

Difference between various Smart Account types in permissionless.js

permissionless.js supports 8 types of accounts. Below is an overview of each account type and their key features:

1. Safe
2. Kernel
3. Nexus
4. Simple Smart Account
5. LightAccount
6. TrustWallet
7. Etherspot
8. Thirdweb

1.Safe

[Safe](#) is a robust and widely used Ethereum smart account provider. With its ERC-4337 module, Safe accounts can integrate with ERC-4337 bundlers and paymasters.

- ERC-7579 Support
 - : Yes, via [Rhinestone's safe7579](#) module.
- Passkeys Support
 - : Supported through [Safe's passkey module](#)
 - ; not yet supported in permissionless.js.
- Multiple Signers
 - : Yes, as Safe is one of the first multi-signature smart accounts.
- Chain Support
 - : Available on all chains where Safe factories are deployed.
- Usage Stats
 - : ~34k Safe accounts created in the last 6 months [source](#)
 -).
- Security
 - : Secures over \$100B+ in assets, making it highly reliable.

2.Kernel

[Kernel](#) by [ZeroDev](#) is a highly gas-efficient smart account compatible with ERC-4337 and ERC-7579.

- ERC-7579 Support
 - : Yes, authored by the ZeroDev team.
- Passkeys Support
 - : Yes.
- Multiple Signers
 - : Supported through flexible permission settings:* Define who can perform actions.
 - - Specify conditions for actions.
 - - Configure what actions can be performed.
- Usage Stats
 - : ~133k Kernel v3 and 771k Kernel v2 accounts created in the last 6 months [source](#)
 -).
- Audits
 - : Audited by [ChainLight](#)
 - and [Kalos](#)
 - .

3.Nexus

Biconomy [Nexus](#) focuses on modularity, security, and scalability. Support for the older Biconomy Smart Account is being deprecated in favor of Nexus.

- ERC-7579 Support
 - : Yes.
- Passkeys Support

- : Supported via Rhinestone's Passkeys Validator (not yet in permissionless.js).
- Multiple Signers
- : Enabled using Rhinestone's session keys module.
- Usage Stats
- : ~78 Nexus accounts and 224,758 Biconomy v2 (deprecated) accounts created in the last 6 months [source](#)
-).
- Audits
- : Audited by [Cyfrin](#)
- and [Spearbit](#)
- .

4.Simple Smart Account

[Simple Smart Account](#) is a sample smart account by the Eth-Infinity team. This is supposed to be a reference implementation for ERC-4337 and not a production-ready smart account.

- ERC-7579 Support
- : No.
- Passkeys Support
- : No.
- Multiple Signers
- : No.
- Usage Stats
- : ~1.5M accounts created in the last 6 months [source](#)
-).
- Audits
- : Audited by [OpenZeppelin](#)
- .

5.LightAccount

[LightAccount](#) is a lightweight ERC-4337 smart account based on [SimpleAccount](#) with added functionality for smart account signers.

- ERC-7579 Support
- : No.
- Passkeys Support
- : No.
- Multiple Signers
- : No.
- Usage Stats
- : ~7.3M accounts created in the last 6 months [source](#)
-).
- Audits
- : Audited by [QuantStamp](#)
- .

6.TrustWallet

[TrustWallet](#) is a popular cryptocurrency wallet supporting a wide range of digital assets across multiple blockchains. It provides users with a secure, self-custody solution and has introduced ERC-4337-compatible features.

- ERC-7579 Support
- : No.
- Passkeys Support
- : Yes, through [Barz](#)
- , Trust Wallet's ERC-4337-compatible smart contract wallet, which supports passkey-based authentication.
- Multiple Signers
- : Yes, Trust Wallet offers multisig functionality to enhance transaction security.
- Usage Stats
- : ~36,838 accounts created in the last 6 months [source](#)
-).
- Audits
- : Trust Wallet has undergone independent audits.

7.Etherspot

Details on Etherspot integration coming soon.

8.Thirdweb

Details on Thirdweb integration coming soon.

Summary of Key Features

Account Type ERC-7579 Passkeys Multiple Signers Accounts Created (6 months) Audited By Safe ✓✓✓ 34k Various Kernel ✓✓✓ 133k (v3), 771k (v2) ChainLight, Kalos Nexus ✓✓✓ 78 Cyfrin, Spearbit Biconomy v2 (deprecated) ✓✓✓ 224k Cyfrin, Spearbit Simple ✕✕✕ 1.5M OpenZeppelin LightAccount ✕✕✕ 7.3M QuantStamp TrustWallet ✕✓✓ 36k Independent audits Etherspot TBD TBD TBD TBD TBD Thirdweb TBD TBD TBD TBD TBD

Gas Efficiency of various Smart Account types

Results (as of February 24, 2024)

Disclaimer the numbers are obtained from [aa-benchmark](#) from ZeroDev.

Since these are gas numbers, lower is better.

Creation Native transfer ERC20 transfer Total Solady ERC4337 212262 100149 89532 401943 Kernel v2.1-lite 230968 101002 90321 422291 Kernel v2.1 265215 106460 96038 467713 Biconomy (deprecated) 270013 104408 93730 468151 SoulWalletCore 276529 101162 90466 468157 LightAccount 279820 100910 90411 471141 Etherspot 279219 103719 93324 476262 ERC7579 reference 289438 103811 93213 486462 Kernel v2.0 339882 110018 99622 549522 SimpleAccount 383218 101319 90907 575444 Safe 4337 401848 115469 105089 622406 Alchemy ModularAccount 827723 106630 96438 1030791