What is Relaying?

Understanding the benefits of relaying and how it can help your dApp thrive After reading this page:

- You'll understand the context shift between standard transactions and relayed transactions.
- You'll know the ways relaying can help improve UX.
- You'll know exactly whyGelato Relay
- is the relayer you should integrate with.
- You'll know what meta transactions are and how EIP-712 signatures work. * Please visit our pageSecurity Considerations and read carefully before moving forward.

Standard transactions

In a standard Ethereum transaction, an ethereum user signs and sends the transaction themselves. This user controls the private key to anexternally owned account (EOA) which they can use to sign a transaction and prove they have the right to spend the balance associated with that account address.

For each transaction a user sends, there is an associated transaction fee, known asgas . Since Ethereum executes computation, each unit of computation has an associatedgas cost, which deters malicious actors from overloading the network by requiring them to pay heavily for a potential attack. This is excellent news for Ethereum's security and helps keep the network consistent under load, but it comes at a hidden cost for onboarding new users.

Onboarding issues

How does a new user start interacting with exciting on-chain applications like DeFi, NFTs, or gaming? They will always need the native token to pay for gas on every network, even if the network has very cheap gas fees likePolygon . This requires the user to open an account at a centralised exchange, go through KYC, and buy crypto using fiat. This can be quite a process, even for the most skilled of degens out there, and it can deter new users from being onboarded to a dApp by increasing the latency between their initial excitement and the time it takes to actually get started.

This is where relaying comes in ! A relayer can help solve these issues by sending a transaction onbehalf of the user.

What is a relayer?

We allow the user to send a transaction without a native token balance (it turns out relayers can be super nifty in loads of ways, for example, allowing a user who wants to swap a token to pay for the gas using the token being swapped!). Ideally, we would also like to still utilise the excellent security of a user signature, but for the transaction to be sent by a different EOA, one controlled by a relayer, who abstracts gas payment away from the user.

This is a very importcontext shift to understand. We have shifted from a user signing and sending a transaction themselves, to a user signing a standardised message and passing that on to a relayer. This relayer will, first, verify the user's signature for security, and then pass their message along on-chain. Gelato Relay does exactly this by taking a user's message off-chain and subsequently building a meta-transaction which is executed on chain.

What is Gelato Relay?

Using Gelato Relay, we relay your user's transactions on-chain, enabling securegasless transactions for an ultra smooth UX for your app. This allows for a variety of new web3 experiences, as the user can now pay by only signing a message, or their transaction costs can be sponsored by the developer. As long as the gas costs are covered in one of the multiplepayment methods that Gelato supports, we handle the restreliably ,quickly andsecurely .

What is a meta transaction?

A meta transaction is a regular ethereum transaction which contains the actual message to be delivered on-chain to atarget contract within itself, hence the term meta . The outer transaction helps facilitate the first on-chain call which is sent by a relayer. The call is forwarded to thetarget contract using an intermediate smart contract (Gelato Relay), which in turn forwards the call using the inner transaction to deliver the relayed message.

EIP-712 signatures

To achievegasless transactions securely, Gelato Relay makes use of theEIP-712 standard. EIP-712 allows for a standardised way to sign and hash typed structured data. This means the user can sign a message using their wallet without incurring a gas cost or interacting with the chain at all, and this signature can be verified on-chain, by the relayer, facilitating a gasless transaction with security built in. This message will include important information such as the transaction signer address, thetarget contract address, and the calldata payload used to target a specific function.

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