

# 16. Account Abstraction: Why It Matters for Wallet UX and Analysts

In crypto, the wallet is the interface to everything. It's your bank, your identity, your passport, and your remote control. But today's wallet UX is broken: confusing seed phrases, complex gas fees, and risky self-custody.

**Account Abstraction (AA)** aims to fix that—and it introduces powerful new onchain behaviors that analysts must understand.

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## What Is Account Abstraction?

Traditionally, Ethereum has two types of accounts:

- **EOA (Externally Owned Account)** — Controlled by private keys (e.g., MetaMask)
- **Contract Account (CA)** — Smart contracts, but they can't initiate transactions

This split causes problems. EOAs are inflexible, and contract accounts can't act without being triggered.

Account Abstraction **blends the two** by turning wallets into programmable smart contracts.

The leading implementation of AA is [ERC-4337](#), which upgrades Ethereum without changing the base protocol. It introduces a new execution layer using *UserOperations*, *Bundlers*, and a central *EntryPoint* contract.

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# Why It's a Big Deal

AA unlocks features like:

- **Gas abstraction** — Let someone else pay your gas (like a dApp or sponsor)
- **Multisig and social recovery** — Native, without Gnosis Safe hacks
- **Session keys** — Temporary permissions for games or apps
- **Automated transactions** — Scheduled or conditional sends
- **Biometric login** — Use Web2 logins with smart wallets

For analysts, this means **a new data layer emerges**—one with new behaviors, new actors, and new risks.

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## Key Components of ERC-4337

Here's how a typical flow works:

1. A user signs a **UserOperation** (like a meta-transaction)
2. A **Bundler** packages multiple UserOps and submits them to the blockchain
3. The **EntryPoint** contract processes the batch
4. A **Paymaster** may sponsor the gas fee
5. A **Wallet Factory** may deploy a new smart wallet

This is all recorded onchain.

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# What Analysts Need to Track

New entities = new metrics.

## EntryPoint Contract

ERC-4337 wallets **interact with one global EntryPoint**, which emits useful logs:

- `UserOperationEvent` — One per operation
- `AccountDeployed` — When a smart wallet is created
- `BeforeExecution` , `Withdrawn` , `Deposited` , etc.

Use these to track usage, success rates, gas consumption, and more.

## Bundlers

Bundlers are EOAs that submit UserOps.

- Who are the top bundlers?
- Are they profitable? (`op_fee` - `tx_fee`)
- Which protocols use custom bundlers?

## Paymasters

Paymasters sponsor gas fees for users.

- How many ops does each paymaster cover?
- What's their total spend?
- Are any exploiting the system?

## Wallet Factories

Track wallet creation by factory.

- How many wallets per protocol?
  - Which chains have the most AA adoption?
  - What's the retention or activity rate?
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## Tables to Use on Dune

ERC-4337 logs are decoded and available in Spellbook or native Dune schemas.

Examples:

```
-- Count daily UserOps
SELECT date_trunc('day', evt_block_time) AS day, COUNT(*) AS ops
FROM erc4337_polygon.EntryPoint_v0_6_evt_UserOperationEvent
GROUP BY 1
ORDER BY 1;

-- Wallet creation
SELECT factory, COUNT(*) AS wallet_created
FROM erc4337_polygon.EntryPoint_v0_6_evt_AccountDeployed
GROUP BY 1
ORDER BY 2 DESC;
```

Multichain data is available in:

- `account_abstraction_erc4337.userops`
  - `account_abstraction_erc4337.account_deployed`
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## 💡 Use Cases for Analysts

With AA, new behaviors emerge:

- **Sponsored DeFi onboarding** — Track how many users are using paymasters
- **Bundler economics** — Are bundlers subsidizing or profiting from ops?
- **Adoption curves** — Which dApps are launching smart wallets?
- **New attack surfaces** — Botnet-style spam, griefing paymasters, or wallet exploits

This is a new dataset. And **you** get to be the first to map it.

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## 💎 AA Is the New Primitive

As wallets shift from EOAs to smart contract wallets, analysts must:

- Learn how to query AA-specific tables
- Understand protocol-level abstractions like EntryPoint, Paymasters, Factories
- Build dashboards that monitor gas abstraction, wallet deployment, and bundler behavior

Account Abstraction isn't just about UX. It's a fundamental upgrade to **how users behave onchain**.

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## ➡ Next Up: Analyze the ERC-4337 Ecosystem at Scale

In the next article, we'll explore how to use **Dune's aggregated AA tables** across all EVM chains to track adoption, model bundler revenue, and surface wallet deployment patterns—without writing chain-specific queries.

**Next: 17. ERC-4337 Aggregated Tables Across EVM Chains**