



# **Arbitrum Expert Service Provider Network Program Development**

*Position Paper by BlockScience*

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## **Executive Summary**

Arbitrum DAO is not a single party, but a complex polity constituted by an array of technical infrastructures, organizations, processes, cultural norms, and a diverse group of people. Action in the context of Arbitrum can emanate from many different loci of coordination. This report addresses ArbitrumDAO as the main forum for public engagement in governance; it provides background research and guidance for the development of an Expert Service Provider Network. The purpose of an Expert Service Provider Network is to ensure that Arbitrum DAO has access to expert services in a manner that is accountable to the public, fiscally responsible, and compatible with the market for those services.

Arbitrum DAO funds programs, such as the one which sponsored this work, via its existing governance processes that are run by third-party entities. Those programs, in turn, pursue their specific mandates accountable to the Arbitrum DAO via various reporting requirements and norms. The Expert Service Provider Network would constitute a new program targeting funding for on-going activities pursuing long-term goals, and requiring significant domain expertise to be performed or evaluated. Previous proposals to the Arbitrum DAO have suggested expert activities including, but not limited to, quantitative finance modeling, economic policy analysis and recommendations, code audits, and cybersecurity related services. While Arbitrum would benefit from these services, there is not currently a program in place that adequately aligns incentives (including accountability mechanisms) between Arbitrum DAO and the potential expert service providers.

Given the scale of funding required to procure expert services on an ongoing basis, a program specifically designed to serve this purpose is recommended. Furthermore, such a program should be co-developed with input from the public and from domain experts in order to ensure legitimacy of large expenditures. Co-development of the program can be onerous as it requires all participants to align on the purpose of the program, the specific stakeholders it serves, and the environmental factors influencing its architecture, as well as a design framework and evaluation heuristics for governance structures. This report aims to lower that burden by providing conceptual frameworks, example practices, and practical next steps for the co-development of an Expert Service Provider Network program.

The recommended program co-development process should begin with education and facilitated discussions funded under an existing program's mandate. An iterative process involving both mechanism design experts and members of the public will conclude with a program architecture suitable for consideration by the Arbitrum DAO. The program development phase is complete when the Arbitrum DAO funds the Expert Service Provider Network program. Following funding, the operationalization phase begins with a series of domain specific education and facilitated discussions, mirroring the early process — but this time the mandates for the specific expert functions, rather than the Expert Service Provider Network, needs to be defined. In the first cycle of expert service provider funding many of the properties specified in the program architecture will have their implementation details determined. The operationalization phase is complete when the first cycle has concluded and service provider evaluation has been incorporated into the second cycle service provider selection process.



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## Introduction

The purpose of this research report is to provide information and guidance regarding the coordination of expert service providers for the Arbitrum Network via appropriation of funds from the Arbitrum DAO treasury. The approach must work within the context of the Arbitrum DAO constitution including both on and off chain processes. The impetus for this assessment is the emergence of proposals calling for more robust frameworks to guide the engagement of expert service providers (Sebix, 2023) across numerous functions, including protocol security and maintenance (BlockworksResearch, 2023), grants (Arbitrum, 2023a), and more. Therefore, this report will provide an overview of concepts related to public finance, with attention to governance and operations. Emphasis is given to the separation of the process for appropriating public funds from the process of procuring expert service providers, as well as holding those service providers accountable to their immediate stakeholders and the public more broadly.

BlockScience is a digital infrastructure engineering firm with experience across the domains of technology, economics, and governance. This research briefing was commissioned by Plurality Labs, on behalf of Arbitrum DAO, to provide a scientific basis for the appropriation and allocation of funds to serve critical security, maintenance, and operational functions through engagements with expert service providers, within the context of a Decentralized Autonomous Organization. The purpose of the document is to provide a position paper-style briefing, so that Arbitrum Stakeholders can have a more grounded discourse on the subject of fund allocation in governance forums and the Arbitrum Delegates can make decisions about existing and future expert service provider proposals with greater confidence.

The research report is organized as follows: In the first section, a conceptual framework for the design and analysis of governance structures is presented, accompanied by examples relevant to developing an Expert Service Provider Network program within the Arbitrum DAO. Different components and conceptions of legitimacy are identified and presented as criteria against which governance structures, such as grant programs, are judged. The concepts reviewed are used to provide context for a more concrete framework aimed at structuring and streamlining appropriations (a.k.a., the act of setting aside money for a specific purpose), procurement, and accountability processes for expert service providers. These frameworks are then leveraged to make specific recommendations regarding next steps for Arbitrum DAO pursuant to developing and ratifying processes for engaging with expert service providers.



## Conceptual Foundations

The BlockScience team has been iteratively developing conceptual frameworks for the design and analysis of internet native organizations such as Decentralized Autonomous Organizations. This report leverages the concepts of **People**, **Purpose** and **Environment** as described in “What Constitutes a Constitution?” (Zargham, Alston, *et al.*, 2023), and **Functional Decomposition** as laid out in “Method for Functional Decomposition of Organizations and their Environments” (Zargham and Ben-Meir, 2023), and our team’s ongoing work toward systematizing recent scholarship on the nature of legitimacy in governance (Applebaum, 2019), as detailed in “Engineering for Legitimacy” (Ben-Meir and Zargham, 2024). These foundational concepts will be presented alongside examples from the Arbitrum ecosystem.

### People, Purpose and Environment

Although coordinating human activities is something many people have experience with (and nearly everyone has experienced the consequences of), the appropriate organizational form depends on context: Who is being coordinated? What do those people hope to accomplish? And what forces are at play to hinder or help them in doing so? The answers to these questions define that group’s *people*, *purpose* and *environment*. Although this heuristic may seem simple, it provides the necessary basis for making decisions about governance that have been custom-tailored for their specific circumstances and context, as opposed to seeking a generic, one-size-fits-all “best” process that is highly unlikely to be as well-suited to the particular situation at hand.

This can be further broken down by *applying* the heuristic, in order to begin thinking through the questions surrounding an Expert Service Provider Network for the Arbitrum ecosystem.

#### People

In the context of an Expert Service Provider Network for the Arbitrum ecosystem, the “people” are the network’s diverse stakeholders, including but not limited to ARB token holders, network application users and developers, active and lurking governance participants, the Arbitrum security council, and current and potential future service providers. It’s worth noting that not all of these stakeholders are likely to be equally involved in procuring expert services. Insofar as the services are paid for using funds from the Arbitrum DAO treasury, anyone involved in DAO governance is likely to have an opinion about appropriations. Additionally, application users and developers may have specific preferences regarding expert services which impact network security and reliability. The service providers themselves, especially those already active in the DAO, must balance their own needs with those of the ecosystem.

#### Purpose

The “purpose” of an Expert Service Provider Network for the Arbitrum ecosystem is to structurally align the incentives of expert service providers with the interests of Arbitrum DAO (noting that, as per the previous section on *people*, the Arbitrum DAO is itself a complex



assemblage of stakeholders). One might be tempted to declare the program's *purpose* to be outlining the necessary services and selecting the optimal service providers; such a program architecture, however, would not account for the critical fact that unlike other grant programs, the expert services in question requires ongoing activity, and the definition of their success cannot be reduced to the delivery of an artifact or measurable short-term outcome. Therefore, the purpose of this program necessarily includes (i) identifying services required, (ii) appropriating funds, (ii) procuring services and (iv) evaluation of service providers – all in a manner which is transparent and accountable to the DAOs stakeholders.

## Environment

The environment is the broader circumstances under which this *purpose* is being undertaken. Firstly, the Arbitrum Network is part of the broader Ethereum Ecosystem. Socially, many of the norms in the Arbitrum ecosystem are inherited from Ethereum; technically, Arbitrum is an L2 network built atop the Ethereum network. Economically, Arbitrum's treasury is composed primarily of ARB tokens, which means budgeting is subject to exchange volatility and bulk spending may place downward pressure on market prices. Service providers will have their own entities which will require contracts to receive payment, and will expect clear service level agreements (SLAs) in order to price their offerings. Operating costs associated with delivering on those commitments will necessitate fiat denominated compensation or large risk margins in their contracts. The contracting requirements for service providers may vary by the jurisdiction their legal entities are incorporated in.

## Institutional Complexity

Detailing an organization's people, purpose, and environment provides much – but not all – of the information that one needs in order to ascertain the degree of *institutional complexity* required in order for those people to be able to realize their purpose within that environment. According to the **law of requisite complexity**, in order to be “efficaciously adaptive”, the internal complexity of a system must match the external complexity it confronts (Boisot and McKelvey, 2011).

A system with *insufficient* institutional complexity will not be able to vary its behavior in all of the ways that potential challenges or changing circumstances might necessitate, but *excessive* institutional complexity can easily lead to inefficiency, opacity, and reduced participation – so it is critical that a given system be neither more nor less complex than its people, purpose, and environment require. The following heuristic offers a straightforward way of identifying the degree of complexity that a particular institution calls for:

*Institutional complexity is a function of the number of people whose activities the institution in question seeks to coordinate, compounded by both the diversity of interests among the people in question and the complexity of the activity that those people are seeking to coordinate.*

The first element of this heuristic, **Magnitude**, is self-explanatory; as the number of people whose activities must be coordinated increases, the complexity of the systems required to



coordinate those activities increases in kind; coordinating the activities of an organization made up of two thousand people will necessarily require more complex infrastructure than is needed to coordinate the activities of a team of two. The second element, **Diversity** can be thought of as faceting the first, insofar as the distinct (and potentially conflicting) interests being pursued under the aegis of a given activity is bounded by, but not identical with, the number of stakeholders in that activity. More complex infrastructure is required to coordinate the activities of an organization whose two thousand members all have overlapping-but-meaningfully-differentiated goals than one whose two thousand members are all tightly aligned around a single vision. The Diversity heuristic should be understood as a matter of degree; for any collection of stakeholders there will be situations that expose non-trivial disagreements over direction that must be attended to via governance (Alston, 2022).

Detailing these first two elements *is part of the process* of identifying an organization's people, purpose, and environment. In the case of the Arbitrum Network, recognizing the sheer number of stakeholders and significant variation amongst their interests is already enough to make clear that well-functioning coordination mechanisms will need to be reasonably complex.

To further specify the degree of institutional complexity required, however, one must attend to our heuristic's third factor, **Variety**. Taking its name from Ross Ashby's Law of Requisite Variety, Variety refers to the *operational complexity* of the activities being coordinated (Ashby 1958). Unlike the number of people and diversity of purposes being coordinated, an assessment of the operational complexity of an organization's activities is not *immediately apparent from an account of that organization's people, purpose, and environment* – but one can be *derived therefrom*, insofar as “operational complexity” refers to *what it takes to pursue a particular purpose in a particular environment*. One can therefore determine operational complexity through a process known as “functional decomposition.”

Taken together, the Magnitude, Diversity and Variety heuristics offer a picture of “external complexity” as referenced in the Law of Requisite Complexity, and thus provide a guideline regarding how much “internal complexity” – or “institutional complexity,” as we call it – is called for by a particular organization's people, purpose and environment.

## Functional Decomposition

The term “functional decomposition” refers to “analyzing a system in terms of its component functions and the interrelationships and interdependencies amongst them. The Arbitrum Ecosystem itself is a polycentric system with multiple loci of coordination, each serving a different function. These include but are not limited to the Arbitrum Foundation, the Arbitrum DAO (on-chain smart contracts), the Arbitrum Security Council and Plurality Labs (who funded this report). The Arbitrum governance docs (Arbitrum Foundation, n.d.) delineate the ecosystem members and their specific roles. Once developed, the Expert Service Provider Network would be its own independent grants sub DAO in accordance with Arbitrum DAO's architecture (Arbitrum, 2023a). The functional decomposition needed for the Expert Service Provider



Network is a recursive extension focused on operations with accountability to governance rather than a new governance function.

Within the Arbitrum DAO there are existing sub DAOs providing detailed decompositions of their programs. Particularly relevant to this discussion is the decomposition by “Type of Grant” decomposition offered by Plurality Labs as shown in Figure 1. Expert service provider grants would specifically target activities not suitably handled under existing grant types.

**Within grant programs, there are a few very different categories of grant types. Each has its own set of benefits and risks:**

Type of Grant	Benefit to Ecosystem	Benefit to Builder	Risks
User/Liquidity Incentives	<ul style="list-style-type: none"> <li>- Acquire new users</li> <li>- Large investors bridge</li> </ul>	<ul style="list-style-type: none"> <li>- Acquire new users</li> <li>- Offer better returns</li> </ul>	<ul style="list-style-type: none"> <li>- Users leave when incentives stop</li> <li>- Attracts engagement farmers</li> </ul>
Product-market fit bets	<ul style="list-style-type: none"> <li>- More businesses to bring users</li> </ul>	<ul style="list-style-type: none"> <li>- They receive funds</li> <li>- They belong to the community</li> </ul>	<ul style="list-style-type: none"> <li>- Very low odds</li> <li>- Requires infrastructure to support it</li> <li>- Can't compete with professional orgs</li> </ul>
Open source infrastructure development	<ul style="list-style-type: none"> <li>- Tooling needed to make builders lives easier is funded</li> </ul>	<ul style="list-style-type: none"> <li>- They receive funds</li> <li>- They belong to the community</li> </ul>	<ul style="list-style-type: none"> <li>- Builders don't have to build things that aren't part of their core product</li> </ul>
Community education & events	<ul style="list-style-type: none"> <li>- A more informed population</li> <li>- Acquisition &amp; retention</li> </ul>	<ul style="list-style-type: none"> <li>- They receive funds</li> <li>- They belong to the community</li> </ul>	<ul style="list-style-type: none"> <li>- Very hard to be fair and unbiased</li> <li>- Lots of grifters</li> </ul>
DAO operations	<ul style="list-style-type: none"> <li>- People can easily find their way</li> <li>- Onchain systems ensure credible neutrality</li> <li>- Ensures legitimacy</li> <li>- Maintains context</li> <li>- Can sense &amp; respond</li> <li>- Executes ideas that suggesting parties don't have time to do</li> </ul>	<ul style="list-style-type: none"> <li>- They receive funds</li> <li>- They belong to the community</li> <li>- They have access to leadership</li> <li>- Opens up career opportunities</li> </ul>	<ul style="list-style-type: none"> <li>- Can lead to bureaucracy</li> <li>- Can lead to capture</li> <li>- Naturally tend to bloat</li> <li>- Naturally tend to work in silos</li> </ul>

Figure 1: Example of grant type decomposition used by Plurality Labs (DisruptionJoe, 2024)

The key question is *“what expertise-intensive activities are necessary to maintain the Arbitrum ecosystem are currently underserved by existing grant programs?”* A governance proposal from a consortium of services providers outlined the following activities in their request for funding: (i) auditing smart contracts and other on-chain code with a focus on supporting upgrades, (ii) quantitative finance research, including simulation modeling and market analysis, (iii)



developing and hosting a dashboard for economic and governance data, (iv) producing policy analysis and recommendations, and (v) conducting public engagement activities (BlockworksResearch, 2023). These activities were presented as capabilities of the service provider consortium's members. As part of a functional decomposition, these activities should be evaluated independently of the service providers offering to fulfill them.

While the BlockworksResearch proposal referenced above was ultimately not passed by the Arbitrum DAO, it started an important conversation about the Arbitrum ecosystem's need for a professional labor force. The functions outlined above are not the only functions required to facilitate a healthy decentralized ecosystem. Another key function within the Arbitrum DAO is Treasury Management (sids2000, 2023); strategically diversifying while minimizing price impact is important for long-term sustainability. Long-term financial planning and the separation of operating budgets (held in stablecoins) from the network's reserves is a prerequisite for a reliable and transparent appropriations process.

A structure for managing a network of expert service providers, therefore, is parameterized by (at least) the set of domain specific services needing to be filled. For the purpose of this report, our assumption is that an existing program manager can be tasked to facilitate the process of eliciting the necessary functions from the Arbitrum DAO stakeholders. With this scope-bounding assumption, governance mechanism design work can focus on handling annual budgets, procuring service providers, and evaluating outcomes. **Table 1** offers an **example** of a functional decomposition for an Expert Service Provider Network.

**The main takeaway from this section should not be the specific list of functions detailed in the example, but rather that such a list must exist, and the *interdependence* of the items on the list should be recognized.** The process of developing this list is itself a mode of program governance, so it should be undertaken according to a participatory process. Such a process will require facilitation in addition to expert labor to produce details like success metrics, levels of effort, and cost estimates.

Decomposing how an Expert Service Provider Network is organized is only half of the method of functional decomposition (Zargham and Ben-Meir, 2023). The other half is a decomposition of the *environment*, meaning the factors outside stakeholders' control that nevertheless need to be considered when designing the program. Environmental factors which are specific to expert services include (i) professional standard and best practices within specific domains, (ii) the market for expert service providers in those domains, (iii) the relative opaqueness of expert labor to non-experts, and (iv) cases where success of expert labor is characterized the reduction in likelihood of bad outcomes, rather than in the creation of specific deliverables.

While the factors listed above are examples, rather than an exhaustive list, they should make clear that a program to fund expert services will face legitimacy challenges when compared against other grant programs which have lower price tags, require less domain expertise to



understand and evaluate, and for which positive outcomes are more easily measured. These factors make supporting expertise-intensive functions via a grant program challenging but not impossible. This observation underscores the need to create a grants program specifically designed to identify and address expertise-intensive labor, in a manner considered legitimate by non-expert stakeholders.



Table 1: Example Functional Decomposition for an Expert Services Program

Function	Description	Success Looks Like	Dependencies
Program Management	Facilitation and coordinating which support all other activities	Public and Expert forum members view the program as legitimate	Requires funding and mandate from Arbitrum DAO
Outcomes Evaluation	Implementation and operation of performance monitoring processes	Performance of service providers is measurable	Requires Function Goal Setting, Metrics and Service Providers
Public Reporting	Organizing and publishing outcome information for public consumption	The public is informed about service provider performance	Requires Data from Outcome Evaluation and goals to report against
Domain-Specific Goal Setting	Determining the purpose of each potential funded service domain	Public engages in determining the mandates of service domains to be funded	Requires participation from Arbitrum DAO stakeholders
Domain Level of Effort Estimation	Determining performance metrics, levels of effort and market value of services	Produces realistic budgets, clear work breakdowns, and success metrics	Requires domain specific goals and Expert participation in planning
Appropriations (Securing Funding)	Engaging with the Arbitrum DAO governance process	Securing grants to fund the program that meet the budgets	Requires budgets, work breakdowns, metrics and reporting
Procurement (Sourcing Service Providers)	Releasing Domain Specific Requests For Proposals, evaluating proposals and selecting service providers	Multiple quality proposals, and the choice process is transparent & meritocratic	Requires funding, goals, metrics, work breakdowns and level of effort estimations
Managing Contracts	Development of standard contracts and negotiating instances of those contracts with service providers	Standard Contract terms are considered fair, yet specialized to domain specific circumstances	Requires legal expertise, metrics, procurement, and outcome evaluation
Providing Services	Entering into contracts and delivering on commitments	Domain specific goals are measurably achieved	Requires Goals, Procurement, and Contacting



## Legitimacy: The Acceptance Criterion for Governance Design

A functional decomposition of the sort modeled above will provide those seeking to design an Expert Service Provider program for the Arbitrum Network with a guide to *the collection of functions that such a program must fulfill in order to realize its animating purpose*.

If successfully designing the “governance apparatus” for such a program consisted only of designing *something* that meets all of these requirements, then the design process would be relatively straightforward. There exists, however, a hidden – but nonetheless universal – design requirement for any apparatus for *participatory* governance: **Legitimacy**. This is because one can think of the legitimacy of a governance apparatus as an index of that apparatus’s overall *capacity to govern* – in participatory systems, “governance potential” is entangled with the faith of the governed. As previously noted, the Arbitrum Network’s sizable polity, diverse set of stakeholder interests, and complex operations can only be adequately served by systems with a fairly high degree of institutional complexity; the more complex the institution, however, the more difficult it is to achieve and maintain the legitimacy of that institution in the eyes of the general public, who typically equate legitimacy with transparency and legibility – even though these qualities can diverge dramatically, and especially in situations where expertise is required.

**Legitimacy thus functions as the “acceptance criterion” for evaluating the design of a governance apparatus.** If the community in service of whom the governance apparatus is being designed does not view that apparatus as *legitimate*, then the members of that community will resist allowing themselves to be governed by it, irrespective of any other benefits that it might provide. To the extent that the health of a participatory governance structure depends on good-faith participation, a program that the community considers even partially illegitimate has functionally no chance of producing the outcomes that it is intended to produce.

A governance apparatus with high legitimacy is able to enact significant interventions without breaking down (that is, without losing the “buy-in” that authorizes it to govern in the first place), while even minimal operation can cause a governance apparatus with low legitimacy to degrade under pressure. In a strict sense, then, optimizing the legitimacy of the machinery of governance also maximizes its *potential usefulness for actual acts of governance*.

BlockScience is currently undertaking research into the components of legitimacy. Building on Harvard Professor Arthur Isak Applbaum’s recent scholarship on the nature of legitimacy in governance, we have begun analyzing the governance design space in terms of three conceptual frames within which legitimacy can be assessed – the **Liberty Principle**, the **Equality Principle**, and the **Agency Principle** (Applbaum 2019) – each of which is characterized by a trade-off curve indicating a tension between two heuristics through which the framing concept can be understood. The **Liberty Curve** charts the tension between **Negative** and **Positive** conceptions of “liberty,” the **Equality Curve** charts the tension between **Relative** and **Absolute** conceptions of “equality,” and the **Agency Curve** charts the tension between **Process-Oriented** and **Outcome-Oriented** understandings of “agency.”



Although this research is ongoing, some preliminary findings concerning legitimacy as a frame of reference for the design and analysis of governance mechanisms are available in “Engineering for Legitimacy” (Ben-Meir and Zargham, 2024).

While the lower limit of an institution’s complexity is determined by that institution’s Magnitude, Diversity, and Variety, the upper limit comes at the point where inefficiency and illegibility pass a tipping point into perceived illegitimacy. Given a fixed degree of institutional complexity, however, the legibility of a system – and therefore also its legitimacy – can be increased by breaking the overall system down into its subfunctions and documenting how these pieces fit together, as one maintains a functional decomposition.

The inverse relationship between institutional complexity and legitimacy is a general challenge in governance design – but a functional decomposition also points to three specific kinds of legitimacy challenges that designers of an Expert Service Provider program for the Arbitrum Network will need to overcome.

## Challenges to the Legitimacy of an Expert Service Provider Network

Even a cursory review of the functions that an Expert Service Provider program for the Arbitrum Network must fulfill in order to realize its animating purpose reveals that those designing such a program will need to confront three particular sets of challenges in order to establish the program’s legitimacy in the eyes of the broader Arbitrum community: those arising from its **temporal scale**, those arising from its **technical specificity**, and those arising from the fact that **expertise is expensive**.

An Expert Service Provider program’s **temporal scale** poses the first set of challenges to establishing its legitimacy, because it takes time for long-term projects to play out, and their results to become observable. In such cases, outcomes may remain unknowable past the point at which the community’s faith in the program begins to waver, and projects with longer time-horizons necessarily involve more uncertainty than those with shorter arcs (as certainty is, ultimately, a function of time).

The second set of challenges to an Expert Service Provider program’s legitimacy stem from the degree of **technical specificity** that such a program will inevitably entail. *The defining feature of expert service providers is their expertise*, meaning that there will always be a significant gap between how well they understand their own work and how well their clients do; indeed, this gap is the site from which the value of expertise emerges in the first place. What this means, however, is that Expert Service Providers frequently recognize requirements that are not obvious (and may also not be easily explainable) to the general public, creating potential issues around transparency that could easily pose a threat to the program’s legitimacy. In other words,



expertise is a “qualification” and thus *requires* gating, even in communities that hold *permissionlessness* as a core value (Nabben and Zargham, 2022).

The third set of challenges is closely related to, and emerges from, the second: By its very nature, an Expert Service Provider program will carry a high price tag, because ***expertise is expensive*** — *and Expert Service Provider programs require significant amounts of expertise throughout their entire life-cycle*. Expertise is both *expensive to develop* (in terms of both time and money) and *in high demand*, driving up its cost from both directions. The expense involved in operating such a program does not *invalidate* its legitimacy, but it does heighten the community’s sensitivity to the question of legitimacy – people typically care more about getting enough value for their money as the amount of money in question increases.

Designing an Expert Service Provider program that the broader Arbitrum Network views as legitimate will therefore require the development of *legitimate processes* for determining what the program spends money on, assessing its fiscal responsibility, establishing the community’s trust in the experts who they will need to rely on in order to see through the program’s technical opacity, and negotiating the uncertainty introduced by its distant temporal horizon.

While questions of legitimacy will therefore be central to the process of designing and operating an Expert Service Provider network, the “legitimacy” of a design is not easily evaluated. Both the component-level and system-level requirements of a governance apparatus, however, can be assessed against the six conceptions of legitimacy (presented as three trade-offs) discussed above. In short, the components of legitimacy also serve as evaluation heuristics *for* legitimacy.

## From Heuristics to Requirements Development

Mapping an organization’s **people, purpose, and environment** gives those designing a governance apparatus the ability to answer fundamental questions about the specific context(s) in which they are working. A **functional decomposition** hones in on specific “functional requirements” necessary for designers to determine what they should be trying to accomplish, within those contexts. Deriving stakeholder analysis and functional decomposition from people, purpose, and environment allows an assessment of Magnitude, Diversity and Variety – allowing a more targeted choice of **institutional complexity**. Finally, subjecting a design to a **legitimacy analysis** enables designers to evaluate the success of that design, and determine if the governance apparatus they have engineered offers a way of pursuing those goals that is both viable and effective.

Institutions have struggled with these questions for all of human history. Building and operating safe public infrastructures is as much about building and operating effective institutions as it is about the technical infrastructures themselves (Leveson, 2016), and our institution-building work is informed and motivated by the longstanding practices of civil engineers (Suchman, 2016). While their implementations have been far from perfect, we can nonetheless mine such



practices to inform our approach to the particular challenges confronting Arbitrum DAO in developing an Expert Service Provider Network.

## Example Practices

This section offers a review of institutional patterns which can be used to structure requirements for mechanisms designed to solicit expert services. We begin by distinguishing governance from operations, drawing on our work on political and functional autonomy. A concrete example of this is separating the process of appropriating funds from the procurement of services – an area that the Arbitrum DAO is already beginning to explore, but would benefit from approaching more systematically. We proceed to consider the complementary roles of experts and the broader public in decentralized networks. We then review the non-financial resources in action within an Expert Service Provider Network. Finally, we review the interplay of incentives and accountability mechanisms in creating a landscape to manage the relationship between the Arbitrum DAO and expert service providers.

## Separation of Governance and Operations

In any organization, governance and operations are two distinct yet interrelated domains, each playing a crucial role in the performance of the organization. Governance primarily involves setting objectives, creating policies, and appropriating funds. It encompasses the strategic direction and oversight of the organization, ensuring adherence to ethical standards, laws, and internal policies. Operations covers all of the activities undertaken within those constraints pursuant to those goals, and is ultimately accountable to the authority of the governing body. In our previously-mentioned piece on “disambiguating autonomy” (Zargham, Zartler, *et. al*, 2023), the BlockScience team carefully distinguishes “Political Autonomy” from “Functional Autonomy”:

*“Functional Autonomy is the concept of autonomy that relates to the internal operation of a system, drawn from engineering “autonomous” systems, whereas Political Autonomy is the concept of autonomy as freedom from external political influence, drawn from political science.”*

Effective self-governance requires both forms of autonomy to be present – creating the context for sufficient freedom from external coercion to make decisions, as well as the capability to process information about its environment into effective decision making. Within the concept of functional autonomy, we further distinguish *strategic* decision-making from *tactical* decision-making, as noted in our prior discussion of the Agency Curve. Strategic decision-making involves deciding “*what* jobs need to be done,” whereas tactical decision making pertains to “*how* to get the job done.”



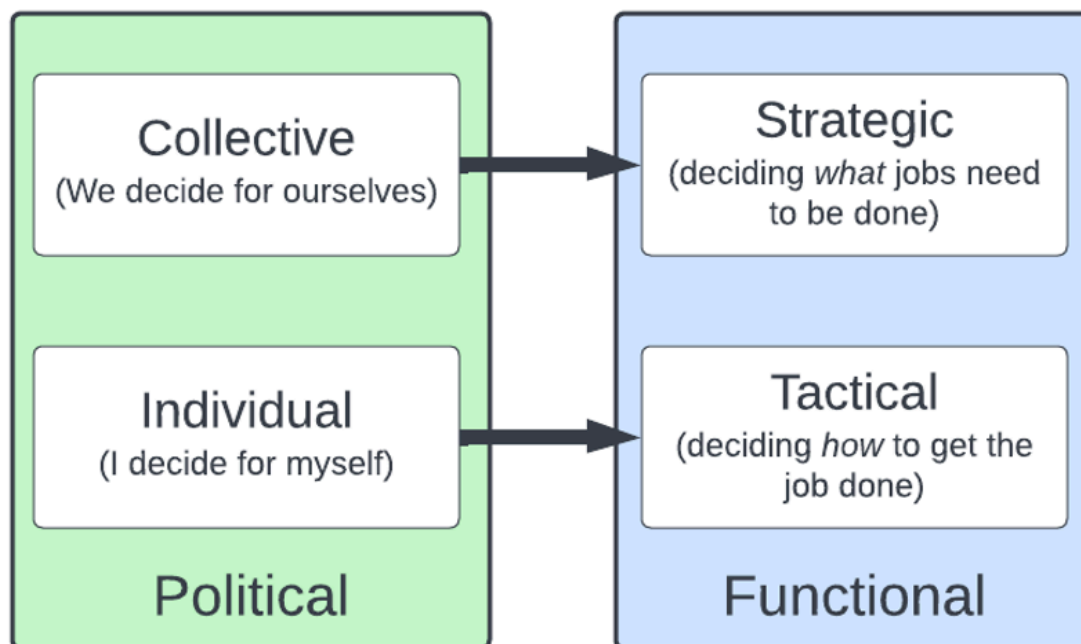


Figure 2: The Types of Autonomy  
from “Disambiguating Autonomy” (Zargham, Zartler, *et. al*, 2023)

In order to make self-governance both tractable and effective, it is necessary for an organization, such as Arbitrum DAO, to focus on strategic decision-making – such as what expert services are required, and how much funding the organization is willing to budget for those activities. As long as the processes for selection and supervision of service providers are sufficiently clearly defined, the selection of a particular service provider and evaluation of their performance within that role is tactical decision-making. In practice, the activities of selecting service providers, monitoring their performance and providing the services are distinct functions. All these activities are operational, but the balance of power amongst them is asserted by a governance structure.

In traditional organizations, the boundaries between operations and governance are managed at the relationship between executive management and a board of directors. One systematic way of keeping governance clearly delineated from operation is *Policy Governance* (Carver and Carver, 2006); this model of governance focuses governance on strategic decision making through defining clear goals and constraints while providing a broad tactical autonomy for executive management.

Decentralized networks depart from the board of directors model, but even without a board of directors and executive managers, it is possible to preserve many of the key insights. Below, Principles 4-10 of the Carver Model’s “Principles for Policy Governance” are quoted, with



“board” generalized to “governing body,” and the various staff roles combined under the term “service provider”:

4. *[A governing body] should formulate policy by determining the broadest values before progressing to more narrow ones.*
5. *[A governing body] should define and delegate, rather than react and ratify.*
6. *Ends determination is the pivotal duty of governance.*
7. *[A governing body's] best control over [service provider] means is to limit, not prescribe.*
8. *[A governing body] must explicitly design its own products and processes.*
9. *[A governing body] must forge a linkage with [service providers] that is both empowering and safe.*
10. *Performance of [a service provider] must be monitored rigorously, but only against policy criteria.*

In the Web3 context, policymaking tends to take the form of algorithms entrenched in on- and/or off-chain software. We refer to this practice as “Algorithms as Policy” (Zargham and Nabben, 2020), and expand on participatory governance of algorithms in *Aligning ‘Decentralized Autonomous Organizations’ to Precedents in Cybernetics* (Zargham & Nabben, 2023). For the case of Arbitrum DAO managing a network of expert service providers, it is necessary to bootstrap with organizational processes, rather than primarily software-based policies, until the policies have gone into effect and been demonstrated as effective. In a decentralized network, policies may be viewed as provisional until they mature to the point that they are administered primarily through software.

## Appropriation of Funds and Procurement of Services

In decentralized organizations, the decoupling of appropriating funds for core functions from allocating funding to service providers is a crucial process that involves clearly delineated governance and operational activities. This separation ensures transparency, efficiency, and accountability in the organization’s financial and operational management.

### Appropriations

Appropriations in public finance refers to the act of setting aside money for designated purposes. These funds are authorized expenditures that a governing body grants to an operating entity with a specific mandate. This process ensures that spending aligns with the priorities determined by the governing body, allowing for efficacy while maintaining oversight.

To this end, a prerequisite activity is defining the essential functions required to achieve the organization’s objective. Then it becomes feasible to budget for these core functions, and set high-level success metrics by which to measure performance. This process involves a strategic overview of the organization’s goals, as well as assessing the resources needed to attain these goals. Governance bodies, which may include a diverse range of stakeholders, are responsible for making decisions on budget allocations for specific functions. They determine how much



funding is required for each core function, irrespective of who the service providers are. This approach ensures that funding decisions are aligned with organizational objectives and are not influenced by the capabilities or interests of specific service providers.

Recent debates within the Arbitrum community over whether to backfund a set of proposals pitched during Round I of the Short-Term Incentives Program (STIP) or initiate a second round of applications, instead (englandzz, 2023; DanThales, 2023) demonstrate the importance of clearly decoupling appropriations processes from procurement processes, and of engineering consistent appropriations processes that meet community standards for legitimacy.

## Procurement

Procurement is the process by which organizations obtain goods, services, or works from external sources. This often occurs via a competitive bidding process – although in many circumstances additional processes are required to screen for relevant qualifications. The aim is to ensure transparency, fairness, and value for money by adhering to predefined criteria to meet specific needs or objectives.

Procurement is the **implementation** of governance decisions made through appropriation processes – the practical, operational side of purchasing goods and/or services. This includes the processes of soliciting, selecting, and evaluating service providers for each role. In decentralized organizations, these activities might not be conducted by an executive management team. Instead, they are delegated to one or more entities specializing in operations and program management.

This decentralized approach to operations and program management relies on the existence of clearly defined functional decomposition, and clear specification of those actors' domains of responsibility, including their dependencies on one another. Within the Arbitrum DAO, such entities include the Security Council (Arbitrum, 2023b; Arbitrum Foundation, n.d.) and the recently-constituted Arbitrum DAO Procurement Committee (Immutablelawyer, 2023b; dk3, 2024), which is responsible for implementing the Arbitrum DAO's non-constitutional "Procurement Framework for Security Service Providers" (Immutablelawyer, 2023a), as well as any additional procurement frameworks that the DAO ratifies through a future Snapshot vote. Aside from the Security Council, however, these entities would benefit from more clearly defined and differentiated mandates, as well as a more precise sense of the interactions and interdependencies between each of these mandates and the others. Once interdependencies are clearly mapped, the checks and balances (or lack thereof) between functions become more apparent. Successful program development will allow stakeholders to observe those checks and balances at a high level, rather than need to dive into the details of specific committees to verify that accountability practices are functioning as intended.

The kind of policy governance which structures a network of interrelated service domains comes at the cost of upfront governance design efforts, but leads to a more open ecosystem while



supporting specialization across functions. To avoid conflicts of interest, however, it is important to maintain a clear separation between those managing the operations and those providing the domain-specific services. Contractual arrangements with and amongst service providers are often required. Contracts for service providers set expectations such as service level agreements, and contain contingencies for termination of contracts with providers who fail to perform their obligations. It is worth noting that the development of legal infrastructure such as contract templates depends on expert legal service providers. The interdependence of expert functions is something to be embraced (and managed), rather than something to be avoided.

When request-for-funding processes are not adequately defined before those processes are deployed, they often engender controversy. Whether or not that controversy is warranted by the action itself, an under-defined process opens participants up to accusations of rent-seeking on the pool of public funding. Arbitrum DAO witnessed a controversy of this sort – and its consequences – when Bankless’ founders separated from BanklessDAO after a grant application for 1.82 million ARB was filed in the DAO’s name on Nov. 20, 2023 (jengajojo, 2023). According to CoinTelegraph, “The BanklessDAO community was quick to criticize the initiative, with many DAO members pointing out that the proposal requested almost two million ARB for writing content without providing detailed information about how the money would be spent” (Partz, 2023); consequently, BanklessDAO committed to bolstering the proposal’s legitimacy by revising the grant – specifically, by breaking down the one-year grant to three-month milestones, and providing key performance indicators (BanklessDAO, 2023). As this example shows, large DAO pools of public funding can expect high community sensitivity to perceived exploit attempts not only when the action in question is deliberately nefarious, but also when its details are overly vague and/or adequate accountability measures are lacking. The risk of controversy is substantial in such cases, even when no actual malfeasance is present.



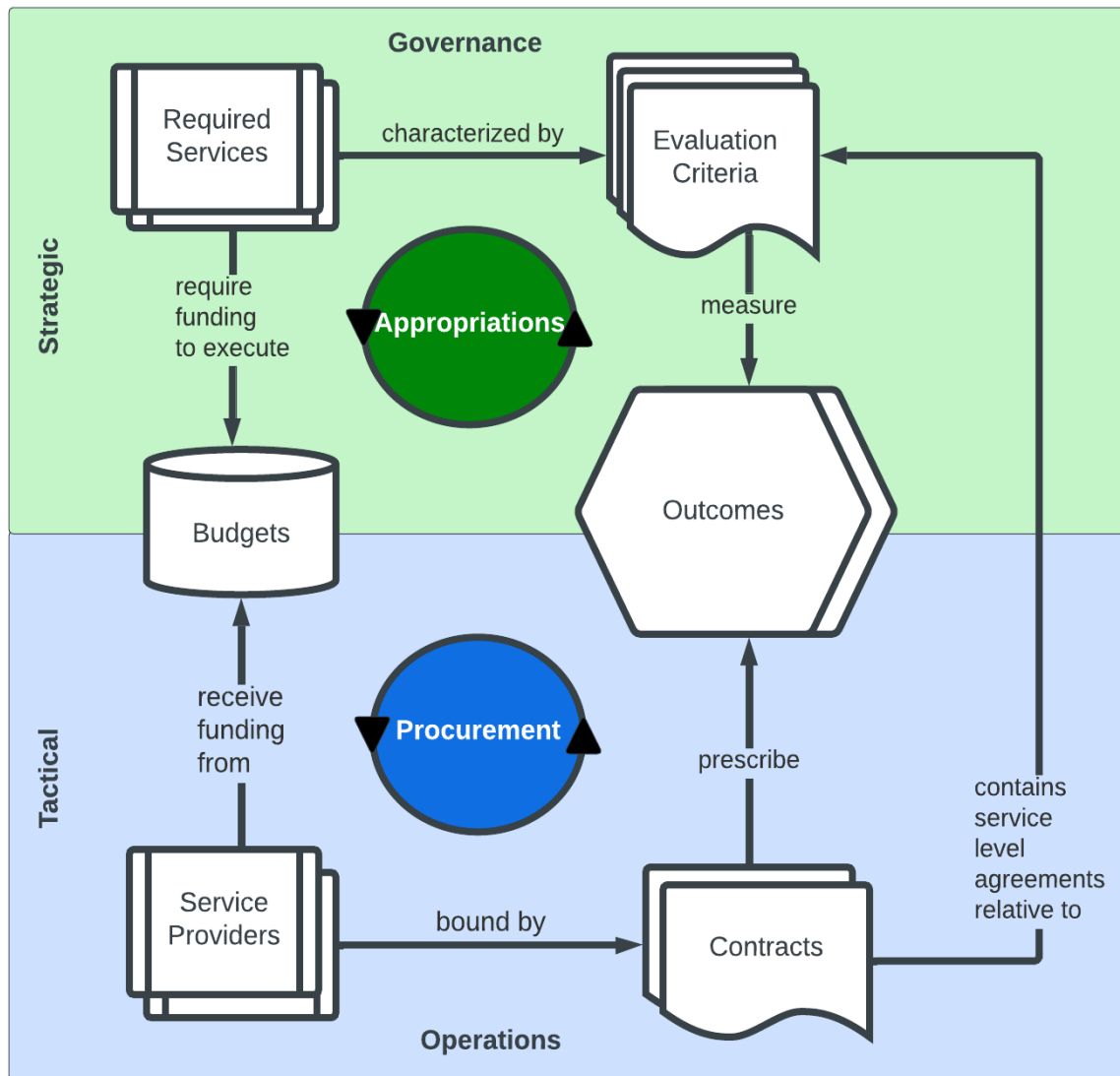


Figure 3: Autonomy in Governance and Operations



## Differentiating Expert and Public Forums

In decentralized organizations, the expert and public forums serve distinct yet interdependent roles, with each contributing uniquely to the decision-making process. Acknowledging the differences, and understanding the nature, strengths, and challenges of each forum is essential for effective organizational functioning.

### Public Forums

Public forums, in many forms of governance, are platforms where a broad range of stakeholders, including non-experts, participate in expression of opinion and discussion. These forums are characterized by their inclusivity and representativeness, ensuring diverse perspectives to gather and be considered by others. The strength of public forums lies in their ability to foster stakeholder engagement and provide insights into the wider community's views and needs. However, public forums have obvious limitations. They can be susceptible to influence by marketing efforts and the reputations of more vocal or prominent actors. This can lead to decisions swayed more by popularity or charisma than by substantive arguments or rigorous analysis. Public forums become the site of governance theater when public discussions are meaningfully connected with avenues for participants to genuinely influence governance outcomes. In Arbitrum's case, for example, public stakeholders include ARB token holders, developers building on the protocol, and people that use the protocol.

### Expert Forums

In contrast, expert forums consist of individuals with specialized knowledge, skills, and experience in specific domains. The strength of these forums lies in their ability to provide in-depth, informed perspectives that are necessarily beyond the scope of general public knowledge. Expertise is typically domain-specific and requires significant investment in education and experience over extended periods of time, making these individuals valuable for their focused insights. However, attracting experts involves challenges such as the need for rigorous vetting processes and substantial compensation, considering both their opportunity costs; furthermore, expert labor is not fungible. Experts are often engaged with multiple organizations, which enriches their experience and adaptability. While it's tempting to prioritize dedicated experts, translating domain specific learnings across operational contexts is one of the roles of experts. Furthermore, it's crucial to recognize that expertise in one domain does not automatically equate to expertise in another, and out-of-domain experts should be considered part of the public forum to avoid overreach of their influence. In Arbitrum, expert forums include



specific teams within Arbitrum Foundation (e.g. security), the Security Council (Arbitrum, 2023b), Plurality Labs, and other services as necessary, such as legal or accounting.

The interplay between public and expert forums necessitates careful management. Balancing accountability (meaning a relationship of explainability and potential consequences for actions between the two kinds of forum (Bovens, 2007)), while providing them with the autonomy to effectively perform their roles, is a delicate yet critical task. Public forums should not be dominated by experts, to ensure a culture of expression and diversity of opinions, yet expert forums must be given the latitude to provide or apply their specialized knowledge, without undue pressure to cultivate a followership or conform to popular opinion. Carving out complementary roles for the expert and public forums is necessary to ensure that decisions are both democratically legitimate and technically sound.

In expert forums, there is a need for experts to evaluate other experts within a certain domain. This can create in-group dynamics, where experts may develop biases or conflicts of interest.

- *In-group Dynamics* are the behaviors that occur within a social group, which is exclusionary, toxic, or collusive, can become an issue. Risks associated with in-group dynamics can be mitigated through education programs and professional standards within various domains of expertise. This ensures a level of objectivity and professionalism in the evaluation process.
- *Dedicated Service Providers* are often preferred by public forums. While experts need some Arbitrum-specific knowledge to perform their role, their task is to bring domain-specific expertise which oftentimes is best served by a broader basis of domain expertise across ecosystems. Service providers serving a broader market have more incentive to focus their efforts on performing their role competitively rather than cultivating influence over funding decisions.
- *Trust but Verify* means decoupling the activity of selecting service providers from monitoring their performance. This balance of powers helps align incentives regarding service provider performance reporting. Specifying and evaluating performance is nuanced as an overly precise set of metrics can lead to gaming the metrics, but underspecified metrics make outcome assessments essentially subjective.

A key challenge in the integration of forums lies in ensuring that experts are not merely performing to meet metrics or marketing their efforts for future funding. Instead, their contributions should be genuinely geared towards advancing organizational objectives, with their accountability mechanisms designed to evaluate the impact and quality of their work, rather than just their ability to garner public approval.



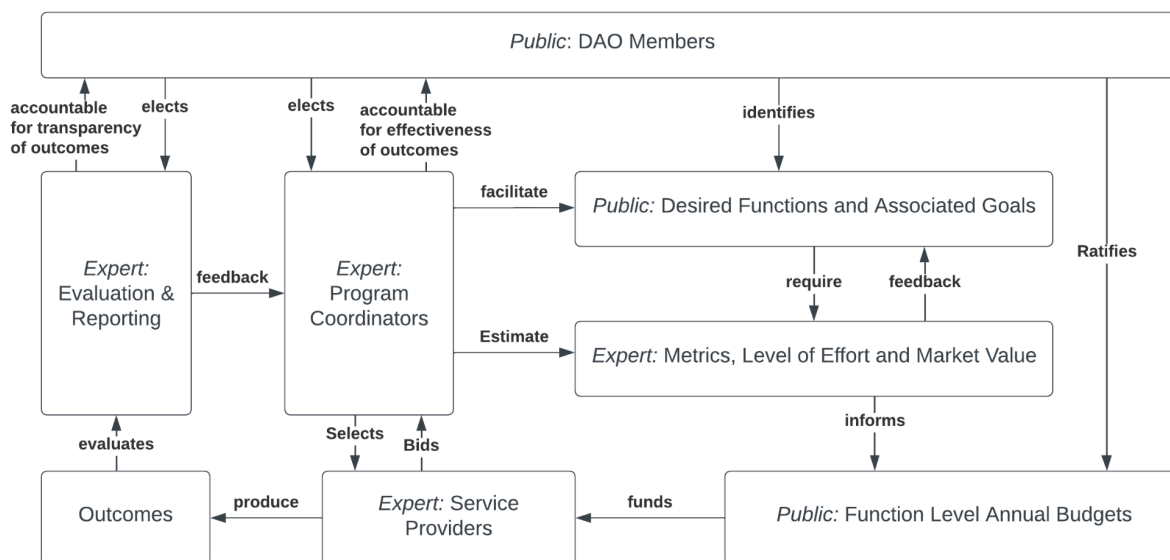


Figure 4: Example grants program architecture for an Expert Service Provider Network

## Respecting Attention, Expertise, and Trust

In decentralized organizations, effectively managing non-financial resources is pivotal for operational and governance success. These resources, including attention, expertise, and trust, play a critical role in the functioning of both expert and public forums.

Attention serves as a fundamental resource in both governance and operational activities. In the public forum, attention is directed towards staying informed about issues, participating in discussions, and engaging in decision-making processes. In DAOs, the interface for the public forum that receives the most attention is voting. This contribution of attention is only one way attention is crucial for governance activities. Staying informed and engaging in discussions ensures that decisions reflect the collective insights and preferences of the broader stakeholder community. If demands on attention are high volume or low quality, however, participation in governance can wane.

In contrast, in the expert forum, attention is focused on executing specialized roles and fulfilling specific responsibilities. This requires higher-volumes attention on more specialized information. Experts, who are compensated for their services (such as the Arbitrum Security Council), must also allocate attention to compliance with any supervisory process in place. Additionally, the public forum must dedicate attention to participating in those supervisory processes through



pre-established mechanisms, ensuring transparency and accountability in the operations managed by experts. The temptation here is to over-engineer mechanisms of accountability and control, to the point that rituals of verification suffocate the actual operational doing of the work (Power, 1999). The goal of managing experts always needs to be to understand how to maintain a balance of power in defining goals, achieving outcomes, and holding service providers accountable.

In practice, no accountability regime can provide a perfect view into operations, and service providers jobs include handling a wide range of contingencies which were impossible to specify in advance. Service providers' contracts, like all contracts, will necessarily be incomplete. "The notion of incomplete contracts refers to the circumstance that some aspect of contractual parties' payoff-relevant future behavior or some relevant payoff in future contingencies is unspecified in the contract and/or unverifiable by third parties" (Rossi, 2014). Trust can be conceptualized as the extent to which actors believe that their counterparties are acting in good faith, even insofar as some of the contractual (or technical) machinery is insufficient to bind them. This notion of trust is earned over time, and is a critical component of cooperation in environments characterized by contractual incompleteness (Lorenz, 1999). Coordination contexts absent trust produce "cover your ass" (CYA) behaviors which amount to optimizing behaviors to minimize risk of blame, rather than toward achieving goals (Barabas, 1993).

Both expertise and trust can be viewed as the consequence of attention spent over time. Expertise is developed through education and experience focused in a particular knowledge domain, whereas trust is developed through attention spent in relation to other actors. Designing governance mechanisms for the oversight of service providers must account for the availability of attention from the public forum, the expertise of the service providers, and the degree of earned trust amongst the service providers required to engender cooperation.

## Balancing Accountability with Other Incentives

In organizational contexts, accountability involves a relationship in which a particular actor is answerable to a public forum for their actions, and will face enforceable consequences for misbehavior (Bovens, 2007). In practice, a public forum is ill-equipped to hold either human or algorithmic actors to account; accountability mechanisms exist to bridge the gap between the operational context of the actor and supervisory context of the public forum. In algorithmic contexts, accountability involves dynamic analysis of the actor (a.k.a., the algorithm), the forum of stakeholders, the relationship between the two, the content and criteria of a specific account, and the consequences of misbehavior' (Wieringa, 2020). In decentralized organizations, designing context-appropriate accountability mechanisms (including human practices and algorithmic processes) for service providers is a nuanced and critical task. These mechanisms must align service providers' interests with organizational goals, and ensure their contributions are constructive and aligned with the organization's objectives.



Before designing or modifying incentive and accountability mechanisms, it is essential to thoroughly map out the design space for interventions; this involves understanding the existing incentive structures, the trade-offs involved in modifying them, and the potential impacts of such changes. That is to say, no mechanism is deployed into a vacuum — all relate to existing practices and processes. It's crucial to consider how different mechanisms interact with each other and the overall system, as well as how they align with both short-term and long-term organizational goals. At present, Arbitrum has a program focused on short-term goals (the Short-Term Incentives Program, or “STIP” [tnorm, 2023]), and has just approved a Long Term Incentives Pilot Program (Matt\_StableLab, 2024; Frisson, 2024), but lacks clear processes for coordinating their activities. Moreover, “short-term” and “long-term” are not sufficient distinctions; although they represent a step in the right direction, the programs also need differentiated mechanisms for assessing success that are matched to those time scales.

Accountability to the public forum includes accountability to future stakeholders – a short-term focus, unsurprisingly, can create short-sighted outcomes. For example, early Arbitrum funding proposals that were proposed and passed allocated \$500k worth of ARB tokens in retroactive funding to support early contributors (Bafkrei, 2023). Those contributions should have already been reflected in the token drop, and the eventual solution does not necessarily align incentives for contributors moving forward. While retroactive funding may be an effective mechanism for contributor rewards, this example demonstrates a potentially opportunistic governance proposal. Accountability in this context would include assessing whether these proposals were aimed at defensible objectives, such as serving contributors the airdrops didn't effectively reach.

One challenge in developing accountability mechanisms lies in determining which stakeholders have legitimate authority to convene a process around long-term planning and strategic goals. Without strategic goals to assess against it is difficult to productively discuss governance proposals.

### **Incentives as Coordination System:**

Incentives encompass the expected risks, costs and benefits associated with participation in an expert network.

- *Financial Aspects:* Financial compensation is a key incentive for service providers, but it's not the only factor. Service providers must consider the full spectrum of financial implications, including operational expenses and potential risks like brand or security threats associated with their work. It is common for financial incentives to be used as compensation to offset risks and other non-financial costs.
- *Non-Financial Aspects:* Beyond monetary compensation, service providers evaluate non-financial factors such as the effort required to comply with accountability processes and the potential impact on their professional reputation. Additionally, compensation mechanisms — especially non-traditional ones like token-based systems — present legal risks, in addition to more mundane concerns like exchange risk.



Many experts work across DAO and non-DAO contexts; in deciding whether to offer services to DAOs they consider the precarity of operating in a nascent and emerging market at all. Often experts who choose to work in the DAO space believe in the ideals of self-governance and thus are willing to bear fat-tailed risks. However, fiscal responsibility dictates that service providers attempt to price those risks into their service offerings.

### **Accountability Mechanisms as Incentive Structures:**

Accountability mechanisms are integral to ensuring service provider activities align with organizational objectives. As such, their design must balance rigor and feasibility.

- *Minding the Epistemic Gap:* It's essential to recognize the distinction between performance metrics and the actual phenomena they aim to measure. While metrics are important for evaluation and oversight, they should not distort or overshadow the underlying phenomena they represent. Balancing quantitative data with qualitative assessments ensures a comprehensive understanding of performance.
- *Balancing Rigor and Feasibility:* If too burdensome, accountability mechanisms can deter participation. Conversely, if too lenient or poorly-aligned with intended functions, they can lead to ineffective processes or unintended outcomes. Therefore, they must be stringent enough to maintain transparency and engender trust, without being overly cumbersome.

### **Evaluation and Evolution:**

Understanding the existing incentive structures and potential impacts of changes is crucial before designing or modifying mechanisms. In cases where mechanisms are already in place, a similar approach can be used to evaluate their effectiveness. If they are not meeting the organization's needs, alternatives should be proposed. However, changes to these mechanisms should be approached cautiously and infrequently, as frequent changes can lead to instability and uncertainty. The ability to change these mechanisms, under the right circumstances, acts as a disincentive for gaming or abusing them, thus maintaining their integrity and effectiveness.

- *Evaluating and Adapting Mechanisms:* For existing mechanisms, their effectiveness should be evaluated with the possibility of proposing alternatives if they do not meet organizational needs. However, changes should be approached cautiously to avoid instability.
- *Adaptive Capacity as Defense Mechanism:* The ability to change these mechanisms, under the right circumstances, acts as a disincentive for gaming or abusing them, thus maintaining their integrity and effectiveness.



Accountability mechanisms are part of the incentive landscape decentralized organizations cultivate to secure expert contributions. Shaping that landscape requires careful characterization and alignment with organizational and service providers' needs. A comprehensive understanding of the existing incentive structures, coupled with a well-considered design or adaptation of accountability mechanisms, is essential for effective coordination of expert service providers and organizational success.

## Governance as Targeted Evolution

The Arbitrum Network has taken steps to address the functions discussed above at the component level, but these steps are not the same as those that are necessary in order to effectively compose such components into a well-integrated system – a process that involves identifying specific capabilities that the overall system lacks, and then engineering at the sub-system level, in order to add those capabilities to the set of affordances belonging to the system as a whole. Furthermore, although existing efforts and initiatives have proven reasonably successful with respect to activities and decisions that are broadly legible to the general population, these efforts have not yet been able to mitigate the inherent challenges to legitimacy presented by situations that are more opaque to all but those with the relevant expertise. Thus, the remainder of this report will describe a process for approaching the process of establishing an Expert Service Provider Network *systematically*, so that its parts fit and function together smoothly, without gaps or obvious seams.

It is worth noting that a well-integrated and well-functioning overall system is a long-term project – one that requires a model of continuous improvement, and not something that can simply be “achieved.” This report identifies one specific weak point in the Arbitrum ecosystem – the capacity to engage with expert service providers – and offers a path to build that capacity. The path described serves to demonstrate practices and procedures that can be re-used to iteratively recognize other needs within the ecosystem that are not being filled and systematically close those capability gaps, as well – work that even the most well-integrated and well-functioning systems must undertake, any time that they seek to mature or evolve beyond their current configuration.

## Practical Next Steps

This report has provided extensive background for the development of an Expert Service Provider Network accountable to the Arbitrum DAO which would provide services to the Arbitrum Network. This background followed a pattern associated with an engineering process applied to governance mechanisms. The discussion of people, purpose and environment provided the organizational context. Functional decomposition provides an approach to recursively breaking down goals until clear requirements for an expert service provider network can be specified. The discussion of legitimacy provides a set of heuristics through which to assess a governance mechanism.



Undertaking a participatory approach to developing governance mechanisms involves significant challenges. These challenges are surmountable, however, and are common enough in public finance that they have been addressed, to varying degrees, by existing public institutions. With that said, government administrations are known to struggle with bureaucratic bloat, vendor lock-in, and low legibility to the public. The existence of public digital ledgers, smart contracts, and other digital institution-building materials offers an opportunity to innovate on public institutions, while still learning from them. Sustainable self-governance, such as in the context of Arbitrum DAO, is the “ability of an organizational system to sustainably implement its purpose, while maintaining homeostasis in its interaction with its niche” (Espinosa, 2023, p. 207). This requires decomposition of what purposes these systems emerged to fill, how innovators can develop alternative cultures, and what infrastructures are capable of fulfilling those purposes.

In furtherance of such institutional innovation within the Arbitrum Ecosystem, the BlockScience team proposes a two-phase path forward:

### **1. Expert Service Provider Network Development**

*Milestone 1:* This Report Delivered to Arbitrum DAO

*Milestone 2:* Co-Developed Proposal Presented to Arbitrum DAO

*Milestone 3:* Funding Secured and Project Launch

*Milestone 4:* Preliminary Mechanism Design Published

*Milestone 5:* Final Mechanism Design Published

### **2. Expert Service Provider Network Operationalization**

*Milestone 1:* Updated Operationalization Plan Based on Final Design

*Milestone 2:* List of Service Functions Published

*Milestone 3:* Expert Service Provider Network Program RFPs go live

*Milestone 4:* First Cycle Service Providers Contracts Go Into Effect

*Milestone 5:* First Cycle Service Providers Performance Assessments

It's worth noting that this outline covers one funding cycle; one key feature will be the seasonality or length of these cycles. Our approach leaves flexibility in determining this facet of the design in Phase 1, while defining Phase 2 under the assumption the first cycle will necessitate the establishment of concrete details such as precise functions, their seasonalities, performance metrics, reporting requirements and review committees. While these details may evolve over time, the choices on the first cycle are challenging and impactful because they set precedents for future cycles.



## Phase 1: Program Development

In order to arrive at a set of mechanisms that have both expert sign-off and community approval, the development of an Expert Service Provider Network should leverage the Arbitrum Network's existing Program Management capabilities in order to facilitate a co-design process with the broader Arbitrum community. Leveraging this report as background research, the Arbitrum Network should fund an organization of the community's choosing to facilitate requirements-gathering workshops, in order to solicit the community's input regarding **which** functions should be delegated to expert service providers, and **what** success in those functions looks like. By iterating with community members and experts, it should be possible to produce a proposal for the Expert Service Provider Network mechanism design work which the Arbitrum DAO is comfortable approving.

The mechanism design work will serve as an isolated pilot regarding accountable expert services. The co-development of the proposal will ensure that the community has already had input into the problem statement and requirements. The services work will itself be broken into two parts. In the first part, the service provider will do preliminary design, and refine it based on peer review from other experts. The second part will involve publishing the design, soliciting feedback from the broader community, and iterating on the design to achieve sign-off from the Arbitrum DAO. This type of work needs both time and scope bounds in order to ensure incentive alignment between the service providers and the Arbitrum DAO; since this part of the project necessarily precedes the existence of the Expert Service Provider Network, a trusted program manager will need to serve as the interface between the service provider and the Arbitrum DAO.

**For a visual representation of Phase 1, see Appendix A. Part 1 of Appendix A describes the process leading up to the Arbitrum community approving a specific proposal for the development of an Expert Service Provider network; Part 2 describes the process of getting from the approval of a proposal for the development of an Expert Service Provider Network to the delivery of a final design of an Expert Service Provider Network, pursuant to the proposal that the community ultimately decides to approve.**

## Phase 2: Program Operationalization

The development, documentation and approval of the Expert Service Provider Network by the Arbitrum DAO is only the beginning. Putting those incentives and accountability structures in place is a different set of tasks – one which a program management organization of the community's choosing is well suited to implement. The first milestone in Phase 2 is to produce an operationalization plan. That plan is expected to be a detailed version of the outline found in Appendix B, based on the specifics of the mechanism designs approved at the end of Phase 1. Publishing this plan will ensure that limits are placed on the demands made of public and expert stakeholders' attention. Both groups should know when and where to look for key information, what roles are available for participating in the process, and when and where to participate in those roles.



The second milestone in Phase 2 is to finalize the set of functions which the DAO aims to support via the Expert Service Provider Network, including details about service cycle lengths, reviewers, performance metrics, service level agreements, reporting requirements and realistic budgets. The existence of this list and associated details will provide the basis of budget proposals to the DAO to appropriate funds from the public treasury to pay for these services. It may take multiple iterations before the funding is approved.

Once the funding is approved, the next milestone is officially announcing the programs and publishing the requests for proposals from candidate service providers. The procurement process involves the selection of service providers from the proposals, and negotiating specific contractual details with those service providers. Finally, those service providers will be held accountable for meeting the terms of their contracts, and contracts may or may not be reviewed at the end of the cycle. The public engagement element of the service providers' contracts ensures that community members, in addition to experts, are informed and empowered to participate in the feedback cycle.

Competing service providers should be encouraged to make proposals during the period leading up to the end of the cycle if they feel they can offer the DAO better service. However, more precise accountability and request for proposal mechanisms need to be developed during Phase 1, because there are non-trivial trade-offs between mechanisms which incentivize rapid turn-over in service providers versus providing the predictability required to incentivize long term outcomes rather than appealing to short-term thinking.

**For a visual representation of Phase 2, see Appendix B. Part 1 of Appendix B describes the process of using the framework developed in Phase 1 to gather community buy-in and secure funding for specific mandates; Part 2 describes the process of procuring service providers pursuant to, and evaluating them against, the mandates that the community ultimately decides to fund.**

Broadly speaking, this approach, as a participatory engineering life-cycle, is aimed at creating a protocol for engaging with service providers that fosters long-term alignment with the needs and goals of Arbitrum DAO.

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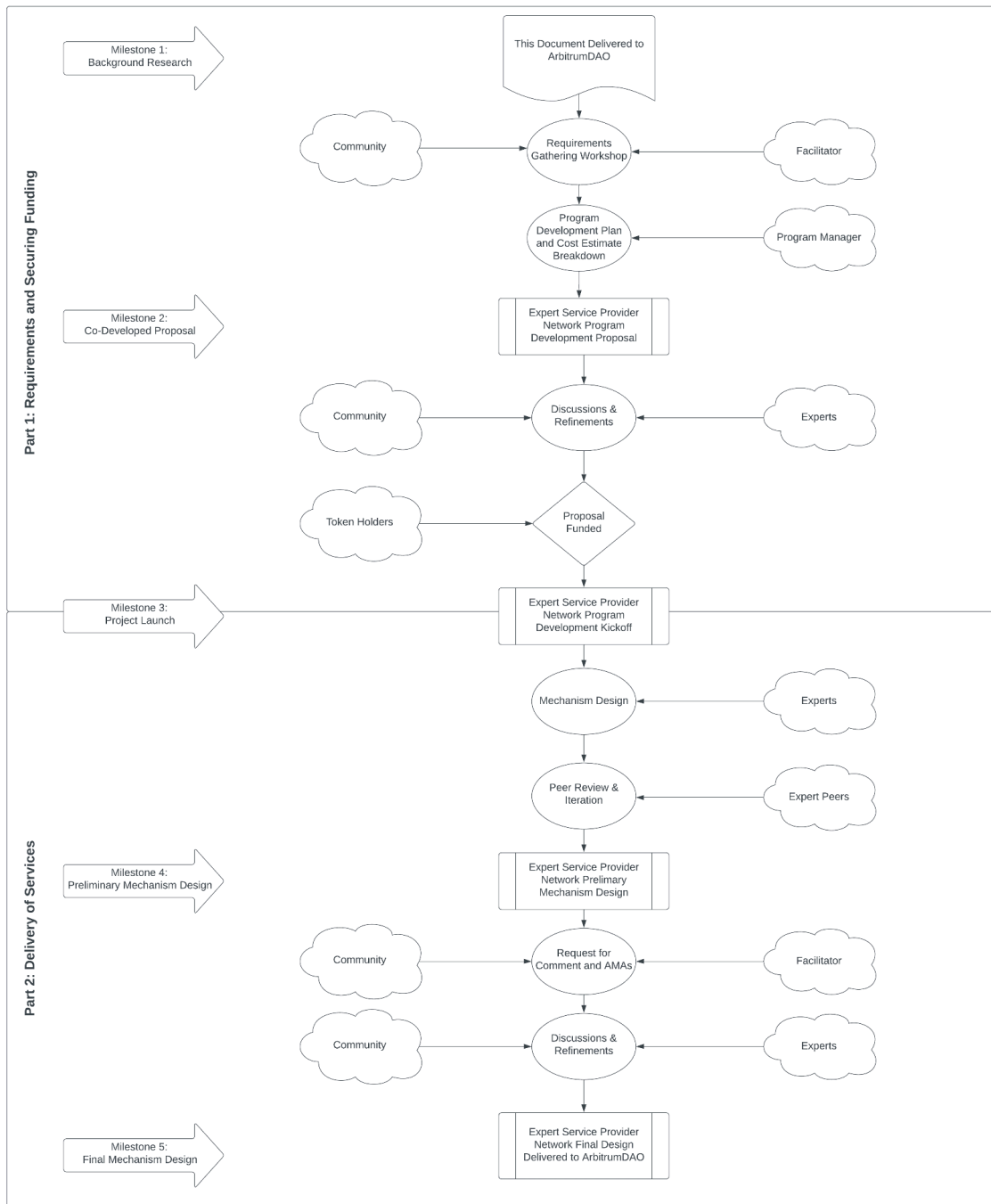
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Appendix A:

Expert Service Provider Network Development Program Plan  
Overview







Appendix B:

Expert Service Provider Network Operationalization Plan  
Overview



