

Galactica Network Governance Framework Working Paper

Version 1.0
May 18, 2023

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Introduction

Galactica Network is a Layer 1 protocol that leverages cutting-edge advancements in zero-knowledge cryptography and reputation-based systems to pave the way for a new era of persistent identities across the internet. Our team has designed the network's technology stack to enable strong Sybil resistance, privacy, and compliance, while preserving users' digital sovereignty. By utilizing zkCertificates, Galactica Network achieves strong Sybil resistance, thus enabling a rich societal substrate to emerge on-chain. Augmenting the existing web3 economic (DeFi) and political (DAOs) institutions with a social dimension allows for the emergence of entirely new use cases in the crypto space; use cases far outstripping the most far-going leaps of imagination. If this thesis sounds a bit extreme, consider reading this paper till the end for proofs.

Here is broadly how it works.

Sybil resistance allows for emergence of Persistent Identities. Persistent Identities are the basis upon which on-chain social primitives can emerge. A network with established persistent identities is a Cypher State - a web3 native collective of subjects that govern distribution of wealth and voting power among themselves - just like Citizens of a nation state do. Thus, we refer to these subjects as Citizens. Citizens engage in a political process that, as we will demonstrate below, in a Sybil resistant setup and with the power of smart contracts can be modeled to follow any established traditional setup - from Athenian democracy to Swiss semi-direct democratic federal republic. Citizens likewise vote for distribution of protocol wealth through voting on distribution of inflation. Public goods funded through inflation feed the system UBI fund, thus, effectively giving the system wealth back to the Citizens.

There is much more nuance to the process. It is explained in detail below: we start with Galactica Network Citizenship that defines the set of subjects to regulate and govern the network, we then proceed with describing how the political process itself is designed. The final section offers an overview of how the said political process is applied to governing ecosystem wide funding processes (i.e. distribution of inflation).

Galactica Network Citizenship (GNC)

Galactica Network is a Layer 1 protocol that leverages the latest advancements in zero-knowledge cryptography to achieve Sybil resistance and enable a protocol-wide institute of reputation. Strong Sybil resistance is a pre-condition for the emergence of the internet of persistent identities, known as the DeSoc.

DeSoc, in turn, is key to unlocking the massive potential of having social institutions on-chain: political, financial and more.

Galactica Network Institutions are abstractions which model social, political and financial institutions. These can be leveraged when building DApps on

Galactica Network and interacting with the protocol itself. The Derivative Institutions are protocol mechanisms at the mutual intersections of DeFi, DeSoc, and DePol. Together they instill meaning in the concept of Galactica Citizenship, providing a forum and a framework for wealth and power distribution within the network.

What is GNC and what are its benefits

Galactica Network Citizenship (GNC) represents a unique way for individuals to claim their stake in the value generated on the network. GNCs are granted to Galactica Network users upon fulfilling specific conditions, such as undergoing zkKYC.

By holding GNC, individuals become part of a vibrant community that actively shapes the future of the ecosystem. GNC holders have the power to participate in the Galactica Network's governance process, collaborating with other stakeholders to drive decision-making and policy formation. Their votes carry weight and contribute to the collective direction of the network, ensuring a truly decentralized and inclusive governance model. Holders of GNCs are subject to a network wide governance process, just like the citizenry of a nation state. As such, GNCs come with their own unique set of rights and responsibilities.

GNC holders also have access to Universal Basic Income (UBI). These payouts provide a continuous distribution of value to GNC holders, based on their reputation scores. The protocol generates value through transaction fees, intellectual property, network effects, and decentralized applications. Citizens possess a contingent claim on said value, similar to the roles of validators and miners in contributing to network security. They likewise hold the power to influence the distribution of this wealth by participating in the political process. Through UBI, GNC holders can unlock ongoing economic benefits and play an active role in the prosperity of the Galactica Network.

Citizens also have the opportunity to engage with specialized on-chain social institutions and decentralized applications (DApps) available exclusively to GNC holders. These Citizen-only DApps offer unique functionalities, real-world benefits such as access to events and private clubs, and participation in social decentralized autonomous organizations (DAOs). As such, GNC holders are granted an enriched digital experience, fostering a dynamic ecosystem where Citizens can connect, collaborate, and collectively shape the trajectory of the ecosystem.

The essence of Galactica Network Citizenship lies in its ability to define individuals as subjects of a dynamic political process. In the subsequent sections, we will delve deeper into the governance structure and mechanisms through which GNC holders actively participate in determining the future of the network.

At a glance the GNC grants a user with the rights to:

1. Universal Basic Income (UBI). UBI represents shares in the ecosystem's innovative projects*. UBI consists of:

- a. A significant share of the Inflation Rewards
 - b. Royalties for Intellectual Property generated within the ecosystem
 - c. Proceeds from Grants & project funding
2. Participation in the Galactica Network Governance Process. Citizens can:
 - a. Vote
 - b. Take part in proposal generation process in the High Council (see below)
 - c. Take part in Parliament activities; forming CIG & SIG (see below)
3. Validator Operations
 - a. Only Citizens can become Validators
 - b. Validators can only be represented by Citizens
4. Anyone can be a Delegator
5. Access to Citizen-only DApps
6. Ecosystem Grants
7. Social DAOs
8. Real world benefits such as events, RW assets, access to private clubs and more.

We will omit details about GNC distributional dynamics and mechanisms through which one can acquire it. An inquiring reader can find those in the appendix.

Galactica's Governance Framework Design

Introduction

DAOs embody governance, as it applies to cryptocurrencies. These organizations are driven by a mission to fulfill the democratic will of their participants. Whether the focus of discussions revolve around leadership, or the intricate mechanics of the underlying dApp, all aspects align under the broader umbrella of Web3 *Governance* [1].

Currently, DAO governance takes place across various platforms, with notable examples including Snapshot, forums, and Discord. The process begins with discussions held on dedicated DAO Discord channels or forums. A topic or issue affecting the DAO is acknowledged and DAO members start proposing and debating solutions [2]. Once community members reach a soft consensus and develop an adequate number of solutions, an official proposal is formulated and

subjected to a vote within the channel or forum. The proposal then progresses to a snapshot vote, where direct token voting is frequently employed [3].

Once a proposal successfully passes the vote, the DAO team assumes the responsibility of implementing the proposal's outcomes. While this process is widely used, it is not necessarily the most effective means of governing a DAO. Decentralized governance models often face challenges, such as voter apathy among participants or the concentration of voting power within a minority of token-holders. These issues have the potential to hinder the effectiveness and fairness of the governance process [4].

Decentralized Autonomous Organizations first emerged in 2016 with a project known as the DAO. Since that time, communities have actively sought solutions to effectively address the model's management challenges and associated issues [3] [5]. These discussions highlight the concern of highly concentrated power structures within governance systems that combine democracy and capitalism in the presence of informational asymmetries. This has led to a recognition that the traditional one-token-one-vote (OTOV) scheme [3], which resembles Athenian Democracy [6], may exhibit systemic flaws when voting power is tied to an economic unit that can be acquired without practical limits.

Within the DAO space, many participants have put forth alternative models to challenge the Athenian Token Democracy. For instance, A16z emphasizes the significance of incorporating "well-designed representative elements from traditional frameworks to build more inclusive and efficient organizations." [4].

What this paper presents is the translation of the Swiss-Model of Governance as a more effective alternative to the OTOV scheme.

The Swiss-Model is a semi-direct democratic federal republic. The federal legislative power is vested in the two chambers of the Federal Assembly: the National Council and the Council of States. The Federal Council holds the executive power and is composed of seven power-sharing Federal Councilors elected by the Federal Assembly [7].

To participate in the governance of the Galactica protocol, users are required to join Interest Groups. This is similar to voters joining a political party, or Swiss citizens in a Canton [8]. The Galactica governance structure comprises the Parliament, which consists of the National Council and the Council of Interest Groups, and the High Council. Galactica's unique system of governance combines characteristics of modern day democracies with a meritocratic focus. By incorporating merit into Galactica's governance framework, it aims to address common challenges faced by traditional democracies and provide all users with an equal opportunity to contribute and be duly recognized for their efforts.

Voting Power & Governance entities

Within Galactica's governance framework the basic functional unit is an agent's *Voting Power* and is a byproduct of the user's Galactica tokens they hold and the Reputation they've earned specific to their field of expertise. The definition of Reputation is to be addressed separately, nonetheless **one does not necessarily have to perform KYC in order to be eligible for Reputation**

accumulation, but in order to have a Voting power he/she does. To earn Reputation it is best to understand that actions involving active participation in the DAO, with the assumption that those actions are positive, will reward users with reputation.

The Voting Power (VP) of a given user in the Galactica network is defined as:

$$VP(s, r) = \Theta(s - s_0)\Theta(r - r_0)f(s)g(r)$$

Where:

$f(s)$ - stake function, concave, VP_{max}^s bounded

$g(r)$ - reputation function, convex-concave, VP_{max}^r bounded

$\Theta(x)$ - Step-activation function, 0 for $x < 0$ and 1 otherwise. s_0 and r_0 are bottom threshold values. users need more than s_0 tokens staked and more than r_0 reputation in order to have non-zero Voting Power.

Over a prolonged period of time the system should tend to meritocracy thus:

$$VP_{max}^r > VP_{max}^s$$

These functions take Stake and Reputation as inputs and represent these parameters as “weights” within the VP function.

$$f(s) = VP_{max}^s(1 - e^{-\alpha*s})g(r) = VP_{max}^r \left(1 - \frac{1}{1 + \beta \left(\frac{r}{VP_{max}^r} \right)^{2n}} \right)$$

Given the parameter ranges:

$$\alpha, \beta, \gamma \in \mathbb{R}^+; k \in (0, 1); n \in \mathbb{N}$$

In the future these parameters may be changed, within certain bounds, by the community via the voting process. It should also be noted that the specific means of acquiring Reputation is not defined as of yet but users can assume that they will be rewarded should they participate in voting, propose a good project to invest in, if their proposal is accepted by the *High Council* and other net benefits for Galactica.

Parliament

The Parliament is designed to represent the vote of the majority of the participants in the network. The Parliament is the overarching mechanism which formalizes the will of the participants. It consists of two entities - the National Council (NC) and the Council of Interest Groups (CoIG), both made up of various representatives from the Interest Groups.

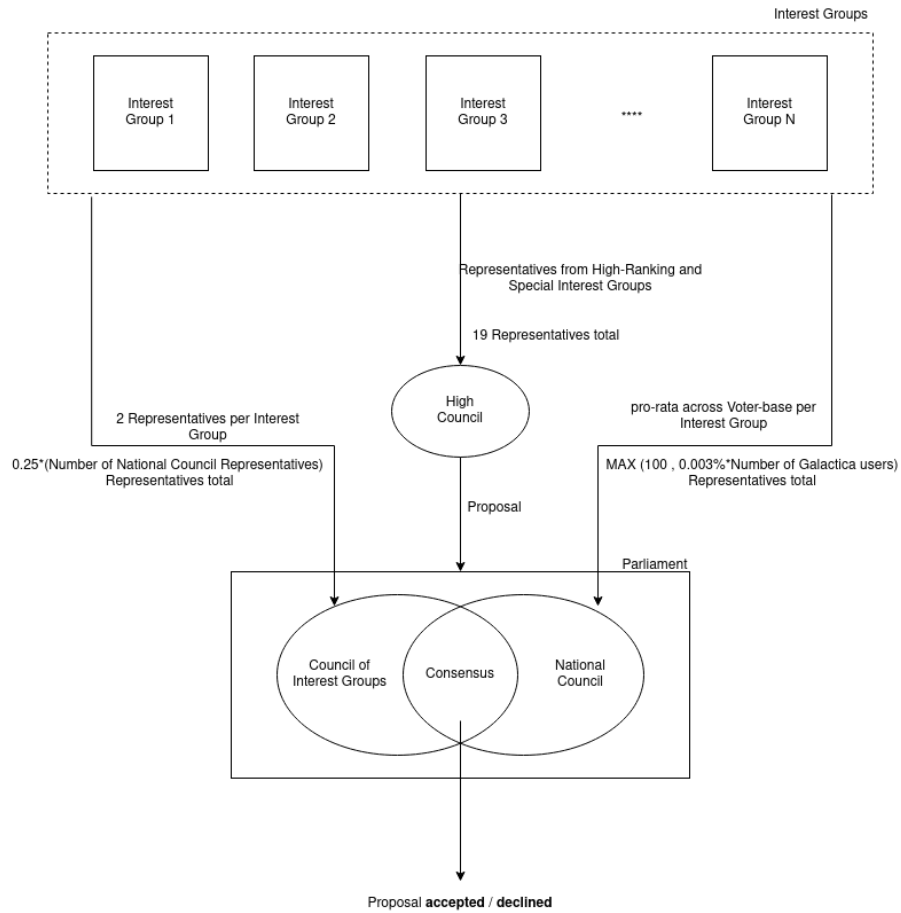


Figure 1: Galactica's Parliament at a glance

National Council

1. Number of Representatives in the NC:

$$NC^{Representatives} = MAX(100, 0.003\% * NumberOfUsers)^1$$

2. Every Interest Group will be represented by a proportional number of Representatives as a the number of votes placed upon them

¹Depending on the number of different Interest Groups these numbers can be changed but their ratio should roughly remain the same

Council of Interest Groups (CoIGs)

1. Number of Interest Groups in the CoIG (Rounded to the first higher odd integer):

$$CoIG^{NumberOfIGs} = 0.5 * 0.25 * NC^{Representatives}$$

2. Every Interest Group is represented by 2 participants irrespective of their populations

As a note:

1. If we have more CoIG Representatives than what is needed, then IGs are ranked by votes given to them and the needed number of Representatives are picked from the top ones ranked by VP.
 - a. Example: if the CoIG has 50% of the Voting Power overall then they will have 50% of the seats in the NC
2. Minimum number of users inside of a IG should be at least

$$MinUsersInIG = NC^{Representatives} + 4$$

High Council

The High Council sits above the Interest Groups and the group's function is to allow for discussion of proposals and issues faced amongst the component Interest Groups that all comprise the High Council. The High Council, at a minimum, will contain two representatives from the following **Special Interest Groups**:

- a. Validator Interest Group
- b. KYC Interest Group
- c. Tech Interest Group
- d. DeFi/GameFi/NFT Interest Group
- e. TradFi Interest Group
- f. Galactica Foundation

Furthermore, the remaining Interest Groups are ranked by their Total Voting Power and the top four can have Representatives in the High Council as follows:

- a. Top 3 Interest Groups are represented by 2 representatives each (total of 6)
- b. 4th Interest Group is represented by only 1 representative (total of 1)

There is a rotation (Voting for Key Interest Groups and Top Four Interest Groups) that is currently set for every twelve months (a Mandate) with each interest group having the ability to be chosen only for two consecutive Mandates (twenty-four months). Key Interest Groups can not be kicked out of the High Council, but IGs that are not Key ones can be voted out with maximum attendance and $\frac{2}{3}$ vote. Absence is penalized and if one misses a voting session they will be warned (on their first offense). Continued absences (two or more) will be penalized in the form of reduction of Reputation points or the rewarding of negative Soulbound Tokens (SBTs).

Choosing Representatives

Within every Interest Group users are sorted accordingly by their respective Voting Power. The top two users by Voting Power are automatically selected as representatives for the High Council (assuming the Interest Group satisfies the conditions to have a representative in the High Council). The third highest ranking user by Voting Power will represent the Interest Group in the Council of Interest Groups. The fourth representative is determined by Popular Vote (see Non-Referendum Decisions section), and National Council representatives are chosen by Popular Vote. The user that has the highest voting power earned overall (from the entirety of the DAO) is the 4th representative in the Council of Interest Groups. Lastly, the Mandate (the term to be served) for each Representative is 1 year. Each Representative may hold the position for a maximum of 2 years in a row.

Proposal to Vote Process

The process for the drafting and voting of a proposal is as follows:

1. A Proposal is created by the High Council
2. The proposal is passed down to the Parliament
3. The National Council and Council of Interest Groups hold discussions on the topic
4. If a consensus is reached the Proposal is passed
5. If a consensus cannot be reached, the Proposal is set for a Mandatory Referendum

Mandatory Referendum

Lack of consensus leads to a Mandatory Referendum where all users in the system will be obliged to vote with their respective voting power on the Proposal. Only YES or NO is accepted during such a voting. All users that participate in the referendum by voting will be rewarded with a portion of Reputation points.

Referendum Mechanics

For referendums created by the parliament, at least 40% attendance needs to be reached for the votes to be counted. The general public can create a referendum independent of all governance bodies, before the referendum is created at least 1% of users need to sign it and if successful the system-wide referendum will be created. The same attendance conditions must be met for the referendums created by the Parliament.

If the referendum is mandatory and the user failed to participate they will receive a SBT that will reflect this and it will have a negative impact on their reputation. The referendum would be a success if at least 50%+1 user had voted for the same option. Protocol referendums (and governance) need at least $\frac{2}{3}$ of the users to vote for the same option. The voting process in a referendum is different from the standard voting process as it does not get calculated with voting power but on 1-user-1-vote principle.

Non-Referendum Decisions

The process by which non-referendum decisions are made is through a popular vote. Users vote with their Voting Power on the options pertaining to a particular proposal. Minimal requirements are defined in the **Parliament Consensus Definition** section.

Parliament Consensus Definition

Consensus has to be reached within the Parliament entities.

1. Council of Interest Groups: If M representatives (and $\frac{M}{2}$ IGs) exist at least 50% + 1 IGs need to attend ($> \frac{M}{4}$), they trivially need to have at least 1 attending representative but at least half of them need to have 2 thus at least $3 * \frac{M}{8}$ representatives need to attend in total. Consensus limit is 50% + 1. This holds for the most common proposals. Those proposals that concern the protocol itself and the governance system must have at least $\frac{2}{3}$ attendance. Consensus is reached after $\frac{2}{3}$ of users have voted on the same option.
2. National Council: At least 50% of the users need to attend. A problem arises if an IG has enough users to reach 50% by itself. It is a minor issue as Galactica has two governance entities that must reach consensus thus the ultimatum rule is impossible. It is not a direct problem but it can bring instability into the system thus it should be addressed, though the system will work only with the basic 50% condition.

The problem of an Interest Group being capable of reaching the 50% vote threshold by itself can be addressed by at least 2 ways:

1. Put a hard cap on the number of representatives some IG has (this is an inflexible option but sufficient)
2. Ascribe some weights on the IGs so that the total attendance will work out to 50% but every IG needs to be represented by at least some precalculated portion of their NC representative set. The weight associated with the smallest should be the biggest and the rest follow the same principle of weighting.

Ascribe some weights on the IGs so that the total attendance will work out to 50% but every IG needs to be represented by at least some precalculated portion of their NC representative set. The weight associated with the smallest should be the biggest and the rest follow the same principle of weighting.

If the consensus is not reached because the NC and CIGs opinions differ, then a system-wide referendum is held This referendum is mandatory for protocol and governance-specific proposals, not mandatory for others.

One vs Many IGs problem (and what to expect) - Unification of IGs

If the representation is being done using the Popular Vote then it is not important if we have one or many IGs regarding the same thing. The only thing that must not be forgotten is the communication channels used within the said interest. They must be made in a way that anyone can express their opinion and that opinion can be seen by anyone. In the end the proposal is to have one IG per topic (1 validator IG, 1 KYC IG, and so on).

Intra-IG process of choosing the Representatives

Both the High Council and the Council of Interest Groups are each allotted two representatives chosen by Popular Vote. The National Council has sorted Voting Power and following the census, the IGs and Coalitions that meet or surpass the threshold will be granted representation on the NC. Representatives will be proportionally awarded based on the sum of voting powers of the IG and Coalition members (groups with higher total Voting Powers will be awarded with more representation).

For the National Council Representative selection process:

1. Popular vote to determine which IGs are in the NC
2. We define some census (3%), every IG that has more then the census limit is in the NC
3. In a proportional way to the total VP placed upon them the number of Representatives are found for every IG that will comprise the NC
 - a. Coalition formation is permitted, for IGs that fail to meet the census limits (thus wouldn't be granted any Representation in the NC)

- they are permitted to form coalitions together in order to acquire representation within the NC
 - b. The stipulation for coalitions is that the total population of the coalition must not exceed two-times the census limit as specified above
 - c. Any number of IGs can comprise a coalition so long as they don't surpass the two-times census limit
4. Sort each IG by Voting Power and pick the top five users that should represent them in the NC (that is if they are to be represented by five people)

Mandate duration and spec

A Representative's mandate length is one year, any user can have at least two mandates in total irrespective of being on the High Council or CIGs. With the IG-specific referendum the people can remove someone from the position of power. The attendance condition is the same as the one defined for referendums. In order to remove him at least $\frac{2}{3}$ users must vote for.

Universal Basic Income (UBI)

As a quick refresher, traditionally UBI is enacted as a sociopolitical financial transfer policy proposal in which all citizens (in our case, governance participants of Galactica) of a given population regularly receive a legally stipulated and equally set financial grant paid by the government. In Galactica for participants to be eligible to receive UBI the user must satisfy the following conditions:

1. Must have non-zero Voting Power
2. Must have SBTs that will confirm that the user frequently applies their Voting Power; they participated in governance either directly (being a member of the governing bodies) or indirectly (voting on a referendum)

The UBI distribution function is the function of the user's Reputation primarily and the SBTs they possess.

Examples of Proposals for Protocol Changes

This section provides some examples as to what governance participants can propose and vote on within the Galactica system; this list is not intended to be exhaustive.

1. Voters could vote on what the share of Inflation Rewards (for example in the next 2 years) would be for:
 - a. Validators's share of token inflation.

- b. Public Goods Fund (PGF) - At the beginning of every quarter the Parliament votes on how much % of the Inflation Rewards is allocated to the Public Goods Fund and at the end of the quarter the Parliament must vote towards which Public Goods projects they must be invested in.
 - c. DAO Ecosystem Fund - Similar to the Public Goods Fund, the voting process for funding of non-public good projects requires the Parliament to cast their vote twice a quarter - once for the size of the fund and once towards which projects it is channeled. Interest Groups propose research topics and the top 10% (of projects based on Voting Power placed upon them) will receive funding based on a quadratic voting basis.
2. Changes to the UBI criteria
 3. Changes to the mechanism of Representatives rotations
 4. Changes to the number of Representatives within the High Council and Parliament
 5. Redefining the Reputation function
 6. Redefining the Voting Power parameters

Academy of Sciences (AoS)

The AoS provides necessary venues for Galactica participant specialization with the express purpose of developing innovative features which would ultimately be deployed on Galactica. The AoS is structured as follows:

1. The Academy of Sciences consists of disjunct Sectors
2. These Sectors are populated by the users that hold skill-specific SBTs that are predefined for said Sector
3. Every Sector is represented by 3 representatives in the Council
4. Council (as an Entity) does not have any voting power, it can give their opinion on the topics discussed within the parliament and they can veto off the proposals that are malicious with absolute attendance and $\frac{2}{3}$ vote
5. It is the responsibility of the HC and Parliament to distribute inflation streams to different substreams that go to Public Goods Funding, Private Goods Funding, UBI and Validators rewards.
6. Academy of Sciences can not create proposals, they can only consult the High Council and the Parliament on the topics that require AoS expertise

- a. An example topic would be: “Galactica wants to invest in an external project that is concerned with electric vehicles, there are 5 projects that Galactica could invest in.” This would then be brought to the attention of the AoS where sectors within the AoS would perform necessary due diligence and come up with a conclusion. The AoS would then provide this conclusion for Galactica to make the final decision.
7. Additionally, the AoS has a leader, the Chief Scientist, who is elected in a popular vote by all members of the AoS. The Chief Scientist has no direct power but is the delegating authority for all proposals regarding the Academy itself. The position receives a salary in reputation. The position’s mandate follows the standard term length and can be removed following an AoS specific referendum (also by popular vote).

The AoS is a unique and important structure within Galactica that encourages community members to contribute their skills and knowledge in a manner that is not typically found in other cryptocurrency projects.

Galactica’s Governance of Ecosystem Funding

Introduction

The following document is intended to offer the first glimpse of Galactica Network’s governance system in the context of funding R&D within the ecosystem, the design of its public goods funding process, public venture funding as well as grants and other developer incentives. Having a good overview of the funding landscape of the Galactica Network is of utmost importance, as it simultaneously drives developer adoption and the value generation process for Citizens through gUBI. A Cypher State, just like a nation state, is defined by (among other things) its political process that sets the rules for wealth distribution across its subjects (i.e. Citizens).

The Cypher State is a socioeconomic system of virtually infinite flexibility and as such offers a much wider innovation design space and more elaborate governance primitives. Given the sheer magnitude of value flows channeled through the Galactica ecosystem funding process, we have approached its design with attention to the game theory aspects of political processes and what follows is a description of a system unprecedented in its depth and scope within the wider web3 landscape. Likewise, it is a good exercise to showcase what DeSoc-rich protocols are capable of.

1. Let’s start with the basics: Galactica Network token’s inflation distribution is decided by the Parliament that is in turn elected by all Citizens. More about the governance framework design can be found in the research section on the website.

2. Within the Galactica Network, inflation is used as a conduit for system-wide value generation and distribution. The principle behind this system design is simple: if value created by inflation funding outweighs the dilution it produces, Citizens will generally be better off. One of the flows for ecosystem inflation is directed towards the projects that apply to work on topics proposed by the Academy of Science (henceforth AoS). AoS is an entity within Galactica Network that is tasked with fostering innovation through facilitating the funding of public goods and research (research frequently is a public good in itself, however, can enable fortunes worth of private goods if successful - think nuclear fusion research in 1980s/90s).
3. The process of allocating inflation to select research topics and teams working on them is called QSD that stands for Quadratic Sovereign Diversification. It is Sovereign because it works to benefit Citizens of Galactica Network, the Cypher State, it is Diversification because it diversifies the Cypher Capital of Galactica Network and it's Quadratic because this is ultimately how it is distributed among Citizens. QSD is expected to be among the most potent sources of funding within the Galactica Ecosystem.
4. Given the sheer magnitude of value flows the QSD procedure entails, it is designed to be democratic in nature with checks and balances. In this vein, while the AoS can propose topics, it's up for the popular vote (by all Citizens) mixed with some voting power allocated to AoS members to decide upon the funding priority. The Parliament decides upon the voting power distribution between the Citizens and the AoS council.
5. Once votes are cast and funding priority is determined, eligible teams will receive (split between each other) three months of inflation rewards in freshly minted \$GNET coins - in other words a very meaningful amount, far exceeding that of an average foundation grant. Due to the sheer size of the value flows emanating from voting on QSD, the approach taken with regard to due diligence and the handling of token inflation is critical, and there are four stand alone entities tasked primarily with overseeing this process:
 - I. **The Auditing Commission** is an entity tasked with performing due diligence on the projects that apply for funding. This entity can also veto funding decisions and blacklist projects;
 - II. **The Galactica Foundation** is an entity that can be applied to for funding; circumventing The Auditing Commission, however, its mandate is much more limited and so are the amounts of \$GNET it can allocate to teams. The format of the funding process is RFP (Request for Proposal). However, getting a grant at the Foundation can have positive PR effects. The Foundation can also whitelist teams directly into the AoS voting process.
 - III. The Sovereign is a network-wide sovereign fund tasked with investing and administering the funds flows.

IV. The Excelsior is a stand alone council composed of members of the Auditing Commission, AoS and the Foundation that votes on team composition for every topic and some other aspects of the operations of the Sovereign.

Every entity described above (apart from the Parliament and the High Council) is either governed by a decentralized council or the decision making process is highly centralized. The Parliament can exclude members of councils and also deny funding by administering the inflation distribution. If the Parliament cannot reach consensus, there will be a Citizen referendum (i.e. popular vote). If the Parliament fails to perform as expected, Citizens can cast a Vote of No Confidence and overthrow the sitting Parliament.

6. The basic principles of the Ecosystem Funding process have now been explained, and before we do a deep dive into each of the entities taking part in the process, we would like to note the core goals a system this elaborate was designed to achieve. As we have mentioned in the [Cypher Capital paper](#), the core premise of the Cypher State is to:
 - a. replace taxes with inflation (as they are the same thing after all: i.e. explicit/implicit dilution of the existing capital base),
 - b. explicitly integrate public goods funding process into the inflation distribution process,
 - c. internalize the value of innovation achieved through public goods funding process across the Citizens through meritocratically distributed UBI, and
 - d. make the parameters of such a system subject to direct diplomatic vote by the Citizens.
7. Optimizing decision making efficiency and decentralization ultimately converges to the creation of small Councils composed of few (or few hundred) members, as:
 - a. Frequent system-wide voting procedures can be cumbersome for end-users, and
 - b. There is higher efficacy of expert councils due to the expertise and reputation they bring to the table (as long as their work is thoroughly documented, accounted for and incentives are set right).

With this in mind, some of the entities listed above will be run by a council with rules of new member admission, voting, economic incentives and member exclusion. Parliament, High Council and the CIG are the entities comprising the Government of the Galactica Network. The Parliament defines the budget for all the entities and can itself be removed through a popular vote. If consensus can not be reached by the two chambers comprising the parliament, subject matter is given to a popular vote. It

is a system perfectly balanced in terms of decision making efficiency and power decentralization.

8. Finally, it's important to note that apart from QSD, there are other ways of getting funding within Galactica Network, including but not limited to direct investments from the Sovereign and grants from the Foundation. The bulk of this paper is concerned with the QSD.

Entities

In this section of the article, we will delve deeper into the specific entities comprising the Ecosystem Funding process as well as the process itself. These entities, which include both decentralized councils and more centralized bodies, work together to ensure the efficient distribution of funding for research and development, public goods, and other development incentives on Galactica Network.

By understanding the functions and responsibilities of each entity, we can better appreciate the intricate mechanics underlying the Galactica Network and understand the power interplay and 'checks and balances' that have been explicitly incorporated into the governance process.

These entities include:

1. Academy of Sciences (Governed by a Council)
2. The Sovereign (Governed by a Council)
3. The Auditing Commission (Centralized, to become Council)
4. Galactica Foundation (Centralized)
5. The Excelsior (Governed by a Composite Council)

Galactica Network Ecosystem Funding Process

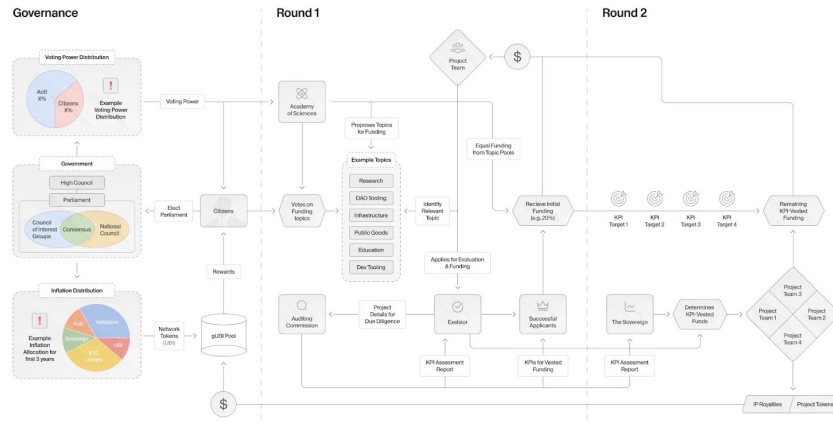


Figure 2: General funding process

Academy of Sciences (Governed by a Council)

A large portion of Galactica Network inflation goes towards funding of public goods through the QSD process. Public goods are broken down into categories (or topics), and the Academy of Sciences is the body responsible for offering lists of such topics which are thereafter voted on by the Citizens and members of AoS itself. The relative voting power of Citizens vs AoS members is defined by the Parliament.

The members of the AoS form the AoS Council. Its members gather Reputation through actions like attending meetings, voting, and creating proposals. The AoS contributes to the evaluation of project proposals and plays a crucial role in the overall funding process.

The AoS is funded by the Parliament. The admission to AoS is a by-reference and thereafter by-vote process that is elaborate upon below.

The Sovereign (Governed by a Council)

The Sovereign is an entity responsible for allocation of investable capital for present/future R&D areas and projects it finds otherwise attractive and also of administration of the financial administrative part of QSD. The Sovereign is funded via an initial allocation of the total \$GNET supply, in addition to the inflation redirected to it through the Parliament vote. The Sovereign is akin to sovereign funds of traditional nation states, such as Norway, Japan and Dubai. The core idea behind it is likewise similar - to diversify the Cypher Capital

of Galactica Network in the interest of its Citizens. The Sovereign's mandate implies three types of investments:

1. Projects from AoS voting process described above - here Sovereign performs mainly an administrative function,
2. Follow up investments into the aforementioned projects - here the assumption is that there is a clear commercial use for the technology developed as a result of the public funding process
3. Other unrelated projects - here the scope is as broad as the Parliament/Excelsior set it up to be.

Sovereign is governed by a Council that consists of people from other entities and it's autonomous.

The mandate of the Sovereign is closely intertwined with that of the Auditing Commission: the latter works closely with the teams funded by the former to establish KPI-based payout schedule and has authority to blacklist teams applying for QSD and abort their vesting.

For unrelated projects, Excelsior approves the shortlist in close collaboration with the Sovereign, the Parliament and the Academy of Science. Sovereign cannot invest outside of this 'whitelist' unless consent to by Excelsior. Excelsior is able to blacklist a certain number (to be defined) of projects from the shortlist before the investment and Excelsior is also able to ask the Parliament to veto the projects from the shortlist. After the initial investment, the Auditing Commission is able to blacklist projects and Parliament can revert this decision.

The Auditing Commission (centralized at inception)

The Auditing Commission plays a pivotal role in the AoS funding process. It evaluates project proposals, acts as a body hardwired into the ecosystem-wide ongoing due diligence effort by providing opinions about the project teams, and has the power to blacklist them from participating in the AoS voting process. Only the Parliament can overrule such a blacklist.

The Auditing Commission is also involved in agreeing upon KPIs with teams seeking funding and can halt the payouts of vested funding streams at its own discretion.

While initially a centralized entity, the Auditing Commission will evolve into a fully decentralized Council.

Galactica Foundation (centralized)

The Galactica Foundation is another centralized entity within the Galactica Network that has a wide range of governance and business activities that will be elaborated upon elsewhere, however in the context of the ecosystem funding, it may provide small grants independently to individual projects. Furthermore The Foundation can whitelist projects and by doing so will enable them to pass through the Excelsior's initial voting process.

The Excelsior (Council)

The Excelsior is a decentralized entity that takes the form of a Council that is composed of members from The Academy of Sciences, Parliament and The Auditing Commission. Its purpose is to determine which projects proceed to the first and second round of QSD (description of QSD rounds can be found below).

QSD Rounds

We now turn our attention to the distinct funding rounds that exist within the QSD. These two rounds are designed to ensure a fair and thorough evaluation of project proposals while maintaining transparency and accountability all throughout the process.

After examining the steps and key players involved in each round, we will gain a deeper understanding of the checks and balances in place to promote efficiency, innovation, and responsible use of resources within the Galactica Network ecosystem.

Round 1

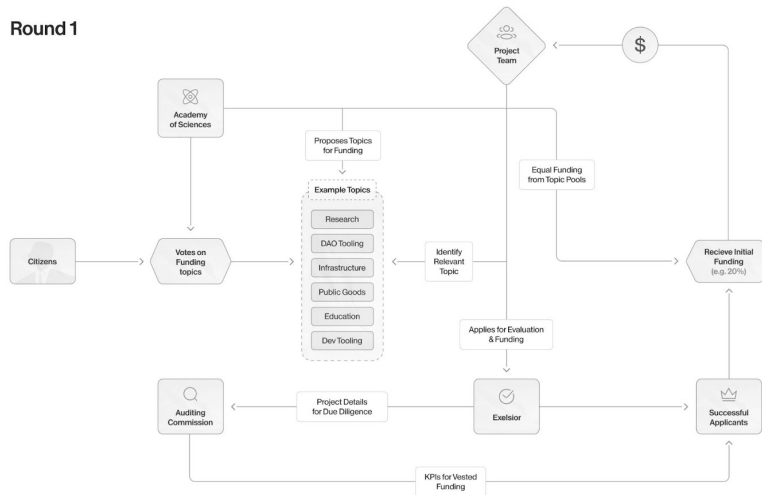


Figure 3: Round 1 of the QSD

1. All possible topics subject to funding are determined by the AoS, while \$GNET is made available from inflation over time.
2. Projects apply.

3. Citizens vote with their distribution (and power) and so does the AoS. The AoS funding is split according to the topics.
 - a. The AoS proposes its voting weight $\in [0, 1]$ for a predetermined period and provides sound reasoning for its voting behavior;
 - b. The Parliament votes what the AoS's voting weight () is going to be, and for the period for which it applies;
 - c. Total distribution of funding is calculated as:

$$\gamma * Distribution_{AoS} + (1 - \gamma) * Distribution_{Citizens}$$

4. The Excelsior is assembled.
 - a. The Excelsior (which will eventually become a Council) is composed of:
 - i. 2 members from The AoS per each topic:
Number sent is $MAX\{NumberOfTopics * 2, K\}$
where K is a parameter dependent on the size and structure of the AoS. Not more than 50% of the AoS representatives can be from the same department (if the AoS does not have a specified Topic);
 - ii. 2 members from The Parliament;
 - iii. 2 members from the Auditing Commission;
 - iv. Members inside Excelsior receive also a salary in Galactica network tokens for their involvement in the funding process.
5. Excelsior votes for funding of Projects that possess potential and are proceeding further in the funding process
 - a. The Auditing Commission creates an official document with comments and opinions about the Project Teams.
 - b. The AoS members draft a funding proposal and determine Teams for each Topic.
 - c. The Parliament oversees the process and prevents AoS collusion and also possible Auditing Commission's intentional veto blockade.
 - d. The Auditing Commission's representatives can veto teams (permanently).
 - e. Council votes on the proposal, and if no consensus is reached, after several rounds the proposal is moved to the Parliament.
 - f. If consensus is reached, the voting proceeds to the final round.
 - g. Parliament representatives give a report to the Parliament about potential collusion or malicious behavior.
 - i. If no malicious behavior was found the proposal is final and the Teams are determined;

- ii. If malicious behavior is suspected the process is frozen, and Parliament must create an investigation and act accordingly. In this case it is within Parliament's power to move funding voting to the Parliament and dismiss bad actors or entire entities themselves (must be voted for by the Parliament).
6. KPIs are set for each project in discussion between the team and The Auditing Commission.
 7. Admitted projects are funded equally from the corresponding topic pools.

Round 2

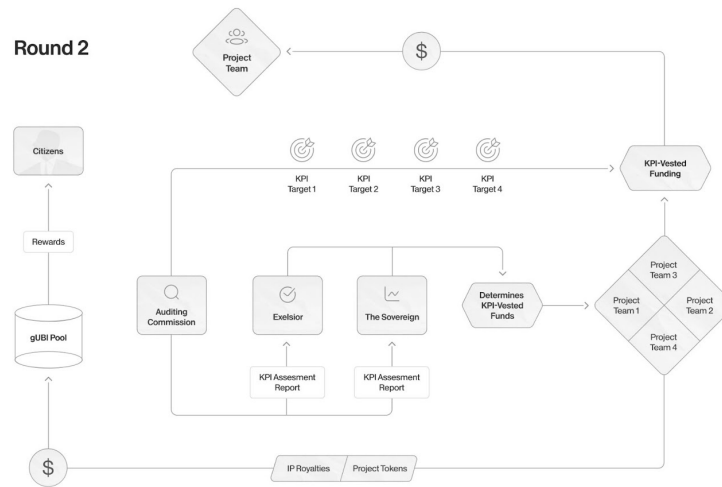
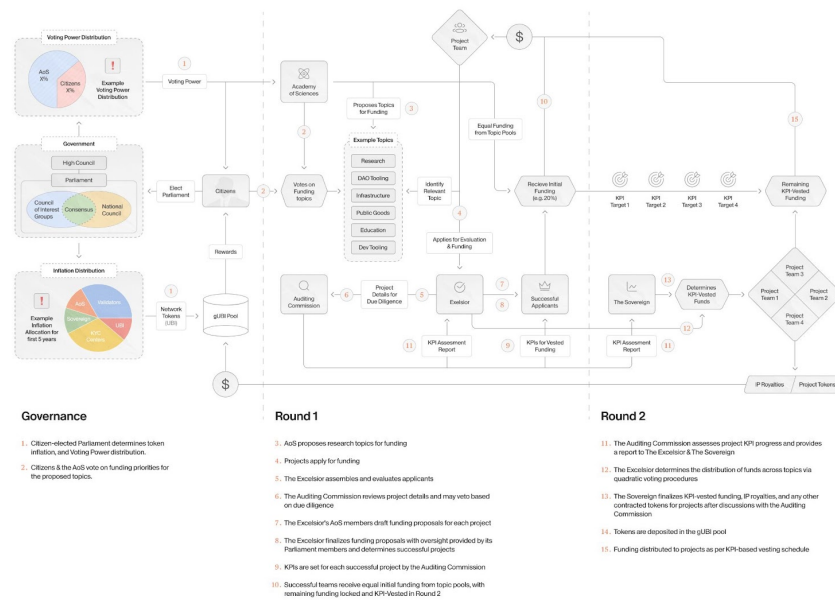


Figure 4: Round 2 of the QSD

1. After assessing the KPIs, the Auditing Commission provides a report to the Sovereign and the Excelsior.
2. The Excelsior votes in a quadratic manner to distribute the funds across different topics (1 person = 1 vote).
3. Same procedure is followed across projects within every topic.
4. The Sovereign & The Auditing Commission hold discussions with every project regarding project-specific, KPI-vested, funding:
 - a. A percent of IP royalties are bound by a contract between the project and The Sovereign and are in The Sovereign's possession;

- b. KPI-vested schedule for each project tokens is determined and finalized by The Sovereign;
5. Project tokens are deposited in the UBI pool.
6. The Parliament assesses The Sovereign's performance and determines if they have met their KPIs in order to release more Galactica Network coins for further funding.

Overview



Appendix I - Council Definition

1. Has N members (to be defined);
2. Voting Power = 1 person 1 vote;
3. Every vote is up to council vote;
4. Minimum attendance is set to $> 50\% + 1$ member;
5. Successful vote is set to $> 50\% + 1$ vote;

6. All of them have an equal vote, however, they vote in a quadratic manner with an equal number of points. Let us assume each has 100 points, they split this in a quadratic manner across different proposals.
7. Mandate duration of X months (to be defined);
8. The following conditions must be met before someone can be voted-out of a Council:
 - a. Full attendance;
 - b. $> \frac{2}{3}$ of the votes are “for”;
 - c. The person in question is unable to cast a vote.
9. New members can be added in the following ways:
 - a. Via referrals:
 - i. After a member has R (of the Council at hand) referrals (to be defined) in their possession, he/she is eligible for admission (by vote) to the Council;
 - ii. Attendance of $> \frac{2}{3}$ (voters which referred the candidate are excluded);
 - iii. $> \frac{2}{3}$ of the votes are “for” (voters which referred candidate excluded).
 - b. Through an application:
 - i. Handled by the Foundation;
 - ii. Requirements:
 - (1) Had a mandate in the Governance (Parliament or High Council);
 - (2) Had a mandate in the AoS.
10. Council members earn Reputation by (among other things) attending, voting and creating proposals.
11. Not participating **decreases** council member’s Reputation, after a certain time of misbehaving they can be (automatically) Voted-out since their performance is public. Publicly Verifiable Secret Sharing proves the possibility of implementing a vote in advance that will be revealed when the vote comes.
12. They are economically incentivized through UBI, that is directly correlated with the amount of Reputation they have. They also receive a fixed salary in Galactica network coins.

Appendix II - Consensus Definition

1. AoS votes in a 1 person 1 vote manner (with X points each).
 - a. Auditing Commission representatives in discussion with the Parliament representatives specify the number (to be defined) of projects that are allowed to pass.
2. Top N projects (to be defined) are automatically picked (if some are equal it is up to the AoS representatives internal vote to decide (if the vote ends in a 50/50 split the proposal is dismissed)).
3. The AoS picks necessary projects, thunless consent to by Excelsior. Excelsior is able to blacklist certain number (to be defined) of projects from the shortlist before the investment and Excelsior is also able to ask the Parliament to veto the projects from the shortlist. After the initial investment, the Auditing Commission is able to blacklist projects and Parliament can revert this decision.e ones that the Auditing Commision should not veto in their opinion.
4. Auditing Commission vetoes:
 - (a) If **no contradiction** has arisen the vote is final;
 - (b) If contradiction has arisen whole council votes (with $\frac{1}{3}$ VP from each entity, then rescaled to VP of a single user);
 - (c) If a stalemate has arisen the option with more Auditing Commission's VP delegated is chosen;
 - (d) If it is still a stalemate the same rule applies for Parliament members;
 - (e) If it is still a stalemate that would mean that AoS members are perfectly distributed also and the decision is moved to The Parliament.

Appendix III - GNC distributional dynamics

Galactica Network Citizenship is a valuable asset that carries significant importance within the ecosystem. As such, it is designed to be difficult to acquire at the protocol's inception stage. Once the network has granted a user Citizenship, however, it remains permanently bound to their on-chain identity; a digital shadow, protected by zero-knowledge cryptography.

There are a total of four citizenship types, and five different waves during which they can be earned, bought or received. In the initial waves, Citizenship can only be earned. These are reserved for community members who contribute the most value to the network in its earliest days. Two subsequent waves allow for citizenships to be earned, bought, or applied through referral, expanding the opportunities for participation. In the final wave, Citizenship becomes open for application by anyone interested, subject to available quotas.

Types of GNC

GNCs are granted for merit or can be purchased through auctions. Types refer to the way a given GNC has been acquired.

There are 4 distinct GNC types:

- Type A
 - Designed for Institutional partners with KYC centers, KOLs with sizeable audiences; Academy of Sciences Alumni; Technology Builders and the Founding Team;
- Type B
 - Designed for Foundation Grant Cohorts; Special Partners; Advisors; Other high value contributors to the network;
- Type C
 - Users with RRC Scores above a certain threshold; ICA and CCA participants and those referred by them;
- Type D
 - All other users, this type permits anyone and everyone to apply.

Each GNC type is different and is allocated to users based on the value they provide to Galactica Network.

GNC price discovery modes

GNC price discovery modes are the way the network determines the purchasable price of Citizenship. Galactica Network offers two distinct price discovery modes for acquiring GNC: the Initial Citizenship Auction (ICA) and the Continuous Citizenship Auction (CCA).

Initial Citizenship Auction (ICA)

The ICA takes place before the Token Generation Event (TGE), ensuring a fixed price for \$GNET. During each ICA, a maximum of X participants have the opportunity to become Citizens, with γX of the GNC allocation going to the highest bidders and $(1 - \gamma)X$ randomly distributed to other participants. The ICA adopts a Vickerey Auction format, where all proceeds are used to purchase \$GNET at a public round price. The top γX bidders are awarded GNC based on their volume of \$GNET purchased.

Continuous Citizenship Auction (CCA)

The CCA occurs post-TGE and reflects market prices for \$GNET. Similar to the ICA, X citizenships are allocated for each CCA, providing a chance for a maximum of X participants to become Citizens. The γX share of GNC is allocated to the highest bidders, while $(1 - \gamma)X$ GNCs are randomly distributed among the remaining participants. The CCA employs an Inverse Dutch Auction mechanism, where bids are used to purchase \$GNET at market price with a discount σ determined by the aggregate volume of bids submitted. The top γX bidders receive GNC as their reward for participation in the auction process.

These price discovery modes ensure a fair and dynamic approach to GNC distribution, accommodating different stages of the network's development and engaging participants in acquiring their Citizenship.

Activation waves of GNC

GNC holders who actively participate in the distribution waves secure their position in a whitelist, signifying their potential eligibility for activation in the future. The activation waves govern the sequence in which distributed GNCs are activated. This establishes an orderly process for granting citizenship within the Galactica Network.

Each wave is defined by the eligible types of GNC, duration, and the price discovery process.

1. **Waves 1 & 2** mark the initial stages of the distribution process, during which Citizenship can exclusively be earned (types A & B). These waves prioritize community members who demonstrate significant contributions to the Galactica Network, recognizing their valuable input and rewarding their active engagement.
2. **Waves 3 & 4** introduce additional avenues to acquire citizenship. In these waves, individuals have the opportunity to earn citizenship through contributions, as well as purchase or apply for it through referrals (C). This expansion in options allows for a wider participation and ensures that individuals with diverse paths can become part of the Galactica Network community.
3. **Wave 5** marks a significant milestone, as Citizenship D becomes accessible to all individuals who wish to apply. During this phase, anyone has the opportunity to become a citizen, subject to available quotas.

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