

Astar Network Governance Whitepaper (Fifth Draft)



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October, 2023

Preface

Human civilization and society are all about forming a network of individuals. After the industrial revolution and the emergence of corporations, what was previously a local network evolved into a global network in trade and business. One of the major factors for enabling this is how we define trust. Trust is necessary for business and commitment. According to Adam Smith, the government's role is to ensure a safe transaction between merchants. Democracy and transparent policies have introduced stability into certain societies, leading to increased trust—or safe transactions—when conducting business between strangers through policies and regulations that organizations can rely on if someone breaks the rules.

Human-to-human connections have changed after the emergence of the Internet. I was born as one of the first digital natives, and I have witnessed how the internet changed human interaction on a global scale. When I was a kid, people frowned upon seeing others dating online and meeting them in real life. However, this behavior was normalized when I was in my late teens, thanks to government regulations and moderation tools for the companies operating the platform.

Despite the innovation in human-to-human interaction through the Internet, we still lack organization-to-organization interaction in an online world, as the stability of a communication channel an organization wishes to use is up to the company that owns it. And the legal regulation that guarantees these safe transactions is still bounded by the physical jurisdiction in which the platform conducts business. In other words, the internet lacks democracy, and our system struggles to catch up to the technical advancements we see. One example is YouTube, an online video streaming platform where anyone can create and share content. It is the biggest, practically a monopoly over the industry. Millions of creators have businesses relying on YouTube for their livelihood. Although YouTube is well-regulated regarding the content it hosts in certain regions, the regulation does not affect the governance of its platform, which leads to the stability of its ecosystem. This exact situation happened in the past when YouTube decided to change its monetization strategy without the consent of its ecosystem. The king owns the kingdom, and it is the platform owner's right to do what they please with their kingdom. But for digital organizations and creators to thrive, we need stability and trust in the platform we work on, just like how political stability leads to a booming economy and a tightly integrated world.

I have devoted my life to finding a solution for creators and innovators to thrive in the new age, and then I first learned about blockchain technology. This transaction guarantee system runs on the Internet across multiple parties, and I knew this would be one of the key technology that would bring political stability to the Internet for creators and organizations to rely on.

My motivation for working on this paper is to establish the building blocks for creating the next generation of Internet society that will be the catalyst for countless innovations that

we will see in the future, using Astar Network as the basis for this movement.

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Abstract

This is the whitepaper that describes the Astar Network governance system. At its core, Astar Network uses a governance system that is inspired by the Japanese Keiretsu system, where multiple independent organizations operate in tandem for a shared business interest. Therefore, Astar Network governance does not make the network a single organization but a platform for multiple organizations to come together. Through this, I introduce the concept of an inter-organizational governance platform.

Astar Network's core assets that attract external players and contributors are defined as technology, treasury capital, and the ecosystem. All governance actions that take place in Astar Network that consumes one of the assets must contribute to the increase in another, making the network maintain its value. Fundamentally, the network will not have an owner, but leaders who can coordinate any network-wide development efforts. It is important that the system enables extreme mobility within the network players, and no one can prevent others from becoming a leader.

In Astar governance, there will be many challenges such as voter apathy, imbalance of resources, platform fragmentation, and skewed voter priorities. There are no straight solutions for all, but these issues can be addressed through transparency within the leadership, creating a system that can only work with transparency, issuing an alternative voting mechanism, and keeping a central starting point for navigating the network governance platforms.

Astar for the governance model, Astar Network will have corporations with the most business stake in the network occupy the council seat and will be responsible for guarding the treasury and maintaining the player culture. Astar Network will issue a new virtual token that is non-transferrable, and burnt when it is not used as the primary method of quantifying a player's voting power. There will be other features to encourage network participation and governance such as anonymous voting and extensive bounty programs with budget-based treasury. But the implementation will be split into phases that depend on the number of players in the system.

Contents

1	Introduction	1
1.1	Background and Motivation	2
1.2	About Astar Network	3
1.2.1	The Astar Network Vision	4
1.3	Terminology and Definition	4
1.3.1	Decentralization	4
1.3.2	Astar Network and the Protocol	5
1.3.3	Stakeholders and Players	5
1.3.4	Network Governance and Decentralized Autonomous Organization	6
2	The Building Blocks of Astar Governance	7
2.1	The Core Assets of Astar Network	7
2.2	Governance Actions and Value Transition	9
2.3	Expected Core Governance Players	10
2.4	Governance Components	11
2.5	Leadership	13
2.6	Accountability	14
3	Governance Problems and Challenges	16
3.1	Imbalance of Resource and Authority	16
3.2	Voting with Asset of Value	17
3.3	Platform Fragmentation	19
3.4	Voter Apathy	19
4	Governance Features and Model	21
4.1	Governance Expression	21
4.1.1	Organizational Council Stakeholder	22
4.1.2	Build2Vote	22
4.1.3	Anonymous Voting	25
4.1.4	Common-Goods Idea and R&D Bounty	25
4.1.5	Budget-Driven Treasury	26

4.1.6	Common-Goods Application	29
4.2	Governance Platform	31
4.2.1	The Communication Layer	32
4.2.2	The Voting and Execution Layer	33
5	Implementation and Execution	36
5.1	Governance Phases	36
5.1.1	Phase 1: Genesis	36
5.1.2	Phase 2: Budget-Based Treasury and Bounty	38
5.1.3	Phase 3: Anonymous Voting	38
5.1.4	Phase 4: Common Goods Project Funding	38
6	Conclusion	40
6.1	Further Research	41
References		42

List of Figures

2.1	The core assets of Astar Network	8
2.2	How the transfer of value within the governance affects each other.	10
2.3	The governance components and governance journey in Astar Network	12
2.4	How the various player ranks are defined in the Astar governance, and the importance of mobility between the ranks.	14
4.1	Rewards are distributed for the idea and the implementation on Astar Network.	26
4.2	The treasury in Astar Network will work on a budget basis, and anyone can create their sub-treasuries to fund specific activities that benefit the network.	28
4.3	How supporting a common goods application contributes to the treasury and user participation.	30
4.4	The Astar governance player communication flow.	35

Chapter 1

Introduction

Forming a community and the rules that govern them can be seen as one of the many foundations that comprise human civilization as we know it. As technology evolves and societal trends change, how we express the same concept changes, creating a new form of society. However, at its core, any community, organization, or government is about people gathering and working together for a specific purpose. To regulate the “collaboration of people,” we create a governance system and ensure that the system can function despite internal or external uncertainties and not harm the people who are part of it.

A governance system can be as simple as family dinner table manners and community guidelines to something more strict like corporate shareholder agreements or federal law. However, the core premise is the same for all of them. The only difference is the consequence of breaking the rules; therefore, the system description becomes more strict and complicated to avoid and misconceptions. In a way, governance is the ultimate—and the oldest—programming language for programming human behavior, where the syntax is made out of carrots and sticks.

In this whitepaper, I will define the governance system and every component needed to create and manage a platform for innovating organizations to work together and incentivize behaviors that improve the system while punishing the ones that hurt it. The governance system will be in high-level abstract terms so that it can be implemented in any system that strives to do the same; however, I am using Astar Network, an ecosystem of innovators in the new Internet world, as the basis for realizing this governance system.

I have written this paper in a way that anyone with any knowledge could understand. I will refrain from using highly technical jargon, making knowledge assumptions, using complicated notations or representations of algorithms, and relying on concepts only seen in a highly-specialized area. Therefore, the reader does not require any background knowledge of specialized areas that this paper touches, such as blockchains, computer science, or social science. However, due to the technical nature of this paper, some prior knowledge might be required for ease of understanding despite my efforts.

This paper is structured so that with each chapter, I go one level lower to describe every aspect of Astar Network and the protocol. This chapter will set the ground rules, vision, and definitions I will use throughout the paper. In Chapter 2, I go through the fundamental building blocks and assets that form what we know as the Astar Network. In Chapter 3, I describe the common challenges and problems that Astar Network and its contemporaries face. In Chapter 4, I go into the features and functions of the Astar governance system. Then in Chapter 5, I describe the implementation phases the network will go through to deliver the governance system described in the previous chapters. Finally, in Chapter 6, I will conclude this paper and outline my future research plans.

Finally, this whitepaper is not a research thesis or an empirical proof for a hypothesis. Although I structured this paper to resemble an academic study for clarity and have used qualitative data with sources to back my statements, most of the concepts and statements will require further research to justify why my proposed solution is optimal for solving the defined problem. Instead, this paper aims to become the starting point for the future development of this concept, and my proposal for creating a new form of online society governance is expressed through the Astar Network.

This whitepaper is the formal specification and application for the digital society that we wish to realize on Astar Network by defining the vision of the ecosystem and the governance system to achieve them. This paper will cover everything from defining misrepresented terminology, how we define effective governance, the vision of our network, the governance system we will implement, and guidelines for governance participants to foster a healthy society on top of Astar Network.

1.1 Background and Motivation

Astar Network is using blockchain technology as part of the ecosystem. Talking about governance in this context will naturally lead to talking about decentralization and decentralized autonomous organizations (DAO). The governance system that Astar Network will use also fits in a similar framework, and my research has several references to these models. However, while doing my research, I noticed that many blockchains and DAOs have a very well-researched model for weighing votes and establishing a sophisticated governance model that the network participants will be part of. However, in many of the networks I looked into, I failed to find the mission or vision it attempts to achieve through its model that provides meaning to the network. The general motivation for a governance system that most projects shared was to achieve decentralization or increase the monetary value of their core digital assets.

However, I can't entirely agree that decentralization or growth in digital assets is the goal for Astar Network. Decentralization is a byproduct and necessary for any organization to scale after a certain point while maintaining its functionality to move toward a set goal. An increase in assets (or generating income) is not the motivation of an organization but

a requirement for the organization to sustain itself. Decentralization and appreciation of digital assets for a blockchain are a few of the components that make the overall system stay afloat, but this should not be seen as the goal rather than a method.

The governance system I propose here was first inspired by the Japanese Keiretsu system, where a network of organizations with diverse business interests come together to support each other's operations while remaining operationally independent (Liberto, 2021). My original hypothesis was to see if I can design a system where I recreate the horizontal Keiretsu network and replace the cross-organizational trust with a blockchain-based decentralized consensus and the central bank with a blockchain network treasury. After extensive research, literature reviews, and observing the blockchain industry based on what Astar Network is, my final research became completely different. But at its core, the intention and the motivation are similar.

Therefore, I am writing this whitepaper to establish the vision of Astar Network, the high-level functionality of the ecosystem that we want to see, the tools and models that we will use to achieve our vision, and how to maintain the operation of the governance participants so that regardless of which technical expressions we decide to use and how it changes, the human aspect of the network should not change, and the governance system should be structured so that even in the situation where the technical solution fails, the human participants can still maintain the system to function as intended.

I believe that technology and any system are ultimately meant to bring value to human users, and even if the system fails in any way, the vision of our technology—Astar Network—will guide the human participants to continuously improve and maintain it so that it can continue to provide value that we intended. I write this whitepaper to establish the groundwork that we can reference in the future to realign ourselves and never lose our mojo.

This paper is not meant to describe the unchanging technology of Astar governance but to act as the compass for future improvements and the direction in which the ecosystem will move by structuring our governance.

1.2 About Astar Network

Astar Network is a digital society that utilizes blockchain technology as part of its operation and an ecosystem of developers, innovators, creators, and businesses in the digital space. Through the technical stack of Astar blockchain, we provide a platform where developers and companies can interoperate their communities and achieve seamless integration to expand and enrich their ecosystems.

The Astar blockchain is a layer-one application platform that supports various programming languages and account standards to build smart contracts, a piece of programmable logic within the blockchain designed to make cross-ecosystem interoperability, both inside and outside of the same blockchain, functional as possible. It uses the **ASTR** token as the native currency to pay usage fees and other utilities.

Among the many features the Astar blockchain provides, one of the key features is called dApps Staking, a unique feature where any ASTR token holders can lock a portion of their token to a project or product in the Astar blockchain. The product that received the locking will receive regular rewards from ASTR tokens created from the network's token inflation. The act of locking your token for a project is essentially showing support for the team, and the goal of the teams building on top of the Astar blockchain is to create something that the token holders would want to support or find a way to gain engagement from the users. The dApps Staking mechanism incentivizes these actions that lead to the value creation of the Astar Network.

1.2.1 The Astar Network Vision

As you can see from Astar blockchain's features, the network vision revolves around the projects, creators, and innovators in the new digital world.

Astar Network strives to become the innovation platform and incubator where individuals and teams of any size can be free to lead, create, and shine like a star.

I firmly believe that there will never be a silver bullet for a fair and functional governance system. Instead, the Astar vision is to create a system that can overthrow itself to improve based on the requirement of its core users and adapt to the changing environment.

1.3 Terminology and Definition

I have already introduced a lot of keywords in the last few sections. Because of the fast-growing nature of the blockchain, Web 3.0, and online community governance, there are no formal definitions of the terminology that many people accustomed to this industry might casually use. Therefore, in this section, I will clear out and redefine certain terminologies for this paper.

1.3.1 Decentralization

Decentralization is a term commonly used in the blockchain space with varying contexts. The dictionary defines this term as the following (need source):

“The spread of power away from the center to local branches or governments.”

However, this term in the blockchain world sometimes describes a protocol's technical distribution and functionality (such as the consensus mechanism). But it may sometimes refer to the community structure or the network-wide decision-making process, where a certain voting mechanism is used to ‘decentralize’ the network by allowing anyone to vote (A DAO governance system).

By definition, decentralization is achieved by having the political structure function by delegating power to the local branches and not having a central figure, like the monarch,

make all the decisions. In this sense, many modern democratic nations or public corporations above a certain size are a government that is decentralized and autonomous, but people in the blockchain industry will claim they are centralized.

Due to the different understanding of the scale and perspective of the degree of decentralization, any attempt at "achieving decentralization" will not be sufficiently agreed upon by people with various backgrounds, and the readers may have different expectations for the same concept.

Therefore, I will seldom use 'decentralization' throughout this paper. Using it will strictly mean the *relative reduction of dependencies for a given act to work as intended Or to be without a central controlling figure*, depending on the context.

1.3.2 Astar Network and the Protocol

A blockchain is one form of distributed ledger technology, where a set of nodes different individuals operate can agree on a network state transition and achieve consensus. Initially, the network and the protocol were treated as the same. However, as the technology evolved, many different use cases and architectures showed up, and it became difficult to see blockchains as a single entity. 'Astar Network' is used interchangeably with the 'Astar Protocol,' where the state consensus occurs.

However, for this paper, I will separate the definition of Astar Network from Astar Protocol as both achieve consensus in very different ways. The Astar Network will refer to the ecosystem, community, business, and other higher-level applications that share the Astar vision. The Astar Protocol (or the Astar blockchain) refers to the technical stack that is one of the many components facilitating the Astar Network. In other words, the Astar Network is not bounded by the technology that it runs on but operates through business and human interests that forms the ecosystem. Therefore, we can separate the human and technical consensus in this paper.

1.3.3 Stakeholders and Players

In a business, stakeholders are interested in the organization's growth. The organization's objective is to grow toward the interest of its stakeholders, which naturally is to increase the profit margin or the company evaluation (need citation). After the growing interest in social entrepreneurship, new stakeholder models have emerged that add external factors as part of the success criteria, such as society, environment, and sustainability, to name a few (need citation).

However, this does not accurately describe the people or organizations that determine the network's growth and success based on Astar Network's vision. Astar Network strives to become a public, open, and ownerless platform for other organizations with separate stakeholders and business interests. A platform will have rules and assets that make it

attractive for certain businesses, but its growth should not prioritize one business interest over another.

Therefore, instead of calling the people or organizations with a growing interest in Astar Network stakeholders, I will refer to them as players or participants who are bounded by the rules of the network governance and act based on the strategy that maximizes their interests.

1.3.4 Network Governance and Decentralized Autonomous Organization

Finally, the network governance and decentralized autonomous organization (DAO).

A DAO is a concept that was mentioned before blockchain communities adopted it. This concept has many variants, such as decentralized autonomous companies (DAC), decentralized organizations (DO), etc. A DAO's diverse functions and structures attempt to emulate a real-life corporation, non-profit organization, or small online community (Hassan and Filippi, 2021). Because of the lack of consistency and consensus among experts in the blockchain industry, it is hard to create a framework that everyone can understand.

Generally, DAOs are accepted as online organizations, regardless of their decentralization or autonomy, as long as they have a form of governance and participants. Therefore, in a broad sense, the act of adding a governance system to a blockchain is to create a DAO.

However, based on the vision of Astar Network, the network does not aim to be decentralized, autonomous, or become an organization. Instead, Astar Network is a platform based on its vision and creates an ecosystem comprising multiple organizations and teams. A DAO is generally known for being comprised of individuals that fit certain criteria and acting as a collective or an organization for a purpose. Astar Network is not an organization of individuals but a platform for multiple organizations (including DAOs) to collaborate and form a network of ecosystems.

Therefore, the purpose of establishing a network governance system for Astar Network is not to make Astar Network a DAO but an open and ownerless platform for DAOs and businesses to collaborate.

In stead, I propose that Astar Network is an Inter-Organizational Governance Platform (IOGP), rather than a DAO.

Chapter 2

The Building Blocks of Astar Governance

In the previous section, I outlined the core motivation and the vision behind Astar governance. Using the Astar vision as the guideline, I will dive deeper and define the core pillars and the building blocks that define the overall Astar governance system, pushing the entire network towards its vision. The governance system should be open so that anyone we define as a stakeholder can participate and contribute to the network.

The goal of the governance in Astar Network is not to be decentralized but to be open to anyone with the right criteria. *In other words, the system aims to create a platform without an owner, only leaders.*

This chapter will describe what a functioning governance system on Astar Network should look and behave like.

2.1 The Core Assets of Astar Network

The asset in this context refers to something of tangible value to a certain group of people that encourages them to take certain actions to achieve it for their gain despite the opportunity cost involved. A straightforward form of an asset would be money, in that people or organizations are willing to prefer an action that grants them monetary benefits.

The assets could be used to incentivize certain behavior or punish them by taking away the assets. We can create a governance system by identifying what types of assets could be used as leverage to program a system that can attract players (stakeholders).

In the case of Astar Network, since the network's vision is to become a public and ownerless platform for organizations to work together, I will define the three core assets that attract people.

1. Technology: This refers to the features and infrastructure provided by the Astar

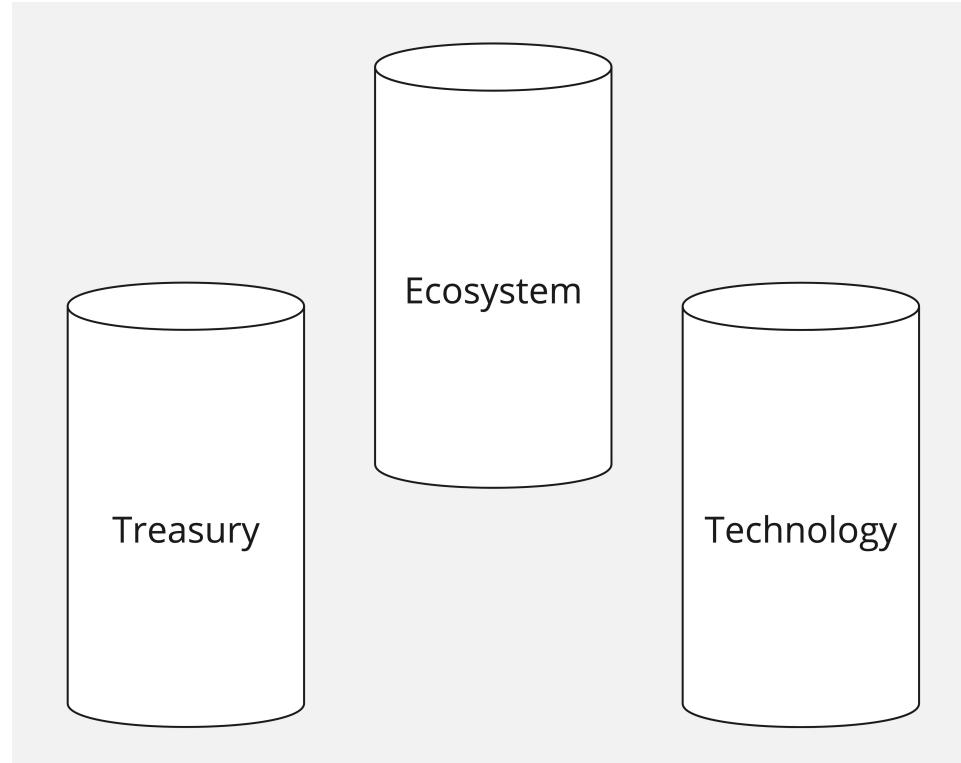


Figure 2.1: The core assets of Astar Network

Protocol and consumed by the Astar Network. Everything connected to the value of the block space of Astar Protocol, such as dApps Staking, smart contracts, layer-two, and access to the Polkadot Network ecosystem, are all part of this category. Our technology must attract network players to build a product and rely on the network as part of their business.

2. Treasury capital: Astar Protocol issues its **ASTR** token, which is used in various ways the network is designed for. As a public network, the Astar Network has a public treasury containing a set of **ASTR** tokens that are accumulated based on rules programmed into the Astar Protocol. The treasury funds can only be allocated through a voting system embedded in the protocol, but the purpose for allocation can change (such as grants, bounties, etc.). Note that the treasury, in this case, will be denoted into fiat value; therefore, not only the number of **ASTR** tokens but the token's value will also contribute to the growth of this asset.
3. Ecosystem (community): The ecosystem refers to the projects, teams, businesses, and the community that directly runs or relies on Astar Network, including other blockchains that are interoperable with it. An ecosystem is attractive to businesses

and projects as it directly indicates the liveliness of the network and the potential reach for a business. So, our ecosystem must be attractive for businesses or projects that wish to have a broader reach. To increase the value of this asset, it will be in the best interest of the governance players to introduce more players or high-profile entities as part of the ecosystem.

In Astar Network, the technology, treasury, and ecosystem will be the main motivators for why a player wishes to participate in Astar governance and contribute to the network. By clearly defining the players' interests and how to obtain them, the network can control one variable in remedying voter apathy. Another variable is making a change through mobility and promise delivery.

2.2 Governance Actions and Value Transition

Now that I have defined the core assets and the player motivation, I will discuss the ideal action for a player in the Astar governance and how the system Astar Network decides to incorporate must facilitate the value transition.

Based on the Astar Network's core assets defined above, the primary motivation for anyone to participate in Astar governance is to exploit one or more assets the network can provide. In that case, the Astar governance system must ensure that the exploitation of one asset can lead to the application of another asset. The term 'exploit' may give a negative impression, but I believe that a robust system has exploitable resources that the players are willing to participate by utilizing the system. Therefore, I will use this term throughout the paper.

For example, Player A wishes to exploit the Astar Network treasury to fund their company. To do this, they must contribute to one of the other assets. In this case, if Player A specializes in technology, they can open a treasury proposal to add or improve a feature for Astar Protocol in exchange for the treasury tokens as compensation. One of these is to develop a commonly used public application, which is described in detail in section 4.1.6. Players who wish to exploit the technology asset will cast a referendum to favor this.

Another example is when player B wishes to exploit technology like dApps Staking. To make their project eligible for staking, they must add value to the ecosystem. If the people who intend to exploit the ecosystem find the dApps Staking listing proposal good for the ecosystem, they will vote in the project's favor.

It is not feasible to expect every aspect of the network's asset to transition from one to another. But suppose Astar governance is involved in the consumption of one asset. In that case, the governance system should be implemented to force consumption behavior to always translate to increasing another asset. Suppose the action does not add value to the network that fits the abovementioned category. In that case, it should be disregarded or punished at the Astar Network or Protocol levels.

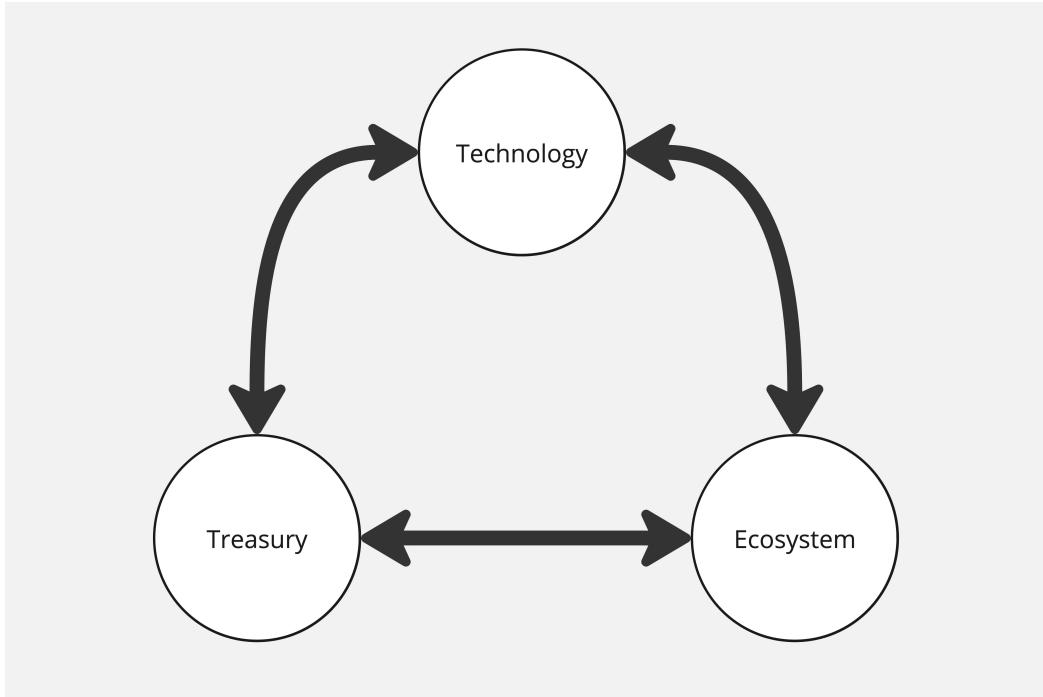


Figure 2.2: How the transfer of value within the governance affects each other.

2.3 Expected Core Governance Players

Based on the defined Astar Network vision, the network must limit the governance players to any form of organization with stakeholders, strategy, and business interests in accessing Astar Network's assets. The Astar governance players are expected to open proposals, vote, and partake in any other governance actions defined by the network.

The technical method of limiting the governance players will be described later, but the high-level player characteristics will be like the following:

1. Companies or organizations directly use Astar Network as part of their business.
2. Companies or organizations with one or more products deployed on Astar Network.
3. People using products that are on top of Astar Network.
4. The people that contributed to Astar Network or the protocol with ideas and innovations.
5. Generally, anyone who adds direct value to the Astar Network through product development.

On the other hand, the following individuals are not expected to be key players in the community, regardless of whether they have voting rights.

1. Average ASTR token holders.
2. Institutional investors and whales.
3. Other blockchain ecosystem projects that are not building on Astar.
4. Other blockchain governance players.

The expected governance players do not mean who will have voting power. But it refers to the type of players the Astar governance should empower the most to achieve the network vision.

2.4 Governance Components

Going one step down to a lower level, I will describe the components forming the governance actions the players can perform in multiple areas with Astar Network. This covers the general workflow and the layers that the players are expected to go through when taking a governance action, but also the higher-level motivation and power that drives them to do so.

I categorized the governance interaction layer into two main parts: one is the platform, and the other is the expression method.

The platform refers to how the governance players can interact with the Astar governance to reach a consensus and, ultimately, enforce the network to enact the outcome based on the consensus. The platform is split into three layers: the communication layer, the voting layer, and the enactment (or execution) layer.

The communication layer is where the governance players will interact with each other, share their thoughts on a network proposal, or for the governance player to convince the other players why their proposal is valuable to everyone. The communication here will be rapid and kept separate from the protocol. This layer includes the Astar Forums, Polkassembly, community chat, calls on platforms like Discord or Telegram, comments for proposal posts, and a highly customized governance communication platform called the Townhall, developed by the team behind Polkassembly.

The voting layer is where the players express their sentiments about a given proposal. If the communication layer is about qualitative voting, this layer is where the players consolidate their sentiment through quantitative voting that will be propagated through the network. Player action will be simple and quick. For example, this layer includes off-chain sentiment voting, on-chain smart contract voting, voting through Substrate pallet, and quadratic voting.

The enactment layer refers to the various platforms in and outside the protocol to execute the referendum that the governance players have agreed on through the voting layer. Suppose

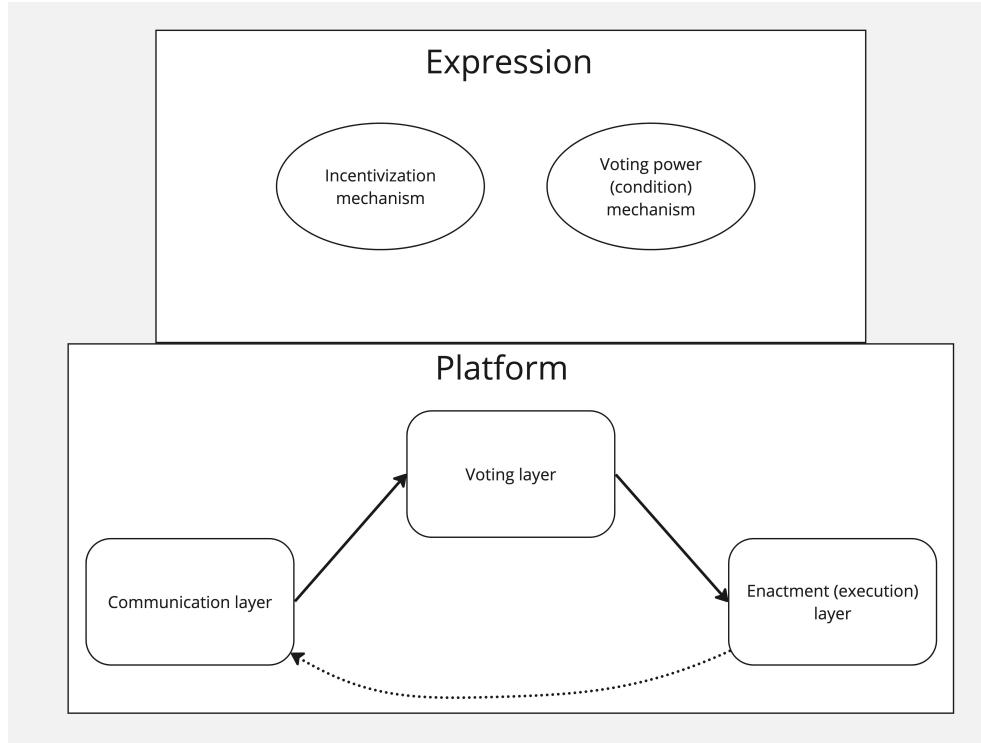


Figure 2.3: The governance components and governance journey in Astar Network

the proposal to enact something fails to pass the votes. In that case, the player must return to the communication layer and attempt to convince the other players or adjust their original proposal based on the feedback. The enactment layer can vary in many ways, such as GitHub for merging code or making changes, performing Substrate runtime upgrades to change the network behavior, performing hard forks, or allocating tokens from the treasury to an account. To increase trust in the governance system, it is generally better to have the enactment layer comprise on-chain ownerless functions embedded in the Astar protocol rather than an off-chain one. If an off-chain enactment is unavoidable, then it will be the player's job to ensure that the authority over this is distributed and secure so that an individual does not become a point of failure.

The expression is more high-level than the platforms in Astar governance. If the platforms were tools and software that the players have to decide and agree on, the expression would be something that cannot be decided but designed. The expression describes how a player's sentiment for a proposal or a governance action could be shared, the motivator for someone to be a player, the activities the players can partake in, and how the power dynamics work between the vast number of players. If the platform is where the player directly interacts, the expression will be the resources that the players will use through multiple platform layers.

The incentivization mechanism doesn't exclusively refer to what the player will gain by

acting. Instead, it describes the player's actions to access the Astar core assets (reward or incentives). The incentivization mechanism refers to how the governance designs and encourages the players to perform certain actions to benefit the network. An example would be a bounty program, hackathons, staking, operating a full node, ambassador programs, and other community activities related to the network assets.

The voting power mechanism refers to how a player's authority and voting power within the Astar governance is quantified and allocated. There are many ways voting power and authority could be represented in different systems. Examples of this are council seats, delegates, governance tokens or cryptocurrencies, and other voting power distribution mechanisms.

When designing and implementing the Astar governance at the lowest level, the network must always be mindful of how each platform layer is being maintained and by whom (for example, does only a handful of internal teams have access to the Astar GitHub? Who is the moderator for the Astar Forums?). It is important to ensure that our platforms are sufficiently decentralized in that there is no gatekeeping or censorship by a single party.

At its core, designing a governance system for Astar Network is to agree on the various platforms the players will utilize and define the governance expression mechanisms so the players can partake in the network activities.

2.5 Leadership

Astar governance aims to make the Astar Network an ownerless IOGP for those who provide value or are committed to the network. As the network has no owner with a higher degree of decentralized decision-making, it might be easy to think there is no leader to govern it. This is also one of the common misconceptions around a DAO, as the decentralized and autonomous part gives some people the impression that the organization can function without a leader.

However, this is far from the truth. Any group of people will need a leader to move forward, and for a decentralized one, this is very important. Suppose Astar governance wishes to stay innovative and flexible to external changes. In that case, the network needs a clear understanding of leadership. Still, since all players in the governance are expected to be a sovereign business with their interests in being part of the Astar governance, it is not wise to have a single leadership in protecting the network from operating for a single purpose and centralization in power.

Instead, I propose that the Astar governance will have a subsection of democracy consisting of the leadership with the authority to veto or change the network at a fundamental level, which can only be exercised through democratic voting amongst the leadership. This can be in the form of a council seat that overlooks the network.

By having a democratic process amongst a smaller group to exercise the ultimate power, the network can avoid creating a hierarchy shaped like a pyramid but establish a trapezoid. Whichever leadership structure the network will implement, it is important that the system

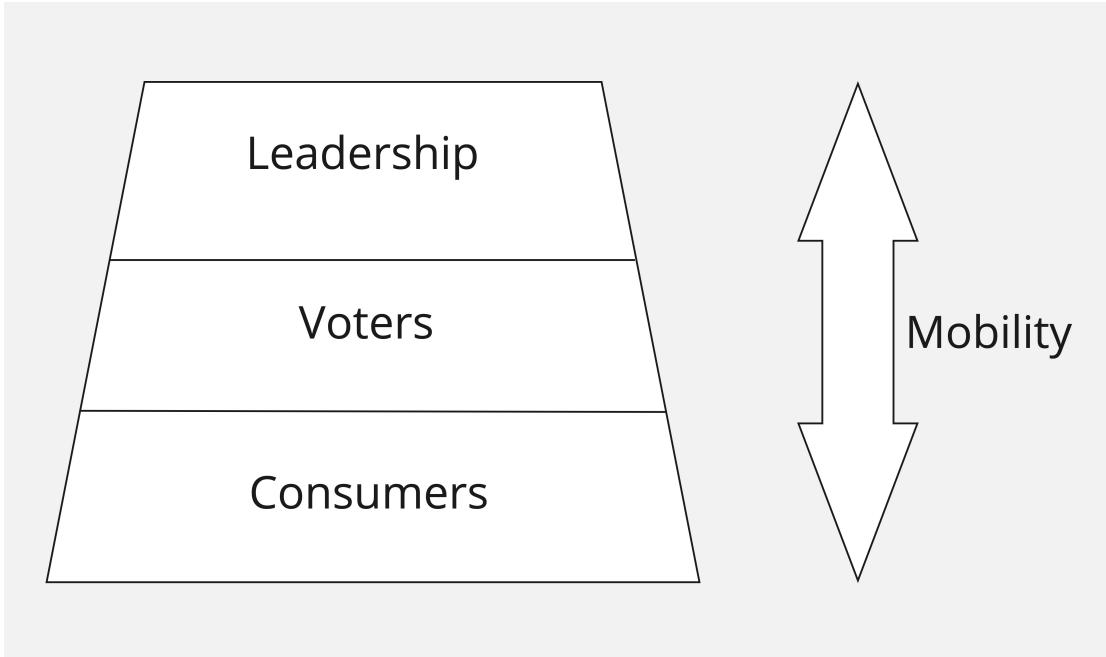


Figure 2.4: How the various player ranks are defined in the Astar governance, and the importance of mobility between the ranks.

encourages high mobility amongst the players in any rank, and the leadership must allow other players to become part of the leadership.

During the early stages of network governance, I expect the system to work differently than planned, as more than the number of players will be required for functioning governance. Therefore, I expect a handful of players will have majority influence based on primitive criteria such as qualifications, prior contribution to the network, and perceived influence. But this will change as the number of players in the network increases with diverse perspectives.

2.6 Accountability

When there is positive behavior, the governance system should also define negative behavior. As described in the previous sections, the network defines that one of the core motivations for a network player to partake in the governance process is to exploit the assets and resources for their business interests that Astar Network can provide. However, to ensure that the transition of value between assets is guaranteed to the degree that the voters are comfortable with showing support for future network proposals, the network needs to add a mechanism that will hold the beneficiary of the network assets (like a treasury proposal) accountable for delivering on the transition of value that they promise (like adding a new feature to the

protocol or delivering on a common-good product that benefits the ecosystem).

This is a very human-centric problem as, ultimately, the voters and the network players are the ones who can define if the output of the beneficiary is satisfactory. The protocol can support resource allocation and other systematic criteria, but it cannot validate if the output is correct with the proposal.

Instead, I propose that the Astar governance incorporate several staking of assets to ensure that the penalty for not delivering is higher than playing by the rules.

One such mechanism could be to force anyone who wishes to benefit from the network through governance (by opening a proposal) to stake a significant sum of ASTR tokens. If the proposal is passed, the tokens will be returned, but if it fails, they will be taken to the treasury (Jentzsch, 2016). The exact amount and the locking duration can be adjusted based on the player's usage and needs.

Another approach is to introduce a form of social staking, where all governance actions in Astar Network performed by a player with an on-chain identity will gain more trust points from the voters. More delivery will lead to more trust and reputation from the network. In case they fail to deliver, they will be scrutinized for their action, and future involvement in the Astar governance will be viewed through a critical lens, effectively making a form of decentralized social staking. This can also be worked in conjunction with the previous idea.

The detailed method will need further research, real-life testing, and observation before the network can find a solution that works for a long time. Still, during the early phase of the Astar governance, a primitive form of spam prevention method will be sufficient, given that the initial leadership can maintain the culture.

The ultimate goal of adding accountability into the Astar governance is to reduce the noise and voter apathy so that promises made through a vote will be delivered or followed up.

Chapter 3

Governance Problems and Challenges

In this chapter, I will describe some of the challenges, limitations, and issues that we will expect and consider based on various aspects of the Astar Network. I use several existing cases to illustrate particular problems and challenges. The challenges described here are common pitfalls that other governance systems may see and those that Astar Network should avoid through incremental upgrades to the system. I cannot list solutions for all areas as their impact of them on the network will differ depending on the number of players and the external situation. However, the challenges mentioned here should be the topic of further research and a subtle warning to the network players that these areas of concern do not go unchecked.

3.1 Imbalance of Resource and Authority

Two essential parts of keeping a governance system decentralized, open, accessible, and effective are to keep the information transparent, and the players mobile (Al-Nawafah and Almarshad, 2020).

However, as the governance players partake in network activities. Naturally, the same players will gain a reputation among other players, leading to a consolidation position. As stated in the previous chapter, leadership is vital in creating an effective governance system on Astar Network. However, it is not ideal when the player who has unintentionally appointed leadership through active participation and contribution is also expected to make large decisions or gain more information and context about the network than others (Wocken, 2023).

For example, Player A might focus on the marketing side of the Astar Network ecosystem, and many projects on the network rely on their service. Player A having exclusive information that could affect the outcome of a referendum or the network's direction could lead to power consolidation. Unless other players have the same marketing network or more resources that can act as an alternative for Player A, it will be difficult for the ecosystem to reduce the

reliance on that player or contribute in the same field without that player's support.

Another issue that the network should be particularly aware of is the transparency in protocol development. To create an effective IOGP, no one player should be solely responsible for developing the protocol. Still, in case anyone wishes to partake in the technical contribution side, the development progress should be made public such as publishing the milestones, exposing the internal backlog to the public, and using platforms that allow anyone to add or contribute to the development scene.

In the case of marketing, there is a limit to how much could be shared due to the sensitive nature of the matter, more so when the purpose of Astar Network is to become a platform for organizations to collaborate. So, asking the players to publicize all marketing and partnership activities would be impossible. Instead, network-wide marketing efforts should be expressed into projects (events, hackathons, etc.). In contrast, the practical business marketing side is delegated to each player who is deeply involved. To maintain the collaborative nature of our network, the players must create a culture of active support where players express what type of marketing support is needed and who can provide this in the network. The resources can be funded through the treasury through a joint proposal, given that the marketing effort also benefits the network.

Further research will be required within and out of the network to identify the core cause of the imbalance, and the solution will differ depending on the context.

3.2 Voting with Asset of Value

For Astar Network, it is important to clearly understand the intentions (motivation) behind the players for participating in the governance and have the system nudge them to participate only in the direction that satisfies the community vision for the network to function correctly and constantly improve. This concept was discussed in the previous chapter as the expression mechanisms used to design the "right motivation" to contribute to the network. Based on the network's vision, the right motivation, in this case, would be to maximize the player's business interests and exploit the core assets of Astar Network.

However, many decentralized finance applications (DeFi) with a governance component, such as Compound, Maker, and Aave use a governance token with monetary value to represent a saying in the community proposal (Nibley, 2022).

For a platform and organization operated by individuals, using monetary value as the core incentive is an easy way to program incentivization mechanisms for good and bad behaviors. Furthermore, the motivation of the governance players will be simple: to maximize the value of the digital assets they hold. This means players will be interested in proposals and player contributions that equate to the appreciation of their holdings. Using the very assets that define the player motivation as the way to express their sentiment means that referendum for any other matters outside of an increase in asset value will lack sufficient incentives for players without a separate business interest (Foxley, 2020).

The reasons why voting with an asset of value will not fit the Astar vision are as follows.

1. Oligarchy: One potential issue I see when making tokens (assets) a representation of voting power is that it essentially means money equals power in the system. This painfully resembles the power dynamics in a capitalistic society. To combat this issue, token voting mechanisms introduce a voting threshold into the equation to limit the power of whales. However, in a permissionless system, anyone can create a new account to cast a vote just below the threshold, which becomes a cat-and-mouse game. If the network requires an on-chain identity to vote, the system moves toward a reputational voting system. Furthermore, the lack of capital should not be why someone's voice is less important than others.
2. Voting cost-benefit analysis: Voting should represent one's voice and opinion on a given matter. However, when the medium of voting can appreciate as an asset, this means that voting is also an action that costs money, either in spending the tokens or through opportunity costs when the tokens are locked.
3. Skewed priority and interests: Continuing on the points mentioned above, allowing all token holders to vote means that the most prominent common interest of the voters will be to increase the token value. This is because corporations and projects building on Astar will serve a different audience, and their proposals are expected to work in their favor. But in the case of token value appreciation, this is seen as a positive for all holders. Because of this, governance proposals that can directly affect the token price (such as generating hype or token economics changes like reducing inflation) will tend to gain more traction with higher votes than those that are more core to the protocol and the innovation of the technology. This tendency goes directly against the Astar vision.

This is one of the reasons why Astar Network cannot become a DAO with individuals as the core players. Instead, Astar Network aims to be an IOGP for multiple organizations to work in tandem while maintaining their business model and interests.

To prevent a situation where the voter sentiment is skewed towards proposals that only focus on asset appreciation, such as the value of **ASTR** tokens, Astar Network will not use assets with monetary value, and the monetary interests in partaking in the Astar governance will be limited to the fiat evaluation of the central treasury (which is also balanced between the supply and the value of **ASTR** tokens).

Instead, Astar Network will give voting rights based on the business interests of a player, the stake the project has on the network, and other factors that require the player to "earn" the vote through development or business activities and be part of the network, rather than solely through the token value.

3.3 Platform Fragmentation

As described in the previous chapter, one of the main concerns regarding the governance design is agreeing on the platform where the governance actions will occur. However, in doing this, the network must consider the vast array of tools, platforms, and functions that are available out there, and choosing only one will lead to platform dependency while choosing multiple will lead to fragmentation.

For example, the team might initially agree to use online forums like the Astar Forums to initiate and continue the discussion. But later, the network players decided to use Polkassembly and TownHall, an online debate and voting platform for blockchain-based governance platforms, which also has a forum function with the added benefit of direct voting from the website. Unless the discussion platform can directly integrate, or the player who initiated the conversation cross-links all posts, fragmentation will be unavoidable, directly leading to a steeper learning curve and a higher barrier of entry (Forums, 2023).

A similar situation could happen with the network's rapid communication channels, such as Discord or Telegram, which are prone to noise and participation from a few highly engaged players.

These two, combined with the multilingual nature of Astar Network's players, will compound in the fragmentation side, where people who are not fluent in the primary language (like English) are discouraged from participating and even create their sub-governance system that uses a separate platform that is unknown to the players outside of their culture. To mitigate this issue, the communication layer should support text translation, and the community actively cultivate multi-lingual ambassadors or players who can act as the cultural bridge.

During the early phases of Astar governance, fragmentation will not be a huge concern, as the network will have a limited number of players. However how the initiators integrate the platforms may discourage participation and gatekeeping engagement, which will go against section 2.5. We will see issues beyond our control once the number of players increases.

Further research will be required to find an effective solution. Still, until then, I propose that the network leadership have diverse language capabilities to facilitate inclusive governance while ensuring a central source of truth that connects to all officially endorsed platforms that the players use through a beginner-friendly guide.

3.4 Voter Apathy

Voter apathy is when political participation amongst the players decreases over time. There are many reasons why a governance system might face voter apathy in a national or organizational context.

But amongst the endless list of causes, three core reasons will be critical for Astar governance.

1. The sense of powerlessness and meaninglessness: If a player (voter) saw countless times that the outcome of their participation does not change anything, or the proposals that are up for vote are too vague, irrelevant, and unclear of the player to be engaged (Finifter, 1970).
2. Political fatigue: If a player has to vote for a similar matter several times, seeing others talk about governance participation without substance, or their votes constantly being vetoed or put into the spotlight by other players, this can lead to fatigue where the players are exhausted, and they want to move on to the next topic or quick governance entirely due to the lack of meaningful progress (Merica, 2020).
3. Political tedium: This is similar to political fatigue but at the logistics and the technicality level rather than a social one. In the case of a decentralized voting system, the system expects that most, if not all, players share the same information and have the same voting right. This means the players are expected to go through a certain degree of tedium when participating in the system (Chohan, 2017).

The above factors of voter apathy can heavily impact the livelihood, functionality, and direction of Astar governance. DAOs will be affected to a higher degree because a decentralized set of individual players are expected to act in coordination like a single organization (Chohan, 2017). Therefore, the burden of a vote is much higher. However, Astar Network, an IOGP, will not suffer too much from the same issues as multiple organizations (including DAOs) with a collection of individuals who can work in rotation to represent a single seat. Of course, this is only true under the assumption that the motivation for the organization to devote their efforts and allocate the resources makes business sense.

For Astar Network, the best approach to prevent voter apathy is by making the proposals have clear value propositions, utilizing a collective of delegates for small teams and small matters, and establishing a governance participation guide for organizations.

However, this topic will require further research and observation for a comprehensive solution in the future.

Chapter 4

Governance Features and Model

In this chapter, I will expand on the practical governance features that will comprise the Astar governance, based on the framework described in section 2.4. I do not expect all the features described here to be part of Astar Network from day one. Implementation details are expected to change depending on the requirement and the current technical situation of the Astar Protocol, and the order in which they are introduced as part of the Astar governance will depend on the number of players and the immediate challenges that the network faces. Therefore, the implementation should be purpose-driven into multiple phases that I will describe in later chapters, and the content of this chapter should be seen as the groundwork for what we can expect to see and research further to bring value to Astar Network.

Furthermore, the features described here will not be the final system. I expect the governance system to change and improve over time based on the change in the number of players, external changes, and other variables that require the IOGP to adapt for it to operate continuously.

Because Astar Protocol is built using the Substrate blockchain framework, the same framework as Polkadot, it will share many of the technical components, and the basis of the governance will be similar as well.

4.1 Governance Expression

In section 2.4, I describe the expression method in a governance system into two categories, the incentive and the voting mechanism. The first three features will be part of the voting mechanism, and the remaining two features will be related to the incentives and player motivation programs to engage them with the system.

4.1.1 Organizational Council Stakeholder

To achieve the vision of Astar Network, the system will work under the assumption that all governance interactions and matters will occur between multiple organizations instead of an individual player.

This means voting power will be distributed to organizations operating on Astar. Furthermore, as the network function, there will be certain organizations with more business stakes and continuous contributions with leadership positions. For example, the network wants to ensure that if there is a time-critical matter in the network, it is fast-tracked by the technical committee, proposing largely-coordinated network-wide changes, canceling dangerous or malicious referenda without controversy, and ensuring the growth of the network while maintaining the culture and the vision. The council members will largely have a one-person-one-vote scheme when voting within themselves or approving the expenditure of a large sum of the treasury funds.

The network council's concept and base role will largely be borrowed from Polkadot's past governance system, such as the abovementioned responsibilities and electing a technical committee for fast-tracking and ensuring protocol-level upgrades (Technologies, 2023).

One major difference in how this mechanism is realized in Polkadot versus Astar Network is that, as the vision states, the network will only treat organizations as the core players. This means that the council seat will be occupied by organizations (one seat per organization), and they will be expected to maintain a certain active contribution to the network to maintain their position.

Having these measures will be seemed as centralized. But this measure will be necessary until the Astar Network can accumulate a certain number of active players and the protocol development is stabilized. And suppose the number of players has increased. In that case, certain governance coordination will require a representative vote, so although the authority and the council's role will change, the fact that the network requires special recognition for those with leadership responsibility will not change.

However, as I described in section 2.5, the mobility of roles is an essential factor. In other words, the Organizational Council Stakeholder feature should be implemented or managed by the players so that those in special roles (the council members) cannot overthrow the overwhelming consensus of the average voters and cannot prevent other voters from being a new council member, given that the average voters are in a consensus. If the mobility is under attack, the council and the entire system must be scrutinized, and the integrity of the IOGP will be questioned.

4.1.2 Build2Vote

As mentioned at the beginning of this paper, in the Astar protocol, there is a unique feature known as the dApps Staking. ASTR token holders can "support" a project on the Astar Network by staking (locking) their tokens to the network. The projects will earn regular

rewards as passive income generated through network inflation. This mechanism defines Astar Network as the platform for innovators, as the network incentivizes projects to deliver value that the users want to support, all without a central authority. This mechanism is also referred to as "Build2Vote." The network can quantify what a project is within Astar Network.

As I have described throughout this paper, Astar Network will have a strict definition of a player: organizations and teams building on top of Astar Network with business stakes. Furthermore, as mentioned in section 3.2, not defining the core players or allowing the players to vote with assets of value risk driving the network into a direction that is not aligned with the visions it initially strives for. Therefore, Astar Network will not use **ASTR** tokens or any assets of value as a medium to express the player's sentiment.

Before I describe the voting model for Astar Network, I will talk about what it means to vote. There are many theories and studies about what motivates people to vote. But in any case, it generally boils down to the ethics as a participant in a system, the expression of self, and the moral obligation of contributing to the system toward a better future (Brennan, 2020).

Looking at voting rights in real life, in the case of Germany, voting rights are given to German citizens who have lived in Germany for at least decades (Angloinfo, 2023). This requirement is shared across most developed democratic countries with varying strictness. However, I see this requirement as a way to limit the votes to come from individuals who understand the culture, are active members of the local society, and have a living stake in the jurisdiction in which the policies will affect. In short, it takes at least a lifetime for individuals to obtain their voting rights, and is based on the cultural association of individuals within a society.

Considering this, the aforementioned moral obligation theory holds some ground as the voting right is distributed to people who identify as in the social group compared to those without it.

Using this line of logic, we can compare this with blockchain-based online governance systems like those seen in DAOs. In a system where assets of value are used as voting rights, there is little to no effort for an individual to be a player. Therefore, I hypothesize that the players lack the sense of obligation or "weight" to the power they are given in a decentralized system without a clear definition of players and the effort to obtain their voting rights. I will need to conduct further research to prove my hypothesis empirically, but this will be beyond the scope of this whitepaper.

Based on the vision that Astar Network is striving to achieve and the core players that I have defined in section 2.3, I propose that the network limit the definition of a "citizen" (players) by organizations who are actively receiving rewards from the protocol's dApps Staking mechanism.

A separate virtual token will represent voting power—let it be called **govASTR**—that will be distributed at the same time as when the dApps Staking rewards are distributed to the

projects on Astar Network. Therefore, the number of "support" a project receives will directly equate to the number of voting power a project has, which emulates the amount of stake a project of an organization has over the network.

To prevent the issues described in section 3.2, the **govASTR** virtual tokens will be non-transferable and burnable after a certain amount of time, called the burn period. This ensures that the act of voting only represents the pure sentiment of the voter and is not affected by uncontrollable external factors such as digital asset price volatility or voting opportunity costs. And by having the unspent voting rights be burnt after a certain amount of time, the voters are encouraged to participate instead of saving.

However, the **govASTR** tokens will be delegatable to other players, such as those who supported the project through dApps Staking, or to another individual represented as a blockchain address, including smart contracts. Delegating the voting power to the supports can act as a bonus and motivation for individuals to use their **ASTR** tokens to support the project. Furthermore, it contributes to the network role mobility described in section 2.5 by allowing any **ASTR** token holders to be considered a player in Astar governance. For delegating to other addresses, this can be used to have a dedicated governance delegate system on top of the Astar Network to reduce the burden for the players, which I expect to increase as the number of referendums and players increase, which can lead to the issue described in section 3.4. Another interesting use case I can imagine is when a project uses a smart contract address to delegate the votes and program a custom logic for distributing voting rights. For example, a DAO on Astar Network that uses NFTs to determine the membership could decide to delegate the votes to players who hold a certain NFT and quantify the voting power based on the rarity of the NFT.

Instead of having a one-person-one-vote system, I propose using the adaptive quorum biasing first used by the Polkadot governance. Adaptive quorum biasing is a voting threshold model that expands on the quadratic voting system that adds a condition for proposals with a low turnout rate will need a super-majority to be rejected (Technologies, 2023).

The **govASTR** tokens will not have any supply limit as they will be burnt after a certain period, and the distributed amount will be solely based on the number of **ASTR** stakes a project receives, which is separate from the **ASTR** rewards it will get. This prevents a situation where the dApps Staking creates the voting right a zero-sum game and prevents other projects from allowing new projects to join as to the fear of voting dilution. In this Build2Vote system, this will not happen.

Furthermore, having a governance token that will periodically burn is great to prevent a single player from accumulating voting power and encourage them to exercise their rights. However, this also means that the players are pressured to vote and may have a situation where they don't have enough voting power to vote for a matter they wish to participate. To prevent this, the voting period should be designed in such a way that the voting period lasts several **govASTR** token burn periods, and **govASTR** token holders can decide to reserve their voting power for a limited amount of burn periods that is decided by the protocol.

Further research will be required to find the appropriate parameters that work well with the governance situation. But this will not be an issue for the initial phase with a few players.

4.1.3 Anonymous Voting

One of the main challenges for a decentralized public voting system is the degree of transparency. Because Astar protocol is a public blockchain where the network history is visible to everyone, every governance action will be traceable.

The lack of anonymity in the voting process will affect the turnout rate and social pressure preventing people from expressing their pure sentiment for a topic (Rogers et al., 2017).

Astar Network will introduce an anonymous voting mechanism that utilizes the Zero-Knowledge Proof (Fazekas, 2022) to prevent this issue. An anonymous vote is rather straightforward as we need to define the governance actions we want to make private and only prove the outcome through hashproof rather than the full data.

However, this topic requires more research to understand and implement a secure way to facilitate this. Therefore, I do not expect this feature to be part of the initial Astar governance but something that will be introduced in the future.

4.1.4 Common-Goods Idea and R&D Bounty

One of the main objectives of the IOGP is to improve itself constantly and incentivize the players to do so. There are many ways in which a self-governing network can facilitate this mechanism.

Some projects like GitCoin offer a bounty system and a grant program managed by a DAO to finance projects and initiatives. Optimism Network also provides a value-driven funding mechanism called the Retroactive Public Goods Funding (Optimism, 2021). This model works well with what Astar Network is trying to achieve, as it utilizes one of the core assets—in this case, the treasury—and converts it to another value as I described in section 2.1.

Astar Network will introduce a mechanism where any individuals (not limited to players with voting rights) can submit network improvement proposals and research to back up their claims to receive rewards. When the players have accepted a network improvement proposal through a standard voting process, they will decide how much reward should be allocated for this effort, and the improvement proposal will become a common goods project bounty if it requires a dedicated development team to deliver it. Individuals can take on the bounty and deliver it for the players' reward. In this system, we separate the proposal for a change from the hard implementation. A small portion of the reward will be allocated from the Astar treasury if the players vote to do so, and players with an invested interest in the bounty (like ones whose business will benefit from the proposal) may add their support in the form of ASTR tokens to the bounty.

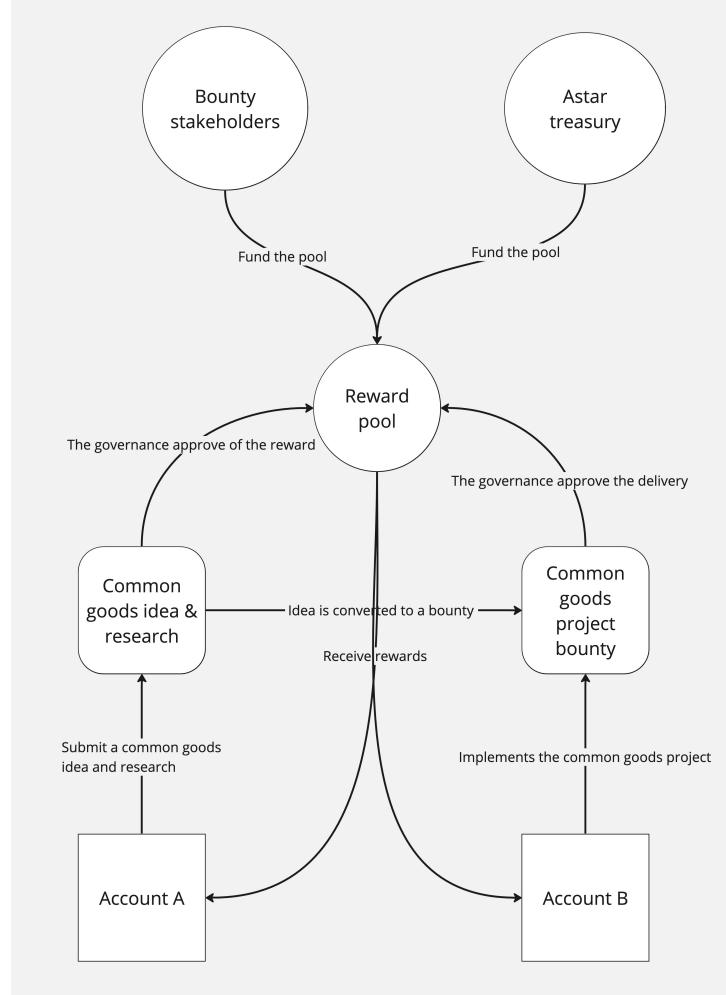


Figure 4.1: Rewards are distributed for the idea and the implementation on Astar Network.

This mechanism for funding the proposal and network development activities from external parties was heavily inspired by the Ethereum Foundation Grants program (Foundation, 2023).

In Astar Network, this mechanism can be implemented as a smart contract and be tested on a small scale before we can prove that this method of funding development efforts is effective.

4.1.5 Budget-Driven Treasury

Finally, the treasury will be the heart of the Astar Network that fuels any IOGP-level development and business activities.

The core mechanics of the Astar treasury will be based on that of the Polkadot treasury. Therefore, many concepts like tipping, opening proposals, the API for UI compatibility, and requiring the council's approval to spend a considerable amount will be similar. During the first few phases of the Astar governance, this will not change as I do not expect the network to have enough players to justify a complex spending mechanism. Therefore, the players are expected to directly open a proposal to request treasury funds which other players and the council will review.

However, a model where all incoming proposals, regardless of the nature of the proposal and the background information required for an adequate evaluation, require consent from all players, and the council will not scale as the number of players and the diverse use cases increase.

Regardless of the size of Astar Network, the treasury must function and fund proposals with the following characteristics.

1. Treasury funds should be allocated only for projects and ideas contributing to the network regarding technology, education, marketing, ecosystem, and anything else that leads to the network's growth (refer to section 2.2).
2. All proposals should have a clear plan, timeline, KPI, motivation, driving person, required resources, and risk factors that could affect the above.
3. The treasury should enable innovators, executors, leaders, or people who ship to focus on their work without financial concerns.
4. The treasury must have clear regulatory guidelines and support (such as invoices or other documents) so that all participants won't face any potential legal issues when supporting the network.
5. People who are qualified and engaged in the topic should handle the funding assessment rather than the council or a few with a lot of voting power.

To scale the Astar Network treasury and reduce the burden of the council members to review all proposals, I propose that the Astar Network adapts a budget-based treasury model. In this model, we utilize the "collectives" module in the Polkadot governance system, which will comprise the individual (not organizations) curators and a sub-treasury account designed to fund specific topics. The sub-treasury will be funded by the main treasury as a department budget, and curators are responsible for ensuring the funds are allocated to proposals that deliver outputs with quality by approving the spending. However, proposals to the sub-treasury still require a majority of support from the average voters, and the curators only act as the guardian of the sub-treasury (essentially the same function as the council, but on a focused and smaller scale).

It is important that anyone can create a new sub-treasury for whatever reason, as long as the council members agree that the initiative can utilize the budget that will be allocated from the main treasury. When the sub-treasury is dry of funds, they must make a budget extension request to the main treasury with spending plans.



Figure 4.2: The treasury in Astar Network will work on a budget basis, and anyone can create their sub-treasuries to fund specific activities that benefit the network.

For example, a community member wants to hold a regional small Astar meet-up, but no sub-treasury can finance this. Then, they must campaign to gather potential curators and supporters interested in creating a sub-treasury proposal with a payroll. Once a proper curator with a good proposal has been set, they can propose to the main treasury, where the council and the governance token holders will vote. Once the sub-treasury has been made, future community projects and initiatives meeting its acceptance criteria can easily open a treasury request and receive funds like they would in other governance platforms.

If the sub-treasury needs more funds, it can request a budget extension from the main treasury with helpful information that describes why it needs an extension. Any votes going

to the main treasury must have at least one approval and no disapproval from the council. In case of a disagreement, the proposal will always require the majority council's support for it to pass or be vetoed. A similar model will only be applied to the sub-treasury. But instead of the council's approval, any proposal will need the curator's approval.

The scope of the sub-treasury can be broad or specific, and it can always evolve. For example, we can start with an education-focused sub-treasury that funds hackathons, documentation, and online courses. However, the hackathon scene has become more prominent and needs more funding. In that case, we can create a separate sub-treasury focusing on funding hackathons and remove hackathons from the scope of the original sub-treasury.

This model will need further research to create the parameters that can prevent bad players from exploiting the treasury without providing value and handling potential conflicts of interest when the curators are also legally associated with the organization that is part of the council.

4.1.6 Common-Goods Application

As described in section 2.2, governance actions being translated into another asset to continue the inflow of network value is an essential aspect of Astar's governance. This is not an easy task for a decentralized network that does not actively provide monetizable value to paying individuals while maintaining security and preventing the risk of a point of failure. Therefore, the standard approach for a blockchain-based governance platform like Astar Network is to increase the token inflation rate and take a percentage of the transaction fee for the treasury. Astar Network will also take this strategy, but I believe that this isn't enough to create a sustainable model that generates value for all governance players to leverage.

On top of the concerns with the treasury business model, based on my proposal for the Build2Vote system described in section 4.1.2, there is a clear potential issue for gatekeeping votes and preventing more participants from being part of the IOGP, which is a situation that Astar Network should avoid as described in section 3.4. A good system should not rely on its players' courtesy and goodwill to function correctly, so a system must be in place to allow more interested players to get directly involved while mitigating the risk of a hostile takeover.

Therefore, I propose the Common-Goods Application (CGA) system. This is a category of applications deployed on Astar Network in the form of smart contracts, which can be developed, maintained, and used by any players in the network for any reason. In conjunction with the concept of funding common-goods ideas and research bounties described in section 4.1.4, the CGA will be funded through these channels, and the motivation for the governance players to build or maintain this project is to use this as a source of income, both for individual and institutional contributors. A CGA accepted by the governance players will be registered in the dApps Staking for any ASTR token holders to stake on. 100% of the staking

rewards from this application will go directly to the treasury, and the govASTR tokens will be distributed to the accounts who staked their ASTR tokens to the application, proportional to the number of tokens staked. This means that the more ASTR tokens account stakes, the more govASTR tokens that account will get. This mechanism is intended to be used for accounts who do not have a project listed in dApps Staking to become a governance player if they do so while acting as a source of income for the treasury in exchange for the distribution of voting power.

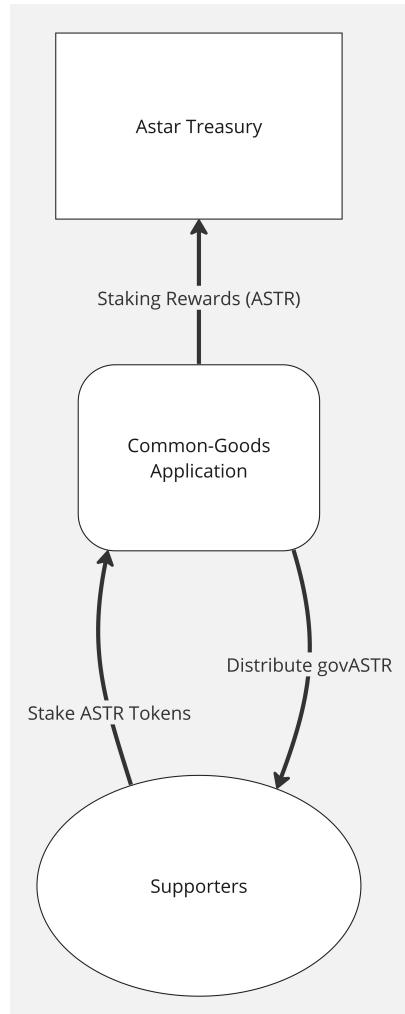


Figure 4.3: How supporting a common goods application contributes to the treasury and user participation.

For an application to be considered a valid CGA, it must satisfy the following criteria:

- Transparency & Openness: The project must be open source and hosted from a

commonly accessible platform like GitHub. Any willing participants with other player's support can contribute to the project. Furthermore, any project or individual must be able to use this application.

- Ownerless: No for-profit organization or individual should have exclusive ownership over the application. There may be core maintainers and a group of active developers, but this should be managed so that anyone willing can be part of the contribution process.
- Non-profit: The CGA should not exclusively benefit one player or an organization. There should not be any paywall or special requirements that only selected authorities can grant for other players to use or access the application. Transaction fees from the contract calls are not counted as funds as long as they return to the network based on the agreed token economics.

Based on the above criteria, the common goods application can be narrowed down to a smart contract deployed on the blockchain that does not rely on a centralized interface. Although the CGA should not be monetized, solutions that utilize the CGA are not affected by this, and the Astar governance activities around the CGA must show that these applications are guaranteed to be audited, maintained, upgraded, and stable for it to be used for production. The purpose of Astar treasury is to ensure the funding of these projects. As long as the CGA is open for anyone to use without additional cost or reliance on a for-profit organization, any for-profit business and projects are encouraged to use this application for their product. It will be the responsibility of the Astar Network governance participants to guarantee the stability and security of the CGA.

An example of such CGA would be a smart contract math library like the ones implemented by OpenZeppelin (OpenZeppelin, 2023). The intention is to remove the need for smart contract developers to deploy the same contract over and over again and instead call from a single CGA contract deployed on Astar Network, which is audited and maintained through the treasury. Ideally, most treasury funding for the application layer should revolve around the CGA and businesses developing such applications to finance their operations and integrate them into their for-profit solution.

4.2 Governance Platform

As explained in section 2.4, the governance platform contains the tools, channels, and functions the players will directly interact with to participate in the Astar governance. This section will describe the primary method in how the governance players can interact with the network and partake in the governance actions.

Due to the online nature of most platforms, I expect that as the number of players increases and the demand from the network changes, the platforms mentioned here will be

replaced by an alternative or expanded to accommodate the need. Therefore, the platforms I list here should be seen as the starting point for Astar Network rather than instructions that are written in stone.

4.2.1 The Communication Layer

The communication layer defines the method for how the governance players will communicate with each other, express their intentions, share additional context, and any other highly contextual governance actions to get the community into a consensus. Generally, the communication layer only contains non-binding actions, and the information density will be high.

Astar Network governance will need the following communication channels to function with information transparency.

1. Network-level discussion channel: This channel will be the platform for network-level discussions. Such as high-level improvement proposals, technical discussions, and inter-organizational coordination, to name a few. Astar Network will use the Astar Forums (a Discourse Forum website) as the primary platform. I also expect any network-wide topics to start from here, regardless of the field.
2. Protocol-level discussion channel: This channel is where discussions related to technical implementations will take place. Although the conversation could be initiated from the network-level discussion channel, it should eventually move to an appropriate channel like the GitHub repository for Astar protocol as a pull request.
3. General high-density discussion channel: This channel is for any topics that must flow in real time. This can include community calls or text messages. At the moment, Astar Network is using Discord as the primary channel. But this can be supplemented by general discussion platforms like TownHall.

The overall player communication flow will resemble something like how it is illustrated in figure 4.4. During the communication flow, if the vast majority of the players express a negative sentiment toward a newly proposed governance action, it will be the proposer's job to provide further information to convince the sentiment or take back their proposal.

Furthermore, another alternative for the network-level discussion channel is Polkassembly, which is also directly integrated into the Astar protocol for opening a new proposal and casting votes with forum capabilities. Astar Network will use the Astar Forums as the single source of truth for discussions, including network proposals, to reduce platform fragmentation. This means that players are expected to use the Astar Forums to provide the full information regarding their intentions and link to other platforms such as Polkassembly for further discussions as needed, rather than keeping all discussions to the forum threads.

Polkassembly will be used solely to express the player's binding sentiments, which will be elaborated on in the next section.

To keep things simple, we will customize the TownHall platform to seamlessly integrate with the abovementioned communication platforms so that all players can stay connected and unified. This effectively uses the TownHall as the main forum.

4.2.2 The Voting and Execution Layer

This layer will cover the binding governance actions, such as casting votes and changes needed at the protocol level to facilitate all the features.

As mentioned in the previous section, Astar Network will use Polkassembly and TownHall as the primary way for players to vote for a proposal. Discussions will be kept separate depending on their nature.

Astar Network will use a virtual token distributed based on the staked **ASTR** token for a project on the dApps Staking module. This means that staking **ASTR** tokens and managing a project is also a governance action. Currently, Astar Network uses the Astar Portal, maintained by the Astar Foundation, for **ASTR** token holders to stake in a project on Astar Network. Because the Astar Portal is the primary point of contact for all dApps Staking-related actions, this platform must be updated to accommodate the new governance changes. Once the Build2Vote feature has been implemented, the Astar Portal must add a new feature to the project management view so that if a project owner logs in, they can customize how the **govASTR** tokens are delegated.

For the enactment layer, Astar Network will use GitHub as the primary platform for hosting the source code for the Astar protocol.

For the protocol-level enactment and execution layer, the Astar protocol will use the chain modules—also known as “pallets”—that handle the governance function of Polkadot and other Substrate-based blockchains. Specifically, Astar protocol will use any combination of the following pallets.

- `pallet-bounties`
- `pallet-collective`
- `pallet-conviction-voting`
- `pallet-democracy`
- `pallet-identity`
- `pallet-membership`
- `pallet-referenda`

- `pallet-scheduler`
- `pallet-tips`
- `pallet-treasury`
- `pallet-society`
- `pallet-whitelist`

Some features will only make sense in certain situations, and I do not expect all features to be added to the Astar protocol in one go. Instead, the features should be added with purpose based on the network's need based on the current active players.

Finally, the essential part of Astar governance is to modify the `pallet-dapps-staking` to support the minting and allocation of `govASTR` tokens based on the number of `ASTR` token stakes that a project has.

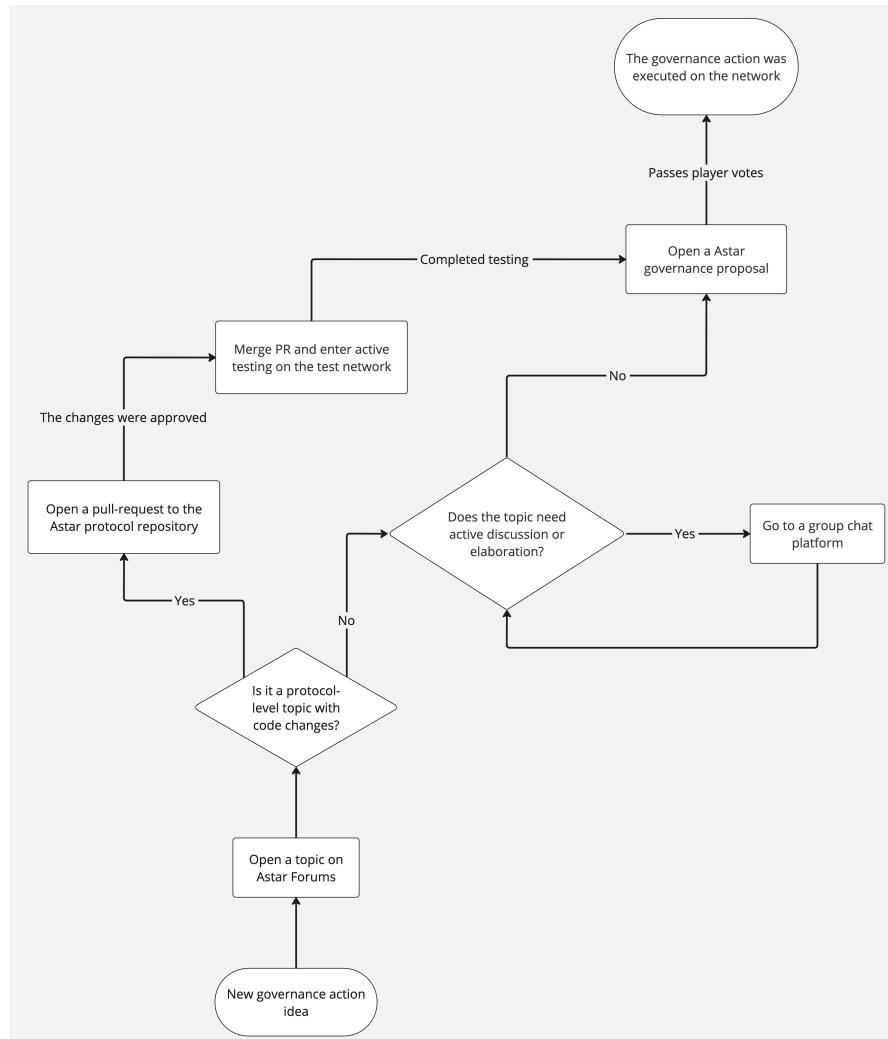


Figure 4.4: The Astar governance player communication flow.

Chapter 5

Implementation and Execution

In this chapter, I describe the expected development phases for the Astar governance system.

Due to Astar Network governance's very human nature, I suspect there will never be a solution that will work for everyone without making any compromises. It is best to assume that nothing will be perfect and things will change over time as the requirements and expectations of the players change. Therefore, a good system will be one that can adapt to external changes and constantly improve.

5.1 Governance Phases

There will be no set timeline, as the phases depend on the network scaling requirements. The phases I describe here are based only on the features I proposed throughout this paper. It will not be surprising to see new governance features added to the network based on the players' requirements. Furthermore, because the network went through all the phases does not mean that the governance is complete. Astar Network is IOGP that will continuously improve as long as there are players with special needs that benefit other players.

Based on the network situation, the phases are meant to illustrate the features that could end up in Astar Network. Ultimately, it is up to the network players and the network leadership to agree on the order and priority in which they are introduced to the network.

5.1.1 Phase 1: Genesis

The first phase is the most important part of Astar governance, as it will initiate everything and give authority over the protocol to the network players.

The main purpose of this phase is to kick-start the network voting mechanism and establish a culture of active participation from the key players. After this phase, Astar Network will become an ownerless network *without central and explicit authority over the protocol of the networks*. However, there will be leadership within the network which will

be primarily responsible for coordinating the development efforts and creating a positive network culture to bring the network towards its vision. They will also act as the police to maintain stability within the players when the number of players is still low.

For the technical implementation, the Astar protocol must first improve the `pallet-dapps-staking` based on the requirements described in section 4.2.2. Furthermore, the Astar protocol must add the following pallets at the very least.

- `pallet-collective`
- `pallet-conviction-voting`
- `pallet-democracy`
- `pallet-identity`
- `pallet-referenda`
- `pallet-treasury`

The `pallet-conviction-voting` should be configured to support voting with `govASTR` tokens. And the `pallet-collective` should define the council members that will govern the network. For the initial council members, it will be up to the governance initiator (the core founding team members or Astar Foundation) to appoint at least three organizations with diverse business interests and vote for the technical committee.

Finally, the Astar protocol must remove `pallet-sudo`, which a centralized account uses to perform every network-changing action. This is a useful feature for quickly improving the protocol and maintaining the network. But when Astar Network becomes an IOGP by introducing the features listed above, having `pallet-sudo` will undermine the existence of a governance system. Therefore, it must be removed once the leadership can confirm that all mission-critical network maintenance actions can be performed from the suite of governance features added to the protocol.

The purpose of the first phase is to add the bare minimum feature that is needed for Astar Network to function as an IOGP that can allow cross-organizational operations between projects on top of the network. The expected common governance actions in this phase will be performing network runtime upgrades, listing new projects to dApps Staking, and allocating treasury funds to player initiatives.

Once the council members confirm that the Astar governance function as intended based on the above purpose, the network created a culture of players actively voting or delegating their votes, and all platforms and interfaces have been integrated, then phase 1 is finished.

Subsequent research will define the exact parameters and interfaces for the unique governance feature, but in a nutshell, this is how the first phase should look like.

5.1.2 Phase 2: Budget-Based Treasury and Bounty

This phase will be about scaling the main on-chain treasury. This phase will take effect when the network gathers a substantial number of new players and the number of incoming treasury proposals exceeds the resources the council can allocate to evaluate the contents properly. At its core, this phase will be more about the culture and workflow setting rather than technical implementation unless it is required to have a unique feature.

The Astar protocol will introduce **pallet-bounties** and **pallet-child-bounties**. Using these pallets alongside those added to the protocol previously, the network can create a sub-treasury (a bounty) with curators and have the main treasury allocate a huge chunk of funds for the area-specific funding efforts. The council's responsibility is to ensure that the budgets are allocated to matters that create value for the network. At the same time, the curators are responsible for ensuring that the projects they fund are showing progress and that their contributions are expressed clearly so that the council will be convinced to extend the budget.

Further research will be needed to design a clear workflow and functionality for Astar's treasury.

5.1.3 Phase 3: Anonymous Voting

Anonymous voting is something that can benefit all voters regardless of the situation. However, the technology for realizing this feature is less than intuitive, and multiple approaches exist to achieve this.

This phase will kick start once the network gains many active players to the point where the voting culture gets tainted and becomes prone to drama based on the voter's identity.

The anonymous voting should be limited to normal votes using `govASTR` tokens, and any fund allocation or proposal details will be kept public and transparent as possible.

Further research will be needed to design and develop this system. But with other players' help, I am optimistic that this can be achieved.

5.1.4 Phase 4: Common Goods Project Funding

The common goods project funding is related to the funding mechanism I mentioned in section 4.1.4. This feature is heavily inspired by the retroactive common goods funding introduced by Optimism Network and the quadratic funding mechanism by GitCoin. The technical implementation will not be challenging because an existing project could be used as a reference for Astar Network.

In the case of Astar Network, I propose that this feature be first introduced to the network as an ownerless smart contract controlled by the Astar governance players rather than being a native feature in the Astar protocol. It is, ultimately, turning this into a common goods application operating on top of the network. This is to scale the network to add multiple high-level features with the flexibility of upgrading the behavior whenever needed.

This phase will start once the number of network improvement proposals and interest in Astar common goods projects increase.

Chapter 6

Conclusion

In Chapter 1, I explained my motivation for writing this paper and the vision and direction where Astar Network, a digital society operating on top of a layer one blockchain, will be heading. Astar Network will become an inter-organizational governance platform. In an IOGP, multiple organizations with their business interests will come together in a single network to host their business solutions, collaborate, and, most importantly, focus on innovating and making a difference. To realize this, I define Astar Network's core players will be the organizations (small teams, DAOs, and companies) who build on top of the network.

In Chapter 2, I described the components and core elements that act as the building blocks of Astar Network. Players in the Astar Network governance wish to be part of it to utilize its core assets, which are the treasury capital, technology, and the ecosystem. Every governance action on the network should lead to the transfer of value from one asset to another.

In Chapter 3, I describe the challenges that I expect Astar Network to face as it introduces the governance system to its core players. Most of the common challenges are observed by organizations. If Astar Network is to become a functioning IOGP, it must overcome these challenges, such as voter apathy, skewed player sentiment, and platform fragmentation, to name a few.

In Chapter 4, I go through the features and components of Astar governance. Astar Network is an IOGP for multiple organizations to collaborate and contribute to a shared business interest. Because of this, Astar Network will not use assets of value to represent voting power but instead quantify the voting power based on the support a project receives through the protocol's dApps Staking module.

Finally, in Chapter 5, I describe what the governance implementation phase will look like. There won't be a "final" state regarding the IOGP governance. Instead, the system must continue to improve based on the players' needs, and it is the job of the leadership to ensure this is the case.

This whitepaper is not the final output for the Astar Network governance, and nothing is

written in stone. I expect that everything I wrote in this paper will be debunked, improved, or completely changed from the ground up as time goes on and more research is done in this field.

Therefore, I present this whitepaper as not the end but the beginning of future research and points of improvement.

6.1 Further Research

Regrettably, this paper lacks extensive research to support my claims and the rationale behind the system's design decision. Hence, I present this paper as a whitepaper of Astar Network's governance system design and product specification rather than a research paper validating a hypothesis. The vast scope of this project made it extremely challenging to draft a research plan that could be realistically delivered in due time. Furthermore, the mix between a traditional governance system that we see in various organizations versus the ones in an online community and DAOs made research quite challenging and time-consuming.

Outside of the further research points I mentioned throughout the chapters, I will also research specific areas that will help contribute to the advancements of this field.

In any distributed organization without a hierarchy, a shadow of hierarchy and new biases appear (Schweisfurth et al., 2023). I will further research how this can affect the overall system, change, and impact the distributed decision-making process.

As I stated in the first chapter, designing the IOGP was heavily inspired by the Japanese Keiretsu network. Although it's the most prominent in Japan due to the trusted business culture of Japan (Liberto, 2021), this system is also visible in other nations with strong horizontal integration in corporations. I will further research this topic to implement a better inter-organizational cooperation environment within Astar Network.

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