

# ERC-4337: Adoption Analysis

- An overview of AA growth and adoption

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PM, Ethereum Foundation

# Planting the Seed



March 2023 - EntryPoint contract deployed to mainnet

(since then v0.6 and v0.7 have been deployed)

A popular SCW standard thwarts fragmentation

erc4337 @erc4337

The rumors are true... ERC-4337 has been deployed on mainnet

Security audit by @OpenZeppelin  
Bundlers and paymasters by @stackup.fi, @AlchemyPlatform, @bconomy, @etherspot, @candidewallet, @blocknative & more  
\$300K in grants by @ethereum



Now live on mainnet and many other EVM chains

- Main improvements over the past year:
  - Major milestones completed: no critical issues
  - Improved developer tooling, documentation, and support
  - Several L2 and L1 standards (market, tokens, and payments) and proposals are now available
  - Many improvements and optimizations
  - Build one app - run the UX revolution

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# Watering the Garden



The Ethereum Foundation awarded close to \$500K in grants to teams and individuals to build and research:

- Bundlers
- Wallets/SDKs
- Indexers
- Key signing and recovery research (p256r1, webauthn, schnorr, DKIM, OpenID, ZKP)
- Education and content
- Complementary standards (e.g ERC-7579/6900, RIP-7212)
- UserOp mempool
- Dev tools and libraries



# Rallying All the Gardeners



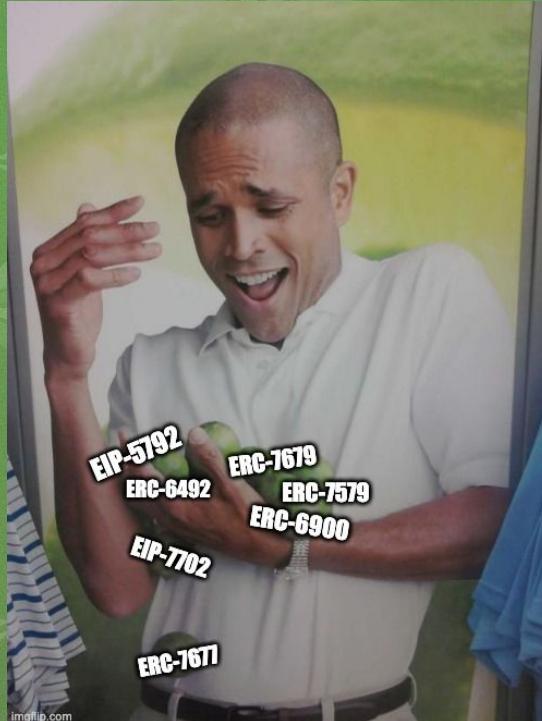
- Rollups and L2s also want Account Abstraction!
- Introducing RIP - Rollup Improvement Proposal
  - RIP-7212: Precompiled for secp256r1 Curve Support
  - RIP-7755: Contract standard for cross-L2 calls facilitation
- EF is supporting Nethermind building rollup-geth





# A Lush Garden of Complementary Standards

- ERC-7769: JSON-RPC for ERC-4337 Account Abstraction
- ERC-7679: UserOperation Builder
- ERC-7710: Smart Contract Delegation Interfaces
- ERC-6492: Signature Validation for Predeploy Contracts
- ERC-7715: Grant Permissions from Wallets
- RIP-7755: Contract standard for cross-L2 calls facilitation
- EIP-5792 : Wallet Function Call API



- EIP-7702: Set EOA account code for one transaction
- RIP-7212: Precompiled for secp256r1 Curve Support
- ERC-6900: Modular Smart Contract Accounts and Plugins
- ERC-7579: Minimal Modular Smart Accounts
- ERC-7677: Paymaster Web Service Capability
- ERC-3770: Chain-specific addresses

# Room to Grow



- ERC-4337: Account Abstraction Using Alt Mempool
- ERC-7562: Account Abstraction Validation Scope Rules
- RIP-7560: Native Account Abstraction
- EIP-7711: An RIP-7560 transactions bundle transaction type
- RIP-7712: Enable RIP-7560 transactions using a two-dimensional nonce
- EIP-7701: Native Account Abstraction with EOF

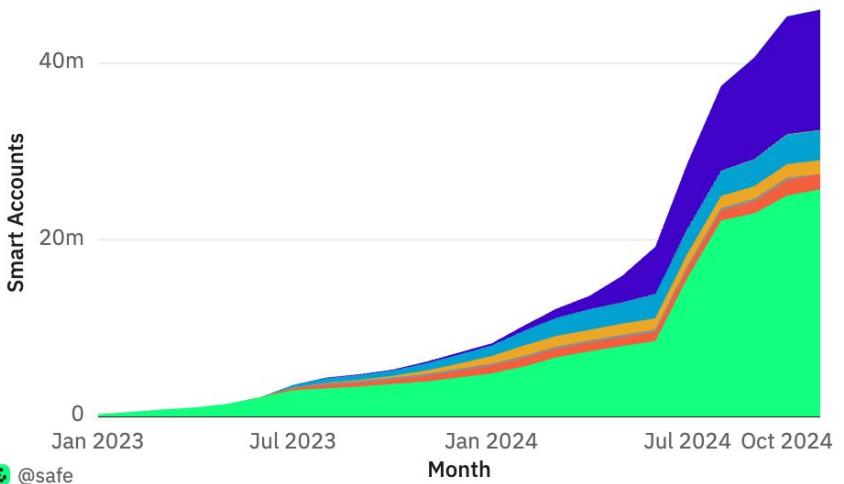
# Growth Accelerants

- **Modular accounts** (Safe / ERC-6900 / ERC-7579) - code reuse, composability, security
- **EIP-7702** - ease the transition from EOA to SCW
- **Paymasters** - leveraged for cross-chain asset transfer (e.g. MagicSpend++)
- **Cheap L2s** - deploying smart accounts now only costs a few cents
- **ZK** - used for novel solutions (e.g. ZK Email, ZK Shield)
- **AI agents** - controlling smart accounts

# Modular Accounts FTW

Cumulative Smart Accounts deployed (by provider)

exc. light accounts



@safe

All  
Coinbase  
Alchemy  
Trustwallet  
OKX  
Zerodev  
Bconomy  
Stackup  
Argent  
Avocado  
Circle  
Stackup  
Pimlico  
Safe

protocol	Deployments	%
Safe	26,969,746	56.45%
Alchemy	13,629,746	28.53%
Zerodev	3,364,635	7.04%
Pimlico	1,728,207	3.62%
Bconomy	1,569,944	3.29%
Stackup	306,202	0.64%
Argent	80,319	0.17%
Coinbase	60,016	0.13%
Trustwallet	42,037	0.09%
Circle	10,330	0.02%
OKX	9,666	0.02%
Avocado	3,510	0.01%

# 88%

Percentage of UserOps using a paymaster.  
A year ago that number was nearly 98%

# UserOp Mempool Launched



- Coordinated effort by bundlers
- Launched by three bundler teams
  - Etherspot
  - Candide
  - Silius
  - More joining soon
- Available on several networks
  - Ethereum mainnet
  - Arbitrum
  - Optimism
  - Polygon - enabled by Fastlane
  - More coming soon
- **Critical to maintaining decentralization and censorship resistance**





# **Let's Talk Numbers**

Total UserOp**█** AA-total Op Users Paymaster

90,096,626  
Total UserOp**█**

🕒 @sixdegree

Total Bundlers**█** AA-total Bundler

3,459  
Total Bundlers**█**

🕒 @sixdegree

Total Paymasters**██** AA-total Op Users Paymaster

413  
Total Paymasters**██**

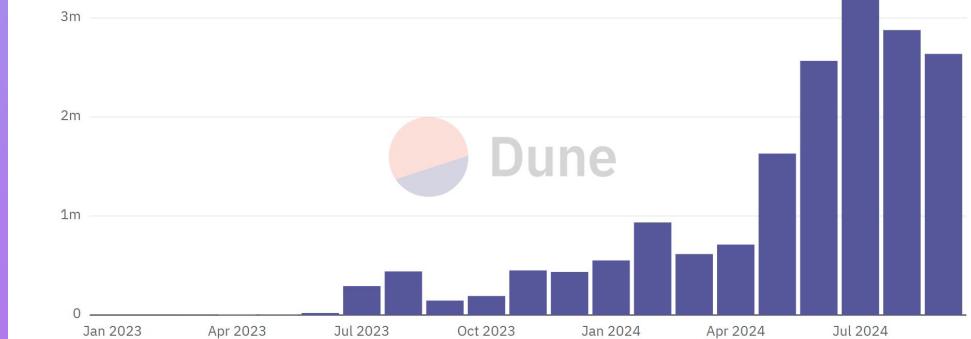
🕒 @sixdegree

Total Users(AA Wallet)**████** AA-total Op Users Paymaster

20,578,915  
Total Users(AA Wallet)**████**

🕒 @sixdegree

Monthly Active ERC-4337 Accounts



# 3M MAU?!

Really???

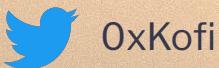
No. Not Really.



# Detector Courtesy of 0xKofi - Data Wizard

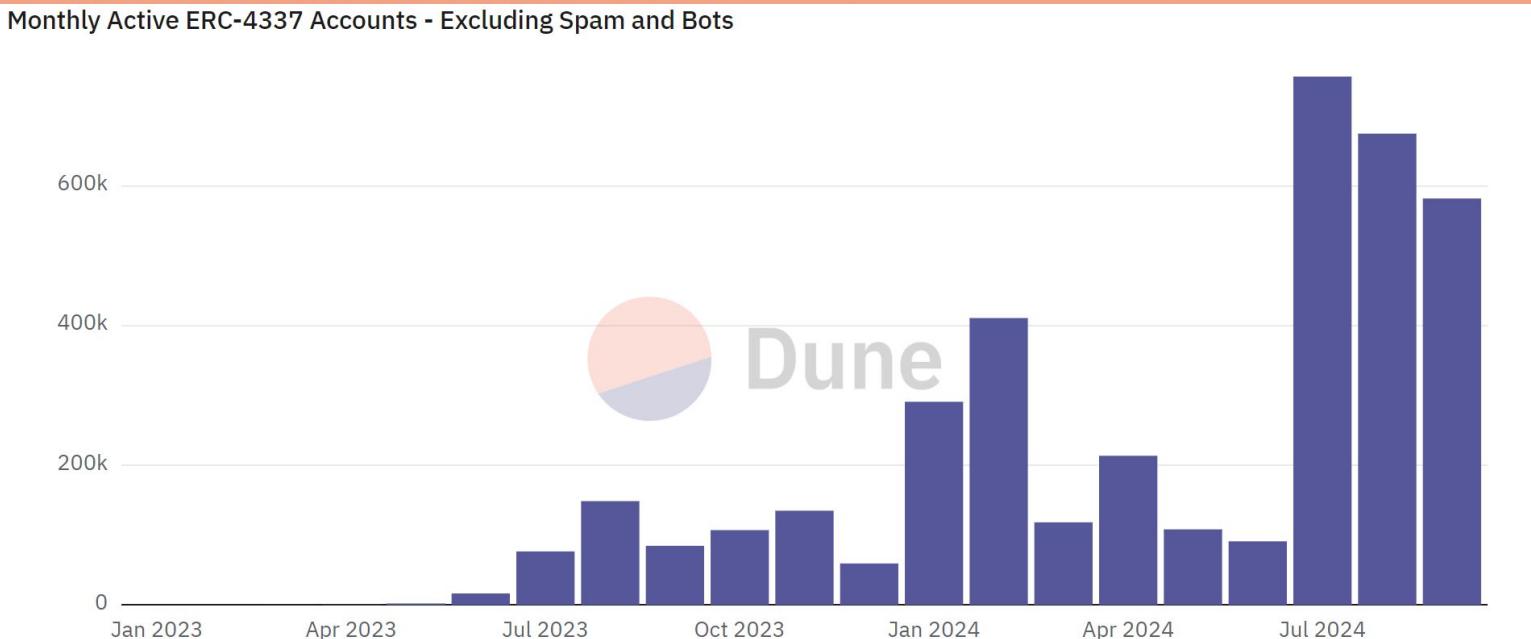


- Data Science Consultant; Past Clients include Alchemy, Safe, Arbitrum and Scroll
- Working on BundleBear; Smart account dataset used by EF, Coinbase, Biconomy, Pimlico and more



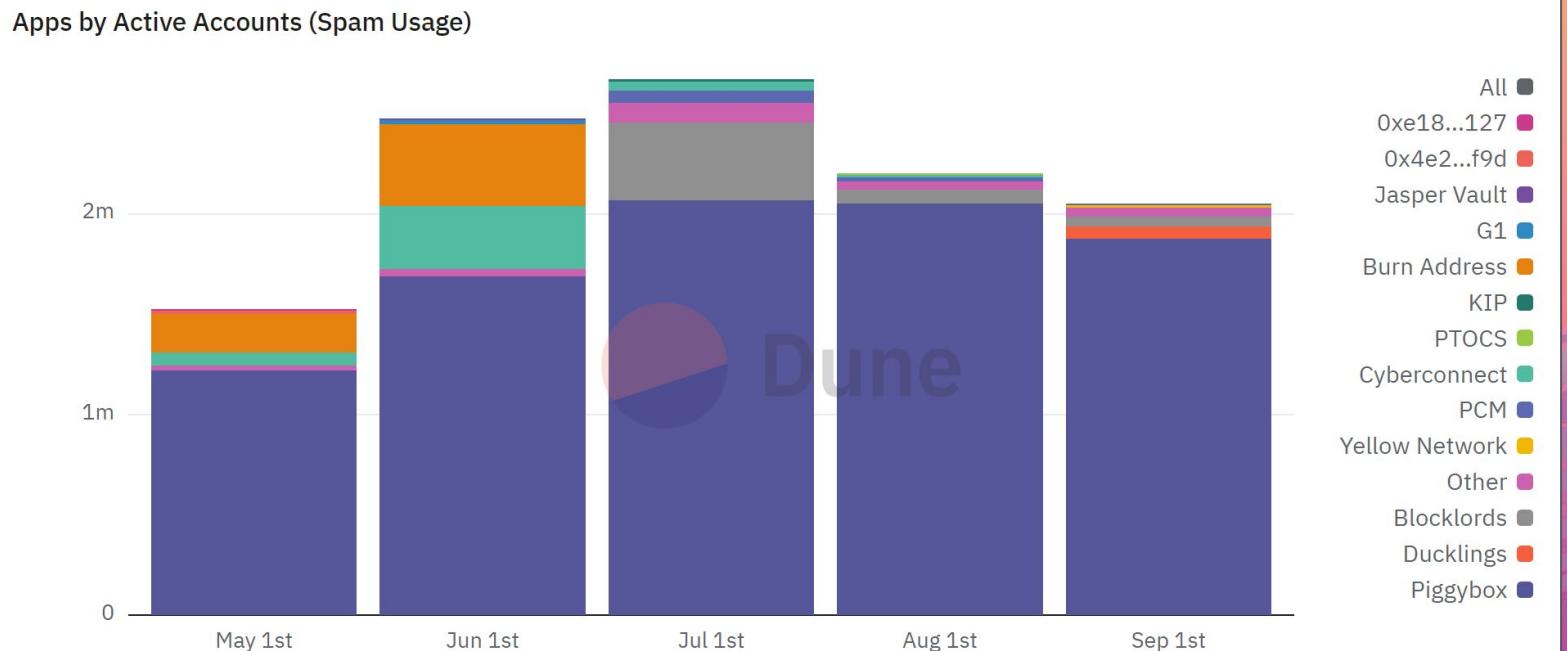
# Human MAU

Monthly Active ERC-4337 Accounts - Excluding Spam and Bots



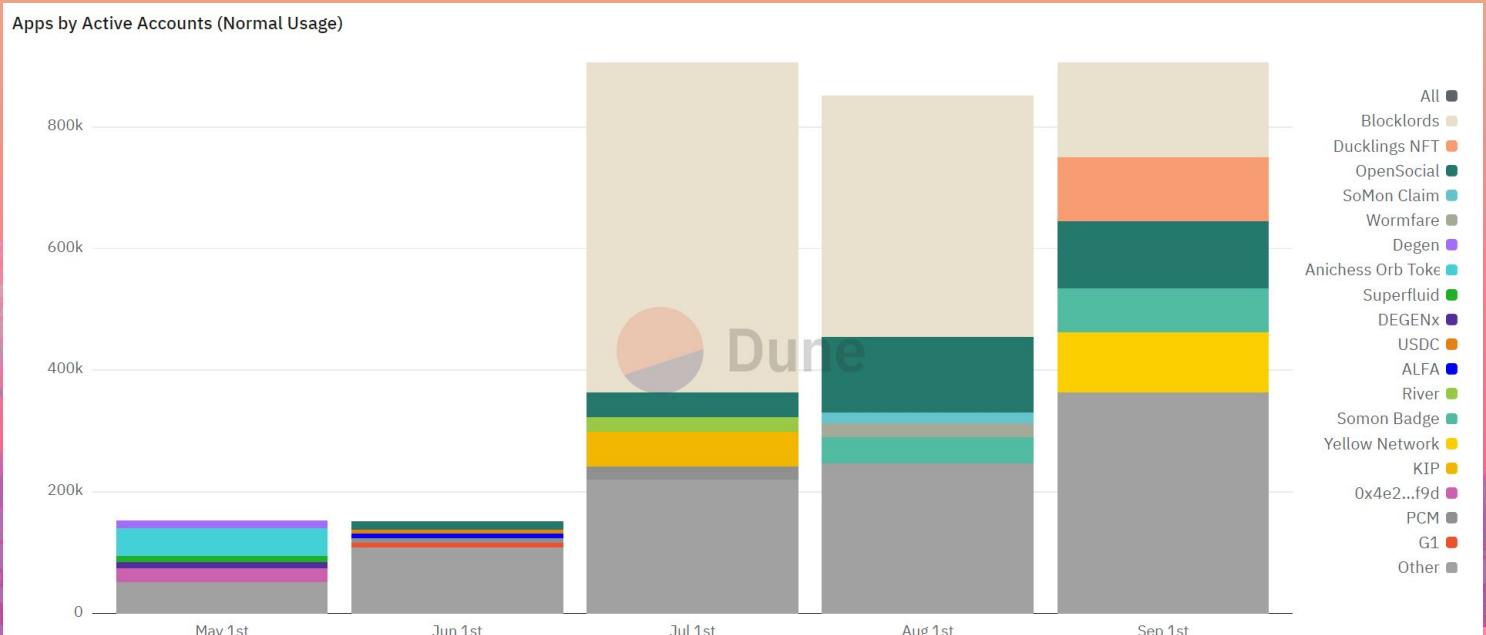
Filtering out spam, sybil attacks, HFT and MEV bots

# Non-filtered Dapp Usage



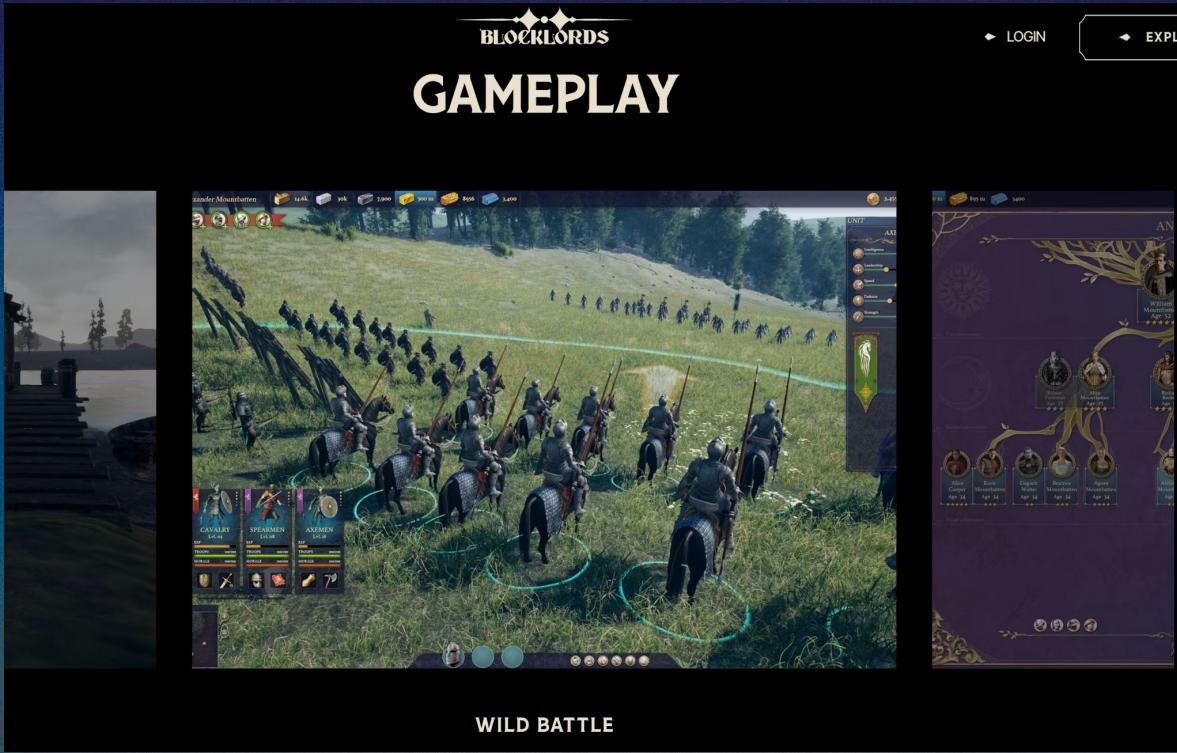
Wow, is Piggybox the killer dapp we've all been waiting for??

# Where are the REAL Dapps?



Top ones right now are Blocklords an RPG game on Base, Ducklings an NFT trading card game, and Opensocial a social app platform

# AAA Soon





# **Let's Talk Money**

Bundler Revenue AA-Total Bundler Revenue USD

\$598,547.58

Bundler Revenue

🕒 @sixdegree

Paymaster Sponsored Gas AA-Paymaster Gas Cost

\$3,777,435.56

Paymaster Sponsored Gas

🕒 @sixdegree

ERC4337 DEX Volume by Blockchain

20m

10m

0

Aug 2023

Oct 2023

Dec 2023

Feb 2024

Apr 2024

Jun 2024

Aug 2024

Oct 2024

All  
gnosis  
avalanche\_c  
arbitrum  
optimism  
bnb  
base  
ethereum  
polygon

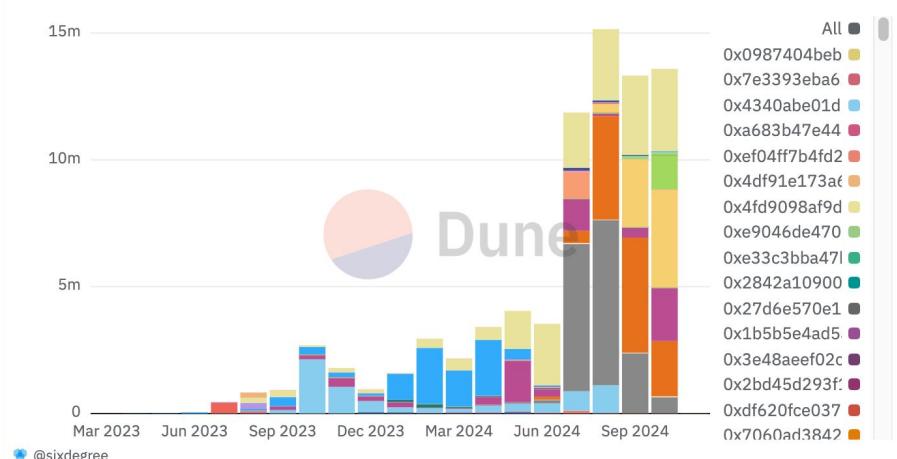
🕒 @joaoavf

# Gas Price 📈 so # of Sponsored UserOps

Monthly Paymaster Sponsored Gas AA-Monthly Paymaster Gas Cost



Monthly Paymaster Activity AA-Monthly Paymaster Activity

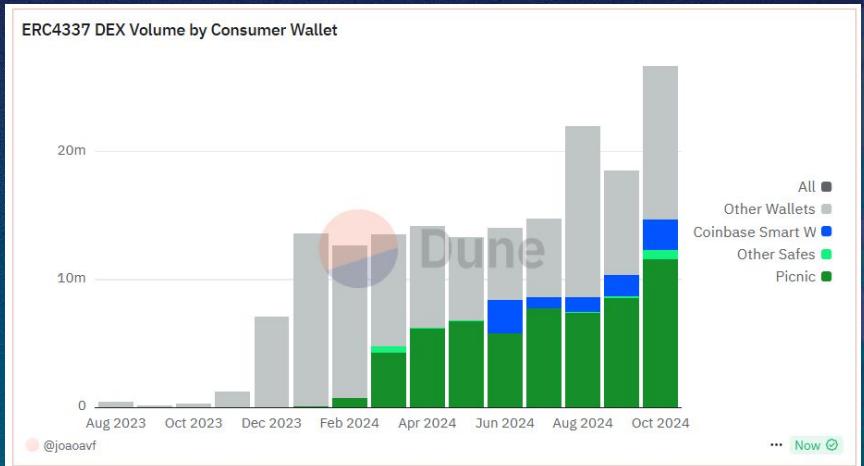


# **Case Studies**

“What can be, unburdened by what has been.”

# Picnic

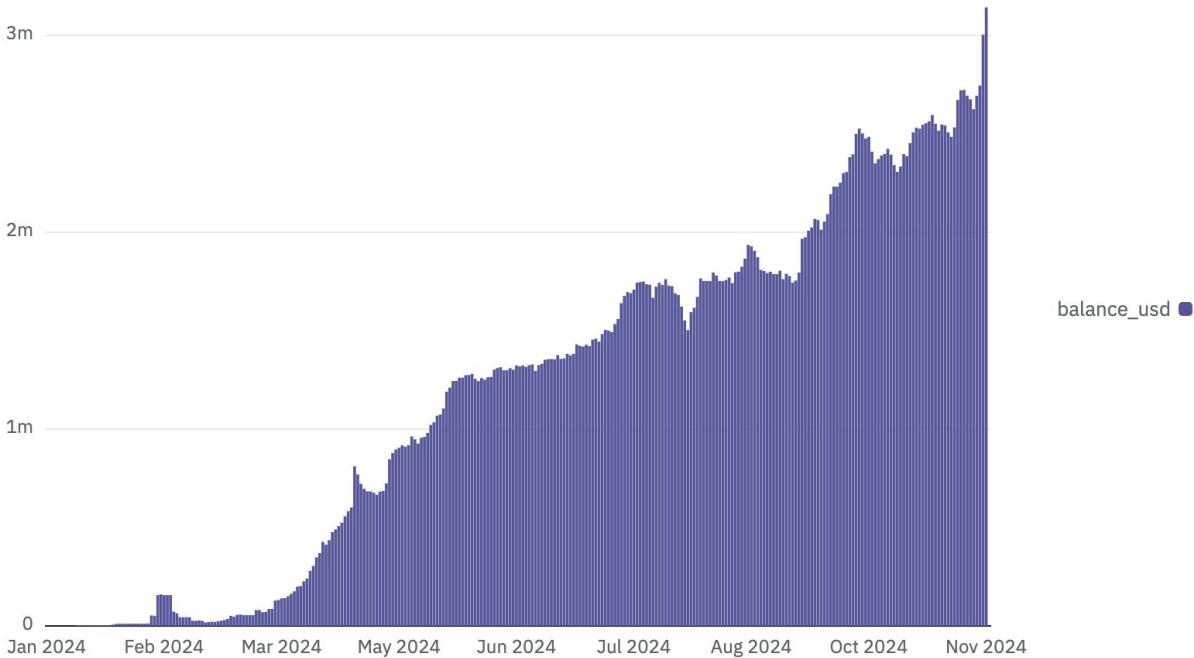
- Makes use of execute to batch transactions.
- Why? Simpler and safer DeFi
- Leading Safe wallet for DEX volume
- High retention rate
- **Received EF grant** to build and open source Jam 🍶 - their DeFi Transaction Batcher



usePicnicBR

# Picnic

Picnic total USD balance across all wallets

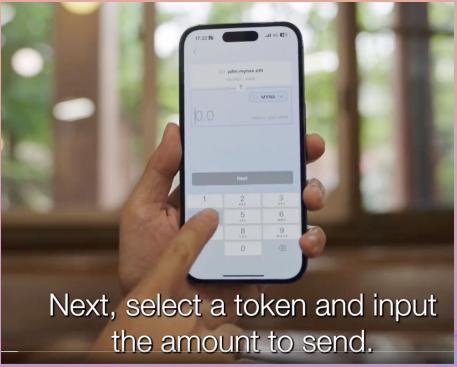


# MynaWallet

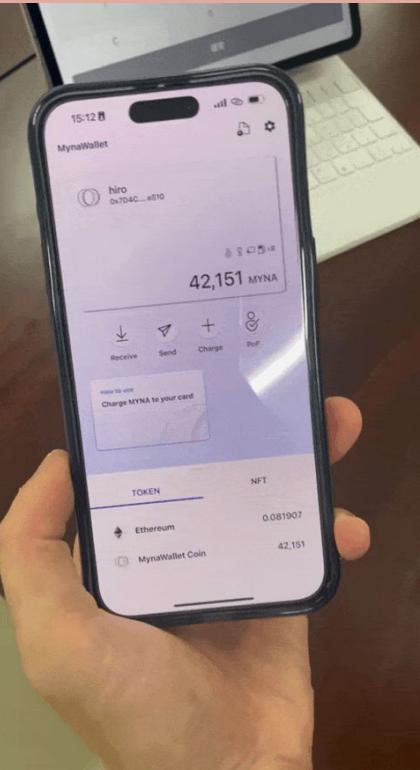
- Turns Japan's government issued ID (issued to 70% of people) into a de-facto hardware wallet
- Paymasters for smooth UX
- **Received EF grant** to explore and implement this novel approach
- Works closely with the Japanese government to explore use cases



MynaWallet



# MynaWallet

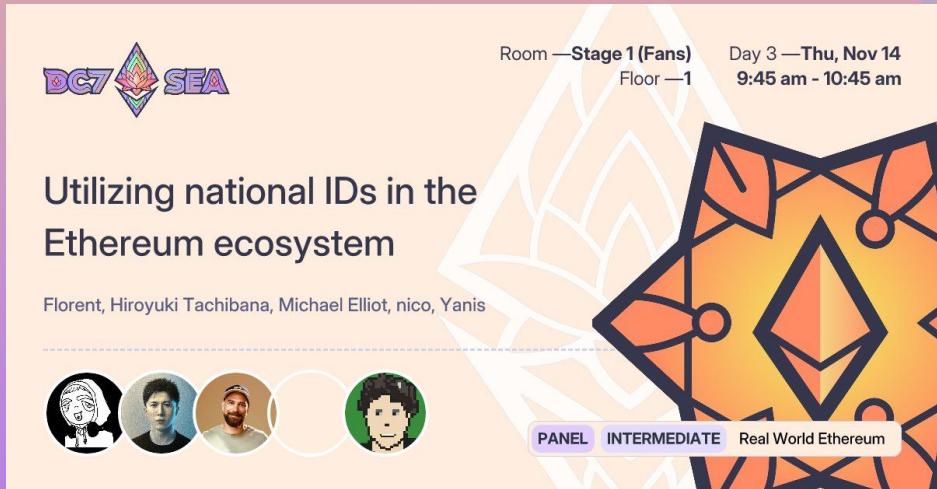


DC7 SEA

Room — Stage 1 (Fans)  
Floor — 1  
Day 3 — Thu, Nov 14  
9:45 am - 10:45 am

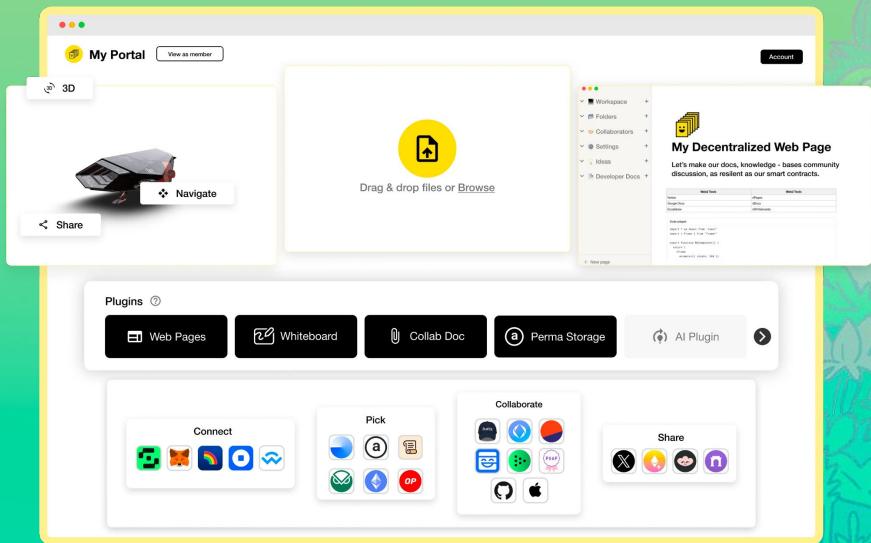
Utilizing national IDs in the Ethereum ecosystem

Florent, Hiroyuki Tachibana, Michael Elliot, nico, Yanis



# Fileverse

- **Non-financial** uses cases, with dapps like ddocs.new and devconcollab.io
- Safe smart accounts and Pimlico paymasters on Gnosis Chain
- Access permissions enforced onchain, storage on IPFS/Arweave



fileverse

# Traditional Enterprise Adoption

- Visa - the OG Paymaster
- Toyota - SCW: Smart Car Wallet?
- Sony - Soneium L2



# Account Abstraction is Here

Thanks to:

- L2/Rollup scaling
- Powerful SDKs
- Prolific standardization
- And of course, AA capabilities (paymasters, batching, key management, etc.)

Dapps can offer both strong **UX** and strong **security**, while preserving **decentralization**

# Thank you!

**Tom Teman**  
PM, Ethereum Foundation

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