Validators and their governance participation

Identifying development paths for proof-of-stake blockchains with on-chain governance

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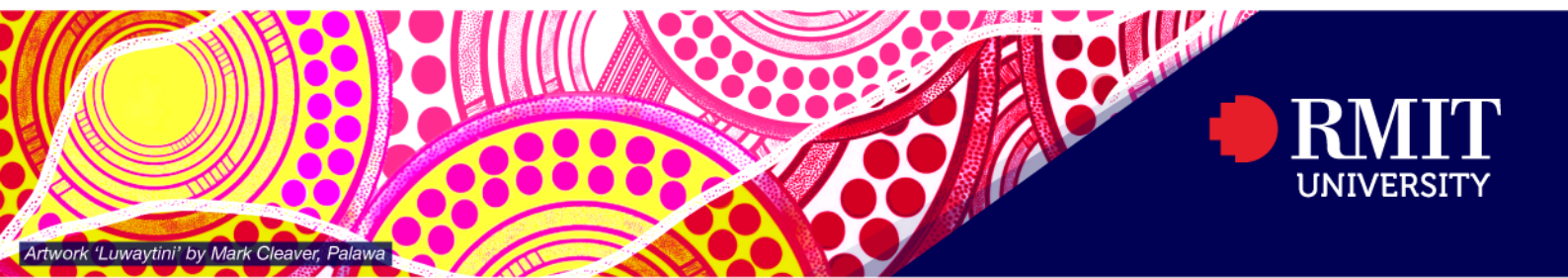

Executive Summary

On July 6 – 7, 2023, a governance break-out group was held during the Blockchain Infrastructure Forum (BIF) to discuss issues and potential solutions to governance in Proof-of-Stake blockchains. Contributors to the break-out out session came from a variety of backgrounds including validator service providers (referred to here as 'validators'), infrastructure providers, foundations, and experts in blockchain regulation. Collectively, the group agreed that validators wield significant power in the ecosystems in which they participate and that the time is right for validators and foundations to assess current governance processes. Following the BIF, RMIT University developed a short questionnaire to further explore whether attitudes to governance differ across validator types.

This report draws on the BIF governance discussion and the survey to describe the state of play and options for ensuring that validators are aligned with the long-term success of the protocols in which they participate. The report is centered on the Cosmos ecosystem, with reference to other PoS blockchains and their governance design. We identify three approaches to improving governance processes for chains where token holders delegate to validators: Validator governance standards and tools; foundation incentives for governance participation among validators, and; evolution in the design of chains (i.e. the rules enshrined in code that determine governance processes). The suitability of each approach may depend on the particular chain's status on the path to decentralization.

Our conclusion is that validators are committed to the continued development of decentralized blockchains and the applications they enable. However, the diversity of validator roles combined with regulatory uncertainty in many jurisdictions means that certain validators cannot operate as governing stewards. Governance by validators should therefore be opt-in for some types of decisions, but chains would benefit from effective and clear options for validators to assign governance duties to those with the willingness and expertise to take it on. Governor roles ('governators') could help maintain technology stability, audit code upgrades, and represent the technology to other stack elements.

Clarifying the characteristics of validator governance participation is vital as deficiencies in PoS on-chain governance may attract attention from authorities, some of whom lack the technical expertise to understand how resilience is maintained in these protocols (such as the importance of validator diversity and sybil resistance). An industry-led, well-managed development path is crucial to ensuring that blockchains gain legitimacy in the eyes of regulators.

Introduction

In Proof-of-Stake (PoS) blockchains, validators are relied on for attaining distributed consensus and performing upgrades to the network. As a result, validators wield significant power in the ecosystems in which they participate and the success of PoS blockchains depends on the alignment of validators' interests with the long-term success and security of blockchains.

The power of validators is more pronounced in delegated proof of stake blockchains (DPoS), in which token holders can participate in securing the blockchain without running a node by delegating their validation rights to a validator of their choosing. In such cases, validators have significant voting power because they are required to self-delegate a certain number of protocol tokens to become a validator, and because they may inherit the voting power of delegators who choose not to vote independently.

This report considers three approaches to improving governance:

1) Validator governance standards
2) Incentivizing governance participation among validators
3) Altering the design of chains (i.e., the rules enshrined in code that determine governance processes) throughout their lifecycle.

We discuss each of these approaches in turn and offer recommendations for the ongoing development of PoS blockchains with on-chain governance. As the various obligations that validators must navigate will influence the success or otherwise of these approaches, we first describe high-level categories of validators based on their service offerings and how this impacts governance participation. Staker motivations and the size, scope and maturity of a blockchain are also important factors to consider in relation to validator governance participation.

1. Factors that influence on-chain governance participation by validators

Validators play a crucial role in PoS blockchains, but it's essential to recognize that they are not all the same. Validators enable individuals and entities to participate in securing the blockchain via staking and enable stakers to earn rewards for doing so (typically with the validator service provider taking a cut of those rewards). In DPoS, validators' participation in governance can be influenced by reputational factors as well as potential legal or regulatory ambiguities.

The sustainability and robustness of PoS governance models gets tested during financial downturns as validators may be less inclined to commit infrastructure and governance resources when there is no guarantee that there will be a return on investment (staff time and capital assets). Identifying the utility of blockchains and establishing fair market pricing is necessary to mitigate the risk of validators exiting networks.

Moreover, blockchains differ in their operational and governance needs. A nascent app chain catering to a specific community might opt for a high level of governance input from its community. In contrast, a more established chain might find it beneficial to establish sub-DAOs, bringing together experts to oversee niche areas. This nuanced landscape highlights the importance of designing and adapting governance models with both immediate and long-term challenges in mind.

1.1. Types of validators in Proof-of-Stake blockchains

The following four validator profiles help explain the reasons why some validators are more active in DPoS governance than others. These are not always independent of one another; for instance, some validators offer custodial services to institutions and non-custodial services to retail token holders.

1. **Custodial exchanges that offer staking to retail customers.** These do not typically participate in governance processes, likely due to liability concerns or because they have no 'signal' from delegators on how to vote and provide no means for delegators to independently vote. They may outsource to other validators. (Note: some exchanges also run public non-custodial staking services, such as Coinbase Cloud).

2. **Validators who stake on behalf of institutional clients and liquid staking providers.** Some validators run white label validators for investors. Others run validators under contracts with liquid staking services. These validators may have particular constraints and liability concerns that prevent them from being active in governance processes. In some cases, venture capital firms run their own validators in order to stake tokens they initially acquired through participation in capital raises.

3. **Large retail validators who operate multiple chains** (over 50) and do not prioritize governance due to the volume of attention and work required.

4. **Activist validators** who are selective with regards to which chains they run validators for. These validators are motivated to participate in governance and attract delegations from token holders who care about the future of blockchains. Some are run as DAOs and aim to use validator income to sustain their DAO's activities. DAO validators often provide rewards to DAO members who take on active governance roles.

Of the survey respondents, seven provided validator services for institutional investors, 10 provided validator services for liquid staking providers and 16 provided liquid staking services for retail customers. All seven that provided validator services for institutional investors also provided services for retail customers, and six of these also provided services for liquid staking services. In addition, one respondent was a VC company that ran validators with tokens it owned.

Of the seven that served both institutional and retail customers, five were validating 11-20 chains, one was validating 2-10 chains and one was validating between 21-50 chains.

Six respondents were validating more than 20 chains. With the exception of one who served institutional investors, these validators served retail and liquid staking services. Of those that validated more than 20 chains, only one responded that they comment on proposals more than half the time and none commented on all proposals. All of them stated that they do not have capacity to comment on more proposals. These validators fit the category of 'large validators who operate multiple chains'.

Whether a validator commented on proposals was not correlated to whether they had institutional or liquid staking service clients but had more to do with capacity. Of those that commented less than half the time, four of the six said they do not have the capacity to follow all governance decisions, and one said they 'lack the tech knowledge needed to form an opinion' and another said it was 'not currently needed'. However, validators who did not provide services to either institutional investors or liquid staking services were slightly more likely to have submitted a governance proposal.

Of the two respondents that never commented on proposals, both were worried about liability risk. One was a blockchain foundation and the other was the VC firm that ran validators.

Of the seven validators who mostly or always comment on proposals, six strongly agreed with the statement that validators should be active in the governance of blockchains. These six fit the profile of 'activist validators'.

1.2. Staker/delegator engagement

While the focus of this report is on validators, it is important to note that those who stake do so with varied interests and priorities, which impacts on both market dynamics and governance participation. Some stakers are primarily driven by the pursuit of financial returns or maintaining their investment under what they see as inflationary token price dynamics. Others are likely to choose a validator based on security or risk factors. For some, a validator's proactive involvement in governance deliberations (assessing or submitting proposals and voting) is paramount.

Some validators revealed that their attempts to engage delegators in governance have received little obvious engagement, making it hard to justify resourcing these activities. On the other hand, activist validators and those affiliated with DAOs prioritize governance and decentralization, appealing particularly to delegators keen on ensuring the long-term viability and health of chains.

For those who choose to stake through custodial exchanges, the likelihood of them voting independently, even if presented with the opportunity, is slim. These stakers likely choose ease of use and accessibility over governance concerns. Further research into the motivations and informational needs of stakers is necessary.

1.3. The scale and maturity of chains

The political economy of every chain is different. For smaller app chains – for instance those that serve a specific community – frequent on-chain voting by validators may be appropriate. Newer chains may also decide that on-chain governance on all types of decisions is necessary until they reach a certain stage in decentralization.

However, the complexity of governance and its consequences increases with the scale of a chain. Participants in the Blockchain Infrastructure Forum concluded that mature chains, in particular, should consider constitutional changes (where the 'constitution' is the rules enshrined in the L1 protocol) that reduce the frequency of on-chain decisions and limit on-chain decisions to certain types of decisions. Reducing complexity and ensuring effective governance is likely to be looked on favorably by regulators. Any such change should be viewed as constitutional and undertaken with care so that iteration is not perceived as a weakness/vulnerability by regulators.

Questions that require further discussion include:

- Is there a period of time when high frequency token-based governance makes sense, but after which it does not?
- Should the velocity of a protocol's iteration decline as it takes on systemic risks?

Reducing or streamlining on-chain governance does not remove the need for well-moderated forums for structured deliberation where people feel safe to express dissenting viewpoints. Good governance has as much to do with quality conversations and good mechanisms.

Four respondents expressed moderate to strong support for the statement 'as a chain matures it should minimize on-chain governance'. This same group expressed support for the statement that 'those who participate in governance should be rewarded for their time' and held neutral to strong beliefs that validators should be active in governance. These validators were therefore supportive of governance participation, but supported options that reduced the burden on validators. They all

cited liability risk or capacity issues (or both) when asked why they did not comment on more proposals. When asked which ecosystem had the best governance, three responded Cosmos and one said that ‘none’ had the best governance.

Of all respondents to the question on which ecosystem has the best governance, the overwhelming majority responded ‘Cosmos’. The reasons for this answer were mostly to do with Cosmos having an active community. This is perhaps unsurprising given that the survey was distributed to Cosmos-centric channels (see Appendix 2). One stated in a text response that 'the scope of protocol changes that can be determined through governance should be minimized. If possible, these changes should be executed on-chain, and an ideal approach would involve altering parameters similar to how Cosmos operates. In this regard, Cosmos showcases the most ideal governance system, as it has modifiable parameters implemented in the code and conducts voting through on-chain processes. However, due to the public nature of on-chain governance, there is also a significant amount of noise generated, which calls for careful consideration of the issues at hand'.

Three respondents said that Ethereum has the best governance (Ethereum uses off-chain governance - see Appendix 1). Their reasons included the mature nature of discussion and that validators do not have to deal with governance at all. Interestingly, these four were not the same validators that favored minimizing governance as a chain matures.

Only four respondents expressed moderate to strong support for the statement that ‘existing public forums are adequate for good governance’.

2. A proactive approach

Regulators in some jurisdictions might enforce the fiduciary duty of validators, but that will only produce a positive outcome for chains and their constituents and users if those regulations are sound. It is likely that if the industry does not propose a way forward then regulators will come up with an inadequate or untenable approach due to insufficient knowledge of these systems.

An immediate area of work is defining the roles that comprise infrastructure support, including sub-categories for the different technological processes associated with it and what happens to assets when staked. Further, closing the gap of traditional finance (tradfi) terminology like ‘broker’/‘broker dealer’ versus ‘technology platform’/’technology service provider’ when referring to validators and chains may be crucial in making such regulatory requirement determinations. Financial reporting rules and taxation on digital assets should also be considered as such rules may also trigger Know-Your-Customer (KYC) / Anti-Money Laundering (AML) and other regulatory requirements.

Questions that regulators are likely to commence with include: Who operates the protocol? Who gets to make what decisions about how it operates day-to-day and when things go wrong? Where financial incentives are provided in the form of a token then how does that work? Does anyone have a controlling interest? What are the checks and balances? Is it really decentralized? Does it operate within the Office of Foreign Assets Control (OFAC) sanctions listed countries? How robust and resilient is the chain? What are the key risks?

In this section we discuss the pros and cons of different approaches.

Of the survey respondents who said they sometimes did not comment on proposals due to concerns over liability risk, three were based in Europe, one was based in Asia, one in North America and one stated that they were not registered.

2.1. Validator governance standards

In Proof-of-Stake blockchains, validators' governance participation is highly variable. One way to increase participation is through governance standards, including systems for validators to signal that they align with such standards, and tools for monitoring adherence to standards. For instance, those who sign up to the standard might agree to participate in a minimum number of proposals, commit to transparency around voting decisions, and offer clear communication with delegators in relation to voting decisions. Validators might also develop processes and systems that minimize the governance burden on individual validators such as dashboards or 'validator juries'.

A voluntary governance standards approach applied to the current system accepts that the process of governance is competitive within and across blockchains and posits that improvements in governance can be met through the choices of those who delegate. Validators who wish to signal to delegates that they are following particular governance standards are able to do so, accepting that other validators may choose a different path. An issue arises in this model with differing motivations on the part of both delegators and validators, meaning that a commitment to supporting the chain through active governance can ultimately fall to the side.

Previous bottom-up attempts to develop a set of standards for validators, like the Validator Commons, have stalled. The lack of sustained participation could be for several reasons: lack of awareness of why governance matters; a 'free rider' problem whereby validators can leave it up to others to invest time and resources into governance; validators de-prioritize voluntary time contributions in tough economic conditions; and lack of pressure from delegates/stakers.

There is nothing inherently wrong with some validators being more active in governance than others. If cryptoeconomically governed systems have differentiated into a state where the four validator types have differing levels of attentional capacity available to their participation, then the path forward is to recognize that this is the case and to concentrate on those who have the most commitment to the development of the chain.

When asked the extent to which they agreed with the statement 'validators should be active in the governance of chains', the majority strongly supported the statement (with 11 respondents scoring 80-100); followed by those who were neutral to somewhat agree (score of 50-75); and three who disagreed (score of 0-30). Those who were against validators being active in governance agreed with the statement that 'validators should only concern themselves with infrastructure'.

Of the seven validators who mostly or always comment on proposals, six showed strong support for the statement that 'validators should undertake self-regulation in a coordinated fashion'. However, these validators were divided in their views on other statements, including the statement 'chains should separate governance from infrastructure responsibilities'.

2.2. Foundations incentivize governance participation

Foundations delegate tokens to validators in order to participate in the security of the chain. Foundations that delegate tokens to validators often make governance participation a condition of their delegations, with a termed requirement for participation that is reviewed periodically. An extension of this would be for foundations to require that validators who receive delegations join an industry body that is aligned on governance standards. However, some foundations may prefer to take a neutral role in governance processes for the sake of decentralization (for instance, one foundation responded in the survey that they do not participate in voting due to liability risk).

Another approach might be to use retroactive funding (via contribution and rewards tools) to incentivise validators to participate. The model for this is ill-explored but could be measured for distribution based on a number of metrics such as total number of governance proposals a

validator has participated in or discussion subjects from representatives in open channels. It's unlikely that this will encourage larger validators who are beyond a volumetric boundary of profitability for any governance participation incentive. For anyone lower than this who would like to earn a predetermined amount from the community pool, retro-active participation funding would require a limited amount of analysis in order to both design incentives around and distribute equitably.

Survey respondents were asked to state the degree to which they agreed with the statement 'People who contribute to governance should be rewarded for their time' (most are in favor so far). Four mostly disagreed with the statement, two were neutral and 13 agreed with the statement (including four in 100% agreement).

2.3. Altering the design of protocols for effective governance

Current governance behaviors among validators and those who delegate to them are the result of the design of individual chains. However, it is possible to undertake a 'constitutional' process that would redesign governance. Cosmos Hub's Atom 2.0 paper proposed significant governance improvement involving committees (it was rejected because it was put forward as a 'blockbuster vote', but individual components have since gained traction). While Solana does not have a system for on-chain proposals and voting, the community is exploring potential governance designs as it begins to add new clients to the network. Polkadot has already reformed its governance under OpenGov. In this nominated proof-of-stake (NPoS) network, all DOT holders are part of the Polkadot DAO and can submit proposals (see Appendix 1). Key features of OpenGov include token holders being able to delegate to multiple delegates across different tracks, and proposals receive different levels of discussion and process depending on their complexity and importance.

Questions for consideration include: What decisions need to be made on-chain versus those that can be made to operate adjacent to the network? What can fall outside of the delegated voting system?

A minimal structural change might involve having some tasks undertaken by committees (such as auditing proposed changes or ensuring standards are followed) so that the responsibility does not rest with validators. A major structural change would be to split block production from governance entirely (For instance, Ethereum's L1 governance is off-chain aside from the steps requiring validators to implement changes via upgrades. See Appendix 1). In the latter case, the fiduciary duty of validators would possibly be removed. Designing an off-chain process that preserves decentralization would be the key challenge.

Another option would be to implement a design that acknowledges that there are different classes of validators. Chains could commit to the principle that validators should participate but that there is a means for them to opt out in a way that reduces the 'governance attack surface'. For instance, those who maintain custody of stake might not have governance rights, which might also remove any liability concerns they may hold.

In the Cosmos ecosystem, some have proposed that a 'governator' role be added to the SDK. These ideas are not new (Zaki Manian has been advocating for such a change since at least June 2022), and a discussion within Osmosis Forum sets out what separating the 'consensus vote' (software updates) from the 'governance vote' (initiatives, grants, procedures etc) might look like (see Gadikian 2023). An activist validator might also choose to take on a governator role, whereas validators who do not wish to participate in anything beyond implementing protocol changes can delegate their stake to a governator. Delegators would still be able to exercise their independent vote as they currently can.

Survey respondents were asked to state the degree to which they agreed with the statement 'Chains should separate infrastructure from governance'. Nine respondents were in agreement, four were neutral and six disagreed with the statement.

On the statement that 'validators should be able to delegate their voting power to governance specialists', 12 were in agreement, three were neutral and four disagreed.

3. Conclusion

Proof-of-Stake (PoS) blockchains rely on validators for achieving distributed consensus. Validators in some PoS chains are expected to participate in on-chain governance, such as deliberating and voting on proposals intended to improve the protocol, approve grants or appoint teams to specific research tasks and operations. However, validators agree that on-chain governance can be confusing, time-consuming and legally risky.

Recent and emerging technical advances such as distributed validator technology, shared security and privacy technology will also have major consequences for validators and may complicate governance participation even further. While these are beyond the scope of this report, good governance needs to be achieved in tandem with these important developments.

Further research is also needed to compare the different governance models of chains, map the differences and determine where 'fiduciary responsibilities' may trigger regulatory oversight, depending on the jurisdiction under consideration. For example, some validators are increasingly taking on additional responsibilities like managing and storing decentralized order books for decentralized exchanges (DEXs). If crypto trading moves from central limit order book (CLOB) to decentralized order books where validators are primarily responsible, does that trigger regulatory requirements and potential designation as regulated entities? 'Staking' as a financial product, process and/or facilitation mechanism is currently being debated in numerous jurisdictions. Such rulemaking could be detrimental to PoS chains if not addressed with facts and competent understanding. Practitioners and innovators who understand the inner workings of this technology therefore need to be proactive in proposing definitions and classifications, including the responsibilities and roles of each participant in the network.

In this report we discussed three options for addressing governance participation. One option is self-regulation through voluntary governance standards whereby validators would agree on and commit to governance principles. Secondly, foundations could play a role by offering rewards for governance participation or making participation in an industry self-regulation association an expectation (if not condition) of validators that receive foundation token delegations. The third approach involves modifying the design of protocols to accommodate more effective governance.

When considering these options, it is important to take into account different validator profiles and how their obligations impact on their participation in governance. We have outlined four validator profiles in this report (acknowledging that these are not exhaustive and that some validators fit more than one profile). Given the way that validators have evolved to meet different needs, the best options will be those that allow validators to opt in to governance, and reward those who do so. Creating a viable, explicit and transparent 'governator' role is one means to do this. Established chains should also explore changes that minimize the frequency and scope of on-chain decisions. Encouraging community involvement, defining roles clearly, and addressing governance limitations are all crucial steps towards more effective and decentralized governance.

4. Recommendations

The following recommendations were developed by the governance working group of the Blockchain Infrastructure Forum. They are intended as the starting point for further discussion and research:

1. Chains need to establish a clear roadmap for decentralization. This requires defining the steps and milestones needed to guide the technology towards decentralization, with a focus on reducing frequency and volume of on-chain governance.
2. Mature chains, in particular, should consider constitutional changes (where the ‘constitution’ is the rules enshrined in the L1 protocol) that reduce the frequency of on-chain decisions and limit on-chain decisions to certain types of decisions.
3. Foster community involvement and governance: Encourage active participation from validators and community members through opt-in governance mechanisms, delegation, and promoting diversity among validators.
4. Define a 'governator' role: Clearly define the responsibilities and qualifications for the governor role, ensuring that it becomes a paid job to incentivize qualified individuals to sustain the technology.
5. Address governance limitations: where technologies are crucial but lacking speculative flexibility, strategies for ensuring sustainable governance need to be addressed.

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Disclaimer

Appendix 1: PoS blockchain governance today

The following provides a high-level overview of different PoS governance approaches among a subset of blockchain networks (in alphabetical order). It is intended as context for the report rather than a comprehensive comparison.

Avalanche

Avalanche is a network of blockchains made up of Primary and Subnet application specific blockchains. The Primary network runs three chains:

- The Contract Chain (C-Chain)
- The Platform Chain (P-Chain)
- The Exchange Chain (X-Chain)

On-chain governance is in the making. Currently Avalanche deploys on-chain governance to adjust:

- Minimal staking amount required to participate
- Minimal amount of time required to stake
- Maximum amount of time a node can stake
- Minting rate
- Transaction fee amount

An interesting feature of Avalanche governance is how it intentionally limits governance to certain decisions. As described in the whitepaper, 'unlike some other governance platforms out there, Avalanche does not allow unlimited changes to arbitrary aspects of the system. Instead, only a 320 pre-determined number of parameters can be modified via governance, rendering the system more predictable and increasing safety. Further, all governable parameters are subject to limits within specific time bounds, introducing hysteresis, and ensuring that the system remains predictable over short time ranges' (Avalanche whitepaper).

Cosmos

The Cosmos Network is composed of interconnected sovereign blockchains built with the Cosmos SDK and Interblockchain Communication Protocol (IBC). The Cosmos Hub was the first IBC blockchain and acts as steward to the interchain network. It has multiple governing bodies who oversee different aspects of development.

Each blockchain has an independent set of validators made secure through native token delegation. Token holders who delegate to validators can participate in on-chain governance. If they choose not to participate their vote defaults to the node operator. This means that low participation in on-chain governance can concentrate voting power to the node operator. Validators in the active set receive rewards. Many pass rewards to stakers and keep a fee. As a result, stakers may be motivated by competitive returns when choosing a validator.

Cosmos chains can have variations of the Cosmos SDK governance module x/gov. For instance, they may choose the number of validators in the active validator set or change the deposit required to submit a proposal.

Ethereum

Ethereum does not use on-chain governance, although many applications built on Ethereum and some Ethereum L2s do. The barriers to running a validator are much lower for Ethereum than for many other PoS chains (32 ETH and basic hardware), and validators are responsible for maintaining the blockchain and upgrading clients. The client teams enact changes decided through multi-stakeholder off-chain processes, including the Ethereum Improvement Proposal (EIP) process and discussed in forums such as AllCoreDevs call, the Ethereum Magicians forum and the Ethereum R&D Discord server.

Founder Vitalik Buterin is a proponent of what he calls multifactorial consensus, where different groups use different mechanisms to reach agreement and where the result depends on these different groups coming together.

Polkadot and Kusama

Polkadot has recently reformed its governance under OpenGov. In this nominated proof-of-stake (NPoS) network, all DOT holders are part of the Polkadot DAO and can submit proposals.

NPoS is a system whereby 'nominators back validators with their own stake as a show of faith in the good behavior of the validator. Nominated Proof of Stake differs from the more generic concept Delegated Proof of Stake in that nominators are subject to loss of stake if they nominate a bad validator' (Polkadot FAQs). A distinguishing feature is that validators receive equal rewards once they have made it into the active set. Validators can use their own tokens or those of nominators (see How to Validate).

DOT holders (some of whom would be validators) can also delegate their vote to volunteer governance delegates. The model uses conviction voting, whereby those who lock their tokens for longer have more power. An expert body called the Polkadot Fellowship can declare proposals malicious, safe or time critical.

Key features of OpenGov include token holders being able to delegate to multiple delegates across different proposal classes categorized by their complexity and importance.

Solana

Solana uses their unique Proof of History algorithm to timestamp data guaranteeing conical block production ahead of their Proof of Stake consensus. This greatly improves transaction throughput as multiple blocks can be produced in a single ‘slot’ through chain forks.

Solana validators participate in procedural on-chain voting to determine chain forks and finalize block production. Validators race for the latest slot, and if a slot gets skipped by some but not others it creates a fork at that slot with both contending slots having a common ancestor. In these instances validators vote to determine the best parent block to create a fork to incorporate competing blocks.

Anyone can create proposals, either as SIMDs (Solana Improvement Documents), sRFCs (Solana Request for Comment), via a Github PR submitting an actual feature implementation etc., although these are most commonly undertaken by the Solana Foundation. At the time of writing Solana does not have a dedicated protocol for participatory on-chain protocol governance. Validators and token holders can submit and discuss development ideas in off-chain forums.

There are 1,970 validors currently securing the Solana network, a superminority of 30 validators together control over %33 of all staked Sol. This cumulative stake could technically be used to halt the network.

Appendix 2: Survey approach

The survey was administered using the Qualtrics survey platform, with human research ethics clearance from RMIT's HREC committee. The survey was anonymous. Respondents accessed the survey via a link, which was sent to specific lists and channels that are restricted to validators, foundations and related entities. As the survey was anonymous, there is no way to know if people from the same organization took the survey.

The first part of the survey included questions about the organization, including whether they were a validator, whether they provided custodial or non-custodial validator services, if they served retail or institutional customers, the number of chains they validated for, and whether they employed a staff member to oversee governance. The second part of the survey asked about practices and beliefs related to on-chain governance, including whether they participated in on-chain voting and discussion of proposals. Respondents were also asked to rate the extent to which they agreed with the following statements:

- Validators should be active in the governance of chains
- Validators should only concern themselves with infrastructure
- Chains should separate governance from infrastructure responsibilities
- As a chain matures it should minimize on-chain governance
- People who contribute to governance should be rewarded for their time
- Validators should be able to delegate their voting power to governance specialists
- Validators should undertake self-regulation in a coordinated fashion
- Existing public forums are adequate for good governance

Due to time constraints, the survey was only open for two weeks. In this time, 22 people responded to the survey. Two did not complete the survey, and one was not directly involved in validator services or a related entity (exchange that provides staking services or a blockchain foundation). This left a total of 19 valid survey responses. Of these 19, two respondents were blockchain foundations, one of which did not run validators. Six respondents were registered in Europe, three in Asia, four in North America, one in Central America, two in the Caribbean, and one was registered in three different regions. Two were unregistered.