

Staking SOL with the Solana CLI

After you have [received SOL](#), you might consider putting it to use by delegating stake to a validator. Stake is what we call tokens in a stake account. Solana weights validator votes by the amount of stake delegated to them, which gives those validators more influence in determining the next valid block of transactions in the blockchain. Solana then generates new SOL periodically to reward stakers and validators. You earn more rewards the more stake you delegate.

For an overview of staking, read first the [Staking and Inflation FAQ](#).

Create a Stake Account

To delegate stake, you will need to transfer some tokens into a stake account. To create an account, you will need a keypair. Its public key will be used as the [stake account address](#). No need for a password or encryption here; this keypair will be discarded right after creating the stake account.

`solana-keygen new --no-passphrase -o stake-account.json` The output will contain the public key after the text `pubkey:`.

`pubkey: GKvqsuNcnwWqPzzuhLmGi4rzzh55FhJtGizkhHaEJqiV` Copy the public key and store it for safekeeping. You will need it any time you want to perform an action on the stake account you create next.

Now, create a stake account:

`solana create-stake-account --from < KEYPAIR`

`stake-account.json < AMOUNT`

`\ --stake-authority < KEYPAIR`

`--withdraw-authority < KEYPAIR`

`\ --fee-payer < KEYPAIR`

tokens are transferred from the account at the "from" to a new stake account at the public key of `stake-account.json`.

The `stake-account.json` file can now be discarded. To authorize additional actions, you will use the `--stake-authority` or `--withdraw-authority` keypair, not `stake-account.json`.

View the new stake account with the `solana stake-account` command:

`solana stake-account < STAKE_ACCOUNT_ADDRESS`

The output will look similar to this:

Total Stake: 5000 SOL Stake account is undelegated Stake Authority:
EXU95vqs93yPeCeAU7mPPu6HbRUmTFPEiGug9oCdvQ5F Withdraw Authority:
EXU95vqs93yPeCeAU7mPPu6HbRUmTFPEiGug9oCdvQ5F

Set Stake and Withdraw Authorities

[Stake and withdraw authorities](#) can be set when creating an account via the `--stake-authority` and `--withdraw-authority` options, or afterward with the `solana stake-authorize` command. For example, to set a new stake authority, run:

`solana stake-authorize < STAKE_ACCOUNT_ADDRESS`

`\ --stake-authority < KEYPAIR`

`--new-stake-authority < PUBKEY`

`\ --fee-payer < KEYPAIR`

This will use the existing stake authority to authorize a new stake authority on the stake account.

Advanced: Derive Stake Account Addresses

When you delegate stake, you delegate all tokens in the stake account to a single validator. To delegate to multiple validators, you will need multiple stake accounts. Creating a new keypair for each account and managing those addresses can be cumbersome. Fortunately, you can derive stake addresses using the `--seed` option:

`solana create-stake-account --from < KEYPAIR`

< STAKE_ACCOUNT_KEYPAIR

--seed < STRING

< AMOUNT

\ --stake-authority < PUBKEY

--withdraw-authority < PUBKEY

--fee-payer < KEYPAIR

is an arbitrary string up to 32 bytes, but will typically be a number corresponding to which derived account this is. The first account might be "0", then "1", and so on. The public key of acts as the base address. The command derives a new address from the base address and seed string. To see what stake address the command will derive, usesolana create-address-with-seed :

solana create-address-with-seed --from < PUBKEY

< SEED_STRING

STAKE is the public key of the passed tosolana create-stake-account .

The command will output a derived address, which can be used for theargument in staking operations.

Delegate Stake

To delegate your stake to a validator, you will need its vote account address. Find it by querying the cluster for the list of all validators and their vote accounts with thesolana validators command:

solana validators The first column of each row contains the validator's identity and the second is the vote account address. Choose a validator and use its vote account address in solana delegate-stake :

solana delegate-stake --stake-authority < KEYPAIR

< STAKE_ACCOUNT_ADDRESS

< VOTE_ACCOUNT_ADDRESS

\ --fee-payer < KEYPAIR

The stake authority authorizes the operation on the account with address. The stake is delegated to the vote account with address .

After delegating stake, usesolana stake-account to observe the changes to the stake account:

solana stake-account < STAKE_ACCOUNT_ADDRESS

You will see new fields "Delegated Stake" and "Delegated Vote Account Address" in the output. The output will look similar to this:

Total Stake: 5000 SOL Credits Observed: 147462 Delegated Stake: 4999.99771712 SOL Delegated Vote Account Address: CcaHc2L43ZWjwCHART3oZoJvHLAe9hzT2DJNUpBzoTN1 Stake activates starting from epoch: 42 Stake Authority: EXU95vqs93yPeCeAU7mPPu6HbRUmTFPEiGug9oCdvQ5F Withdraw Authority: EXU95vqs93yPeCeAU7mPPu6HbRUmTFPEiGug9oCdvQ5F

Deactivate Stake

Once delegated, you can undelegate stake with thesolana deactivate-stake command:

solana deactivate-stake --stake-authority < KEYPAIR

< STAKE_ACCOUNT_ADDRESS

\ --fee-payer < KEYPAIR

The stake authority authorizes the operation on the account with address.

Note that stake takes several epochs to "cool down". Attempts to delegate stake in the cool down period will fail.

Withdraw Stake

Transfer tokens out of a stake account with thesolana withdraw-stake command:

```
solana withdraw-stake --withdraw-authority < KEYPAIR
```

```
< STAKE_ACCOUNT_ADDRESS
```

```
< RECIPIENT_ADDRESS
```

```
< AMOUNT
```

```
\ --fee-payer < KEYPAIR
```

is the existing stake account, the stake authority is the withdraw authority, and is the number of tokens to transfer to .

Split Stake

You may want to delegate stake to additional validators while your existing stake is not eligible for withdrawal. It might not be eligible because it is currently staked, cooling down, or locked up. To transfer tokens from an existing stake account to a new one, use thesolana split-stake command:

```
solana split-stake --stake-authority < KEYPAIR
```

```
< STAKE_ACCOUNT_ADDRESS
```

```
< NEW_STAKE_ACCOUNT_KEYPAIR
```

```
< AMOUNT
```

```
\ --fee-payer < KEYPAIR
```

is the existing stake account, the stake authority is the stake authority, is the keypair for the new account, and is the number of tokens to transfer to the new account.

To split a stake account into a derived account address, use the--seed option. See [Derive Stake Account Addresses](#) for details. [Previous Solana CLI: Connecting to a Cluster](#)[Next Solana CLI: Deploy a Program](#)