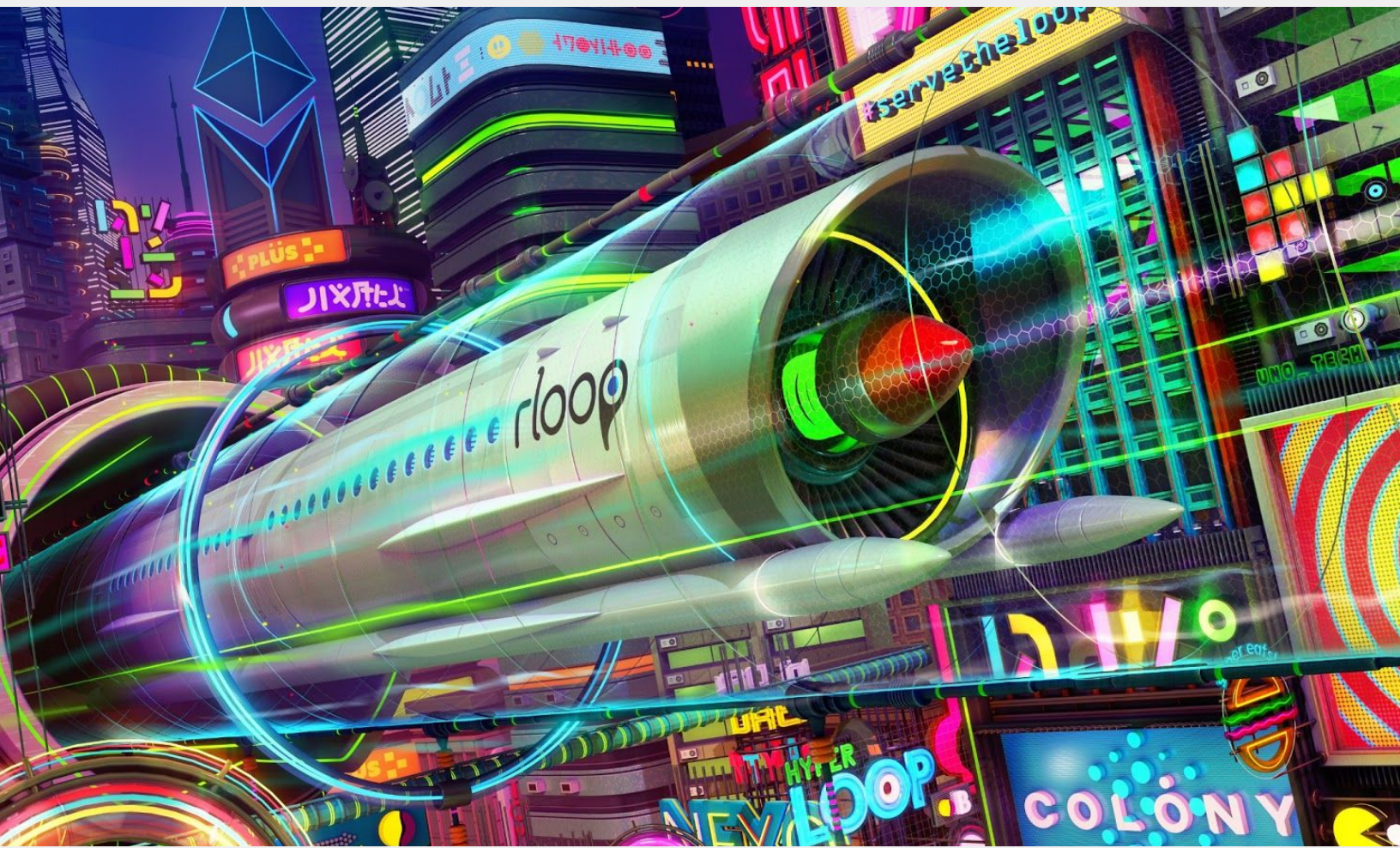


THE rLOOP NETWORK

A Decentralized Innovation Platform



Whitepaper v0.9.5

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Introduction

Knowledge is power.

Sometimes that knowledge resides in the secrecy of closed deals and pre-patent research.

Sometimes that wisdom resides in the crowd.

The rLoop Network is a decentralized innovation platform designed to connect individuals and organizations to collaborate on emergent technologies in ways that were never before possible.

Contribute to projects of significant impact. Collaborate on their development. Earn a stake in those projects. The rLoop Network is designed to make this process as simple and accessible as possible. It is a mechanism to drive knowledge, expertise, and resources towards emergent technologies as efficiently and economically as possible.

The Network features a modular set of tools and collaborative applications to allow individuals to propose projects, review proposals, contribute towards a diversity of technologies, and actively participate in their development and deployment. The entire lifecycle of a project is supported by the Network.

The rLoop Network will be the substrate upon which a passionate community and innovation can thrive.

The rLoop community began this work over three years ago, focused on the promise of the Hyperloop and winning awards for innovation, design, and manufacturing, including “Best Non-Student Design” and “Pod Innovation Award” from SpaceX. The community retains interest in multiple projects including the Hyperloop, the future of flight, the future of work, and the future of information.

Setting out to solve big problems brings purpose and meaning to work. Now is the time for a global collaboration network that identifies transformative opportunities to the world’s greatest challenges. The rLoop Network is a proven model for connecting individuals and organizations to decentralize innovation.

The winds of change have arrived.

The Community

rLoop was initially formed in 2015 when a handful of individuals answered a challenge from Elon Musk and SpaceX to re-imagine transportation via the Hyperloop Competition. As the community grew and processes were developed to aid virtual collaboration on this complex system, the vision expanded to apply these processes to a growing number of global problems.

Today, over 1,300 people from more than 50 countries have rallied behind the rLoop concept and philosophy. The community is diverse in geography, education, experience, and interests. It includes passionate and motivated designers, engineers, makers, and manufacturers. All collaborating together as equals, free to contribute in whatever capacity they choose, and united by a vision to create a better world through innovation.

rLoop has demonstrated success with our distributed and crowdsourced community, our collaborations with industry partners, as well as our award winning Hyperloop designs and vehicles. The community has won multiple international awards and designed and manufactured hardware that achieved numerous firsts in the Hyperloop space, including:

- First Hyperloop vehicle with pressure vessel capable of supporting human life
- First Hyperloop vehicle levitating in place at partial vacuum
- First engineering system entirely designed and built by the crowd



Some of the rLoop Community during Hyperloop testing at SpaceX

Vision

We believe that innovations in technology enable a significant increase in the speed and effect of human centric growth, be it in economic, political, or cultural advancements.

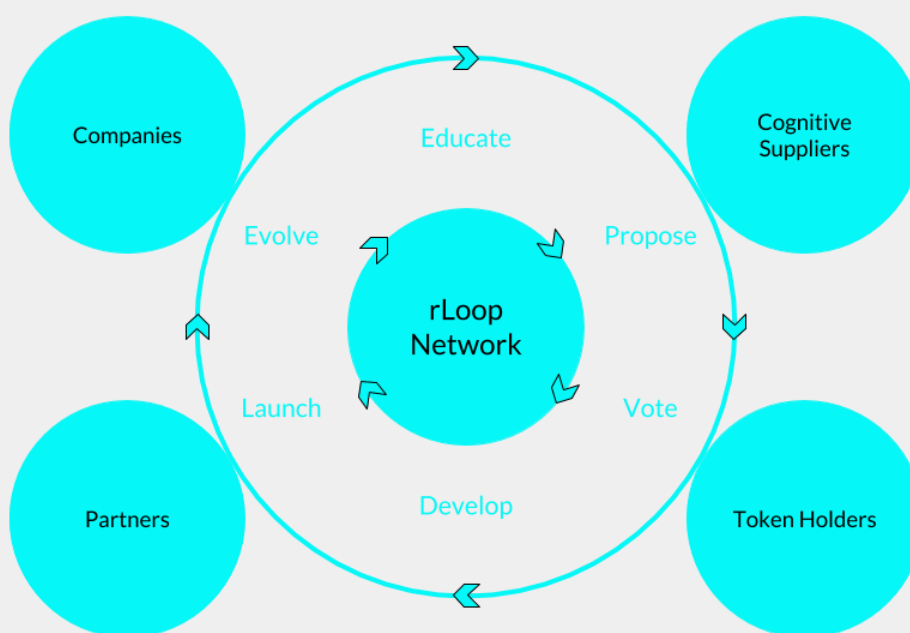
We believe the environment for such radical innovations should be open, collaborative, and free from legacy motivations or restrictions. Restrictions that include geography and national structures.

We believe there is a vast global pool of talent and resources that is under-utilized or largely untapped, as traditional organizational structures inhibit motivation, and opportunities become increasingly geographically localized. Acceptance of the status quo is a misinformed prescription ultimately limiting the success of individuals and organizations.

We believe there is a better way for people to work together, where an individual can invest their time on projects that ignite their passion and are unimpeded by organizational barriers.

We are excited for the future, and we think you should be too.

Connect. Collaborate. Innovate.



Overview

The rLoop Network is a decentralized innovation platform designed to connect individuals and organizations to collaborate on emergent technologies in ways that were never before possible.

The Network encourages the rapid and early discovery of the most feasible and impactful projects, rewards early adopters, and incentivizes sustained support. It allows an amorphous group to coordinate around a project, attract collaborators and resources, manage project governance, and support development throughout the entire lifecycle - from concept through to launch.

Example

Jaka has an idea for an all-terrain rescue vehicle. He drafts a proposal using a template provided by the rLoop Network and posts it in a community channel for collaboration. Amir sees the draft proposal and believes he can help to refine it. After some co-development they believe the proposal is sufficient to proceed - they submit it on the rLoop Network, allowing anyone to stake the rLoop Token (RLP) to the project and receive the project-specific token in return. The cost of minting project-specific tokens is set according to a bonding curve such that earlier staking receives more of the token, providing incentive to quickly identify quality projects. Holders of the project-specific token are granted certain privileges within that project, such as voting on use of project resources or influencing development.

Both Jaka and Amir stake RLP to the all-terrain rescue vehicle project immediately. Saskia and Clarence review the project and believe it to be exciting and feasible. They each stake RLP to it and receive the project-specific token at a higher rate than Jaka and Amir.

Jaka, Amir, Saskia, and Clarence are now cooperating on the development of the project, and collectively managing the available resources. They judiciously guide the project development in order to attract further interest, which will increase the resources available to the project. At a certain stage they realize they require simulations on their model but don't have the expertise among them. They create a bounty in the Cognitive Marketplace and in a short period of time the work is completed with quality assurance and delivered to them.

The project is progressing and demonstrating success, and this attracts attention from others in the community. Five more individuals stake RLP to the project. After a few weeks, Clarence disagrees with the direction the project is taking and decides to exit. He sends his

project-specific token back to reclaim RLP according to the bonding curve, which is now higher than his original stake. He has been rewarded for identifying a successful project and for his contributions towards its success.

The above processes can continue automated and unsupervised, allowing innovative and emergent technologies to go seamlessly from proposal to growing a community of supporters and resources for development. Project participants have ‘skin-in-the-game’¹ and incentive to productively guide the project development in order to attract further interest and increase resource availability. The system rewards early adopters and provides incentive to hold the project-specific token as it grants influence over the development cycle as well as project-specific utility.

Traditional processes for early-stage projects are costly and arduous. The rLoop Network allows for rapid discovery and development of potentially world-changing technologies, and makes them accessible to large, engaged communities.

Process

The rLoop Network features a modular set of tools and collaborative applications to allow for the creation, scrutiny, co-development, and launch of a diversity of emergent technologies by a passionate and motivated crowd.

The general cycle for a project in the rLoop Network follows these phases:

Propose > Vote > Develop > Launch > Evolve

Initially the rLoop Network will place importance on providing these platform features. There are planned platform additions from the community, and there is seemingly no limit to the number of services and marketplaces that could be built on top of the network.

Propose

Central to the rLoop Network mission is providing a voice and opportunity to individuals passionate about emergent technologies by allowing their ideas to be presented to and reviewed by a community of like-minded individuals. In order for a project to gain support from the community, a process to assess its potential impact and associated risks must exist. While every

¹ [https://en.wikipedia.org/wiki/Skin_in_the_game_\(phrase\)](https://en.wikipedia.org/wiki/Skin_in_the_game_(phrase))

project is expected to have a unique path, each should provide sufficient information to the community to allow for an educated assessment.

The first step for a potential project is the creation of a proposal. The proposal should define the problem it is addressing, explain the current state of solutions, outline the proposed solution, and establish success criteria. The proposed mechanism for this is inspired by NASA's COTS² approach, serving to create success criteria to evaluate the lifecycle of a project with a focus on demonstration of capabilities over capital acquisition. It obligates a potential project to undergo some consideration in preliminary study with attention on making milestones feasible and the project sustainable. A general template for project proposals is provided by the Network but it is not mandatory to use this template.

There are three ways we can see a proposal being created and submitted on the Network, all of which are performed off-chain:

- collaboratively among the entire community
- created by an individual or group and opened to the community for collaboration
- created by an individual or group and submitted independently

Proposal Spam

The collective attention of the community is a scarce resource. Immense value within the network is the knowledge and expertise of the community combined with the agility of the platform to manage and deploy this resource in a quick and efficient manner.

As every proposal submitted on the Network imposes on that collective attention, some mechanism to regulate submissions to prevent abuse is required. This is a primary utility for the rLoop Token (RLP): the acquisition of attention within the network. The risk of spamming the collective attention arises during the proposal phase from both innocuous and malicious intent. If there is no 'skin-in-the-game' for a proposer than there is no regard for the quality of submissions. A malicious actor could also intentionally spam proposals to congest the network.

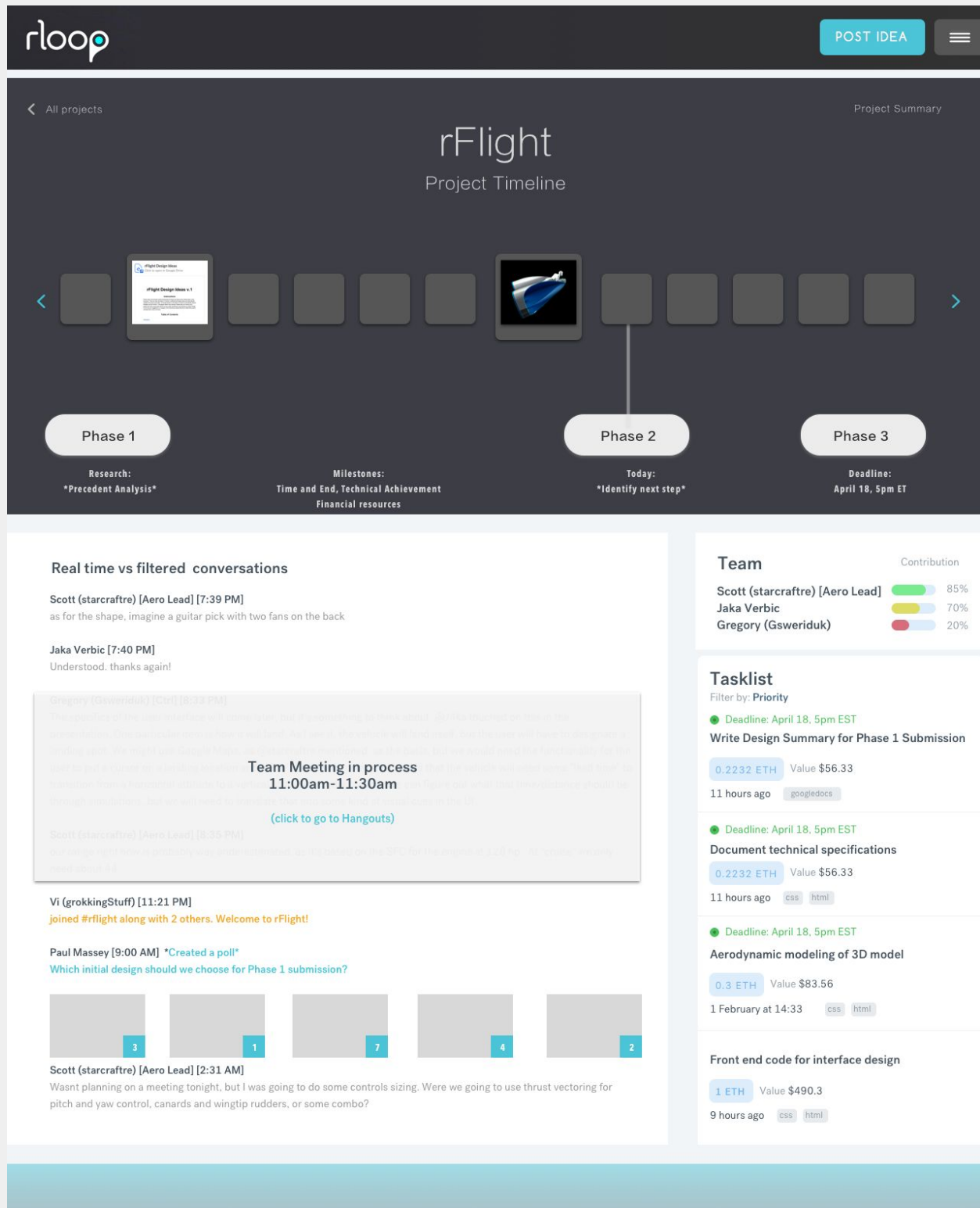
The requirement of a proposer to stake a minimum value of rLoop Tokens (RLP) is suggested to mitigate this threat. If an individual or group wishes to engage the collective attention of the Network, that individual or group will need to stake a number of tokens at the time of submission. A minimum number of tokens will be required, but there is no limit to the number

² <https://www.nasa.gov/commercial-orbital-transportation-services-cots/>

of tokens they can stake. In fact, staking more tokens than are required would signal confidence in the feasibility and sustainability of the proposed project.

The rLoop Token (RLP) then acts as a critical component to the resilience of the system.

Once a proposal is successfully submitted there is no limit to the number of individuals who can stake towards a project, allowing for a large number of globally distributed individuals to identify and signal support for projects deemed of merit and offering meaningful influence over its development.



A model of the project platform

Vote

On the rLoop Network, rLoop Token (RLP) holders will have the ability to search and filter project proposals. Each proposal should provide sufficient background information regarding the concept as well as associated milestones and timelines. Enough information should be available to make an informed decision about whether the project is sustainable, whether its milestones are feasible, and whether an individual would want to support its development³.

The community of rLoop Token (RLP) holders predict the success of a project by staking their RLP token to the proposal and in exchange the project mints and issues its own token. There is no limit to the number of tokens that a project may mint but the cost to do so is dynamic based on a bonding curve, where the cost increases as more tokens are created. This is known as a Continuous Token Market⁴, and serves to create a type of prediction market wherein the community is placing a personal stake on their belief that a project is feasible and can achieve its milestones. The value of a proposed project at this point is therefore determined by its potential to be a compelling focal point⁵.

To adapt the Continuous Token Market to the needs of the rLoop Network we need to add functionality to the project-specific token - namely, a means for the project to fund its potential development costs and a governance mechanism. The project-specific token may serve other purposes within a project, such as a contribution tracking mechanism, project-specific utility, or project-specific perks as explored later in this document.

Buying a Project-Specific Token

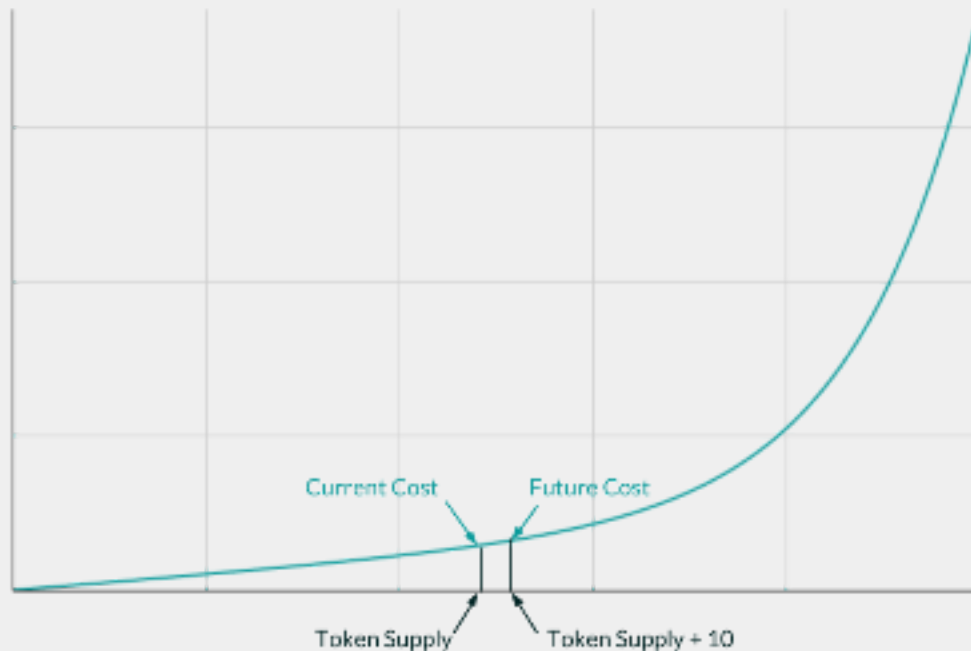
The cost to buy project-specific tokens is set according to a bonding curve. A bonding curve is a pricing algorithm that modifies the cost to mint new tokens depending on the existing supply of tokens. The earlier an individual stakes their RLP to a project, the more of the project-specific token they will receive. The incentive created is for the community to identify and support meaningful projects quickly and early. As more attention is attracted to a project and more individuals want to be part of its development, the cost to buy the project-specific token from the bonding curve increases.

³ It is noted that criteria for success or impact of a project is subjective, and that individuals wanting to support a project would have their own criteria for judging these merits.

⁴ Initially proposed by Simon de la Rouviere [here](#)

⁵ [https://en.wikipedia.org/wiki/Focal_point_\(game_theory\)](https://en.wikipedia.org/wiki/Focal_point_(game_theory))

At any time, a project-specific token may also be sold back to the bonding curve to reclaim an appropriate reward in RLP that is set by the bonding curve, which will reduce the supply and therefore the cost to buy new tokens.



Various algorithms have been explored to determine the ideal bonding curve for a project. A project should have the ability to define how its token appreciates in cost for every factor-increase of its supply. This can be expressed as a function⁶:

$$y = m(1 + a\%)^{b \log_c(x)} + b$$

Where:

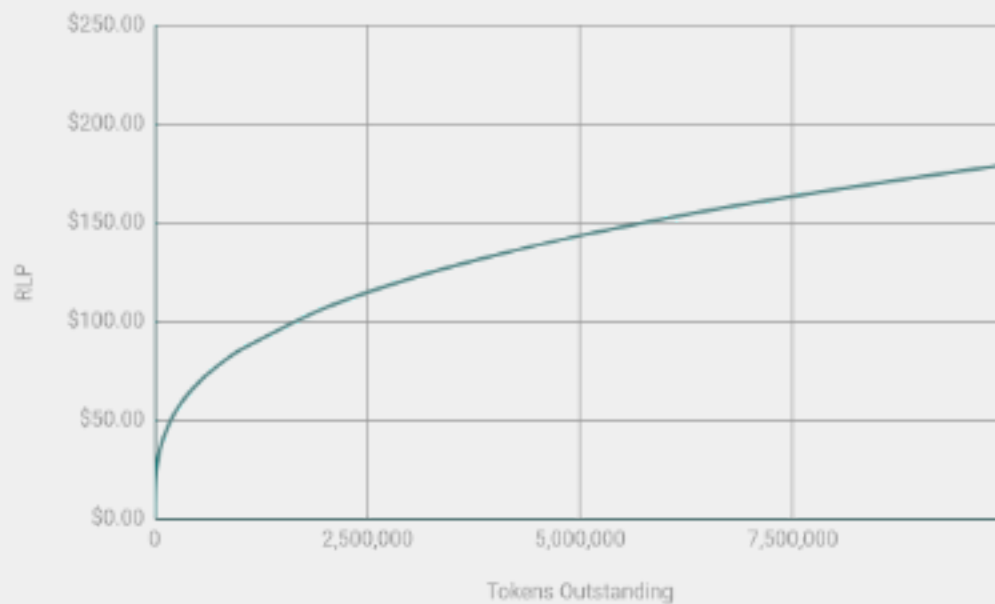
- a represents the percentage growth in price per factor-increase
- b is a constant that adjusts the function
- c is the base of the factor-increase (i.e. for a doubling of token supply, c would equal 2)
- m is a multiplicative factor that adjusts the slope of the defined curve

As an example, if a project desired its token appreciation to be set at 25% for every doubling of the token issued, the equation would look like this:

⁶ Originally proposed by Wilson Lau [here](#)

$$y = m(1 + 25\%)^{\log(x/a)} + b$$

And the curve would look like this:



Selling a Project-Specific Token

At any time, a project-specific token may also be sold back to the bonding curve to reclaim an appropriate reward in RLP that is set by the bonding curve. The action of selling back to the bonding curve destroys the project-specific token and decreases the existing supply, which also decreases the entry cost to new interest.

While we've thus far discussed a bonding curve where the price to buy and sell a project-specific token would be according to a *single* curve, it's not necessary that this be the case. And as mentioned previously, we need a means for a project to extract some value to fund its potential development costs. We can achieve this by introducing a second bonding curve⁷, where the cost to buy is different than the cost to sell. The difference between the two curves is how a project is funded. There are several methods to achieve this⁸ by manipulating the algorithm discussed previously:

$$y = m(1 + a\%)^{\log(x/a)} + b$$

⁷ Originally proposed by Simon de la Rouviere [here](#)

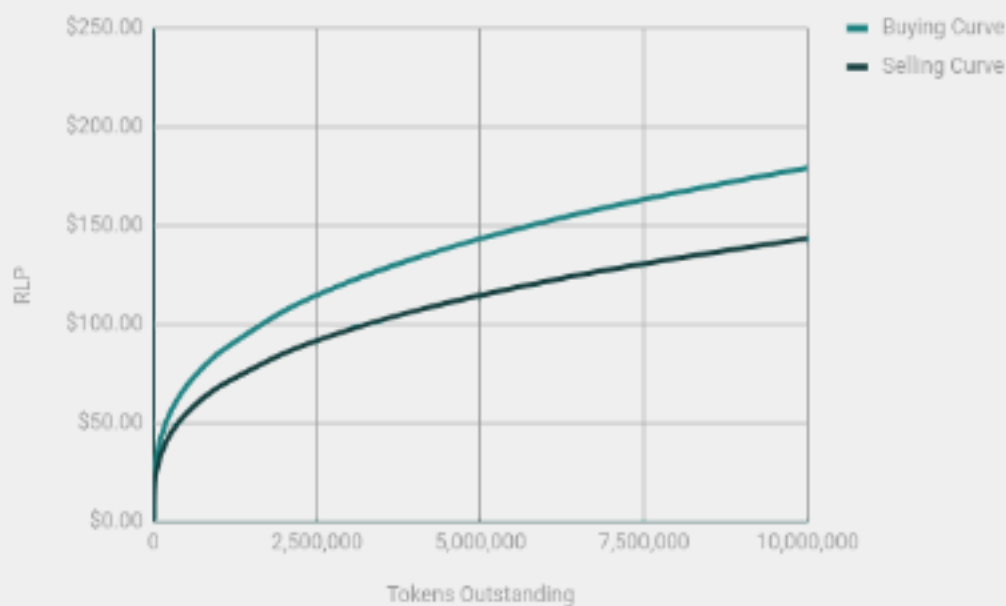
⁸ Explored by Wilson Lau [here](#)

Every project is unique and may have differing requirements or expectations for funding. Several options are made available initially to suit a variety of needs.

Increasingly Divergent Curves

The first option is an increasingly divergent set of buy and sell curves. As more project-specific tokens are created, the difference between the two curves increases. Individuals wanting to support a project take an initial predictable loss as a percentage discounted from their stake, and the difference between the two curves is captured by the project to fund its development.

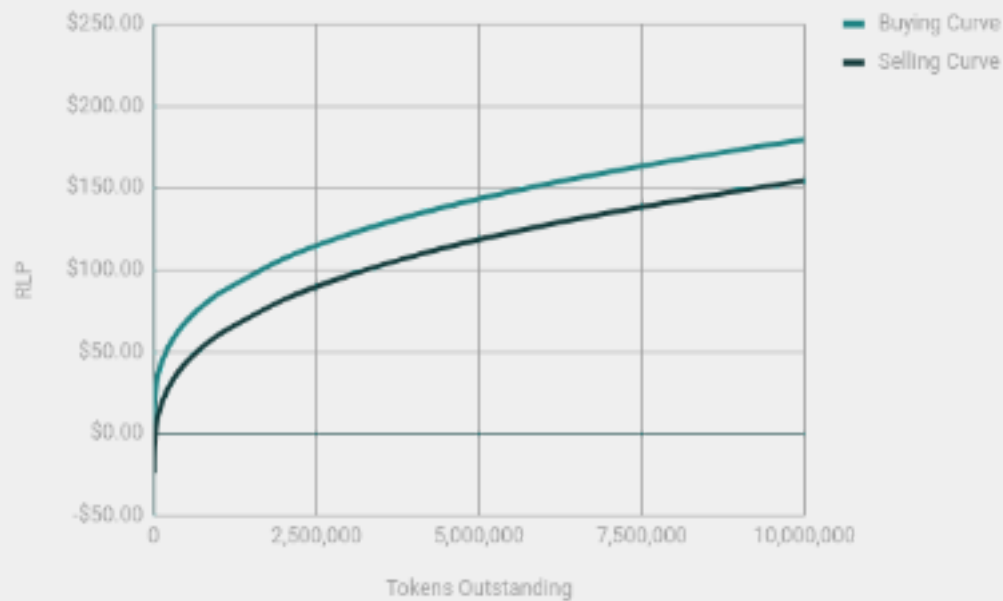
We can apply a discount to the buying curve by modifying m to create the selling curve, which would look like this:



Consistently Divergent Curves

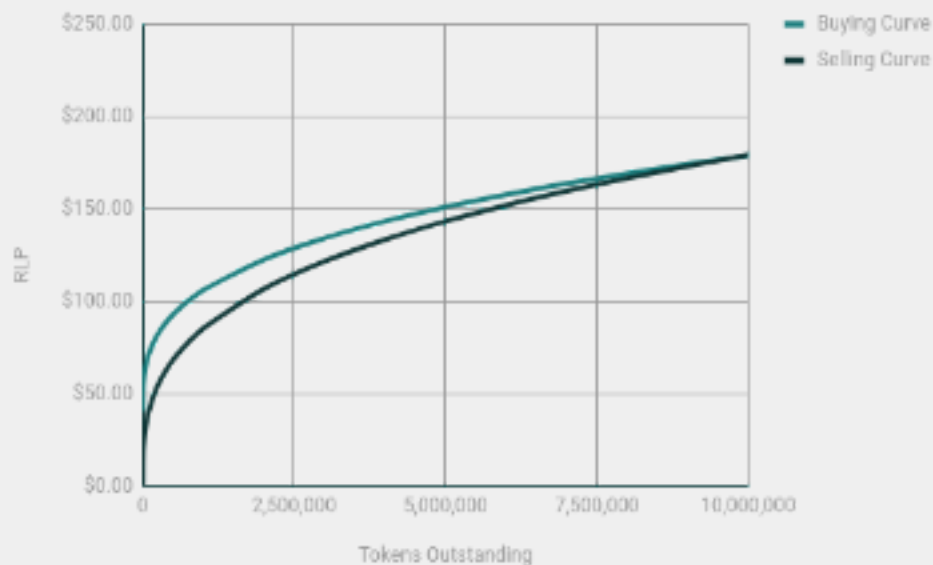
Another option is a consistently divergent set of curves where the difference between the buy and the sell remains consistent as the supply of tokens changes. Project participants still take an initial predictable loss but instead of a discount as a percentage, an absolute value is captured from every stake (for example, 0.1 RLP). The funding pool for a project can then be calculated as the discount value multiplied by the number of staked RLP.

By applying a negative constant to the buying curve ($-b$) we create the selling curve, which would look like this:



Converging Curves

Some projects may seek to raise a specific targeted amount to fund development but do not require or foresee the need for sustained funding. A converging set of curves would allow for such a case while still allowing interest and participation to be attracted. The targeted amount can be raised over a set number of tokens, but the two curves converge when that target is met and act as a single bonding curve. Such a curve would look like this:



A project may use its allocated funds for bounties, material costs, salaries, or other creative uses. Project supporters are incentivized to deliver specifics of the milestones along prescribed timelines in order to attract future attention. Additionally, project participants need to ensure the validity of the project in the face of Evolved projects, as described later in this document.

If the project is not not developing or demonstrating progress, its token holders may lose confidence and express that by selling their tokens back to the bonding curve. In this way, participants are essentially voting on the continued viability and success of a project by either holding their tokens (signalling their belief that the project will achieve its milestones and attract new interest), or selling their tokens to reclaim RLP to be applied to other projects. This acts as a pseudo-prediction market on the project itself.



proposal



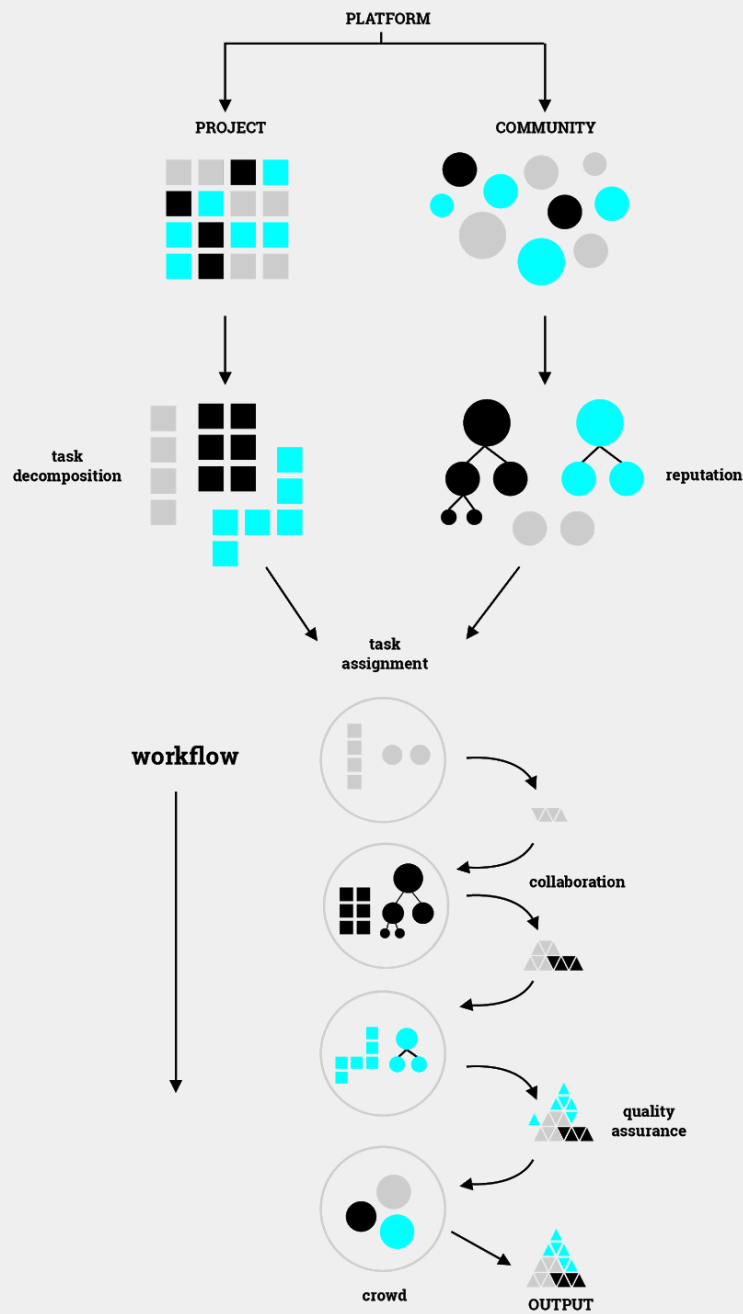
staking



consensus

Develop

Once a project begins to receive support from the community it can start to be acted on. Work can be decomposed into smaller ‘microtasks’, designed with particular needs and outcomes, which can then be structured into workflows to allow for broad collaboration. Project participants judiciously guide its development, and the talent available in the general community can be leveraged through incentivizing work in the Cognitive Marketplace. Quality assurance and peer review may be required to ensure work output is concatenated and of high quality.



Liquid Democracy

It was mentioned previously that we need to adapt the Continuous Token Market in order to attach a governance mechanism to a project's specific token to allow meaningful control for its

holders. Project participants can vote on matters related to development and management of resources, but it has been shown that engagement in a direct democracy drops in larger groups⁹ as voters do not have time or the expertise to vote on everything. While representative democracy¹⁰ is considered to scale better for large groups, it has its own problems with transparency, accountability, abuse of powers, and barriers to becoming a representative. Instead, a type of liquid democracy¹¹ can exist at the project level, where project participants have the option to directly vote or delegate their voting power to other voters - and can do so at any time. Delegation can also be transitive, with voting power passing through several delegates. The ability to override a delegate and vote directly offers increased control, transparency, and accountability while scaling to large groups.

By creating a liquid democracy, rapid collective decision making can be achieved and scaled. Delegates have incentive to act in the best interest of the project or risk losing their votes and potentially causing individuals to exit a project completely. In order to identify worthy delegate candidates a Reputation system should exist, which could also help to solve other concerns such as identity and permissions.

Reputation

A reputation method is needed to facilitate the onboarding of new members to the network and to a project. The introduction of ranks which increase rights and responsibilities is proposed, with the requirement for progressing through the ranks being dependent on more value and/or stake contributed. This system can help to address concerns related to access control, governance, identity, and more.

Only one rank may be occupied at any time. Certain criteria needs to be met in order to rise to the next rank, and similarly one may be demoted should they fail to continue to satisfy the requirements of their present rank. A new member starts with few rights and responsibilities but, as time is spent in the community along with value and stake added, rank will increase along with rights and responsibilities.

This can be particularly useful for:

⁹ <http://bford.info/2014/11/16/deleg.html>

¹⁰ https://en.wikipedia.org/wiki/Representative_democracy

¹¹ https://en.wikipedia.org/wiki/Delegative_democracy

1. Permissions

Increased rank can equate to increased authorization. At the lowest level there may be no rights. As you increase your rank you may gain the ability to read files and directories, followed by writing to them, followed by shared ownership in them. The levels may vary with the needs of the project.

2. Governance

Increased rank can equate to increased participation rights in governance. At the lowest level you may have only voting rights. At the highest rank you may be eligible to be a delegate. The levels can vary with the needs of the project.

3. Identity Authentication

Increased rank can equate to increased authentication of identity levels. At the lowest level you may just have a public key. At the highest rank you may have full KYC¹² verification. The levels of authentication can vary with the needs of the project.

4. Acknowledging Experts

This ranking system would allow an easy process for new members to identify growth avenues while recognizing the added value of members over time.

New participants may enter the project at Rank 1. To get promoted to Rank 2, the individual must pass that rank's entry criteria. This may include one or some combination of the following:

- staking more tokens
- spending a minimum amount of time in the network or in a project
- provably adding some value to the system (completing tasks, participating in quality assurance, etc.)
- increasing an authenticated identification level

If they pass these criteria, they are promoted and gain increased rights and/or responsibilities. If they no longer meet the criteria for a particular rank, they may be demoted.

¹² https://en.wikipedia.org/wiki/Know_your_customer

A certain rank may be required in order to claim dividends or profit from revenue generating projects. For example, in order to claim profit from a revenue-generating project, a member may be required to hold a number of project-specific tokens and be of a rank where full KYC identification has been fulfilled and meaningful contributions and control have been proven.

Cognitive Marketplace

Current crowd-work usually consists of small tasks paired to workers who produce an output. This structure is insufficient to support complex, creative, and interdependent work, and for workers has led to low reward structures and lack of skill development.

In order to incentivize work within a project from the talent within the broader community, and specifically individuals who may not be directly staked in a project, a bounty may be issued through the Cognitive Marketplace.

Tasks in the Cognitive Marketplace may also be structured into workflows such that one task unlocks further work. A project may use RLP from its staked pool or project-specific tokens to incentivize work through a bounty. The bounty tokens are held by a smart contract and, upon completion of the task and approval from the bounty creator, the bounty is automatically dispersed to the Cognitive Supplier. A bonus can be offered based on earlier-than-expected completion, and a decay rate for the bounty may also be set to incentivize completion in a reasonable time. This would encourage Cognitive Suppliers to only partake in bounties for which they have a reasonable expectation to complete, and not to overburden themselves by taking on too many tasks at once.

A participation fee may also be assigned to a bounty, which may be used for ‘high-risk, high reward’ tasks, to limit the potential for Sybil attacks¹³, and to create ‘skin-in-the-game’ for the collaborator. The participation fee is set by the creator and is held by smart contract until the completion of the task, at which time the fee is returned. If the task is not completed before the end of the decay period, the participation fee is forfeited to the bounty creator.

When a Cognitive Supplier(s) indicate a challenge/task is complete, a phase for Quality Assurance may be opened. Not every task will require Quality Assurance, and it will be at the discretion of the bounty creator(s) to decide whether it is necessary.

¹³ https://en.wikipedia.org/wiki/Sybil_attack

Quality Assurance

Quality assurance may be needed to ensure work output meets the requirements of the task and is of high quality. A Quality Assurance phase can be opened after a bounty is complete, allowing Verifiers to review submitted work to ensure it meets the criteria as described in the bounty.

In order to qualify to review submitted work, a Verifier is required to stake a certain amount of RLP. Their incentive is to carefully review submitted work else risk losing some of their stake. If they correctly review a submission they will earn RLP from the bounty creator. Depending on the nature of the task and the demands of the bounty creator, a Verifier may also require a certain Reputation level.

Several verifiers are assigned to review a task, with consensus among them required to either approve or reject the submission. In the case where a task is deemed to be incorrect or incomplete, actionable feedback is required such that the Cognitive Supplier has the opportunity to understand or address the challenge. In all cases, the focus will be on dispute mitigation but there may be instances where a Cognitive Supplier disagrees with the consensus of the Verifiers. A dispute resolution system is then required with disinterested individuals convening to review the case.

There is an element of trust introduced in this process. Cognitive Suppliers need to trust that Verifiers are both capable of adequately understanding and testing the solution, and are not acting maliciously (such as a scenario where the Verifier can see the work output but deny the approval to prevent the bounty from being distributed). The bounty creator is also trusting the contributing Cognitive Supplier(s) in that they are not using any alternate means to influence Verifiers to their support. While there are inherent incentives for good behaviour¹⁴, other methods are being examined to reduce or eliminate the need for trust as well as to mitigate potential attacks.

This Quality Assurance process incentivizes peer review of work output, rewards Verifiers for correctly approving or identifying issues with the output, and discourages false/incorrect claims against the work output.

¹⁴ The output of the community and projects may be reflected in the value of the token. Should the work being reviewed be incorrectly assessed to be correct, the quality of the output decreases and can affect all token holders.

Knowledge Vault

The Knowledge Vault is a library of work created by community-driven projects within rLoop. The library can contain research papers, design reports, tests, simulations, and other relevant content created in a project. The Knowledge Vault would be curated by the community and made available as a shared resource to be leveraged by all projects on the network in order to accelerate development, reduce costs, decrease duplication of work, and eliminate information silos. This also distributes risk among all projects and project participants, as projects that fail are still adding to the collective knowledge available to be leveraged by current and future projects.

Intellectual Property

If a distributed team can be granted legal title over assets they generate, including intellectual property, then those assets can be established on-chain to allow them to be programmatically bought, sold, rented, and assigned, with partitioned ownership used to resolve disputes and enforce resolutions. Projects such as Mattereum¹⁵ and Bernstein¹⁶ are working to make this a reality, and would create an ideal method to manage rights of assets being generated by a distributed team in order to correctly, legally, and technically address those assets, as well as to allow for enforceability.

Launch

There are a few paths that a project may take to commercial viability. It may be focused on creating a product or service, or it may be generating intellectual property that can be licensed. There are a few methods that can be used to handle each case with respect to the project-specific token holders, and certainly more options are being explored for future growth of the rLoop Network and its projects. Consideration for regulatory compliance are necessary when designing such mechanisms.

If a project is creating a product, service, or intellectual property, those assets may be made available through the Marketplace. There are two options if this is the case:

¹⁵ <https://www.mattereum.com/>

¹⁶ <https://www.bernstein.io/>

1. Revenue generated by the project can be returned to the specific projects pool without minting tokens¹⁷, thereby increasing the value of the project-specific token.
2. Revenue generated by the project can be distributed to project-specific token holders regardless of the price at which they purchased the token. This is a type of dividend and, depending on regulatory considerations, a certain Reputation level may be required to claim this benefit.

The possibility exists for a project to be commercialised through designated entities (portfolio companies). Portfolio companies are technologies, such as the Hyperloop, that are developed in the rLoop Network and reach maturity or commercial viability, at which point they could be transferred along with the relevant team into new wholly owned entities and developed as independent portfolio companies. In this event, the possibility exists to consider the project-specific tokens as equity in the new business before it has been ‘baked’. This is similar to a dynamic equity split model. At the point in time that the project is formally incorporated, the project-specific tokens can be exchanged proportionally for equity in the new business.

Marketplace

The Marketplace is where the products and services that projects output are made available, allowing the RLP token to function as the primary means to consume the value created within the interconnected web of projects on the network.

The Hyperloop project, for example, could have a ticketing app that would exchange RLP for a ride on your local Hyperloop, or the ability to transport cargo on the system, through the Marketplace. The personal flight device created by rFlight could sell or lease the product, and Intellectual Property generated by any project could be leased or acquired. Many creative methods to make the project outputs available and accessible can ultimately be realized through the Marketplace.

Evolve

As a project grows, new markets or applications for the tech may be identified by the community who can ‘evolve’ the original project to spawn a new one. This evolution is achieved

¹⁷ This was explored by Alex Van de Sande [here](#)

by introducing a new project proposal, which may be done by either the existing team or by a new team.

The evolved project can use lessons from the original, although it may introduce new technologies or a new niche. Now, partners in the original project can ‘vote’ on the evolved proposal by acquiring its project-specific token. Some may return their original token to acquire the new one, while others may use RLP to hold tokens in both projects.

The market and individual drive to maximize profit will quickly evaluate the viability of the evolved project. This is a type of external governance model, with evolution occurring autonomously and entirely driven by the community.

Internally, a project evolves to suit the environment for which it was initially intended. Voting among participants in the project is a type of internal evolution that is slow, conservative, and resistant to drastic change in the interest of stability. An evolution is external to a project, and can be done very rapidly. Each evolution introduces a mutation of the original project and brings a new set of partners, rules, values, and talent. The evolved project must innovate and provide value, or it will not survive. And the cycle continues organically.

A new project does not have to be competitive to the original.

Ancillary Platform Features

rUniversity

The rUniversity is designed for ongoing professional education for the community, as well as a resource for external individuals and organizations to access a wealth of tools for personal and professional growth. Incorporating lectures, workshop tutorials, and guest speakers, the community will have access to this extensive resource to support their continued growth.

Competitions

The Competition platform offers incentive prizes for a clear and measurable goal that is awarded to the first person or team to achieve it. Where a project would inherently target a solution, a Competition defines a problem and has no solution bias. A Competition can be launched by anyone, any group, and/or in conjunction with external partners who may sponsor a Competition.

Competitions would be open external to the network. Depending on the specific competition, certain resources may be made available to participants. A prize would be assigned to the Competition which could be in RLP, another cryptocurrency, fiat, or a combination thereof, and the team successfully satisfying the requirements of the competition are awarded the prize.

Using the Competition dApp, innovation and creativity is encouraged internally and externally, and groups of collaborators form organically to solve incentivized problems. Because a Competition would be open externally to the rLoop Network it provides an alternative opportunity to earn the rLoop Token.

Ongoing Projects



Hyperloop

The same methods of travel available to us today were also available to our great-grandparents. These modes of transportation remain inefficient, unsafe, and environmentally harmful. Rather than pursuing incremental improvements to outdated systems, rLoop is disrupting the paradigm by creating fast, safe, efficient, economical, and sustainable travel with our Hyperloop technology¹⁸.

The Hyperloop levitates a vehicle in order to reduce rolling resistance. That vehicle is then placed in a tube or a tunnel in which we can control the environment and optimize for our purposes - namely, reducing the air pressure to eliminate almost all air resistance. The result is an energy elegant system that is safe, sustainable, and fast - with an estimated top speed of 765 mph / 1,200 kmh.

¹⁸ The Hyperloop concept was open sourced by Elon Musk in 2013. That paper can be found [here](#).



Magnetic Levitation

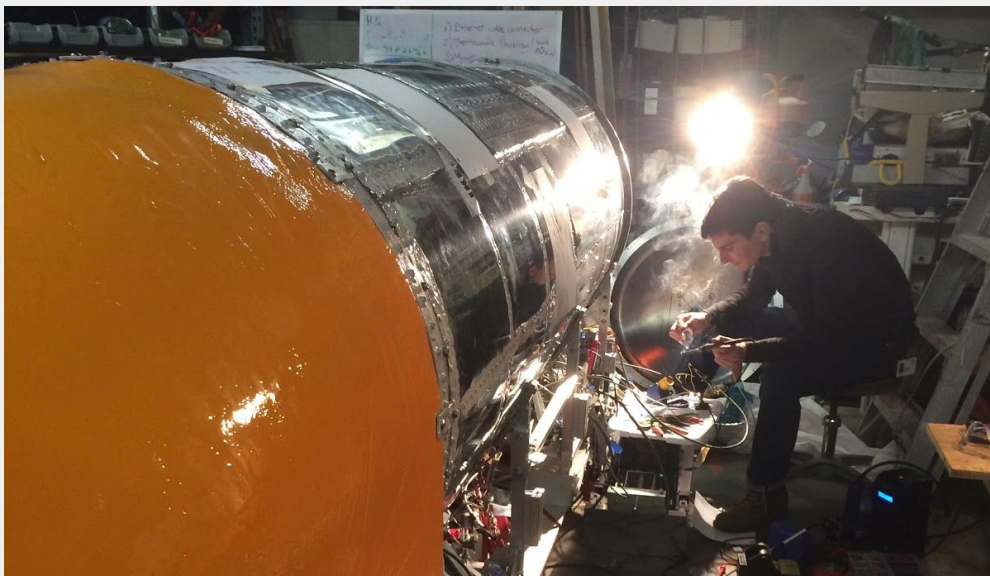


Partial Vacuum Environment

rLoop has set new records in this field, winning global competitions and earning worldwide attention. We have produced some of the most advanced and scalable Hyperloop technology in the world using a completely crowdsourced model from concept to design to manufacturing. Our initial prototype we nicknamed the 'rPod'.

In the quest for the Hyperloop, much attention has been focused on the look, the feel, and the development of the pods that are proposed to transport us into a brave new world at near the speed of sound. But rLoop recognises that a pod a hyperloop does not make.

Instead, rLoop is focused on the diverse elements that must be brought together to make a safe and economical whole system that can work. The community is working on making this system truly functional, identifying routes, developing key technology and infrastructure, developing a full safety case, and working on the economics of both cargo and passenger transport. The name "rLoop" is actually hyperloop without the hype!





rFlight

rFlight is a project aiming to make personal aerial mobility accessible to all. Spurred into development by the announcement of the GoFly Competition sponsored by Boeing, the rFlight team is creating a "motorcycle for the sky" - a compact vehicle capable of fast and exciting horizontal flight, vertical take-off and landing (VTOL), and supporting the pilot with semi-autonomous control. The aim is to create an eco-friendly, near-silent vehicle powered by innovative electric propulsion. With the rFlight project, the ability to create a safe and accessible experience of true personal flight is made achievable.

For more information, see: <https://www.rloop.org/rflight>



rBridge

rBridge is a new way to connect virtual designers and engineers with real-world makers and manufacturers. The vision to create a global prototyping platform enabling anyone to make any innovation a reality. Together with the rLoop Network, the entire development process from idea generation to market launch will be covered. This model minimizes capital expenditures, reduces physical footprints, intelligently manifests geographically, and sources locally.

For more information, see: <https://www.rloop.org/rbridge>

Partners

TE Connectivity

TE Connectivity is a technology company that designs and manufactures connectivity and sensor products for harsh environments in a variety of industries, such as automotive, data communication systems, aerospace, defense, energy and subsea communications.

Autodesk

Autodesk makes software for the architecture, engineering, construction, manufacturing, media, and entertainment industries.

Precision Building Group

Precision Building Group is leading the global effort to construct the infrastructure of tomorrow.

TATA Steel

TATA Steel is one of the top steel producing companies globally with annual crude steel deliveries of 27.5 million tonnes (in FY17).

Arx Pax

Arx Pax Labs is a Silicon Valley technology company that invented Magnetic Field Architecture (MFA) technology.

Digi-Key

Digi-Key is the fourth largest electronic component distributor in North America and the fifth largest in the world, and is a broad-line distributor of board level components.

Slack

Slack is a cloud-based set of proprietary team collaboration tools and services.

R Systems

R Systems is a service provider of high performance computing resources.

ANSYS

ANSYS is the global leader in engineering simulation, helping the world's most innovative companies deliver radically better products to their customers.

rLoop has a history of collaborating and supporting developing engineering talent. rLoop has been mentoring and supporting students at San Jose State University (SJSU), University of California Santa Barbara (UCSB), and École Polytechnique Fédérale de Lausanne (EPFL), amongst others. We encourage young talent and students to participate within rLoop as it provides great mentorship opportunities.

Conclusion

Humanity's future will continue to be driven by technological and organizational innovation. The rLoop Network is designed to decentralize emergent technology, allowing individuals with shared interests to coordinate around projects, curate information and proposals, and actively participate in the development of potentially world-changing technology. Exponential societal, cultural, and economical advancements can be realized through technological innovation, and the best way to maximize this potential is by increasing accessibility.

rLoop is at the forefront of innovation. We are connecting globally distributed talent and resources to opportunities that have historically been localized. We are pioneering processes in collaborative virtual design and remote manufacturing. We are redefining how people work together, how they are recognized for their contributions, and how they are rewarded for their work. What is outlined above is based on our years of experience, but remains purposefully high level. The needs of each project will be unique, and we anticipate that as the community grows and collaborative technology matures the network will need to remain fluid and adaptive. Modularity is critical to sustainable growth.

When the untapped talent of millions of people has an outlet, the results are incredible. The rLoop Network is well situated to be at the forefront of technological innovation, and the global economy as a whole.

Appendix

A.1 - Mapping the rLoop Network to rLoop's History

This section is a work-in-progress. It will map the processes outlined in the document above to the historic experience of rLoop in developing its projects since 2015.

A.2 - Example Contract Codes for Bonding Curves

The following is a list of sample contract codes for implementing Bonding Curves:

<https://github.com/oed/bonding-curves>

<https://github.com/oed/bonding-curves/blob/master/contracts/EthPolynomialCurvedToken.sol>

<https://github.com/relevant-community/bonding-curve-component>

<https://github.com/relevant-community/contracts/tree/bondingCurves/contracts>

<https://github.com/bancorprotocol/contracts>

<https://github.com/JoshsRandomRepos/Resources/wiki/Curved-Bonding>

<https://github.com/OpenZeppelin/openzeppelin-solidity/pull/827>

A.3 - Projects as Decentralized Partnerships

The below is a possible route for projects to form as Decentralized Partnerships, and is the work of Ori Oren. The below is excerpts from his paper titled “ICO’S, DAO’S, And the SEC: A Partnership Solution”¹⁹.

A.3.1 - What is a Decentralized Autonomous Organization?

A decentralized autonomous organization, or DAO, is a centerless network of peers governing democratically or meritocratically²⁰ with community functions and rules enforced digitally.

¹⁹ https://cblr.columbia.edu/wp-content/uploads/2018/07/5_2018.2_Oren_Final.pdf

²⁰ <https://en.wikipedia.org/wiki/Meritocracy>

Blockchain technology has permitted this new type of structure to exist without a formal hierarchy, thanks to smart contracts with verifiable rules that cannot be broken and which can only be altered in accordance with the rules. Instead of centralized management, coordination among an amorphous group is facilitated through incentive and code.

A.3.2 - Legal Background

“The DAO” is the most notorious example of such a decentralized business model. The DAO was setup to function as an open source, decentralized venture capital fund. During its ICO, The DAO raised millions of dollars from thousands of investors, who became the network of decentralized token holders and de facto operators of The DAO fund. After that, the goal was to have the token holders introduce code to finalize the executory capabilities of the fund. Every token holder had the right to be a “Contractor” and “pitch” a block of code that represents a smart contract investment (a hypothetical example could be code that automatically invests \$10 million of DAO funds into the S&P 500 and then winds down the investment automatically by \$1 million each month, distributing any profits to token holders). The DAO used “Curators” to ensure the code does what it intends to do and control the pace of pitches. Then, token holders voted on each smart contract pitch. If a pitch reached quorum, the code would automatically execute the smart contract.

The SEC Report can be found [here](#).

A potential solution to the risks of fraud and failure in a DAO model may exist in partnership law.

A.3.3 - Projects as Decentralized Partnerships

The community can support projects by staking RLP to proposals. Once sufficient tokens have been staked, the project can be adopted and those who staked to it can become partners in the project - this is a Decentralized Partnership model.

A Decentralized Partnership allows participants the freedom and flexibility to support the development of potentially world-changing technology and earn a direct stake in those projects. The project-specific token as a smart contract would allow for efficient specification of governance rights like transferability, management authority, and dissolution. A project can choose to be open-access and democratic, explicitly allowing anyone to become a partner

regardless of financial background. For the purpose of a project in which all participants hold equal management rights, uniform partnership law is a seemingly ideal method of regulation²¹.

Participants buy membership in the project using RLP in the interest of sharing control and profit. There is no limit to the number of partners that can create a general partnership²², allowing for a large number of partners who are globally distributed to share meaningful control.

Projects as Decentralized Partnerships would offer a partnership agreement digitally while having a similar legal status to that of a general partnership. The digital agreement would need to address some of the key challenges of a partnership, such as the rights to transfer partnership interest, the sharing of profits, the sharing of liabilities, restriction on dissolution, and the rights and methodology for committing the partnership to action. It is essential that the management and operation be decentralized such that the partners have meaningful control and voting rights. To ensure this is the case, all token holders must have proportional rights, and measures must be put in place to ensure no single entity can dominate control.

An essential characteristic of a general partnership that would be reflected in a Decentralized Partnership would be the share of profits and losses. This sends a strong and meaningful message to the decentralized community: by being a part of a decentralized partnership, everyone is responsible for each other. As the profits and losses are shared equally regardless of contribution level in a general partnership agreement²³, by default the smart contract of a Decentralized Partnership Token can serve to alter these rules to distribute the rights in section 401²⁴ on a prorated, per-token basis.

Pass-through taxation is a default rule in general partnerships that will be helpful for Decentralized Partnerships: “[tax income or loss is allocated to partners according to the partners’ economic interests in the partnership²⁵.” Partners will be responsible for their own taxes, making the taxing easier for both payers and collectors.

In terms of dissolution, the ease of exit through the transfer of tokens makes tougher dissolution protocols acceptable. The Decentralized Partnership token could feature a protocol for partners to return their token to the Project Pool and reclaim a prorated percentage of their stake, which has only been diluted by the expenses of the partnership to that point.

²¹ http://www.uniformlaws.org/shared/docs/partnership/upa_final_97.pdf

²² http://www.uniformlaws.org/shared/docs/partnership/upa_final_97.pdf, Sect 202

²³ http://www.uniformlaws.org/shared/docs/partnership/upa_final_97.pdf, Sect 401

²⁴ Id.

²⁵ http://www.uniformlaws.org/shared/docs/partnership/upa_final_97.pdf, Sect 401

Alternatively, or in addition, a majority or supermajority vote could be required to dissolve and automatically wind down partnership assets, rather than dissolving a partnership by the whim of a single partner.

The ability to easily transfer ownership according to the token terms is a further benefit to a Decentralized Partnership: creating a viable exit strategy. This promotes efficiency and democracy by keeping majority tyranny²⁶ in check through the threat of minority token holders withdrawing their profits and selling their tokens. The Decentralized Partnership allows for wide fundraising, dispersed ownership, and more meaningful control.

A.3.4 - Internalization of Risk

Being recognized as a partnership establishes not only rights, but duties for the partners as well. Token holders would allow each other the duties of honesty, loyalty, and good faith - duties which could be enforceable by law. Partners will be forced to comply with the duty of loyalty, and thus not take advantage of minority token holders, else face the threat of partnership litigation. This encourages democracy and responsibility while discouraging insider hacking by creating independent causes of action.

Because partners risk personal liability in the event of tort or creditor debts, the partnership proposal would need to be transparent as to what risks the partners will be exposing themselves if they are to attract informed partners. After the project is adopted, the partners will remain informed and motivated to participate by the threat of losing money—partners will not want to end up in debt based on the decisions of others. This is yet another boon to democracy within the organization. The best performing projects will attract the most-informed partners, which will weed out the weakest projects over time.

While the threat of liability is a motivator for caution, it is also a major benefit of decentralization. As more partners are added, the magnitude of debt risk decreases because partnership liabilities will be spread out over a larger number of partners. Further, it discourages investors from purchasing too large of a share in the partnership (and thus too much liability), unless they can secure their own majority and control their risk. This could lead to a larger distribution of ownership and a more diverse democracy.

²⁶ https://en.wikipedia.org/wiki/Tyranny_of_the_majority

A.3.5 - Positive Externalities

A Decentralized Partnership designation is not only suited for the participating members, but also for stakeholders in general. In the example of an autonomous car that operates as a ride service with token holders sharing profits, who is liable in the event of an accident with a pedestrian? If the token is treated as a security, implying at most a limited partnership, it is likely that the original coder of the car would be responsible for compensating the pedestrian. In a Decentralized Partnership, all car token holders could be held joint and severally liable for compensating the victim. The tort victim would have more parties to recover from than if they could only look to the original coder—who might be insolvent on his or her own. The smart contract embedded in the partnership token could help circumvent the liability challenges of pseudonymity. If the business is found liable, the funds could automatically be pulled from token holders' accounts to pay debts. With this threat, partners will be more likely to come forward to their own defense. Another option could be for tokens themselves to be forfeited if the partner does not come forward. The cost of this liability would be spread out among more investors, which means the same compensation to the victim with less damage to the business. The victim has more opportunities to recover while no single defendant would be overly burdened by the liability.

Partnership rules that treat all participants equally, for better or worse, fit the concept of a democratic and egalitarian business model perfectly. This is an organic way to ensure automated business models, like the autonomous taxi, are coded responsibly without creating unnatural barriers to experimentation.

Resources

Continuous Token Market

<https://media.consensys.net/exploring-continuous-token-models-towards-a-million-networks-of-value-fff153175776>

<https://medium.com/@simondlr/tokens-2-0-curved-token-bonding-in-curation-markets-1764a2e0bee5>

<https://medium.com/@avsa/sponsored-burning-for-tcr-c0ab08eef9d4>

<https://blog.ventus.io/token-bonding-curves-683b8b309c18>

<https://tokeneconomy.co/token-bonding-curves-in-practice-3eb904720cb8>

<https://medium.com/coinmonks/token-bonding-curves-explained-7a9332198e0e>

<https://btcmanager.com/token-bonding-curves-and-their-use-in-intellectual-property-distribution/>

<https://www.slideshare.net/PaulKohlhaas/token-bonding-workshop-at-dappcon-18>

Intellectual Property

<https://tokeneconomy.co/token-bonding-curves-in-practice-3eb904720cb8>

https://cms.mattereum.io/upload/iblock/784/mattereum-summary_white_paper.pdf