Aura Network: a NFT-centric blockchain platform

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Contents

This paper gives a brief overview of Aura Network*, a layer-1 NFT-centric blockchain platform.*

1 Context

Since the birth of Bitcoin in 2009, the crypto market has grown to thousands of billions of US dollars in size. While most of on-chain activities coming from decentralized finance (DeFi), we have seen the unprecedented growth in popularity of non fungible tokens (NFT) since the last year. In March 2021, the digital artwork "Everydays: the First 5000 Days" by Beeple, a collage of 5000 images created daily by the artist in the last 13 years [3] sold for $ 69 millions. Since then, NFTs have started to penetrate into our daily lives in various ways.

NFT origin can be traced back to the ERC-721 Ethereum token standard [2]. An NFT is a distinguishable token that can be owned and transacted by individuals. Given an asset, either digitized or physical, we can issue an NFT that embeds the asset metadata including name, description, and images to represent the ownership of the NFT creator to such asset. As this ownership relation can be freely traded in the market and the unique property of the token, NFT investment is becoming widely popular. By the last quarter of 2021, the NFT sales worldwide have surged to $ 10.5 Billion [5].

What will the future look like for NFT? The technology is growing beyond simple collectibles towards a much more diverse use of NFTs in finance, gaming, real estate, metaverse, etc. Every asset, digital or physical, can have its unique representation in the decentralized blockchain ecosystem and can be transacted without restriction. A lot of new applications and platforms rise to tackle new use cases or target different communities. However, these solutions have to overcome a lot of challenges before becoming actually mainstream, especially in

term of usability and interoperability.

Usability is a key factor to almost all software products that end-users interact with. While NFT is just a token standard, the actual NFT object is owned, transacted by end-users through various decentralized applications (DApps). Most of the current NFT schemes are based on Ethereum, thus they inherit drawbacks from the Ethereum network as well. The confirmation time is slow, Ethereum 1 has around 15-30 transactions per second (TPS), which is extremely slow for global scale DApps. Gas price is also extremely high, especially when minting new NFTs or uploading metadata to the blockchain. Ethereum 1 carbon footprint is also very high due to the use of proof-of-work algorithm. These problems limit the utility of NFTs to use cases that concern only high-value items rather than for everything. The tech community has been working actively on this problem for years. Ethereum 2 upgrade promises a more scalable and sustainable ecosystem. However, it is still a long way until all the upgrades are in place. Alternatively, other blockchains with much better usability emerge such as Flow or BNB Smart Chain (BSC). While non of the alternative choices is as popular as Ethereum, these blockchain platforms offer a much better user experience and are more suitable for different use cases.

There is little *interoperability* among different NFT ecosystems. There is currently no way to directly transmit an NFT from Ethereum to BSC yet. While cross-chain communications are blooming, it is still some time before we can see all of these advancements work with NFT. While the major NFT schemes are concentrated in Ethereum, this problem prevents the wide adoption of the technology to other blockchain platforms.

What are the most popular blockchain platform for NFT? Despite all drawbacks in usability of Ethereum, NFT transaction value on the platform still dom-

inates the market by more than 85% (March 2022) [1]. Following the chart are Ethereum competitors such as Solana, Avalanche, etc. There is little difference between creating NFT on one platform and another. Hence it is extremely difficult for these platforms to compete with Ethereum as users are already much familiar with all the tools, wallets and high liquidity marketplaces like OpenSea. Top blockchain platforms like Solana, BNB smart chain, Avalanche, etc. are having their own NFT marketplaces and games, mostly by investing a lot of capital in startups, game studios or leveraging their existing crypto community.

When a business chooses a blockchain to create NFT, there are several things to consider such as transaction cost, robustness, security, speed, community, usability, interoperability, etc. It is difficult to have one that get all of these characteristics. Some NFT projects that thrive to reach next level of innovation choose another approach, that is to make their own blockchain network e.g. Ronin and Flow so that they can optimize and tailor it to have their desire quality. We believe that this bottom up approach is the correct way of solving the usability and interoperability problems described above. There should be more layer-1 blockchain that can be optimized for specific purposes, governance and secured by communities that share the same trait or interest. Thus, applications on top of these blockchain can have more customization for their target customers. Eventually, these chains can be connected through various cross-chain communication protocols to create a network effect to bring more utility for tokens.

2 Introducing Aura Network

We introduce *Aura Network*, an NFT-centric, layer-1 blockchain that focuses on expanding the use of NFT across various industries. Our vision is to create a

[1] https://cryptoslam.io/

one-stop destination for minting, evaluating, querying, and transacting NFT, to become a pioneer NFT infrastructure for the future. Aura Network focuses on building a *sovereign blockchain* that is optimized for NFT use cases. This section provides a high-level view of the vision of Aura Network.

2.1 Sovereign blockchain

Aura Network is a *sovereign blockchain*. That means having its own decentralized infrastructure that can be governed independently by Aura Community rather than depending on other layer-1 chains. Blockchain like Ethereum or Solana are trying to have everything built on top of it, this make these networks eventually be congested with too many unrelated transactions that can only be solved by sacrificing either security or decentralization. Even then, it takes a long time to update these networks as every change might cause significant impact to existing applications. By targeting our self as a sovereign, NFT-centric blockchain, Aura will have more freedom to optimize the platform to give better performance, security and utility for NFT applications.

2.2 Optimizing and scaling for IP owners

Aura focuses on helping *brands*, *influencers*, *IP owners* and *game creators* providing a way to tokenize their digital assets to create an unique experience using NFT. Aura thesis on building the next level NFT eco-system evolves around this customer segment:

- **Bottom-up optimization**: By working with content providers / owners, Aura gradually optimize the platform both in terms of technical capacity and utilities for accelerating the building process of NFT based decentralized applications.

- **Geological scaling**: Aura shares the view of Ethan Buchman - *co-founder of Cosmos* on blockchain scalability via geo-local systems. It is to bridge the gap between the platform and the customer it serve by providing support for local communities. Eventually, successful applications building on top of Aura from one local community can be easily replicated and customized to fit other communities that share same attributes such as culture, language, countries, etc.

- **Maximize interoperability**: Pushing bottom-up development is not scalable in the long term. Eventually, this approach will meet top down system like Ethereum or Solana at some point. By adopting global standards, integrating with bridges, inter-blockchain communication protocol, Aura can help local brands and content providers to scale their applications and products to the global market.

In developing this thesis, Aura is one of the pioneer platform that help local businesses, IP owners and game studios to tokenize their portfolios and scale to global level. This will help bringing more end-users from the mainstream traditional market into the NFT/metaverse ecosystem. This is the key step in improving the awareness about and utility of NFT as it then can be used widely even in traditional finance.

2.3 A universal framework for NFT

The original Ethereum token standard ERC-721 and ERC-1155 laid a foundation for NFT standard interfaces. How these tokens are created and used in DApps depends on the creativity of developers. It also the source of complexity in developing DApps. There are well-known middleware solutions to tackle this complexity such as *Infura* or *Metaplex* but mostly they are tools and man-

aged services helping application developers to outsource the complexity of key management or blockchain client integration. Aura Network takes it to the next level by not only developing middleware services, open-source smart contract templates, but also supporting integration with local services such as payment gateway, e-commerce platform, social network, etc. With such built-in support tools, Aura Network helps accelerating not only creating new DApps, but also creating a whole new NFT business easily.

2.4 Maximizing interoperability

With the success of Bitcoin, Ethereum, Cardano, and others, a lot of crypto project was born, creating many isolated blockchain networks. With multiple blockchains coexisting, cross-chain communication solutions emerge. Atomic swap, cross-chain messages, inter-blockchain communication protocol are all examples of the capability to link different blockchains together to create a more cohesive ecosystem that benefits everyone. While most of the existing technique applies for fungible tokens, there are a lot of use cases for inoperable NFT that can be transferred from one chain to another for example: digital assets, game items, deeds, identity, etc.

Interoperability is a key part in the thesis of building Aura Network. Interconnectivity and bridging is one of the major force driving the success of DeFi and we expect it will be the same for NFT.

3 Architecture

In this section, we will present the high-level software architecture of the Aura Network ecosystem.

3.1 Blockchain Platform

The Aura Network Blockchain platform is a *Layer-1 blockchain* built using *Cosmos SDK* [4]. The Cosmos SDK is an open-source framework for building proof-of-stake blockchains. It allows developers to create a blockchain platform from scratch with native interoperate capability with other blockchain platforms.

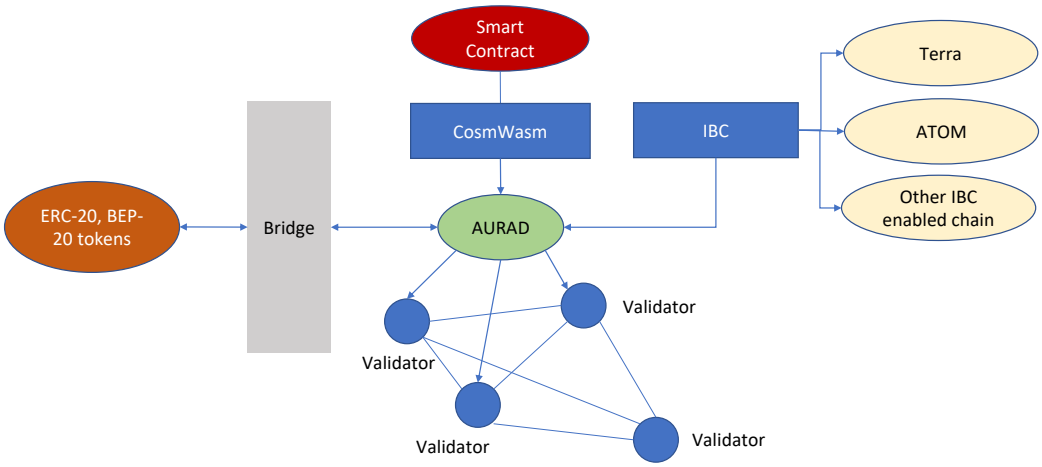


Figure 1: The Aura Network blockchain architecture

Figure 1 shows the high-level architecture of the Aura blockchain platform. There are several main components that we want to highlight in this architecture:

Validator

Validators are blockchain nodes that participate in the consensus process to confirm transactions and produce blocks. The consensus engine is *Tendermint* [1], a Byzantine Fault Tolerance state machine replication engine while the Proof-of-Stake (PoS) logic layer is provided by the Cosmos SDK.

aurad

aurad, the short form of “Aura Daemon" refers to the compiled platform binary that runs on all Validator nodes. aurad contains standard Cosmos modules like *Auth*, *Bank*, *Mint*, *Slash*, *Stake*, etc. that are required to run the blockchain platform. There are a few simple modifications such as adding parameters and specific business logic that may be required by the Aura tokenomics. But overall, there won’t be much change from the provided modules from Cosmos.

CosmWasm

CosmWasm stands for “Cosmos WebAssembly", it’s a Cosmos module that enables WebAssembly virtual machines in the cosmos SDK. As the smart contract written for CosmWasm is compatible with all other Cosmos-based blockchains, we choose CosmWasm as the middleware for building smart contracts and DApps for the Aura ecosystem. Currently, it only supports contracts written in *Rust*, but many high-level programming languages can be added in the future.

IBC

Inter-Blockchain Communication Protocol (IBC) are the signature Cosmos module that support transferring tokens directly from one chain to another. Aura Network enables IBC by default so that moving Aura Coin to Terra, Atom, Osmosis or other IBC-enabled blockchain can be performed easily.

Bridge

Bridge is also an important part of aurad. As Aura Network focuses on bridging assets to other blockchains even outside of the Cosmos SDK, bridge solution that support ERC-20, BEP-20 tokens will be employed. We are in contact with

decentralized exchange and bridge team e.g. Impossible Finance to develop this component.

3.2 Aura Network ecosystem

Figure 3.2 shows the potential building blocks of the Aura Network. At the moment, we divide the ecosystem into 6 main categories

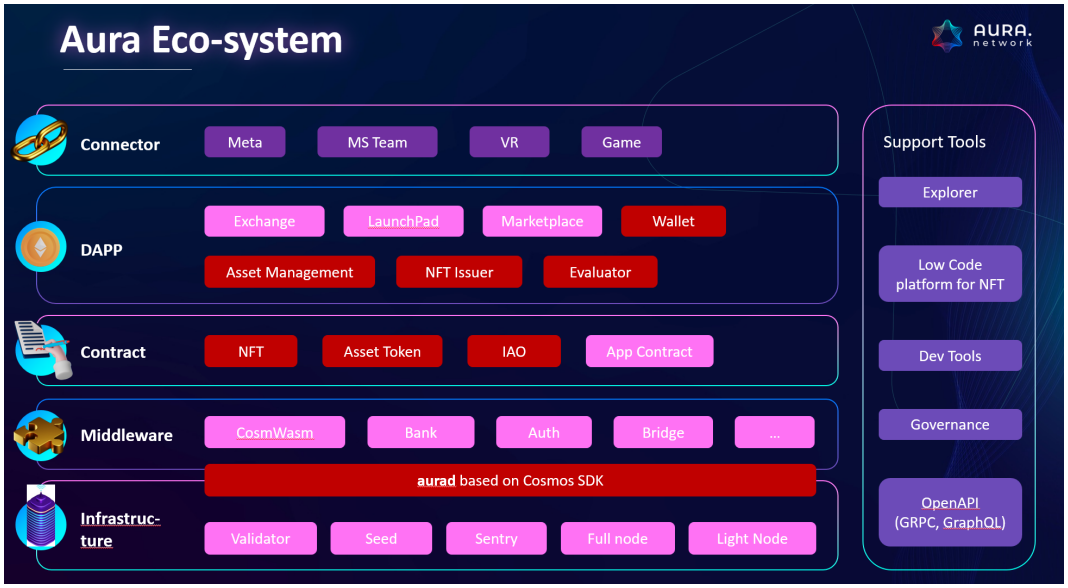


Figure 2: The Aura eco-system

Infrastructure

The Infrastructure layer mostly refers to the blockchain platform that is mentioned above. Other than validators, Cosmos and Tendermint's best practices in running production software also include Seed, Sentry, Full and Light node. Details on the setup of these nodes are described in the Cosmos SDK documentation. We will also provide scripts and instructions on how to set up different types of nodes later on through Aura development documents.

Middleware

The middleware layer contains Cosmos modules bundled together with aurad. As mentioned, most of the provided Cosmos modules are included. The Aura team also publishes modifications to these modules in the development docs as well.

Smart Contract

The smart contract layer contains smart contracts written in Rust, compiled, and run on the CosmWasm module.

Decentralized App

Decentralized Applications (DApps) are the main focus of the Aura Network. All business solutions are written here such as NFT Asset Management, Wallet, NFT Issuer, NFT evaluation, Exchange, Launchpad, Marketplace, etc. As Aura Network focuses on NFT businesses, the Aura team will take the lead in developing these DApps to attract all types of stakeholders as mentioned in the introduction section.

Connector

The connector layer contains integration APIs, SDKs that are used to bring NFT assets to Metaverse networks. By itself, Aura Network does not provide a metaverse experience but provides infrastructures for bringing NFT assets to the metaverse.

Support Tools

This layer contains usual software tools that are mandatory to the Aura blockchain platform. That contains blockchain explorer, low code software development, development tools, OpenAPI, and Governance tools.

4 Tokenomics

This section describes information related to a native currency supported by the Aura Network.

4.1 Token Usage

We introduce 2 types of native tokens in the Aura Network: the Aura Token on Ethereum and Aura Coin. Both refer to the same unit.

1. Aura Token on ETH: To launch Aura Network, we first introduce the ERC-20 Aura Token on Ethereum. This token only acts as a placeholder for the later Aura Coin that will be introduced when Aura Mainnet launches. Like other ERC-20 tokens, Aura Token can be freely traded on the cryptocurrency market.

2. Aura Coin: Aura Coin is the native currency of the Aura Network blockchain platform. Besides the trading capability of Aura Token, Aura Coin has many other utilities:

   Staking: Aura Coin holders can delegate their coins to trusted validators to earn passive commission income from the network.

   Governing: Aura Coin holders can participate in voting for software updates or other important decisions of how the Aura community should be

developed.

Transaction fee: Aura Coin is used to pay for transaction fee.

Exchange and Swap: Aura Coin can be exchanged or swapped in the market

Payment for Utility Services: As Aura focuses on bringing real-world assets and different stakeholders to the ecosystem to offer business services, Aura Coin can be used for payment for these utility services. Aura holders can vote to choose their service providers (evaluator, auditor, etc.) and use Aura to pay for their services.

4.2 Token Distribution

Token Allocation	Allocation (%)	AURA	TGE (%)	Vesting Schedule (monthly)
Ecosystem Growth	20	200M	50	Linear vesting over 2 years
Strategic	20	200M	0	Linear vesting over 2 years
Public Distribution	5	50M	100	No vesting
Foundation Reserves	10	100M	0	Linear vesting over 2 years
Team	20	200M	0	1 year cliff then linear vesting over 3 years
Block Rewards	25	250M	0	Rewards for validator per block over 5 years.

Table 1: Aura token distribution design

Table 1 shows the token distribution metrics for Aura Network. The maximum amount of Aura that can be minted is exact **1 Billion** tokens. This value is specified in the Aura genesis block and cannot be changed in the future unless we do a hard fork. This is applied for both Aura Token on ETH and the Aura Coin as the token is simply just a placeholder.

There are 6 categories that Aura coin will be allocated to:

1. **Ecosystem Growth**:

   20 percent of the total coin will be allocated to the ecosystem growth fund.

This fund is used for ecosystem development such as project grants, bug bounties, attracting stakeholders to provide utility services, etc. Examples include, but not limited, to the following:

(a) **Airdrop:**

Built on the Cosmos SDK system, we would like to reach the most active participants on the same system. As such, some AURA token will be dropped to ATOM and other tokens in the Cosmos system. The drop is either in a fixed quantity (in the spirit of Uniswap), or proportional to staked tokens. Tokens are claimable conditional on some criteria such as the length of staking, the minimum quantity of qualified tokens staked, participating in governance voting, or engage with the community in any social media such as Telegram or Discord etc. We will also consider to airdrop some random Fan Tokens to AURA token holders to encourage people to hold AURA token on a long-term basis.

(b) **Community pool:**

Developing and expanding network reach requires tokens as a source of capital, which can be financed from the Community pool. A stakeholder (can be a validator, advisor, or influential participant of the network) can write up a proposal and specify the requested quantity of token, the purpose of using token, timeline of the plan and any expected result. The proposal is then to be voted “Yes” or “No” on the majority rule basis. That is, if a proposal receives more than 50% “Yes” votes, it will be implemented, and vice versa. The voter can be validators and/or token holders. Token holders can delegate their coin to their choice validator to increase the weight on the cast of that validator. The weight is proportional to the total amount of token

available to all voters at the time of voting. The process is designed to be democratic, and proposals that are unambiguously beneficial to the network and stakeholders should pass for most of the time.

There will be a time when a proposal is controversial in the sense that the benefit-cost is ambiguous to the voters. As such, we would like to collect feedback from the "No" voters on why they downvote the proposal. We propose that when choosing "No", there is another question for why the voters choose no, and the answer is to be chosen in a multiple-choice format. This mechanism would help proposer to improve on their proposals for the following-up rounds.

(c) **Bug bounty**:

Some tokens will be allocated to users who report bugs and proposes fixed to the network.

2. **Strategic partner**:

20% percent of the tokens go to private sales to strategic partners. They are invited to finance the project in an exchange for the token of a network, at a discount rate of $0.025 per token to compensate for the extra risk that they take in due to the projects being in the early stage.

3. **Public distribution**:

5 percent of the tokens go to the public sale. We are working with several centralized exchange to launch an Initial Exchange Offering (IEO). We also plan to list in AURA to other Decentralized Exchanges (DEXs) to reach a wider range of investors.

4. **Foundation Reserve**:

10 percent of the total coin will be stored in the foundation treasury fund. It is supposed to be served as a "last-resort" in the case that the network

requires funds to solve a particular problem that other source of funding (e.g Community Pooling) is not on the table. All decisions on how to spend the fund must go through a public governance proposal as outlined in the "Community Pool" subsection.

5. **Team**:

   20 percent of the total coin go to the AURA team to incentivize the developer to expend their effort in building the network.

6. **Block Rewards**:

   25 percent of the total coins will be periodically minted as block rewards to distribute to validators and delegators.

   Alternatively, block rewards can be allocated to different part of the project. Look at the following diagram as an example from Stargaze As noted by Stargazer post: "45% of block rewards are set aside for NFT bidding and staking incentives. Token holders will be able to earn yield by bidding and staking on NFTs for certain periods of time. An upcoming post will outline this mechanic in details". This is a feature that AURA team is exploring.

   Incentives play a big role in deciding the token allocation. For example, allocating "insufficient" amount of tokens to validators may lead to the extreme case where validators cheat the network by accepting fraudulent block (e.g double-spending), or validators may not be interested in participating the network which threats the network security. Allocating too little tokens to advisors may result in advisors being "inactive", discouraging them from engaging with the team to provide helpful advice. Overall, we strategically allocate our token in line with our long-term vision with regards to the development and future of the project,

4.2.1 Token generation event

There are 2 *Token Generation Events* (TGE) that are corresponding to the 2 types of native currency in the network, the token and the coin. For Aura Token on Ethereum, the token generation is quite standard as the Aura team will mint and transfer tokens manually based on the specification in Table 1.

By the time of Aura Mainnet's release and the listing of Aura Coin, the Aura Token contract on ETH will be frozen so that no more token can be minted. Aura Token holders then can claim their coins on the Aura Mainnet by sending their tokens on ETH to the migration contract. These tokens can be burnt later on. The state of vesting schedule at the time will also be replicated to the Mainnet.

4.2.2 Account Vesting

Vesting refers to the process of locking a certain amount of coins or tokens then gradually release them with time. Other than public distribution coins, the rest of the token allocation categories are locked and vested on different terms. The vesting process for Aura Token and Aura Coin starts at the IEO event. Tokens or Coins are linearly unlocked every month based on the vesting schedule.

In Aura Mainnet, locked Tokens from Team and Strategic partners can still be delegated for staking and voting for governance. However, tokens in the ecosystem growth and foundation reserves are not available for delegation.

4.2.3 Block Rewards

Block rewards refer to Aura coin rewards from the network to validators who participate in the consensus process of Aura Mainnet and produce blocks. In the first *5 years* of Mainnet, a total of 250 millions Aura Coin will be distributed for validators in every block. Apart from the block rewards from the network,

validators also receive transaction fee (*gas*) from transaction creators. We assume that after 5 years of running Aura Network, the transaction fee from the network will be large enough to reward validators so there will be no need for block rewards to be minted anymore.

4.2.4 Token release simulation

Figure 4.2.4 shows a simple simulation on Aura token release schedule. Apart from the block reward category, the rest of the token allocation categories are straight forward to calculate based on its vesting schedule. The simulation file is located on our Github repository [2].

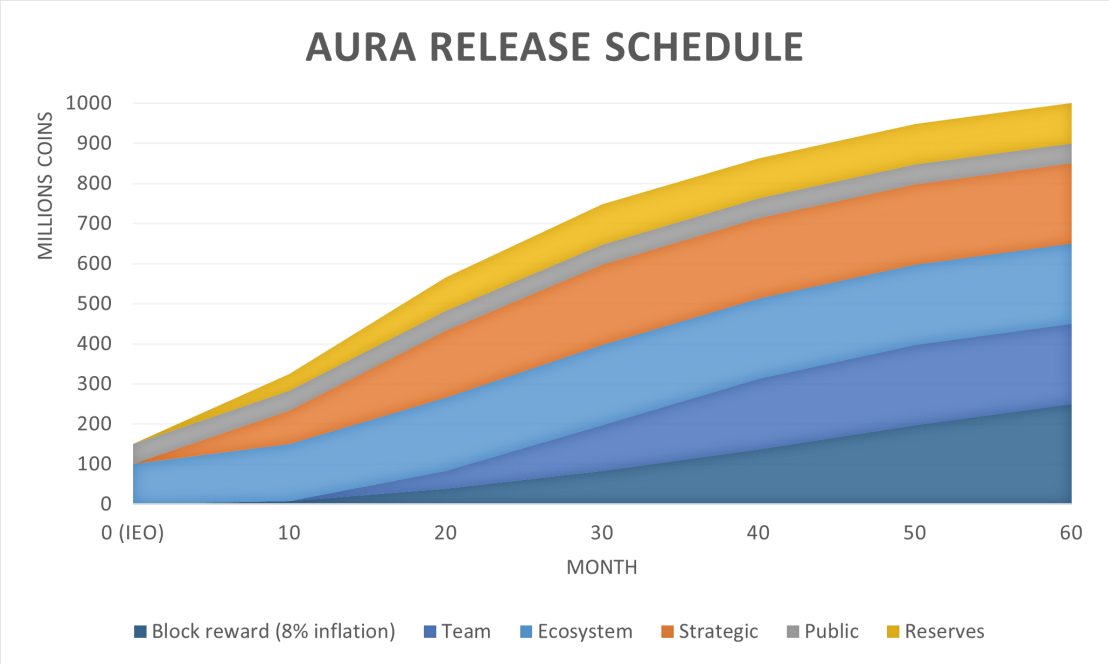


Figure 3: Simulation of aura release schedule

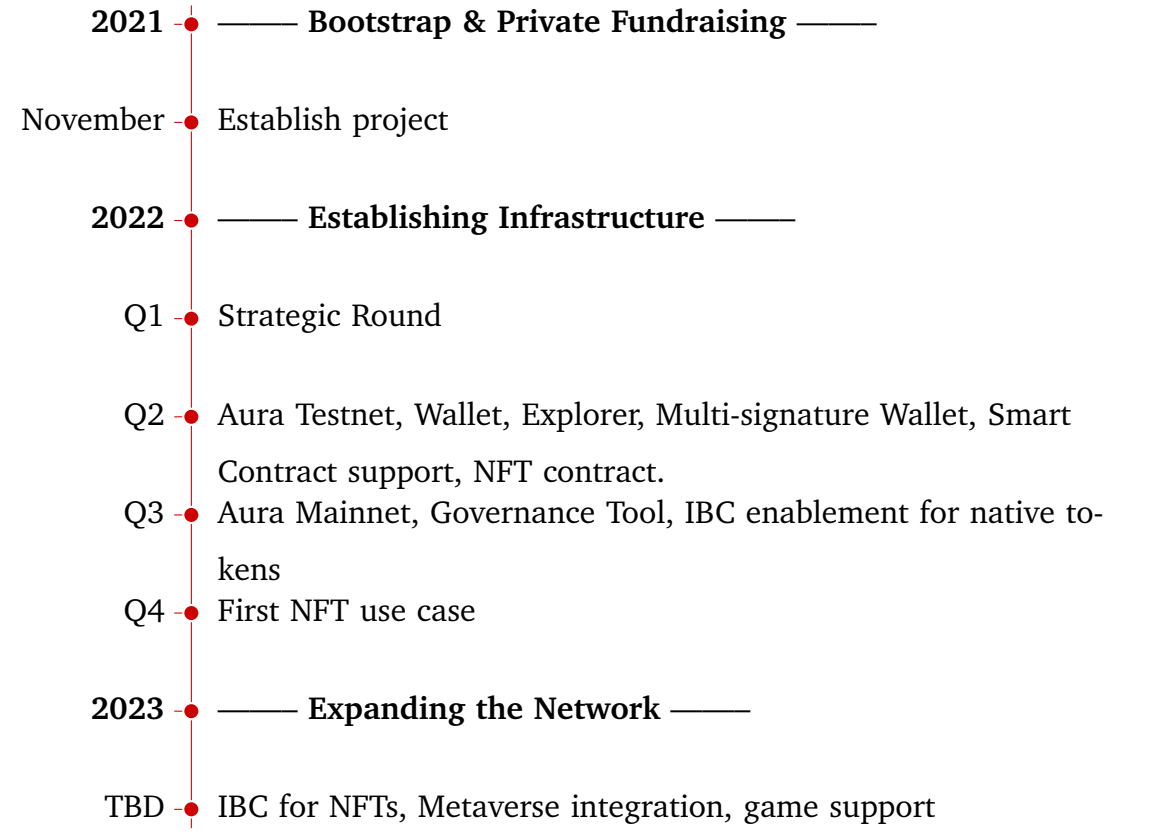
Assuming that 2/3 of the total Aura Coins in the whole network are staked, our simulation shows that with an average of 8% inflation per year, we can fully

[2] https://github.com/aura-nw/whitepaper/tree/main/simulation

distribute all 250 millions to validators within 5 years (60 months).

5 Roadmap

TIMELINE 1: *Aura Network Roadmap*



We presents the roadmap of the Aura Network project in the timeline drawing above. From 2021 to 2023, the project goes through 3 main phases. The *Bootstrap & Private Fundraising* phase is in 2021 where the team perform mandatory steps to establish the project base such as registering legal entities, call for seed & strategic funding from VCs, etc. The second phase in 2022 consists of mostly infrastructure building objectives such as issuing tokens, releasing Mainnet and some support tools. We also target to have our first NFT use case at the end of

2022. Finally, the third phase in 2023 will focus on developing bridges to other networks and metaverse connectors.

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