

# Economic Model



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## Abstract

This paper outlines the characteristics and uses of a cryptographic token RADIX (XRD), which is a fixed supply payment token, intended to be issued and used on the [Radix Public Ledger](#) (the Ledger or the Radix Ledger). The Radix Ledger is a permissionless distributed ledger which functions in accordance with open source code.

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## Invitation for Comment

This Invitation for Comment has been issued by Radix DLT and in this paper “we” or “us” means Radix DLT.

This paper is a public draft and we continue to seek comments and suggestions. By taking part in this debate you grant your consent to any ideas, concepts and materials that you provide being used in further iterations of the Radix Economic Model, and any implementation of the Radix Ledger without limit and without entitlement to any remuneration, benefit or recognition (including a full waiver of moral rights).

If you have a proposal for a change to the Economic Model please post it in the Radix Forum in the Economics Category with the thread title starting with [Economic Model Suggestion]. <https://forum.radixdlt.com/c/economics>. Any suggestions posted in this way will be reviewed by the Radix team (Radix DLT).

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## Changes from Previous Economic Model

This Radix Economic Model contains significant differences from the preceding version of the Radix Economic Model, which was released in February 2019. All previous publications should be considered withdrawn and superseded by this document. To learn more about the changes please see our Economics Update blog post.

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## Stable Value Token

The Radix Ledger was created with several aims, including the ambition to develop a decentralised, stable store of value. Such a token, if launched, would function separately from the XRD, and be subject to both successful technical development and regulatory approval.

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To preserve an option to publish a well collateralised, decentralised stable value token, a Stable Token Reserve (the Reserve) is intended to be created at the genesis of the public Radix Ledger.

The Foundation has a 10 year period in which to test different formulations of a stable token, which may or may not require the use or distribution of the Reserve. Should the Reserve not be needed; or testing prove unsuccessful; or regulatory approval be impossible, the Reserve will be burnt.

This paper will deal only with the creation and launch of RADIX (**XRD**) - a limited supply, utility token.

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## Governance

A full governance paper (the Governance Paper) will be released by the Radix Foundation prior to the public launch of the Radix Ledger. This will describe a structure and method for achieving Radix Community consensus for the adoption of changes to the Radix Ledger.

This will include two unincorporated representational bodies: the Radix Community, and the Radix Council. The Radix Community will be made up of the stakeholders that use and support the Radix Ledger. The Radix Council is intended to be appointed by this Radix Community and provides a way in which Community consensus can be achieved.

Some aspects of the economics described below are encoded into the Radix Ledger, and an update to the economics would also require an update to the Ledger. As shorthand, this paper may refer to “adoption” of a new protocol “by the Radix Council”. This refers to the anticipated process in which the Radix Council arrives at recommendation protocol change that are in alignment with the interests of the Radix Community.

It should be emphasized that these decisions only result in the endorsement of a protocol that the Radix Community might then choose to adopt by updating the version of the Ledger they are running. Neither the Council or Foundation has any control as to whether any recommendation or development is adopted. The Radix Ledger, when published, like other open voluntary networks, belongs to no-one person or group.

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## Executive Summary

The RADIX token (XRD) is a non-redeemable payment token and will be the first token intended to be released on the Radix Ledger. Most on-ledger operations have a fee that will be payable in XRD. XRD will serve as the mechanism whereby the Ledger provides a reward for useful work that computers (**Node Runners**) do to validate transactions and other operations on the Radix Ledger.

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The amount of XRD paid by a user will be benchmarked against a price index to keep the cost of using the Radix Ledger approximately predictable in fiat. Once fees are enabled, the transaction cost is expected to be the XRD equivalent of circa \$0.001 (USA) per transaction.

It is intended that the Radix Foundation will cap the total supply of RADIX tokens at 12Bn XRD, which will all be emitted at Technical Go-Live. There is no emission curve.

The Radix Foundation exists to provide support for those who use the Radix Ledger and to support the aspirations of those who use and contribute to the evolution of the Radix Ledger.

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## System Stages

The launch of the Radix Ledger is intended to be separated into four phases:

Phase 1: Technical Go-Live

Phase 2: Fee Go-Live

Phase 3: Decentralised Exchange (DEX) Go-Live

Phase 4: Stable Token Release

### Phase 1: Technical Go-Live

At Technical Go-Live the Radix Foundation launches the Radix Ledger. From this point the Radix Ledger is public, permissionless, and transactions are considered immutable.

During this period the Radix Ledger will be free to use (no Transaction Fees) to allow for the smooth onboarding of new users. A per transaction proof-of-work will be submitted in place of a Transaction Fee to prevent Ledger spam.

The main purpose of Technical Go-Live phase is to test the basic functionality of the Radix Ledger in an open network environment.

During this time the Radix Foundation will roll out various Developer Grant Programs which are targeted to ramp up efforts to provide tools for the Radix Community and new features for the Ledger. Please see [The Radix Foundation](#) section below for details of the Developer Grant Programs.

### Phase 2: Fee Go-Live

The Fee Go-Live phase has two objectives:

1. to instigate a per-transaction fee.
2. to test the Node Runner fee distribution.

This phase will see the introduction of the per-transaction fee (Transaction Fee).

The Transaction Fee will initially be recommended by the Foundation according to a protocol-enabled process approved by the Radix Council. This Transaction Fee recommendation will be calculated using the average daily open market XRD price against the US Dollar.

This ensures that while the cost of an XRD might fluctuate on the open market, the cost of paying for the use of the Ledger is relatively predictable against the US Dollar.

The Radix Council will help advise as to when the time is right for the Transaction Fees to be set automatically from exchange data feeds and then subsequently migrated to be set by reference to price information derived from transactions on the Radix Decentralised Exchange (DEX). For more details see the [Radix Price Index](#) section.

### **Phase 3: Decentralised Exchange (DEX)**

During this Phase the Radix Foundation will be responsible for testing and proposing the DEX for inclusion as a native function on the Ledger. The DEX is intended to provide a universal layer for value interchange on the Radix Ledger, enabling on Ledger exchange of tokens as well as decentralised, autonomous, pricing of Radix transaction fees. It is not expected to have completed the testing phase until at least a year after Technical Go-Live.

### **Phase 4: Stable Token Release**

This component of the Ledger is expected to take a long time to develop, may never be launched, and is not intended to be the primary focus of the Foundation until all previous components have been tested, released and matured. See [here](#) for more detail on the Stable Token Reserve

This phase is also conditional on several internal and external factors, including the successful development and testing of a stable value algorithm that uses the XRD as reserve collateral, and of the appropriate regulatory approvals. Should these be successful the 2.4Bn XRD Stable Token Reserve will be released for direct management by the stable value algorithm.

# System Components

This section introduces the key system components of Radix, and some notes about how they interact with each other.

## The Decentralised Exchange (DEX)

The DEX is intended to become a native component of the Radix Ledger. If approved it will permit willing buyers and willing sellers to be matched together so that a Market Price may be found for tokens created within the Radix Ledger.

Further information about the Radix DEX can be found on our [Knowledge Base](#).

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## Radix Price Index

Startups, commercial operators and individuals that wish to use the Radix Ledger may need to be able to reliably predict the long term cost of doing so.

For many public ledgers (Bitcoin, Ethereum, etc), this can prove challenging due to fluctuations in the price of using the ledger (transaction fee), and the price of the token used to pay for such use (token price).

As the total supply of XRD is fixed, it is likely to be price volatile relative to fiat money (e.g. USD, EUR, RMB, YEN etc). From Fee Go-Live, businesses, developers and individuals will pay an XRD Transaction Fee for using the Radix Ledger.

In order to help ensure that the Transaction Fee is moderately consistent relative to fiat money, the Transaction Fee (in XRD) will be frequently reset against a benchmark to reflect a target fiat per-operation cost.

Initially, the benchmark is intended to be updated daily by the Radix Foundation. It is expected that this process will involve using the previous day's average exchange-traded price of the XRD against the US dollar. This price information will most likely be drawn from reputable exchanges which choose to list the XRD as a tradeable token.

Once the Decentralised Exchange is launched, the Foundation will propose methods to move the price index benchmark to a fully decentralised process. Although the amount may change, the Ledger operation fee is intended to always be payable in XRD.



As a worked example, let's assume that each on-ledger operation is targeted to cost US\$0.001:

If US\$1 will buy 10 XRD on an exchange, then the per Transaction Fee 0.01 XRD.

If US\$1 will buy 1,000 XRD on an exchange, then the per Transaction Fee is 1 XRD.

If US\$1 will buy 0.1 XRD on an exchange, then the per Transaction Fee is 0.0001 XRD.

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## Fee Distribution

The Radix Ledger is operated by a network of Nodes (computers running the Radix Ledger client software). The individuals and companies that choose to run these Nodes are called Node Runners. Anyone may become a Node Runner by downloading and running the [Node Runner client](#) that will be released by the Radix Foundation for the Technical Go-Live phase.

All Ledger operations that require a change of Ledger state (e.g. transaction, token creation, messaging, conditional state creation) must be submitted with a Transaction Fee, in XRD.

50% of this Transaction Fee is earned by the Node Runners when they validate transactions. These Transaction Fees are the main incentive the Node Runners receive for running and maintaining the Ledger.

To help prevent network spam, as well as provide a way in which network users can choose to directly support the objectives of the Foundation, the Transaction Fee payer may choose what is done with the other 50%. A Transaction Fee payer may either:

1. Send it as a Grant to the [Radix Foundation](#).
2. Burn it in the spend transaction.

Practically speaking, many app developers that use the Radix ledger will likely decide a default for all of their users rather than pushing this decision to the user on a transaction by transaction basis, but either is possible.

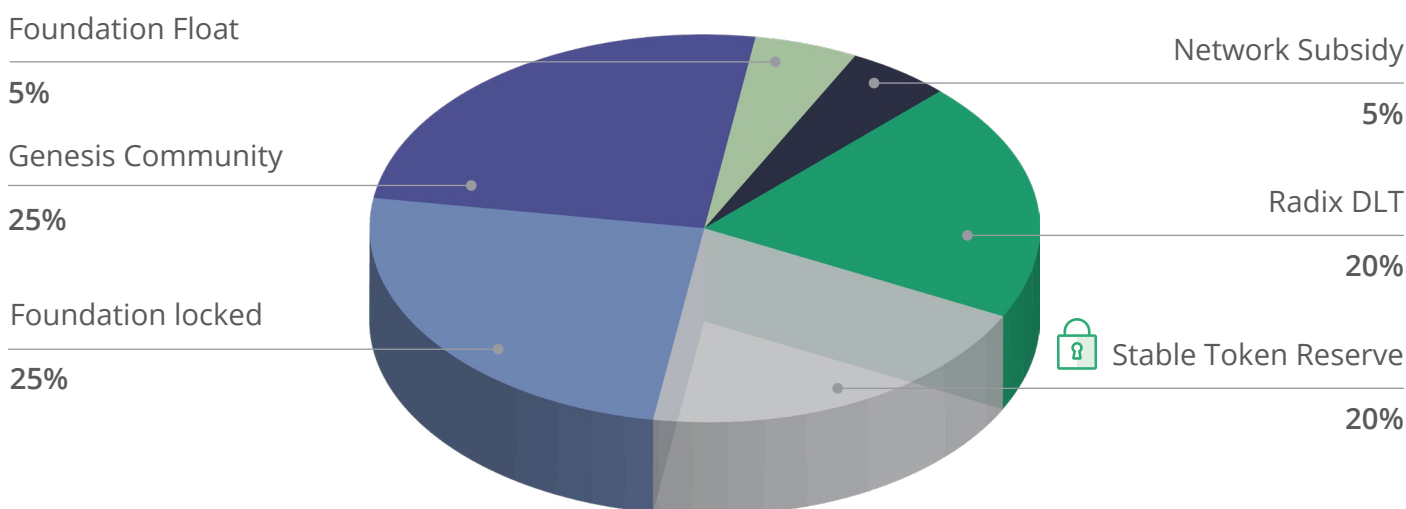
Some Node Runners may also earn a proportion of the [Radix Network Subsidy](#) for helping to promulgate the Ledger. The regulation of any transactions processed by Node Runners is outside the scope of the Foundation's legal control or responsibility

# Organizational Components

When the Radix Foundation publishes the Radix Ledger it is expected that a total of 12Bn XRD (100% of total supply) will be created in the Genesis Atom.

It is suggested that the Foundation will allocate XRD from the Genesis Atom in the following way:

Genesis Community:	3.0Bn XRD issued to early supporters
Radix Foundation Locked:	3.0Bn XRD to support the development of the Ledger and Radix ecosystem
Radix Foundation Float:	0.6Bn XRD for initial community, marketing and development work
Radix Network Subsidy:	0.6Bn XRD for Node Runner network security incentivisation
Radix DLT Ltd:	2.4Bn XRD for founder and team
Stable Token Reserve:	2.4Bn XRD locked to the Stable Token Reserve



All XRD comprising the first issue (Genesis Tokens) will be released to the User wallets according to an unlocking schedule. This structured release is designed to help ensure long term commitment to the project by key parties.

Save for a portion of tokens, which will be released to the Radix Foundation on the issue date to cover the cost of growing the Radix Community, developing and promoting the Ledger (Radix Foundation Float), all other tokens will commence their unlocking schedule from Technical Go-Live.

The details of the unlocking schedules for the different Genesis recipients are included below.

## Genesis Community

The Radix Ledger has been in development since 2012. Between 2013 and 2017, those that were part of what was then called the eMunie community were given an early opportunity to support the project.

3Bn XRD will be distributed to the Radix Community. The largest single recipient of Genesis tokens will represent 8.14%, with the median holding being 0.21%. This represents a broad distribution of Tokens.

All Genesis Community Tokens will unlock, pro-rata, daily over a one year period. This means that each Genesis Community member will have 1/365th of their tokens unlocked every day for a year after the date of allocation.

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## Radix Foundation Locked

The Foundation Locked Grant is a partially locked grant of 3Bn XRD.

Prior to Technical Go-Live the Foundation intends to make a portion of this Grant available to be purchased directly by third parties. Any purchase of these tokens will be subject to a 1-year, pro-rata, daily unlocking schedule in the same manner as the Genesis Community Tokens.

All funds received during this period will go directly to the Foundation. All remaining, unsold tokens will be locked at Technical Go-Live for a 1 year period and then will unlock on a daily pro-rata basis over a 6 year period.



## The Radix Foundation

The Radix Foundation is a not-for-profit company limited by guarantee, registered in the United Kingdom. This Foundation will promote Radix Community engagement, oversight and participation.

A Governance paper outlining governance protocol will be published ahead of Technical Go-Live by the Radix Foundation. This will explain how the Radix Foundation will operate and how stakeholders can participate. These stakeholders include, but are not necessarily limited to:

1. Individual users
2. Node runners
3. Application creators
4. Token creators

For a ledger of this nature to succeed, it must be adopted by business and retail customers alike. Adoption requires dedication, hard work, evangelism and the careful balancing of the interests of all parties.

Although this list is by no means exhaustive, below is a summary of the contribution that the Radix Foundation will seek to make to the Radix Ledger and Community:

1. **Technology Development**
  - a. Core Protocol Development
  - b. Open Source Support
  - c. Crisis Management
2. **Radix Community Development**
  - a. Developer conferences
  - b. Developer meetups
  - c. Hackathons
3. **Marketing**
  - a. PR/Announcements/Events
  - b. Stakeholder Relations
  - c. Public Education

The Radix Foundation will receive a mixture of short term and long term grants to support the growth of the Radix Community.

These grants are separated into fiat received from the sale of [Pre-Release Tokens](#), Tokens received for the [Token Float](#), and Tokens received as part of a [7 year unlocking schedule](#).

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## Radix Foundation Float

The Radix Foundation Float is a 0.6Bn grant of XRD that will be unlocked at Genesis to ensure key Radix Community goals and growth are achievable from day one.

Whilst not an exhaustive list, some of the main schemes the Foundation Float (unlocked from the issue date) will be used to incentivise are listed below.

- [Radix Card Program](#)
- [Radix Grant Program](#)
- [Adoption Fund](#)
- [Market Float](#)

## Radix Card Program

In recognition of the importance of the Radix Community to the adoption and use of the Radix Ledger, it is proposed that a small budget of XRD will be made available for the Radix Card Scheme.

This scheme will allow end users to buy Radix Cards; a simple cold wallet that works directly with our mobile app wallets. These Cards will come preloaded with a small amount of free XRD to provide access for users to start messaging, paying transaction fees and deploying applications on the Radix Ledger.

There will only be a limited number of these Cards available and their purchase and use will be subject to appropriate terms and conditions. To make sure you are informed as to when these are available, please sign up to our newsletter: <https://radixdlt.typeform.com/to/x3yotG>

## Radix Grant Program

The Radix Grant program is a bundle of Radix Community projects that promote the development of the Radix ecosystem; it will be administered by the Foundation. This includes running frequent challenges, training programs and coding bounties being tendered to the Radix Community.

## Adoption Fund

The Adoption Fund is expected to make up the largest proportion of the Foundation's unlocked XRD Token Budget. It is set aside to enable strategic partners direct access to help facilitate adoption of the Ledger.

## Market Float

As token distribution will be low at the start of the Ledger we recognise the importance of facilitating liquidity at the on-ramps that allow users, developers and companies to acquire XRD to use the Ledger. To ensure this liquidity, a proportion of XRD from the Token Budget will be made available to provide a float to on-ramp partners.

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# Radix Network Subsidy

The Radix Network Subsidy (**Network Subsidy**) is a 0.6Bn XRD grant to help bootstrap the early Radix Ledger security. This grant is intended to be administered by the Foundation and aims to provide a discretionary additional incentive that may be distributed to selected Node Runners during periods when there is insufficient usage-based Transaction Fees to cover the operating costs of a Node.

The goal of this subsidy is to ensure a baseline network size and throughput capacity, even during its nascent stages. The Network Subsidy is budgeted to last for up to 10 years, but will be stopped at any point at which it is no longer necessary to ensure the security of the Radix Ledger. Any remaining funds will be held by the Foundation to provide a security backstop in the event of a reintroduction of the Network Subsidy being necessary.

The Network Subsidy is distinct from Transaction Fees. While any Node Runner may earn Transaction Fees, only Node Runners that provide a minimum level of service to the network may receive a Network Subsidy. The number of Node Runners invited to participate in the Network Subsidy will be limited by the total XRD float at any given time.

The conditions by which a Node Runner may receive the Network Subsidy will be made public prior to the commencement of the Network Subsidy program. Nodes run by the Foundation, Radix DLT Ltd or employees of either will not be eligible.

Node Runners that do not participate in the Network Subsidy will still be able to earn Transaction Fees.

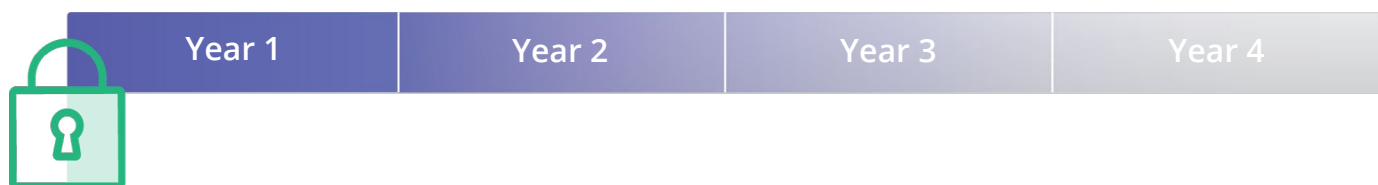
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## Radix DLT Ltd

Until the [Radix Foundation](#) is fully funded and operational, all development work is being done by a team of (currently) [26 full time staff](#) employed by or contracted to Radix DLT Ltd. Since 2017, Radix DLT Ltd has been responsible for the Radix Ledger development.

Daniel Hughes (Founder and CTO of Radix DLT) has spent 7 years of full-time work and a significant amount of his personal wealth on the development of the technology and code which now comprises the Radix Ledger. This amounts to an extraordinary time, effort, and intellectual contribution, for which there will be an allocation of 2.4Bn XRD to Radix DLT Ltd (The DLT Genesis Tokens).

Radix DLT has also received investment from equity investors to continue development of the Radix Ledger. To give confidence in Radix DLT Ltd's long-term commitment to Radix and the public Ledger the DLT Genesis Tokens will be completely locked (meaning they will be cryptographically restricted from being transferred for one year) and will then be vested daily over a 3 year period.



## The Stable Value Token Reserve

Once there has been a successful launch of both the Ledger and DEX, and both have been running reliably for a sufficient period, a second, stable value token may be established. As the Foundation's main goal is, first and foremost, to ensure the long-term sustainability of the Radix Ledger, a decision to launch the stable value token may take a number of years.

This stable value token would only be available directly from the Radix Ledger and would be targeted only to have long-term predictable and stable value. Ownership of the XRD does not automatically grant ownership of the Stable Value Token.

The allocation of 3Bn XRD for the Stable Value Token Reserve would only be accessed by the stable value algorithm during extraordinary market events. Outside of this, these tokens would not enter general circulation.

In the event that it is decided that Stable Value Token will not be launched by the Radix Foundation these tokens will be burned as part of a managed process to minimise market impact. It is not expected that a decision to burn the Stable Value Token Reserve will be made for at least 10 years. The Radix Community will be given a minimum six months notice prior to the commencement of any managed burn process.

## Table of Unlock Schedules

Unlocking Schedule for Genesis Atom Beneficiaries		
Scheme	Token Grant	Unlocking Schedule
Genesis Community	3Bn XRD	1/365 daily
Radix Foundation Float	0.6Bn XRD	None
Radix Network Subsidy	0.6Bn XRD	None*
Radix Foundation Locked	3Bn XRD	1 year lock, then 1/2190 daily**
Radix DLT Limited	2.4Bn XRD	1 year lock, then 1/1095 daily
Stable Token Reserve	3Bn XRD	Locked until release of Stable Value Token***

\*Availability subject to the network security needs

\*\*Prior to Technical Go-Live a portion of this Grant will be available to be purchased directly by third parties. These tokens will be subject to a 1-year, pro-rata, daily unlocking schedule in the same manner as the Genesis Community Tokens

\*\*\*The stable token is a long term project meaning [The Stable Value Token Reserve](#) can be discounted from coin circulation until the stable token algorithm has been launched

