollup

Polygon launched **zkEVM in beta** on Ethereum mainnet in March 2023

Polygon became the default home **for tokenizing traditional finance funds**, led by Hamilton Lane and Franklin Templeton

Polygon helped **create novel loyalty programs** for big brands including Starbucks and Lufthansa

Expanded validator set to include Google and Amazon's cloud services

Source images: Google



Polygon dev activity on Alchemy continued to climb

Total Requests:

33% Y/Y

Active Teams:

4% Y/Y

Free Requests:

80% Y/Y

Free Teams:

3% Y/Y

Enhanced API Requests:

246% Y/Y

Source: Alchemy



Arbitrum released new, powerful developer tooling...

2023 Highlights:

The Arbitrum **DAO** and Arbitrum **Foundation** were launched to govern Arbitrum's **One** and **Nova** chains, along with the first airdrop of ARB tokens

Released **Arbitrum Stylus**, a programming environment adding C, C++ and Rust support for Arbitrum One and Arbitrum Nova

Launched **Orbit**, a toolkit for launching Arbitrum chains

Developed **BOLD**, a challenge protocol supporting permissionless validation

Offchain Labs partnered with **Espresso Systems** to build a decentralized sequencer protocol

Source images: Google



...driving Arbitrum devs and activity growth on Alchemy

Total Requests:

156% Y/Y

Active Teams:

406% Y/Y

Free Requests:

176% Y/Y

Free Teams:

416% Y/Y

Enhanced API Requests:

3,995% Y/Y

Source: Alchemy



Optimism launched new upgrades and Base support

2023 Highlights:

Source images: Google

Implemented the **Bedrock network upgrade** to a modular structure allowing multiple proof types

Announced the **Superchain**, a network of interoperable OP Stack chains

Enacted the “**Law of Chains**” a social, technical and economic framework governing the **Optimism Superchain**

OP Stack chains expand to include **Coinbase’s Base**

Celestia Labs builds first modularization of OP Stacks’ DA layer

OP

Optimism builders showed their strength

Total Requests:

36% Y/Y

Active Teams:

41% Y/Y

Free Requests:

189% Y/Y

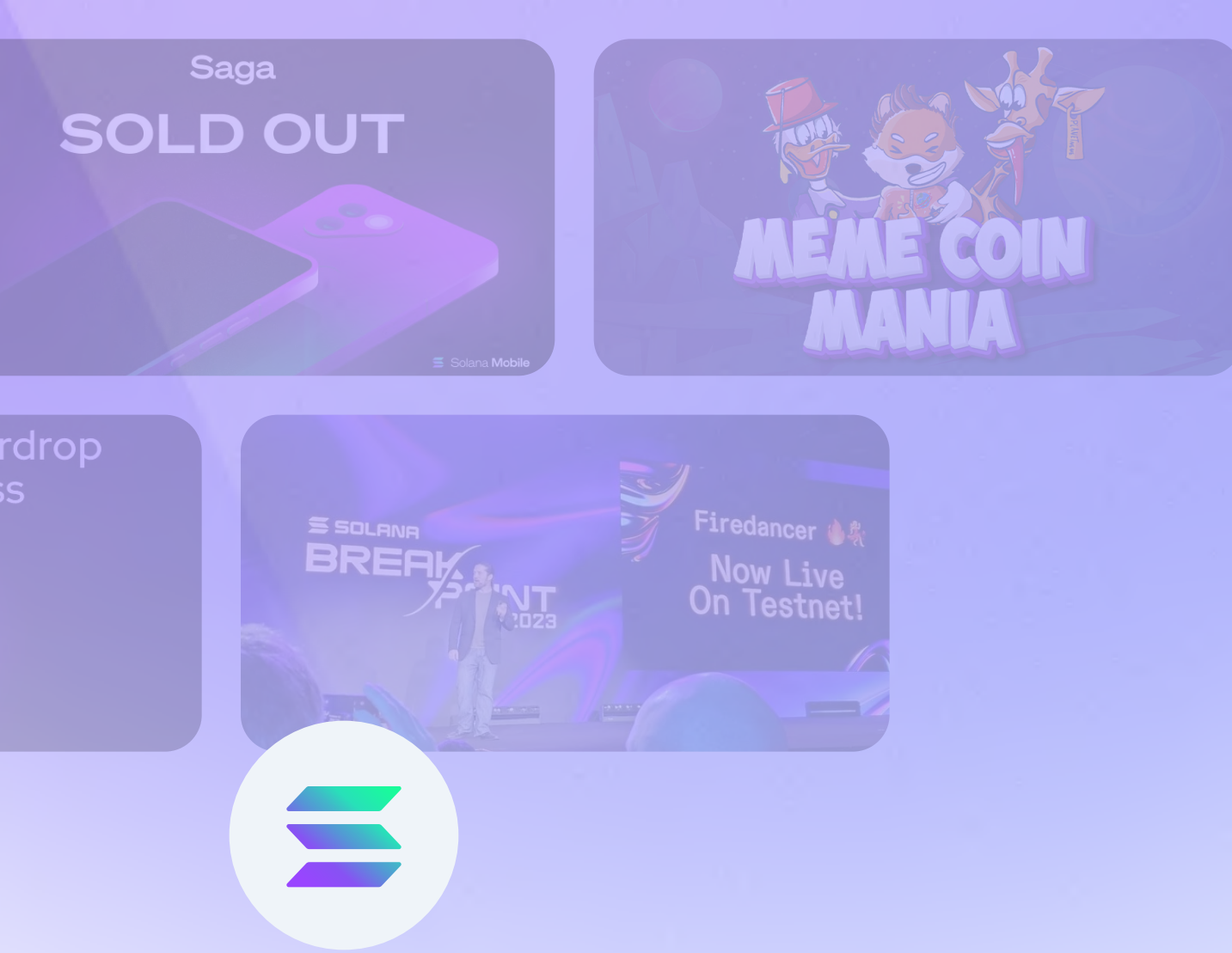
Free Teams:

39% Y/Y

Enhanced API Requests:

695% Y/Y

Source: Alchemy



Solana had a breakout year

2023 Highlights:

Source images: Google

- Solana total **DEX, NFT, and USDC** transfer volumes topped Ethereum in Q4
- Pyth and Jito airdrops **kicked off DeFi 2.0**, challenging Ethereum's dominance
- Meme Coin mania** took over Solana with tokens like BONK and Dogwifhat driving DEX volumes on Solana to a monthly high of \$28.48 billion in December 2023
- Solana's Saga phone** sold out after people discovered they contained 30 million free \$BONK, which covered the cost of the phone
- The team behind **Firedancer**, Solana's upcoming **validator client**, reached an important milestone after launching a partial implementation, **Frankendancer**, on **testnet**



Solana dev activity soared in 2023

Total Requests:

180% Y/Y

Active Teams:

210% Y/Y

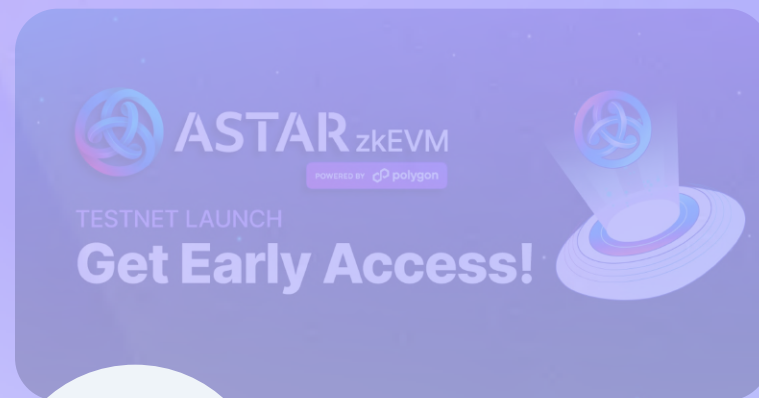
Free Requests:

192% Y/Y

Free Teams:

219% Y/Y

Source: Alchemy



Astar brought big brands and devs together

2023 Highlights:

Launch of Wasm on **Astar**, the first parachain supporting Wasm smart contracts in the Polkadot ecosystem

Launch of **Astar zkEVM Testnet** in collaboration with Polygon Labs

Sony Network Communications **incubated** 19 projects with the Astar Foundation

Astar held its **first global hackathon** with Toyota and its **second hackathon** with Mazda and Mitsubishi Estate

JR Kyushu Railway, Tokyo Railway, and Calbee engaged customers with NFT tech on Astar

Source images: Google



Astar devs were Alchemy API power users

Total Requests:

63% Y/Y

Active Teams:

242% Y/Y

Free Requests:

32% Y/Y

Free Teams:

243% Y/Y

Enhanced API Requests:

39,465% Y/Y

Source: Alchemy



Technical innovations attract lots of activity and interest to Starknet

2023 Highlights:

Source images: Google

Cairo Zero was upgraded to the **new Cairo**, the Turing-complete programming language for writing provable programs

StarkEx passed **\$1 trillion** in cumulative trading, and Starknet, during several weeks in 2023, scaled more activity on Ethereum than all the other L2s combined

In 2023, Starknet's developer ecosystem grew by 14% to become the [8th largest crypto developer community](#)

The release of **Starknet Alpha v0.12.0** provided enhanced performance and scalability, resulting in a 10x increase in throughput

Starknet's first appchain launched in **July 2023**

Things we found interesting in 2023

- 1 Ideation & interest
- 2 Local development
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- 4 Mainnet developer activity
- 6 Scaling usage
- 6 Trends and insights**

Major Moments in Web3

2023 was a big year for reshaping the industry in terms of tightening security, professionalizing services, and shipping new use cases. Here are a few highlights.

- **FTX fallout:** After the **high-profile implosion of FTX** in **2022**, Sam Bankman-Fried was found guilty on **seven federal counts** and convicted on **fraud and money laundering charges**. The **collapse** cast a shadow over the Solana ecosystem for much of **2023**.
- **Tokenization:** Demand for onchain **Real World Assets (RWAs)** increased **more than 4x** in **Q4** alone to over **\$5.6B** in assets, while traditional finance institutions made **big strides** in **tokenizing securities on private networks**.
- **Crypto ETFs:** Years of **legal and regulatory work** by industry leaders culminated in **victories** in **2023** that paved the way for the **January 2024 approval** of the **first spot Bitcoin ETFs**.

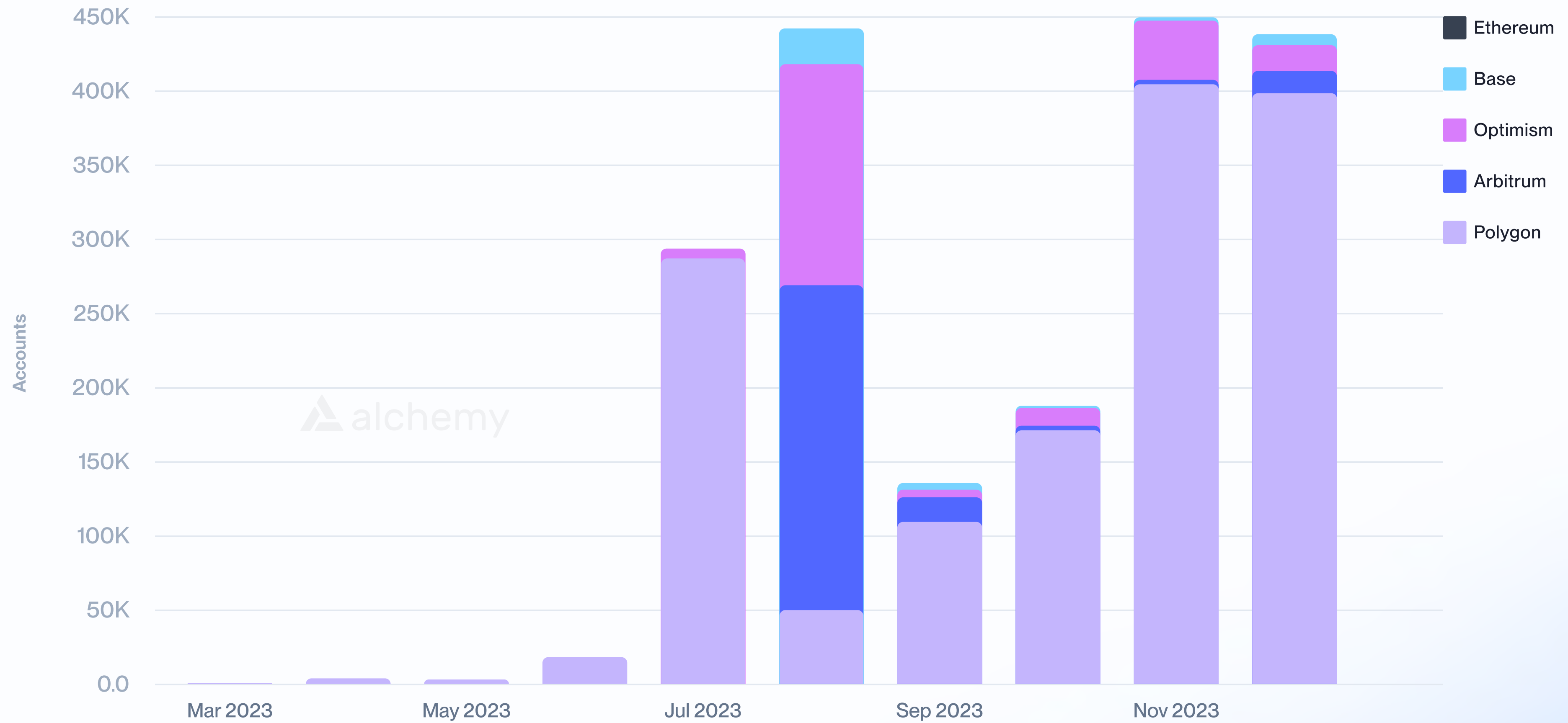
A look at **Account Abstraction's** breakout year

ERC-4337 smart account adoption saw major growth in the fourth quarter of 2023, surpassing **1 million total deployed accounts**.

- **Account Abstraction** was introduced in **Q3** and brought with it new features like sponsored gas and social login to simplify user experiences.
- Over **960,000** new **ERC-4337** accounts were created by Q4, representing **53%** of the total **1.8 million** deployments to date.
- Companies including **Visa, Wipro/Shell, and Circle** have already begun integrating Account Abstraction.

Polygon led all chains with active Smart Accounts

Monthly Active Accounts

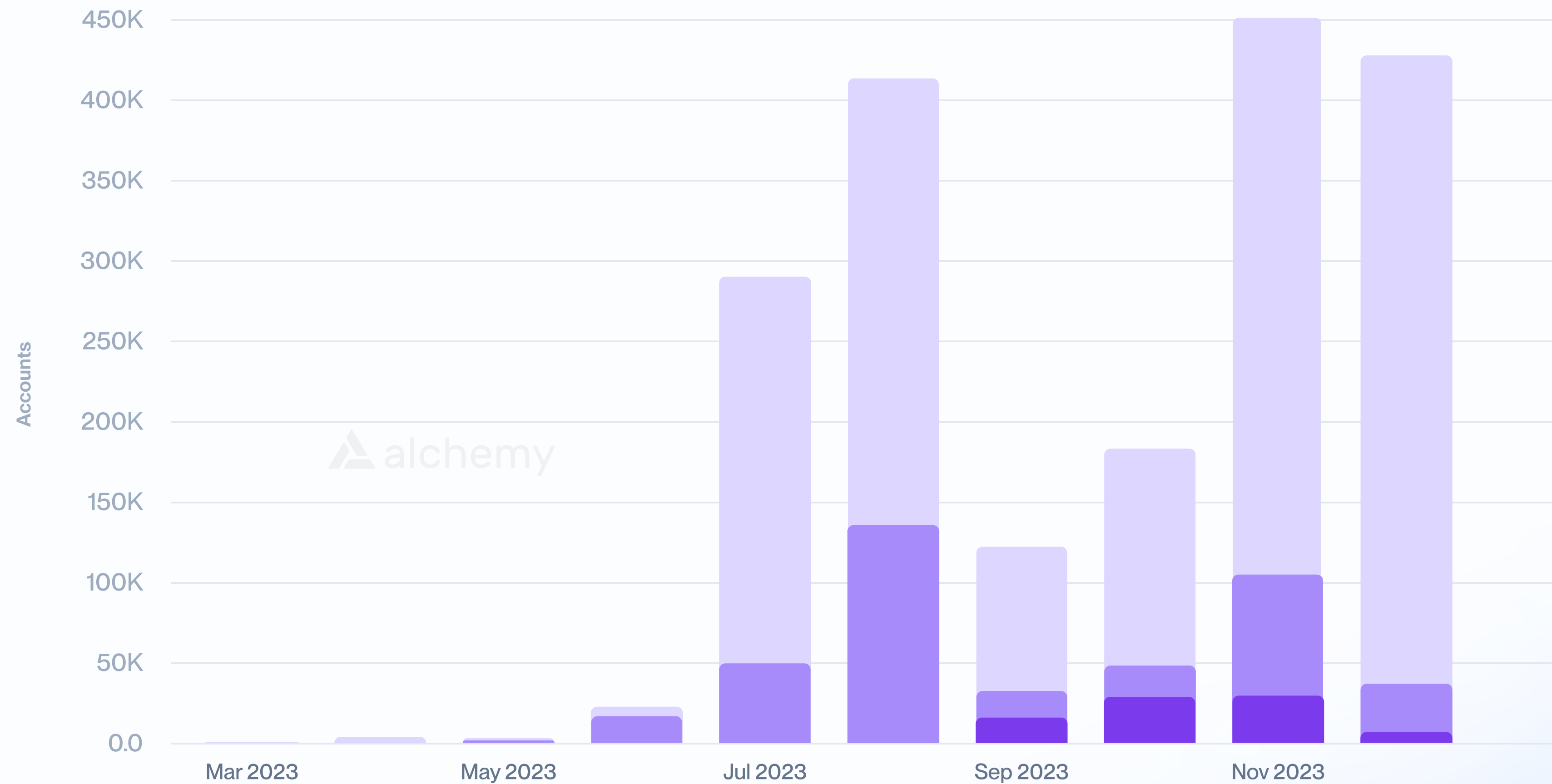


Source: OxBKfi

Smart Account power users grew 15x 🤯

UserOp 2-5 UserOps >5 UserOps

Monthly Active Accounts Classified by Usage

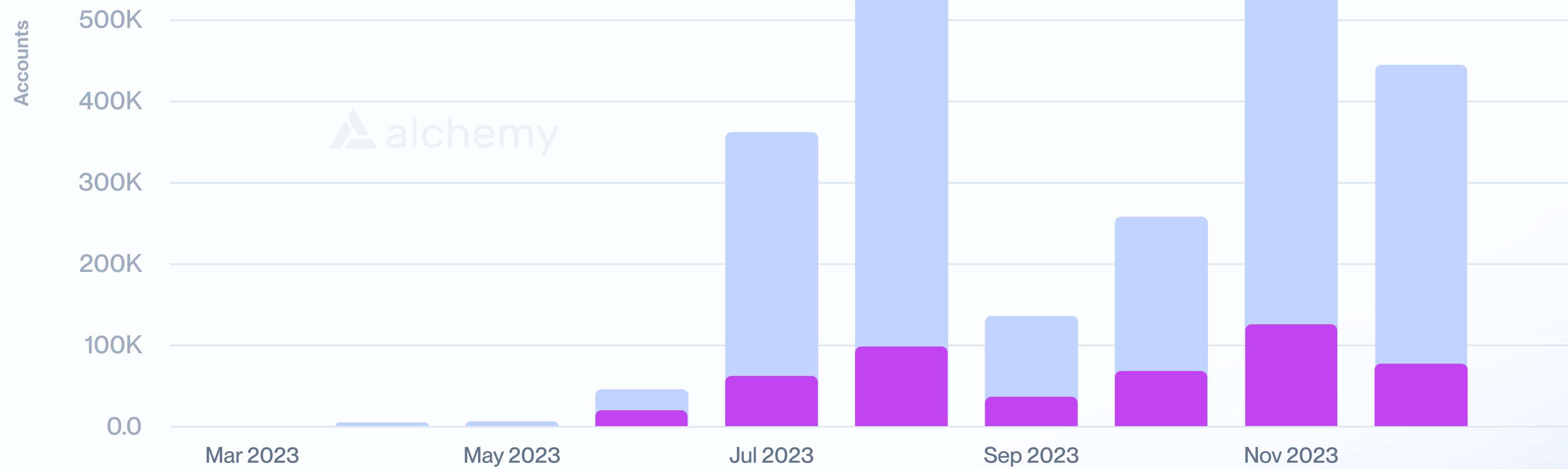


Source: OxKofi

Returning Smart Account users increased 13% in Q4

Newly Active Account Returning Account

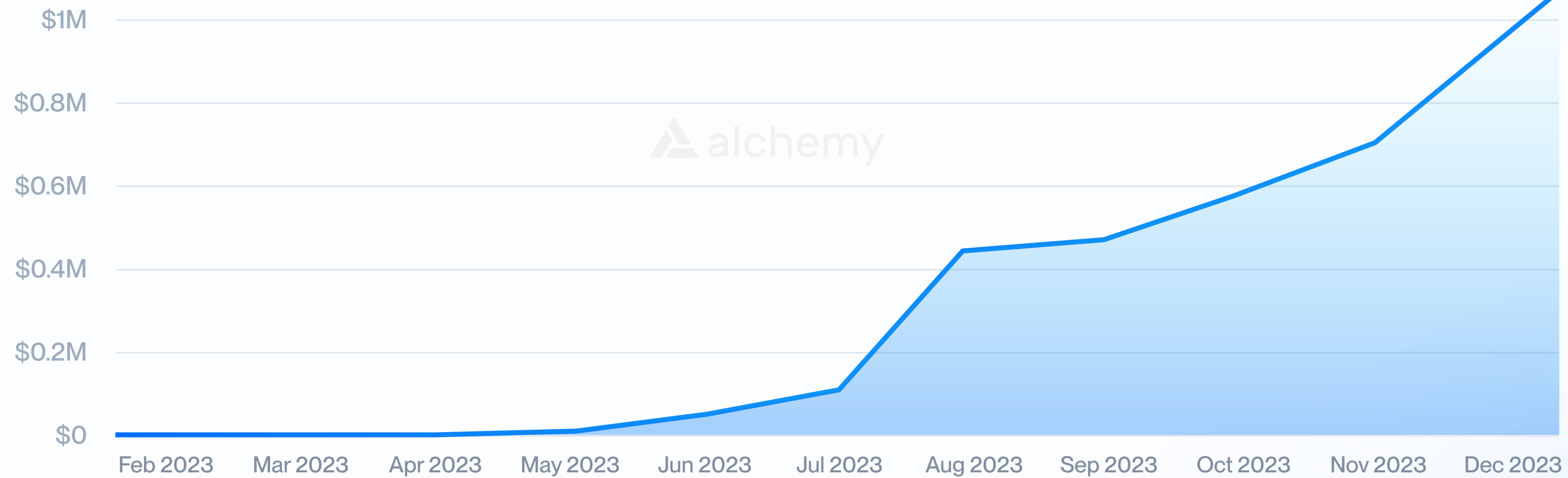
New vs Returning Monthly Active Accounts



Source: OxKofi

Global paymaster volume passed the **\$1,000,000** milestone in Q4 🎉

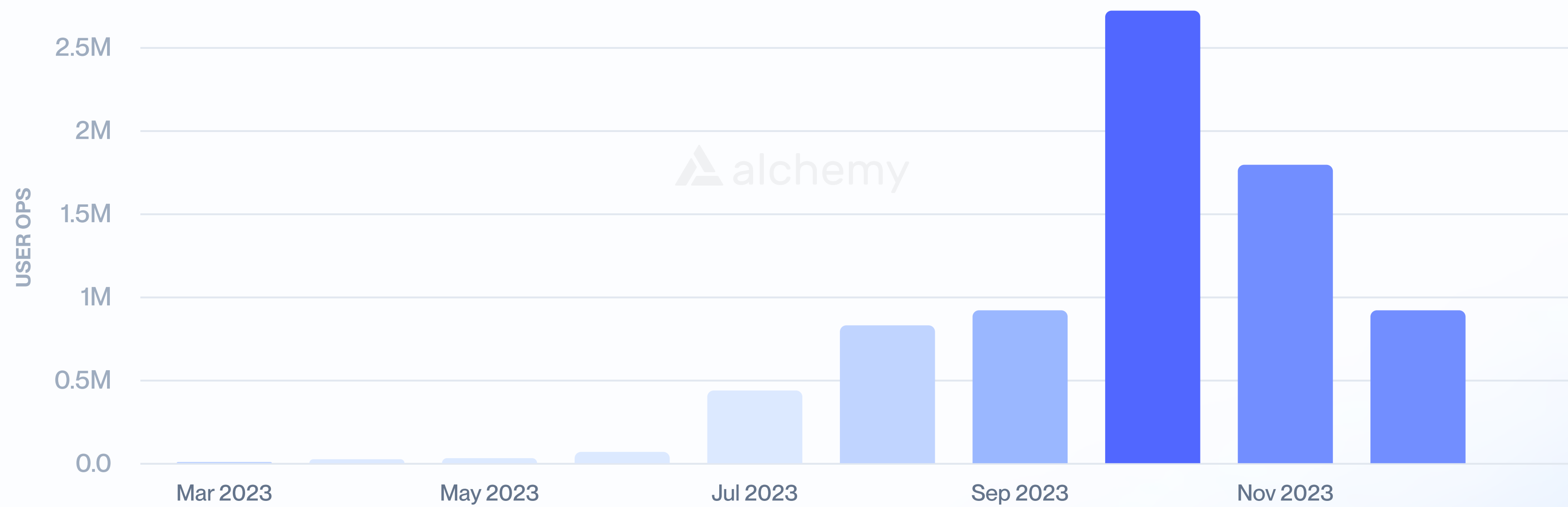
Cumulative Paymaster Volume (USD)



Source: OxKofi

User Operations increased **193%** in Q4 🚀

Monthly UserOps



Source: OxKofi

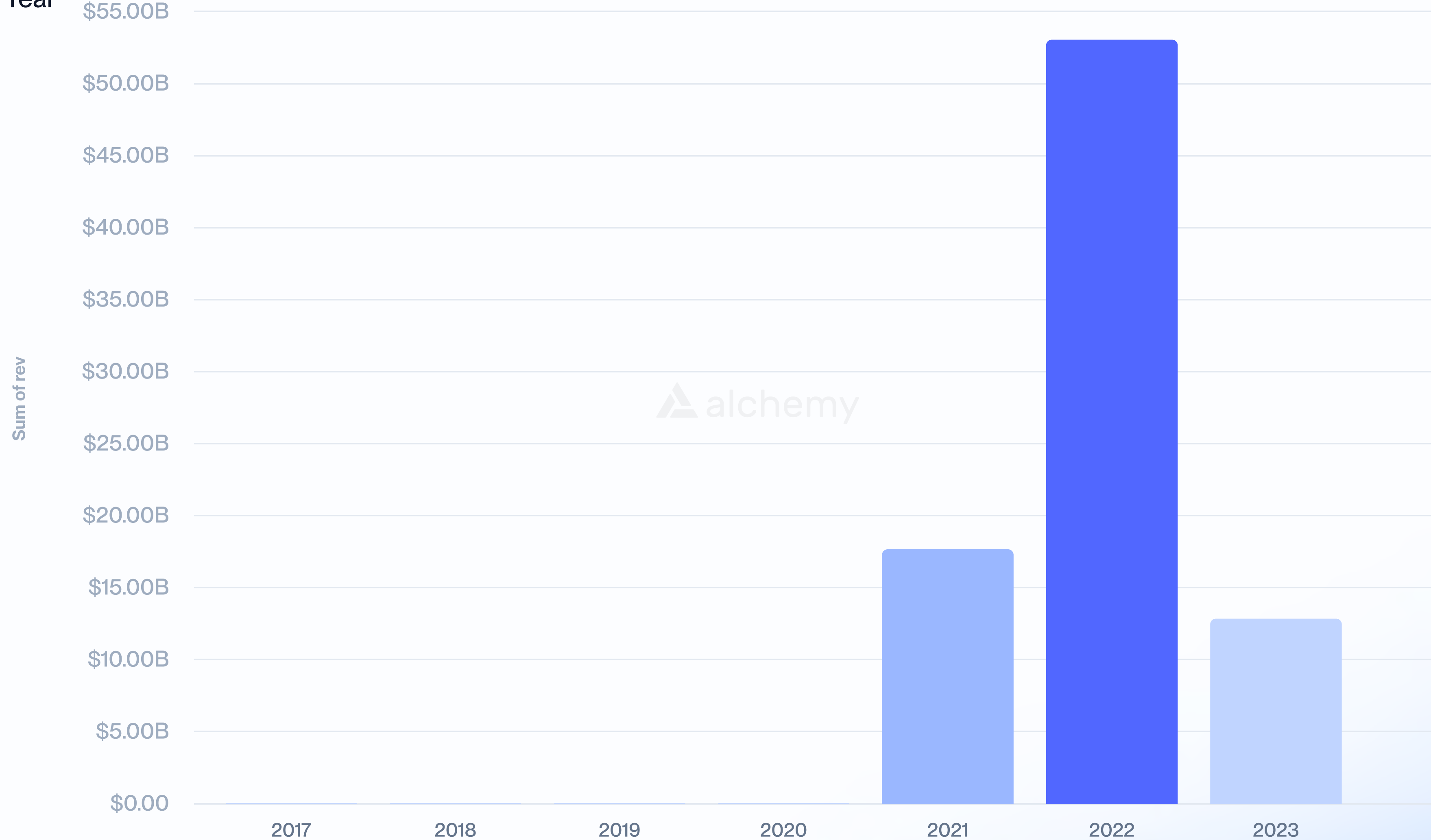
ERC-4337 use cases popped off in Q4

In Q4, the top three apps driving growth were:

- **Grindery**, a popular self-custodial EVM smart wallet for Telegram, generated **35% of UserOps** in December.
- **FanTV**, a video streaming platform that rewards users with tokens for watching videos. In December, **18% of UserOps** were driven by users claiming and transferring FanTV rewards.
- **CyberConnect**, a web3 social network that allows developers to create social applications centered on digital identity and content ownership, generated **13% of UserOps** in December.

NFT Volume down -76% Y/Y

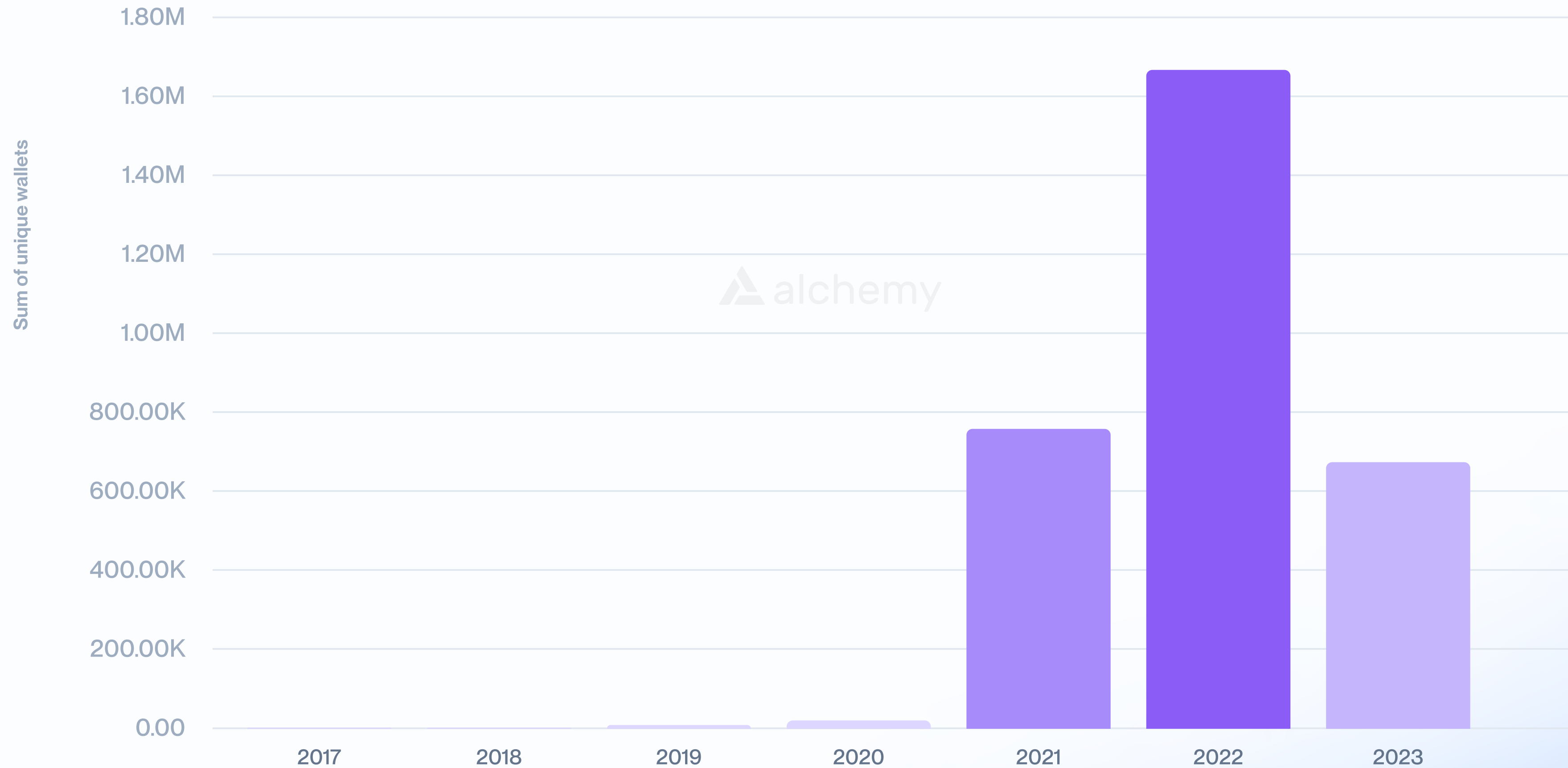
NFT Volume by Year



Source: Dune

NFT users down -56% Y/Y

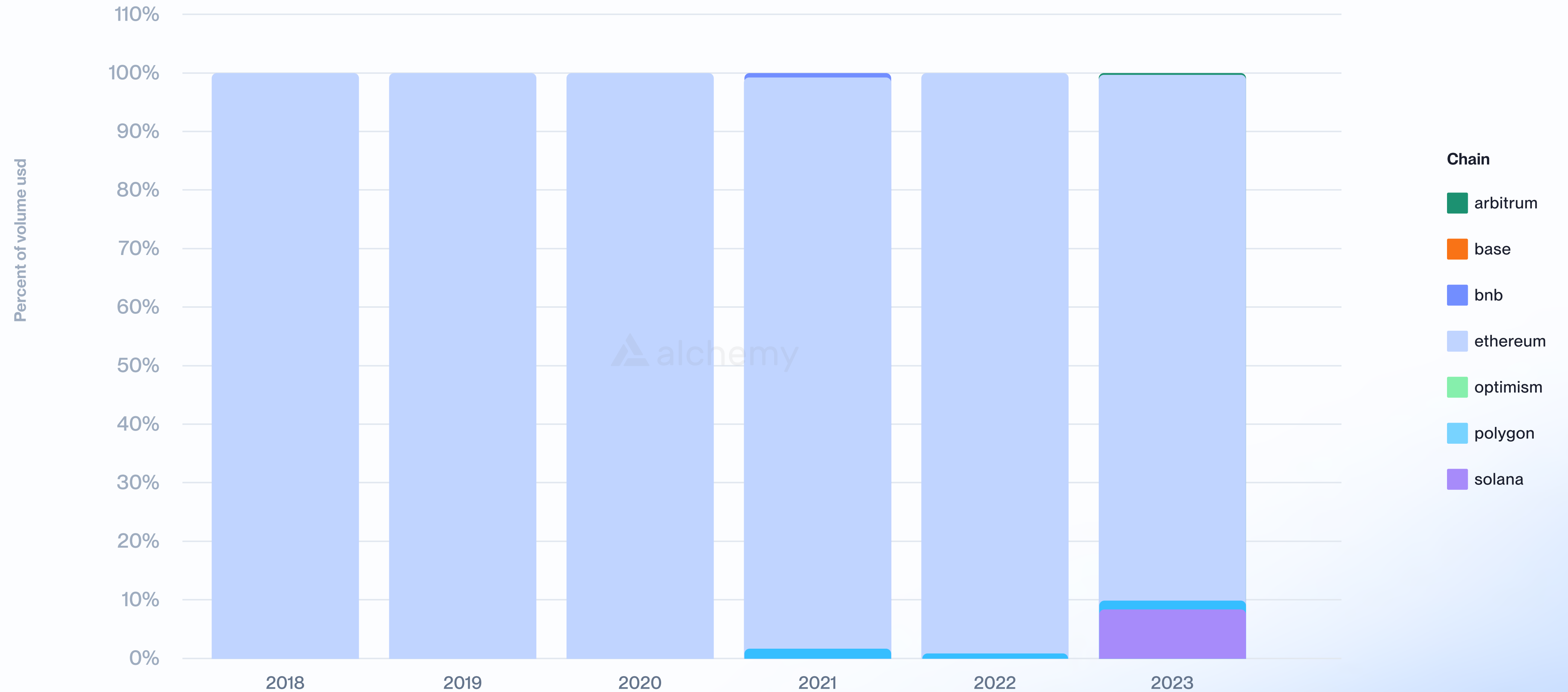
Unique Wallets that traded NFTs



Source: Dune

8% of NFT volume transitioned from Ethereum to Solana and Polygon

NFT Volume by Chain



Source: Dune

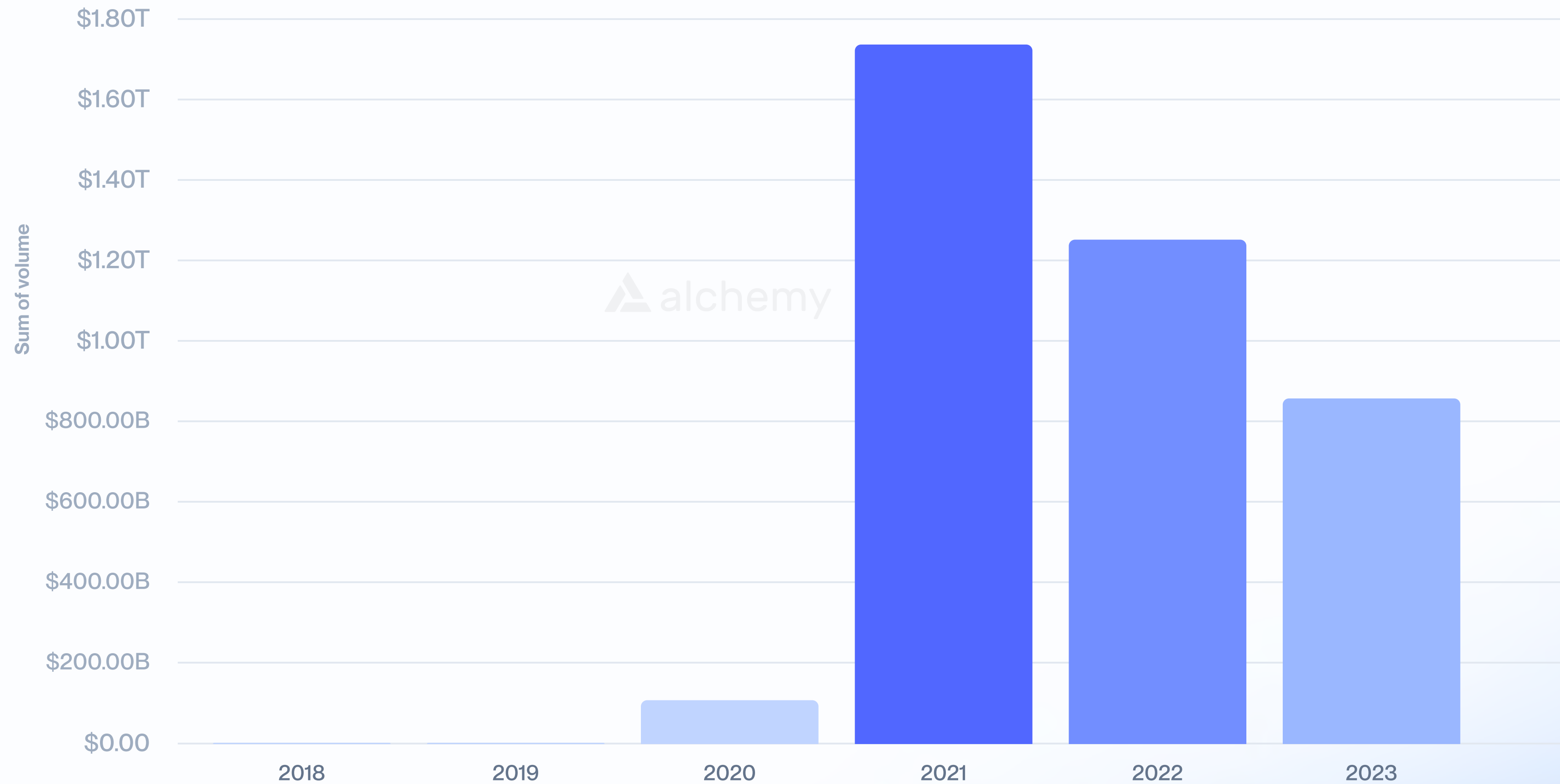
NFTs start to take on **new forms**

While traditional NFT volume and users were down across EVM chains, new forms of non-fungible tokens took the stage in 2023.

- **Bitcoin Ordinals:** Inscriptions were introduced in early 2023 with the Ordinal protocol and the BRC-20 token standard. By December 2023, more than [47M Ordinals](#) were inscribed on Bitcoin by 263K users.
- **Inscriptions:** The resulting congestion on the Bitcoin network led creators to [migrate](#) across a number of chains, leading to similar challenges and dominating Q4 traffic for some.
- **Solana NFTs:** In 2023, Solana snatched up 6% of NFT volume away from Ethereum. By the end of 2023, [monthly sales volume](#) of Solana NFTs surpassed Ethereum for the first time ever.

EVM DeFi volume down -30.28% Y/Y

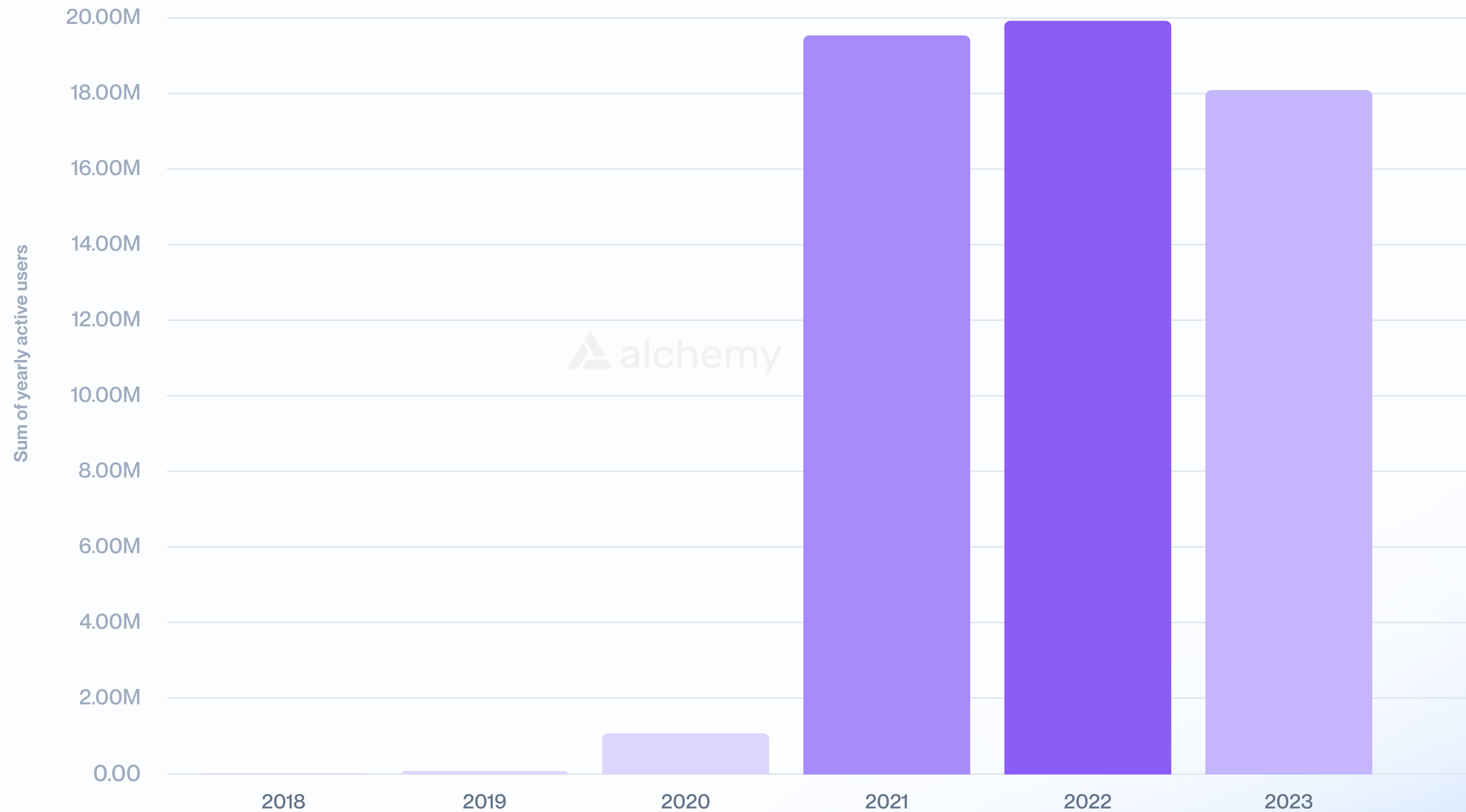
DeFi volume



Source: Dune

EVM DeFi users down -9.24% Y/Y

DeFi Unique Active Wallets



Source: Dune



Thank you!

Methodology

Methodology

This report aims to provide an accurate and useful representation of web3 development.

The following sources were used for data collection purposes: Alchemy's data, Dune (verified smart contracts), npmjs.com (SDK installations and metadata), and Coingecko (token prices).

Thanks to our sources

Developer Activity:



Smart Contracts, Bridging, and Programs:



Account Abstraction: Special thanks to



Market and Prices:



SDKs:



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