OAK Network Token Economics

Sean McGinnis Chris Li

May 10th 2022

Contents

1 Introduction

OAK is the native token of OAK Network, which is a delegated proof of stake network with the purpose of providing decentralized and trustless cross-chain automation. OAK aims to provide users with easy and affordable tools to schedule and automate payments that can be triggered by time, token price, or other events. Providing these services to millions of users OAK requires a thriving ecosystem that is both secure and incentivizes good faith participation in the network for all stakeholders. This paper describes the economic structure OAK uses to reward good faith participation from a wide variety of stakeholders including automation users, stakers, collators, and investors.

2 Token Basics and Initial Distribution

This section will describe some of the basic features of the OAK token including the initial supply, distribution, and uses of the genesis tokens.

The initial supply of OAK will be one billion tokens. These tokens will be minted and placed into circulation over a four year schedule and will be distributed according to the figures below:

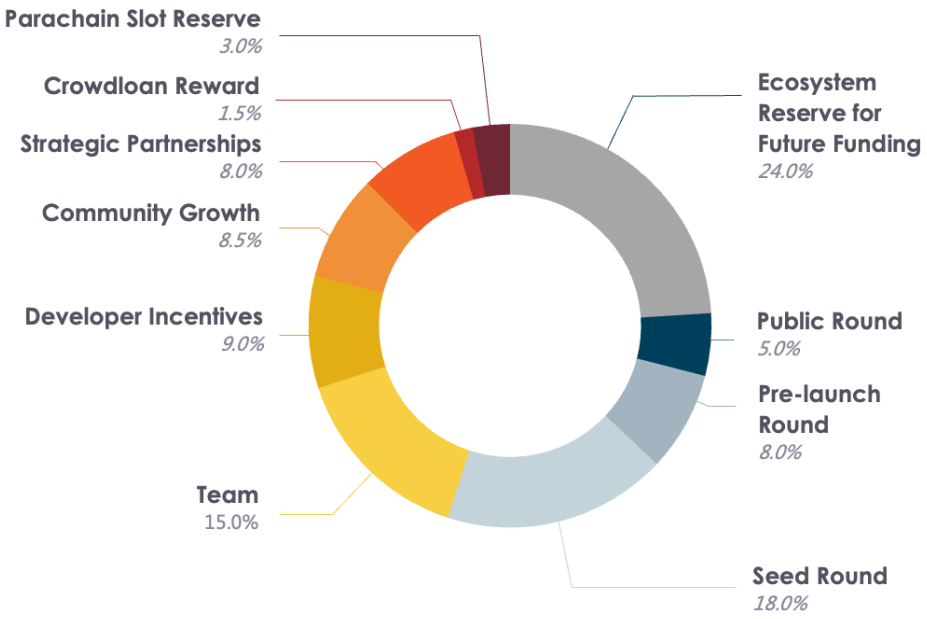

Figure 1: Initial OAK Distribution

Initially, the tokens will be distributed into each of these nine categories, accounting for the full one billion OAK supply. Each of these categories are minted and released on a separate schedule that is

realized over three years. Vesting details are included in the following table and category descriptions.

Stakeholder	**Token Allocation**	**Vesting Period (months)**
Seed Round	18.0%	24
Team	15.0%	45
Pre-launch Round	8.0%	24
Public Offering	5.0%	12
Developer Incentives	9.0%	48
Community Growth	8.5%	48
Strategic Partnerships	8.0%	48
Crowdloan Reward	1.5%	25
Parachain Slot Reserve	3.0%	20
Ecosystem Reserve	24.0%	60
Total	100.0%	

Figure 2: Token Distribution and Vesting Periods

Category Descriptions:

Seed Round:

- **Purpose:** To compensate the initial investors for supporting the development of the OAK Network
- **Vesting Schedule:** Tokens shall be distributed in five distributions of twenty percent (20%) at 12, 15, 18, 21, and 24 months from launch.

Team:

- **Purpose:** To incentivize the direct contractual workforce of the OAK Network
- **Vesting Schedule:** The Tokens shall be subject to a one year cliff following Token Distribution Event. Thereafter, the tokens shall be delivered in twelve equal distributions of 8.33

Pre-launch Round:

- **Purpose:** To raise any additional funds required to develop the OAK network and provide full automation functionality.
- **Vesting Schedule:** 30% to be distributed at month 6, 30% at month 12 and the remaining 40% distributed evenly (10%) every quarter in the 2nd year.

Public Offering:

- **Purpose:** To distribute OAK tokens to customers, retail investors, and any others who aim to use and contribute to OAK's ecosystem
- **Vesting Schedule:** Distributed evenly (8.33%) every month for the first 12 months.

Community:

- Developer Incentives:
  - **Purpose:** To boost project and platform adoption among developers through a variety of programs such as open grants, bug bounties, and hackathons.
  - **Vesting Schedule:** 48 months; 25% to be minted one month after Token Distribution Event, and the remainder minted in equal portions each month through the 48th month.
- Community Growth:
  - **Purpose:** To drive community growth through communication, marketing, and community development. These include initiatives such as Ambassador programs, KOL, meetups, and more.
  - **Vesting Schedule:** 48 months; 25% to be minted one month after Token Distribution Event, and the remainder minted in equal portions each month through the 48th month.
- Strategic Partnerships:
  - **Purpose:** To provide free trials for partners, such as trading firms and exchanges, as well as to create initial liquidity pools for cross-chain asset transfer.
  - **Vesting Schedule:** 48 months; 25% to be minted one month after Token Distribution Event, and the remainder minted in equal portions each month through the 48th month.
- Crowdloan Reward:
  - **Purpose:** To raise DOT in a crowdloan to secure a Polkadot parachain slot
  - **Vesting Schedule:** 24 months; 12.5% to be minted one month after Token Distribution Event, and the remainder minted in equal portions each quarter in the following 24 months.

Future Parachain Slot Reserve:

- **Purpose:** To be reserved for winning future parachain slots on Polkadot.
- **Vesting Schedule:** 20 months; to be minted and distributed evenly (20%) at the 4th, 8th, 12th, 16th and 20th months.

Ecosystem Reserve:

- **Purpose:** To be used at discretion of the OAK Network team, including for future funding operations, business expansion, mergers and acquisitions, etc.
- **Vesting Schedule:** To be determined; the vesting will not begin in the first 24 months after Token Distribution Event and the vesting period will last for at least 36 months.

The vesting schedules described above except that of Ecosystem Reserve result in a circulating supply curve in the figure below.

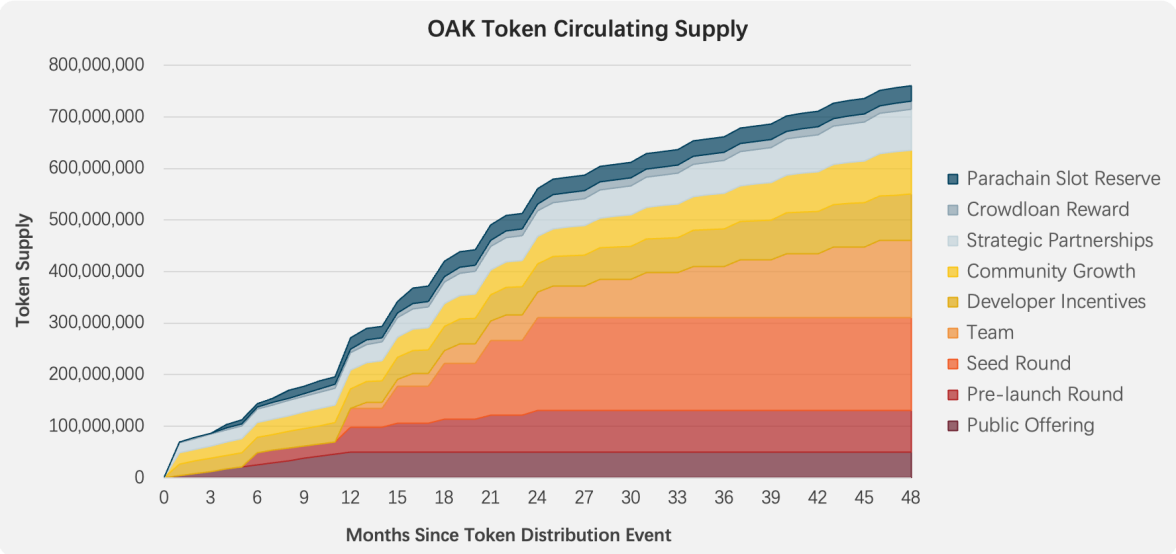

Figure 3: Circulating supply curve

3 Token Supply

This section discusses inflationary and deflationary forces, the expected long-term token supply, and burning mechanisms.

3.1 Inflationary Forces

Inflation is expected to follow a model similar to Moonbeam which includes a fixed 5% annual inflation rate divided into three components:

This inflationary force will be constant throughout the duration of the network's life except for the first two months. Additionally, it will be counterbalanced through burning of transaction fees and treasury funds which are expected to result in the token becoming slightly deflationary over time.

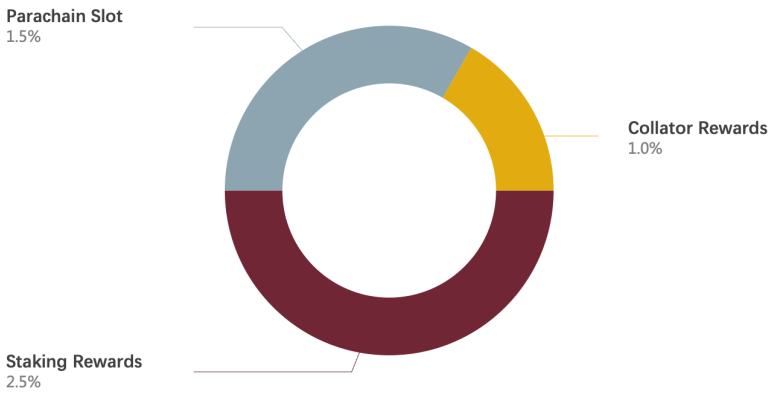

Figure 4: Breakdown of inflationary forces

3.2 Deflationary Forces

To counterbalance the constant 5% annual inflation a portion of automation fees will be burned. At the launch of the OAK Network this proportion will be small and will grow over the life of the ecosystem. The lower initial burn rate will allow early revenue to be invested back into the network to pursue positive NPV projects and improve the ecosystem. Overtime, the portion of transaction fees burned will grow to provide a deflationary force that may make the token deflationary overall. The changes in the burn rate will be decided through the governance process and will respond to the abundance of positive NPV projects available to the OAK Network.

In addition, funds in the treasury will also be burned overtime if left unused. Initially, this feature will be turned off in order to make best use of resources in the early stages of the ecosystem but will be activated shortly after launch.

3.3 Vision for Long Term Token Supply

The vision for OAK's long term token supply is to be initially inflationary to allow tokens to be used towards positive net present value (NPV) projects voted on by the community. As the network matures there may come a time when it is more valuable to token holders to pursue development projects selectively and burn a larger portion of transaction fees (returning value to token holders). With sufficient traffic and a large enough burn percentage the token may become deflationary as value is distributed back to token holders. This point, where there is a greater supply of treasury tokens than positive NPV projects, may take many years to arrive or may never be reached if new opportunities are constantly presenting themselves. This transition to burning a larger portion of transaction fees will need to be decided upon by the token holders through participating in the governance process.

Figure 5 displays one example of how the long term OAK circulating token supply is envisioned.

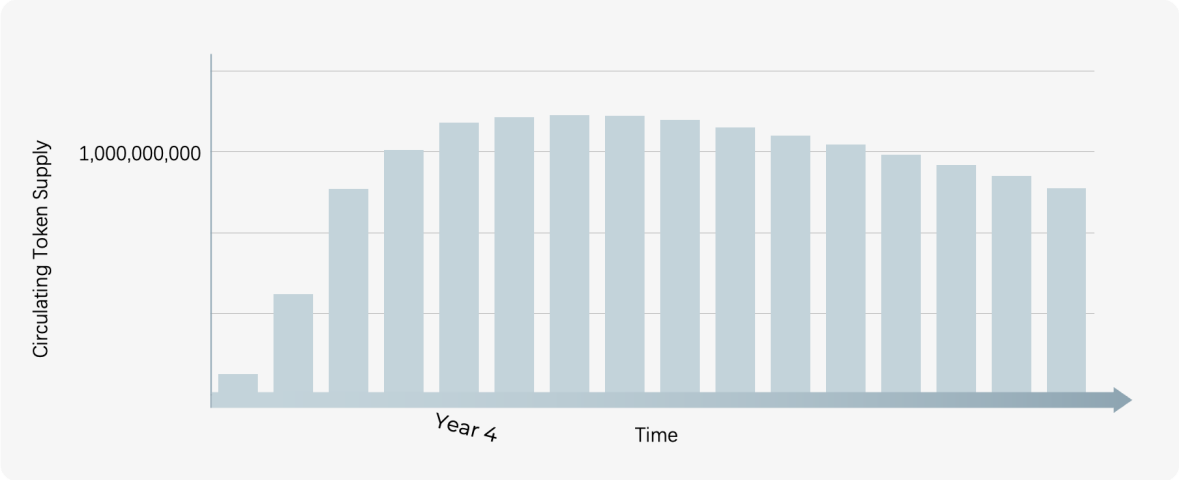

Figure 5: One possible curve for the total token supply over time

4 Staking and Collator Rewards

Staking and Collator rewards will be granted once inflation is activated for the OAK network (at the two month mark). These rewards will be evenly paid to collators for each block they successfully author, encouraging collator reliability. Of the 5% of the total inflation, 1/5 (1% inflation) of this token supply will be provided directly to collators. Staking rewards will be granted in a similar manner to the top 300 stakers for each active collator. 1/2 of tokens minted through inflation (2.5% inflation) will be divided among the stakers per block authored. Dividing the token rewards in this way encourages collators to be reliable in order to maximize their rewards and encourages stakers to approximately evenly split themselves among collators with some variation based on collator reliability.

Inflation will consider not just the circulating token supply but the entire token supply at the time meaning that the 5% inflation over the first year will consider that there are approximately 1 billion tokens despite the circulating supply being much less. This allows for outsized returns on collating and staking over the first couple years while the circulating token supply is still low. These larger early returns add stability to the ecosystem when it is younger and riskier and ensures that collating and staking will be an attractive option despite the risk associated with newer and less-established products.

4.1 Staking Returns

The following graphs in Figure 4 show staking rates of return with three different assumptions of the percentage of the circulating supply of OAK staked (20%, 40%, and 60%). This graph displays both the higher rates of return over the early stages of the ecosystem as well as demonstrates how an equilibrium will be reached for the total supply of OAK staked. Rates of return are higher if total supply staked is low encouraging token holders to increase their stake.

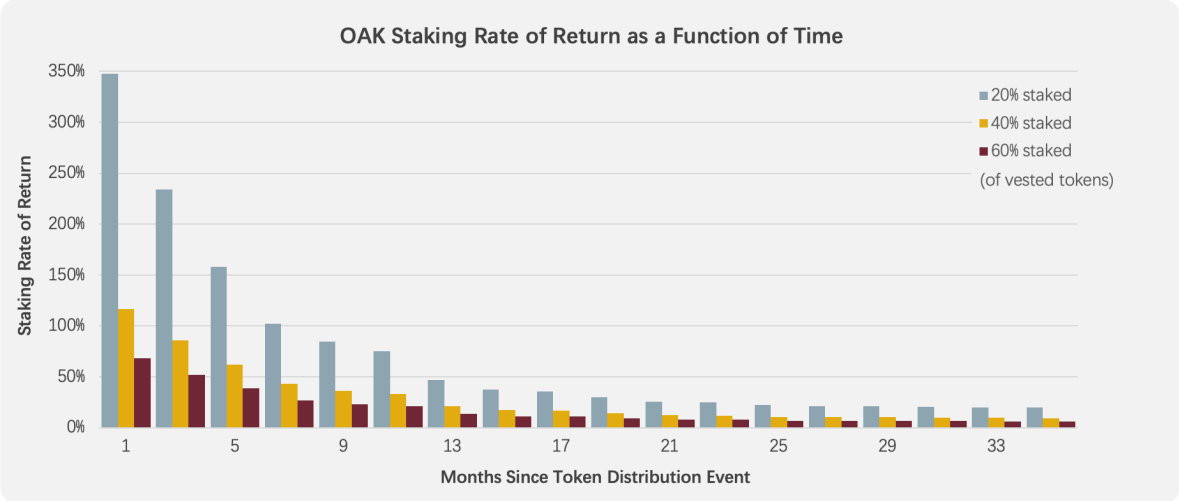

Figure 6: OAK staking annual rates of return as a function of time (differences between data sets assume different percentages of circulating tokens staked)

The average first year staking rates of return (averaged across months 0 through 12) for 20%, 40%, and 60% of total circulating supply staked are ∼94%,∼47%, and ∼31% respectively.

4.2 Collator Rewards

Collators can expect to earn the staking rewards described above for their self-staked OAK. In addition, they will receive collating rewards over a time period according to the following equation:

*Collator Rewards = 1% inflation * # of blocks authored by the collator/# of total blocks in that time period*

While the total number of collator slots will be capped to avoid exceeding an upper limit, if fewer collators are competing or if they have less staked, the rewards per unit of invested capital increase. This mechanism allows collator rewards to remain competitive over time.

5 Fees

5.1 Automation Fee

Automation fees power the core functionality of the OAK ecosystem which allows users to set time or price triggers to schedule their future transactions. This functionality requires both inclusion weight (at the time the task is created) and execution weight (at the time that the task is executed). Additionally some resources will be required to store the task on the chain as it awaits execution. The formula for this fee is as follows:

$$\begin{aligned} Fee(Task) = C_{now} * [BaseFee + InclusionWeight(Task)] + ExpectedRent(Task) \\ + \sum_{n=1}^{k} (CrosschainFees_n + OracleFees_n + C_n * ExecutionWeight\,(tx)) \end{aligned} \tag{1}$$

Where:

- C_{now}: Is a traffic multiplier based on the traffic of the previous block
- $BaseFee$: A minimum fee for including any task on the blockchain
- $InclusionWeight(Task)$: A fee that scales linearly with the weight of including the task on the block
- $ExpectedRent(Task)$: A function of the expected space required on the block for the pointer until the execution time is reached.
- K: the number of requested transactions in the task
- n: each specific task is represented by a single integer value of n
- $CrosschainFees$: The expected required fees to execute the requested task on other blockchains (for example a Polkadot or Ethereum gas fee if transactions are executed on those chains as part of the task).
- $OracleFees$: The expected required fee for oracle inputs that may be required to trigger a task (such as token price data)
- C_n: Is a traffic multiplier based on the expected traffic at the time of execution
- $ExecutionWeight(tx)$: A fee that scales linearly with the execution weight of the requested transaction

This equation describes the automation fees for time or price triggers and can be used for both one time and recurring tasks (for example a task including 12 monthly payments). Ultimately, this equation accounts for the costs of including a task on the blockchain considering task weight and blockchain congestion at that time, as well as the costs of executing the task based on weight, congestion, and the fees of other ecosystems if applicable. If a transaction is made that does not require automation, for example: simply moving funds from one wallet to another, then only the inclusion fee is charged as no rent or execution weight is required.

5.2 Traffic Based Pricing

Traffic multipliers are designed similarly to Polkadot traffic factors. These factors slowly increase or decrease the fees charged for new tasks based on whether block fill rates are above or below a target level. While Polkadot only needs to change their fee based on ecosystem traffic at the time a transaction is included on the blockchain, OAK needs to also consider the expected traffic of the ecosystem at the time that the task is executed. This requires some prediction of future traffic depending on how payment methods are structured. These will be explored in greater depth in future documentation.

These traffic factors prevent customers from experiencing large price changes from one moment to the next, however, fees will still adjust over longer periods of time, approaching a market equilibrium.

6 Related Features and Future Work

The OAK Network is designed with many future features and functionalities in mind. Some of these items will be discussed briefly below with more to come in future documentation.

6.1 Fees

This paper only scratches the surface of OAK's fee model which needs to consider changing prices over time as well as ecosystem traffic both today and in the future. When pricing triggers are introduced, enabling stop loss and limit orders, OAK needs to be able to handle processing large numbers of orders that arrive at unpredictable times. These technical considerations affect fees which must ultimately account for risk, managing high traffic events, and responding to/prioritizing customer needs. OAK plans on releasing further documentation on fee design detailing each feature and associated tradeoffs.

Additionally, more work is being done to understand XCMP (cross-chain message passing protocol) fees to allow OAK to interact with other Kusama parachains. Future work will detail the fee structures for interacting with chains both within and outside the Polkadot/Kusama ecosystem.

6.2 Risk Management

Web3 is famous for its volatility, and OAK's event registry model inherently takes on risk as it accepts payments and fees at one time, but executes the transactions at another. OAK plans to build risk management directly into the product through use of insurance and liquidity pools that minimize customer risk exposure. Our end goal is to provide a "set it and forget it" automation experience that is both affordable and reliable regardless of market conditions. OAK will provide additional documentation detailing what types of risk OAK decides to manage and how that can be done efficiently and reliably.

6.3 Refunds

The OAK team aims to provide the best possible user experience, which would logically include offering refunds for high cost automations (for example: tasks with a large number of recurring transactions) that are no longer desired by the user. Refunds with the additional transactions and user flexibility could present arbitrage or security risks if not handled with care. OAK intends to offer secure and customer focused refunds as the product develops. Future documentation will include a comprehensive description of any refund feature we offer including the reasoning and tradeoffs behind those decisions.

7 Conclusion

The OAK Network aims to empower web3 users through easy to use automation across ecosystems. The decisions and features discussed throughout this document aim to create a stable and well managed ecosystem that supports affordable layer 1 automation. Our team will continue to work to improve the technology, economics, and governance of OAK in pursuit of this goal. This evergreen document will continue to be updated as we learn and grow, and further work that explores fees, risk management, and other payment features will be published in the coming months.

References

[1] Polkadot Token Economics by Research at Web3 Foundation:
https://research.web3.foundation/en/latest/polkadot/overview/2-token-economics.html

[2] Polkadot: Vision for a Heterogeneous Multi-Chain Framework
https://polkadot.network/PolkaDotPaper.pdf

[3] Moonbeam Token Economics:
https://moonbeam.foundation/glimmer-token/#:~:text=Moonbeamtargetsa5%annual,securityneedsofthenetwork