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### General Concepts

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### IRIShub Node Types

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#### Full Node

A full-node is a program that fully validates transactions and blocks of a blockchain. It is distinct from a light-node that only processes block headers and a small subset of transactions. Running a full-node requires more resources than a light-node but is necessary in order to be a validator. In practice, running a full-node only implies running a non-compromised and up-to-date version of the software with low network latency and without downtime.

## #

#### Validator Node

The [IRIS Hub](#) is based on [Cosmos SDK](#) [open in new window](#) and [Tendermint](#) [open in new window](#), which relies on a set of validators to secure the network. The role of validators is to run a full-node and participate in consensus by broadcasting votes which contain cryptographic signatures signed by their private keys. Validators commit new blocks to the blockchain and receive revenue in exchange for their work. They must also participate in governance by voting on proposals. Validators are weighted according to their total stake.

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#### Validator Candidate Node

Only top 100 bonded full nodes can become validator nodes, the rest will become candidates. The situation will change as delegation amount changes.

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### IRIShub User Types

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#### Validator Operator

A validator operator is the only one who can operate the Validator's informations or participate in governance as the validator.

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#### Delegator

Delegators are IRIS holders who cannot, or do not want to run a validator themselves. IRIS holders can delegate IRIS to a validator and obtain a part of their revenue in exchange. They can earn as much as the validators and only need to pay some commission.

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#### Profiler

Profiler is a special type of user who can submit software upgrade/halt proposals

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#### Trustee

Trustee is a special type of user who will receive funds from CommunityTaxUsage proposals

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## IRIS Token

The IRIS hub has its own native token known as IRIS . It is designed to serve three purposes in the network.

- Staking.
- Similar to the ATOM token in the Cosmos Hub, the IRIS token will be used as a staking token to secure the PoS blockchain.
- Transaction Fee.
- The IRIS token will also be used to pay fees for all transactions in the IRIS network.
- Service Fee.
- It is required that service providers in the IRIS network charge service fees denominated in the IRIS token.

It is intended that the IRIS network will eventually support all whitelisted fee tokens from the Cosmos network, which can be used to pay the transaction fees and service fees.

## #

### Staking Rewards

The validator and its delegators can share the following rewards by proportion:

- Block Inflation
- Block Inflation exists to incentivize IRIS holders to stake. The more staked IRIS tokens are, more secure the network become(Read more about [Staking](#)
- ).
- Block Inflation will be [distributed every block](#)
- [.Inflation rate](#)
- in IRIShub for the first year will be 4%.This ration could be adjusted by parameter-change
- proposals
- . In this way, loose IRIS will devalue year by year.
- Block Proposer Reward
- In IRIShub, the probability for being a proposer is proportional to the validator's bonded tokens. If one proposed block is finalized, the proposer gets extra rewards for it.
- Fee
- Each transaction needs a [fee](#)
- for compensating validators' work [Gas](#)
- . These fees can be paid with IRIS and may later in any tokens which are whitelisted by the IRIShub's governance. Fees are distributed to validators in proportion to their stake. A minimum fee/gas ration is set in IRIShub.

Each validator receives revenue in proportion to its total stake. However, before this revenue is distributed to its delegators, the validator can apply a commission for providing staking services.

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### Staking Rewards Calculation Formula

The following formulas are based on the current [IRIShub Mainnet Params](#) .

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Annual Rewards (ignore proposer rewards and fees)

- AnnualInflation =
- Base \* InflationRate
- (aka 2 billion \* 4% = 80 million iris)
- ValidatorRewards =
- (AnnualInflation / BondedTokens) \* (1 - CommunityTax) \* (ValidatorSelfDelegation + DelegatorsDelegation \* ValidatorCommissionRate)
- DelegatorRewards =
- (AnnualInflation / BondedTokens) \* (1 - CommunityTax) \* DelegatorSelfDelegation \* (1 - ValidatorCommissionRate)

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### Block Rewards

- BlockInflation =
- AnnualInflation / (3652460\*12)
- (aka 12.68 iris)
- ProposerExtraRewards =

- $(\text{BaseProposerReward} + \text{BonusProposerReward} * \text{PrecommitPower} / \text{TotalVotingPower}) * (\text{BlockInflation} + \text{BlockCollectedFees})$
- $\text{BlockRewards} =$
- $(\text{BlockInflation} + \text{BlockCollectedFees}) * (1 - \text{CommunityTax}) - \text{ProposerExtraRewards}$
- $\text{ValidatorTotalRewards} =$
- - Non-Proposer:  $(\text{BlockRewards} / \text{BondedTokens}) * \text{ValidatorBondedTokens}$
  - Proposer:  $\text{NonProposerValidatorTotalRewards} + \text{ProposerExtraRewards}$
- $\text{Commission} =$
- $\text{ValidatorTotalRewards} * \text{ValidatorCommissionRate}$
- $\text{ValidatorRewards} =$
- $\text{ValidatorTotalRewards} * (\text{ValidatorSelfDelegation} / \text{ValidatorBondedTokens}) + \text{Commission}$
- $\text{DelegatorRewards} =$
- $(\text{ValidatorTotalRewards} - \text{Commission}) * (\text{DelegatorSelfDelegation} / \text{ValidatorBondedTokens})$

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### Validator Responsibilities

Validators have two main responsibilities:

- Be able to constantly run a correct version of the software:
- Validators need to make sure that their servers are always online and their private keys are not compromised.
- Actively participate in governance:
- Validators are required to vote on every proposal.

Additionally, validators are expected to be active members of the community. They should always be up-to-date with the current state of the ecosystem so that they can easily adapt to any change.

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### Validator Risks

- Unavailability
- : Validators are expected to keep signing votes for making new blocks. If a validator's signature has not been included in more than 30% of the last 34,560 blocks (which amounts to approximately 48 hours, assuming an average block-generating time of 5 seconds), this validator will get jailed and removed from current validatorset for 10 minutes, and their bonded tokens will get slashed by 0.03%.
- Double Sign
- : If the protocol detects that a validator voted multiple different opinions about the same block (same height/round), or voted for different blocks at the same height/round, this validator will get jailed and removed from current validatorset forever. Their bonded tokens will get slashed by 1%.
- Censorship
- : If the protocol detects that a proposer included invalid transactions in a block, this validator will get jailed and removed from current validatorset for 2 days.

All metrics mentioned can be adjusted by parameter-change proposals.