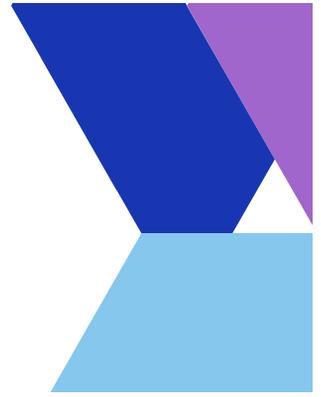




The Introduction of Public Goods in the Web3 Space

We Support and Fund Public Goods Projects We Believe In



Authors: *Ray*, Core Contributor at LXDAO; *Twone*, Core Contributor at Uncommons; *Tiào*, Core Contributor at LXDAO

Coordination: *Hazel*, Core Contributor at GCC **Design:** *Yuxin*, Core Contributor at GCC

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Preface

In the last few years, supporting “public goods” has grown to become a key part of the Ethereum ethos. At the same time, the resurgence of the term has rightly led many to spotlight the complexities that come with it, especially in an increasingly global and networked society. Defining what we mean by the public and establishing to what end they should be served is not only difficult, but often paradoxical in the context of the traditional definitions of non-excludability and non-rivalry constructed at a time where goods were fundamentally local.

As part of a collective effort to bridge the “cosmo-local” tensions brought on by our post-web era, writers and activists have begun to encourage us to refocus our attention on the notion of the commons; to think less about specific boundaries, and more about the capacity of even bounded goods to produce meaningful positive externalities. Indeed, while a public park might have operating hours or a subway system might charge a fee, these goods should be funded all the same as they help us carry ourselves, connect with each other, and contribute to broader society. Regardless of terminology, how we create more of this activity is as such paramount to any future we author.

While these conversations are just beginning, I’m excited to see GCC taking part in helping us think more about how we can better map the ways in which we can philanthropically and productively support each other.

-Scott Moore, *Public Works*

GCC, short for Global Chinese Community of Universal Digital Commons, is a dedicated community fund supporting digital public goods within the global Chinese community. Our past initiatives include community rounds at Gitcoin Grants 15, 16, 18, and 19, along with donations to RemixCC, P2P Foundation, Funding the Commons, among others. For more details, feel free to visit our [official website](#).

In our latest endeavor, we've brought together researchers from LXDAO and Uncommons to compile a comprehensive report on digital public goods. Our aim is to spark meaningful conversations and deep reflections on this subject within the global Chinese community and broader global crypto communities. Looking ahead, we're excited about the prospect of increased investment in this vital area. While the topic of digital public goods is intricate and multifaceted, we acknowledge that our report may have its limitations. Therefore, we eagerly invite and appreciate constructive feedback and critiques from our readers.

We would also like to thank the following individuals for their valuable suggestions and feedback on this report (listed in alphabetical order):

Bruce Xu, Constantine Gao, Eugene Leventhal, Jason Vong, Luran, Michel Bauwens, Nicholas Hu, York, Zik

Apply for GCC funding: <https://www.gccofficial.org/grants.html>

Social Media: @GCCofCommons

Contact us: contact@gccofficial.org

3.1 Common Definitions of Public Goods in the Web3 Space

In the Ethereum ecosystem, the term "public goods" has become increasingly popular. When it comes to defining public goods, one approach is to follow Samuelson's understanding, which describes them as goods with non-competitive and non-exclusive characteristics[1]. This is the most common and familiar definition in the ecosystem[2].

Another definition takes a more inclusive approach, considering public goods as an expansion of the concept of "commons"[3]. The concept of commons originates from Hardin's "Tragedy of the Commons" and Elinor Ostrom's work "Governing the Commons." Ostrom defines common pool resources (commons) as "natural or man-made resources from which it is difficult to exclude or limit users once the resource is provided, and one person's consumption of resource units makes

those units unavailable to others." [4] In this context, commons can be seen as non-exclusive but still competitive goods.

There are also viewpoints that challenge the non-competitive and non-exclusive elements more directly, as presented in the article "Ethereum's Regens Tend to Ethereum's Public Goods," [5] authored by Dr. Paul J. Dylan-Ennis and Scott Moore. The authors argue that these two elements were introduced after World War II when people tended to understand "public goods" within the framework of nation-states. However, it appears that many public goods have both exclusive and competitive elements at a broader level. For example, if you cannot enter a specific country, a road may be considered a public good only for those within that country. Atmospheric resources are not non-competitive, as the consequences of the climate crisis illustrate. Therefore, the authors define public goods through positive externalities. They suggest that we may pay for public transportation, but it benefits the entire city, providing convenience for everyone. While public transportation is exclusive, it doesn't exist for profit but for the prosperity of the entire city. However, the authors do not provide a detailed explanation of what constitutes a positive externality in this article.

Of course, there are likely other definitions and perspectives. The Web3 world is far from being constrained by a single idea, and there is no mainstream standardized understanding of public goods in the Web3 space. As mentioned on the Public Goods Network:

By definition, public goods are goods or services that are non-excludable and non-rivalrous in nature. Think community parks, the air we breathe, open-source software, etc. We're at a point where individual communities are choosing what constitutes a public good, and a vast array of definitions are emerging.

[1] <https://research.protocol.ai/blog/2022/what-are-public-goods-and-commons/>

[2] <https://support.gitcoin.co/gitcoin-knowledge-base/gitcoin-grants/general-questions/what-are-public-goods>

[3] <https://www.belfercenter.org/publication/fostering-digital-commons-internet-native-experiments-sustainable-open-source-software>

[4] https://edisciplinas.usp.br/pluginfile.php/6829184/mod_resource/content/1/Elinor_Ostrom_1999.pdf

[5] <https://www.coindesk.com/consensus-magazine/2023/02/23/ethereums-regens-tend-to-ethereums-public-goods/>

[6] <https://publicgoods.network/>

3.2 We Need a Definition as Disputes Arise

Essentially, as a meme, public goods have been quite successful, becoming a focal point of the Ethereum community's attention. However, its definition remains somewhat vague. The most common understanding of public goods is that they are "non-competitive" and "non-exclusive." But we also know that such goods are rare in real life. In fact, when Vitalik proposed the concept of the "revenue-evil curve," he wasn't specifically referring to "public goods" but rather to a broad

spectrum that exists between public goods (provided by governments or similar entities) and private goods (provided by markets).[7]

When it comes to identifying "public goods" for a particular community or nation, it can be relatively straightforward and doesn't necessarily require getting entangled in the notions of "non-competitive" and "non-exclusive." It's evident, for example, that defense resources are public goods for a community or nation. However, in an era discussing "Global Public Goods," public goods for one community or nation can become exclusive to another.

Furthermore, if we have a sum of money and want to allocate it to "public goods" projects within the Ethereum community, how should we evaluate these projects? How can we allocate resources more effectively? The Ethereum community also has these concerns.[8]

3.3 Developments in Modern Public Goods Theory

Perhaps we can gain some insights from academic research.

Samuelson is considered the creator of modern public goods theory. However, a closer look at the history of the modern concept of "public goods" tells us that the "non-competitive" and "non-exclusive" characteristics of public goods, after their introduction, faced controversy. Samuelson himself adjusted this definition at times. In Eleanor Ostrom's more macroscopic narrative of the academic context, Samuelson's concept of public goods is built upon binary frameworks of public goods/private goods, state/market, and assumptions about purely rational individuals. Subsequent scholars have been expanding the understanding of "public goods" and the complexity of human behavior. Eleanor Ostrom herself provided a more flexible and continuous model:

		Subtractability of Use	
		High	Low
Difficulty of Excluding Potential Beneficiaries	High	Common-pool resources: groundwater basins, lakes, irrigation systems, fisheries, forests, etc.	Public goods: peace and security of a community, national defense, knowledge, fire protection, weather forecasts, etc.
	Low	Private goods: food, clothing, automobiles, etc.	Toll goods: theaters, private clubs, daycare centers

Figure 1. Four types of goods. Source: Adapted from E. Ostrom, 2005: 24.

Most importantly, if we approach from the perspective of human behavior rather than from theoretical assumptions, we will see the complexity of specific situations:

“When engaging in extensive fieldwork, one encounters a vast diversity of situations where humans interact. For example, riding as an observer in a patrol car in the central district of a large American city at midnight on a Saturday evening presents different patterns of human interaction than what one might observe in a suburb on a weekday afternoon when school is letting out. In both scenarios, one witnesses the production of a public good - local safety - by an official of local government. The people involved in each situation vary in terms of age, sobriety, their reasons for

being there, and their objectives. This context influences the strategies of the police officer being observed[10]."

As Ostrom mentioned, even public safety, a public good often perceived as universally applicable, is not inherently non-exclusive or non-competitive. In specific contexts, people's perception of a "public good" varies. The nature of a good is not inherent in the good itself; rather, it is institutionally determined[11].

[7] https://vitalik.ca/general/2022/10/28/revenue_evil.html

[8] <https://twitter.com/koeppelmann/status/1636288094180634624>

[9] <https://doi.org/10.1017/S105383720000941X>

[10] https://www.nobelprize.org/uploads/2018/06/ostrom_lecture.pdf

[11] <https://csgs.kcl.ac.uk/elinor-ostrom-and-the-contestable-nature-of-goods/>

3.4 How Do We Understand Public Goods?

In academia, the concept of "public goods" remains numerous and possibly contradictory, as it is in web3. In a recent video, Vitalik mentioned that public goods have a specific "scope" [12]. This statement is still relatively vague. We currently do not have the ability to provide a "definition." However, in this report, we also want to propose several reference points to help the Web3 community understand public goods and promote thinking and discussion about public goods in the ecosystem.

Our considerations are as follows:

- We hope to provide a concept that is less controversial and as comprehensive as possible of various viewpoints.
- We will first consider the significance of this definition or understanding for the builders of public goods in Web3.

Based on that, two points we could take into considerations: Increasing Returns and Positive Externalities

Increasing Returns

The definition of public goods takes a different approach in the famous paper "A Flexible Design for Funding Public Goods" authored by Vitalik Buterin, Zoë Hitzig, and E. Glen Weyl:

By "public good," we refer to any activity with increasing returns in the sense that the socially efficient price to charge for the activity (marginal cost) is significantly below the average cost of creating the good.[13]

This article is highly relevant to the rise of public goods funding in Ethereum. Unlike the common non-excludable and non-rivalrous framework, this definition expands the scope of public goods by defining them based on the contradiction between the increasing returns of goods and their marginal cost. The original text does not delve into the details of this definition, but it has

complexities in theory or limited practical applicability (Glen Weyl's understanding of increasing returns seems broader [14], [15]). This report doesn't go into depth about this definition.

Positive Externalities

The concept of "externalities" is closely related to market failures and serves as a fundamental basis for government intervention in markets [16]. The provision of public goods aims to address the negative externalities that result from market failures, and providers of public goods are often seen as "the government." However, governments do not always naturally provide "public goods," just as markets can fail, governments can fail as well [16].

Compared to negative externalities, there is relatively less discussion in academia about positive externalities [17], even though these externalities are precisely what public goods provide—spillover effects that generate increasing returns. Meanwhile, existing institutions lack incentives and protections for positive externalities [18].

We believe that "externalities" are a more intuitive description of public goods compared to increasing returns [19]. Every individual's actions produce externalities, and public goods need to create positive externalities. We also believe that the scope of these positive externalities can vary.

Many large tech companies often have narratives of "making the world a better place," and they frequently have dedicated departments to construct and promote these narratives. However, what they create is not public goods: if we rely on scraping user privacy, money generated through hierarchical management structures to engage in philanthropy, these "positive externalities" are built on a foundation of "negative externalities," and they do not have to bear responsibility for or fulfill their obligations regarding these negative externalities—if we value privacy, dignity, and equality. We cannot accept this form of "do gooder" because both the process and outcomes are equally important.

Many public goods in Web3 are designed for the "public" within their ecosystems, and we often see related doubts or expressions. Here, we don't intend to say that they are not public goods. We assess public goods based on two criteria:

- Whether an activity can generate positive externalities (with a range of different positive externalities).
- Whether an activity produces negative externalities or avoids its responsibility for negative externalities (or whether it can mitigate negative externalities through negotiation and dialogue).

Hence, in this report, **if an activity can create some "positive externalities" and does not harm the public (where the public refers to human society), we consider it a form of public good.**

How to assess and measure externalities? In this report, we are not equipped to address this issue. We are attempting to promote a consensus on "public goods" and keep it open for the community and further research to broaden the current boundaries.

[12] <https://www.youtube.com/watch?v=OH3dPShZwag>

[13] <https://doi.org/10.1287/mnsc.2019.3337>

[14] <https://www.radicalxchange.org/media/blog/2019-01-14-j73qnz/>

[15] <https://www.radicalxchange.org/media/blog/2019-12-30-gqx4th/>

[16] <https://doi.org/10.1017/S0265052509090190>

[17] <https://scholarship.law.wm.edu/cgi/viewcontent.cgi?article=3450&context=wmlr>

[18] <https://www.econstor.eu/handle/10419/32240>

[19] *We adopt the definition of externalities as per Mankiw (Principles of Economics, 6th Edition): An externality is the effect of one person's actions on the well-being of a bystander. Positive externalities arises from activities that yield benefits to parties who do not pay to receive them, while negative externalities as arising from an actor's behavior that imposes a cost on someone else, for which the actor does not pay.*

04

The Significance of Public Goods in Web3

Web3, as a new paradigm, is reshaping our understanding of the internet and digital assets. In this paradigm, public goods play a crucial role. Compared to traditional public goods, those in Web3 have more layered extensions and connotations. They not only provide a foundation for the Web3 ecosystem but also endow it with profound cultural and technological significance.

4.1 Public Goods as the Basis of Trust

Blockchain Transparency and Immutability

- In a digital world filled with uncertainties, **trust becomes a scarce resource**. Through blockchain technology, Web3 offers a transparent and immutable foundation for public goods. Every transaction, every execution of a smart contract is permanently recorded, forming an open, verifiable history. This represents not just a technological revolution but also a significant innovation in humanity's mechanisms of trust.
- Public goods in the Web3 ecosystem, such as public blockchains and smart contracts, are all based on blockchain technology. Every transaction, every execution of a smart contract is recorded on the blockchain, accessible and verifiable by anyone. This transparency provides a basis of trust for Web3 public goods, allowing users to participate and use them with confidence[20].
- In public procurement, for example, blockchain technology has been proposed to enhance efficiency, convenience, and transparency[21]. This transparency provides a solid foundation of trust for public goods, enabling more development of public goods in the Web3 ecosystem.

4.2 Enabling Unpermissioned Access to Web3

Enforced through Cryptographic Protocols

- In the traditional centralized world, many resources and services are restricted, accessible only to a few. However, in the world of Web3, public goods ensure equal access to resources and services for everyone. This unpermissioned nature not only demonstrates the power of technology but also reflects a deep pursuit of freedom and equality.

- This means that anyone can participate in the network without needing centralized approval or verification. Such openness provides a level playing field for developers, businesses, and individuals globally, enabling them to freely create, communicate, and collaborate. In traditional centralized networks, permissions and identity verification are usually controlled by centralized entities, potentially leading to power concentration and abuse. However, in the world of Web3, this power is decentralized through cryptographic protocols and smart contracts, making the network more democratic and decentralized.
- The unpermissioned nature of Web3 public goods, another key feature, ensures that anyone can participate in the Web3 ecosystem without needing permission from centralized institutions. This unpermissioned nature is enforced through cryptographic protocols, ensuring the openness and inclusivity of Web3 public goods[22].
- **In this unpermissioned environment, trust becomes an intrinsic attribute, not something imposed by external institutions. This trust is based on mathematics and cryptography, not centralized authority.** This shift creates a more open, transparent, and fair environment in the Web3 ecosystem, enabling innovation and collaboration.

4.3 The Complexity of Web3 Public Goods

The ecosystem of public goods in Web3 presents an unprecedented level of complexity. This complexity arises not only from technological advancements but also from the decentralized, open, and global nature of Web3.

Transformation Among Various Goods

- In the Web3 ecosystem, there is a complex transformational relationship between public goods. This complexity poses not only a technological challenge but also prompts a profound reflection on human organization and collaboration methods. Tokens, smart contracts, DAOs, DApps, and other forms of digital assets and services can transform and call upon each other.
- For example, a smart contract can create a new token, which can then be used for voting or decision-making in a DAO. This interconnectivity and transformation create limitless possibilities for the Web3 ecosystem, providing more potential and flexibility, but also significant complexity. Each transformation or interaction can introduce new risks and challenges[23].

Lack of Centralized Coordination of Resources

- *Decentralization is one of the core features of Web3. Ideally, decentralization ensures that resources are not concentrated in centralized institutions. However, in reality, what is often observed in Web3 organizations (especially communities) is more of a multi-centric, multi-nodal characteristic. This means that even in establishing Web3 public goods, complete decentralization is often not yet well realized, making the coordination and distribution of resources more complex.*
- This decentralized characteristic offers greater freedom and flexibility for public goods but also brings challenges in coordination and governance. **Without centralized institutions, ensuring effective resource utilization, preventing paradoxical behaviors, achieving fair distribution, and shared interests become key issues facing Web3 public goods.** This requires not only technological support but also deep human societal contemplation about cooperation and fairness. This is both a challenge and an allure of Web3 public goods[24].

- For instance, blockchain technology has been proposed to improve decision-making processes to more accurately capture individual and collective interests, thereby better serving the public interest[25].

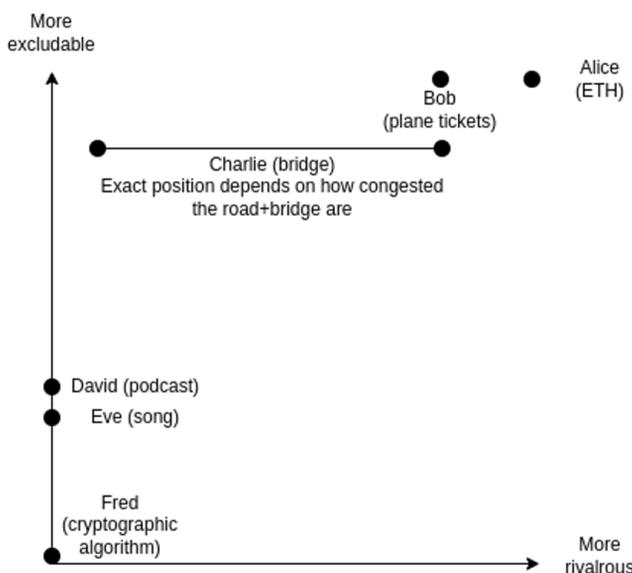
Diversity and Interoperability

- Another notable feature of Web3 public goods is their diversity. From various public blockchains to a range of DApps, to different tokens and assets, the Web3 ecosystem is filled with diversity. This diversity offers a wealth of choices to users and developers but also poses challenges in interoperability. Ensuring smooth interaction and collaboration between different public goods, avoiding the "island effect" and fragmentation, are issues that need to be addressed in Web3 public goods.

4.4 Monetization of Public Goods (The Revenue Evil Curve)

The Revenue Evil Curve

The Revenue Evil Curve is a research method and tool proposed by Vitalik Buterin (2022) for analyzing the potential harm of different monetization strategies on public goods. **This curve describes how much harm creators of a product need to inflict on potential users and the broader community to generate a certain amount of revenue.**



For example, a public good like Wikipedia can generate revenue through advertising, but this might harm its user experience and neutrality. Therefore, we need to balance the benefits of monetization with potential harm to determine the optimal fundraising strategy (7).

In the world of Web3, this balance is especially important because public goods like tokens, smart contracts, and DAOs all have their unique monetization strategies and challenges. We need to find a way to fund the development of these public goods without compromising their public nature and value.

Harm to Public Goods from Monetization:

- *With the development of the Web3 ecosystem, the monetization of public goods has become a hot topic. This monetization is often achieved through tokenization, where tokens can represent value or rights and are traded in the market. **However, this monetization may lead to a distortion of the value of public goods, making them more dependent on market forces than their intrinsic social value.***
- When public goods are monetized, they may be subject to market influences, leading to changes in their value. These changes may pose a threat to the long-term stability and sustainability of public goods. This is not just an economic issue but also a philosophical question about the nature, value, and significance of public goods.
- For example, funding public goods through fees, advertising, or other commercial strategies may reduce their value or make them no longer truly public goods [26].

Who Can Share the Benefits of Public Goods (Token Holders/Community Members):

- In the Web3 ecosystem, the distribution of benefits from public goods is an important issue. With the rise of the token economy, the relationships between token holders and community members are becoming increasingly complex. This complexity requires a new governance model to ensure the fair and transparent distribution of benefits from public goods.
- Both token holders and community members are important participants in public goods, and they should fairly share the benefits of public goods. But this raises a question:
 - how to ensure this fairness?
 - Who should share these benefits? Is it token holders or all community members?
- In this environment, the role of the community becomes particularly crucial. The community is not only a consumer of public goods but also its producer and maintainer. Therefore, defining and measuring the contributions of each participant to ensure that community members can fairly share the benefits of public goods is a core challenge in the Web3 ecosystem.

[20] Ducreé, J., Gravitt, M., Walshe, R., Bartling, S., Etzrodt, M., & Harrington, T. (2020). [Open Platform Concept for Blockchain-Enabled Crowdsourcing of Technology Development and Supply Chains](#).

[21] [A Framework for the Adoption of Blockchain-Based e-Procurement Systems in the Public Sector](#)

[22] Subramanian, H., & Subramanian, S. (2021). [Improving Diagnosis Through Digital Pathology: Proof-of-Concept Implementation Using Smart Contracts and Decentralized File Storage](#).

[23] Pirker, D., Fischer, T., Witschnig, H., & Steger, C. (2021). [velink - A Blockchain-based Shared Mobility Platform for Private and Commercial Vehicles utilizing ERC-721 Tokens](#).

[24] Elmay, F. K., Salah, K., Jayaraman, R., & Omar, I. A. (2022). [Using NFTs and Blockchain for Traceability and Auctioning of Shipping Containers and Cargo in Maritime Industry](#).

[25] [Using Blockchain to Improve Decision Making That Benefits the Public Good](#)

[26] Vitalik Buterin. (2022). The Revenue-Evil Curve: a different way to think about prioritizing public goods funding. https://vitalik.ca/general/2022/10/28/revenue_evil.html

As discussed earlier, by retracing the concept of public goods from traditional economic theory, we explore the notion and understanding of public goods in Web3. On this basis, we attempt to redefine and reinterpret public goods in Web3. So, how do we determine whether a Web3 project or asset is a public good?

If we consider the dimensions of exclusivity and rivalry, pure public goods are rare. However, both funders and project teams need to determine what constitutes a public good: to better facilitate funding and to obtain funding. In his description of the "revenue-evil curve," Vitalik Buterin uses exclusivity and rivalry as important conceptual tools, categorizing funding priorities into four types:

- Public goods that are completely non-rivalrous and have no value capture mechanism that affects their non-exclusivity (artificially creating exclusivity, such as through charging fees, would lead to waste);
- Public goods that are completely non-rivalrous and can capture value without affecting their non-exclusivity (like a podcast earning advertising revenue);
- Goods that are somewhat rivalrous but can be subsidized to reduce excessive fees (thereby achieving optimal social benefits);
- Goods that can be fully regulated by the market, which do not require funding and should be treated as private goods.

Therefore, exclusivity and rivalry serve as important criteria.

- **Exclusivity:** If the use of a good does not exclude others from using it, it is non-exclusive. In the context of Web3, many decentralized applications (DApps) and protocols are open-source, meaning anyone can access and use them without excluding others. For example, ENS, as a decentralized naming system, allows anyone to register and use domain names without excluding others[27].
- **Rivalry:** If the use of a good reduces its availability for others, it is rivalrous. In the context of Web3, many assets and services are non-rivalrous. For example, when someone votes on fund allocation in Vita DAO, it does not diminish other members' right to vote[28].

However, as mentioned, public goods in Web3 remain a somewhat vague concept; some projects still identify themselves as public goods even if they charge fees (have exclusivity). This means that in addition to non-exclusivity and non-rivalry, we need more effective ways to determine public goods.

Determining based on the presence of positive externalities

- **Positive Externalities:** When the consumption of a good or service benefits not only the consumer but also others, it has positive externalities. In Web3, many projects and protocols generate positive externalities for the whole community. For example, when Vita DAO invests in a health research project, it benefits not only the participants but could also have long-term benefits for

the entire community and human health[28]. Certain goods might charge fees but contribute to the prosperity of the entire ecosystem, such as charging for oracle services. People may not be angry about paying taxes; what frustrates them is not seeing better outputs from their taxes. Therefore, charging fees to maintain positive externalities and sustainability might occur in some public goods, such as Chainlink mentioned in this report.

Determining based on the degree of decentralization

- If the public cannot decide the production of public goods, why are such goods “public”? The governance and production of public goods should be decentralized to avoid single points of failure, maintain system security, and prevent the tyranny of the majority.

Vitalik Buterin's reference to the “revenue-evil curve” in his paper further emphasizes the importance of public goods in Web3[29]. As revenue increases, the value of public goods may decrease, implying the need for more public goods to maintain community health and prosperity. This also underscores why it is crucial to ensure that Web3 projects and assets are non-exclusive, non-rivalrous, decentralized, and have positive externalities.

[27]: [ENS: Decentralized Naming for Wallets, Websites, & More](#)

[28]: [VitaDAO: A new funding mechanism for longevity research](#)

[29]: Buterin, V. (2018). On Radical Markets. [Link](#)

06

Current Web3 Public Goods Ecosystem

Classifying Public Goods and Selecting Cases

Bitcoin opened the door to Web3, and more and more Web3 products are being implemented in various scenarios, including finance, gaming, social interaction, and even new forms of collaboration and resource distribution. Web3 has evolved into a complex ecosystem. In this complex ecosystem, there are no centralized institutions to allocate and coordinate resources. Instead, decentralization is the way forward.

In this process, openness and transparency are the best ways to gain trust. On the blockchain, data, code, and governance processes are visible to everyone, inadvertently giving many products the characteristics of public goods. It can be said that public goods form the foundation of Web3.

Due to the complexity of the Web3 ecosystem, it is challenging to classify public goods accurately. In this report, we categorize public goods into upstream, midstream, and downstream. Upstream includes the infrastructure of Web3, such as public chains, storage, developer-related tools, and their corresponding code. The midstream includes middleware and services, while the downstream consists of applications that interact directly with end-users.

In this case analysis, we will start from the attributes of public goods and the selected scope will cover upstream, midstream, and downstream. We will try to choose public goods with significant influence in each category. The assessment of influence will refer to Gitcoin grants, RetroPGF, and public goods invested in by mainstream investment institutions.

In this report, we will analyze some public goods as objectively as possible to present the diversity in the field of public goods.

6.1 Upstream

6.1.1 geth

Category

Infrastructure, Open-source

Introduction

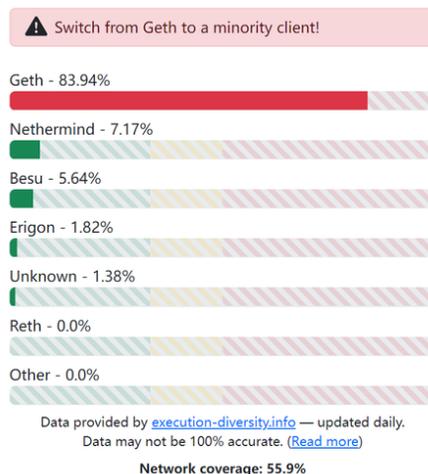
Geth is an implementation of the Ethereum protocol execution layer, widely used in the Ethereum network. Geth includes many built-in tools, which can be used not only to run nodes but also as developer tools, such as accessing blockchain networks, managing accounts, and more.

Development of Geth started in 2014[32], and it has always been the official client implementation of Ethereum. Before Ethereum transitioned to PoS, Geth could run directly as an Ethereum node. After the consensus layer transitioned to PoS, Geth needs to run an Ethereum node in conjunction with the consensus layer client.

User Base

On GitHub, the Geth code repository has more than 43k followers. In the Ethereum network, there are over 850,000 validators, and over 80% of the nodes use Geth as the execution layer client. [30,31]

Execution Clients



Funding Sources

Funded by the Ethereum Foundation and the first two rounds of RetroPGF.[34,35]

Openness and Permissionlessness

Geth's code is entirely open-source, allowing anyone to use Geth to connect to Ethereum network nodes or deploy their own blockchain network without any restrictions or the need for permission.

Non-Exclusivity

Anyone can access all of Geth's code directly. One person gaining access to the code doesn't impact others' access, making it highly non-exclusive.

Non-Competitiveness

The use of Geth's code by one person doesn't degrade the availability or experience of others. In fact, it contributes to Geth's improvement, demonstrating a high degree of non-competitiveness.

Degree of Decentralization

Geth's code is an implementation of the Ethereum protocol, and the entire community contributes to the improvement and optimization of the Ethereum protocol. Individual or single organizations find it challenging to directly influence Geth's development direction.

Contributor Incentives

Currently, core developers receive incentives from the Ethereum Foundation. For other contributors, there isn't a clearly defined incentive structure. However, due to Geth's prominence, those who participate in contributing to Geth can gain influence. This follows the operational model of traditional open-source projects. Geth receives funding to maintain project operations from the Ethereum Foundation and offers services to the community in a completely non-profit manner.

Externalities

In the current EVM ecosystem, besides Ethereum, layer2 solutions, and EVM-compatible side chains or related off-chain solutions also use Geth. On GitHub, the number of public repositories referencing Geth's code has reached 15,000[33]. If private repositories are included, this number would be even higher.

Geth has been instrumental in providing a stable Ethereum client, driving the Ethereum ecosystem and offering the necessary features and tools for creating and deploying DApps. It has further promoted the widespread adoption and application of the Ethereum ecosystem. Geth's active ecosystem enables rapid responses to emerging issues, creating a positive feedback loop between developers and users, which, in turn, leads to wider adoption of Geth.

However, Geth's immense popularity has also brought some potential risks to the Ethereum network. If issues arise in Geth's code, it could potentially pose security risks to the entire Ethereum network.

Dependency graph

Dependencies Dependents [Export SBOM](#)

Repositories that depend on github.com/Ethereum/go-ethereum

14,691 Repositories 7,758 Packages [Owner](#)

[unicornultrafoundation](#) / [go-u2u](#) github.com/unicornultrafoundation/go-u2u ☆ 0 🗑️ 0

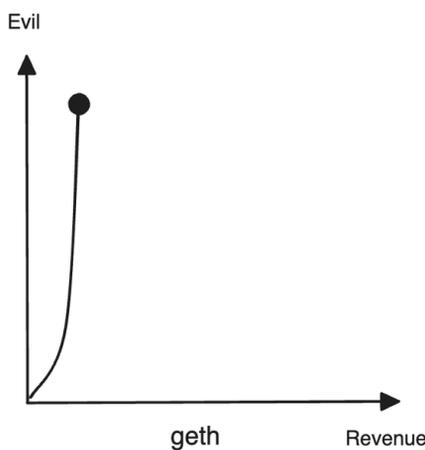
Sustainability

Geth itself does not have a revenue-generating model and relies primarily on funding from the Ethereum Foundation. As open-source software, it is practically impossible to achieve sustainability through a paid model. If Geth were to start charging, it would need to shift to a closed-source model, leading users to migrate to alternative client implementations.

Using the Vickrey-Clarke-Groves (VCG) revenue curve, it becomes evident that Geth has a low degree of monetization. The best approach is to maintain openness and seek increased funding for the project.

Revenue-Evil Curve

Geth's code is entirely open-source, and open-source is a necessity. If the code were to begin charging for use or seek patents, it would likely deter users from utilizing the Geth code. Geth has very few monetization options, and each choice comes with a high cost, resulting in an incredibly steep revenue-evil curve for Geth.



Prospects and Challenges

Currently, Geth holds a majority share in the Ethereum execution layer implementation, with over 80% usage. If we consider the broader EVM ecosystem, this percentage could be even higher. For nodes in the Ethereum network, switching clients comes with high costs, involving the migration of

funds and data, potentially introducing security risks. As long as Geth continues to provide an excellent user experience, there is little motivation for users to switch.

The Geth community is vibrant, and it is likely to remain competitive in the future. However, while a substantial market share is advantageous for Geth, it is not ideal for the Ethereum network as a whole. If Geth's code encounters issues, it could potentially pose significant problems for the Ethereum network. The Ethereum Foundation and the community have recognized this issue and are actively encouraging client diversity to enhance network security. This might reduce Geth's usage share, but it won't diminish its position in the ecosystem.

[30]<https://clientdiversity.org/#distribution>

[31]<https://mainnet.beaconcha.in/>

[32]<https://github.com/ethereum/go-ethereum/tags?after=0.3.0>

[33]<https://github.com/ethereum/go-ethereum/network/dependents>

[34]<https://docs.google.com/spreadsheets/d/13QTvuv4HTTDBctRxuqngECUMc70QP4usbmcFT8XT-GI/edit#gid=583271201>

[35]https://docs.google.com/spreadsheets/d/1g4ilABymNQsmIBC8cskQip7Ojd_qK6lhozICyoVfU9k/e-dit#gid=617544496

6.1.2 IPFS

Category

Storage Infrastructure

Introduction

IPFS is a protocol set for organizing and transmitting data, utilizing peer-to-peer (P2P) networking and content addressing. There are many implementations of IPFS, and anyone can set up an IPFS node and connect it to the IPFS network. All nodes connected to the network can publish data in a decentralized manner[36].

It's important to note that IPFS is a set of protocols; it does not provide storage or services itself. Anyone can use this protocol to develop software (for example, kubo is an implementation of IPFS) and then join the IPFS network[37].

Once connected to IPFS, data can be stored within this network, with each uploaded piece of data receiving a unique Content Identifier (CID).

User Base

Active Contributors: 2000+

Independent Node Count: 280,000+

CID Count: 1 billion+

Funding Sources

IPFS is a product under Protocol Labs. It was initially backed by Y Combinator (YC) and later led to the establishment of Protocol Labs, which released products like Filecoin and libp2p. [38, 39]

Openness and Permissionlessness

IPFS is a completely open network, requiring no permission to join or use.

Non-Exclusivity

IPFS is open to everyone, and there are no restrictions preventing specific individuals or organizations from joining the IPFS network. It boasts a high degree of non-exclusivity.

Non-Competitiveness

IPFS is a fully decentralized network, allowing anyone to publish or access content without impacting others' user experience. In fact, additional nodes improve the user experience, making it highly non-competitive.

Degree of Decentralization

The IPFS network is highly decentralized, with no requirement for permission to join. Additionally, participants can contribute to the improvement of the IPFS protocol, aligning perfectly with the principles of Web3.[40,41]

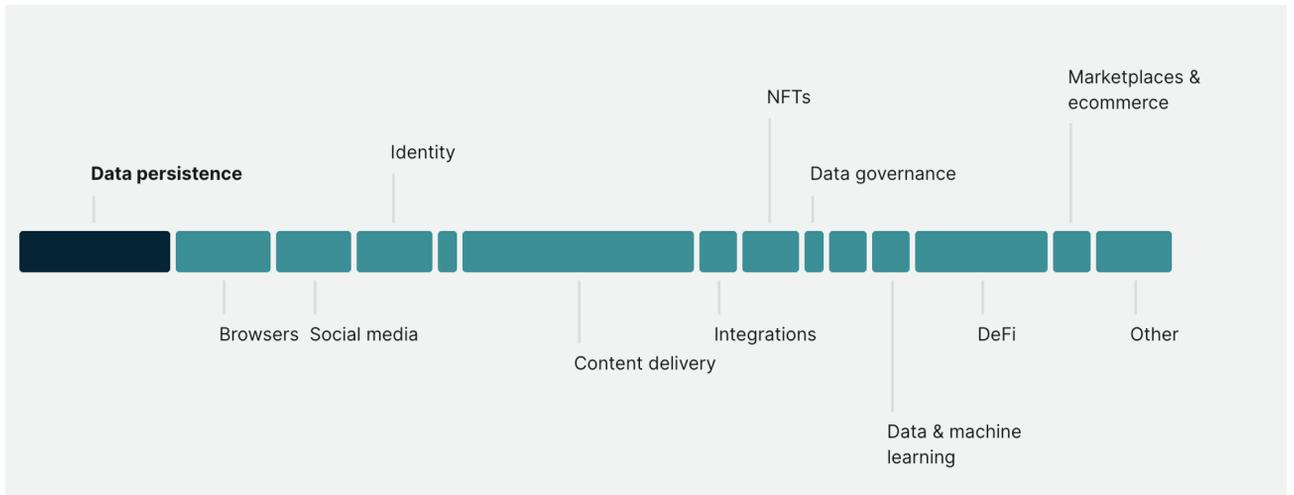
Contributor Incentives

IPFS is a protocol designed by Protocol Labs and is entirely open-source. Anyone can contribute improvements to this protocol and join the network as a node. However, IPFS itself lacks any incentives for its ecosystem contributors. This issue results in the instability of IPFS storage nodes, with the potential for data loss.

To address this problem, Protocol Labs designed Filecoin as an incentive layer for IPFS. Users are required to spend Filecoin tokens to store data, and data nodes earn income by storing this data, creating a positive feedback loop.[44]

Externalities

IPFS offers a decentralized storage solution, reducing the costs of data storage and sharing. Users don't need to pay expensive server rentals or bandwidth fees. Furthermore, due to decentralized storage, data is less vulnerable to attacks and loss, enabling easy access and sharing. Many projects in Web3 have already adopted IPFS for data storage[42].



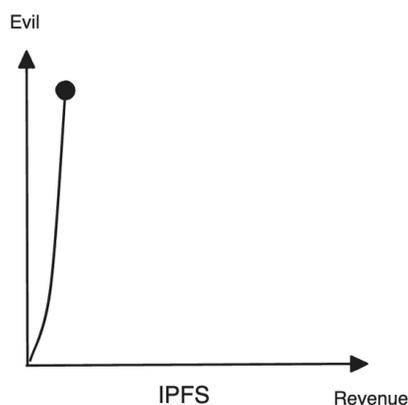
Sustainability

As a protocol, IPFS itself has a very low degree of monetization. Judging by the revenue-evil curve, it's among the projects that should receive funding. Charging for the IPFS protocol could quickly lead to a loss of users.

Protocol Labs indirectly ensures the sustainability of IPFS through Filecoin. As long as Filecoin forms a positive loop with users, resources can continue to be allocated to IPFS.

Revenue-Evil Curve

IPFS is an open-source protocol, and there are limited monetization options available. It needs to remain open-source to gain user trust, as charging or pursuing patents would lead potential users to reject it. Regardless of the approach, the cost would be prohibitively high.



Prospects and Challenges

IPFS is the most successful case in the field of decentralized storage and is the preferred choice for data storage in many Web3 projects. For example, many NFT projects choose to store their data on IPFS. However, IPFS also faces several challenges that need to be addressed for its long-term success:

- **Node Incentives:** Data stored on nodes might be lost forever if it isn't synchronized with other nodes. With Filecoin's support, a positive feedback loop can be established between users and

IPFS node maintainers. Without the incentive layer provided by Filecoin, IPFS nodes might lack the motivation to continue offering storage capacity.

- Privacy Concerns: Data on IPFS is visible to everyone, and if the data isn't encrypted, privacy breaches can occur. Moreover, as more people access a file, it remains on IPFS for a longer time. Even if data is encrypted, there is still a possibility of it being decrypted.
- Data Ethics: Anyone can publish data on IPFS, leading to potential malicious publications of explicit content, violence, inappropriate political or religious content, and even copyright issues. The IPFS protocol itself can't address these problems.
- Performance Issues: IPFS lags significantly behind traditional file systems in terms of transfer efficiency, speed, and retrieval and requires further optimization.

[36] <https://ipfs.tech/>

[37] <https://github.com/ipfs/kubo>

[38] <https://www.ycombinator.com/companies/protocol-labs>

[39] <https://www.rootdata.com/Projects/detail/Protocol-Labs?k=MzQxMA%3D%3D>

[40] <https://discuss.ipfs.tech/latest>

[41] <https://github.com/ipfs/ipfs>

[42] <https://ecosystem.ipfs.tech/>

[43] <https://www.youtube.com/watch?v=pXRr6X12nLQ>

[44] <https://filecoin.io/zh-cn/blog/#posts>

6.1.3 Foundry

Category

Development Tools; Open-source

Technical Dependencies

Foundry is a rewrite of the open-source Ethereum testing framework DappTools[45].

User Base

Foundry's GitHub repository has 6.8K stars, surpassing Hardhat (6.3K)[46].

Introduction

After several months of effort by the Paradigm team, Foundry was launched in December 2021. It is a toolkit for Ethereum application development[47].

User Base

It is safe to say that Foundry is one of the most popular toolkits for Ethereum application development. Foundry is often compared to Hardhat, which is considered the most widely used development toolkit in this field ([48], [49]).

Funding Source

The development team behind Foundry comes from the well-known cryptocurrency venture capital firm Paradigm. Participants include Paradigm's CTO, Georgios Konstantopoulos[50].

Openness and Non-Exclusivity

Foundry is a typical FLOSS (Free/Libre and Open Source Software). Despite being developed by a commercial company, it is open-source and can be studied, modified, and customized by users. As free software, the exclusivity and competitiveness of Foundry can be negligible.

Degree of Decentralization

Anyone can fork Foundry's code repository and create their own version, making Foundry highly decentralized.

Contributor Incentives

The core development team of Foundry comes from Paradigm, so it can be speculated that the development of this product is financially supported by Paradigm.

Foundry is essential infrastructure in Ethereum, so contributors receive recognition from the open-source community.

Externalities and Sustainability

As an open-source tool, the Foundry toolkit offers many conveniences to Ethereum developers and is one of the most popular developer toolkits in the field. Therefore, Foundry's GitHub repository is highly active, creating a virtuous cycle.

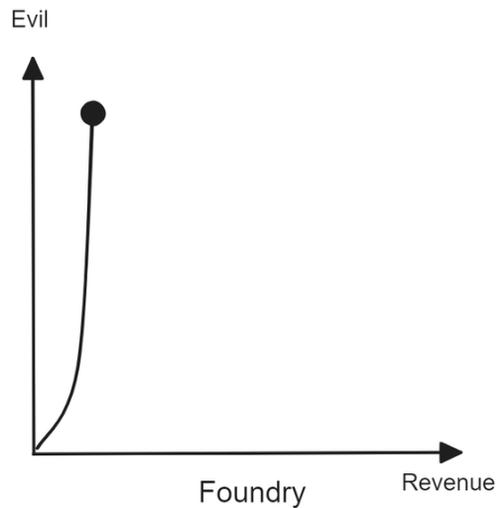
Moreover, Foundry is an open-source tool developed by the company Paradigm, which is financially strong and resource-rich.

Therefore, Foundry exhibits a strong level of sustainability.

Revenue-Evil Curve

As a software toolkit, Foundry's marginal production costs can be negligible, and for developers, it provides high utility (as mentioned earlier, Foundry is currently one of the most popular development toolkits). Charging users for revenue would introduce exclusivity, leading to the waste of knowledge resources.

In the revenue-evil curve model, Foundry belongs to the category that is very close to "pure public goods" and should be prioritized for funding. Foundry itself is a good example of this: it was developed with investment from a leading company in the industry and is offered for everyone's use as free software.



Prospects and Challenges

In comparison to other software toolkits, Foundry quickly joined the top ranks. With the development of Ethereum and an increasing number of developers entering the space, there is reason to believe that Foundry's influence will further expand, and developer engagement and improvement of this public infrastructure will become more active.

[45] <https://github.com/dapphub/dapptools>

[46] <https://github.com/foundry-rs/foundry>

[47] <https://www.paradigm.xyz/2021/12/introducing-the-foundry-ethereum-development-toolbox>

[48] <https://twitter.com/gakonst/status/1538201417764089856>

[49] <https://ethereum.stackexchange.com/questions/143171/hardhat-vs-foundry-which-to-use-for-testing#:~:text=The biggest difference is that,tests run a lot faster>

[50] <https://twitter.com/gakonst/status/1468397058801299460>

6.1.4 Code4rena

Category

Decentralized Security Auditing

Introduction

Code4rena is a decentralized security auditing platform designed to be a fair and just system. It treats every code audit as a competition, offering a prize pool for each audit, which any security expert can participate in to win rewards. The Code4rena platform consists of three roles: Sponsors,

Wardens, and Judges. Wardens discover vulnerabilities, Judges assess the quality and security level of the discovered vulnerabilities, and generate the final report.[54]

Compared to traditional audit companies, a project gets more attention from individuals, increasing the likelihood of discovering vulnerabilities. Furthermore, Code4rena encourages teamwork, allowing the sharing of rewards even if someone reports a vulnerability already discovered by another participant.[55]

User Base

Over 5,000 registered users, with over 260 projects audited.[55]

Funding Sources

Token issuance: Total supply of 1 billion tokens.[53]

Investment: Paradigm acquired 15% of \$ARENA tokens in exchange for \$6 million USDC.[51,52]

Openness and Permissionlessness

Code4rena is a decentralized security auditing platform where audited projects and generated data are open to everyone without requiring any permission.

Non-Exclusivity

The platform's non-exclusivity varies for the three roles:

- For Sponsors, they can publish their own code on Code4rena, match it with an appropriate prize pool, and apply without exclusivity to other project sponsors.
- For Wardens, they need to complete registration and verification on Discord, and their registration doesn't exclude other Wardens.
- Each audited project requires a Judge, and Judges are voted on by the community. There are certain influence requirements for Judges, so this role has a higher level of exclusivity.

Non-Competitiveness

In terms of competitiveness, different roles on Code4rena have varying degrees:

- Sponsors may face competition on the same project since discovered vulnerabilities directly impact the prize they receive.
- For Wardens, the projects they publish are independent of each other and do not lead to competition.
- Each Judge is individually responsible for auditing a project, avoiding competitiveness.

Degree of Decentralization

The initiation of project publication and audits on the Code4rena platform comes from the community but goes through a Code4rena platform review. While this is done to maintain the platform's project and auditor quality, it affects decentralization to some extent. Additionally, Code4rena has completed token issuance, but the distribution and unlocking of tokens are not very transparent, which also affects its level of decentralization.

Contributor Incentives

The main contributors to the platform are the Wardens, who take most of the prize pool. They can earn different rewards depending on the severity of the vulnerabilities they discover.

```
Med Risk Shares: 3 * (0.9 ^ (findingCount - 1)) / findingCount
High Risk Shares: 10 * (0.9 ^ (findingCount - 1)) / findingCount
```

Rewards are calculated based on various criteria, including the vulnerability's CVSS score, which is widely used to determine the severity of security vulnerabilities. The higher the CVSS score, the more significant the reward.

Externalities

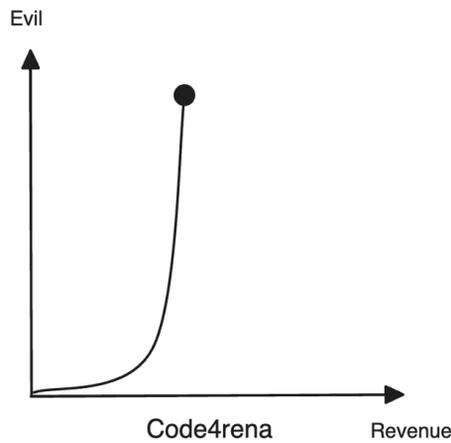
Code4rena's model is similar to open-source software in that the final audit data is publicly released and visible to everyone. This reduces the probability of the same errors occurring within the ecosystem, making the entire ecosystem more secure.[56] For Wardens, this is also a good opportunity to increase their influence and potentially leads to employment opportunities.

Sustainability

Each project on the Code4rena platform is settled individually, and all funds during the audit process are provided by the project's prize pool. In theory, as long as projects continue to be published on Code4rena, the platform can operate sustainably. Furthermore, it has completed token issuance and exchanged investment capital for tokens, providing diverse funding sources that ensure the platform's long-term viability.

Revenue Evil Curve

Code4rena already monetizes through taking a cut from the project's prize pool, which is necessary to support the operational work involved in the audit process. However, beyond this approach, there are limited additional monetization options. Offering a higher percentage share or charging auditors directly could be detrimental to the platform.



Prospect and Challenges

Many companies conduct security audits, but Code4rena has found a unique approach in decentralized audits, utilizing the power of the community to perform security assessments. In this model, Code4rena doesn't need to employ a large number of auditors and can still complete high-quality code audits, with the entire audit process being transparent and open.

However, Code4rena faces some challenges:

- Dealing with private projects: Not all project teams are willing to open their code for auditing. Various reasons, such as maintaining competitiveness or privacy, can make this challenging within Code4rena's current model.
- Increasing governance costs: With a growing number of projects on Code4rena, concurrent management of projects requires more governance effort. Hosting competitions and generating reports all involve manual labor and are difficult to automate. These challenges need to be addressed without compromising audit quality.

[51]<https://www.rootdata.com/Projects/detail/Code4rena?k=NTY0Ng%3D%3D>

[52]<https://www.tally.xyz/gov/code4rena/proposal/96186327433425569365693193851921659567593762025299955477992469488567283802379?chart=0>

[53]<https://polygonscan.com/token/0x6847d3a4c80a82e1fb26f1fc6f09f3ad5beb5222>

[54]https://www.geckoterminal.com/polygon_pos/pools/0xbc44b606fc6a7b700b1802f8a82eb11aba9100ed

[55]<https://github.com/code-423n4/org/discussions/36>

[56]<https://code4rena.com/contests/2023-10-ens#top>

6.2 Midstream

6.2.1 L2BEAT

Category

On-chain transparency, data analysis

Introduction

L2BEAT is a public good dedicated to on-chain transparency, primarily focusing on the Ethereum Layer2 space. In addition to providing data such as TVL and market share for various Layer2 solutions, L2BEAT assesses the security of these Layer2 solutions using the following framework. [57]:

Auxiliary Rollup: Evaluating the degree of human intervention required for Rollup projects. The less dependent a Rollup is on auxiliary components, the higher the level of decentralization and lower the risk, and vice versa.[58]

Layer2 Rollups are categorized into three levels:

- Stage 0: Complete dependency on auxiliary components, borderline Rollup. Currently, most Layer2 projects fall into this category.
- Stage 1: Limited dependence on auxiliary components, with an operational fraud proof. A few Layer2 projects are in this stage.
- Stage 2: No auxiliary components, and all Rollup processes can be executed automatically. A few Layer2 projects have reached this stage.

L2BEAT aims to become a fair and independent regulatory authority. In addition to conducting security assessments of various projects, L2BEAT actively participates in project governance, further developing transparent and secure solutions, and providing research reports based on their findings.[59]

User Base

Twitter followers: 26,000+

Funding Sources

- Gitcoin grants: \$72,338.37 (first 12 rounds)
- RetroPGF Round 1: \$15,892
- RetroPGF Round 2: 256,294.36 OP tokens
- Individual or institutional donations
- Investments

Openness and Permissionlessness

Access to L2BEAT's website and data does not require any permissions and can be freely accessed.

Non-Exclusivity

L2BEAT's data and reports are accessible to anyone and do not exclude specific individuals or organizations, demonstrating a high degree of non-exclusivity.

Non-Competitiveness

Access to L2BEAT's data and reports by one user does not affect the experience of other users, indicating a high degree of non-competitiveness.

Degree of Decentralization

L2BEAT operates in a corporate form, and the reporting and assessment levels are carried out internally and published by L2BEAT, reducing the level of decentralization in the process.

Contributor Incentives

L2BEAT's main contributors are company employees, and the specific incentive mechanisms are unknown.

Externalities

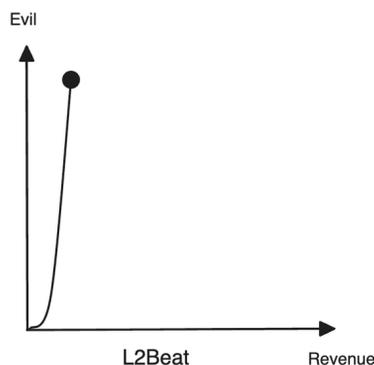
L2BEAT strives to provide accurate and reliable information, acting as an independent regulatory body to enhance on-chain transparency and uphold the maximum benefit of users and the ecosystem.

Sustainability

L2BEAT's data and assessment results have the potential for monetization. However, L2BEAT currently relies on donations and investments to sustain its operations, and the specific amount of investment received is unknown. No other sustainability methods have been identified at this time.

Revenue Evil Curve

L2BEAT's primary value lies in its fair and independent assessments. If it were to start charging regular users, they might turn to other platforms. Charging project teams could compromise its fairness and independence, thereby diminishing its most critical value. Considering these factors, L2BEAT has few monetization methods in place.



Prospects and Challenges

L2BEAT's greatest value lies in its objective evaluation of project teams, which can serve as a reference for other projects in their decision-making processes. To maintain its influence, L2BEAT must continue to uphold its fairness and independence. While it currently achieves fairness and

independence, it lacks institutional and governance mechanisms to ensure the continuity of these principles. Additionally, L2BEAT accepts donations from other organizations, which could potentially impact project assessments and the impartiality of evaluations.

[57]<https://l2beat.com/scaling/summary>

[58]<https://ethereum-magicians.org/t/proposed-milestones-for-rollups-taking-off-training-wheels/11571>

[59]<https://l2beat.notion.site/We-are-hiring-Work-at-L2BEAT-e4e637265ae94c5db7dfa2de336b940f>

6.2.2 Defillama

Category

Data Analysis

Introduction

Defillama is the largest Defi TVL (Total Value Locked) aggregator, encompassing data from hundreds of protocols. The data is entirely open-source, maintained by individuals or teams from these protocols[60]. Defillama's goal is to ensure the accuracy and transparency of this data.

User Base

Defillama's Twitter account has over 220K followers. It is a key product of Llama Corp, with more than 10M monthly active users[61].

Funding Sources

RetroPGF's second round of funding (171292.71 OP), and Gitcoin Grants (first 12 rounds: \$37,096.42).

Openness and Permissionlessness

Defillama is open to all without requiring permission from anyone or any entity to access it.

Non-Exclusivity

Anyone can use Defillama to view and search data. Defillama offers a paid version of its API, which requires payment to use. However, if the free version meets the needs, there is no necessity to pay. Overall, the degree of non-exclusivity is high.

Non-Rivalry

Defillama provides services in the form of data and APIs. The viewing or searching of data by anyone does not impact the experience of others, indicating a high degree of non-rivalry.

Degree of Decentralization

Defillama's data is sourced from hundreds of protocols, and the process of data aggregation is entirely transparent. It is difficult for individuals or organizations to disrupt or alter the data,

indicating a high degree of decentralization.

Contributor Incentives

Contributors to Defillama can receive certain incentives.

Externalities

As Defi protocols become increasingly complex, obtaining accurate Defi data is a significant challenge. Defillama lowers the barrier to accessing Defi data, making complex Defi data analysis readily available. Its data is completely open-source, maintained by a team of enthusiastic individuals and contributors from hundreds of protocols, ensuring high accuracy and transparency.

Defillama also provides an API, making it convenient for other applications to integrate with it[62].

Sustainability

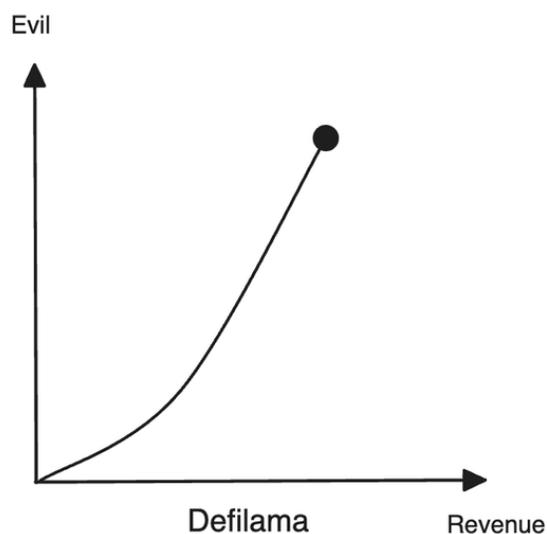
Defillama's revenue primarily comes from donations. It offers free data dashboards and APIs. If the free API is insufficient, there is an upgraded version available for \$300/m, but this constitutes only a tiny part of its revenue. However, as Defillama's user base grows, server and personnel costs are likely to increase, posing sustainability challenges[60].

Defillama offers a free and ready-to-use Defi data dashboard and API, ensuring open and transparent data and accuracy, thus attracting a large user base. However, the service lacks a corresponding model for generating revenue and mainly relies on donations, which are small and unstable. As the user base grows, it might not cover server and personnel costs.

Defillama is just one product of Llama Crop, which is also increasing its competitiveness by launching different products like LlamaNodes, LlamaPay, etc. However, how to achieve sustainability and secure a stable stream of funds through these product combinations remains a major challenge. There is internal disagreement about whether to issue a token, and it remains to be seen how this will be resolved.

Revenue Evil Curve

Defillama's monetization options are limited. Charging all users could quickly drive them to other data platforms, but offering everything for free might make it challenging to cover server and bandwidth costs. Thus, the monetization strategy involves charging users with higher usage demands.



[60]<https://github.com/DefiLlama/DefiLlama-Adapters/graphs/contributors>

[61]<https://llama-corp.com/>

[62]<https://defillama.com/about>

[63]<https://defillama.com/docs/api>

6.2.3 Ethereum Name Service (ENS)

Category

On-Chain Identity and Domain Service

Introduction

The Ethereum Name Service (ENS) is a distributed, open, and scalable naming system based on the Ethereum blockchain. It provides a secure and decentralized way to access resources such as Ethereum addresses, IPFS hashes, smart contracts, and more in a human-readable format, rather than traditional wallet addresses.

ENS works by resolving readable names (e.g., "Uncommons.eth") into computer-readable identifiers, such as Ethereum addresses, other cryptocurrency addresses, content hashes, metadata, and more. ENS also supports "reverse resolution," enabling the association of metadata (such as canonical names or interface descriptions) with Ethereum addresses.

User Base

As of 2023, ENS has registered over 2.79 million domain names with 660,000 users. On average, each user owns approximately four domain names.

Funding Sources

The development of ENS has two sources of funding: (1) grants and (2) revenue from .ETH name registration and renewal fees.

In terms of grants, ENS's primary management and development team has received funding from the Ethereum Foundation (the primary funding source), Chainlink, Protocol Labs, and several other organizations.

For domain registration fees, users are required to pay fees based on the length of the registered domain name. Currently, ENS charges fees based on the character count of the domain name: 3 characters cost \$640 per year, 4 characters cost \$160 per year, and 5 characters or more cost \$5 per year.

Domain owners can renew their domains at the original cost. When a domain is not renewed for more than 90 days, it enters an auction mode with an automatically decreasing price.

Openness and Permissionlessness:

ENS is an open-source project. The actual management and development of ENS are handled by a non-profit organization called True Names LTD. The income generated from .ETH name registration and renewal is received by a 4/7 multisignature contract that manages the ENS root domain. The key holders of the contract will decide how to use the funds.

Anyone can use ENS to register domain names without going through KYC or any centralized approval process. Additionally, the open-source nature of ENS means that its development process is transparent, and community members can participate in the development and governance of ENS.

Non-Exclusivity

The use of ENS domain names is non-exclusive. Once a domain name is registered, it points to the resource specified by the registrant, but it does not prevent others from accessing that resource. The domain name itself in the ENS system is unique, but the resources to which they point can be public. Like an electronic protocol, ENS domain names are infrastructure and are not owned by anyone.

Non-Competitiveness

A user using a specific ENS domain name does not reduce the ability of other users to use the ENS service. The system can handle a large number of domain names and resolution requests without resource scarcity due to the use of a single domain name.

Degree of Decentralization

The ENS root domain is managed by a 4/7 multisignature contract (Multisig), and the key holders can be found on the ENS official website's Organization page. Among the multisignature key holders, only one is involved in ENS development: Nick Johnson, who is the creator and primary developer of ENS. The other key holders are members of the Ethereum community and other projects.

ENS is an open-source project, and all of its code can be found on GitHub.



Ethereum Name Service (ENS)

764 followers Ethereum <https://ens.domains/> @ensdomains

Pinned

ens-contracts (Public) The core contracts of the ENS protocol JavaScript 448 323	ens-app-v3 (Public) TypeScript 85 65
docs (Public) Main documentation site for the ENS protocol 68 156	ensjs-v3 (Public) ENS javascript library for contract interaction TypeScript 72 28
thorin (Public) A web3 native design system. TypeScript 53 13	media-kit (Public) ens media kit resources JavaScript 4 7

Incentives for Contributors

Contributors can be incentivized by participating in ENS governance and providing services. For example, the fees paid by domain registrants can be used to reward participants who contribute to the system. Additionally, contributors can earn income within the ENS ecosystem by offering valuable services and infrastructure.

Externalities

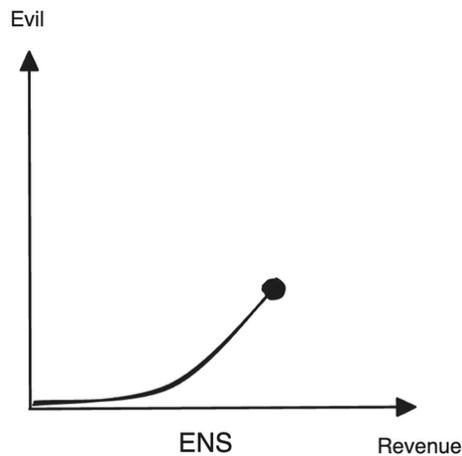
ENS has positive externalities for the entire blockchain ecosystem. It simplifies the use of blockchain addresses, improves user experience, and promotes the broader adoption of blockchain technology. By providing a trusted decentralized naming service, ENS also fosters the development of new applications and services.

Sustainability

The sustainability of ENS is based on its commitment to open-source principles and community support. The operational funds for the system come from the fees paid by users for domain name registrations, providing a continuous source of funding for ENS. Additionally, strong community support and a wide range of applications [source](#) ensure the long-term development of ENS.

The Revenue Evil Curve

The Ethereum Name Service (ENS) primarily generates income through registration and renewal fees for domain names. These revenues are essential for supporting the maintenance and development of the network. Since these fees are public and fixed, and the same for all users who want to register an ENS domain, in terms of revenue, it may be positioned at the lower end of the curve, indicating that the income is relatively transparent and reasonable. It maintains a certain level of income without generating excessive negative externalities, hence the slope of the curve is relatively gentle.



Prospects and Challenges

While ENS is one of the early projects in the blockchain naming system space, there are now increasingly more profit-oriented competitors. Due to different financing models, these competitors may have more abundant resources than ENS, enabling them to hire more developers, integrate with more wallets and dApps, and attract more users through advertising.

Other challenges also come from the following aspects:

- **Security and Abuse:**

A study ([source](#)) pointed out that despite providing decentralized domain name services, ENS also faces issues similar to traditional naming systems and new issues introduced by ENS attributes. For example, the system contains thousands of abused ENS names, some fraudulent blockchain addresses, and indexes of malicious websites. Additionally, the study found that 22,716 .eth names (3.7% of all names) are vulnerable to name hijacking attacks. This indicates that the ENS community needs to invest more effort in detecting and mitigating issues in decentralized naming services.

- **Incomplete Technical Infrastructure and Ecosystem:**

ENS relies on the performance and stability of the Ethereum network, which currently faces issues such as congestion, high transaction fees, and scalability challenges. These problems can affect the smoothness, availability, and sustainability of ENS. For example, when the Ethereum network is congested, user operations may be delayed or fail, leading to a degraded user experience. When Ethereum transaction fees are high, users may be reluctant to engage on-chain, resulting in reduced activity.

[64] <https://docs.ens.domains/>

[65] <https://ensuser.com/news/2019-12-20-who-should-own-the-naming-system-of-the-future-ens-as-a-public-good.html>

[66] <https://github.com/ensdomains>

[67] Challenges in decentralized name management: the case of ENS
<https://dl.acm.org/doi/10.1145/3517745.3561469>

6.2.4 POAP (Proof of Attendance Protocol)

Category

On-chain Reputation

Introduction

POAP, short for Proof of Attendance Protocol, is a blockchain-based protocol designed to verify participants in events or activities. The core idea behind POAP is to leverage blockchain technology to provide participants with verifiable ERC721 tokens that serve as proof of their attendance at a specific event or activity. [68]

User Base

As of now, the number of POAP tokens minted exceeds 6.8 million, there are over 38,000 issuers, and independent addresses exceed 1.2 million. [72]

Funding Sources

Investment: \$10 million[74,75]; Gitcoin grants: \$141,694.47 (first 12 rounds)[68]; revenue from commercial issuances[70]

Openness and Permissionlessness

POAP protocol data are on-chain and accessible to anyone for verification. However, the creation of data has certain conditions. Users must participate in an event to receive POAP, and issuers must create an event and have it audited before issuing POAP.

Non-Exclusivity

For participants, POAP's non-exclusivity is evident in its ability to provide verifiable evidence for all attendees. Anyone can use POAP to prove their attendance at an event. However, during an event, there is a limited supply of POAP, which may lead to situations where some participants cannot obtain a POAP token.

For issuers, the content they publish needs to go through an audit process, which acts as a form of exclusivity as it prevents content that does not meet the criteria from being issued.

Non-Competitiveness

POAP's non-competitiveness is demonstrated by its ability to accommodate a large number of participants. The system can handle a significant number of participants without diminishing the experience for others. POAP provides independent proof for each participant, and unless there is an insufficient supply of POAP tokens, it does not become competitive due to an increase in the number of participants.

Degree of Decentralization

To publish an event on POAP, it needs to go through an audit, which is conducted internally by POAP. This is primarily to prevent the issuance of content related to copyright, explicit content, political bias, hatred, and related issues. While this is done to protect the POAP ecosystem, it also, to some extent, reduces the degree of decentralization.

Contributor Incentives

POAP is currently operated in a corporate form, and contributors are incentivized through salaries.

Externalities

For most ERC721 standard NFTs, they are used primarily as avatars. However, POAP has discovered a practical use case for NFTs that allows them to be actively used.

Additionally, POAP achieves decentralized proof of attendance, reducing the potential for false claims and minimizing the cost of providing proof for participants, including human, material, and time costs. By providing verifiable evidence, POAP increases the empowerment of participants in various scenarios where individual abilities need to be proven.

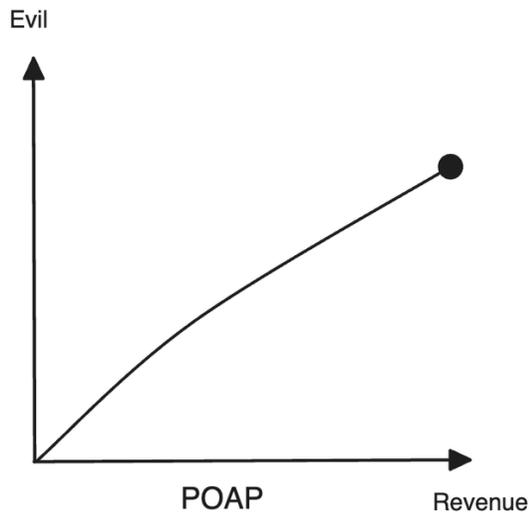
Sustainability

POAP has obtained sufficient startup capital from investment institutions to ensure smooth development and operation in the initial stage of the project. Additionally, they have secured some funding from Gitcoin grants.

Apart from external funding, POAP is exploring sustainability through a combination of approaches. For individual or small-scale commercial usage, POAP can provide services for free, but for large-scale commercial activities, there may be fees associated with using POAP.

Revenue Evil Curve

The monetization options for POAP are slightly more varied, allowing for minor charges on issuers who release a large number of POAPs. For regular users, there are hardly any monetization options. If there were charges for obtaining POAPs, it would quickly lead to a decline in users, as people would likely stop using the product.



Prospects and Challenges

POAP focuses on the niche of proof of attendance. Other technologies such as Decentralized Identifiers (DID) could become competitors, and there are even more decentralized products like floats.city, which has minted nearly 4.5 million tokens. From a product perspective, POAP does not have a deep moat.

However, POAP's advantage lies in being the first choice that comes to mind when it comes to proving attendance. POAP is also expanding its influence through the development of a mobile application, but it may need further development to reach its full potential. With a wealth of data accumulated within POAP, it needs to interact with other applications in the ecosystem. Integrating more applications to facilitate data flow could enhance the depth of its moat.

[68]<https://poap.xyz/>

[69]<https://poap.zendesk.com/hc/en-us/articles/9494120581773-How-Can-I-Produce-Quality-POAP-Drops->

[70]<https://curation.poap.xyz/guidelines/policy-and-process/commercial-use-policy>

[71]<https://docs.google.com/spreadsheets/d/1NVM6VJ3fPX7Nd7KrHol7BArHi6NKbgLbpQ5JIXFyXJo/edit#gid=203498842>

[72] <https://gnosisscan.io/token/0x22c1f6050e56d2876009903609a2cc3fef83b415>

[73] <https://floats.city/>

[74]https://www.crunchbase.com/funding_round/poap-seed--c2cc2c78

[75]<https://www.rootdata.com/Projects/detail/POAP?k=MjM3OQ%3D%3D>

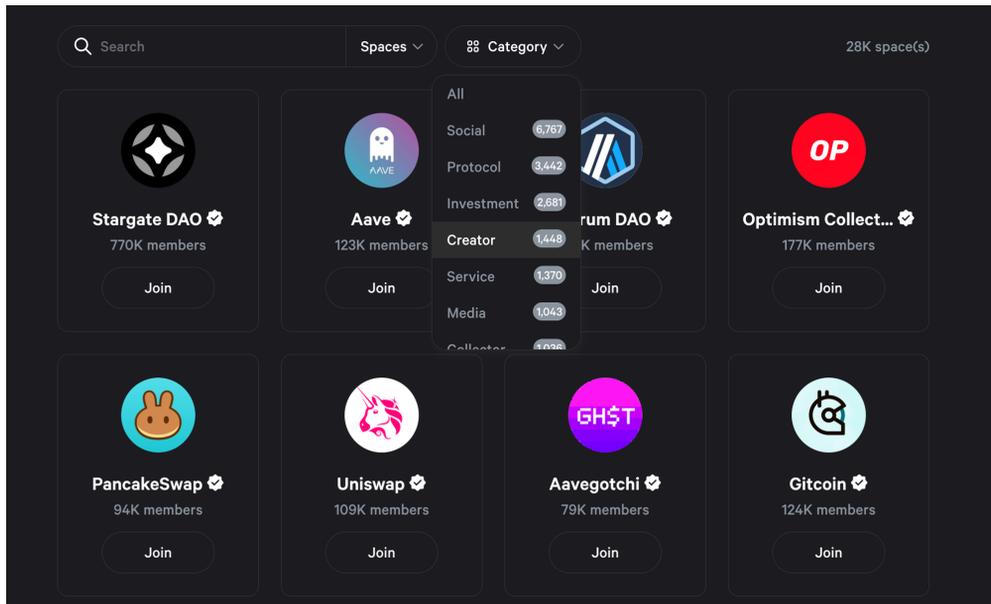
6.2.5 Snapshot

Category

User Base

Since its establishment, Snapshot has attracted a large number of DAO and Ethereum community members to participate in various proposal voting. These proposals may involve governance decisions, token allocation, project development direction, and more. Due to its low gas fees, it is particularly popular among DAOs that frequently conduct community voting.

Currently, you can see on the official website that there are already 28,000 DAOs or organizations using Snapshot.



Funding Sources

In 2021, Snapshot Labs completed a \$4 million seed round investment led by the crypto-focused early-stage venture fund 1kx. Coinbase Ventures, StarkWare, MetaCartel, Gnosis, and Scalar also participated in this funding.

Prior to this round of funding, Snapshot had been supported by donations from Gitcoin and funding from companies like MetaCartel DAO, ENS, Curve DAO, and Balancer.

Openness and Permissionlessness

Creating a Space on Snapshot is easy and requires almost no cost. Anyone or any organization can create proposals or vote on Snapshot, and they don't need to pay gas fees for each of their votes.

Non-Exclusivity and Non-Competitiveness

Every token holder has equal rights to vote and share their opinions. One person's vote does not impede the votes of others.

Degree of Decentralization

Snapshot achieves decentralization on multiple levels. It is built on the Ethereum blockchain, which means that any attempts to modify or manipulate voting results are restricted by the transparency and immutability of the blockchain.

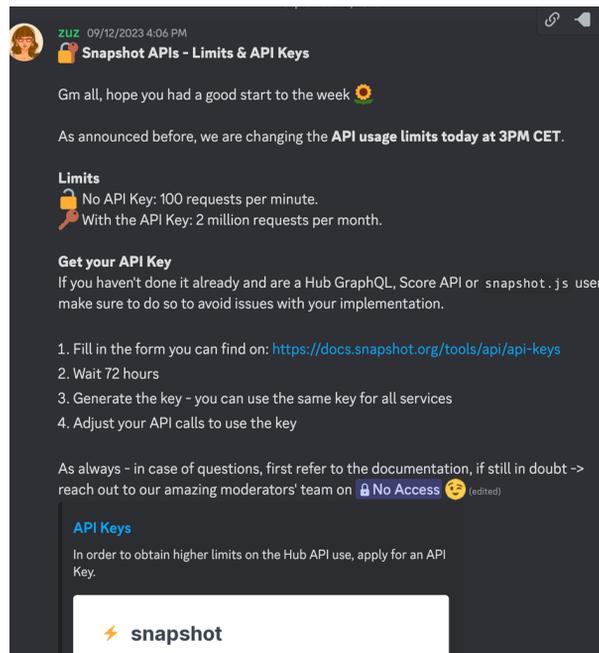
It allows DAOs and communities to autonomously manage their spaces, set rules, and conduct votes. It also does not store users' private keys or sensitive information. Additionally, Snapshot's code is open-source, and community members can improve the code, overseeing the platform's security and fairness.

Contributor Incentives

While Snapshot does not directly provide financial incentives, it offers a platform for community members to participate in important governance decisions, which in itself serves as an incentive. Users engage more actively in community development by participating in decisions through voting.

Externalities

Snapshot can be integrated into other dApps and platforms. For example, a DAO can integrate Snapshot into its website or application, enabling users to vote directly there. With an open API, developers can apply for API quotas on Snapshot's Discord to build custom solutions or tools.

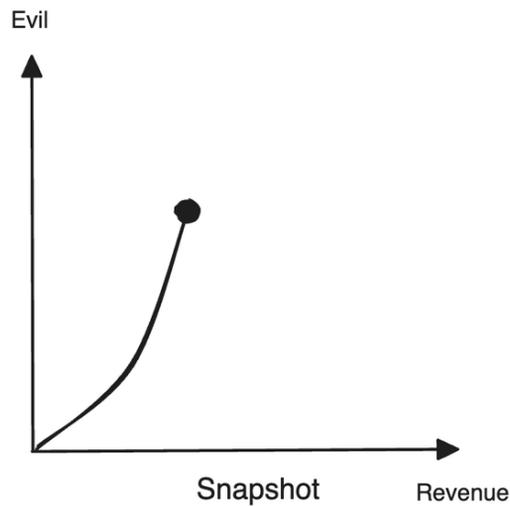


Sustainability

The sustainability of Snapshot lies in its low-cost and high-efficiency characteristics. Since voting does not occur on-chain, it does not consume network resources or result in gas fees. This enables it to continue operating during congested periods on the Ethereum network without imposing financial burdens on users or DAOs.

Revenue Evil Curve

Snapshot itself, as an open-source tool, may not directly generate income. The services it provides are free, so its income potential may be quite close to zero. Once Snapshot begins to charge for its services or increases the usage requirements, it can be anticipated that it will lose a significant number of users, especially those DAOs and communities that require frequent interaction in governance.



Prospects and Challenges

One of the primary challenges facing Snapshot is how to continue providing a secure and reliable voting platform while expanding its functionality and capacity to support a larger user base. Additionally, it needs to address potential governance issues, as theoretically, anyone can vote, but in practice, mobilizing a large community to actively participate is not easy. Ensuring ongoing user engagement and high-quality discussions is a challenge. Dealing with contentious votes or proposals and preventing manipulation or attacks are areas where Snapshot needs continuous optimization.

[76]<https://github.com/snapshot-labs/snapshot>

[77]<https://snapshot.org/#/>

[78]<https://discord.com/channels/707079246388133940/729758076445655052/902872489108074538>

6.2.6 Coordinape

Category

DAO Governance; Decentralized Team Collaboration and Resource Allocation

User Base

Coordinape's user base primarily consists of individuals from the cryptocurrency and blockchain industry, especially those associated with organizations and communities that employ decentralized governance models. Currently, over 100 DAOs are using Coordinape, including DAOhaus, BanklessDAO, Index Coop, Yearn Finance, Seed Club, and Uncommons.

Funding Sources

Coordinape does not directly generate or provide funds. Instead, it serves as a distribution mechanism, allowing members of a DAO to autonomously decide how to allocate existing funds from a pool. According to Coordinape's [official documentation](#) [79], funds typically come from the DAO's internal budget or external sponsorships.

Openness and Permissionless

Coordinape is open-source, and anyone can review its code. Additionally, its permissionlessness is evident in the fact that anyone can join an existing circle or create a new one without needing centralized approval processes.

Coordinape's openness also extends to its compatibility with external tools and services. The platform seamlessly integrates with other DeFi tools and services, as well as other DAO tools, providing users with a broader range of functionalities and a richer experience.

Non-Exclusivity and Non-Competitiveness

Coordinape promotes non-exclusivity through its unique "non-competitive" fund allocation model. As explained in the article "Decentralized payroll management for DAOs" [81], the platform eliminates traditional "zero-sum" competitive thinking because it is not based on a fixed bonus pool but allows members to allocate resources based on their recognition of each other. This approach encourages collaboration and mutual growth among team members rather than competition.

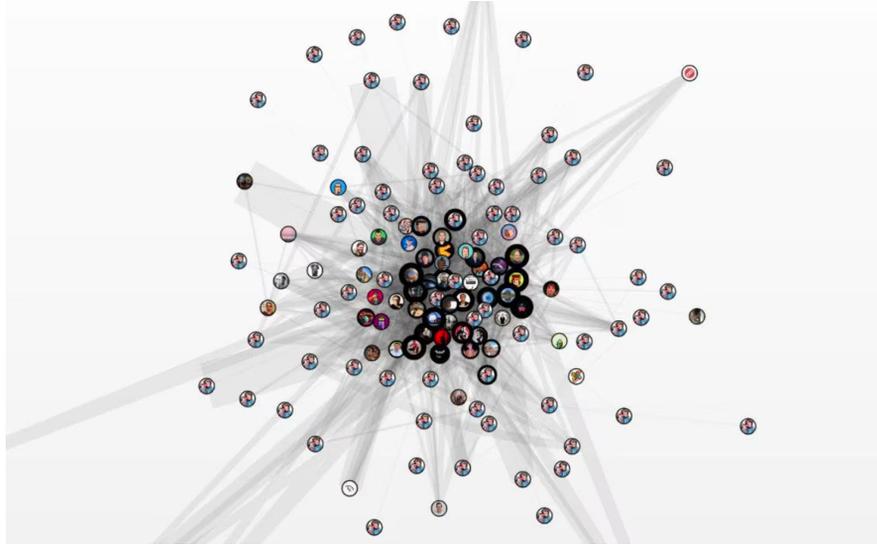
Degree of Decentralization

Coordinape's degree of decentralization is evident in its decision-making and operational processes. Unlike traditional centralized organizations, Coordinape does not rely on a central authority to guide or manage its activities. Instead, as mentioned in the article "Metanauts Guide to Coordinape" [82], decision-making power is decentralized, and it is collectively made by community members through a decentralized consensus process. This structure not only enhances transparency and security but also empowers community members and fosters their sense of autonomy.

Coordinape's smart contracts and protocols are open-source, allowing them to be audited and verified, ensuring transparency and reliability of operations.

Contributor Incentives

Coordinape's contributor incentives go beyond monetary rewards. While fund allocation is its core function, it provides a platform for members to have their efforts and contributions recognized. Members can allocate "appreciations" (give) based on contributions to the project, forming a "gift circle" or "appreciation circle" to reward the value they create for the DAO.



Externalities

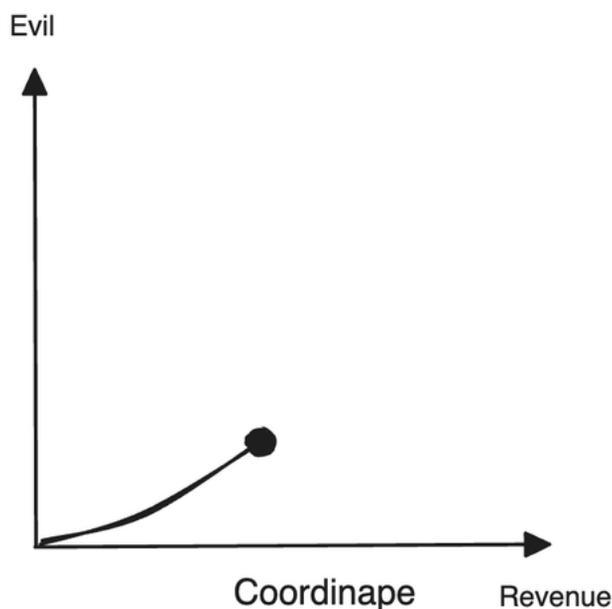
Coordinape's externalities are evident in its ability to integrate with other platforms and projects. For instance, it can seamlessly integrate with other DeFi tools or projects related to DAOs, providing users with a smoother and more seamless experience. Due to its openness, third-party developers can create new applications or tools, increasing user interactions.

Sustainability

Coordinape's sustainability depends on its ability to continue attracting and retaining users and the viability of its business model. Due to its decentralized nature, it can respond more effectively to the needs of its members and changes in the market. Furthermore, by decentralizing decision-making to individual members, it encourages broader participation and involvement, contributing to efficient resource utilization and long-term community engagement. As indicated in the [full report](#)[83], to achieve long-term sustainability, Coordinape needs to continuously evolve and adapt to the evolving cryptocurrency landscape.

Revenue Evil Curve

The core functionality of Coordinape is decentralized and democratic resource allocation, which can reduce the risk of abuse of centralized power. However, any platform involving the distribution of money carries the potential risk of manipulation or exploitation. If the evaluation system is manipulated or not fairly participated in by all members, its level of "evilness" may increase. Nevertheless, given Coordinape's original design intent and primary function of enhancing fairness and collaboration among peers, its level of "evilness" is likely to remain relatively low.



Prospects and Challenges

In empowering community members with the authority to make fund allocation decisions, Coordinape effectively decentralizes power from a few individuals, allowing the entire community to participate in the decision-making process. It also holds a distinct advantage in terms of usability and accessibility compared to more complex tools.

However, as the community scales, determining specific responsibilities, roles, and levels of engagement for each member becomes more challenging. One possible solution is to reduce the circle size, but this leads to new issues: how to determine the distribution of rewards among different circles from the overall fund pool. This may require voting within the DAO organization to address.

In practical use, there is an area for optimization in Coordinape's operation: since all allocations in Coordinape are executed on-chain, the process is transparent and fully traceable. However, the community often exhibits a "network of favors," where many people tend to evenly distribute their tokens rather than channel them to contributors who provide valuable contributions. If Coordinape can incorporate ZK privacy technology in the future, it could enhance fairness while maintaining neutrality and trustworthiness.

[79]<https://coordinape.com/>

[80]<https://docs.coordinape.com/get-started/get-started>

[81]Decentralized payroll management for DAOs <https://medium.com/iearn/decentralized-payroll-management-for-daos-b2252160c543>

[82]<https://medium.com/mstable/metanauts-guide-to-coordinape-964778e0f073>

[83][1fLjvPOvibcCUj9ES44_cdoX5Hb7LpDaloGWz5FbUEM](https://medium.com/mstable/metanauts-guide-to-coordinape-964778e0f073)

6.2.7 Safe (Previously Gnosis Safe)

Category

Wallet

Introduction

Safe (formerly known as Gnosis Safe) is both a decentralized wallet protocol and a system for collective asset management. Its primary product allows users to create and manage Safe multi-signature wallets with the minimum number of approvals required before executing transactions. Safe wallets rely on smart contracts to restrict wallet permissions, thereby enhancing transaction security.

User Base

According to information provided on its website, Safe wallets have been deployed to over 4.4 million accounts distributed across more than 12 networks. The total assets held in these accounts exceed \$47 billion [84].

As of October 17th, the Safe ecosystem includes 189 projects [85] and 5,816 GitHub repositories that rely on the Safe {Core} protocol [86].

Funding Sources

In early 2017, Safe was separated from Gnosis through a proposal (GIP-29) in the GnosisDAO. In July, it announced raising \$100 million in funding [87]. Investors include 1kx (lead investor), Tiger Global, A&T Capital, Blockchain Capital, ConsenSys, Polygon, and individual investors such as prominent NFT influencer Punk6529. Currently, these funds, along with the remaining Safe tokens (which are currently non-transferable ERC-20 tokens), are managed by the Safe Ecosystem Foundation.

Openness and Permissionlessness

The protocol code of SafeDAO is entirely open-source, demonstrating openness and permissionlessness.

Non-Exclusivity and Non-Competitiveness

Safe's wallet application is also free to use, exhibiting characteristics of digital commons, and it is non-exclusive and non-competitive.

Degree of Decentralization

In terms of formal governance, Safe follows a DAO governance model with a modular, composable, and dynamic governance framework [88]. The primary stakeholders of SafeDAO include token holders, delegates, guardians, non-token holders, the Safe Ecosystem Foundation, and GnosisDAO.

Guardians, active members of the SafeDAO community, often play a crucial role in decision-making (Guardians may receive significant delegation [89]). The Safe Ecosystem Foundation acts as a

steward for SafeDAO, managing the treasury and providing compliance.

Additionally, GnosisDAO and SafeDAO jointly manage a treasury, and GnosisDAO is also a significant holder of Safe tokens.

Overall, SafeDAO exhibits strong decentralization characteristics, distributing governance power through token allocation and actively nurturing community leaders (guardians) to reduce governance costs while separating the treasury from DAO governance.

Externalities

As mentioned, the Safe multisignature wallet is one of the most mainstream wallets in the industry, safeguarding the assets of many organizations requiring collective asset management.

Moreover, Safe is an active participant and advocate for smart contract wallets, with the safe{core} protocol [9] focusing on the portability, composability, and security of smart contract wallets. Given the attention to account abstractions in Ethereum, this public good is anticipated to benefit the entire ecosystem.

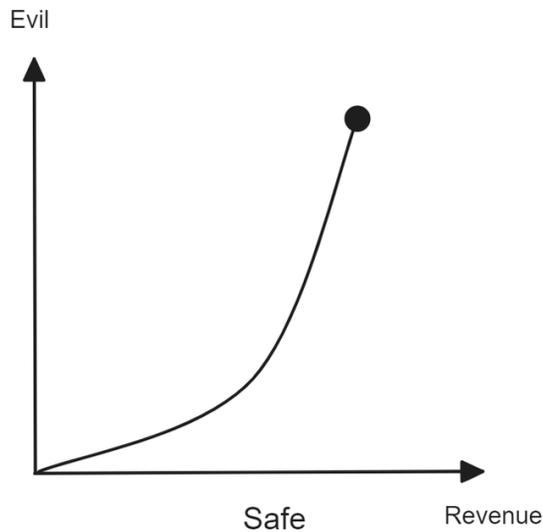
Sustainability

SafeDAO has a Safe Grants Program (SGP) [91] to promote the sustainability and decentralized development of the Safe ecosystem by funding relevant projects.

The current value capture mechanism for Safe is through token economics, but community members are actively exploring other possibilities, such as proposals like the Token Value Alignment Program [92].

Revenue Evil Curve

Safe wallets are one of the most trusted wallets in the Web3 space, and many organizations store their treasury funds in Safe multisignature wallets. It also has very low marginal production costs but can generate corresponding funds through market mechanisms, such as raising venture capital or developing fee-based services or applications that do not charge individual users but specific institutional users. In the context of the Evil Revenue Curve, it can be considered a category with public goods attributes that can be monetized to some extent.



Prospects and Challenges

Safe wallets are highly trusted for their security, and as the Ethereum ecosystem focuses on implementing account abstractions, Safe's efforts in contract wallets and protocols have the potential to bring significant growth to both the ecosystem and itself.

SafeDAO has recently been established, and its governance framework requires refinement, with governance experience still in the process of forming. The SAFE token is currently non-transferable and is not circulating in the market.

Continuous research and development investment are needed for Safe wallets, including funding and team efforts in areas such as security and user experience.

[84] <https://safe.global/>

[85] <https://safe.global/ecosystem?page=3>

[86] https://github.com/safe-global/safe-core-sdk/network/dependents?package_id=UGFja2FnZS0zNDY2NzAyMDE5

[87] <https://decrypt.co/104908/digital-asset-platform-safe-announces-100m-fundraise>

[88] <https://docs.google.com/document/d/1iDlSEglD-Gu81FwrCOGXtqLK5J7ETzyOhkWJu51TpAw/edit>

[89] <https://forum.safe.global/t/how-to-safedao-governance-process/846>

[90] [SafeDAO Governance Hub](#)

[91] <https://forum.safe.global/t/safe-guardian-responsibilities/2105>

[92] <https://github.com/safe-global/safe-core-protocol-specs/blob/main/whitepaper.pdf>

[93] <https://forum.safe.global/t/sep-6-safe-grants-program-sgp/3213>

[94] <https://forum.safe.global/t/safe-token-value-alignment-program/3766>

6.2.8 Allo Protocol

Category

Funding

Introduction

Allo is an open-source protocol that enables communities or organizations to efficiently and transparently allocate funds. It serves as the backend for Gitcoin grants and is part of the Gitcoin grants stack.

The Allo protocol consists of three parts:[96]

- **Funds Pool:** The funds to be allocated.
- **Allocation Registry:** The allocation of funds needs to follow specific strategies.
- **Registry:** Projects participating in fund allocation need to register in advance.

In addition to fund allocation, the Allo protocol can also establish an on-chain reputation system based on accumulated data.[97]

User Base

Twitter followers: 6k+

The protocol has not yet been officially launched.

Funding Sources

The Allo protocol is currently developed by Gitcoin and does not receive external funding.

Openness and Permissionlessness

Allo contracts are deployed on the blockchain, allowing users to participate in voting without permission. However, creating funds pools and registering projects require approval, making it not entirely permissionless.

Non-Exclusivity

To participate in fund allocation within the Allo protocol, registration is required, and this registration process needs to be approved by Gitcoin, which reduces non-exclusivity to some extent.

Non-Competitiveness

The fund allocation process for individual projects does not impact other projects and does not diminish the user experience, indicating a high level of non-competitiveness.

Degree of Decentralization

While the Allo protocol is on-chain, critical processes such as project registration and fund allocation involve human participation, reducing the level of decentralization to some extent.

Contributor Incentives

Gitcoin Allo is currently developed by Gitcoin, and the incentives are unknown.

Externalities

Quadratic funding (QF) has proven to be an effective method of fund allocation, with Gitcoin having already distributed over \$50 million using this approach. The Allo protocol can handle various forms of fund allocation within communities or organizations, allowing everyone to benefit from the advantages of QF, improving the efficiency and transparency of fund usage.

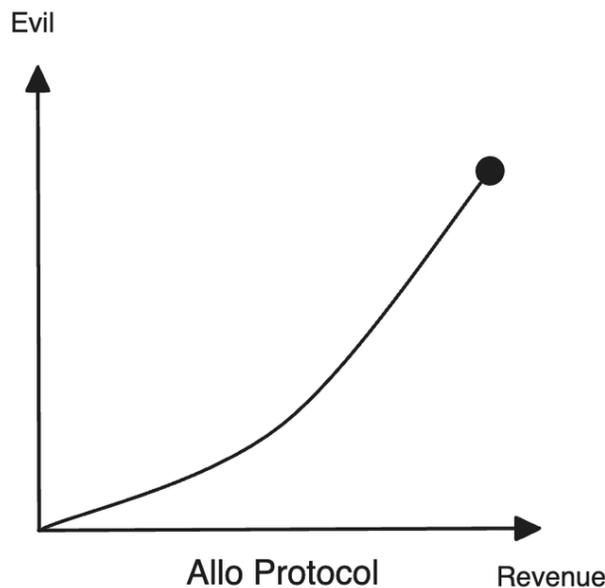
Sustainability

Gitcoin Allo was originally the backend for Gitcoin grants and was supported by Gitcoin. After the launch of Allo Protocol, it will charge fees from the funds pool. These fees are divided into two parts: base fees and protocol fees. Currently, the base fee is set at 0, and the protocol fee is 2.5% of matched funds[96], which is determined through Gitcoin's governance process.[98]

Once the Allo Protocol is live, sustainability can be achieved by collecting fees from the funds pool.

Revenue Evil Curve

The Allo Protocol has already monetized through base fees and protocol fees. For users, the key factor is the fee ratio, which is adjustable. If the ratio is relatively low, it remains acceptable to users. However, as the ratio increases, it gradually becomes more detrimental to users.



Prospects and Challenges

The Allo Protocol currently serves as the backend for Gitcoin grants, which has established significant influence. Additionally, Allo can integrate with streaming payment protocols to diversify

fund allocation methods. After launching, Allo can continue to gain users based on Bitcoin's influence, maintaining a leading position in the field of fund allocation. However, Allo itself faces some challenges:

- **Review System:** All registered projects require Bitcoin's approval, and the current review process may not be transparent, affecting the level of project participation to some extent.
- **Fee Collection:** Allo Protocol charges fees. In addition to donations, a 2.5% fee (adjustable) is applied when withdrawing funds from the pool, which may erode the allocated funds, especially when dealing with substantial fund amounts.

[95]<https://www.gitcoin.co/blog/allo-gitcoins-newest-protocol>

[96]<https://twitter.com/alloprotocol/status/1670823356336160768>

[97]<https://docs.allo.gitcoin.co/overview>

[98]<https://docs.allo.gitcoin.co/allo/fees>

6.2.9 Metagov

Category

Governance

Introduction

Metagov, short for The Metagovernance Project, is an interdisciplinary research collective established in 2019. This diverse group brings together experts from various fields, including law, political science, economics, communications theory, sociology, anthropology, systems science, and game theory. [99]

However, according to their own description, they have another vision: a skunk works. A skunk works "is a space for experimentation and play—where we explore together new possibilities that exceed the bounds of existing knowledge." [100]

User Base

Metagov's Slack community has 759 members (as of 10/31), and its Twitter account has 2,830 followers (as of 10/31). It's worth noting that Metagov's articles, reports, and contributions have a significant impact in the web3 space. Their collaborators include some of the most prominent projects, and they have built notable articles and projects, such as DAOstar, like the article *Cryptoeconomics as a Limitation on Governance* published by community member Nathan Schneider. [101]

Openness and Permissionlessness

Metagov's research articles and designed governance tools and standards are all open source and openly accessible.

Externalities

In general, Metagov is dedicated to exploring ways of individual and community self-governance online, including developing frameworks, tools, and systems for fostering online self-governance to support and expand the right to self-governance in the digital age.[102]

Their work goes beyond academic research and extends to practical applications. They have established a shared vision among researchers and practitioners to explore institutional technology together and empower communities with new economic systems.[103]

Metagov's activities can be classified into two broad categories:

- **Research Community**

- Community: Fostering discussions and community participation through activities such as discussions, workshops, and collaborative projects.
- Event Organization: Organizing events related to governance, such as conferences, seminars, and projects like AI Palace.
- Workshops: Regularly conducting workshops that bring together researchers and professionals to explore governance-related topics.

- **Design Governance Tools**

- Metagov Gateway: An API gateway for digital governance services.
- DAOstar: A standards body for the DAO ecosystem.
- Agreement Engine: A tool for building net-native agreement systems.
- PolicyKit: An engine for building governance in online communities.
- CommunityRule: A user-friendly governance toolkit for communities.
- Governance Surfaces: A tool for analyzing DAO contracts.

These activities encompass both advancing research and practice in the digital self-governance field and designing mechanisms and tools to facilitate effective governance

for online communities. This aligns with Metagov's two visions: the research community and the experimental space.

Funding Sources

Metagov has received funding from the following organizations:

Henry Luce Foundation, One Project, the Grant for the Web, Bitcoin grants, the Filecoin Foundation, the Ethereum Foundation, the EPSRC/University of Oxford, GnosisDAO, Aragon, Radicle, Metacartel Ventures, NEAR, Commonwealth, the Stanford Digital Civil Society Lab, and many Metagovernors through their membership program.

It's worth noting that Metagov has a membership mechanism: fees are collected annually and are divided into three levels—students at \$20/year (currently received 13 membership fees out of 10), professionals at \$50-250/year (currently received 34 membership fees out of 10), and sponsors at \$500 and above/year. Metagov states that the purpose of the membership mechanism is not for fundraising, as membership funds and other grants are handled separately. Anyone can join the Metagov community and related projects. The membership mechanism is designed to promote broader community participation, maintain the community, allocate resources to the community, and experiment with collective autonomy.

Degree of Decentralization

The degree of decentralization of the Metagov community is relatively low. Metagov is a 501(c)3 nonprofit in the US. Currently, it is collectively led by the board of directors, who are responsible for the organization's operations at the legal level. In addition to the board of directors, the formal governance positions in the community include the executive director responsible for daily operations, research directors responsible for research activities, membership actively participating in community governance, and various specific working groups.

The community's [governance document](#) promises to evolve towards more democratic community governance as it develops. It's worth noting that the formal governance structure and power distribution in Metagov is hierarchical, but the mode of collaboration is loose rather than hierarchical.[106] This might be related to the fact that many experienced community members come from research institutions.

In a document called **Governance Evolution**, an outline of how the community will evolve towards democratic governance is provided, along with progress indicators.

Non-exclusivity and Non-competitiveness

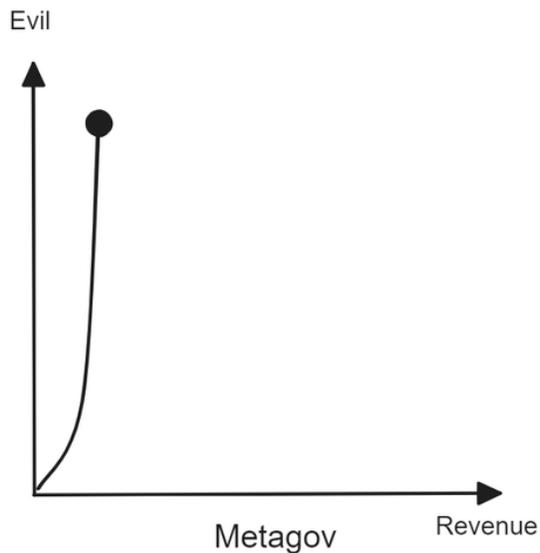
The primary public goods provided by Metagov are research and tools related to self-organizing governance. These resources are freely available for use, making them highly non-exclusive and non-competitive.

Sustainability

- MetagovDAO is used to fund research related to DAOs and online governance [108]. The funding for this project comes from Bitcoin grants. MetagovDAO encourages research proposals from within the Metagov community, as well as collaborations with Bitcoin and BitcoinDAO members. Grant amounts typically range from \$100 to \$10,000. Funding decisions are made by MetagovDAO administrators [109].
- Other general funding is used for community governance and project group work.
- Funds generated through the membership program are collectively allocated by the members.
- Metagov's financial status is publicly disclosed on Open Collective [110].

Revenue Evil Curve

Metagov's most notable contributions are its research in DAO governance. This type of research has monetization potential but may face moral objections. It also artificially introduces exclusivity and is not a socially optimal solution. Therefore, it falls under the category of public goods that should be funded initially in the evil revenue curve.



Prospects and Challenges

With the rise of DAOs, community governance is a highly discussed topic within the Ethereum ecosystem. Communities are also a cultural characteristic of Web3. Metagov has brought together a group of experienced researchers focused on the study and tool design for network self-organization. This aligns with the need for a more open and decentralized internet that we are building and contributes valuable knowledge goods that Web3 can give back to the real world.

However, Metagov itself is not a decentralized organization. Of course, the community is committed to transitioning to a more democratic community organization. Through the membership mechanism, the community is experimenting with community governance, and the challenges of democratic governance and expanding the community are what Metagov will face in its development process.

[99] <https://onlinelibrary.wiley.com/doi/full/10.1111/kykl.12345>

[100] <https://metagov.pubpub.org/pub/faqs/release/2>

[101] <https://vitalik.ca/general/2021/09/26/limits.html>

[102] <https://metagov.org/>

[103] https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4570035

[104] <https://metagov.pubpub.org/pub/membership-program/release/10>

[105] <https://metagov.pubpub.org/bylaws>

[106] https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4570035

[107] <https://metagov.pubpub.org/pub/core-group-evolution/release/5?readingCollection=7137d396>

[108] <https://metagov.org/metagovdao-call-for-proposals-research-community/>

[109] <https://communityrule.info/create/?r=1638940202802>

6.2.10 Chainlink

Category

Oracle Network; Open Source

Introduction

Chainlink is a framework for decentralized oracle networks that provide tamper-proof reference data to on-chain smart contracts. Similar to how blockchains use decentralized computation to create data integrity, Chainlink employs a decentralized model to aggregate and store off-chain price data on-chain, ensuring high accuracy, reliability, and tamper resistance of data.

User Base

Chainlink is currently the largest oracle service, according to data from defillama (10/16)[111]. Among 46 oracle markets, Chainlink has a market share of 46.37% of the Total Value Secured, while the second-ranked WINKLink holds 24.81%. Chainlink is the most economically impactful oracle network.

Funding Sources

Chainlink introduced the LINK token in 2017[112]. The total token supply is limited to 1 billion, enhancing its scarcity. 30% of the tokens are allocated to Chainlink's parent company[113], which is used for recruitment, operations, and development work. The remaining 35% is reserved for incentivizing network participants such as node operators.

However, the token economy is not part of Chainlink's future roadmap. To become a sustainable ecosystem, Chainlink is shifting towards a payment model to capture value from users[114].

Openness and Permissionlessness

Chainlink's core nodes and contracts are open source on GitHub[115].

In theory, anyone can participate in Chainlink's decentralized oracle network. Although there are some hardware requirements, including the need for an Ethereum client to interact with smart contracts and process transactions[116].

Non-Exclusivity

Chainlink has exclusivity.

In an article released on Chainlink's podcast in June, we can see its economic model[117]. Chainlink is committed to achieving a "sustainable oracle economy." It primarily incentivizes the network through staking and increasing user fees.

The monetization models and user payment structures that Chainlink is adopting include:

- Pay-per-usage - Users pay fees for oracle services based on actual usage, such as paying from the contract's fee balance or directly from their wallet when using related oracle services.
- User cost-sharing - Applications share some of the fees generated with Chainlink service providers to cover oracle service costs. For example, GMX pays 1.2% of protocol fees to Chainlink.
- BUILD program - Start-up projects offer a portion of their native tokens (3-7%) to Chainlink service providers in exchange for support.
- Stake-based security mechanism - Holders can receive corresponding fee rewards or be penalized for bad behavior by staking LINK tokens.

Non-Competitiveness

Chainlink has a high degree of non-competitiveness.

As an oracle network service, Chainlink itself is a digital information/software that can be used and accessed by multiple parties simultaneously. Many different decentralized applications and smart contracts can use Chainlink's data sources and services simultaneously without conflict. Additionally, the Chainlink network can scale at lower or even zero marginal costs.

Degree of Decentralization

Chainlink's technical system is decentralized.

Chainlink is built on a decentralized oracle network (DON). DON is maintained by Chainlink nodes. As an abstraction layer, DON provides an interface for smart contracts to access a wide range of off-chain resources and computational capabilities. Through incentive-based cryptographic economic security mechanisms, DON's nodes are motivated to independently perform reliable and correct actions to maintain the overall security of DON. Chainlink's code is also open source on GitHub[118].

However, there are controversies related to Chainlink's Safe Multisig Wallet that are associated with governance and centralized security.

According to Chainlink's website, the multisig wallet is used to modify on-chain parameters related to Chainlink services[119]. This may include replacing faulty nodes on the oracle network, introducing new features, or resolving logic errors in smart contracts. Chainlink considers this process a reliable one, balancing resistance to collusion with the flexibility required to implement improvements and parameter adjustments, responding securely, reliably, and quickly to black swan events and other potential events to minimize service disruptions to users. Other response methods that do not use a multisig wallet would pose significant risks to users.

The second version of the Chainlink whitepaper also describes the role of the multisig wallet[120], placed under the title "Emergency Governance".

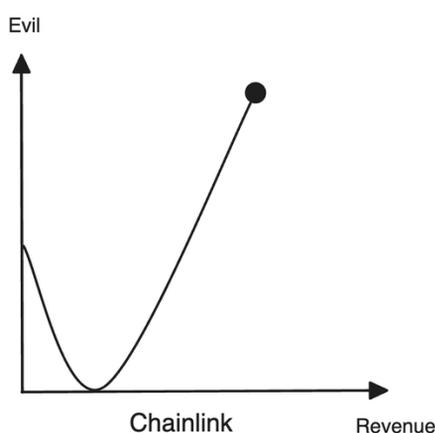
The mechanism of the multisig wallet is seen by some critics as a weakness of centralization in Chainlink, which could lead to an "event capable of destroying the entire decentralized finance sector with a single transaction"[121].

Externalities

Blockchain systems require data determinism to allow nodes to verify each other's information. As a result, smart contracts cannot access liquid off-chain information. Important use cases for blockchains, such as decentralized finance and future large-scale adoption in the real world, require blockchains to interact with off-chain information. Chainlink's solution is a decentralized oracle network. It is indispensable for the prosperity of decentralized finance. Additionally, Oracles alleviate the computational and storage burden on the blockchain itself.

Revenue Evil Curve

The services provided by Chainlink are essential for mixed smart contracts and are foundational for the large-scale application of blockchain. The Chainlink network needs incentive mechanisms to be maintained. Therefore, charging users to maintain the security, stability, and sustainability of a decentralized network is a reasonable practice. I believe that in the evil revenue curve, the service of oracles itself belongs to goods with exclusivity and partial competitiveness.



Prospects and Challenges

Oracles have significantly unlocked the potential of blockchain technology, making them an indispensable component in the entire Web3 economy and its societal impact. Chainlink's technical architecture is also highly trusted within the Ethereum ecosystem.

However, Chainlink's "centralized" characteristics are expected to continue facing scrutiny from the community. It will need to continue adjusting its protocol to achieve a sustainable crypto-economic model. This is crucial for maintaining the trust and acceptance of the community.

[111] <https://defillama.com/oracles/Chainlink>

[112] https://assets.ctfassets.net/k3n74unfin40/20sibnaDM6se50FWm95kxD/987e627c4630c36d1acdb_ea3ffa8aca1/Tokenomics_2022.03.17_LINK.pdf

[113] <https://chainlinklabs.com/>

[114] <https://blog.chain.link/sustainable-oracle-economics/>

[115] <https://github.com/smartcontractkit/chainlink>

[116] <https://docs.chain.link/chainlink-nodes/resources/requirements#blockchain-connectivity>

[117] <https://blog.chain.link/sustainable-oracle-economics/>

[118] <https://github.com/smartcontractkit/chainlink>

[119] <https://chain.link/faqs>

[120] <https://research.chain.link/whitepaper-v2.pdf>

[121] <https://twitter.com/ChrisBlec/status/1521989330826371073>

6.2.11 MolochDAO

Category

Funding

Introduction

After the "DAO hack," the DAO model went dormant for a while. It wasn't until early 2019 that the emergence of MolochDAO brought the DAO concept back into the spotlight. MolochDAO was founded during the crypto bear market of 2019 with the primary goal of providing funding for critical infrastructure projects in the Ethereum ecosystem, such as Ethereum 2.0 development.

The operational framework and values of MolochDAO have influenced a wave of subsequent DAO organizations and funded essential projects in the Ethereum ecosystem[122].

Funding Sources

In the initial version, MolochDAO 1.0, funding came from its members. Members received non-transferable shares and voting rights corresponding to the amount of funds they contributed. In the latest version, MolochDAO 3.0, shares can be transferred, and voting rights can be delegated, significantly increasing the flexibility of MolochDAO.

Openness and Permissionlessness

MolochDAO's smart contracts are entirely open-source, exhibiting openness and permissionlessness. Its governance model has been adopted or forked by many subsequent DAOs.

Non-Exclusivity and Non-Competitiveness

As a funding allocation mechanism, MolochDAO exhibits exclusivity and competitiveness.

First, MolochDAO funds public infrastructure and common goods. In its early days, its primary goal was to fund the development of Ethereum 2.0, making it exclusive.

Second, MolochDAO's funding pool is limited, and it can only support a finite number of projects,

making it competitive.

As a Knowledge Commons, MolochDAO is non-exclusive and non-competitive. Its governance model, including the famous Ragequit framework, has provided a blueprint for many other DAOs, and its influence continues to this day.

Sustainability

MolochDAO's funds come from its members, so it does not have a sustainable source of income.

Degree of Decentralization

MolochDAO's protocol has undergone three upgrades and is a decentralized DAO controlled by smart contracts, distributing shares and voting rights according to the amount of funds contributed^[123]^[124].

MolochDAO 1.0 aimed to be a "Minimum Viable DAO," with a straightforward protocol and minimal lines of code:

- To become a member, one had to submit a membership proposal, which required approval through a vote by existing members.
- Members' voting power was directly proportional to the amount of assets they committed in their membership proposal. These voting rights were not transferable.
- Funding proposals were initiated by existing members and voted on sequentially.
- Members could "ragequit" and exit the DAO, receiving a proportional share of the treasury.

Subsequent versions introduced features like external proposals, delegation of votes, additional proposal types, and "wizards," enhancing MolochDAO's flexibility and accessibility.

Externalities

DAO Governance

MolochDAO was a pioneer in the rise of DAO organizations, and it inspired a wave of subsequent DAOs. Its governance protocol has had a significant impact, with notable

examples including MetaCartelDAO and Meta Gamma Delta DAO. Later DAOs continued to fork and improve upon MolochDAO's protocol, eventually leading to upgrades in MolochDAO itself^[125].

Public Goods Funding

Amid the crypto bear market, MolochDAO and projects like Gitcoin (which introduced the Quadratic Funding framework in 2019) spurred discussions and debates around "public goods" and "coordination" in the Ethereum ecosystem. These discussions have grown into essential values within the Ethereum community.

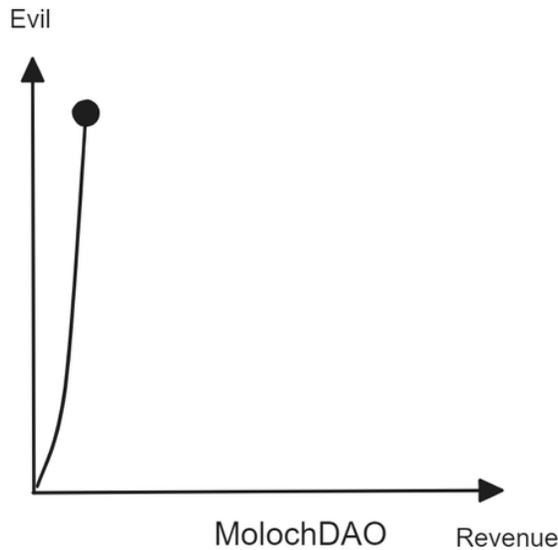
Support for Ethereum Public Goods

During the Ethereum 2.0 upgrade period, MolochDAO provided funding for a range of public infrastructure projects within the Ethereum community, including Ethereum Cat Herders and the Eth2 Deposit Contract.

Since 2019, Moloch DAO has distributed nearly \$1.4 million in grants[122].

Revenue Evil Curve

MolochDAO serves as a funding mechanism for "public goods." As such, it is inherently non-competitive (its purpose is to create public goods, encouraging non-competitive and non-exclusive projects) and lacks appropriate market mechanisms for subsidies. The same applies to MolochDAO as a knowledge-based public good. Therefore, on the evil revenue curve, it falls into the category of non-competitive and non-exclusive items, which should be prioritized for funding.



[122] <https://decrypt.co/resources/what-is-moloch-dao-funding-public-goods-ethereum-ecosystem>

[123] https://link.springer.com/chapter/10.1007/978-3-031-20160-8_13

[124] <https://arxiv.org/pdf/2304.09822.pdf>

[125] <https://molochdao.com/annual-report/>

6.2.12 Donate3

Category

Funding/Donation

Introduction

Donate3 is a project that has been incubated by LXDAO from its early stages ([126], [127], [128], [129], [130]).

Donate3 is a multi-chain, multi-coin donation tool that allows recipients to generate attractive and comprehensive donation buttons with simple configurations and integrate them anywhere. Users can make donations, leave messages, and receive EAS-based donation receipts through the tool. Additionally, Donate3 collects and compiles donation data for users to easily understand their donation history.

User Base

Donate3 is relatively new and is in its initial operational phase. You can find related donation data and integrated projects on its official website[131].

Funding Sources

Currently, incentives or rewards for Donate3 project team members come from two sources:

1. Prizes won in hackathons (such as Consensys Hackathons and Wanxiang Hackathons).
2. Support from the LXDAO treasury.

Openness and Permissionlessness

Donate3's code is entirely open-source, showcasing openness and permissionlessness.

Non-Exclusivity and Non-Competitiveness

Donate3's software development toolkit is also freely available for use. Anyone can deploy it with simple code, making it highly non-exclusive. Additionally, as a digital product, its marginal cost is negligible, demonstrating high non-competitiveness.

Degree of Decentralization

Donate3 is a project incubated by LXDAO and is primarily built and governed collectively by team members. The Product Manager (PM) serves as the bridge between the project team and LXDAO.

Contributor Incentives

Incentives for contributors are distributed based on their Proof of Contribution's weighted scores.

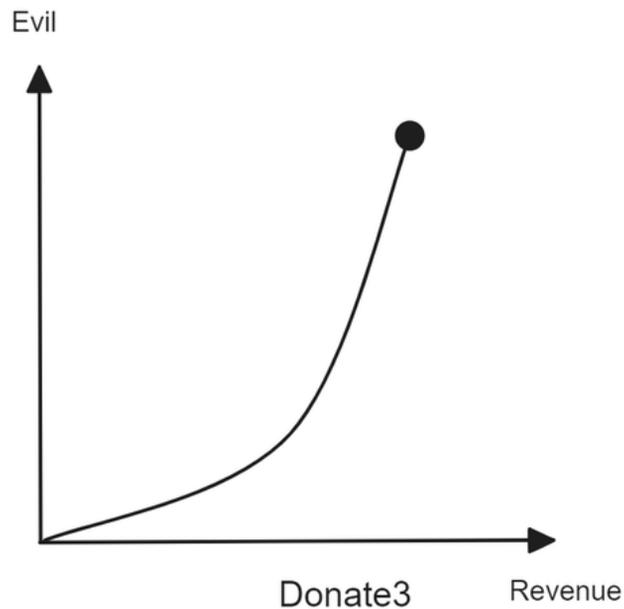
The incentive distribution in Donate3 works as follows: Each team member logs their work hours, multiplies them by their respective hourly rates, and after PM's review, the incentives are disclosed to team members. If there are no disputes, the incentive weight for a specific member is determined.

Externalities and Sustainability

- By supporting multiple blockchains and various tokens, Donate3 enhances the donation experience on the blockchain.
- With the message feature and the generation of donation receipts, donation activities become more versatile, creating a lasting connection between donors and recipients.
- The donation statistics provided through the data dashboard make it simpler and clearer for recipients to track and understand donations.

Revenue Evil Curve

As a digital application, Donate3 has very low marginal production costs. Charging users universally could reduce its utility. If it accumulates a sufficient user base, Donate3 can be monetized through methods such as advertisements, fees, or providing specialized services to organizations. In the evil revenue curve, Donate3 falls into the category of public goods that can be appropriately monetized.



Prospects and Challenges

"Public goods" is becoming an increasingly popular term in the blockchain space, and Donate3 has the potential to make donations more cost-effective and user-friendly.

However, it requires effective marketing to encourage more people to use the product. Additionally, financial support is needed for iterative development in the early stages of the product.

[126] <https://forum.lxdao.io/t/topic/178>

[127] <https://forum.lxdao.io/t/community-call-2022-09-21/180>

[128] <https://forum.lxdao.io/t/proposal-new-project-donate3/186>

[129] <https://forum.lxdao.io/t/donate3/299>

[130] <https://forum.lxdao.io/t/donate3/669>

[131] <https://www.donate3.xyz/>

6.3 Downstream

6.3.1 CryptoZombies

Category

Education

Introduction

CryptoZombies is an educational platform that allows users to learn blockchain programming by writing games and is currently the largest blockchain development education platform.

When users take Cryptozombies courses, they need to continuously interact with the courses and can also earn virtual currency and NFTs. Virtual currency can be used to purchase subsequent courses, making the learning process more engaging and practical. The current courses cover Solidity, Chainlink, Optimism, zkSync, and more.[132]

User Base

The current number of registered users has exceeded 400,000.

Funding Sources

Second-round funding from RetroPGF (130,577.81 OP), and support from the Loom Network team. [133]

Openness and Permissionlessness

Anyone can participate and access the website without any restrictions.

Non-Exclusivity

As long as you have a wallet, you can participate in the courses. There are no other restrictions on the courses, making it relatively non-exclusive.

Non-Competitiveness

Each user's course data and progress are independent, allowing each user to learn independently without interfering with or competing for resources with other users. It has a high degree of non-competitiveness.

Degree of Decentralization

The entire game course is developed internally by the team, and its level of decentralization is relatively low.

Contributor Incentives

There are currently no specific incentive measures disclosed.

Externalities

Cryptozombies provides tutorials through games, making interactive courses user-friendly, especially for those new to blockchain. Blockchain learners can access and learn from these high-quality courses for free, facilitating the rapid dissemination of blockchain content.

Sustainability

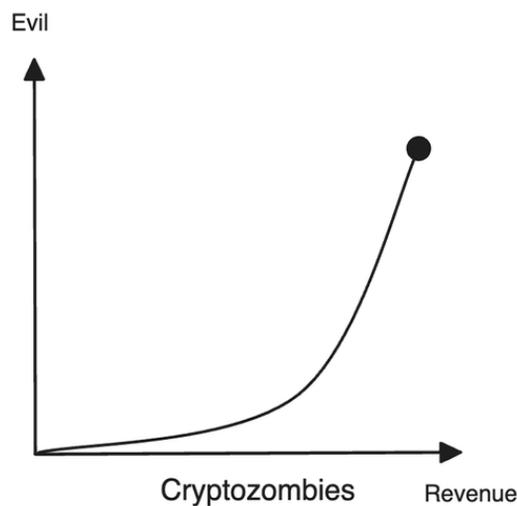
Cryptozombies is a product developed by the Loom Network team, and the Loom Network team recently completed a coin offering. For the Cryptozombies team, sustainability can be achieved through support from the Loom Network team.

Of course, the Cryptozombies team also obtains funding through external donations, such as the 130,577.81 OP received from the RetroPGF second round.

Content production, which may make it difficult to meet users' demands for course content.

Revenue Evil Curve

As an educational product, Cryptozombies has various monetization options. For example, it can generate revenue through advertising or by offering more advanced paid courses, which would not significantly harm regular users. However, if the pressure to monetize becomes too high, potentially requiring the entire course to be paid for, it could be costly for potential users.



Prospects and Challenges

Cryptozombies started with Solidity tutorials and has gradually added courses on zkSync, Optimism, and plans to cover more new content in the future. The quality of the courses is high, meeting the needs of beginners. With the support of the Loom Network team, Cryptozombies does not have to worry about funding and can focus on producing high-quality content.

However, there are some issues, such as the slow pace of content production, which might not fully meet the users' demand for course content.

[132] <https://cryptozombies.io/en/course>

6.3.2 Dark Forest

Category

Education

Introduction

Dark Forest is a decentralized real-time strategy game based on Ethereum, inspired by Liu Cixin's book "The Dark Forest" and its theories. Players explore, conquer planets, and compete with other players in a vast, procedurally generated universe. What sets this game apart is its use of zk-SNARKs (Zero-Knowledge Succinct Non-Interactive Arguments of Knowledge) to maintain the privacy of players' movements until they choose to reveal their positions.

User Base

- **Active Community Users:**
 - Dark Forest's community members frequently engage in discussions on various platforms such as Discord, Twitter, and forums, but the exact number of users is challenging to estimate. The Twitter followers number is 25,000. It is observed that community activity significantly increases whenever the game is updated or a new game round begins.
- **In-Game Online Players:**
 - The number of online players in Dark Forest fluctuates. According to official data, each game round typically has around 600 players, with transaction numbers reaching up to 250,000. During periods of high player engagement, participation can range from around a thousand players. Due to the limitations of blockchain transaction processing speed (TPS), each game round is usually set to last for approximately 10 days.

```

round complete yes
players 1866
ranked players 650

```

place	player	score
1.	0x6d11551d33c...	1,700,000,000
2.	0x0a9226cb970...	1,700,000,000
3.	0xdb8fbb48bd6...	1,064,347,475
4.	0x66d489f40f3...	931,310,000
5.	0x777d37f2905...	869,099,999
6.	0x76a959dd8ff...	784,363,567
7.	0x5fd1da7f4ca...	661,042,471
8.	0xf747dbcedc9...	519,665,832
9.	0xb6e554cc69c...	497,950,552
10.	0xdcaf829700b...	483,050,150
11.	0xed700b708d5...	470,458,485
12.	0x8dc13e92246...	468,740,000
13.	0xdfda0ac1eb2...	458,850,037
14.	0x0238590392d...	439,504,593
15.	0x52b372ce14b...	432,150,875

Funding Sources

Dark Forest has not issued its own token yet, but it has received funding from various investment firms and individuals, including YCombinator, Paradigm, Naval Ravikant, and Balaji Srinivasan, among others.

Currently, the game utilizes xDAI and ETH as its in-game tokens for paying game-related fees and purchasing non-fungible tokens (NFTs).

Openness and Permissionlessness

The core of Dark Forest is its "permissionless interoperability." The game is essentially built on Ethereum smart contracts and acts more like a protocol or set of rules rather than an application limited to a specific client.

This structure means that anyone with the relevant capabilities can create custom front-end clients to interact with the backend contracts according to their preferences. More importantly, this structure allows any Ethereum address to interact with it, regardless of whether these addresses represent human users, bots, or other contracts.

This openness not only greatly expands the boundaries of gameplay strategy but also fosters a vibrant plugin ecosystem. In this ecosystem, players can freely combine, build, and experiment with various innovative gameplay styles. This has led to the emergence of creative applications such as the artifact trading market, celestial trading market, planet bounty system, and even combat AI. These enrich the game's objectives and gameplay while attracting a more diverse player base. With the introduction of the Lobby system and further development of on-chain engines, even the fundamental rules of the game can be redefined, allowing players to set their own universal rules.

Non-Exclusivity and Non-Competitiveness

The game world's resources are open, and players can freely explore and occupy star systems. Although there are competitors, a player's actions do not deplete available resources because the universe is vast, and resources are abundant. This design allows players to enjoy the game without harming others.

Degree of Decentralization

The game operates entirely on the Ethereum blockchain, with no single entity controlling the game. This ensures the immutability and transparency of data. On the other hand, the game's decentralized nature reduces the risk of single points of failure.

Decentralization is not only reflected in the game's mechanics but also in its protection of player privacy and fairness. By using zk-SNARKs (Zero-Knowledge Succinct Non-Interactive Arguments of Knowledge), the game can verify the correctness of players' submitted planet positions and states without disclosing specific player data. This technology ensures the security of information, allowing players not to worry about revealing their game strategies and positions to other players.

The use of smart contracts further enhances the game's decentralized characteristics. All game rules are embedded within smart contracts, meaning that once deployed, developers cannot easily change the game's rules. This ensures the game's fairness. This immutability protects players from potential fraud and unfair treatment, strengthening trust in the entire system.

However, while zk-SNARKs provide privacy protection, they also introduce computational challenges as the generation and verification of these proofs require relatively high computational resources. While smart contracts offer rule immutability, they also need to adapt to changing user needs and the gaming environment, which may limit the game's flexibility and adaptability to some extent.

Contributor Incentives

Contributor incentives primarily manifest in support for developers and content creators. Community members can contribute to the game by developing plugins, providing game strategies, or creating artwork.

Contributors are also incentivized by planet NFTs created by the official team, which are distinguished by levels and colors. These planet NFTs are deployed on the Ethereum mainnet and can be traded in markets like OpenSea, with peak selling prices reaching 5-6 ETH (at that time, the market value of ETH was about 1 ETH = 3000 USDT). Additionally, players who rank in the top 63 in each round can also receive the same NFTs.

Furthermore, contributors can indirectly gain reputation, recognition, and potential future opportunities by enhancing the gaming experience, expanding game functionalities, and strengthening interactions among community members. This also increases their sense of belonging within the community.

Externalities

Dark Forest introduces blockchain technology to real-time strategy games, showcasing the potential of this technology in the gaming industry. It provides an experimental ground for blockchain's usability and scalability, potentially sparking more innovation and applications.

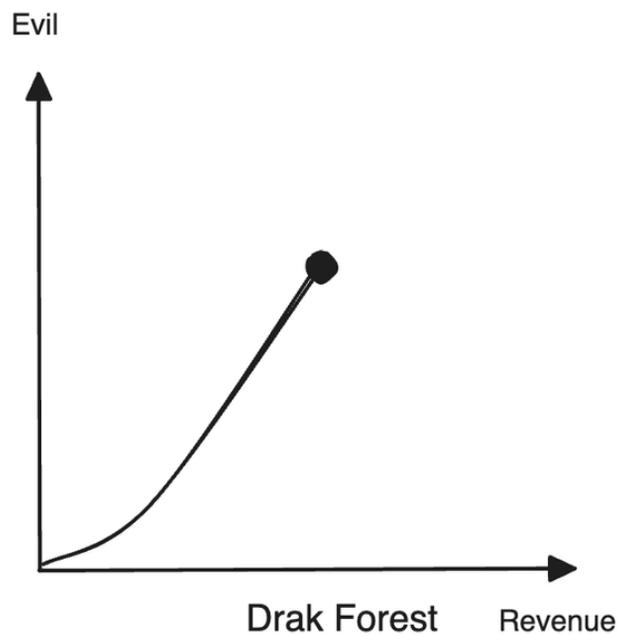
Furthermore, as a decentralized application (dApp) based on Ethereum, it introduces new users to the world of blockchain, to some extent increasing the diversity of the Ethereum network's user base. Through its game mechanics and technical implementation, Dark Forest offers an experiment in the field of blockchain gaming that other developers and projects can reference.

Sustainability

The main challenge facing Dark Forest is how to maintain its user base and attract new players while preserving its unique game mechanics and philosophy. It needs to continually innovate and adapt to player needs to ensure its long-term appeal and survival.

Revenue Evil Curve

Dark Forest uses zero-knowledge proofs to protect player privacy and achieve technological innovation. In terms of "evilness," this can be seen as a positive feature, as it enhances player privacy and data security. However, if the game's monetization strategy leads to inequality among players, or if the in-game economy is manipulated by a few players, this could increase the game's level of malevolence. Additionally, blockchain games typically have some monetization mechanisms to support their development and maintenance, so the level of revenue generation might be moderately high.



Prospects and Challenges

After the initial launch of Dark Forest, the game saw an influx of over 10,000 players, driven by Vitalik's endorsement and social media buzz. However, this popularity highlighted the game's limitations: Ethereum's performance was insufficient to support the operation of such a complex application. On the day of Dark Forest's launch, the entire Ethereum network experienced congestion, with players facing delays or failures in their actions. Additionally, trillions of Gas were

spent, and the high transaction costs could deter player interaction on the blockchain; scalability issues could limit the game's size. Moreover, as the game was designed using libraries and architectures based on DeFi applications, even subsequent optimizations couldn't address the fundamental issue.

Nevertheless, Dark Forest, as a pioneer in full-chain gaming and the early application and exploration of ZK-Snarks, has significantly influenced and inspired many subsequent projects.

In terms of Dark Forest itself, the game's innovation and insights have had a profound impact. One of the game's founders, Brian Gu, established 0xPARC as a research institute for ZK-Snarks to promote the development of zero-knowledge proofs. Another branch of 0xPARC, Lattice, is responsible for designing and maintaining the full-chain gaming engine, MUD. Another co-founder, SCOTT SUNARTO, began developing a dedicated shard Rollup framework for full-chain gaming: World Engine. The game Dark Forest may not be the final design goal but merely a starting point. This is one of the reasons why this article categorizes Dark Forest under the 'Education' category.

[134]<https://zkga.me/>

[135]Freedom and Restraint in Dark Forest: A Peek at the Metaverse Through a Blockchain Game
<https://ieeexplore.ieee.org/document/9934831>

6.3.3 TreeGEN

Category

Refi

User Base

As a relatively new project, specific user scale data for TreeGEN is not explicitly mentioned in publicly available resources. However, based on its activities on social media and involvement in innovative projects in the renewable energy field, it can be inferred that the organization is actively expanding its influence and user base. For instance, TreeGEN's partnerships and involvement in renewable energy initiatives indicate growing interest in its solutions.

Funding Sources

There are currently no reports of public funding for TreeGEN. However, based on some available information, it can be speculated that their sources of funding might include:

1. **Partnerships and Project Sponsorship:** According to a [report on the partnership between Bluesphere Carbon and TreeGEN Ltd](#), Bluesphere Carbon has established a partnership with TreeGEN Ltd to jointly develop TreeGEN's Refi project. This partnership likely provides financial support and technical collaboration for TreeGEN.
2. **Community and DAO Support:** [A blog post from Refi DAO](#) mentions collaboration with TreeGEN, implying that Refi DAO may provide some form of financial support or partnership opportunities.

Openness and Permissionless

TreeGEN is an organization focused on Refi, and its core philosophy is to use blockchain technology and Web3 concepts to provide funding, governance, and regeneration for public

resources. This open model means that anyone can participate without the need for specific permissions or qualifications. For example, according to a [report from Ethical Marketing News](#), Bluesphere Carbon has partnered with TreeGEN Ltd to jointly develop TreeGEN's Refi project, which aims to provide funding to farmers for tree planting through Refi, resulting in a positive impact on the Earth.

Non-Exclusivity and Non-Competitiveness

TreeGEN supports renewable energy through its Refi project, which is a non-exclusive field since the benefits of renewable energy extend to various levels of society. The project's non-competitiveness is evident in its enhancement of environmental sustainability through cooperation rather than competition.

Decentralization

TreeGEN focuses on Refi, providing funding for farmers and communities through blockchain technology to support reforestation and other environmentally friendly projects. This approach itself is decentralized as it bypasses traditional financial intermediaries and provides funds directly to those in need.

Contributor Incentives

TreeGEN encourages community members to participate in its projects. This extends beyond farmers to include technology developers, researchers, and other stakeholders. Incentives for these contributors may include a sense of community, recognition, and possible economic returns.

Externalities

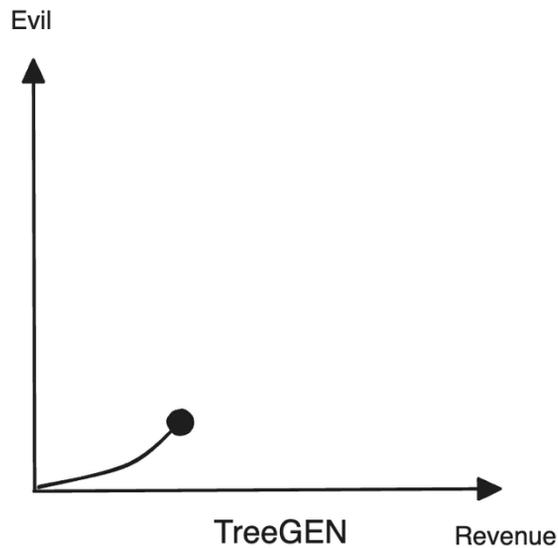
TreeGEN promotes the use and investment in renewable energy, reducing carbon emissions, and supporting environmental sustainability and community development.

Sustainability

TreeGEN's sustainability is reflected in its long-term commitment to renewable energy and environmental protection. Through the Refi project and other initiatives, TreeGEN is building an ecosystem designed to endure and grow.

Revenue Evil Curve

As a Refi (Regenerative Finance) project, TreeGEN is typically committed to positive social and environmental impacts and supports sustainable environmental development. Therefore, in terms of "evilness," it would likely score low. Additionally, its revenue prospects largely stem from funding initiatives aimed at reducing carbon footprints and promoting sustainable development. However, as there are currently no publicly available reports on its financing, TreeGEN's level on the revenue evil curve should be considered low under these circumstances.



Prospects and Challenges

The prospects for TreeGEN include expanding the influence of its Refi project, attracting more partners and funding, and becoming a leader in the field of renewable energy. Challenges may include ensuring the financial feasibility of the project, adapting to regulatory changes, the need for technological innovation, and staying relevant in a competitive and rapidly changing field.

[136]<https://ethicalmarketingnews.com/bluesphere-carbon-and-treegen-ltd-partner-to-develop-revolutionary-treegens-refi-project>

[137]<https://twitter.com/JimiCohen>

[138]<https://medium.com/topl-blog/topl-spotlight-11-building-refi-communities-with-treegens-jimi-cohen-e888b6df1d77>

[139]<https://blog.refidao.com/refi-roundup-51/>

[140]<https://ethicalmarketingnews.com/bluesphere-carbon-and-treegen-ltd-partner-to-develop-revolutionary-treegens-refi-project>

6.3.4 Uncommons

Category

Community

Introduction

Uncommons is a public sphere where a collective of Commons Builders explores Crypto Thoughts together. Uncommons is a corner of the blockchain world, where a group of public goods builders

collide with crypto-humanistic thoughts. It was formerly known as the GreenPill Chinese community.

User Base

TG group with 200+ members, 1200+ Twitter followers.

Funding Sources

The primary source of funding is donations (200 ETH initial funding).

Other sources of funding include the Nouns Workstream group selling their Nouns tokens at a profit of 7.5 ETH after the Nouns fork proposal was approved.

Openness and Permissionlessness

The Uncommons community is open to anyone interested in public goods creation and crypto culture, emphasizing an open discussion environment.

Non-Exclusivity and Non-Competitiveness

Uncommons aims to promote the free flow of knowledge and crypto thoughts, attracting more crypto-humanitarian enthusiasts, content creators, and researchers. As it is a blockchain-based community focused on content and research, and all content and sharing within the community are fully open source, the sharing of knowledge and discoveries does not reduce their availability. This non-exclusivity and non-competitiveness reflect its nature as a public goods community. Additionally, the research outcomes from Uncommons are intended to benefit everyone.

Degree of Decentralization

The Uncommons community is highly decentralized in its operation and management, with community members participating in the decision-making process.

The overall daily operation and governance work of the community is handled by Operators (OPs). The OP's responsibility is to manage support tasks within the community's overall scope. OP work is service-oriented, and they receive a salary from the community treasury each month. Each OP cycle is for one quarter (3 months), and full-time OPs work for two cycles in one round, while part-time OPs work for one cycle in one round. OPs can choose to run for re-election.

In addition, the Uncommons community has a Steward Council (SC), responsible for managing the community treasury multisig wallet, with oversight and strategic decision-making authority. There is also a Health Assistant (HA) dedicated to assisting with community governance. This initial three-tier structure provides checks and balances.

Contributor Incentives

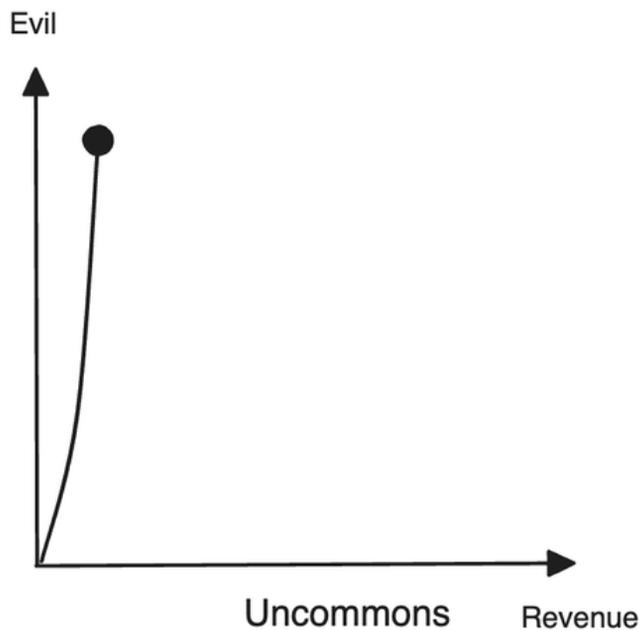
In Uncommons, contributors can earn material bounties by participating in and forming working groups, or by running for the position of OP. Additionally, community members who engage in high-quality discussions or publish content within the community can earn recognition and incentives through the "Little Red Flower system," which is recorded on the blockchain.

Externalities and Sustainability

The activities and projects of Uncommons have positive externalities on the web3 world in the Chinese-speaking community, such as advancing crypto-humanitarian ideas, raising awareness of Ethereum development and public goods creation, among others. These externalities contribute to the long-term sustainability of the community.

Revenue Evil Curve

As a non-profit community primarily producing content and research results, Uncommons is currently at a low level of monetization. Additionally, the positive externalities of its content outputs can benefit everyone. Compared to other types of communities or DAOs (Decentralized Autonomous Organizations), it is more challenging for Uncommons to subsidize its operations through alternative revenue streams. Therefore, its position on the revenue evil curve is at a relatively steep slope.



Prospects and Challenges

Uncommons may face challenges such as maintaining community engagement, attracting more members to participate, and addressing potential governance issues. Additionally, Uncommons is currently operating as a non-profit entity, so ensuring financial sustainability is also a topic worthy of consideration.

[141][Uncommons](#)

[142]https://twitter.com/Un_commons

[143]<https://matters.town/@creatorgreen>

5.3.5 VitaDAO

Category

Decentralized Science (DeSci)

Introduction

VitaDAO is a decentralized autonomous organization (DAO) focused on extending human life through biomedical research. It achieves democratic funding and decision-making for scientific research, particularly in the fields of anti-aging and longevity, using blockchain technology.

By collectively owning and managing intellectual property (IP) related to scientific knowledge, Vita DAO provides new funding sources for scientific research. Through smart contracts and blockchain technology, Vita DAO ensures transparency and traceability in the entire voting and fund allocation process. Anyone can see which projects receive funding, how funds are distributed, and which decisions have the support of the majority of members. This provides an alternative to traditional research funding models.

User Base

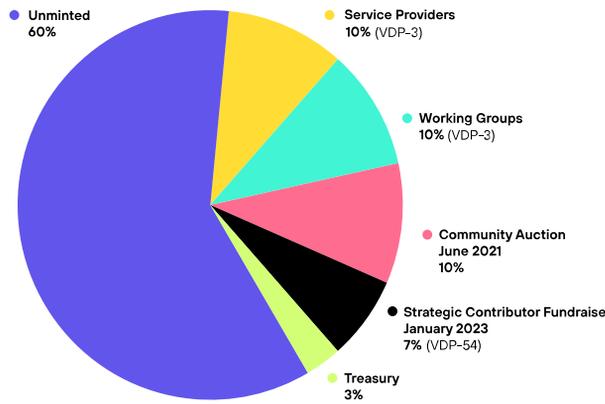
As of 2023, Vita DAO has more than 5000 active members, including researchers, biomedical experts, cryptocurrency enthusiasts, and supporters of longevity research.

Funding Sources

The primary source of funding for Vita DAO is its native token, VITA.

The total supply of VITA tokens is based on the number of seconds in the lifespan of the longest-lived human known in history. Vita DAO has committed that if scientific research can surpass this lifespan limit, additional tokens will be minted based on the new longevity record.

VITA tokens serve as the foundation of the Vita DAO ecosystem and are core to its democratic governance structure. Members holding VITA can participate in various critical decisions, including which research projects should receive funding and how to manage Vita DAO's intellectual property (IP) portfolio. Members can acquire VITA through various means, including direct purchases, contributions to Vita DAO's work, capital injections, or by providing research data and other forms of intellectual property.



*As of 1 January 2023

Token Distribution

In terms of financing, in 2023, Vita DAO secured \$4.1 million in funding, with participation from Pfizer Ventures, Pfizer's venture capital division, Shine Capital, L1 Digital, Balaji Srinivasan, and others. It's worth noting that Pfizer not only holds Vita governance tokens but also participates in governance proposals.

Openness and Permissionlessness

Vita DAO's openness is primarily reflected in its membership structure and intellectual property (IP) management. It has an open membership acquisition mechanism, where anyone can join Vita DAO by contributing funds, work, or providing valuable research data or IP assets.

The VITA token, as Vita DAO's governance token, empowers its holders to participate in Vita DAO's decision-making. This includes voting on which research projects should receive funding, providing guidance on how to manage Vita DAO's IP holdings, and granting access to and utilization of its research data repository. This permissionless participation and governance model encourage transparency and community-driven scientific research.

Non-Competitiveness and Non-Exclusivity

Sharing knowledge and discoveries does not diminish their availability. Vita DAO operates on principles of sharing IP and data, and even though Vita DAO owns these assets, it encourages and facilitates their widespread use and reuse. This is most notably reflected in Vita DAO's non-competitive and non-exclusionary approach.

Vita DAO accumulates its IP portfolio through acquisitions and commissioned research, primarily representing the outcomes of therapeutic research projects, such as patents and licenses. These IP assets are converted into non-fungible tokens (NFTs), ensuring their uniqueness and verifiability.

In addition to IP, Vita DAO generates and manages a significant amount of data assets related to its research projects. These data assets provide potential resources for external research.

Degree of Decentralization

Vita DAO's operation relies on its distributed governance structure, which allows members holding VITA tokens to participate in the decision-making process through a decentralized platform. All key

decisions, including fund allocation, research direction selection, and IP management, are determined through member voting, rather than being controlled by a single centralized entity. However, the degree of decentralization may be influenced by community participation, diversity of members, and token distribution.

Contributor Incentives

To encourage individuals and organizations to contribute to public goods, Vita DAO has designed a set of incentive mechanisms. Through VITA tokens, contributors can participate in Vita DAO's governance, including decisions on research project selection and fund allocation, as well as the management of generated data and IP.

Although VITA tokens grant governance rights, they do not confer direct ownership of intellectual property. This means that while members can decide how to use and manage Vita DAO's research outcomes and related IP, they do not own these IP assets. This design structurally helps promote open science and knowledge sharing.

The design and circulation of VITA tokens follow a sustainable circular economic model. If more research projects receive funding and generate positive research outcomes, the value of Vita DAO's IP portfolio will grow. This value growth not only attracts more member participation but also stimulates the production and contribution of more high-quality IP, further enriching Vita DAO's research projects and outcomes. This circular economic model ensures Vita DAO's ongoing development, with members benefiting from their participation and contributions.

Externalities

Vita DAO's activities generate a range of externalities that may impact the broader community and even the overall advancement of life science research. For example, by funding scientific research and broadcasting the entire process on-chain and transparent decision-making, this helps accumulate and disseminate knowledge, potentially promoting broader scientific and medical progress. In addition, its innovative funding model may inspire traditional research institutions and funders to rethink their approaches. Vita DAO's principles of open data and research outcome sharing also facilitate scientific discovery and technological innovation to some extent.

Sustainability

The sustainability of Vita DAO is built upon its token economy (VITA token economic system) and intellectual property management foundation, and it largely depends on whether it makes progress in the field of biomedical research.

Although its sustainability faces challenges, such as ensuring that the scientific projects it funds have substantial impact and gaining acceptance from the traditional academic and industry communities, its DAO structure allows it to continuously adapt and evolve to meet the needs of its members and changes in the scientific community.

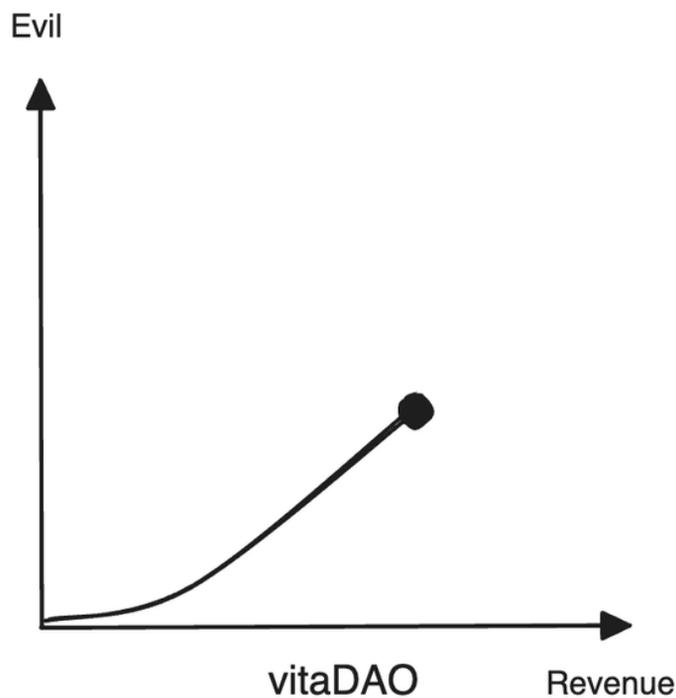
For example, Vita DAO is seeking partnerships with research groups to expand its scientific research and knowledge base. Through collaborations with research groups at the University of Copenhagen, Vita DAO's asset pool gains the necessary research, operations, and legal protection. Participants are rewarded with VITA tokens, providing them with economic incentives and additional governance rights over Vita DAO's intellectual property. This structure creates a positive

feedback loop, with ongoing engagement by scientists enhancing the quality and impact of Vita DAO's research, and the growth and success of Vita DAO attracting more expertise and data.

Revenue Evil Curve

If the projects funded by VitaDAO achieve success (including generating direct income from research outcomes, patent licensing fees, or selling equity), then the potential revenue-return expectations could be very high. However, such investments typically carry high risks, and the revenue can be quite unstable. Considering that VitaDAO has already received some investments, we place its revenue level at a moderate position.

On the evil axis, VitaDAO's goal is to advance human health and lifespan by funding biomedical research that typically struggles to secure funding. Therefore, its fundamental purpose is positive, with the potential for beneficial social impact. This is predicated on the assumption that its funds are indeed used for the declared purposes and that it maintains transparency. Based on its current progress and the analysis above, VitaDAO's level of malevolence is considered moderately low, although this could change in the future.



Prospects and Challenges

Vita DAO aims to fund more longevity research projects and attract more members. It also plans to raise awareness among the public about longevity science and decentralized scientific research.

At the same time, Vita DAO is exploring collaborations with traditional scientific research institutions and industry partners to promote resource sharing, knowledge transfer, and technology commercialization. Through these efforts, Vita DAO hopes to make a significant contribution to extending human healthspan.

However, Vita DAO also faces a series of challenges, including expanding its user base, ensuring high-quality research projects, and managing complex governance processes.

In the short term, it needs to find ways to attract more researchers and contributors. In the long term, it needs to continuously adapt and improve its governance and incentive mechanisms to ensure the success and sustainability of its projects. It also needs to address issues related to knowledge management and regulatory acceptance.

- **Governance Complexity:** As a global decentralized organization, Vita DAO needs to manage members from different backgrounds with varying interests and viewpoints. Finding a governance mechanism that balances the interests and perspectives of all parties is a significant challenge.
- **Legal and Regulatory Issues:** Due to the global and innovative nature of Vita DAO, it may encounter various legal and regulatory issues, especially related to intellectual property, fundraising, allocation, and data protection.

[144]VitaDAO. (2021). VitaDAO Whitepaper. <https://docs.vitadao.com>

[145]Golato, T. (2021). A Year in Review: Interview with VitaDAO Co-founder Tyler Golato. <https://www.vitadao.com/blog-article/vitadao-letter-year-in-review-interview-with-vitadao-co-founder-tyler-golato>

[146]<https://www.theblock.co/post/206552/pfizer-ventures-backs-decentralized-science-startup-in-4-1-million-round>

6.3.6 JPG

Category

Cultural public good, Community

Introduction

JPG is a curation platform and infrastructure that develops "cultural tools" for the rapidly evolving NFT ecosystem. JPG's goal is to map the relationships between artworks in the decentralized digital art landscape, providing valuable context and embedding them within a cultural context.

User Base

JPG's Discord Server currently has 2,620 members, and its Twitter account has 13.6k followers (as of October 31st).

Funding Sources

In early 2022, JPG raised \$3.8 million in a funding round led by Electric Capital and IDEO CoLab Ventures.

Technical Dependencies

JPG exhibitions and canons are backed up on the decentralized storage network Arweave to ensure data permanence.

Externalities

Exhibitions and Canons

As a curation platform, JPG's community has exhibition projects, allowing anyone with an Ethereum address to create NFT galleries and permanently back them up on the decentralized storage network Arweave.

On the infrastructure side, JPG introduced Canons, a token-curated registry (TCR) system based on Ethereum. Canons aim to index and map the relationships between NFTs in a decentralized way, providing more cultural context to NFTs. Canons are NFT lists curated by the community. Each canon has a title, description, and a set of standards defining the types it includes. For example, there can be a "conceptual art" canon. Canons are also permanently stored on Arweave, creating an indexed, ever-growing NFT relationship database and map, becoming the cultural infrastructure of web3.

Community

JPG's Discord community brings together art enthusiasts, curators, and thinkers. The ongoing intellectual exchange in the community itself is a public good.

Cultural Influence

NFTs are often seen as commodities, with many focusing on their market value. However, some are exploring the value of NFTs beyond market speculation, including the recent ERC-6551, and one of the motivations of creators is to open up possibilities for NFTs. The JPG community, through curation, aims to become the infrastructure for the cultural layer of web3, activating a different imagination for NFTs.

Non-Exclusivity and Non-Competitiveness

JPG's two main activities are Canons and Exhibitions. For exhibitions, anyone with an Ethereum address can create their own exhibition.

Regarding canons, JPG community members can submit proposals to add or remove specific collections from existing canons. Proposal voting is done by Canonicon NFT holders. Canonicon NFTs are free to mint, and the list of holders consists of those involved in the community, including existing JPG exhibition curators, and more. Currently, anyone who is a member of the JPG Discord community only needs to verify their wallet and wait for the JPG team to add them to the minting list. Canonicon holders can accumulate reputation points (JXPG) through valuable contributions (such as well-received proposals). This reputation determines their voting rights. Over time, JPG's goal is for canons to be community-managed, but in the initial stages, the JPG team will help set standards and recruit participants through a controlled onboarding process.

It can be seen that, at this stage, the non-exclusivity and non-competitiveness of canon are limited, and ownership of a Canonicon NFT is required for participation. However, this restriction is

to reduce uncontrollable factors in the early stages of project development, and it does not undermine the public good nature of canon.

Contributor Incentives

JPG is integrated with the NFT marketplace ZoraV3, allowing direct purchases of any assets listed on open orders in JPG exhibitions.

When creating listings, ZoraV3 supports an optional "Finder's Fee." Currently, the Finder's Fee collection address is JPG's multisignature wallet.

In the future, as JPG's marketplace functionality expands, the Finder's Fee mechanism may be distributed between JPG and curators.

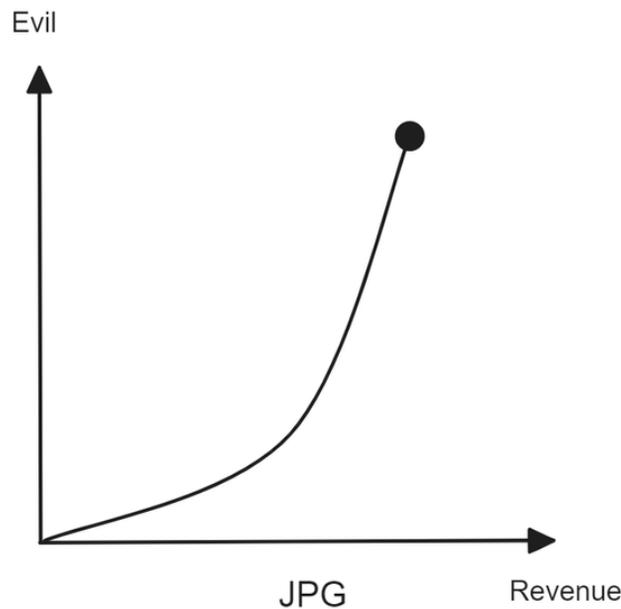
This indicates that JPG plans to introduce incentives for curators, allowing them to collect a portion of the "Finder's Fee" from art sales in JPG exhibitions.

Degree of Decentralization

JPG has a clear Canon protocol, and community members can propose changes. Besides that, it does not have a more defined organizational structure, leading me to assess it as having a relatively high level of decentralization.

Revenue Evil Curve

JPG, as a community and cultural artifact, is non-competitive and non-exclusive. However, it has some monetization pathways, such as funding and collaboration with NFT trading markets. Therefore, it falls into the category of public goods that can be appropriately monetized.



Prospects and Challenges

The cultural possibilities of NFTs are an area that is yet to be fully explored, as evidenced by recent proposals like ERC-6551, which aims to unfold the potential of NFTs beyond investment. The JPG

community has gathered a group of creators interested in this, and active discussions and co-curation within the community are gradually laying the cultural layer of web3.

Maintaining an active community while ensuring sustainability may be one of the challenges JPG faces. The participation rate in DAO governance has always been a concern, and JPG relies on mutual inspiration within the community.

[147]<https://www.rightclicksave.com/article/the-power-of-community-curation-jpg>

[148]<https://www.coindesk.com/web3/2023/05/19/beyond-the-jpeg-web3-is-expanding-the-artists-canvas-through-immersive-irl-experiences/>

6.3.7 Commons Stack

Categories

Community; Culture

Introduction

Commons Stack was founded in 2019 and has been involved in designing and implementing several groundbreaking projects.

The mission of Commons Stack is to build tools and frameworks that enable impact initiatives or projects to develop into decentralized autonomous communities (CommonsDAOs). Their approach (commons) is inspired by the work of Elinor Ostrom, who studied how commons could thrive beyond the binary opposition of public and private, by adhering to certain principles of cooperative governance. The main logic is to create systematic incentive structures through the Commons Stack platform, aligning individual interests with common interests, thus enabling collective action to organically occur.

Funding Sources

Commons Stack collaborates widely with project partners, including BlockScience, Blossom Labs, Metagov, Curve Labs, PrimeDAO, Giveth, 1Hive, Aragon, Token Engineering Academy, Token Engineering Commons, and more. While they have not disclosed specific information, it can be inferred that projects provide funding to Commons Stack to support its ongoing operations.

The Commons Stack also accepts donations, as seen on their [Giveth donation page](#).

Openness and Permissionlessness

Commons Stack is "[an expanding open-source component blueprint library for governance, fundraising, capital allocation, and impact measurement](#)." Therefore, these tools possess the characteristics of digital public goods, with a high degree of openness and permissionlessness, as well as non-exclusivity and non-competitiveness.

Degree of Decentralization

According to the information on their website, Commons Stack's team is small and has clear divisions of labor, with no apparent hierarchical features.

Externalities and Sustainability

Commons Stack focuses on the intersection of culture and token engineering—providing both technical tools and cultural frameworks and governance structures. In terms of methods and products, they specifically have four pillars: Cultural frameworks, economics co-design, research, and Library of tools.

Cultural frameworks: Based on applied research into governance models of the commons, they provide cultural frameworks and governance solutions for communities. These frameworks aim to create a social layer within the community, fostering democracy and active participation. For example, they were the first to use the Praise mechanism in the token engineering community to distribute rewards and applied Ostrom's principles to DAO governance, among other initiatives.

Economics co-design: Communities collaboratively design economic systems and models to ensure the participation of those most affected, promoting inclusivity, representation, flexibility, and democracy. They began applying economic co-design methods in 2021.

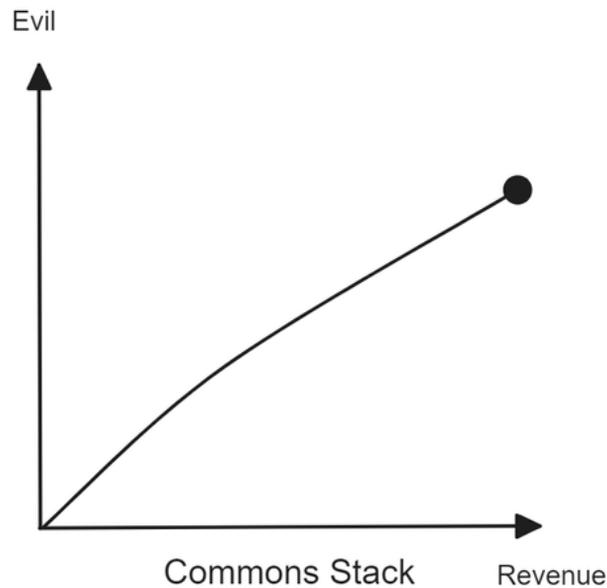
Research: They conduct applied research based on institutional economics and the theory of the commons to provide insights for the development and iteration of tools and frameworks. For example, they collaborated with BlockScience in 2019 and published research on Augmented Bonding Curve and Conviction Voting.

Library of tools: They provide a modular, interoperable technical toolkit for communities to fund projects, create regenerative economies, and collectively manage resources. They released the Commons Simulator in 2021, and Token Engineering Commons became the first CommonsDAO. In 2022, they introduced the TRUST token, and Trusted Seed became

an independent entity. They also released cultural deployment protocols for Praise and launched Commons Prize, among other initiatives.

Revenue Evil Curve

Commons Stack, as a knowledge public good, exhibits non-exclusivity and non-competitiveness. However, it obtains a certain degree of monetization through collaborations with other organizations, making it a monetizable public good.



Prospects and Challenges

Similar to Metagov, Commons Stack primarily provides knowledge-based public goods (related to community governance of common pool resources). With the rise of DAOs and funding for public goods, there is a market demand for these types of public goods within today's Ethereum ecosystem. By incubating and supporting DAOs, Commons Stack can share in the profits of successful DAOs. It can also continue to keep these kinds of public goods open-source.

However, the challenge lies in Commons Stack's need to continually provide tools and insights for the self-organization of the Web3 ecosystem and to integrate cultural and sociological tools with code. This requires interdisciplinary participation and the influx of new intellectual forces.

[149]<https://giveth.io/project/commons-stack>

[150]<https://faq.commonstack.org/#what-is-a-commons>

[151]<https://www.commonstack.org/work#open-source>

[152]<https://token-engineering-commons.gitbook.io/tec-handbook/archive/archived-content/praise-and-impact-hours>

[153]<https://www.commonstack.org/about#partners>

6.3.8 CirclesUBI

Category

Economic Equality; Community; Social Experiment

Technical Dependencies

The Circles protocol consists of two layers: Layer 0, which is deployed on the Gnosis Chain as smart contracts, and Layer 1, which comprises applications or services built on top of it. These rely on

Gnosis sidechain components such as Relayers, graph-node, APIs, Pathfinder, Trust, and Capacity Networks to provide channels for interaction with the blockchain.

Introduction

The concept of the Circles Basic Income System was initiated by Martin Köppelmann, a co-founder of Gnosis, in 2013. It was eventually put into practice in Berlin in 2020, leading to the establishment of the Circles Cooperative as a pilot for Circles UBI.

Circles UBI is a project aimed at providing a Universal Basic Income (UBI) to everyone in the form of digital tokens that circulate based on mutual trust. These tokens are periodically distributed to every individual in the community. Users can send these tokens to others in exchange for their products or services, offer them as gifts, or make donations. The tokens can also be used to access or participate in publicly funded goods and services like education, health, or environmental initiatives. As a community-driven solution, Circles UBI encourages the use of local products and services, thereby strengthening the local and circular economy.

User Base

CirclesUBI has 23.9k followers on Twitter (as of October 31).

Funding Sources

The Circles Cooperative in Berlin is funded through donations, including contributions from [Martin Köppelmann](#) and various anonymous or named donors (details can be found on [Open Collective](#)).

Openness and Permissionlessness

Circles UBI is characterized by openness and permissionlessness.

Built on blockchain technology, the code of relevant smart contracts and applications, along with the whitepaper, are available on [GitHub](#). Anyone can view, fork, or contribute to the project. Users can understand the system's operation and offer their suggestions.

Non-Exclusivity and Non-Competitiveness

Circles UBI embodies complete non-competitiveness and to some extent, non-exclusivity.

Each user periodically receives a set amount of Circles points as part of their UBI. The supply of Circles Points is determined by an algorithm that adjusts based on supply and demand and is not affected by the number of users or transaction counts.

Circles UBI possesses some degree of non-exclusivity. The distribution of points is entirely exclusive. However, because the Social Trust Graph is a crucial mechanism in this project, the points a person receives are tied to them. If someone has not established enough trust or connections with other users, they may be excluded from certain transactions or networks. The economic activity within one's community can also impact the value of their points. Consequently, Circles UBI may not guarantee the same results for everyone. As mentioned earlier, this is designed to promote localization, cooperative relationships, and community.

Degree of Decentralization

The Circles Cooperative in Berlin, as the first instance of CirclesUBI, adopts a highly decentralized community governance approach. [Learn more](#).

Contributor Incentives

Contributors to Circles Coop receive their income from donations. Due to the lack of ongoing funding sources, [the organization will cease its operations in January 2024](#).

The project has a relatively low level of monetization, driven by their goal of unconditionally providing basic income to everyone in a specific region. Given this vision, monetizing the project is challenging.

Externalities and Sustainability

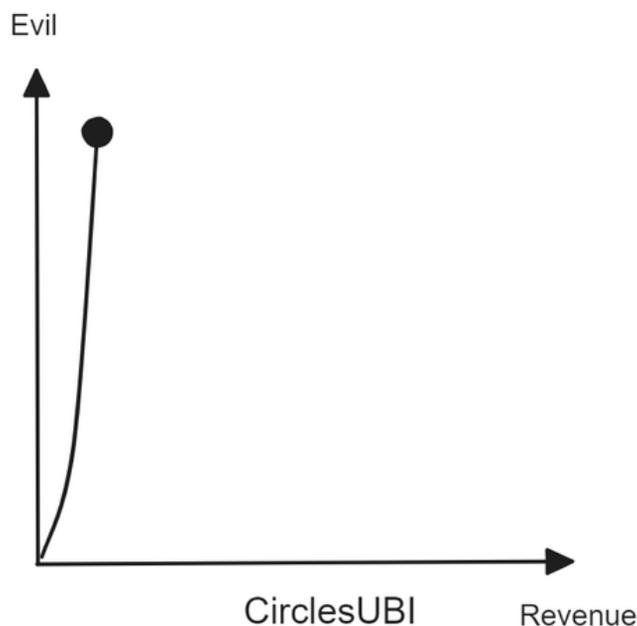
Circles UBI's experiment has garnered attention from the academic community. [A study in 2023](#) suggests that the system positively impacts local trade and proves to be an effective method of bottom-up digital currency practice.

In summary, Circles UBI exhibits the following positive externalities:

- **Fostering community cooperation:** Circles UBI promotes social cohesion among users, relying on a trust graph based on social relationships to enable this alternative currency. Circles UBI also encourages users to support one another and their communities, making the Circles Points of local individuals more valuable as the local economy strengthens.
- **Supporting local economies and economic democracy:** Circles UBI enables users to engage in the local economy, empowering local residents. Individuals can receive basic income unrelated to employment or income status and can use points to purchase or sell local products and services.
- **Environmental sustainability:** Circles UBI contributes to environmental sustainability and resilience by reducing dependence on fossil fuels and global supply chains. Additionally, it may incentivize users to adopt more sustainable lifestyles and practices, as they can use points to access or support green initiatives and solutions.

Revenue Evil Curve

CirclesUBI, being inherently non-competitive and non-exclusive (providing universal basic income), faces significant ethical barriers to monetization. Therefore, on the income evil curve, it falls into the category of public goods that should be considered for funding in the first place.



Prospects and Challenges

Through programmable currency, CirclesUBI seeks to promote the development of local economies and build supportive communities. This is an intriguing experiment and aligns with the cultural DNA of Ethereum (consider the prominence of public goods concepts within Ethereum).

The challenge may lie in how to activate community participation while securing some form of funding to sustain the project in a process that might lack direct economic returns. Circles Coop Berlin has already announced its impending closure, and at present, a viable solution has yet to be identified.

[154]<https://joincircles.net/community/>

[155]<https://opencollective.com/circles>

[156]<https://github.com/CirclesUBI>

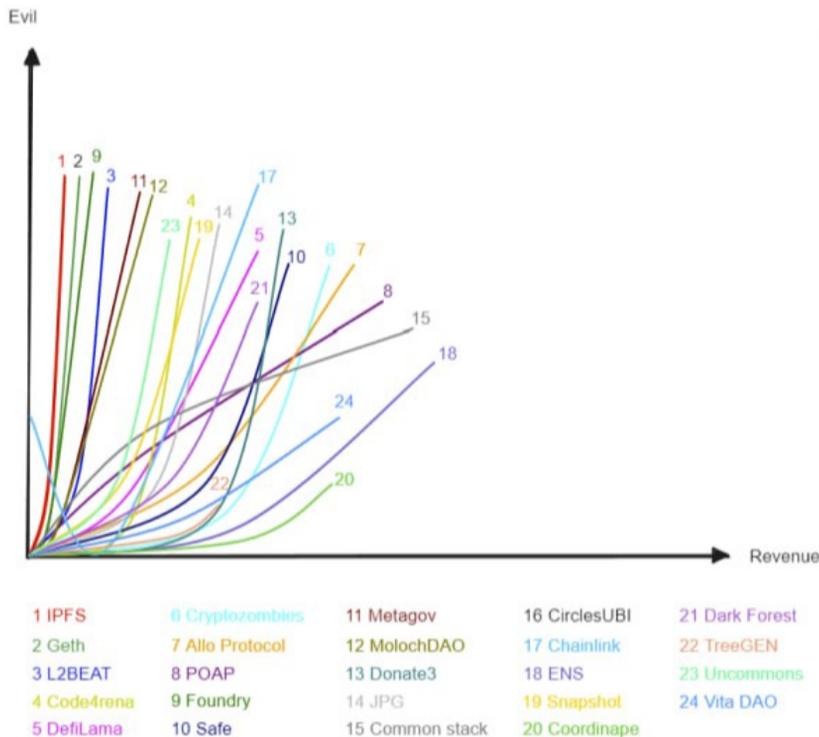
[157]<https://circles.coop/governance/>

[158]<https://twitter.com/CirclesUBI/status/1714281638115631402>

[159]<https://dl.acm.org/doi/pdf/10.1145/3582515.3609538>

Revenue Evil Curve All-in-one

Vitalik's Revenue Evil Curve provides us with a new perspective on evaluating public goods. Most public goods are not purely public, and their excludability and rivalry can change with monetization. The Revenue Evil Curve can serve as a tool for fund allocation. Here, we use the Revenue Evil Curve to analyze the above case. Of course, this is not a quantitative analysis, and different perspectives may yield different results. This analysis only represents our viewpoint.



07

The Outlook of Web3 Public Goods Ecosystem

7.1 Web3 Public Goods Ecosystem Outlook

Blockchain technology offers the advantages of immutability and transparency for data, solving trust issues. In Web3, there's a single user system, a shared database that can be trusted by everyone, and Web3 applications cannot restrict users to their own systems. Additionally, blockchain technology provides smart contracts and token mechanisms. Tokens can be verified, circulated, and traded, and they are programmable, providing a foundation for DAOs and on-chain governance.

An increasing number of projects and foundations are recognizing the importance of public goods. Bitcoin, for example, has distributed \$50 million in funding for public goods, and the Ethereum Foundation has provided over \$100 million in funding. RetroPGF's retrospective incentive program is ongoing, allocating over 30 million OP tokens to impactful public goods.[160]

7.2 New Models for Public Goods in Web3 Products

In Web2, to build a competitive product, you need to create a closed system with high barriers to entry through product, technology, and data. However, in Web3, the situation has changed. To make a product competitive, you need to connect with other users and products and remain open. Many Web3 products exhibit characteristics of public goods, as they must be open and accessible to anyone, in contrast to the closed systems of Web2 products.

Public goods will become a new business model in Web3. Web3 products need to gain trust through open sourcing, so most products tend to resemble public goods. Web3 products should be open and transparent, rather than creating a closed system like Web2 products.

7.3 Paths to Sustainability for Public Goods

- **Donation**

Donation is the most common way to fund public goods at present. There are two types of donations: individual donations and institutional donations. Individual donations are generally small, and even widely used public goods struggle to obtain sufficient funding from individual donations to sustain their projects. Institutional donations are motivated by the desire to make the ecosystem more prosperous. For example, the Ethereum Foundation continues to fund public goods within the Ethereum ecosystem. Uniswap also funds projects within the Uniswap and Ethereum ecosystems. These organizations help ensure the sustainability of the ecosystem and, in turn, benefit from it.

However, many organizations are unable to continue their donations due to a lack of sustainable funding. Donations offer no promise of returns, making it challenging for organizations to derive tangible benefits from the projects they support. Additionally, there is a lack of effective evaluation of public goods before donations are made, and there is insufficient tracking and management of fund usage after donations, leading to inefficient fund utilization.

Vitalik introduced the concept of the Income Evil Curve to determine if a public good is suitable for monetization and proposed that more funds should be donated to public goods that are less monetizable. However, there are no specific use cases for this concept, and no mechanisms for equitable fund allocation. [161]

QF mechanisms provide a new way to match funds, allowing everyone to decide the allocation of funds. Gitcoin and Clr.fund have implemented QF protocols, enabling communities to decide which projects should receive more funding, partially addressing the question of which projects are worth funding. Nevertheless, there is still a lack of solutions for tracking fund usage after donations.

Use cases: Early-stage startups with limited funding sources

- **CSR Income**

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Use cases: Early-stage startups with limited funding sources

- **Public Chain Gas Income for Supporting Public Goods**

While CSR is limited to on-chain public goods, PGN proposes an alternative approach to fund public goods by allocating a portion of gas fees from nodes (validators). PGN is an experiment initiated by Gitcoin and operated by a Public Goods Alliance, designed to run for at least two years.

PGN's mainnet went live in August 2023 and is currently in its initial stages of operation. The number of users and TVL on the mainnet is still relatively low. If PGN can gain traction, it will establish a new mechanism for funding public goods, similar to a tax system to maintain public goods.

The specific allocation of gas income generated within the ecosystem remains undetermined, and this complex issue addresses which public goods should receive funding.

Use cases: Early-stage public goods and off-chain public goods

- **Retrospective Funding**

Optimism has proposed a scheme to provide retrospective funding for public goods and has already completed two rounds of funding, with the third round ongoing, with quarterly distributions planned. The first round distributed \$1 million in grants to 58 projects, and the second round awarded 10 million OP tokens to 195 projects as a reward for their contributions to Optimism and the Ethereum ecosystem.[165,166]

This is the first implementation of retrospective funding for public goods, and the projects funded through this program are determined by community voting. The third round of funding is underway, with 30 million OP tokens to be distributed.[167]

Retrospective funding is a new approach that funds public goods only after their value to the ecosystem has been demonstrated. This prevents early investment in the wrong public goods and enhances fund utilization efficiency.[168,169,170,171]

However, this approach also faces challenges, including how to support early-stage public goods and how to measure the contribution of public goods. Moreover, determining the allocation of funds to different public goods remains a complex issue.

The evaluation and voting for these projects are conducted through OP's Citizen UI and are not highly decentralized.

Use cases: Public goods that have made contributions to the ecosystem

- **Implementing Public Goods Sustainability with DAOs and Tokens**

Blockchain technology provides smart contracts and tokens, and tokens can be programmed by smart contracts, laying the foundation for the sustainability of public goods.

Once public goods have matured, they can establish a DAO (Decentralized Autonomous Organization) to govern and manage these public goods. They can raise funds by issuing tokens. Those who hold these tokens can actively participate in the governance of the DAO, determining the future development of public goods while ensuring transparency throughout the process. Token holders also share in the benefits or profits generated by these public goods.

Tokens are also used to incentivize community members who contribute to public goods. Community members become more actively engaged in the iteration and development of public goods, thereby achieving sustainability.[173]

Applicable scenarios: Established and validated public goods

7.4 Challenges

Web3 provides new mechanisms and funding sources for the development of public goods. Many promising approaches are emerging, such as CSR (Contract Secured Revenue) and gas income redistribution, retrospective incentives, etc. These approaches can provide sustainable support for public goods contributing to the ecosystem. Building on the foundation of smart contracts and tokens, the entire process can be made more decentralized. For instance, Gitcoin is using the Allo Protocol to reduce the degree of human involvement in Quadratic Funding (QF).[173] All of these developments are pushing the public goods ecosystem in a positive direction. However, it cannot be denied that there are many challenges on the path to achieving sustainability for public goods:

- Insufficient awareness and attention from the general public regarding public goods.
- Lack of clear and transparent governance processes for public goods.
- Most public goods lack influence and struggle to secure sufficient donations.
- Inefficient utilization of funds allocated to public goods.
- Difficulty in quantifying the impact of public goods.

These challenges need to be addressed to ensure the sustainable development of public goods in the Web3 ecosystem.

[160]<https://docs.google.com/document/d/1CFD6ztSh2ggJ5O-U3uEea92UVB1cRbvBIA1tfPxLK8/edit>

[161]https://vitalik.ca/general/2022/10/28/revenue_evil.html

[162]<https://ethereum-magicians.org/t/eip-6968-generalized-csr-protocol/14178>

[163]<https://fantom.foundation/blog/gas-monetization-sustainable-income-for-developers/>

[164]<https://docs.canto.io/evm-development/contract-secured-revenue>

[165]<https://medium.com/ethereum-optimism/retroactive-public-goods-funding-33c9b7d00f0c>

[166]<https://app.optimism.io/announcement>

[167]<https://community.optimism.io/docs/governance/economics/>

[168]<https://community.optimism.io/docs/governance/allocations/>

[169]<https://gov.optimism.io/t/how-base-will-participate-in-optimism-governance/6690>

[170]<https://community.optimism.io/docs/governance/retropgf-3/#>

[171]<https://community.optimism.io/docs/governance/retropgf-2/>

[172]<https://consensys.io/blog/white-paper-equitable-public-good-allocation-and-the-unlocking-of-economic-value-through-token-based-markets>

[173]<https://grants.gitcoin.co/#GG19-Rounds>



Afterword

What is the importance of the kind of infrastructures that crypto-nomadic networks are building, and in particular, it's turn towards the production and funding of 'public goods', a kind of 'digital commons' that creates the common infrastructure that is beneficial for the whole community and the whole network? In order to understand this, it helps to put this development in the wider context of recent technological developments.

1) The prefigurative self-structuring of the crypto movement

In 1971, the computer chip was invented[1], and gradually networks became available to large institutional and market actors, ushering the neoliberal order of globally integrated supply chains; Then, in 1993, access to digital networks was democratized, through the browser and the world wide web, ushering a new period of human history: the materialization of the noosphere, i.e. the globally interconnected sphere of cooperating (and conflict-engaging) human minds[2].

It is indeed useful to see the evolution of our universe as a path to ever increased complexity. First came the creation of the material world, presumably at the Big Bang, and this was followed 3.77 billion years ago, with the creation of life on earth; and life evolved to create a complex, self-aware and interconnected life-form, humanity, (300,000 years ago) which established a third sphere, the noosphere, the sphere of interconnected cultural exchange and cooperation, spread by ever more efficient media. Every historical empire was better at using more powerful media to expand its control and maintain its unity[3], but paradoxically also unifying its territories for greater internal cooperation, and more external trade. But people were still talking 'to' each other, based on their geographic location, and sending messages through and fro.

However, once the internet, a genuinely translocal many-to-many metamedium that creates virtual collaborative spaces, became a global participatory medium, a number of new practices and social movements emerged from it.

The first was the 'open source' movement, in its different facets: open and shared knowledge, with open access requirements, free software, but also shared designs for material artifacts. In open source 'peer production'[4], open platforms allow for permissionless contributions, verified by a systems of maintainers or editors which protect the integrity of the overall system, and protected by a system of licenses defending the openness against private enclosures and capture. But on top of this shared resource, a 'commons', a multitude of entrepreneurs and private actors can add value and conduct economic activities. Just as the craft-agrarian congregations, and the worker guilds created substantial economies around their commons[5], so do the new digital commons. In fact, the link between digital interconnection on the one hand, and cooperation and innovation on the other hand, is 'super-linear'[6] and now competes with physical proximity in its effectiveness. The true new superpower is combining the two forms of cooperation in an integrated fashion: high tech with high touch.

But the open source system was certainly not perfect, it was prone to corporate domination, and once business and governments discovered the huge exponential growth of internet participation, they substantially changed the nature of the original peer to peer infrastructure of the internet, and ushered in, first the client-server based Web2.0, which re-introduced corporate control, and then, corporate platforms who coordinate central surveillance in cooperation with governments, the Censorship-Industrial Complex[7].

Open source had an additional problem, which is that not the whole mass of contributors had access to the funds that could sustain their work over the longer term. The more you did for the common network, the less you would be funded. Precisely because of the unconditional openness of the licenses, many open source projects started to be dominated by big corporate participants who had more capital to stimulate business activities around these shared commons.

The development of crypto was therefore at least partially a response to the issue of funding open source development, just as it was an attempt to make markets more distributed and fluid by allowing tokens as micro-shares, and many new forms of 'fractal ownership'.[8] As I explained in a 2018 report from the P2P Foundation," P2P Accounting for Planetary Survival"[9], open source based peer production models came with this also came three with fundamental innovations that truly qualify as 'post-capitalist accounting',

- Contributory accounting, which allowed for the recognition of contributions to the network, which cannot directly be funded by the commons-market interface; in crypto, this has been generalized through the public goods funding mechanisms, which continuously fund contributions to the general network infrastructure
- Flow accounting, such as Resource-Events-Agents, which places any transactions in the whole network, this is now a given in the open ecosystems of crypto, through the common use of a universal ledger
- The one innovation that is still missing at large in the crypto economy is the ecological 'thermo-dynamic' accounting, which would allow for context-based sustainability, i.e. any participant in any crypto-economic network would be aware of sustainability limits; however, the 'Regen' part of the crypto community is actively working on such solutions.

But let us return to our narrative of the developmental overview:

- Once Satoshi Nakamoto published his white paper on Bitcoin on the P2P Foundation Ning forum, and developed the system, the world had access to the first globally scalable 'socially sovereign' digital currency; and once its blockchain was understood to be a universal ledger to

secure a global ecosystem of trusted transactions, a qualitative new step was reached: a open economic ecosystem could be built that was based on open permissionless contributions, but coupled with a stack of economic solutions, and which allowed massive mutual coordination. For the first time in human history, small group dynamics, the average cooperating group on the network consists of 4-5 people, could scale globally, and the world reached Peak Hierarchy. Of course, this is a potentiality, not yet an actuality, but it is realistic enough to motivate millions of people to collaboratively build the infrastructures for a new decentralized world.

The new system no longer relied on any single agent, giving commands, and neither does it exclusively rely on the command of market pricing, but it was based instead on open network principles and mutual signaling, what the experts call 'stigmergic collaboration'. Like the social insects, but with human intentionality on top. We now have economic agents that can mutually coordinate their work, and allocate resources, on a global scale, in a transparent, 'holopictal' universal account system. Holopictal, seeing everything from every angle in the network, stands in contrast with the 'panoptical' structures of the classic hierarchical institutions, but also contrasts to the market, where everyone is blind to impacts and externalities, and only a synthetic price signal is available, which we now know, does not adequately reflect ecological costs and realities.

With this step, the world has become truly translocal, while of course, fully recognizing that we still need the production of a very concrete and material earth. Fortunately, digital technology has also changed material consumption and production. 2008, the global financial crisis which created mass youth unemployment in many different countries and urban areas, saw the emergence and then exponential growth of what is called the 'urban commons'. These urban commons are the result of citizens re-organizing themselves to secure certain provisioning systems in challenging times, from access to healthy organic food, shared housing and transport, etc ... It affects mostly the consumption and not the production of goods, but the use of digital technologies has made their coordination costs much more marginal, helping them to grow substantially. They grew tenfold in ten years, and probably represent 2-3% of the urban public at this stage.

So really, and this is no dream or fancy but daily reality: individuals can now not only communicate and self-organize in a peer to peer way, but they can build entire economies, new types of organizations, such as Distributed Autonomous Organizations. And these technologies and digital means are by no means divorced from the physical world of production and consumption.

Humans however, do not just need bread and butter, they need identity and belonging just as much, if not more, hence the emergence of what I believe we can best call, at this moment of history, 'CoordiNations'. [10] Some of course, like Balaji Srivanasan, are already dreaming of the next steps, Network Nations, or even Network States[11], entities with the same level of sovereignty as geographic nation-states. To be continued, and see whether these are realistic expectations at this stage in human history ...

But crypto is definitely going 'somewhere', just as software is eating the world, and then open source ate software, crypto is now eating open source, and open source crypto is thus also, gradually, moving itself to 'eat the world'.

2) The role of CoordiNations such as the Global Chinese Commons and their role in the production of Public Goods for the Ethereum community

This brings me to the role of the Global Chinese Commons. The GCC is one of the many networks of self-organized crypto-nomads, itself a tiny part still of the now 36 million strong network of digital

nomads, and of the five million individuals who have access to crypto wallets. They are motivated to contribute to a decentralized global economy and society, to reformulate their Chinese identity in the context of this new global participatory role, and they strongly support the development of 'public goods' for the Ethereum and crypto networks. It may not be a surprise that they are Chinese, as China is now once again at the center of world civilization, taking back its historical place, while it is also the first 'biophysical civilization', in which the aim of Ecological Civilization is one of the two central ideas of development. While the distance between dream and practicality is still very very large, it is creating new mentalities amongst Chinese citizens, that we may interpret as being post-consumption, in which the need for meaning surpasses the need to secure bread and butter. This is where the engagement for public goods fit in.

Public goods, in my vision, somewhat misnamed, because 'public' suggests either the public sphere of government or merely 'civil society', are what Elinor Ostrom would have called 'common goods', and what I would call the commons. They are shared resources, produced by a community or a group of stakeholders, and regulated according to their own rules, not the rules of any participating businesses, nor the rules of any of the controlling nation-states, or hypothetical future new international intergovernmental organizations. All of these economic and civic agents can participate in these projects however.

Of course, commons have to be legal, and they are and must be to be accepted in their physical environments, but on top of that, they can develop specialized rules for their own operations, and it is these rules that are collectively determined by their contributors, not by outside agents or purely monetary interests.

This is massively important: commons-based, cooperating communities, consisting of all kinds of contributory agents, that can be individuals, cooperatives, NGO's, companies, financial or non-financial entities alike, for-profit, non-profit, and not-forprofit (let's call the latter for-benefit entrepreneurial agents) can now cooperate on systems that natively scale at the global level!

So let's get back to our original framing. If the 19th century developed market institutions, and the 20th century a regulatory framework centered around the role of the centralizing institution of the nation-state, then for sure, **the 21st century could and should be considered the century for the development of the decentralized, productive, p2p-oriented economy and society. Our historical task today is to find out what its benefits and limits are, and this can only be done through experimentation and trial and error, of the networked and self-organized economy and society ITSELF.**

It is too early to say where this experiment will lead to, how much 'functional equivalence' networks can achieve with the state, and if new forms of perhaps even post-capitalist markets can be developed, but what is certain, is that a new world is being constructed, collectively, by collaborative, peer to peer, open source and community-driven communities that use practices of 'crypto governance', to self-manage their affairs, with a maximal amount of individual freedom and collective decision-making. And that they do this, not as unpaid volunteers, but as people that can make a living from these contributions. And that they can engage in such productive activities, as individuals that are not subordinated to an employer in contract of submission, which is what current labor law dictates, but as 'autonomous labor'.^[12] Indeed, we have here collectives of freely associating workers, much like the guilds in ancient times, but who can now work directly at the global level.

- If kin-ship based tribes, markets and states are the first three institutional models of human civilization,
- And if in the modern market-state world, nonprofits are the third sector, then what we are now building is a 'fourth sector' model, based on decentralized peer production, and new hybrid forms of organization.

I have my own doubts that we will live in an exclusively network world, after all, the old 'new' models did never completely displace the older forms; markets and states coexist with tribes, rather, I see the fourth sector as a hybrid model, in which the commons-based network embraces older models of market pricing and command, in a higher integration.

I choose to call this a cosmo-local model, because the digital is not sufficient on its own. Humanity needs to eat and make, before it can engage in noospheric cooperation and move digital monies around.

The cosmo-local model indicates that under networked conditions, two main models can co-exist:

- The first model is the local production model. I suspect that for many different reasons, such as environmental ones and resource constraints, we have momentarily reached 'Peak Globalization', and that supply chains and production will be relocalizing, under the adage, 'what is heavy is local, what is light is global and shared'. What digital networks offer here is the 'distributed manufacturing' model. Small factories that can produce 'on demand', based on globally available designs, that can be adapted and changed to local circumstances, but can be produced in 'circular' fashion using biodegradable materials, thereby achieving 'perma-circularity'. Imagine a local permaculture community, whose members have 'their feet in the mud', rooted in the local civic and productive community, embedded in local, bioregional, cultural-ethnic-religious communities of their choice, with supportive national entities that support this type of development.
- The second model is the cosmic cooperation model, in which all nodes of the network learn from each other permanently, and any innovation anywhere is an innovation everywhere, and they develop the common cooperation patterns and protocols? This is why I also like to call them 'protocol cooperatives'. The production is local, but the knowledge is 'cosmic'.
- The third aspect of this will be the intermediaries, whom I'd like to call 'Everywheres'. If the Somewheres are the locally rooted people, and the Nowheres are digital nomads who have lost their connection to such local communities, then the Everywhere's are those that are able to connect, and enrich the local through their connection with the global.

The cosmo-local model is paradoxically, both fully local and fully cosmic, local AND universal.

This is, in summary, what I believe crypto-nomadic networks like the Global Chinese Commons 'CoordiNation' are working on, and this is, how their still modest but fast growing activities can be framed as an important actor in world-historical terms. It is also why I am extremely happy to work with and for them on research-oriented purposes.

But **let's make no mistake, this is not the end of the road, but just the beginning.** The public goods that the Ethereum community is producing, on a rather important scale, thanks to players like Gitcoin, and new players like Public Works and GCC, are responsible for redistributing \$75m to developers. But these are still public goods that produce commons for Ethereum, and most DAOs and crypto communities are still mostly allocating financial resources for immaterial work on code and design. The next step would be a convergence with the commons of physical production, the

cosmo-local urban commons and p2p hardware companies, so that crypto governance becomes a mutual coordination infrastructure for more and more human citizens.

-Michel Bauwens, Chiang Mai, November 30, 2023

[1] https://en.wikipedia.org/wiki/Invention_of_the_integrated_circuit

[2] <https://wiki.p2pfoundation.net/Noosphere>

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[6] <https://medium.com/@jordangreenhall/from-city-to-civium-5838e0cdf31>

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[11] <https://thenetworkstate.com/>

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