Proposal: Polkadot Nominator Insight Hub Spreading the Best Nominator Strategies through TOP Nomination Leaderboards

Proponent: 13YMTEPKAxPRiyaZdMKrozeNT9x1Pa5h7aExebCdi6nc3Qqd
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Requested DOT: 34280 DOT
Short description:
Motif is a staking benchmark platform that features leaderboards highlighting nominator behavior models: a nominator rewards, current stake size, the date of its increase, the set of validators, last set updates with dates, etc. This shortcut allows both existing and new nominators to effectively track the rewards of the best and the actions they take to achieve them.

This tool provides nominators with a valuable opportunity to self-educate using real-world examples, enhancing their effectiveness in fulfilling their role within the system. The leaderboards highlight the key actions of top performers and the rewards they achieve. The essence of this "following the best" approach is to enable nominators to consistently execute key actions, thereby enhancing both their individual and the overall system's efficiency, without falling out of the active set and missing out on rewards.

The Motif concept of demonstrating unmoderated behavior based on onchain events helps the nominator community compete within a decentralized approach, without a 'one-size-fits-all' solution or a centralized 'to-do' list. Leaderboards are envisioned to introduce elements of a social network, which further stimulates engagement and stickiness—a crucial factor in a reward-centric system. This will allow for the seamless integration of change tracking and notification systems, creating an additional feedback loop between the nomination system and nominators.

1. Actualization: The inefficiency of nominators in increasing competition and ways to improve it through experience sharing.

This research examines the inefficiency of nominator behavior and explores potential methods to enhance it by sharing best practices. Over the past year (835-1200 eras), the minimum rewarded stake has seen a 2x increase, currently standing at 501.9 DOT. In reality, a higher stake is required to ensure consistent rewards. This surge can be attributed to the competitive nature of nominators, which necessitates them to take pivotal actions.
Many nominators, in the midst of this competition and while executing tasks within the system, often act suboptimally. This results in them losing their spot in the active set, either temporarily or permanently. Such lapses lead to diminished profits for these nominators, subsequently giving rise to public discontent and dropout from ecosystem (Section 2).

The foundational hypotheses guiding our research were: to determine if the nominators' behavior was genuinely suboptimal, to devise methods to quantify this behavior, and to understand the implications of such behavior.

The significance of this research is underscored by the system's long-term incentive structure. Within Polkadot, nominators play a highly lucrative role, thanks to the incentivization model (Section 3). As we discern from system updates, this incentive is poised to remain in effect for a long-term. The DOT model suggests a substantial amount of tokens being locked. Initially, the goal was to lock 75% of tokens even before parachains became live [polkadot wiki]. The next concept was that parachains would absorb a significant portion of DOT [web3.foundation research], allowing for a balanced distribution between liquid tokens, bonded tokens in staking, and parachain slots. As of mid-January 2023 and Runtime upgrade v9340, this rate diminishes by 0.5% for each active (non-system) parachain, commencing from 75% (with a floor of 45%). The overarching aim aligns with this objective. However, in reality, parachains haven't substantially locked DOT throughout their existence [messari report q2 2023], while the ideal staking dwindled to 52.5%. The crowdloans' magnitude has become inconsequential for the DOT TVL [parachains.info], and prevailing plans have pivoted the model source, curtailing opportunities for token locking outside of staking. The subsequent notion regarding the size of ideal staking also proposes to remain ideal staking bar high (proposed by Jonas). This concept suggests setting the ideal staking at 60 percent source and can be adjusted upwards through governance in the future. It's crucial to note that nominators are the primary

solution for locking DOT tokens, and all proposed systems target a larger reward for nominators, the main actors in this process.

Our research indicates that, despite the substantial reward, the majority of nominators' behavior is indeed suboptimal (Section 4): the selection of validators is inefficient, and many nominators, including those with large stakes, often fall out of the active set. Our study also delved into the use of ceasing rewards as an incentivization tool (disincentivization). The disincentivization system results in a significant and growing percentage of total nominator dropouts. The overall staked (or bonded) amount remains relatively stable, despite the increasing competition, and incentives and other motivating factors seem to exert limited influence on nominator behavior. Coupled with the swiftly rising min-reward level, this results in an escalating churn rate (40% and growing). Moreover, a significant number of existing and newcomers nominators will face potential disincentivization, leading to substantial dropout.

However, our research has spotlighted successful nominators who adeptly navigate the system, consistently securing rewards without losing their active set status. Their stakes are always competitive and efficient in terms of APY, and they adeptly select the best validators. Nominators who retain their rewards execute key actions more proficient than those facing disincentives. Thus, ensuring nominators are aware of effective strategies fosters a deeper commitment to the ecosystem, fortifying the overall ecosystem.

The conclusion drawn is that a significant portion of nominators, for some reason, fail to undertake the necessary actions, leading to partial or complete loss of rewards. The reasons could range from a lack of knowledge about key actions, decision-making moments, or a combination of both. Yet, the presence of long-term successful nominators indicates that the system operates adequately.

Based on these insights, we advocate for the creation of a platform that showcases exemplary behavior models for nominators (Section 5). This entails the introduction of leaderboards that spotlight top-performing nominators and their actions, such as stake size, increase dates, validator changes, and other pertinent activities (Section 6). For newcomers, this presents a “golden” opportunity to emulate or adopt effective strategies, comprehend their role, and correlate their actions with potential rewards. For existing nominators, it provides a pathway to amplify their efficacy within the system and augment their rewards.

Significantly, this self-education solution can promptly address the issue, given its scalability and adaptability within the system. The system integrates a competitive social dimension, amplifying virality and the requisite engagement level, vital in a reward-driven competitive

milieu. The solution doesn't advocate for a specific "central model" or preordained action; it leans on the existing dynamic on-chain data. Users can harness the collated data or open-source aggregates to discern patterns rooted in the decentralized behavior of sources.

The introduction of a Nominators Leaderboard emerges as a persuasive solution to optimize the utilization of DOT tokens. It also fosters active participation, thereby bolstering network security and efficiency within the Polkadot ecosystem.

2. Context of the Proposal: Active Staker Paradigm

Polkadot's Nominated Proof of Stake (NPoS) mechanism, a cornerstone of its operational framework, significantly enhances the system stability, security, and overall network integrity. The NPos revolves around the interaction between nominators and validators, which play a crucial role in its network structure.

Unlike traditional Level 1 blockchains, where stakers might passively participate, Polkadot's framework requires nominators to actively contribute to network stability and security. Their continuous activities include managing validator rotations, optimizing operational parameters, and promoting network decentralization. The distribution of rewards in the network is heavily reliant on the active participation of these nominators.

This design encourages a detailed collaborative approach towards network security, decentralization, and efficiency, thereby strengthening the network's resilience and encouraging active community involvement, further reinforcing Polkadot's decentralized ethos.

3. Problem Statement: NPoS Complexity

The complexity of the NPoS system in Polkadot along with a lack of easy-to-use nominator tools can lead to several concerns:

1. **Complex Incentive Structure:** The nuanced reward system is complex for nominators to manage independently to keep it adequate and profitable.
2. **Decentralization Education Dilemma:** Since there is no central entity responsible for providing a 'to-do right now' list, nominators are limited in their ability to find the best strategies or discover potential mistakes.

3. **Nominator Demotivation and Apathy:** Inadvertent errors (such as miscalculating stakes or selecting inappropriate validators) can lead to an immediate halt in rewards. Furthermore, nominators may not discover these errors right away and may struggle to find a quick solution, which can result in demotivation in case of losing rewards periodically.

As a result, the mechanisms intended to guide nominator behavior economically do not function as intended. In the envisioned Polkadot model, nominators competing for higher rewards should progressively increase personal stakes and make better validator set, leading to:

1. Improved Validator Selection.
2. A more diverse pool of validators and increased community-based competition, diminishing centralization.
3. An elevated amount of network staked tokens.
4. Enhanced network economic security.

Importantly, the growth of staking by individual nominators leads to increased profits for individual validators. Thus, developing an effective mechanism would allow validators to earn more.

In the next chapter, we will validate the accuracy of our hypotheses.

4. Research of Incentives and Nominator Behavior

Motivation stands as a keystone in any incentivized system, as is the case with blockchain technology. This research explores the behaviors exhibited by nominators and validators concerning rewards and the subsequent repercussions on the overarching network dynamics. The primary objective is to ascertain the efficacy of incentivization mechanisms and how they wield influence over user actions.

4.1. Hypotheses of the Study

Based on Previous Conclusions (Problem Statement Part):

1. Nominators' behavior appears to be inefficient in terms of their role in the system.
2. Nominators interact with incentive mechanisms inefficiently, leading to increased complexity in achieving the system's objectives.
3. The system offers a pathway for nominators to acquire rewards, and a nonzero count of nominators successfully secures rewards.
4. Nominators who obtain rewards tend to display more compliant behavior within the system, proactively adhering to the rules.

From points 3 and 4, it can be inferred that if there are such successful nominators, their behaviors can serve as examples. Importantly, this self-education approach adheres to decentralization principles, as no recommendations or directives are imposed; rather, it promotes true decentralization over centralization.

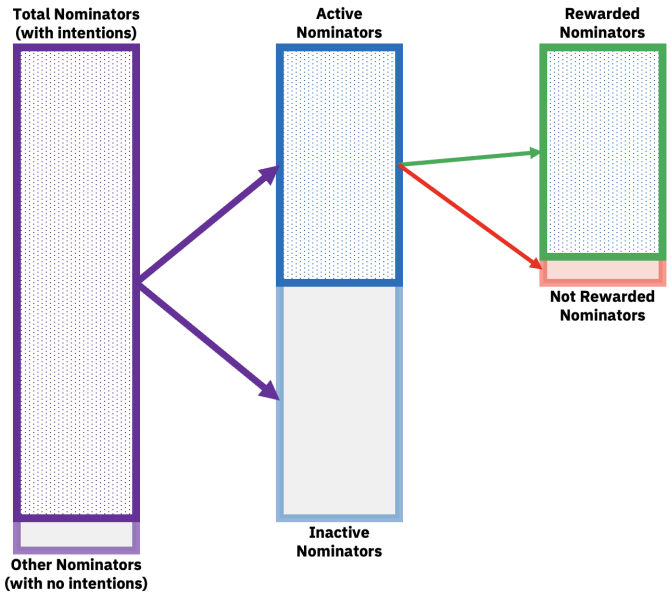
4.2. Methodology

To address the earlier hypotheses, our research methodology encompassed a complex analysis of the on-chain events involving users with stakes. We primarily investigated the distribution of rewards and non-distribution (disincentivization) among nominators and validators, as well as events related to the growth of staked assets. Additionally, we delved into the dynamics of nominators' interactions with validators, mainly focusing on the active switching of validators, particularly emphasizing how this behavior responds to reward variations. We employed statistical learning methods to support our findings. It's important to note that this report presents only the conclusions drawn from our research, omitting the exhaustive overview of tools and the complete array of conducted analyses.

4.3. Staking Terminology

Source: Polkadot+Kusama Staking Update: February 2022 by Kian Paimani and Zeke Mostov from Parity Technologies, staking dashboard, Polkadot wiki.

1. **Nominator types:** We utilize three main stages for nominators, namely "intention/others", "active/inactive", and "rewarded/not rewarded".



Graph 1: Nominator types in details

1.1. **Total Nominators:** an account that has expressed the intention to nominate (an account that has at least bonded tokens).

1.1.1. **Active Nominator:** a nominator who came out of the NPoS election algorithm backing an active validator, sharing their slashes and potentially rewards.

1.1.1.1. **Rewarded Nominator:** active nominators who emerge as winners in competition with other nominators at the end of the era, able to receive rewards.

1.1.1.2. **Not Rewarded Nominator:** Active nominators who do not win in competition with other nominators at the end of the era, and thus are not eligible for rewards

1.1.2. **Inactive Nominator:** nominators from the total list who do not emerge from the NPoS election algorithm to support an active validator and will not be eligible for rewards.

1.2. **Other Nominators:** these are various nominator types, including cases like "chilled" nominators who express the intention to unbond their tokens, as well as more specific corner cases that fall outside the scope of our discussion.

2. For nominator counts:

2.1. **Count of Total Nominators** (nominator intentions) and the maximum possible nominator intentions (TOTAL).
2.2. **Count of Active Nominators** and the maximum possible active nominators.

3. For nominator stakes:
   3.1. **Min-intention-threshold:** the minimum stake required to declare the intention to nominate. This is a strict threshold set by the chain protocol.
   3.2. **Min-active:** the minimum stake among the active nominators.
   3.3. **Min-reward:** the minimum stake among the active nominators to have a chance to win rewards.
4. For nominator size:
   4.1. **Large nominator**: Accounts with a size exceeding 10,000 DOT (0.0007% of the current supply). These can be referred to as Whales or Dolphins.
   4.2. **Regular nominator**: Accounts with up to 10,000 DOT. These can be referred to as ordinary or normie accounts.
5. **Nomination Pools:** A tool for individual stakers to receive rewards with stakes from 1 DOT. A nomination pool acts as a nominator and nominates validators on behalf of its members. These pools are "built" on top of NPoS to offer a very accessible entry point to staking without compromising Polkadot's rigorous security model.
6. **Era:** An era is a 24-hour period during which an active set of validators produces blocks and performs other actions on the chain.
7. **Staking Rewards:** Validators who produce a block receive tokens as rewards, which they can share with their nominators. Both validators and nominators can stake their tokens on-chain and receive staking rewards at the end of each era.
8. **Chilling:** Chilling refers to stepping back from any nominating or validating activity. Validators or nominators can perform this action at any time, and its effects are visible in the subsequent era.
9. **Disincentivize:** stop proving rewards after meeting some conditions.

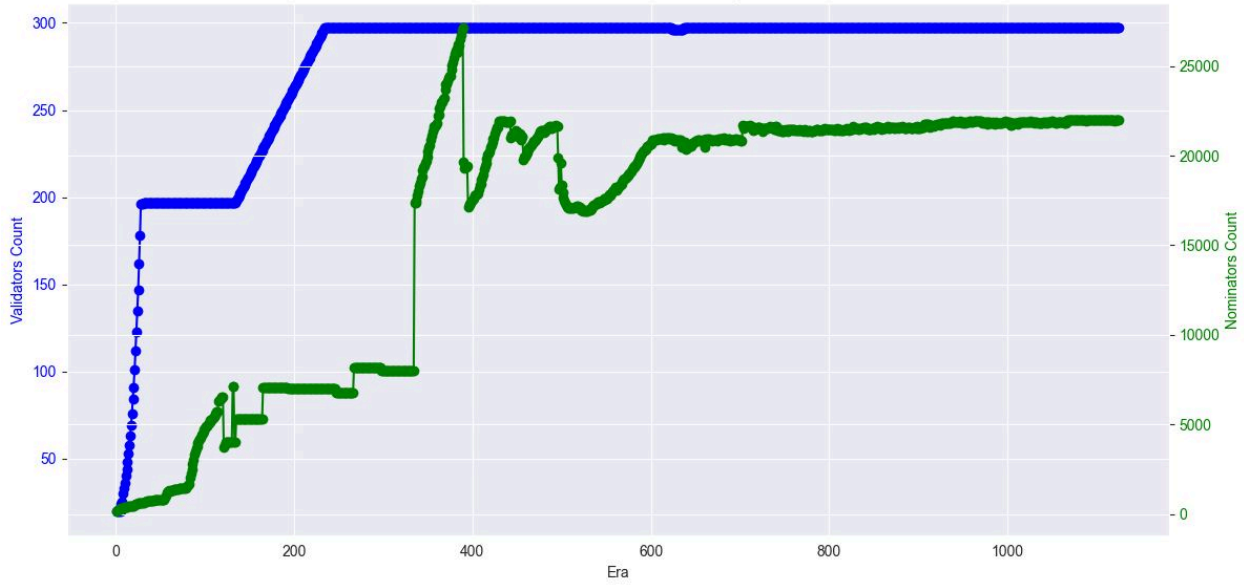
4.4. Data Source

For the research, we drew from static on-chain data provided by the SubSquid (with appreciation extended to the SubSquid team and the supportive Polkadot community).

Utilizing a pre-collected database encompassing the most prevalent user-associated events across various eras, we embarked on this analysis. Admittedly, this dataset is not exhaustive as it can be, and the complete on-chain data would be ideal for unveiling all possible correlations. We see the need to obtain data directly from Substrate to achieve a much more comprehensive understanding of behavior and triggers of various events. This entails using specialized data indexing, which should be integrated into the project's framework. Nonetheless, the data at our disposal enables us to discern primary correlations and identify foundational patterns to address our inquiries.

4.5. Validation of the Dataset

We employed a formal criterion to validate the dataset - the count of active nominators and validators across different eras.



Graph 2: Dynamics of Active Validators and Active Nominators Based on the Existing Database.

This graph illustrates the dynamics of active validators and nominators. It facilitates the tracking of significant network development stages:

1. The initial cap of validators at 197 and its controlled expansion to 274 (Polkadot 2020 Roundup by Gavin Wood)

2. The notable WASM nominator crash. [(A Polkadot Postmortem by Bastian Köcher)]
3. Plateauing of active nominators in later eras, eventually stabilizing near the targeted limit of active nominators.[(https://wiki.polkadot.network/)]

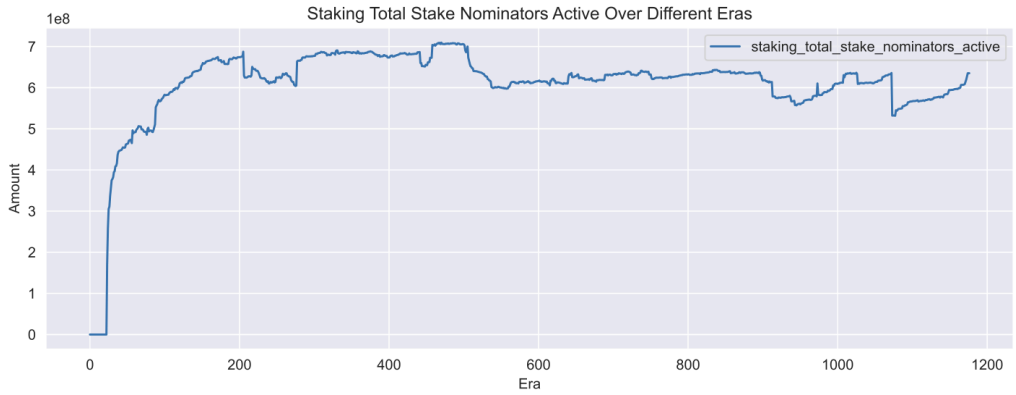
Thus, we can assert that the dataset is validated for the purpose of our study.

4.6. Behavior of Total Staked Assets

Observing that the number of active validators and nominators has remained fairly constant, it's essential to note that this count doesn't consider the quantum of bonded assets, which forms the bedrock of network stability and incentivization targets.

The system's design encompasses the locking of a substantial portion of funds. Validators and nominators amplify their personal stakes (bonds), which in turn yields rewards. The NPoS system encourages validators not only to obtain rewards from their own assets but also through effective collaboration with nominators. Similarly, nominators are incentivized by competitive stakes, successful validator choices, and other factors.

Drawing from the available data, we can investigate the behavior of the overall staking amount. This value should ideally align with system mechanisms, reflecting existing growth over time (More info here: https://wiki.polkadot.network/docs/learn-staking-advanced and https://research.web3.foundation/Polkadot/overview/token-economics)



Graph 3: Dynamics of Total Stake of Active Nominators (Scale Adjusted for Compact Display), Scale: 100MDOT

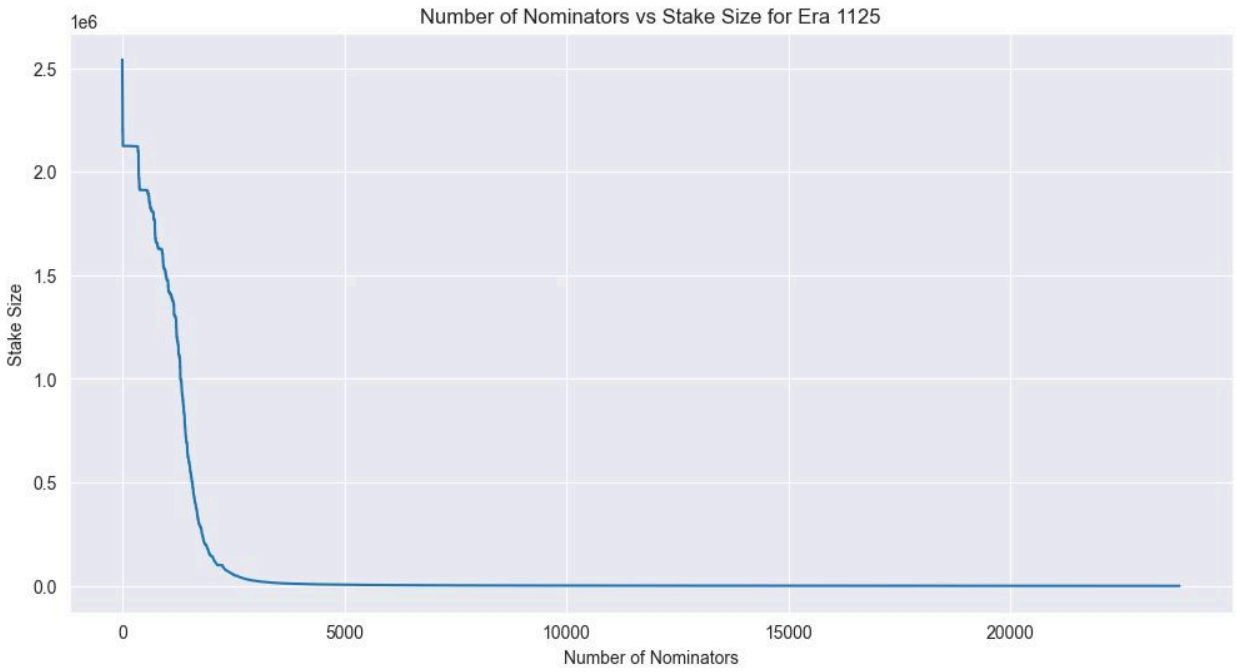
The graph shows various anomalous drops, especially around the 500th era. This decrease in staking could potentially be linked to the initial and substantial parachain auctions. However, further investigation is required to confirm this.

Given that the validator stake is relatively small compared to nominators (0.3% at the time of this research, according to subscan.io), we will focus on studying the behavior of active nominators and their stakes.

4.7. Active Nominator Bonds Distribution across era

In scenarios with a fixed number of active nominations and a relatively low percentage of validators, the combined stake of active nominators becomes the primary source for absorbing additional funds. The nominators' pool behaves as individual nominators themselves, and we will delve into their impact in subsequent sections.

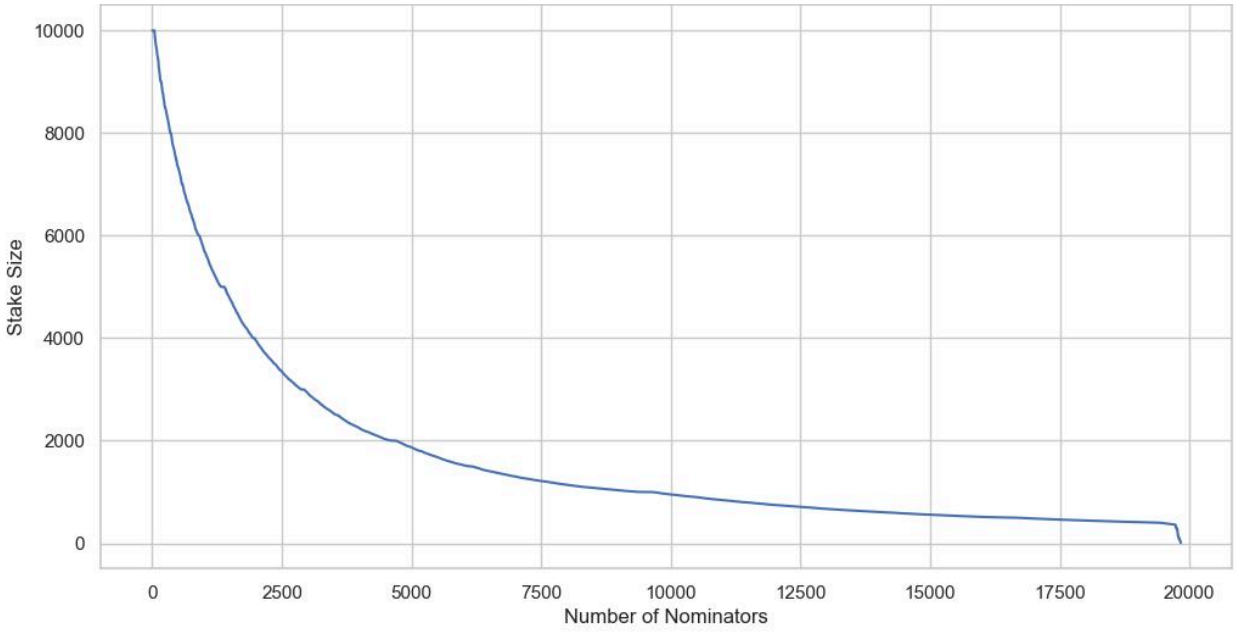
In our database, we focused on the period up to era 1125 and studied individual stakes. This included all active nominators participating in this era, with stake sizes measured in MDOT.



Graph 4: Stake size dispersion across active nominators (MDOT).

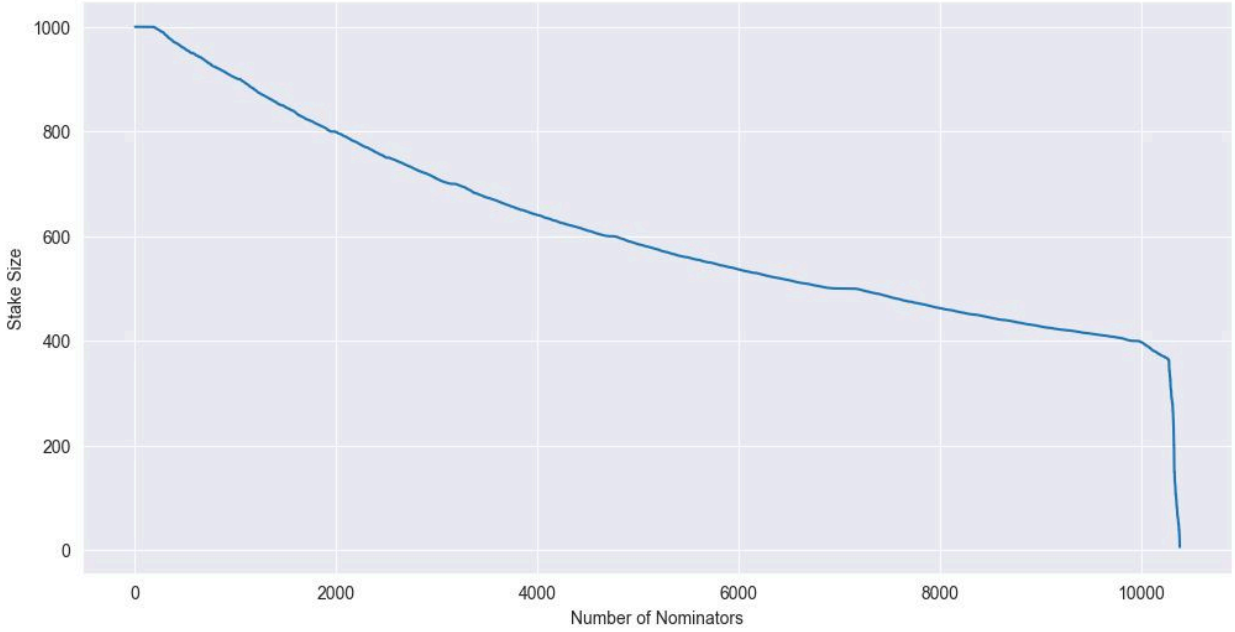
As seen, the liquidity of active nominators is highly concentrated. This concentration could result from self-nomination by large holders, nominations from centralized exchanges (CEXs), technical addresses, funds, etc. Further investigation beyond the scope of this research is needed to delve into this phenomenon.

For a clearer graphical representation and further research, we can limit the analysis to Active nominators with stakes below 10,000 DOT.



Graph 5: Stake size dispersion across nominators (DOT) for nominators with stake size under 10 000 DOT

And for stakes up to 1000 DOT.



Graph 6: Stake size dispersion across nominators (DOT) for nominators with stake size under 1 000 DOT

The graphs illustrate that, during this era, over 10,000 active nominator addresses have bonded stakes under 1000 DOT.

4.8. Nominators during Liquidity Absorption: Distribution of Liquidity within the Active Set

As the system continues to maintain the ideal stake above the existing total stake, it anticipates a continued accumulation of liquidity within the nominator set (as key agents). However, stake accumulation within the nominator system can vary.

There are three primary methods of absorbing liquidity:

1. **Large Nominators (Centralization Extremum) - "Whales":** In the absolute case of this scenario, liquidity is accumulated by the largest players, significantly surpassing the min-reward. In such a situation, competition among nominators remains almost unchanged, and the min-reward is subject to minimal influence.
2. **Regular Accounts (Decentralization Extremum) - "Normies":** In the absolute case of this scenario, liquidity is accumulated evenly across all accounts, leading to increased competition among accounts near the min-reward. In this case, competition among nominators significantly intensifies.
3. **A Combination of Both.**

Absorption through Regular accounts (or with a higher weight in a mixed scenario) is more desirable as it promotes ecosystem decentralization and security. It's crucial to highlight that a decentralized scenario (or one leaning towards it) will impact a significant number of nominators, as it will raise the min-reward above their current stake.

For instance, an increase of 500 DOT from the current stake (personal stake 1000+ DOTs per active nominator, but the actual stake should be higher) will impact 10,000 nominators from the active stake. An increase of 1500 DOT will affect approximately 15,000 nominators from the active set. It's essential to recognize that the number of nominators (who should augment their stake) will slightly exceed the active set due to competition and non-zero inactive nominators competing (or dropping out) within the active set.

The influx of liquidity can occur evolutionarily (as noted, over the last 400 eras, the min-reward has more than doubled) or as a result of stake overflow from assets released post-crowdloans (with 100M DOT locked in leases 6-13 and ~40M in 7-14. source).

Our dataset allows for retrospective examination of current behavior during total stake changes: identifying the agents of its absorption. We will compute the potential burden this would place on the system, which can be viewed as the expected maximum growth of personal stakes.

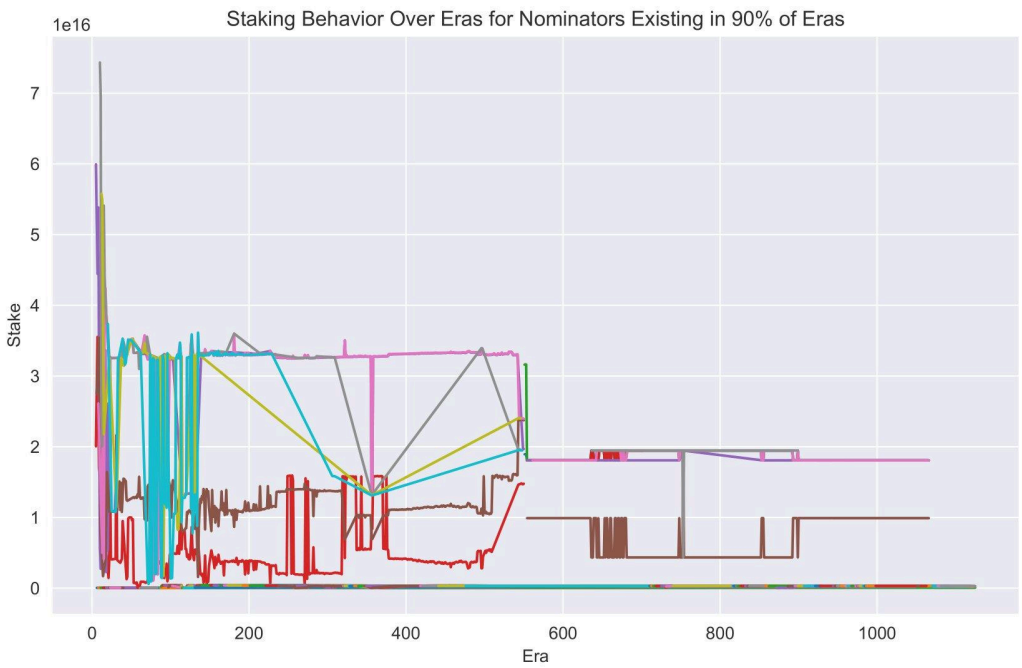
Next Steps in Research:

1. To estimate the impact of the stake growth and min-reward impact, we need to assess the potential system centralization caused by the growth (which might concentrate liquidity).
2. Investigate the feasibility of this based on the current behavior of nominators. Even a 500 DOT stake increase could prompt over 10,000 nominators to raise their stakes.
3. Proceed to analyze the behavior of individual stakes.

This will allow us to forecast the efficiency and achievability of stake growth.

4.9. Large Nominators Personal Stake Size Over Time Analysis and Potential Capacity.

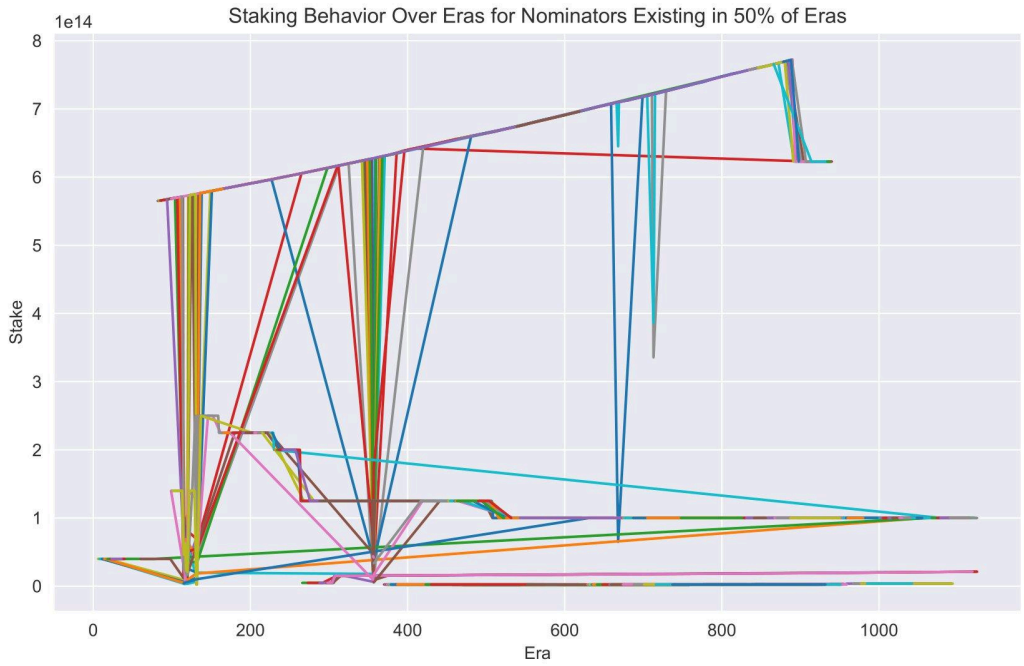
Our findings indicate that the stakes of active nominators are highly concentrated. Let's analyze how these large accounts behave over time. For our analysis, we are particularly interested in accounts that are committed to long-term engagement with the network and are willing to absorb a substantial amount of DOT tokens. To identify these accounts, we will focus on the largest ones with long-term bond



Graph 7: Behavior of Personal Stakes of Active Nominators Across Maximum Eras in the Database (Present in Over 90% of Eras).

This graph showcases participants with largest nominations with this timeframe that rarely increase their stakes. These might be technical addresses (exchanges, Parity addresses, etc.).
This graph also demands additional data. Nonetheless, it indicates that many nominators that increase their stakes are not prominently visible.

Next, we research Large accounts near 10 000 DOT (make details 100x) and make wider range of stability in the ecosystem



Graph 8: Behavior of Personal Stakes of Large Active Nominators Across Maximum Eras in the Database (Present in Over 50% of Eras).

Notably, a significant portion of these addresses drop around the FTX crash. Further research is required to conclude from this graph.

These data points can potentially provide answers regarding the utilization of stakes by these larger nominators after the initial and most significant crowdloan auctions (around era 500). It's possible that only a portion of these stakes will be associated with and returned to the accounts.

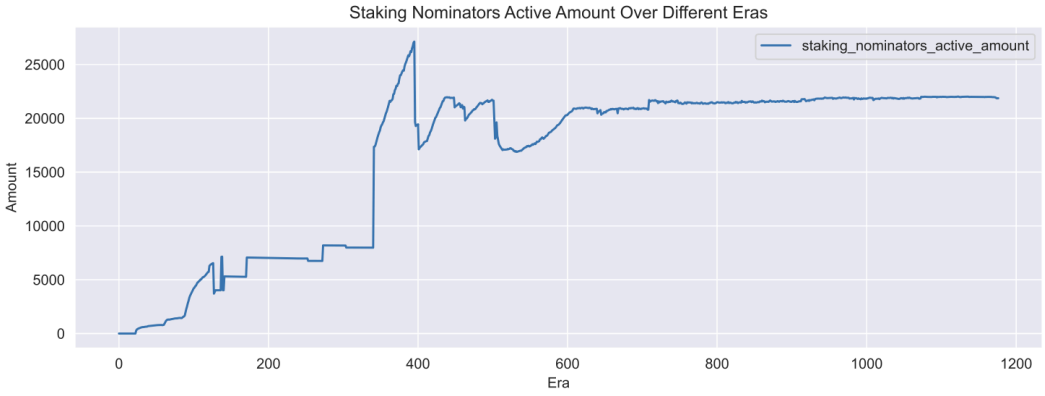
Moreover, among these large accounts, we do not observe a clear trend of accumulating stakes. This requires further research, but at first glance, the potential for overall stake growth through existing whales does not seem to be the most likely scenario. Exploring this issue in-depth, utilizing asset price, account clusters, and crowdloan information, can uncover implicit correlations.

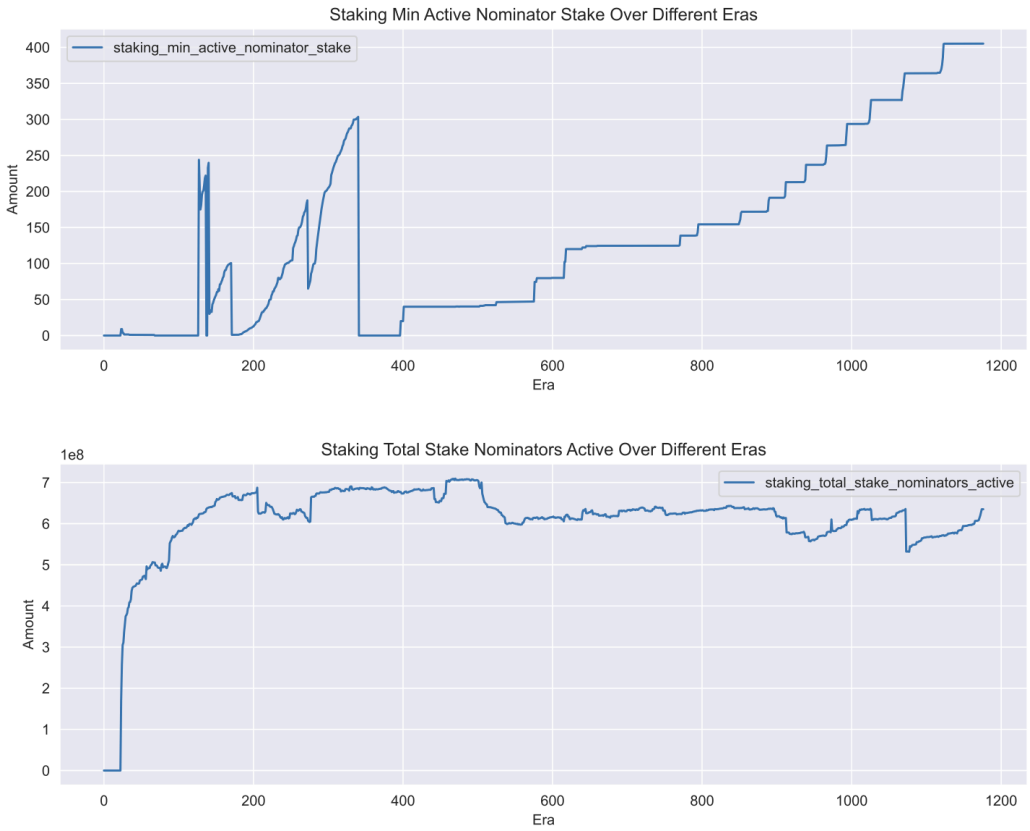
Hence, it is essential to research the realm of Regular nominator accounts and their behavior.

4.10. Regular Nominantor Absorption Dependency on Minimum Stake research

Let's examine the behavior of Regular accounts in case of the increase in liquidity within the system. Within the nominator incentivization system, there are two predictable "minimum nomination" levels. In this chapter, we will focus on the "min-reward" level, which provides an opportunity for active nominators to win rewards. This rigid mechanism is widely used in various communications and websites and should directly influence and drive an increase in individual nomination bonds , ultimately impacting the overall staking activity.

To assess this, we will compare three graphs: the count of active nominators, the total active stake size (bonds), and the Min-reward size, all plotted on the same horizontal scale from the 0th to the 1171st era.





Graph 9: Count of Nominators, Total Active Stake Size, and Minimum Nomination Size.

From this graph, we observe that the dependency on the Min-reward does not necessarily affect the overall stake size, which is somewhat puzzling. The distribution of active nominators based on stake size suggests that there is competition for rewards in the active set, and the increase in Min-reward should affect this competition (via disincentivization). This analysis excludes inactive nominators.

To better understand the outcomes of Min-reward growth, let's examine active nominator behavior during disincentivization.

4.11. Regular Nominator Behavior upon Disincentivization

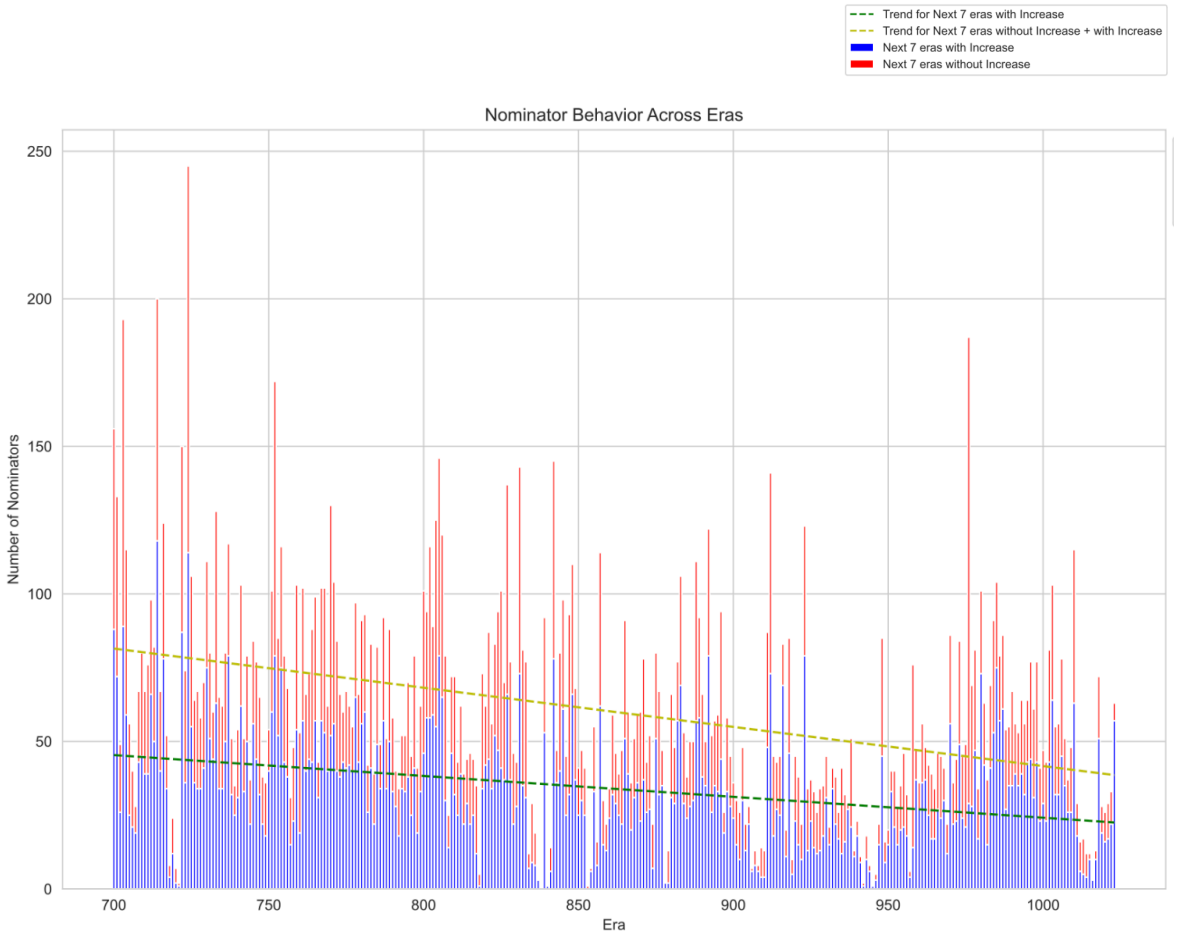
One of the target actions is the disincentivization of an active nominator, meaning they do not receive rewards. The primary reasons for this are either failing to be in the active set or having a stake smaller than competitive thresholds during reward distribution.

As the system grows, these events are likely to occur more frequently. Consequently, disincentivization can lead to several possible courses of action:

1. The user tries to resolve the issue by taking actions (changing validators, increasing their stake, etc.).
2. The user exits the system and ceases to be a nominator.
3. The user takes no action.

To study this, we focus on a relatively clean dataset: from era 700 to 1125, observing user behavior following disincentivization. Our database contains information specific to an era concerning an active nominator but lacks information about their activities in eras when they are inactive. Therefore, we can track only certain actions. For example, we can see that an active nominator received a reward, was then disincentivized, and after 5 eras, re-entered the active set and received a reward. We can track changes in their stake but cannot know how many times they increased it or changed their validator set (and how many times they did it). This information is still relevant and can be used in subsequent research with different data sources. Nevertheless, this database effectively describes successful nominators and how they achieve success by entering the active set and receiving rewards.

4.12. Impact of Disincentivization on Active Nominators Who Swiftly Rejoin the Active Set (Within 7 Eras)



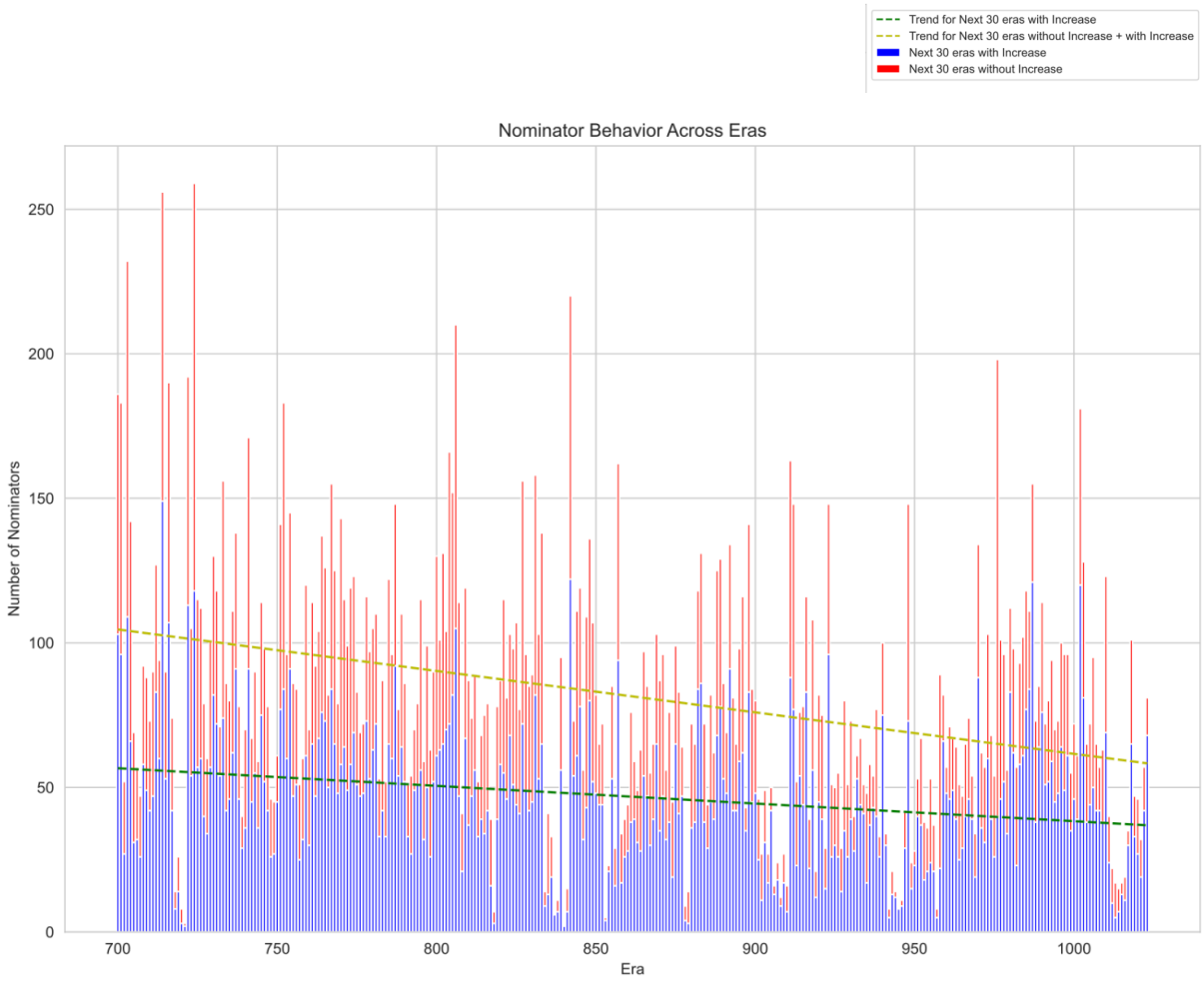
Graph 10: Active Nominators Who Rejoin the Active Set Within 7 Eras in numbers and trends (with or without bond increase)

Here and later we distinguish between two types of returns: those involving an increase in stake and those without it. We observe that many inactive nominators increase their stakes to re-enter the active set. It's worth noting that this trend is gradually decreasing. This may be linked to frequent stake adjustments becoming somewhat burdensome for inactive nominators, prompting them to explore other actions.

Users who return without changing their stake may have either changed their validator set or taken no action to re-enter the active nominator set.

4.13. Impact of Disincentivization on Active Nominators Who Rejoin the Active Set (Within 30 Eras)

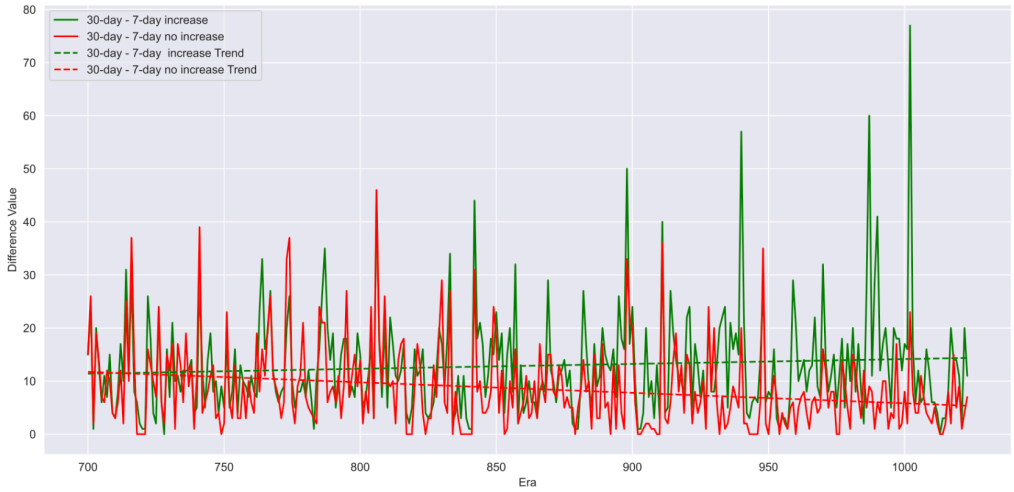
This dataset includes data for 7 eras.



Graph 11: Active Nominators Who Rejoin the Active Set Within 7 Eras in numbers and trends (with or without bond increase)

On this graph, the trend of returns is generally lower.

We can compare the 30-day and 7-day graphs for returns with and without an increase in stake.

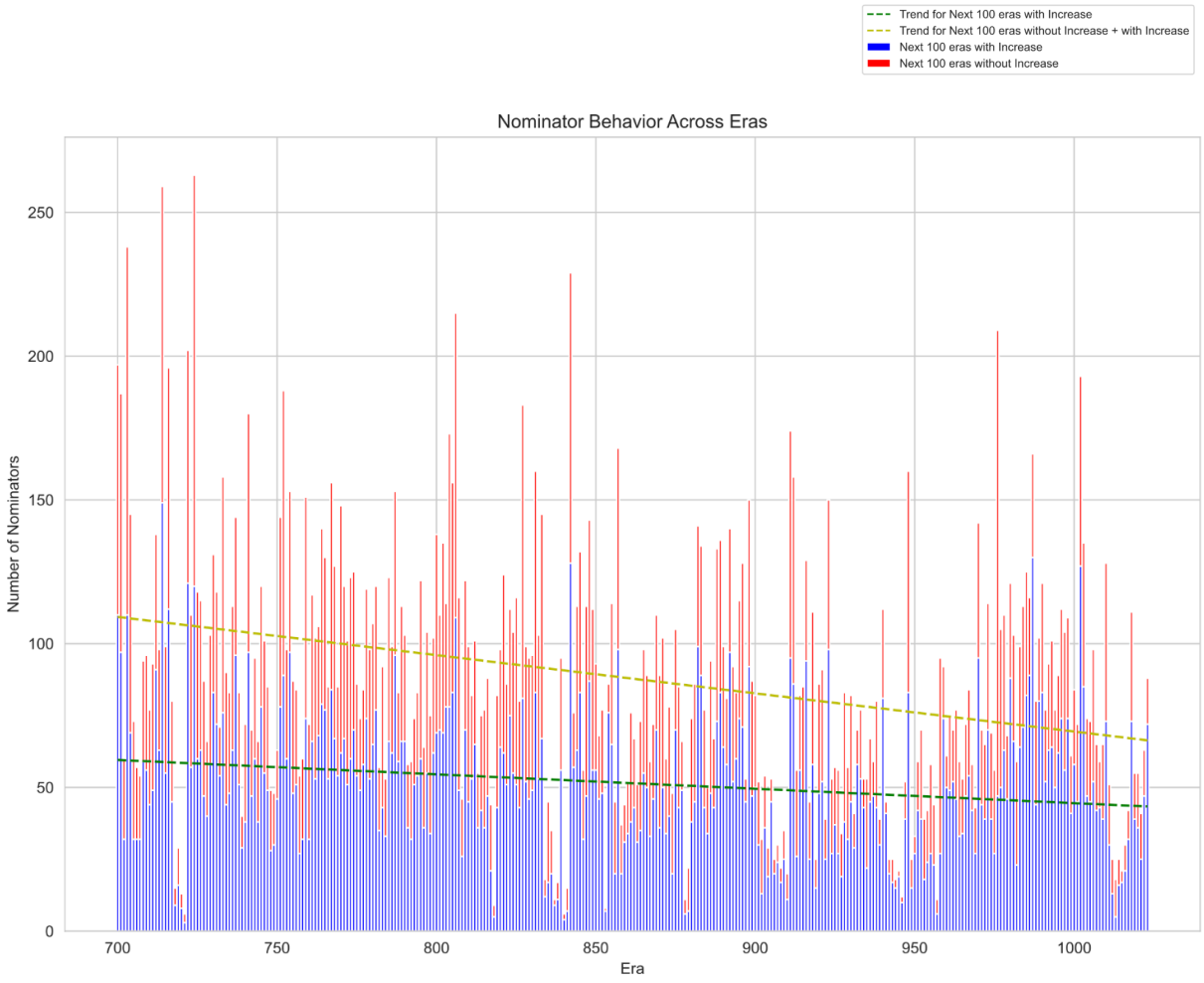


Graph 12: Difference between Active Nominators Who Rejoin the Active Set Within 30 and 7 Eras in numbers and trends (with or without bond increase)

This graph shows that changes in returns in eras without an increase in stake are decreasing, while those with an increase are on the rise. This could be related to some 'resilience' among inactive nominators that gradually diminishes with higher returns.

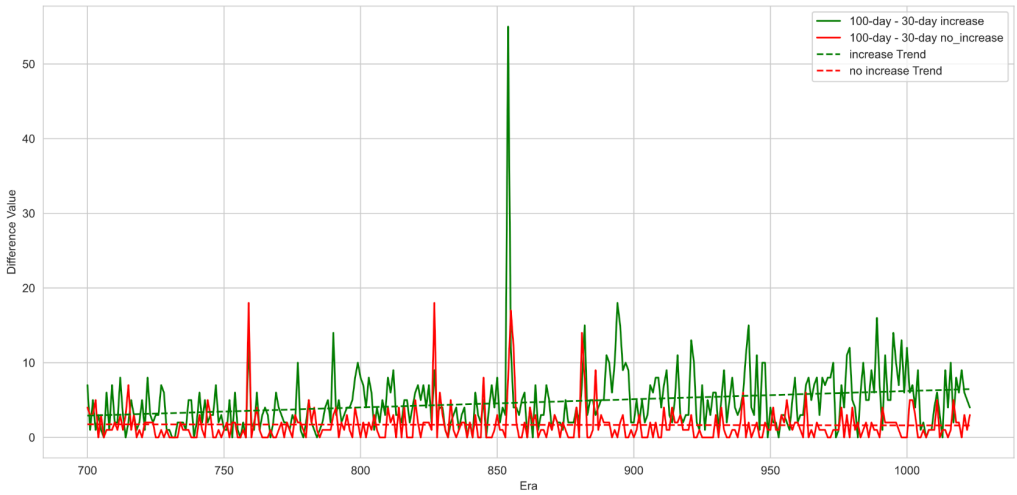
4.14. Impact of Disincentivization on Active Nominators Who Slowly Rejoin the Active Set (Within 100 Eras)

This dataset includes data for 30 days and 7 days.



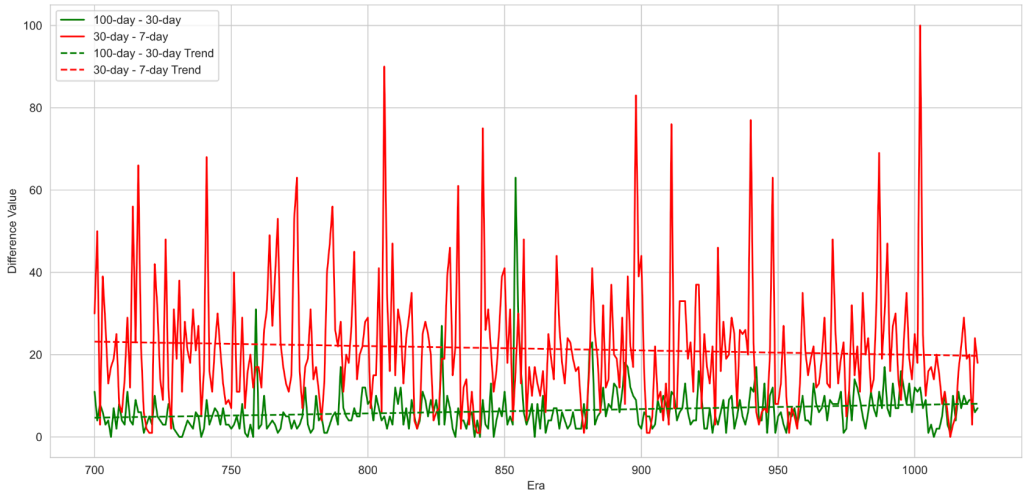
Graph 13: Active Nominators Who Rejoin the Active Set Within 7 Eras in numbers and trends (with or without bond increase)

This graph is less informative, so let's compare it with the 30-day graph and analyze the relative differences.



Graph 14: Difference between Active Nominators Who Rejoin the Active Set Within 100 and 30 Eras in numbers and trends (with or without bond increase)

We also see that towards the end of the period, there's an increase in returns after an increase in stake. The anomaly in the middle can be investigated separately, but it doesn't stand out significantly when we compare the differences between 100-30 and 30-7 days.

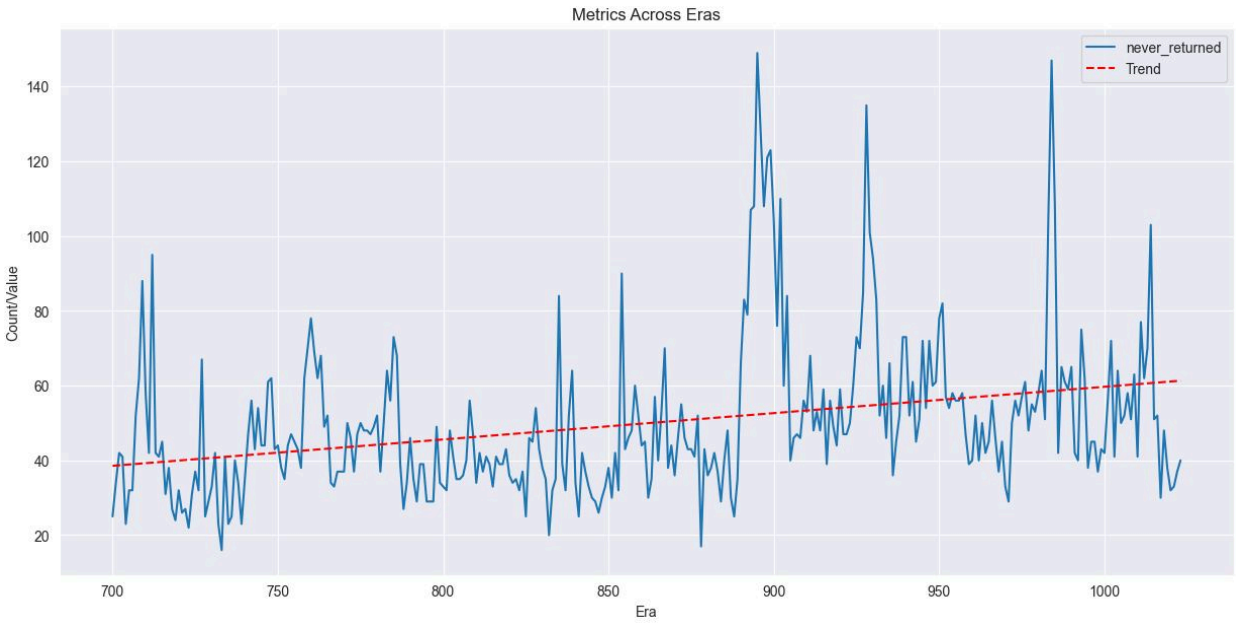


Graph 15: Difference between Active Nominators Who Rejoin the Active Set Within 100 and 30/ 30 and 7 Eras in numbers and trends (total)

We see significant potential for researching correlations in the future with resource prices and events related to raising the minimum stake, in order to gain a deeper understanding of inactive nominators' behavior.

4.15. Impact of Disincentivization on Active Nominators Who Never Rejoin the Active Set (100+ Eras)

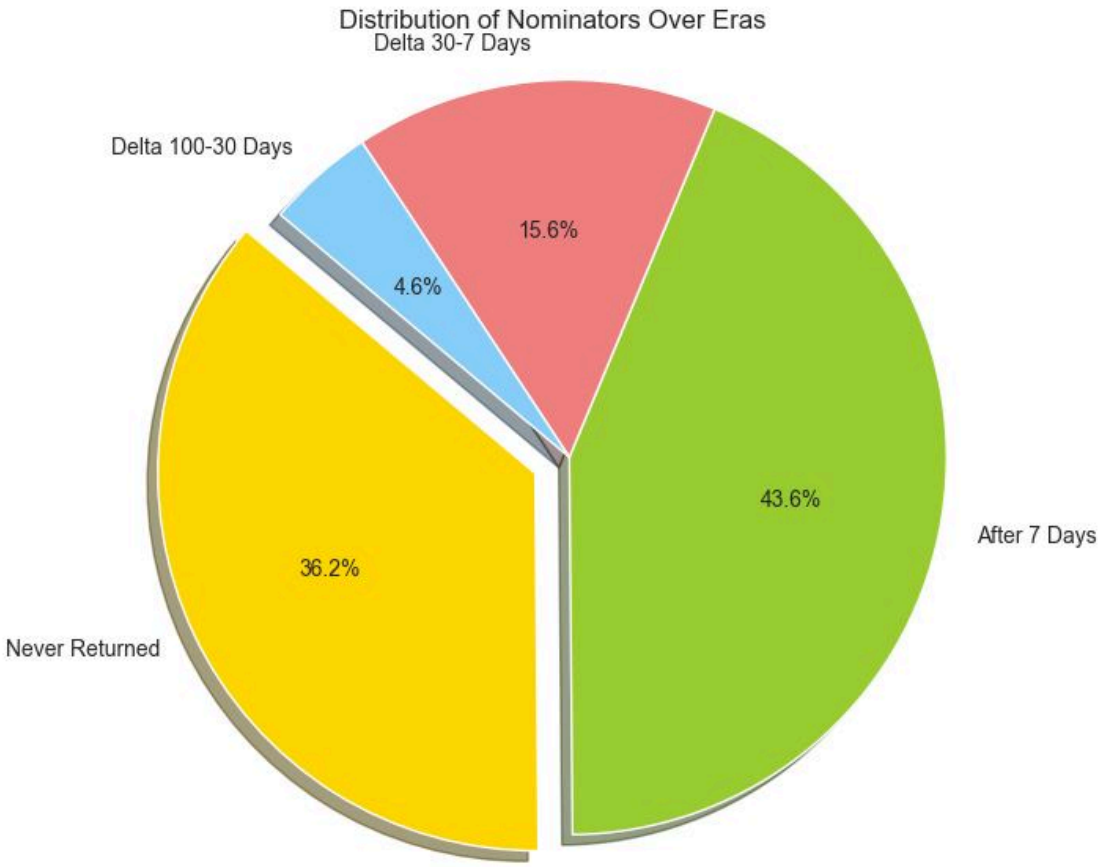
We will use a rolling window of 125, indicating that after disincentivization, the user does not re-enter the active set anymore. We cannot tell if they withdrew their tokens, moved to nominator pools, or attempted to change their validators. In this section, we examine the fact of not re-entering the active set.



Graph 16: Nominators Who Never Rejoin the Active Set (125+ eras rolling window)

As we can see, the cohorts are significant. In each era, more than 50 nominators (median) are completely removed from the system.

Thus, if we look at the average statistics for the period from era 700 to 1125, after a nominator experiences disincentivization, statistically, the following process occurs:



Graph 17: Disincentivization outcome: Active Nominators Who Rejoin the Active Set Within 7, within 30 (without 7), within 100 (without 30 and 7) Eras in % and never returned in active set.

4.16. Behavior of Users Who Have Stopped being Active Nominators.

After exiting the active nomination process, there are three main directions within the system:

4.16.1. Abandoning their stake.

Regarding the "abandoning stake" option, the number of users who remain inactive is quite substantial. Staker Space (based on SubVT API by Helikon) makes research showing that around 19,600 addresses are currently bonded without rewards (This corresponds to about 2.8 million DOT, which is roughly 0.21% of the total issuance). This is a copy of the original file (25 aug 2023).

4.16.2. Withdrawing funds to a Centralized Exchange (CEX) for selling or staking there.

This option requires further on-chain investigation.

4.16.3. Withdrawing funds to a Nomination Pool.

This option is relatively new and potentially interesting for users. However, it comes with the challenge that users need to educate themselves about this new tool. Currently, there is less money in these pools compared to the funds in inactive validator accounts (less than 0.2% of the total DOT issuance). This tool also potentially requires a comprehensive guide for users and educational resources.

Additionally, options 2 and 3 involve a 28-day cooling-off period. This can be viewed negatively by users, even if they are aware of it, as one of the examples of such negative perceptions is growing (https://matrix.to/#/!FdCojkeGzZLSEoiecf:web3.foundation/$M_cXkXkVLKQv5aWpbV81nDdMDP68jo2oAxFi2louMiA?via=parity.io&via=corepaper.org&via=matrix.org)

Please note that churn for a user is a one-time process in one direction. The user does not re-enter this selection. If a user takes some action, disincentivization occurs again, and the user may re-enter the system or exit. Therefore, from a user behavior analysis perspective, the choice proportions are slightly different (the chances of returning are higher) for a user who gradually increases their stake. Here, we can build a series and calculate the percentage of similarity in next research.
For example, if we understand that an active nominator follows a pattern of increasing their stake by 500 DOT on their way to 5000 DOT, they will encounter this situation 90 times (if they will be incentivised only after missing rewards). From here, we can analyze

the convergence towards the probability of them exiting the system, and it surpasses the baseline of 36 percent. Therefore, the chances of a nominator, who has experienced disincentivization 90 times, rejoining the active set are lower than for a nominator who has never encountered this situation.

4.17. Nominators rotation in the Active Set Across the Last Eras

Since the system operates close to the Maximum Count of Active Nominators, when users drop out, others take their place. In this chapter we will research behavior of affected nominators.

Note that in this section, we are not examining the behavior of large accounts and are focusing on the behavior of regular (i.e., <10,000 DOT) nominators.

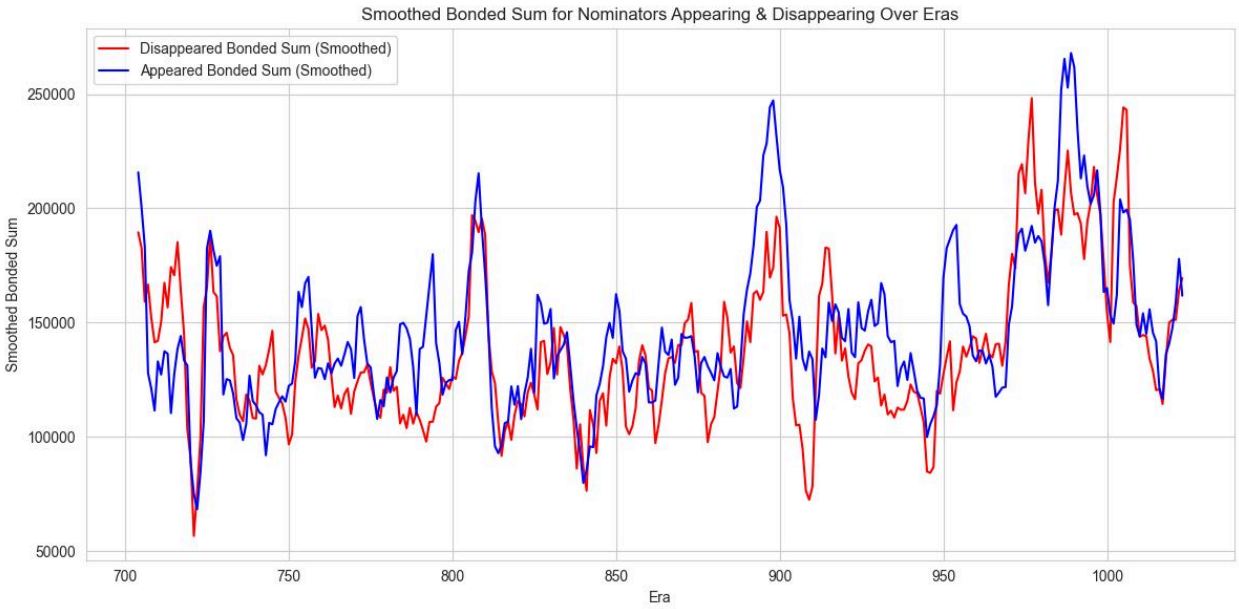
There are a few clusters of affected nominators:

1. Newcomers, in case of bringing fresh liquidity into the system (most likely from centralized exchanges and possibly with substantial volumes in one chunk).
2. Dropouts - experienced (more or less) users who have a stake in the ecosystem and have gone through the onboarding, but have stopped participating as nominators or have withdrawn their funds.
3. Disappeared Temporarily - they can be used to track the effectiveness of the system's disincentivization methods.
4. Re-Appeared - these accounts can be used to track the changes that brought them back into the active set (or the absence of changes).

Additionally - a group of those who disappeared from the active set (TOTAL Disappear = Dropouts + Disappeared Temporarily) and those who joined the active set (TOTAL Appear = Newcomers + Re-Appeared).

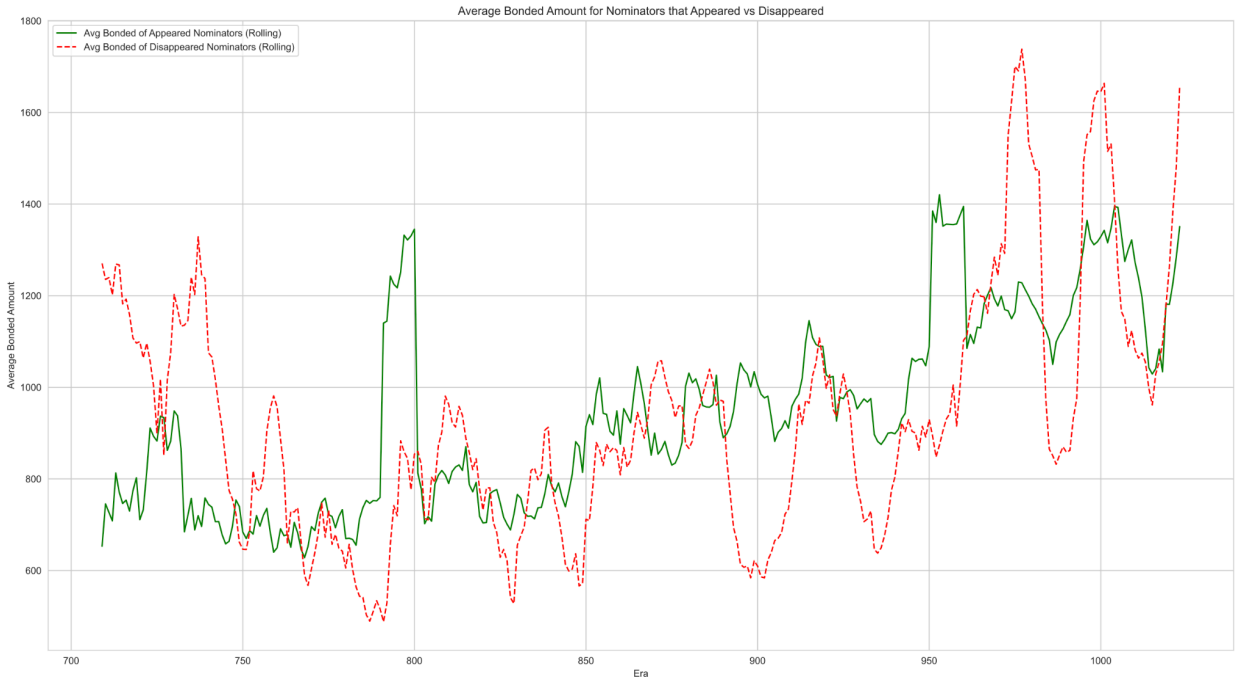
To examine this, we can assess changes in liquidity: the change in their total bond (among those who left the active set (TOTAL Disappear) and those who joined the

active set (TOTAL Appear)). The blue line represents the total bond of those who Appeared in the active set, while the red line represents those who left.



Graph 18: Per-era Cumulative Total of Bonded Accounts of Active Nominators Who Appeared and Disappeared in the Active Set. This graph shows the per-era dynamic (not era-to-era cumulative).

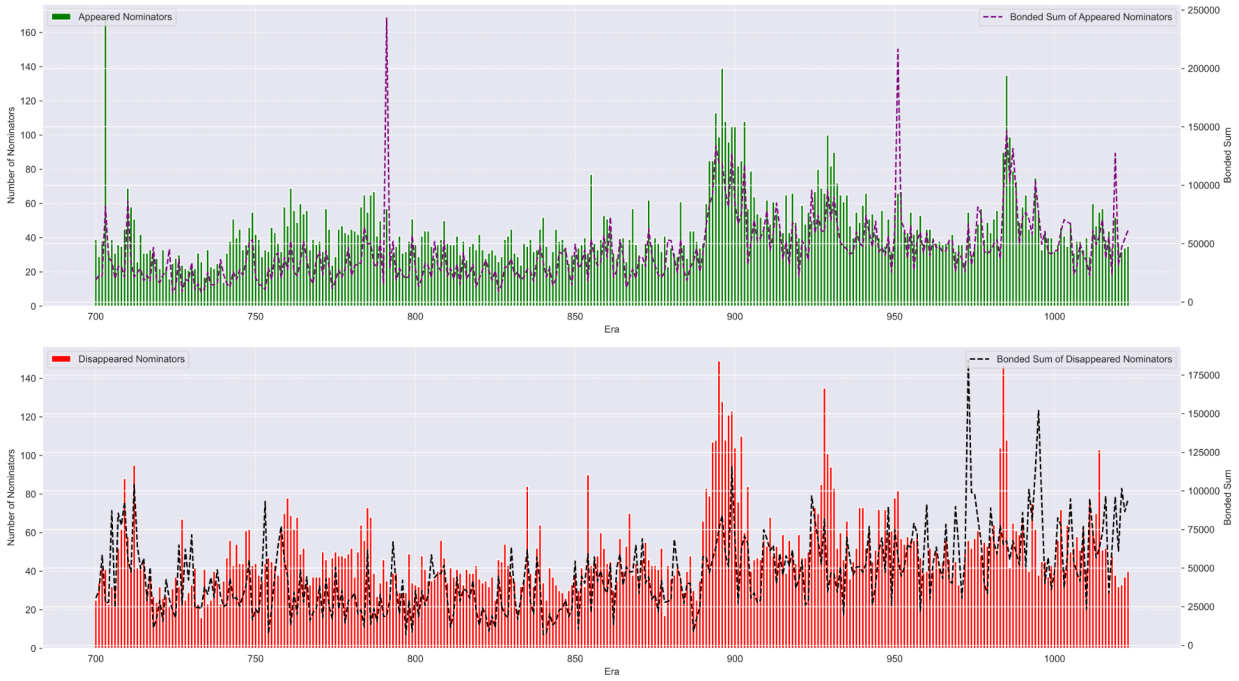
As evident from the graph, the blue line consistently surpasses the red line, indicating that the new active nominators bring more liquidity into the system. Take a look at the average size.



Graph 19: Average Bonded Account of Active Nominators Who Appeared and Disappeared in the Active Set. This graph shows the per-era dynamic, not cumulative.

This graph displays the average behavior of those who left and those who joined per era. It is particularly interesting as it shows that users leave the active set (red line) not solely because of a stake size competition. Their cumulative stake might even be higher than that of those who replaced them.

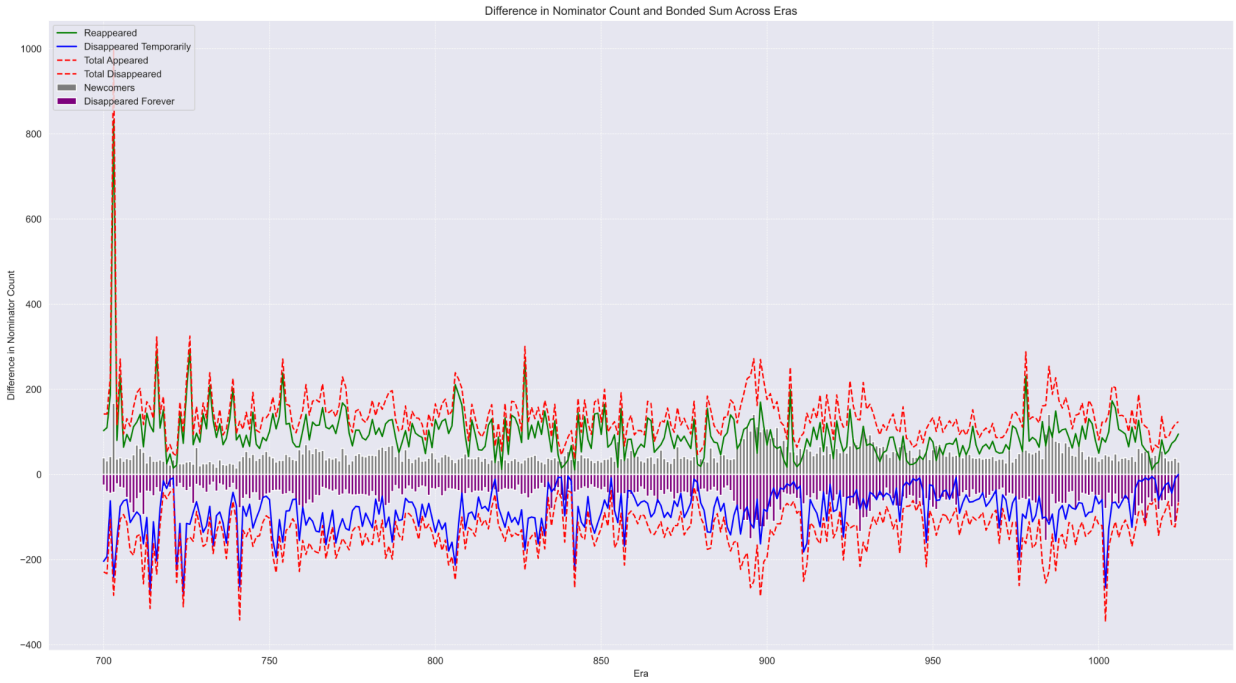
It's interesting to examine the number of users who exited the active set forever (dropout) and first-time active set stakers (newcomers to the active set).



Graph 20: Per-era cumulative Total of Bonded Accounts of Active Nominator Newcomers and dropouts (Overall) in the Active Set with Numbers of These Nominator Sets.

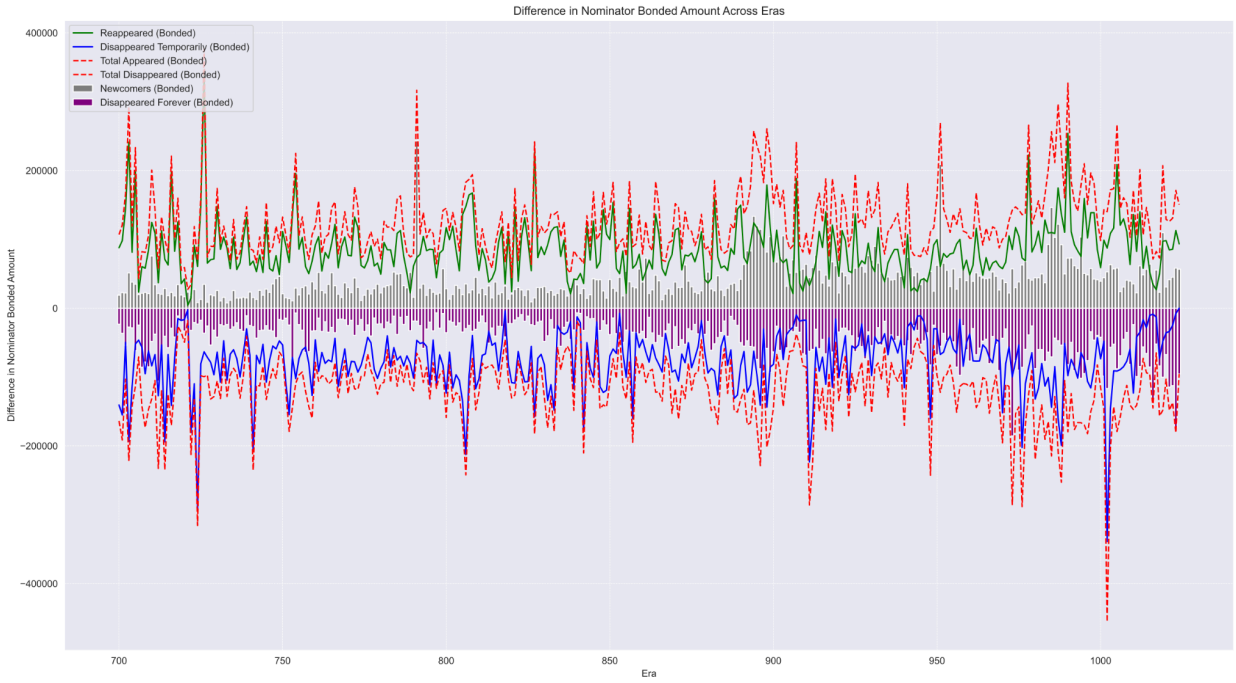
Now we can consolidate all this information together and analyze the dynamics of the number of users and their total bonded accounts era by era.

Analysis of the number of users: how many users in total exit the active set (total disappeared), how many of them exit completely (dropout), how many exit temporarily (temporary disappeared), how many newcomers join in total (total appeared), how many are (newcomers), how many of those who left (reappeared).



Graph 21: Detailed composition of incoming and outgoing addresses (unique addresses) in quantity.

We have also calculated the dynamics of the total liquidity they bring in and take out era by era (here, we use a smoothing over 10 eras) for a more illustrative demonstration of the processes.



Graph 22: Detailed composition of incoming and outgoing addresses (unique addresses) in total amount of bonds per group.

This graph requires additional research, primarily related to the capacity and mobility of user sources entering the active set (newcomers). Especially, the dependence on the size of the min-reward (entry ticket).

Additionally, not all newcomers are necessarily new individual users. These addresses could be considered as nominators, but it's more likely that they include multisigs, nominator pools, and other entities that would require separate research. Therefore, we recommend considering this as the most likely number of new users entering the nomination. Only nominator pools added 100 or more nominators to the active set.

4.18. Results of the active Regular nominators research

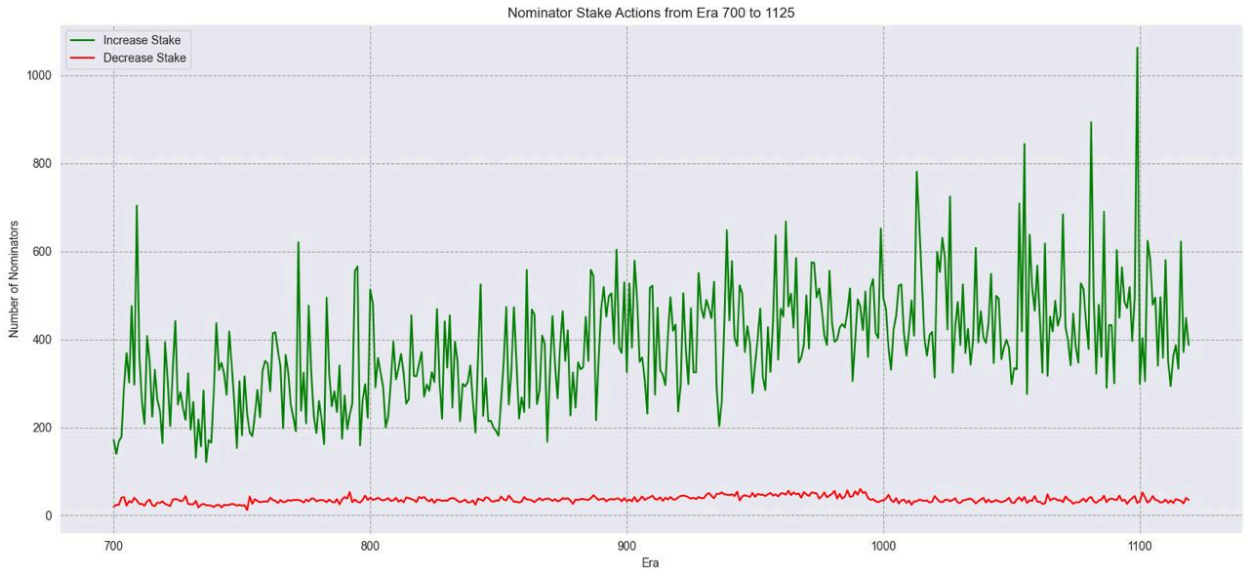
Results of the research on the impact of min-reward and disincentivization on Normies nominators:

1. The increase in min-reward does not significantly impact the overall stake, despite favorable conditions for it to do so.
2. The growth in min-reward leads to nominators dropping out of the active set, with a substantial number of them ceasing their participation in nominations. This dropout rate increases in tandem with min-reward.

A hypothesis that can be formulated from these findings is that the lack of a clear positive correlation between the increase in overall stake and min-reward is due to the inefficiency in the behavior of nominators. To explore this further, we can investigate whether there are nominators exhibiting the expected behavior, determine their quantity (if they exist), and analyze their behavior.

4.19. Study of Behavior Among Active Nominators Receiving Rewards

Used dataset allows us to extract information about the actions of nominators that they perform in the era when they receive rewards. This enables us to analyze the actions of nominators who are in the system and operate efficiently without being disincentivized.



Graph 23: Actions by Active Rewarded Nominators during active era

As we can see, there are a significant number of efficient nominators in the system who control it and likely have a strategy in place. However, if we compare the number of efficient nominators to the number of disincentivized nominators who made changes in their stakes around 50 per era, there are more successful nominators who increase their stakes by 500+ per era. It's worth noting, though, that their growth seems to be reaching a saturation point based on the trend.

Thus, we can conclude that there are nominators in the system with anticipated behaviors who receive the expected incentivization. However, their number is currently statistically insignificant to exert a noticeable influence. This is a preliminary assessment, and for a more comprehensive analysis, a specific database with a larger number of samples is required.

4.20. How Stake Growth Linked to Rewards in the best nominations case

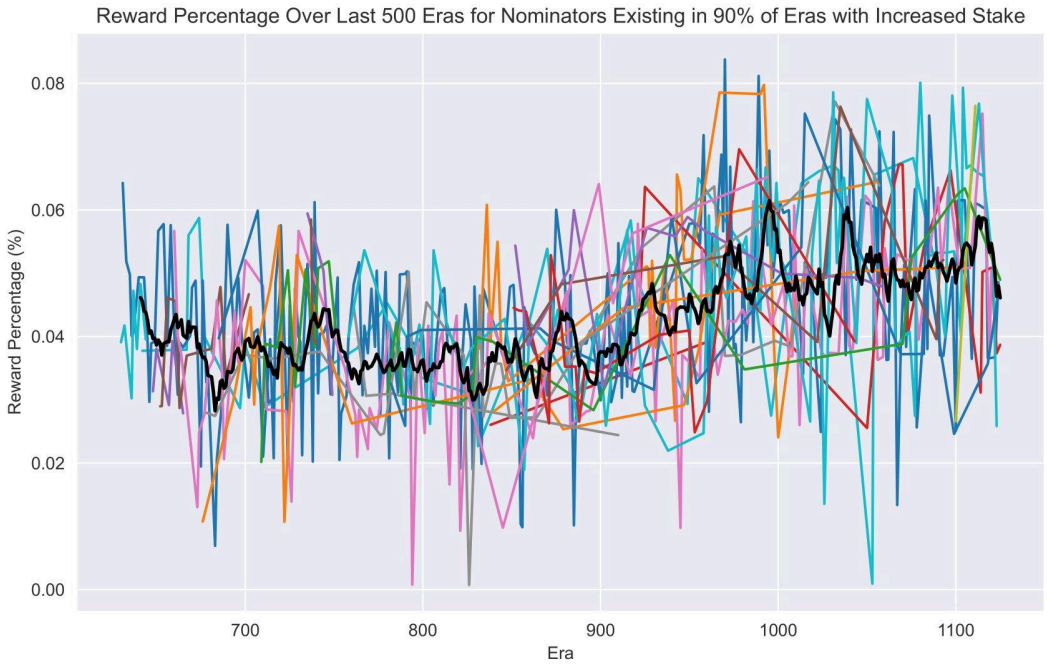
Let's examine whether nominators who receive rewards are increasing their stakes and whether there's a pattern in rewards.

The analysis will focus on a same subsample of the last 500 eras, identifying the most consistent active nominators (present in 90% of these 500 eras) who increased their stakes at least once. This graph excludes Large nominator addresses that appeared in and might have technical origins.

Graph 24: Behavior of Successful Nominators in the Last 500 Eras, Present in 90% of Eras.

We can observe that these nominators actively increase their stakes, with rapid growth (faster than min-reward).

Also examine the rewards received by those active nominators.



Graph 25: Distribution of Rewards (Subsample) among Successful Active Nominators in the Last 500 Eras, Present in 90% of Eras.

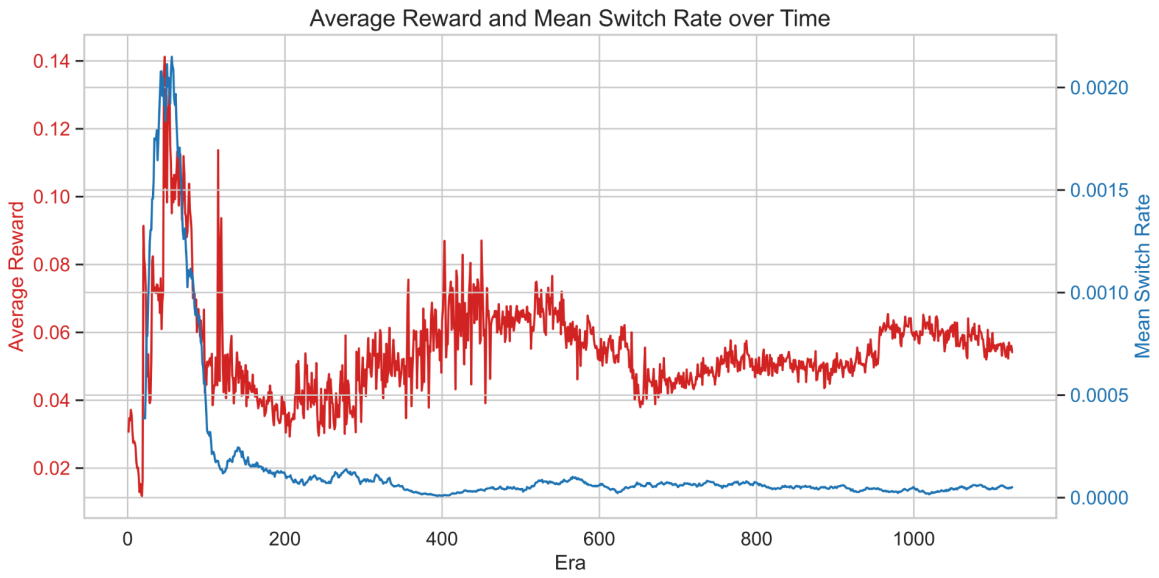
These constantly active nominators tend to enhance their reward function. The average reward metric over the last 500 eras displays an upward trend, characterizing this group as successfully utilizing staking to maximize rewards.

Conclusion: The system houses nominators who receive rewards and increase their stakes. These nominators can be identified and tracked. However, it's important to note that the data used here has a qualitative nature; for precise quantitative characteristics, the data scheme must be expanded and enhanced.

Their metrics are truly among the most outstanding, and this can serve as an excellent role model for both other nominators and newcomers who are considering becoming nominators.

4.21. Nominator Activity from the Perspective of Validator Selection

The second key hypothesis of NPoS is that active nominators will use their stake to select the best validators and continuously refine this selection to maximize their profits. To investigate this, we will analyze the frequency of changes in validator selection.



Graph 26: Number of Validator Switches Across All Eras and Their Relationship with Rewards.

In this image, two lines are visible. One represents the average reward for active nominators over time, while the other showcases the rate of validator switches. We can assume that active nominators generally don't utilize the ability to switch validators.

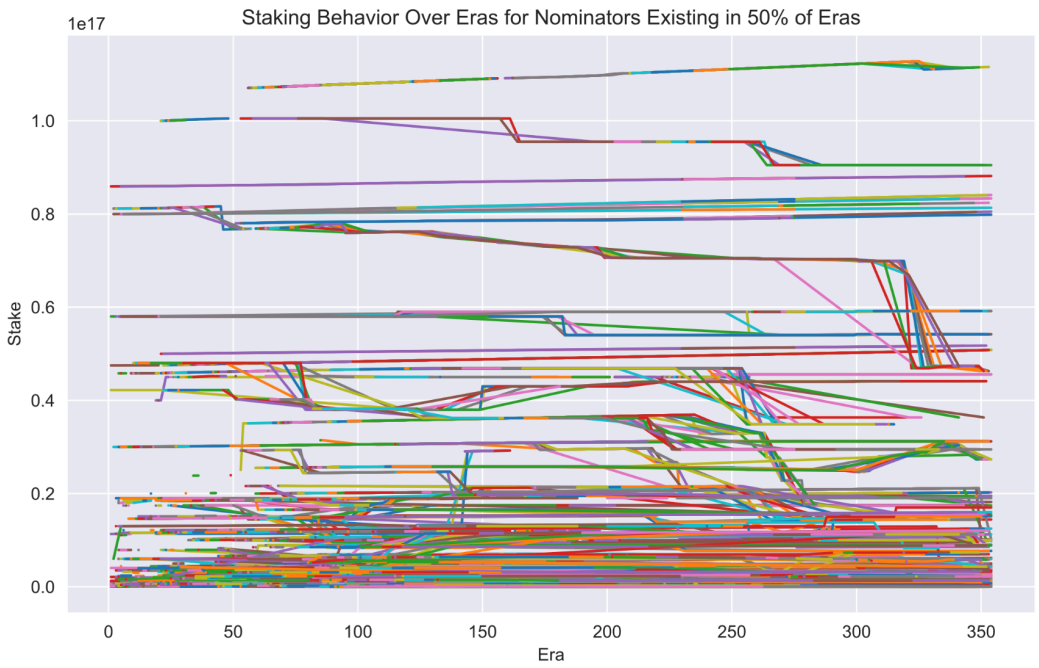
We observe some anomalies in the first 150 eras. Let's research these anomalies.

4.22. POA epoch anomalies.

To research this, we will analyze the frequency of changes in validator selection within the first 350 eras.

Graph 27: Number of Validator Switches and rolling mean avg reward in the First 350 (Normalized) Eras.

To understand behavior we can observe the behavior of active nominator stakes (bondes). We will focus on active nominators who are present in more than 50 percent of this timeframe (175+ eras)

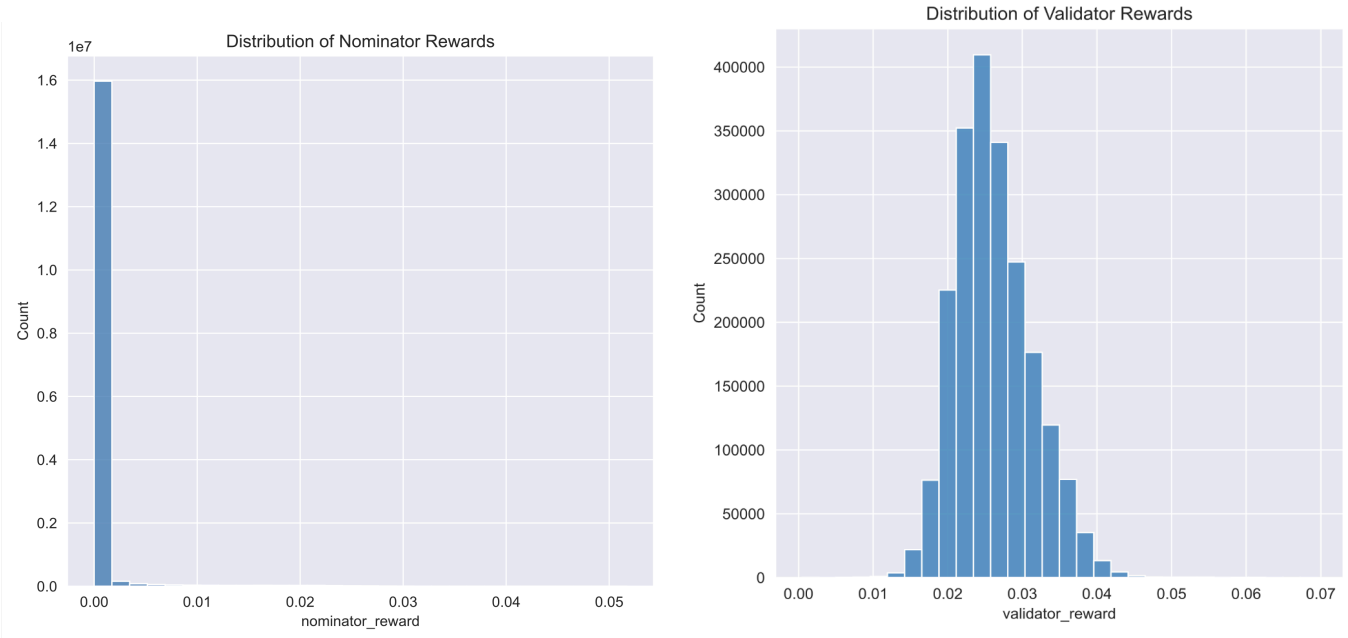


Graph 28: Behavior of Personal Stakes of Active Nominators in the First 350 Eras (Present in Over 50% of Eras).

Graph shows that by the 350th era, the stake was quite stable. Many notable active nominators with existing high stakes have reduced their stakes.

4.23. Distribution of Rewards Among All Active Nominators and Validators (First 350 Eras)

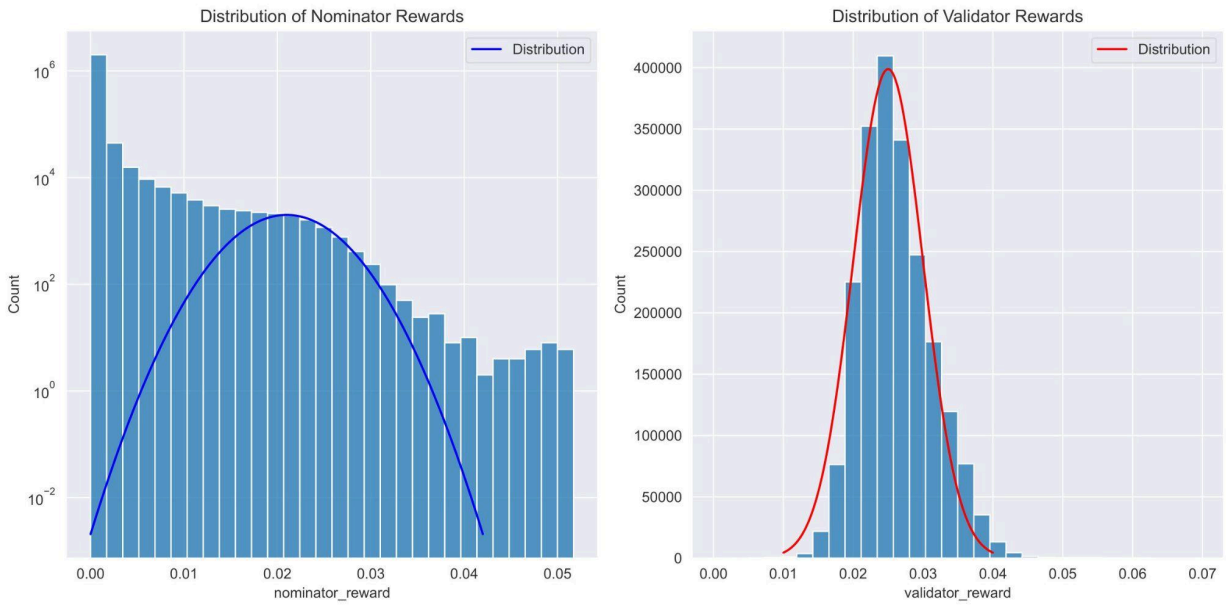
For this segment, we investigate the number of validators and nominators who have or have not received rewards and the relative reward size in relation to their stake.



Graph 29: Distribution of Active Validator and Nominator Rewards

This histogram presents rewards received by active validators and nominators. Most nominators do not significantly benefit from staking at the first eras, whereas validators tend to profit.

Active nominator rewards show varying degrees of comprehension of the reward system, with a small percentage reaping substantial rewards, and many receiving only marginal gains. Active validators, on the other hand, tend to adeptly earn rewards, as evidenced by a more evenly distributed curve compared to active nominators.



Graph 30: Projection of Active Validator Reward Distribution onto Active Nominators for the First 350 Eras. The logarithmic scale suggests that while around 2% of nominators appear to benefit, only 0.1% truly do, obtaining profits. Note: nominator one is expressed in natural logarithmic form for nominators, and typical for validators.

This distribution appears anomalous, and the reason behind it is the initial launch phase of Polkadot, during which rewards were not distributed for a significant portion of the time. You can learn more about this launch process here: Polkadot Launch Process. Therefore, what we see here is a superposition of two distributions: one without incentives (Proof of Authority stage) and the other with incentives (0.0002-0.0003 normal reward in those eras). Thanks to Bill Laboon for helping us find this answer.

We observe higher validator switching activity during the Proof of Authority (PoA) stage (graph 27), followed by a drop after. The density of switches also declines to somewhat expected.

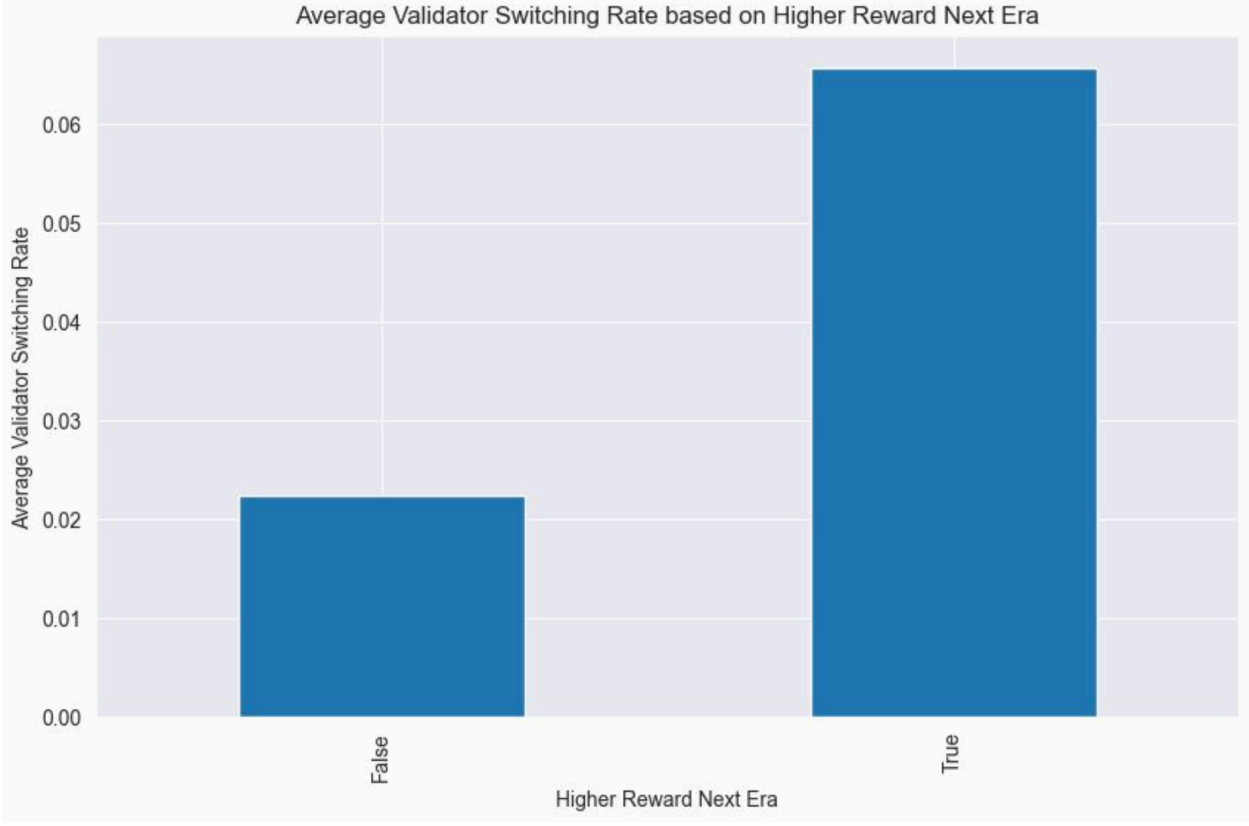
Therefore, we can exclude this phase from further consideration.

4.24. After POA research validator switching activity.

The average reward line exhibits an upward trend from the 200th era to the 400th era (graph 27). Subsequently, it experiences minor fluctuations but has remained relatively stable since the 600th era.

Conversely, the line representing the switching rate tells a different story. It begins high in the early epochs, decreases rapidly until the 200th epoch, and thereafter fluctuates moderately, maintaining a generally low level.

Based on these trends, we can hypothesize that active nominators don't frequently switch validators. This might indicate that nominators are not actively engaged in selecting the best validators or that they lack knowledge of how to do so effectively. However, when analyzing the relationship between those who frequently switch and rewards, a correlation becomes evident. To assess this, we examine correlations between rewards and validator switches among successful nominators (we filter based on 75 quantile by reward metric).



Graph 31: Correlations for Successful Active Nominators Using the Validator Selection Function and Their Skill in Increasing Rewards in the Next Era.

Successful Active nominators appear to effectively use the validator selection function, resulting in enhanced rewards.

Conclusion: The system includes successful nominators who excel in choosing the best validators and gain incentives accordingly.

4.25. Outcomes

Confirmed the main hypotheses:

1. Nominators don't optimally use NPoS.
2. ~~Nominators don't often increase their stakes to meet minimum bond requirements.~~ Nominators interact with incentive mechanisms inefficiently, leading to increased complexity in achieving the system's objectives.
3. The system offers a pathway for nominators to acquire rewards, and a nonzero count of nominators successfully secures rewards in expected level.
4. The system offers a pathway for nominators to acquire rewards, and a nonzero count of nominators successfully secures rewards in expected level.
5. Nominators who obtain rewards tend to display more compliant behavior within the system, proactively adhering to the rules.

Discovered:

1. A substantial number of successful nominators exist, and their quantity and stability allow for statistical data collection and behavior modeling.
2. Supporting a competitive behavior model within the framework of continuous reward reception yields better results than incentivizing actions through reward withholding (disincentivization).
3. Within the system, there are nominators who receive rewards in the upper range, and this behavior is visible on-chain.

4. The system's mechanisms allow for absorbing a significant amount of liquidity, but this process can be made more efficient in terms of assisting the self-education of nominators.

Based on these findings, the experiences of successful nominators can be shared with other nominators.

5. Solution: Follow the Leader. Educating and Sharing

Best Behavior through Leaderboards with Insights and Rewards.

This approach involves showcasing a set of actions performed by successful nominators, which can be replicated by any other user. This set of actions includes specific steps like selecting particular validators and types of actions (such as increasing stake, changing operators), along with the associated analysis (frequency of switches, frequency of stake increases). By doing so, this method enables newcomers nominators to explore various potential strategies, select the ones that resonate with them, or even create their own.

This method offers several benefits:

1. Reducing the need for extensive educational resources.
2. Implementing real-world demonstrations using actual validator cases.
3. Adding a social dimension by featuring success stories from similar users.
4. Simplifying the process of emulating successful actions.
5. Providing accessible metrics that users can progressively learn from.

6. Motif Leaderboards Platform Structure

Motif presents an interface that presents information about nominators and validators in a structured and user-friendly format. Users can immediately access dashboards, action sets, efficiency metrics, and more.

Each element of the Motif platform serves specific purposes, allowing users to efficiently navigate, analyze, and interact with the Polkadot ecosystem. It also creates possibilities for broader integration.

Planned set of informational dashboards:

1. **Nominator Dashboard: nominators rewards leader-list with insights and Behaviour Analysis**
   Interactive dashboard showcasing the most successful nominators, offering sorting options and detailed nominator profiles for fast research or deep analysis.

2. **Validator Dashboard: validator rewards and payouts leader-list with insights and traction**
   Dashboard featuring the top-performing validators, allowing sorting and in-depth validator profile analysis from a nominator's viewpoint.

3. **Nomination Pool Dashboard: nominators rewards and payouts leader-list with insights and traction.**
   Dashboard for analyzing the best nominator pools, enabling sorting and easy analysis of the nominators within each pool.

4. **User Spaces with Subscription and Earn Tracking Options:**
   Personalized space for users to allow tracking preferred nominators/validators/pools, subscribe to preferred one, and receive updates. Potential inclusion of nomination functionality.

5. **API/SDK Integration Module:**
   Integration module, providing APIs and SDKs for seamless integration of Motif's functionalities into third-party applications.

6.1. Nominator Dashboard. Components:

Shortlisted Nominators:

1. Top Rewards Receivers:
    1.1. Latest Era (TOP 20)
    1.2. Last 10 Eras (TOP 20)
    1.3. Last 100 Eras (TOP 20)
    1.4. All Time (TOP 20)
    1.5. Recommended action set based on that TOP-nominators list. The system generates suggestions for stake sizes based on the actions of top-performing nominators, considering validators they have chosen that are not oversubscribed, and other relevant factors.
2. Top Gainers:
    2.1. Latest Era (TOP 20)
    2.2. Last 10 Eras (TOP 20)
    2.3. Last 100 Eras (TOP 20)
    2.4. Recommended action set based on that TOP-nominators list. The system generates suggestions for stake sizes based on the actions of top-performing nominators, considering validators they have chosen that are not oversubscribed, and other relevant factors.
3. All Time
    3.1. Best Newcomers (TOP 10)
    3.2. Recommended action set based on that TOP-nominators list. The system generates suggestions for stake sizes based on the actions of top-performing nominators, considering validators they have chosen that are not oversubscribed, and other relevant factors.

For each nominator, there is an overview of information within the dashboard and a more detailed view accessible by clicking on the nominator's profile (separate tab).

4. Dashboard Overview Information:
    4.1. Earnings of the nominator for:
        4.1.1. Latest era
        4.1.2. Last 10 eras
        4.1.3. Last 100 eras
        4.1.4. All time
    4.2. Current stake
    4.3. Stake increase history last event (date of the last increase and amount)

4.4. Current set of validators. Short overview for each validator:
    4.4.1. Whether the validator was in the last active set
    4.4.2. Earnings of the validator in the last set
    4.4.3. Payout of the validator to the specific nominator in the last set
4.5. Recently added validators to the set (last event)
    4.5.1. The validator that was added
    4.5.2. Date of addition

5. Detailed Information within the Nominator's Profile:
    5.1. Behavioral information
        5.1.1. Tools or features utilized in the system
        5.1.2. Voting activities
        5.1.3. Participation in crowdloans
        5.1.4. Funds contributed to crowdloans
        5.1.5. Peak balance
        5.1.6. Parachain involvement
    5.2. Historical information
        5.2.1. Earnings of the nominator for each era
        5.2.2. History of stake increases
        5.2.3. Histogram showing the presence of validators in the nominator's set
        5.2.4. Histogram showing rewards received from validators
        5.2.5. Dates of changes in the validator set
6. Notification bell
   enabling notifications in the user's account about changes in the validator set

6.2. Validator Dashboard. Components:

Shortlisted Validators:

7. Top Rewards Receivers:
    7.1. Latest Era (TOP 10)
    7.2. Last 10 Eras (TOP 10)
    7.3. Last 100 Eras (TOP 10)
    7.4. All Time (TOP 10)

7.5. The system identifies available slots from the leaders within this block and separately displays options for nominators to choose from for validation.

8. Top Nominators Payout:
   - 8.1. Latest Era (TOP 10)
   - 8.2. Last 10 Eras (TOP 10)
   - 8.3. Last 100 Eras (TOP 10)
   - 8.4. The system identifies available slots from the leaders within this block and separately displays options for nominators to choose from for validation.
9. All Time
   - 9.1. Best Newcomers (TOP 10)
   - 9.2. The system identifies available slots from the leaders within this block and separately displays options for nominators to choose from for validation.

For each validator, there is an overview of information within the dashboard and a more detailed view accessible by clicking on the validator's profile (separate tab).

1. Dashboard Overview Information:
   - 1.1. Earnings of the validator for:
     - 1.1.1. Latest era
     - 1.1.2. Last 10 eras
     - 1.1.3. Last 100 eras
     - 1.1.4. All time
   - 1.2. Payouts for the nominators:
     - 1.2.1. Latest era
     - 1.2.2. Last 10 eras
     - 1.2.3. Last 100 eras
     - 1.2.4. All time
   - 1.3. Current total stake
   - 1.4. Current self-stake
   - 1.5. Current fee
   - 1.6. Fee increase history last event (date of the last increase and amount)
   - 1.7. Current set of nominators. Short overview for each nominator:

1.7.1. Whether the nominator was in the last active set
1.7.2. Earnings of the nominator in the last set
1.7.3. Payout of the validator to the specific nominator in the last set
1.7.4. Date of onboarding

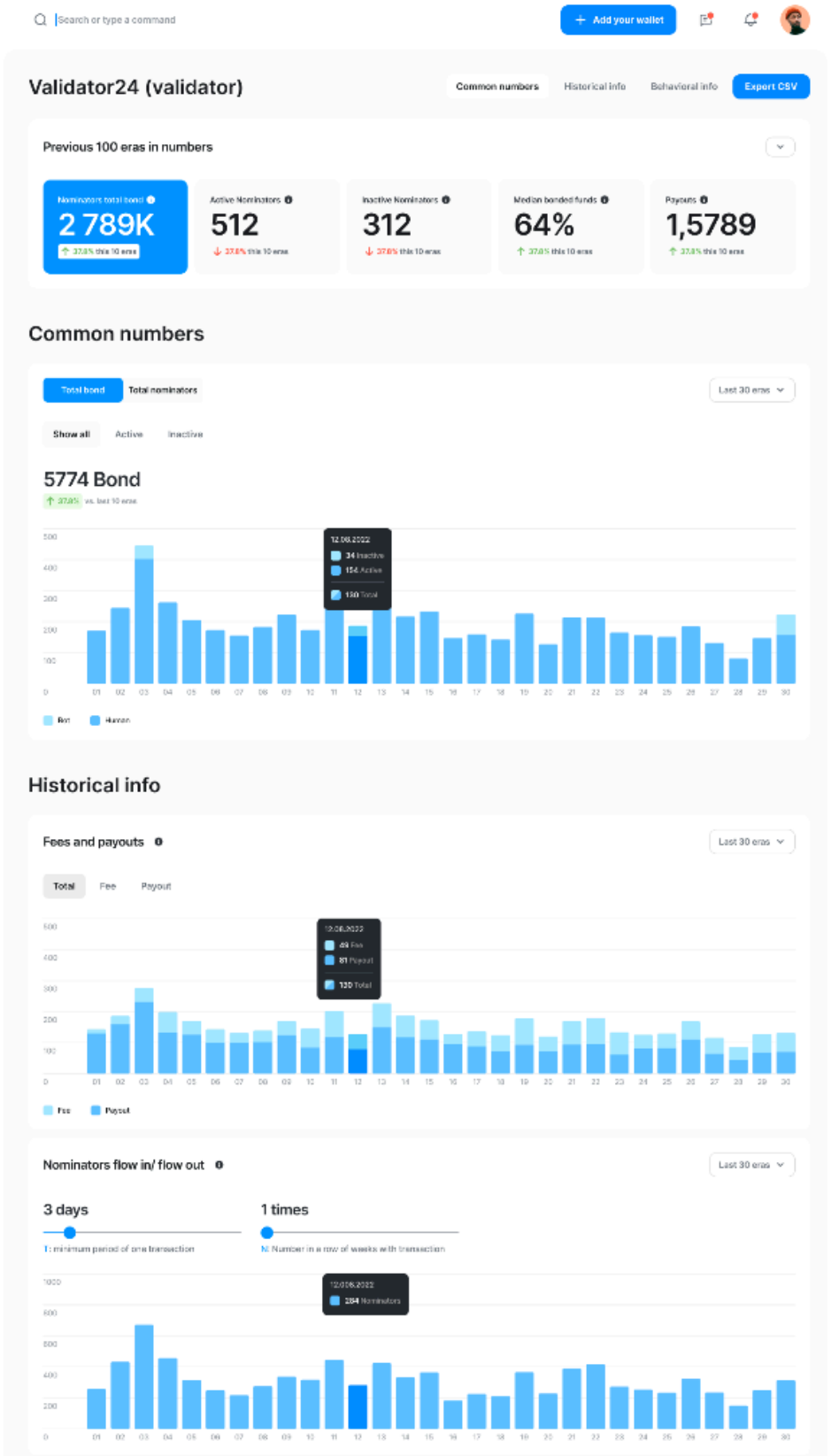
2. Detailed Information within the Validator's Profile:
   2.1. Behavioral information
      2.1.1. Tools or features utilized in the system
      2.1.2. Voting activities
      2.1.3. Participation in crowdloans
      2.1.4. Funds contributed to crowdloans
      2.1.5. Peak balance (with nomination)
      2.1.6. Peak balance (self-bonded)
      2.1.7. Parachain involvement
   2.2. Historical information
      2.2.1. Rewards for each era
      2.2.2. Payouts for each era
      2.2.3. History of feed increases
      2.2.4. Histogram showing the presence of nominators
      2.2.5. Histogram showing payouts
      2.2.6. Dates of changes in the validator set
3. Notification bell
   enabling notifications in the user's account about changes in the validator set

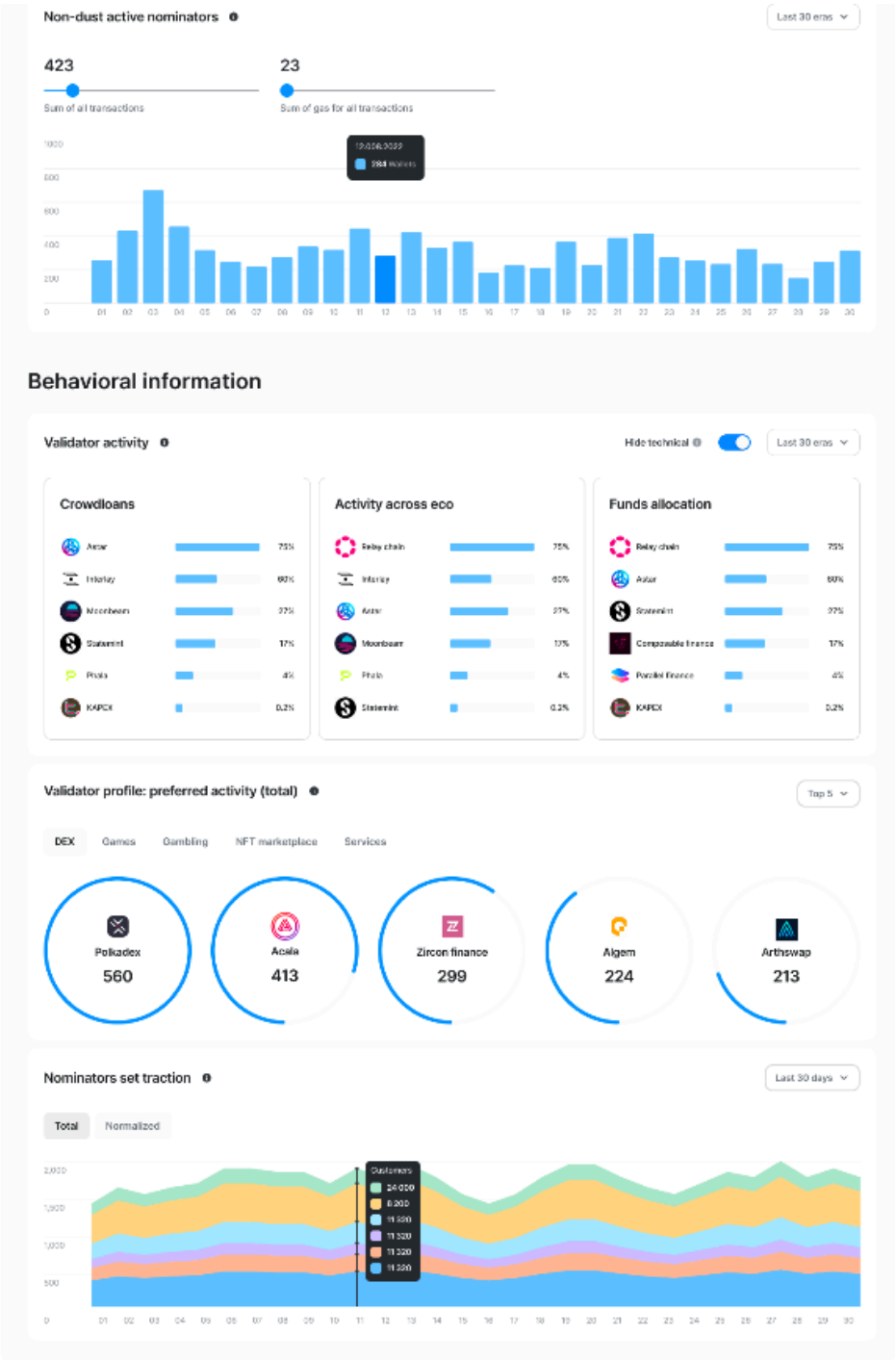
This comprehensive structure offers users the ability to access quick insights as well as in-depth analysis options for every nominator or validator. This empowers users to make well-informed decisions and actively engage with the platform. Please note that this list is approximate and may be subject to modifications or enhancements during the implementation process.

7. Interface sketches

The implementation of the interface will take the form of a desktop application, providing users with a convenient way to explore the system's capabilities. The design

will follow the style of "Similarweb," known for its user-friendly and visually appealing approach. The following is a basic layout and visual example of an internal project page. Please note that the dataset provided is illustrative and subject to change.


Search or type a command
Add your wallet
Validator24 (validator)
Common numbers
Historical info
Behavioral info
Export CSV
Previous 100 eras in numbers
Nominators total bond
2 789K
Active Nominators
512
Inactive Nominators
312
Median bonded funds
64%
Payouts
1,5789
Common numbers
Total bond
Total nominators
Last 30 eras
Show all
Active
Inactive
5774 Bond
Historical info
Fees and payouts
Last 30 eras
Total
Fee
Payout
Nominators flow in/ flow out
Last 30 eras
3 days
1 times



Graph 32: Interface prototype

8. Team:

Our team specializes in researching user behavior in the web3 ecosystem. We have a track record with research in the blockchain industry, specifically in DeFi traders' behavior, dApp user experience, and utilizing AI&ML.

- **Nick** – CTO (Revolut, WayRay)
- **Roman** – Blockchain research (Lido)
- **German** – Data Scientist (PHd, DeFi ML research)
- **Denis** – Full stack JS (Astral, Flowhealth)
- **Władysław** – UX (Web Design Clay, Beta)
- **Slava** – Full stack JS

9. Team traction

Our team already has relevant experience with different methods of blockchain research. We have conducted research to determine the most suitable method for this case. Projects done and methods that were tested (*Samples can be found in the Appendix.1 at the end of this proposal).*

1. **First dataset** (complete)
    - Different SQL aggregation of the data + API requests
    - API based 3rd party calculations.
    - Relation only database used.
2. **Astar** (complete)
    - On-demand data extraction through API requests
    - Graph-based ABI research tool used
    - Cashing + indexation + aggregation in one step
    - Relation + non-relation cached data storage with block height detection
    - Features extraction
    - ETL method based on an collected smart-contract method from logs
3. **dYdX research** (complete)
    - On-demand data extraction (covalent + alchemy)
    - Cashing + indexation + aggregation in one step
    - Relation + non-relation cached data storage with block height detection

- Features extraction
- ETL method based on an collected smart-contract method from log
- ML clusters analyze
- ML dynamic research

4. **Lido**
    - API-based pre-score added
    - ML dynamic research fo dynamic clusters

10. Benefits for Polkadot from Motif:

The Motif platform empowers key stakeholders with valuable data, insights, and educational resources. It aligns interests, optimizes engagement, and fosters a stronger and more collaborative Polkadot community.

Importantly, the realization of all these benefits is achieved by addressing existing inefficiencies. The Motif solution aims to solve problems and redistribute lost benefits among stakeholders.

10.1. Benefits for Validators:

1. **Increased Rewards:** Validators can customize their actions to align with successful nominator behaviors, enhancing their chances of attracting nominations and consequently, earning more rewards.
2. **Competition Beyond Low Fee**: Motif allows validators to compete not just on commission rates but on actual performance. This provides more maneuverability for validators while benefiting them.
3. **Efficient Resource Allocation:** By gaining insights into nominator preferences and actions, validators can allocate resources more effectively, resulting in improved network performance.
4. **Data-Driven Strategy:** Validators can develop strategies based on data analysis of rewards, behaviors, and trends, enhancing their likelihood of success.
5. **Optimized Engagement:** With insights into successful behaviors, validators can optimize their engagement to attract nominations and rewards more efficiently.

10.2. Benefits for Nominators:

1. **Enhanced Nominations:** Nominators can self-educate from successful peers and optimize their nominations, maximizing rewards and contributing to the network's security.
2. **Confidence and Understanding:** The platform provides a clearer comprehension of the NPoS mechanism, boosting the confidence of nominators in their decisions and actions.
3. **Informed Choices:** Nominators can make well-informed decisions about nominating validators based on data-driven insights, resulting in more effective participation.

10.3. Community-Wide Benefits:

1. **Onboarding and Retaining Members:** The platform can attract new community members who are motivated by rewards and can retain members by offering valuable insights and engagement opportunities.
2. **Stable Value Dynamics:** Increased bonding of DOT due to the platform's influence can lead to more stable value dynamics for the Polkadot token.
3. **Enhanced DOT Value:** By promoting honesty and better network behavior, the platform indirectly contributes to improving the DOT token's value proposition.

11. New Tools and Use Cases in the Polkadot Ecosystem through Motif

Motif, a data-driven platform, unveils an array of pioneering tools and use cases within the Polkadot ecosystem, profoundly impacting diverse network facets. By capitalizing on data insights, education, and advanced functionalities, Motif propels Polkadot's potential, fostering an agile and efficient ecosystem.

11.1. Educational Insights into Earnings

Motif delivers data-driven educational resources, offering a pragmatic grasp of rewards mechanisms, structures, and effective earnings strategies in the Polkadot realm. This clarity simplifies onboarding, rendering it more accessible for newcomers, liquidity providers, and projects. By disseminating these insights, Polkadot gains broader user adoption, increased liquidity, and a surge in innovative products and services.

11.2. Benchmarking and Performance Enhancement

Motif's analytics enable participants to tailor predictions through contrasting their performance with successful examples on the platform. Embracing these tried-and-tested strategies empowers nascent projects with heightened prospects of success. Leveraging advanced tools, including sophisticated notifiers, cross-analysis instruments, and AI-driven enhancements, further refines validator and nominator roles, optimizing efforts for optimal outcomes.

11.3. Elevated Liquidity Efficiency

Motif's comprehensive data on validator performance, rewards, and engagement trends functions as an invaluable resource for emerging projects. This resource aids in gauging user potential, identifying latent liquidity avenues, and gauging the viability of use cases. Leveraging these tools, newcomers can be seamlessly assimilated, augmenting overall operational efficiency.

11.4. Incentivization Platform: An Intrinsic Component of DID/Web3 ID

Motif introduces an incentivization platform that harnesses transaction patterns and on-chain activity metrics to fortify user identification. This forges a more robust and secure digital fingerprint, transcending the reliability of traditional public addresses. Moreover, Motif's data-driven capabilities empower the prediction of behaviors among novice users, intensifying their involvement. This amalgamation can tailor

incentivization strategies for existing users, catalyzing amplified liquidity within the Polkadot network.

11.5. Empowering Governance

Motif furnishes distinctive insights into liquidity provider behavior, fueling the design of tools grounded in their activities. This includes community preferences and behaviors, facilitating informed governance decisions and galvanizing dynamic community engagement.

12. System architecture

This system architecture structure outlines the phased approach to creating a Motif, complete with an intuitive user interface and comprehensive analysis dashboards. The Motif will be designed to operate on a dedicated archive node and events will be meticulously tracked and marked on our end for enhanced data accuracy.

12.1. Nominators and Validators Leaderboards (Dashboards)

Target:

- Launch user-friendly dashboards to facilitate the sorting and analysis of nominator and validator performance.

Results:

- Introduce leaderboards featuring top nominators and validators, enriched with detailed information about their actions. Enable nominators to make easy and informed decisions based on comprehensive performance metrics.

Main Product:

- Leaderboards for nominators and validators based on on-chain data.

12.2. User Personal Spaces

Target:

- Introduce personalized user profiles to enhance user engagement.

Results:

- Allow users to subscribe to their preferred validators/nominators and receive real-time notifications. Foster direct engagement between users and the Polkadot network through the platform.

Main Product:

- User profiles featuring registration, subscription, tracking, and notification functionalities.

12.3. In-depth Nominator and Validator Insights

Target:

- Provide comprehensive profiles for Nominators and Validators, including historical earnings, engagement, and partnerships.

Results:

- Utilize detailed historical data to offer strategic insights and trend analysis, empowering users with comprehensive information for more informed decision-making.

Main Product:

- Internal pages dedicated to the profiles of every validator and nominator.

12.4. Backend

Target:

- Provide fresh and organized data for display in the user interfaces.

Results:

- A backend system that fetches raw data from the blockchain, annotates, processes (linearly, using machine learning, etc.), performs transformations, and stores it in a user-friendly format.

Main Product:

- A resilient and high-performing infrastructure that efficiently processes, stores, and retrieves data from the Polkadot blockchain.

13. Additional modules architecture (backlog)

In addition to the core modules, the system can also be extended to incorporate supplementary features, such as

13.1. Nomination Pools Leaderboards

Target:

- Enhance the functionality of nomination pools leaderboards for a more engaging user experience.

Results:

- Present leaderboards showcasing top pools along with detailed information about their actions. Enable nominators to make informed decisions based on performance metrics and pool characteristics. Streamline the process of increasing bonds.

Main Product Development:

- Create leaderboards for nomination pools with up-to-date on-chain data.

Backend additional development:

- Enhance the ETL process with a focus on extracting data related to pools and pool user actions.
- Implement refined data structuring techniques.
- Develop deep inner ETL processing (jobs).
- Implement basic machine learning-based computations over data.
- Improve data visualization to facilitate better pool comparison.
- Incorporate historical pool data for trend analysis.

13.2. API/SDK Integration Tools

Target:

- Develop integration tools to extend Motif's insights and engagement mechanisms to third-party applications, broadening its user base.

Results:

- Enhance the staking experience beyond the confines of Motif applications.

Main Product Development:

- Create integration toolsets for external application integration.

Backend additional development:

- Develop a comprehensive API/SDK toolkit with clear documentation.
- Implement secure authentication mechanisms for third-party app integration.
- Provide sample code and use cases for developers.
- Enhance the backend infrastructure to accommodate various use cases.

14. Open-source development

All development activities will be conducted in an open-source manner, fostering transparency, collaboration, and community involvement. This approach aligns with the Motif platform's commitment to inclusivity and allows for contributions from a diverse range of developers, ensuring the growth and enhancement of the system within the wider ecosystem.

GitHub for the project: https://github.com/Motifnetwork

15. Future Monetization Strategies for Motif

The challenge in monetizing Motif lies in generating revenue while preserving its open and equitable nature that benefits all users. Striking a balance between profitability and providing reliable information is crucial for sustained success.

15.1. Premium Subscriptions, Reports, and Analysis

Tiered premium subscriptions featuring advanced features, AI-driven analytics, and curated insights. Subscribers gain access to detailed information tailored to serious stakeholders, validators, and nominators. While this offers an in-depth perspective,

users can adapt the insights for their own analyses. Tailor-made reports for stakeholders seeking specialized insights can also be offered, including validator-specific data analysis and insights for cryptocurrency research firms or investment groups.

15.2. Educational Courses and Workshops

Comprehensive educational courses and workshops on Polkadot's ecosystem, NPoS, and staking. Users can enroll in pay-per-course or subscription-based options to expand their understanding.

15.3. Referral Programs for Liquidity Pools

Using referral programs involving other liquidity systems in the network. Users referring others contribute to revenue and may earn incentives if their referrals engage with premium services.

15.4. White-Label Solutions

White-label versions of Motif for integration into other platforms. This empowers entities to offer similar insights and analytics to their user base, fostering broader adoption.

Implementing these strategies thoughtfully will allow Motif to balance its commitment to unbiased information and financial sustainability, driving growth and innovation within the Polkadot ecosystem.

16. Motif milestones

The Motif proposal outlines two major milestones that drive the development process towards a functional version with dashboards, followed by a progressive expansion of system capabilities. With each milestone achieved, the platform evolves to become more user-friendly, engaging, and valuable within the Polkadot network.

Milestone 1: Backend Setup and Nominators/Validators Leaderboards (Dashboards)
Milestone 2: User Personal Spaces and In-depth Nominator/Validator Insights

17. Motif Budget

Source file: Motif_Treasury_Proposal.xlsx

	Milestone_1: backend + main leaderboards	
	Task	**Status**
Research		
	Technology stack research	Done
	Onchain event types	Done
	Database	Done
	ETL Prototyping	Done
	ML Prototyping	Done
Backend Infrastructure Setup:		
	Design a scalable modular data storage solution on AWS.	Pending
	Set up a dedicated archive node for Polkadot.	Pending
	Create an optimized database schema for indexed Polkadot data.	Pending
	Implement notification services and telemetry.	Pending
	Develop an ETL procedure for data extraction and storage.	Pending
	Design a schema for storing data from ETL processes factory	Pending
	Implement data extraction processes interacting with the archive node.	Pending
	Test and debug the ETL process and its output.	Pending
Continuous Integration and Deployment (CI/CD):		
	Set up automated testing and deployment pipelines.	Pending
	Ensure that new features and updates are thoroughly tested before deployment.	Pending
Data Annotation and Transformation:		
	Develop algorithms to annotate raw data with event markers and metadata.	Pending
	Design data transformation pipelines for structured formatting.	Pending
	Implement data processing pipelines for generating dashboard-ready data.	Pending
	Research, mark, and describe all on-chain events.	Pending
	Implement event tracking and marking mechanisms.	Pending
	Test and debug the database functionality.	Pending
Main Leaderboards Design:		

	Create a schematic design grid with a modular concept.	Pending
	Develop a variety of sorting parameters and visualization options.	Pending
	Design pages for leaderboards for nominators and validators.	Pending
	Integrate front-end design and conduct stability checks.	Pending
User Testing and Feedback Integration:		
	Include phases for user testing and feedback collection.	Pending
	Incorporate user suggestions and improvements into the development process.	Pending
Error and Exception Handling:		
	Develop robust error-handling mechanisms to prevent application crashes.	Pending
	Implement error reporting and monitoring tools.	Pending
Backup and Disaster Recovery:		
	Set up backup mechanisms to prevent data loss.	Pending
	Develop recovery plans in case of system failures (rpc stops and so on)	Pending

90 days (~83 working days) : Oct 1, 2023 - Dec 31, 2023

Detail			
Position	**Workload (hours)**	**Hour rate (USD)**	**Budget (USD)**
DevOps	504	50	25200
Back-end developer	504	50	25200
Onchain Data Annotation Specialist	126	60	7560
Blockchain research	126	60	7560
UI/UX designer	336	35	11760
Front-end developer	504	50	25200
Product manager	84	50	4200
ML Engineer	168	65	10920
Test Engineer	84	35	2940
Project manager	126	35	4410
			0
Subtotal			**124950**

Detail			
Target	**Time**	**month subcribtio**	**Budget (USD)**

		n (USD)	
AWS	3	3500	10500
Cloud services	3	900	2700
Subtotal			**13200**
Grand total per milestone			**138150**

Milestone_2: deep insights pages + user profiles		
	Task	**Status**
Backend Development:		
	Develop an additional ETL procedure for new data.	Pending
	Update the data storage schema.	Pending
	Implement additional ML-based ETL methods.	Pending
	Test and debug the ML-based ETL processes.	Pending
	Update the caching database for improved data comparison.	Pending
	Extend user data storage capabilities within the Database.	Pending
	Develop systems for user action routing related to personal data.	Pending
Continuous Integration and Deployment (CI/CD):		
	Set up automated testing and deployment update pipelines (user flows).	Pending
	Ensure that new features and updates are thoroughly tested before deployment.	Pending
Machine Learning Integration:		
	Research and implement basic ML-based computations over data.	Pending
	Prototype and develop basic ML-based computations with customer input.	Pending
	Research, mark, and describe ML outputs.	Pending
	Test and debug the database functionality.	Pending
Notification tools		
	Develop event-triggered notification mechanisms.	Pending
	Develop event tracking mechanisms for timestamping and categorization.	Pending
Front-end Development:		
	Prototype front-end design for validator pages.	Pending
	Enhance data visualization for comparison and research.	Pending
	Integrate historical data for trend analysis.	Pending
	Prototype front-end design for nominator pages.	Pending
	Prototype front-end design for user profiles.	Pending
	Design user registration and authentication flow.	Pending
	Design management platform (technical front).	Pending

Type Validation and Front-end Finalization:		
	Prototype front-end design for validator and nominator pages.	Pending
	Prototype front-end design for user profiles.	Pending
	Validate design and functionality.	Pending
	Integrate user action routing systems.	Pending
	Conduct stability checks and data issuance.	Pending
	Test on different screens and perform bug fixing.	Pending
Security and Privacy Measures:		
	Implement security protocols to protect sensitive user data.	Pending
	Integrate encryption mechanisms for data in transit and storage.	Pending
	Develop mechanisms to handle user authentication securely.	Pending

90 days (~83 working days) : Jan, 1, 2024 - Apr 1, 2024

Detail			
Position	**Workload (hours)**	**Hour rate (USD)**	**Budget (USD)**
DevOps	*The calculation will be made one month prior to submission.		
Back-end developer			
Onchain Data Annotation Specialist			
Blockchain research			
UI/UX designer			
Front-end developer			
Product manager			
ML Engineer			
Test Engineer			
Project manager			
Subtotal			*

Detail			
Target	**Time**	**month subscription (USD)**	**Budget (USD)**
AWS	*The calculation will be made one month prior to submission.		
Cloud services			

Subtotal			*
Grand total per milestone			

*The calculation will be made one month prior to submission.

18. Milestones Payment Conditions

2 Milestones proposes (each from 2 tasks)

18.1. Milestone.1: backend + main leaderboards.

At the completion of Milestone 1, users will gain access to fully functional leaderboards that showcase the performance and activities of both nominators and validators within the Polkadot network. These leaderboards provide users with valuable insights into key players in the network, aiding them in making informed decisions regarding their staking strategies and engagement with validators.

18.2. Milestone.2: deep insights pages + user profiles.

With the conclusion of Milestone 2, users will be equipped with a comprehensive research interface offering deep insights into the behavior and trends of various nominators and validators. This empowers users to analyze data, identify patterns, and make strategic decisions about their staking activities. In addition, the introduction of user profiles allows clients to personalize their experience by setting notifications and closely monitoring the activities and performance of specific validators and nominators, further enhancing their engagement and involvement in the Polkadot ecosystem.

18.3. Total

The total amount above is in **$**, and the amount of DOT will be converted based on the **EMA7** on the day of the official submission.

(https://polkadot.subscan.io/tools/charts?type=price))

1. **Payment conditions:**
    a. **Funding amount:**
        i. Milestone.1 Price (USD): $138150. DOT_Price_EMA7: 4.03. Milestone.1 Price (DOT): 34280 DOT.
        ii. Milestone.2 Price (USD): The calculation ч will be made one month prior to submission.
    b. **Timings:**
        i. Milestone.1: 3 months
        ii. Milestone.2: 3 months
    c. **Milestones payments:**
        i. Prepayment for the first milestone.1 100% upfront
        ii. Report the results to the community + Propose 100% prepayment for the milestone.2.
        iii. Report the results to the community after completing milestone.2;
    d. **Report schedule.**
        i. Main reports will be available at the end of milestone
        ii. Ongoing reports will be provided every 4-6 weeks (depending on the results)
    e. **Proponent address and contacts:**
        i. 13YMTEPKAxPRiyaZdMKrozeNT9x1Pa5h7aExebCdi6nc3Qqd
        ii. EMAIL NIK@MOTIF.NETWORK
        iii. WEBSITE https://MOTIF.NETWORK
        iv. RIOT @motifnetwork:matrix.org

19. Appendix 1: Utilized Research Method - Event-Based Analysis

Our research methodology, referred to as event-based analysis, has been meticulously honed over a span of more than a year by our dedicated blockchain research team. This approach revolves around dissecting critical events and activities embedded within a blockchain ecosystem. Its foundation rests on revealing concealed correlations within transaction-related data, often eluding the awareness of users.

Central to this methodology is the meticulous capture and dissection of noteworthy incidents. This encompasses a diverse range of elements including actions executed, involved counterparties, supplementary contextual data, network enhancements, data correlations with distinct addresses in specific instances, and other significant occurrences that wield a pronounced influence on the ecosystem.

Motif's application of event-based research is underpinned by sophisticated data collection techniques and state-of-the-art algorithms. These enable us to rapidly discern, categorize, and meticulously analyze these events in real-time. The culmination of these efforts empowers Motif to furnish researchers with time-sensitive and pertinent insights, thereby facilitating informed decision-making deeply rooted in the latest blockchain advancements.

An essential aspect to highlight is that:

1. **We delve not only into the event itself but also into its supplementary parameters.**
2. **We do not employ off-chain user information, gather it, or track it in any manner.**
3. **Our approach involves decryption and pre-analysis of the essence of specific events from the user's perspective.**

19.1. Reference/experience

Our team has conducted and is actively engaged in multiple research projects to battle-test our event-based research method. Examples of completed and ongoing studies include:

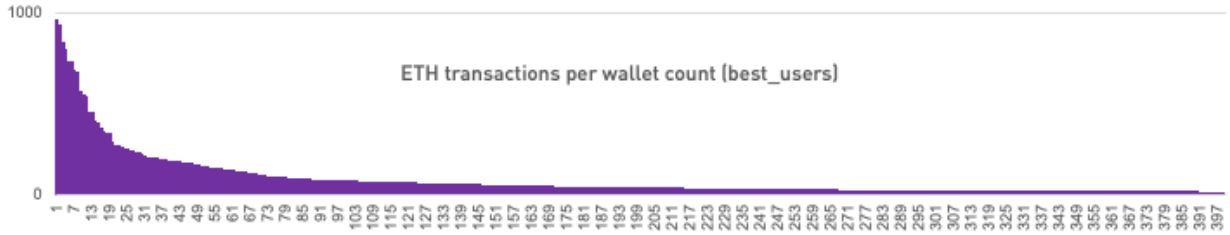
1. **dYdX** (complete)
2. **Astar** (complete)
3. **NDA** (complete)
4. **Lido** (complete).

In the following sections, we will discuss the results of these studies and demonstrate that the event-based method is sufficient for the purposes of research within the Polkadot ecosystem.

19.2. Event-based extraction methods can produce enough data for the web3 research.

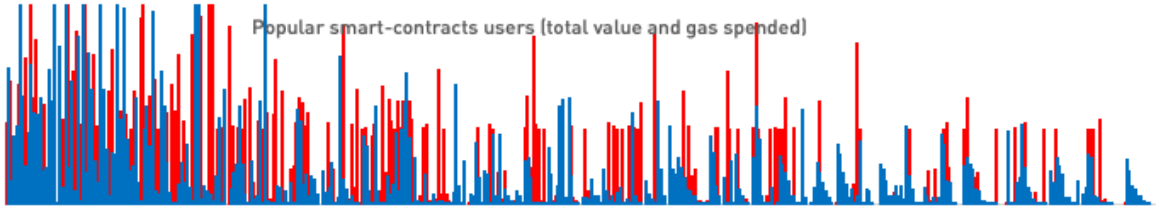
The main goal is to identify sources of "features" (inputs that can be used for aggregate calculations). Generally, in blockchain systems, we have two sources of "features": transaction count and wallet balance (in Polkadot, it is also difficult to aggregate these features as previously mentioned).

However, simply looking at the number of transactions and balances is not informative. For example, in the collected EVM dataset (shown in Graph), we had ~400 users, 80% of whom had less than 25 total transactions and almost-zero balances at the time of the research.



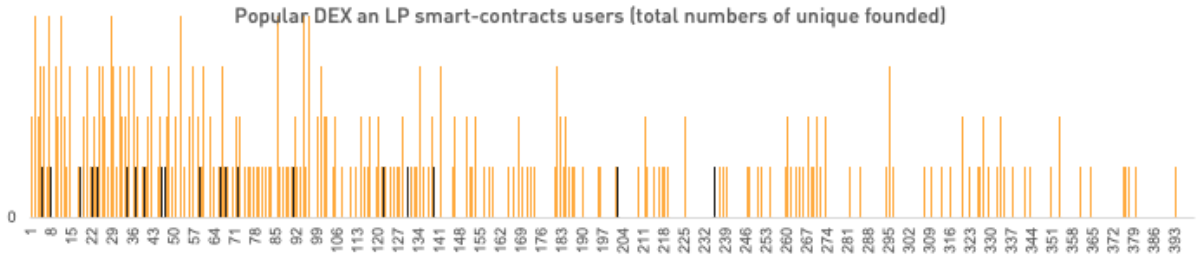
Graph 33: Typical blockchain user data

Meanwhile, user trace information is very useful and contains a lot of information. For example, this Graph is a dataset from the same users extracted by a feature of popular smart-contract events (users are in the same order as in the previous data-set). It includes information on gas spent and total interactions with popular smart-contracts.



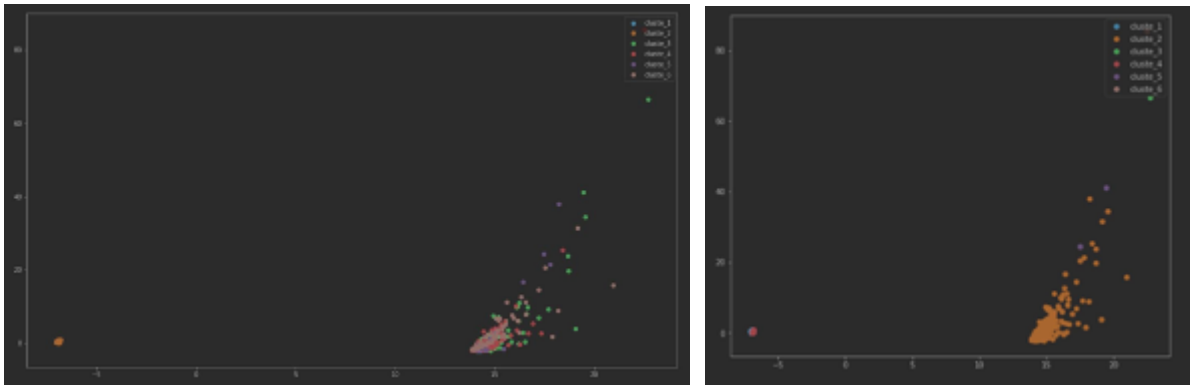
Graph 34: Same user data with associated on-chain aggregates

Additionally, we can define specific smart-contracts, such as DEX events for the same distribution and the same order:



Graph 35: Same user data with events enabling user behavior recognition

Even with a small amount of available data, such as in the case of the provided EVM dataset (with only 400 users, 80% of whom had less than 25 total transactions), user sets can be clustered and analyzed effectively



Graph 36: Clusterization of the user data with events enabling user behavior recognition

Furthermore, the discovered clusters can be statistically described, which can aid in making predictions about the performance of future users and their actions

Cluster	Count of wallet	Average of pnl_eth	Average of balance_eth	Average of transactions_n	Average of in_smartc_n	Average of gmail_flag	Average of twitter_flag	Average of discord_flag	Average of telegram_flag	Average of v_LIDO	Average of v_dYdX	Average of v_Uniswap V3
0	798	0,000	0,001	0,862	0,000	0,969924812	0,043859649	0,003759398	0,013784461	-1	-1	-1
1	818	0,020	0,032	32,802	6,483	0,968215159	0,771393643	0,728606357	0,748166259	1,48724E+14	0	1,42631E+15
5	952	0,000	0,001	1,993	0,000	0,975840336	1	0,964285714	0,978991597	-1	-1	-1
Grand Tota	**2568**	**0,00628528**	**0,010652375**	**11,45521807**	**2,065031153**	**0,971573209**	**0,630062305**	**0,590732087**	**0,605529595**	**4,7374E+13**	**-0,681464174**	**4,54331E+14**

Graph 37: The ability to cluster users based on a fragment of information

~~Users' behavior can be predicted based on different features, such as dApp usage, transaction count and timestamps.~~

The behavior of a new user can be predicted even based on fragments of their actions, by performing certain simple criteria (interacting with a certain type of smart contract, spent gas, registration date, etc.).

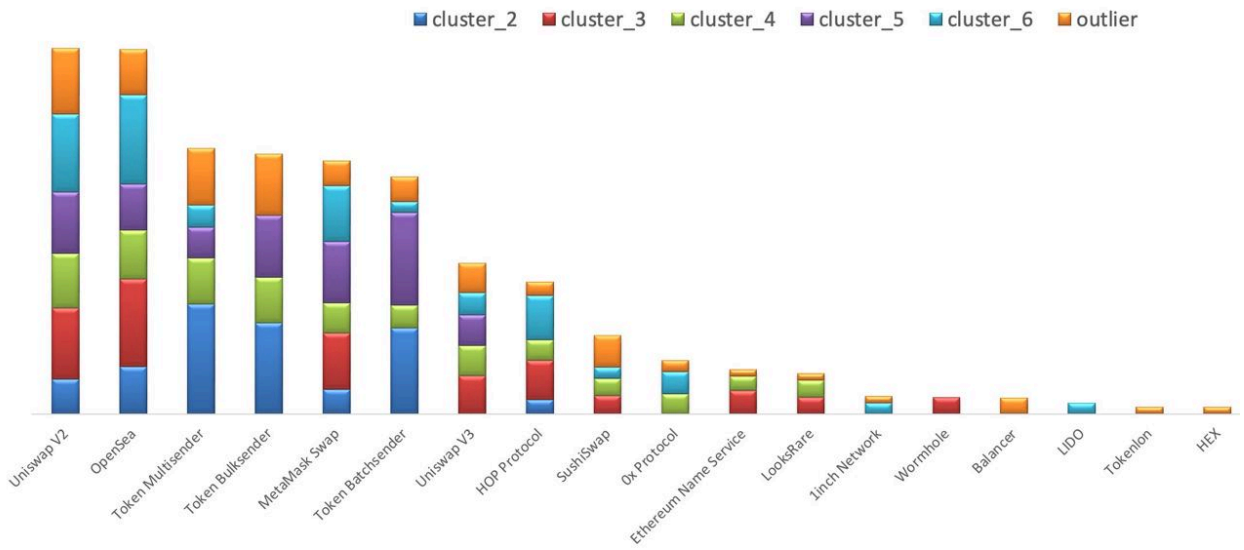
Thus, the Event-based extraction method is suitable for extracting features and can provide enough information for proper research.

19.3. Users can be profiled by their activity or assets

Users can be profiled based on their activity or assets with an event-based method. This is known as user profiling, which involves dividing users into groups based on their interests.

One way to create user profiles is by using clustering, which groups users based on similar features. In the case of our first userset, we created clusters of users that were stable and easily describable by the dApps they interacted with (games, exchanges, launchpads). This allows us to understand the interests of the group and use this information in future work.

For example, in dYdX's case, we see that the best-performing cluster of users (cluster 3) do not have any bulk senders in their trace (that’s kinda strange from the first view, cause bulk senders often used as a token-spam without user consistency). This means that they have a different profile and behavior than other users in the dataset.



Graph 38: The capability to create behavioral filters for user sets and generate behavioral assumptions.

For example, in that userset’s case, we see that the best-performing cluster (3) of users do not have any bulk senders in their trace.

19.4. Motif can be used for dynamic research too (even in very low numbers sets)

Our research of that user base, although very informative, was conducted using a static data snapshot.

This time, we've tried researching the dynamic data-set. Using data from the dYdX exchange, we've uploaded user activity data from 4 months (August, September, October, November) onto a smart-contract. Motif then extracted all intersections with targeted smart-contracts and collected associated data. We will test how many features we can generate for each month and what can be done with them.

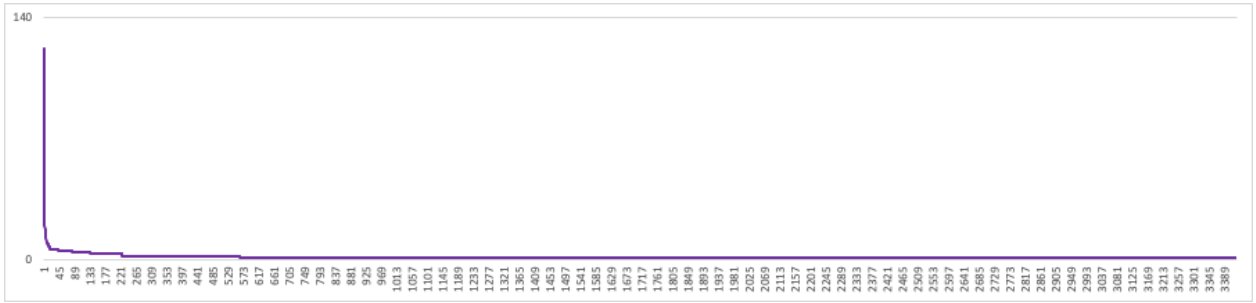
Here's the basic data-set:

The basic dataset for this period includes 3424 unique wallets that made 6857 interactions. Only 564 users made more than 1 transaction (UAW_T>1), with a total of 3997 transactions. These users were active in the following months:

August: 275
September: 250
October: 120
November: 174

In other words, the data is limited in this case.

This is Aug-Nov total dispersion by transactions made Graph.

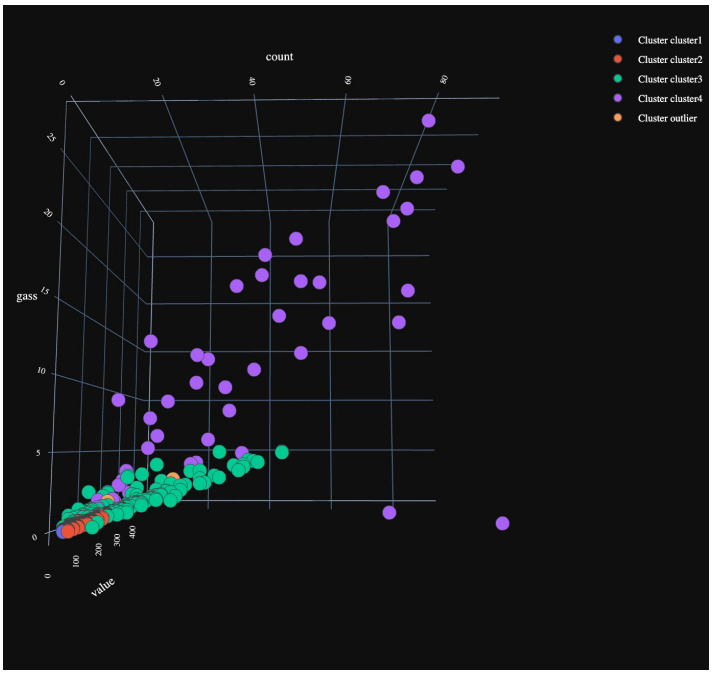


Graph 39: Typical repetitive user-generated dataset in transaction number view

This is how the clusterization looks after event-based extraction and aggregate recombination Graph:

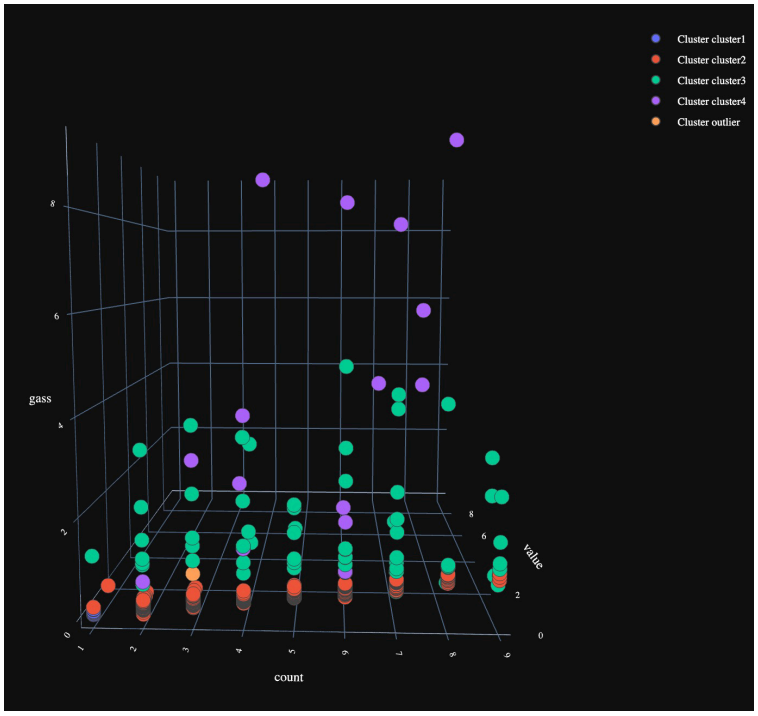
Distribution W per month from sample					
Id	**Aug**	**Sep**	**Oct**	**Nov**	**Grand Total**
cluster1	552	1.685	1.845	2.264	6.346
cluster2	643	799	865	956	3.263
cluster3	180	200	193	193	766
cluster4	61	54	51	56	222
outlier	35	11	10	13	69
Grand Total	**1.471**	**2.749**	**2.964**	**3.482**	**10.666**

Graph 40: Clusters after event-based method research



Graph 41: Clusters visual research

Additionally, we can use other hypotheses to define clusters, such as the economic value of the user being proportional to the amount of gas spent. The more gas a user spends, the more money they spend. This can be used to further define and analyze the clusters.



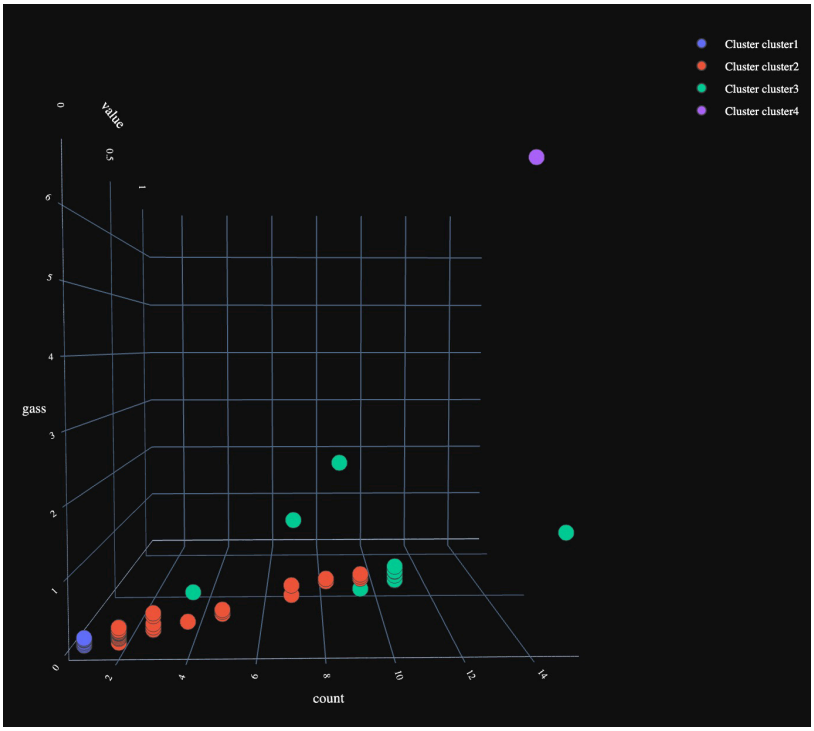
Graph 42: Clusters visual research with adding intrinsic economic value data

This hypothesis works: as seen from the picture above, the existing clusters group in some order. In this case, we can divide clusters by economic bases. As a result, we can also identify users that have moved from "good" clusters to lower ones.

Distribution of transacted Wallets					
Id	**Aug**	**Sep**	**Oct**	**Nov**	**Grand Total**
cluster1	154	102	61		317
cluster2	18	87	133	184	422
cluster3		11	15	23	49
cluster4		1	1	3	5
Grand Total	**172**	**201**	**210**	**210**	**793**

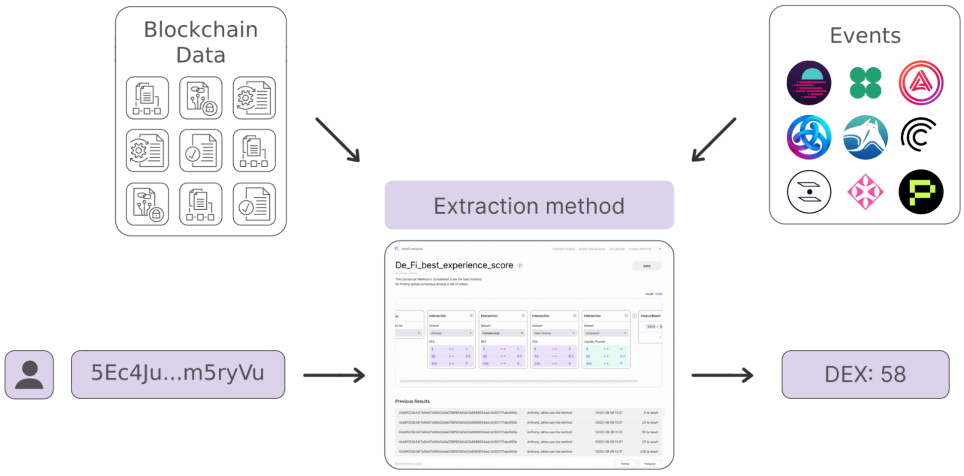
Graph 43: User translation between clusters can be found

This is a potential target for reactivation. For example, these are the transactions from Sep - Oct cohorts):



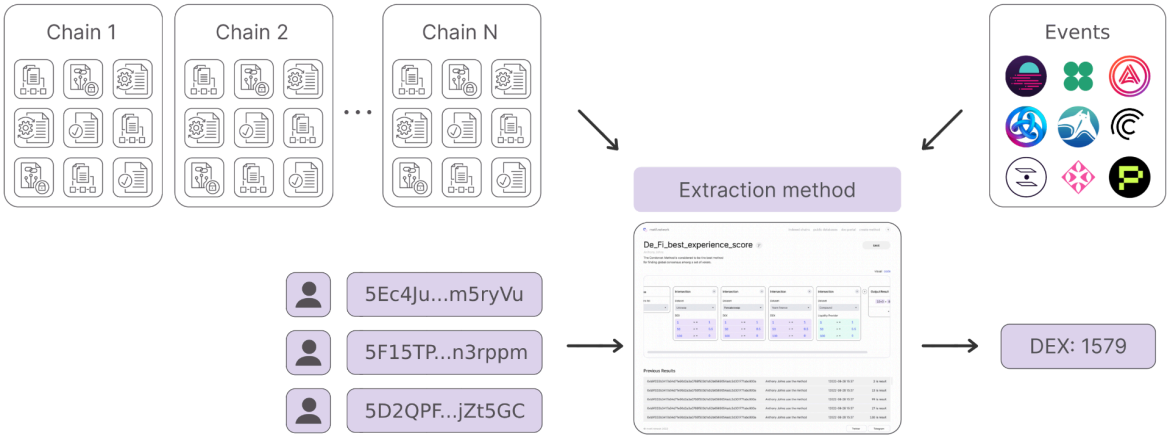
Graph 44: User translation between clusters can be described

The event-based approach encompasses two pivotal steps: Extraction and Calculation (or orchestration). In Extraction, data is systematically collected and organized from diverse sources, while Calculation involves interpreting this data to derive insights and outcomes.



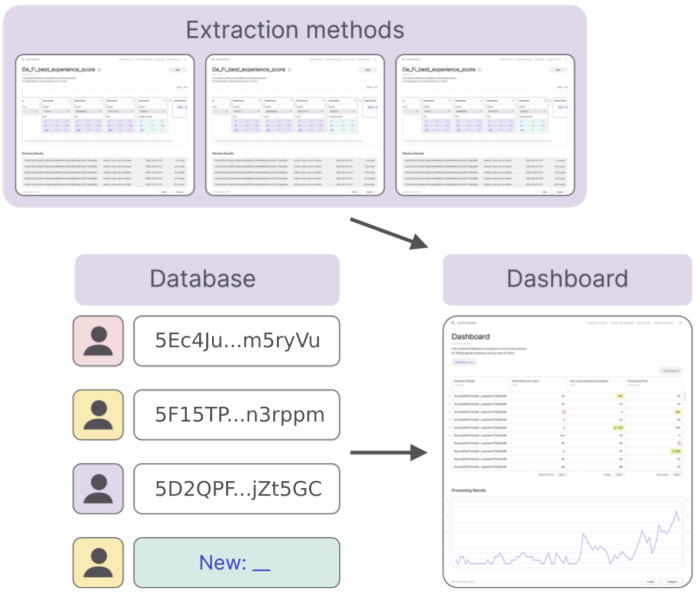
Graph 45: Extraction diagram

When examining user behavior in the Polkadot ecosystem, our Extraction process mirrors the Ethereum Virtual Machine (EVM) approach. It hinges on user wallets across various pallets and chains. However, in substrate-based networks, an additional step is necessary to transform the network-specific address into a standardized substrate address due to the absence of wallet-based stitching like in EVM networks.



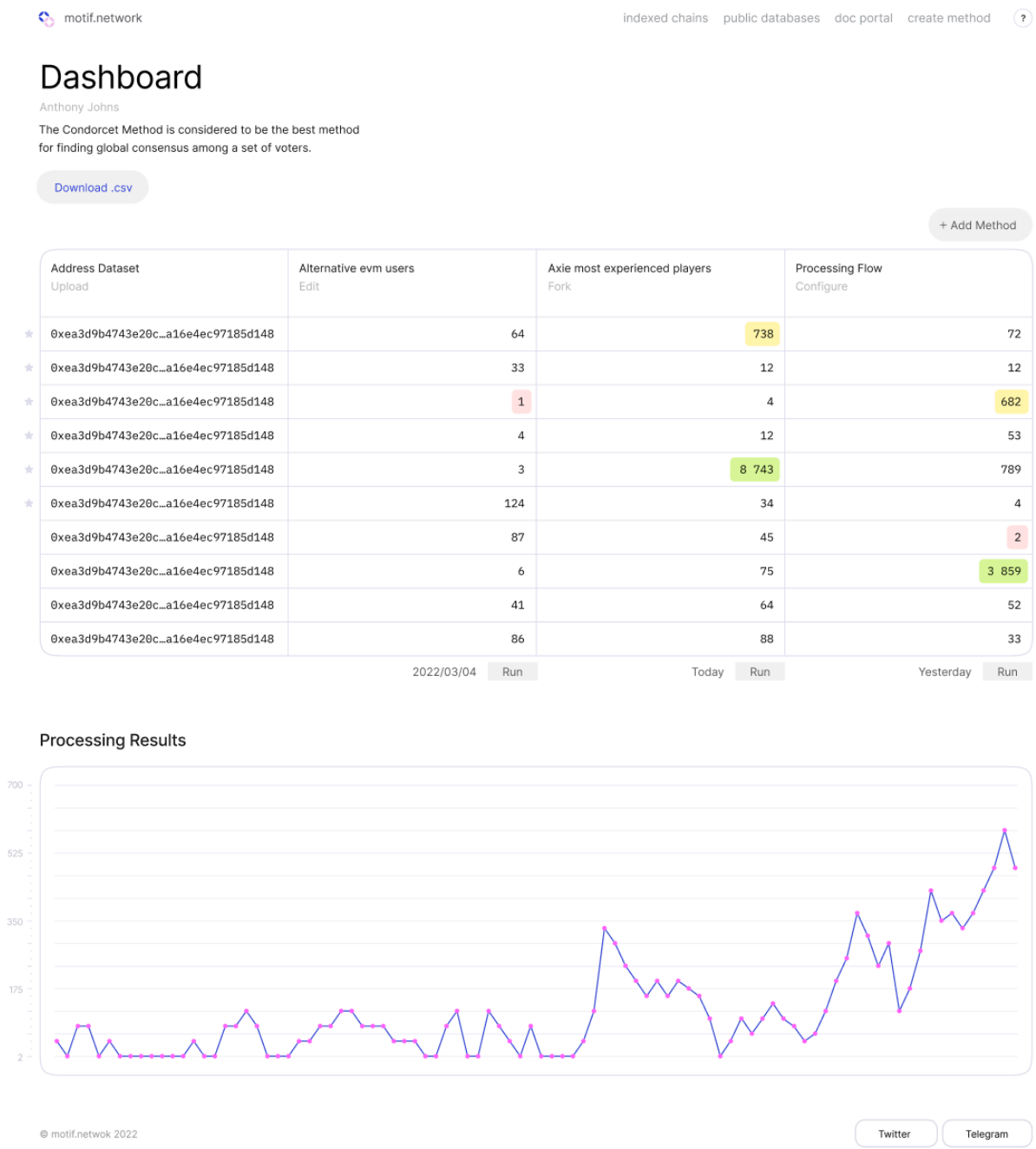
Graph 46: Substrate-like extraction diagram

Subsequently, the system works with these collected aggregates, synthesizing them using diverse extraction methods to unveil insights and correlations. Then, the entire database undergoes analysis.



Graph 47: Calculation diagram

Information association links results with methods and addresses, facilitating rapid result recognition.



Graph 48: method output data visualization prototype

19.5. Analyzing Method Efficiency

- Wallets with at least 10 transactions can be studied using transaction data, which provides a variety of features (such as type, timestamp, gas spent, and method) that are suitable for statistical and machine learning analysis.
- A daily average of 80 unique active wallets (UAW) is adequate to reveal correlations and establish user profiles.
- Wallet profiles can be predicted using research data and on-chain metrics such as minimum token levels, chains, or key actions.

This event-based approach, bolstered by rigorous Extraction and Calculation steps, stands as a robust and insightful method for comprehending user behavior within the Polkadot ecosystem.