
title: Staking withdrawals description: Page summarizing what staking push withdrawals are, how they work, and what stakers need to do to get their rewards lang: en template: staking image: ../../assets/staking/leslie-withdrawal.png alt: Leslie the rhino with her staking rewards sidebarDepth: 2 summaryPoints: - The Shanghai/Capella upgrade enabled staking withdrawals on Ethereum - Validator operators must provide a withdrawal address to enable - Rewards are automatically distributed every few days - Validators who fully exit staking will receive their remaining balance

Staking withdrawals were enabled with the Shanghai/Capella upgrade which occurred on April 12, 2023. [More about Shanghai/Capella](#)

Staking withdrawals refer to transfers of ETH from a validator account on Ethereum's consensus layer (the Beacon Chain), to the execution layer where it can be transacted with.

Reward payments of excess balance over 32 ETH will automatically and regularly be sent to a withdrawal address linked to each validator, once provided by the user. Users can also **exit staking entirely**, unlocking their full validator balance.

Staking rewards {#staking-rewards}

Reward payments are automatically processed for active validator accounts with a maxed out effective balance of 32 ETH.

Any balance above 32 ETH earned through rewards does not actually contribute to principal, or increase the weight of this validator on the network, and is thus automatically withdrawn as a reward payment every few days. Aside from providing a withdrawal address one time, these rewards do not require any action from the validator operator. This is all initiated on the consensus layer, thus no gas (transaction fee) is required at any step.

How did we get here? {#how-did-we-get-here}

Over the past few years Ethereum has undergone several network upgrades transitioning to a network secured by ETH itself, instead of energy-intensive mining as it once was. Participating in consensus on Ethereum is now known as "staking", as participants have voluntarily locked up ETH, placing it "at stake" for the ability to participate in the network. Users who follow the rules will be rewarded, while attempts to cheat can be penalized.

Since the launch of the staking deposit contract in November 2020, some brave Ethereum pioneers have voluntarily locked funds up to activate "validators", special accounts that have the right to formally attest to and propose blocks, following network rules.

Before the Shanghai/Capella upgrade, you couldn't use or access your staked ETH. But now, you can opt-in to automatically receive your rewards into a chosen account, and you can also withdraw your staked ETH whenever you want.

How do I prepare? {#how-do-i-prepare}

Important notices {#important-notices}

Providing a withdrawal address is a required step for any validator account before it will be eligible to have ETH withdrawn from its balance.

Each validator account can only be assigned a single withdrawal address, one time. Once an address is chosen and submitted to the consensus layer, this cannot be undone or changed again. Double-check ownership and accuracy of the address provided before submitting.

There is **no threat to your funds in the meantime** for not providing this, assuming your mnemonic/seed phrase has remained safe offline, and has not been compromised in any way. Failure to add withdrawal credentials will simply leave the ETH locked in the validator account as it has been until a withdrawal address is provided.

Exiting staking entirely {#exiting-staking-entirely}

Providing a withdrawal address is required before *any* funds can be transferred out of a validator account balance.

Users looking to exit staking entirely and withdraw their full balance back must also sign and broadcast a "voluntary exit" message with validator keys which will start the process of exiting from staking. This is done with your validator client and submitted to your consensus node, and does not require gas.

The process of a validator exiting from staking takes variable amounts of time, depending on how many others are exiting at the same time. Once complete, this account will no longer be responsible for performing validator network duties, is no longer eligible for rewards, and no longer has their ETH "at stake". At this time the account will be marked as fully "withdrawable".

Once an account is flagged as "withdrawable", and withdrawal credentials have been provided, there is nothing more a user needs to do aside from wait. Accounts are automatically and continuously swept by block proposers for eligible exited funds, and your account balance will be transferred in full (also known as a "full withdrawal") during the next [sweep](#).

When are staking withdrawals enabled? {#when}

Staking withdrawals are live! Withdrawal functionality was enabled as part of the Shanghai/Capella upgrade which occurred on April 12, 2023.

The Shanghai/Capella upgrade enabled previously staked ETH to be reclaimed into regular Ethereum accounts. This closed the loop on staking liquidity, and brought Ethereum one step closer on its journey towards building a sustainable, scalable, secure decentralized ecosystem.

- [More on Ethereum history](#)
- [More on the Ethereum roadmap](#)

How do withdrawal payments work? {#how-do-withdrawals-work}

Whether a given validator is eligible for a withdrawal or not is determined by the state of the validator account itself. No user input is needed at any given time to determine whether an account should have a withdrawal initiated or not—the entire process is done automatically by the consensus layer on a continuous loop.

More of a visual learner? {#visual-learner}

Check out this explanation of Ethereum staking withdrawals by Finematics:

Validator "sweeping" {#validator-sweeping}

When a validator is scheduled to propose the next block, it is required to build a withdrawal queue, of up to 16 eligible withdrawals. This is done by originally starting with validator index 0, determining if there is an eligible withdrawal for this account per the rules of the protocol, and adding it to the queue if there is. The validator set to propose the following block will pick up where the last one left off, progressing in order indefinitely.

Think about an analogue clock. The hand on the clock points to the hour, progresses in one direction, doesn't skip any hours, and eventually wraps around to the beginning again after the last number is reached.

Now instead of 1 through 12, imagine the clock has 0 through N (*the total number of validator accounts that have ever been registered on the consensus layer, over 500,000 as of Jan 2023*).

The hand on the clock points to the next validator that needs to be checked for eligible withdrawals. It starts at 0, and progresses all the way around without skipping any accounts. When the last validator is reached, the cycle continues back at the beginning.

Checking an account for withdrawals {#checking-an-account-for-withdrawals}

While a proposer is sweeping through validators for possible withdrawals, each validator being checked is evaluated against a short series of questions to determine if a withdrawal should be triggered, and if so, how much ETH should be withdrawn.

1. **Has a withdrawal address been provided?** If no withdrawal address has been provided, the account is skipped and no withdrawal initiated.
2. **Is the validator exited and withdrawable?** If the validator has fully exited, and we have reached the epoch where their account is considered to be "withdrawable", then a full withdrawal will be processed. This will transfer the entire remaining balance to the withdrawal address.
3. **Is the effective balance maxed out at 32?** If the account has withdrawal credentials, is not fully exited, and has rewards above 32 waiting, a partial withdrawal will be processed which transfers only the rewards above 32 to the user's withdrawal address.

There are only two actions that are taken by validator operators during the course of a validator's life cycle that influence this flow directly:

- Provide withdrawal credentials to enable any form of withdrawal
- Exit from the network, which will trigger a full withdrawal

Gas free {#gas-free}

This approach to staking withdrawals avoids requiring stakers to manually submit a transaction requesting a particular amount of ETH to be withdrawn. This means there is **no gas (transaction fee) required**, and withdrawals also do not compete for existing execution layer block space.

How frequently will I get my staking rewards? {#how-soon}

A maximum of 16 withdrawals can be processed in a single block. At that rate, 115,200 validator withdrawals can be processed per day (assuming no missed slots). As noted above, validators without eligible withdrawals will be skipped, decreasing the time to finish the sweep.

Expanding this calculation, we can estimate the time it will take to process a given number of withdrawals:

Number of withdrawals	Time to complete
400,000	3.5 days
500,000	4.3 days
600,000	5.2 days
700,000	6.1 days
800,000	7.0 days

As you see this slows down as more validators are on the network. An increase in missed slots could slow this down proportionally, but this will generally represent the slower side of possible outcomes.

Frequently asked questions {#faq}

No, the process to provide withdrawal credentials is a one-time process, and cannot be changed once submitted.

By setting an execution layer withdrawal address the withdrawal credentials for that validator have permanently been changed. This means the old credentials will no longer work, and the new credentials direct to an execution layer account.

Withdrawal addresses can be either a smart contract (controlled by its code), or an externally owned account (EOA, controlled by its private key). Currently these accounts have no way to communicate a message back to the consensus layer that would signal a change of validator credentials, and adding this functionality would add unnecessary complexity to the protocol.

As an alternative to changing the withdrawal address for a particular validator, users may choose to set a smart contract as their withdrawal address which could handle key rotating, such as a Safe. Users who set their funds to their own EOA can perform a full exit to withdraw all of their staked funds, and then re-stake using new credentials.

If you are part of a [staking pool](#) or hold staking tokens, you should check with your provider for more details about how staking withdrawals are handled, as each service operates differently.

In general, users should be free to reclaim their underlying staked ETH, or change which staking provider they utilize. If a particular pool is getting too large, funds can be exited, redeemed, and re-staked with a [smaller provider](#). Or, if you've accumulated enough ETH you could [stake from home](#).

Yes, as long as your validator has provided a withdrawal address. This must be provided once to initially enable any withdrawals, then reward payments will be automatically triggered every few days with each validator sweep.

No, if your validator is still active on the network, a full withdrawal will not happen automatically. This requires manually initiating a voluntary exit.

Once a validator has completed the exiting process, and assuming the account has withdrawal credentials, the remaining balance will *then* be withdrawn during the next [validator sweep](#).

Withdrawals are designed to be pushed automatically, transferring any ETH that is not actively contributing to stake. This includes full balances for accounts that have completed the exiting process.

It is not possible to manually request specific amounts of ETH to be withdrawn.

Validator operators are recommended to visit the [Staking Launchpad Withdrawals](#) page where you'll find more details about how to prepare your validator for withdrawals, timing of events, and more details about how withdrawals function.

To try out your setup on a testnet first, visit the [Goerli Testnet Staking Launchpad](#) to get started.

No. Once a validator has exited and its full balance has been withdrawn, any additional funds deposited to that validator will automatically be transferred to the withdrawal address during the next validator sweep. To re-stake ETH, a new validator must be activated.

Further reading {#further-reading}

- [Staking Launchpad Withdrawals](#)
- [EIP-4895: Beacon chain push withdrawals as operations](#)
- [Ethereum Cat Herders - Shanghai](#)
- [PEEPanEIP #94: Staked ETH Withdrawal \(Testing\) with Potuz & Hsiao-Wei Wang](#)
- [PEEPanEIP#68: EIP-4895: Beacon chain push withdrawals as operations with Alex Stokes](#)
- [Understanding Validator Effective Balance](#)