

# Validator sets

Validators are grouped into sets that determine what behaviors are permitted to the validator and what data is stored on-chain.

There are three validator sets - consensus, below-capacity, and below-threshold - that are discriminated by the stake / voting power of their respective validators.

Two protocol parameters determine the composition of each validator set:

- `max_validator_slots`
  - : the maximum number of validators allowed to participate in consensus of any block
- `validator_stake_threshold`
  - : the minimum stake required to participate in consensus

With this in mind, each of the three validator sets is defined:

- Consensus:
  - the set of validators that participates in consensus and voting on blocks. It contains the validators with the most voting power and cannot exceed `max_validator_slots`
  - size. Validators in this set also require greater than `validator_stake_threshold`
  - staked tokens.
- Below-capacity:
  - contains the validators who have greater than `validator_stake_threshold`
  - stake but are not one of the top `max_validator_slots`
  - validators. These are next in line to join the consensus
  - set should space open up.
- Below-threshold:
  - contains all active validators with less than `validator_stake_threshold`
  - stake

Any validator that is in one of the three validator sets above can be considered an active validator.

## Querying the validator set of a given validator

A validator's state can indicate the validator set to which it belongs. This can be queried at the CLI with:

```
namadac
```

```
validator-state
```

```
--validator VALIDATOR_ADDRESS --epoch EPOCH
```

The `--epoch` argument is optional; if not provided, the state will be queried at the current epoch.

## Jailed and Inactive validators

Validators that are considered to be jailed or inactive cannot belong to one of the three aforementioned validator sets. Extra restrictions are enforced and other transactions may be required in order for these validators to become eligible for consideration in consensus.

Jailed validators have committed protocol infractions or not maintained liveness requirements of consensus validators. They can only return to an active validator set by submitting a successful `unjail` transaction. See more details [here](#).

Inactive validators have manually removed themselves from consideration in consensus activities with a `deactivate` transaction. This can typically signal that a validator has ceased operations and might signal delegators to unbond from it. See more details [here](#).

[Staking Jailing](#)