

The AAVE logo is centered within a horizontal band that features a color gradient from teal on the left to purple on the right. The band is decorated with several thin, white, wavy lines that create a sense of motion and depth.

Towards Aave as a Credit Protocol

Tranching Risk to Enable Greater Capital Efficiency,
Innovation, and Robustness

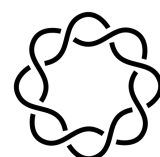




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Introduction

Aave has become a leading crypto credit platform, with \$1.4B in deposits. Impressively, it has both achieved and maintained this without deploying liquidity mining incentives, meaning Aave depositors are loyal users that have chosen to stay despite the more attractive yields offered elsewhere. This is a testament to the quality of Aave's product and community.

However, we ultimately see lending becoming a "balance sheet as a service" business. This is an extremely competitive market since anyone that has a balance sheet can effectively facilitate lending, as we can see by large tech companies such as Uber, Amazon, Google and many others recently making moves to begin offering financial services.² Within the crypto space, upstarts such as CREAM have achieved traction by taking on more risk while larger projects such as Yearn and others have also made moves to enter the lending space with a "stablecredit" solution.³

While large lending pools such as Aave command some network effects, their current design with a single, undifferentiated capital pool also comes with drawbacks.

- Capital inefficient by bundling different risks together and offering a blended return, appealing to a narrower capital base
- Hampers innovation by increasing the potential costs of failed experiments as these can cause contagion and systemic risk.
- Act as a target for nimble competitors who can either introduce incentives to facilitate vampire attacks and/or take more risks in adding new, riskier products.

Our goal with this proposal is to continue moving Aave towards being a credit protocol rather than a credit facility. We want Aave to be the go-to platform for launching, growing and managing money markets, taking advantage of Aave's existing community, liquidity, and scale.

In this way, our goal is to create incentives that enable permissionless innovation to happen on Aave rather than via forks or competitors. With this, we also want to ensure the potential risks from this innovation are siloed off from the rest of the protocol to prevent contagion and systemic risk while allowing innovators greater ownership and potential upside.

Thus, innovators and their early backers are able to reap the majority of the rewards from their innovations, but they must also ultimately bear the risk of its failure. This should also lead to more efficient allocation of capital as Aave holders can select from a broader base of yield opportunities within the ecosystem depending on their particular risk appetites.

1 <https://app.aave.com/home>
2 <https://sell.amazon.com/programs/amazon-lending.html>
<https://www.uber.com/blog/loans-from-uber/>
3 <https://docs.yearn.finance/r-and-d/stablecredit>





At the same time, we must balance this with ensuring these innovators both benefit from and contribute to Aave's network effects and scale. Crucially, the system must be designed such that innovators cannot exploit Aave by leveraging it initially and later forking away from it, as this would be detrimental to the broader ecosystem.

Most importantly, this design should lead to a better product for users, as Aave is able to add new products faster while keeping the UX simple and ensuring the risks introduced by these new products are insured by those capturing the upside. This effectively enables Aave to leverage its existing liquidity to offer a bundled insurance and credit platform for users; a value proposition that few competitors can match.

Design Considerations - Moats and Network Effects in Crypto

"Moats" refer to a businesses' ability to maintain its competitive advantage as it grows. As the name indicates, a moat generally relies on keeping others out. As we've seen with the examples of Sushi and others, the open, permissionless and thus forkable nature of DeFi makes it difficult to establish enduring moats. In turn, this makes value capture difficult as any excess rent extraction will result in a cheaper fork coming to market.

However, there are also unforkable attributes which we believe DeFi projects should optimise around. These include liquidity, security, community, and integrations. In our proposal, we seek to combine these unforkable attributes in order to create long-term defensibility and growth for Aave.

Liquidity

Liquidity is a moat in that greater supply-side liquidity (e.g. depositors in Aave) leads to higher capacity/better prices which begets more demand-side usage, fees, and greater supply-side liquidity. With \$1.4B in TVL in addition to \$700M in market cap, Aave certainly has a liquidity moat over all existing lending protocols.

However, as we've seen with recent vampire attacks by Sushi and others, while liquidity provides a network effect, it is also extremely fluid and likely to flow to platforms with the highest incentives. As such, it cannot be used in isolation but must instead be combined with additional unforkable attributes to provide a sustained moat.

In our proposal, we seek to leverage Aave's liquidity, and combine it with security and community in order to bootstrap new lending markets and allow for more variety in risk-reward tradeoffs for Aave holders. Crucially, while innovators have access to their own pool of funds in order to maximise their independence and tranche risk, all TVL sits on Aave in order to maximise liquidity network effects.





Security

Security has many dimensions, but at a high level it can be seen as the cost of attacking or undermining a protocol: the higher the cost, the more secure the protocol is. Higher security protocols attract more demand since they can handle higher capacity in the form of higher value transactions. This in turn generates better yield for supply-siders and contributes to the same positive flywheel effect we see with liquidity.

In terms of both financial and smart contract security, Aave is one of the most battle tested systems in the space. **In our proposal, we seek to build on this by taking advantage of Aave's existing liquidity and incentivising it to be used to provide differing levels of security (and receiving corresponding amounts of yield). We believe this can allow Aave to offer additional yield opportunities to its holders while quickly offering new products to users in a safe way, making it difficult for smaller upstarts to compete.**

Community

Most DeFi protocols either are or aim to one day become user-owned public goods. As such, their progress and success is largely dependent on the size and quality of the user bases that govern them. Strong communities build good products which in turn attracts more high-quality community members, creating the familiar network effect flywheel.

Strong communities also increase the coordination costs of forking. While liquidity mining has shown that at least some community members will defect given sufficiently high incentives, it has also shown that many will not. A shining example here is Aave which, despite no liquidity mining incentives at all, currently possesses higher TVL and Market cap than COMP which has provided much higher incentives.

Our proposal seeks to take advantage of Aave's existing strong community and accrued knowledge, providing incentives for innovation to tap into this knowledge base and stay within the Aave ecosystem. Combined with liquidity and security, our goal is for Aave to be the ecosystem of choice for anyone wanting to create innovative lending products.





Integrations

If liquidity is unforkable supply, then integrations are unforkable demand. Unlike the other unforkable attributes, integrations can also be proprietary in that they often rely on proprietary relationships (e.g. exchange listings). A protocol with a significant amount of integrations becomes very difficult to fork since these integrations must be built one by one and require time and trust. At the same time, the protocol which already has the integrations and the trust finds it much easier to continuously grow the number of integrations it already has, providing a strong network effect.

Aave already benefits from a significant number of integrations, with both \$AAVE and aTokens being integrated with many DeFi protocols and listed on multiple exchanges. **Our proposal seeks to leverage these integrations, ensuring that while the complexity involved with risk tranching leads to all the advantages previously mentioned without detracting from the UX and integration network effects. Specifically, we want to make sure Aave continues to control the user relationship and integration network effects.**

Combining attributes

Ultimately, our goal is to leverage Aave's existing network effects and combine them, compounding their effects. We seek to continue moving Aave from a credit facility to a credit protocol, leveraging Aave's existing community, liquidity, and integrations to become the go-to-place to launch, grow and manage money markets. At the same time, we believe this approach will enable rapid innovation, ensuring Aave is able to offer the greatest variety and depth of credit products to its users.

Methodology

This report will focus on outlining the high-level token architecture and principles we propose could be used to achieve the previously mentioned goals of enabling permissionless innovation, siloed risk and network effects for Aave as an insured credit protocol.

We have purposefully omitted specifics around lower-level details and system parameters in an effort to ensure that initial discussions remain focussed on overall architecture rather than precise numbers. While a model is included, this should be seen as a way to help illustrate the concepts discussed rather than representing anything final or definite.

Provided the community likes the general direction of our proposal and we can come to agreement on the principles of the broader architecture, the Delphi team will set to work on fleshing out some of the important lower-level details. As a next step, we will construct a full model to allow for simulation of different scenarios, releasing this to the community for feedback. Provided this is agreed, the final step is to work on an implementation plan outlining the best way to initially launch this new system.



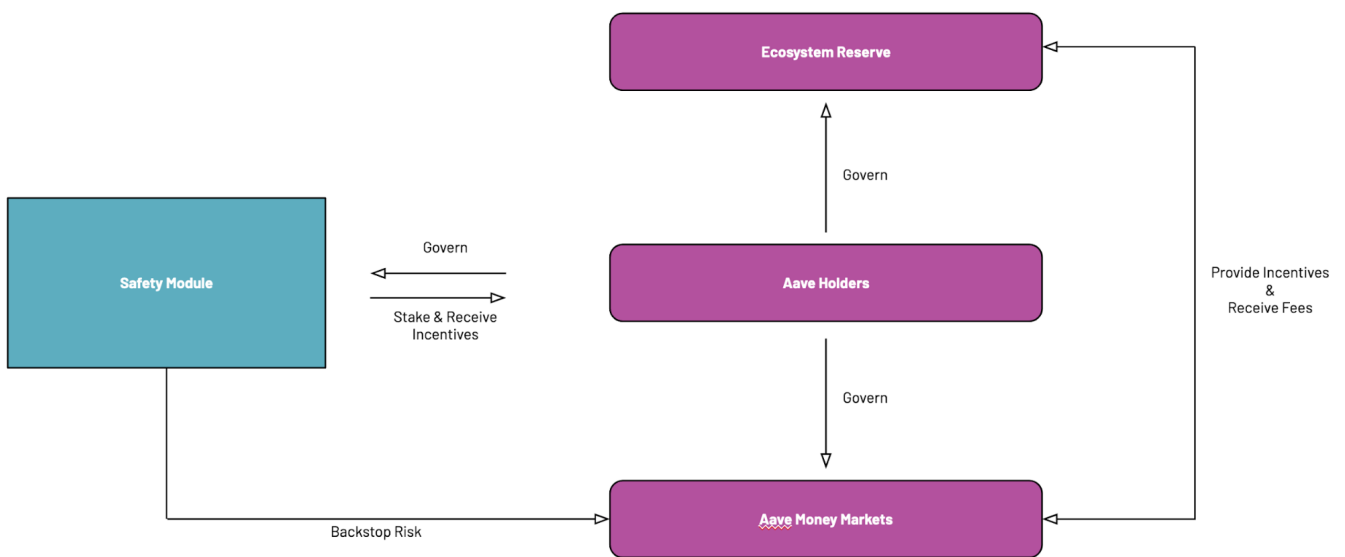


System Specification

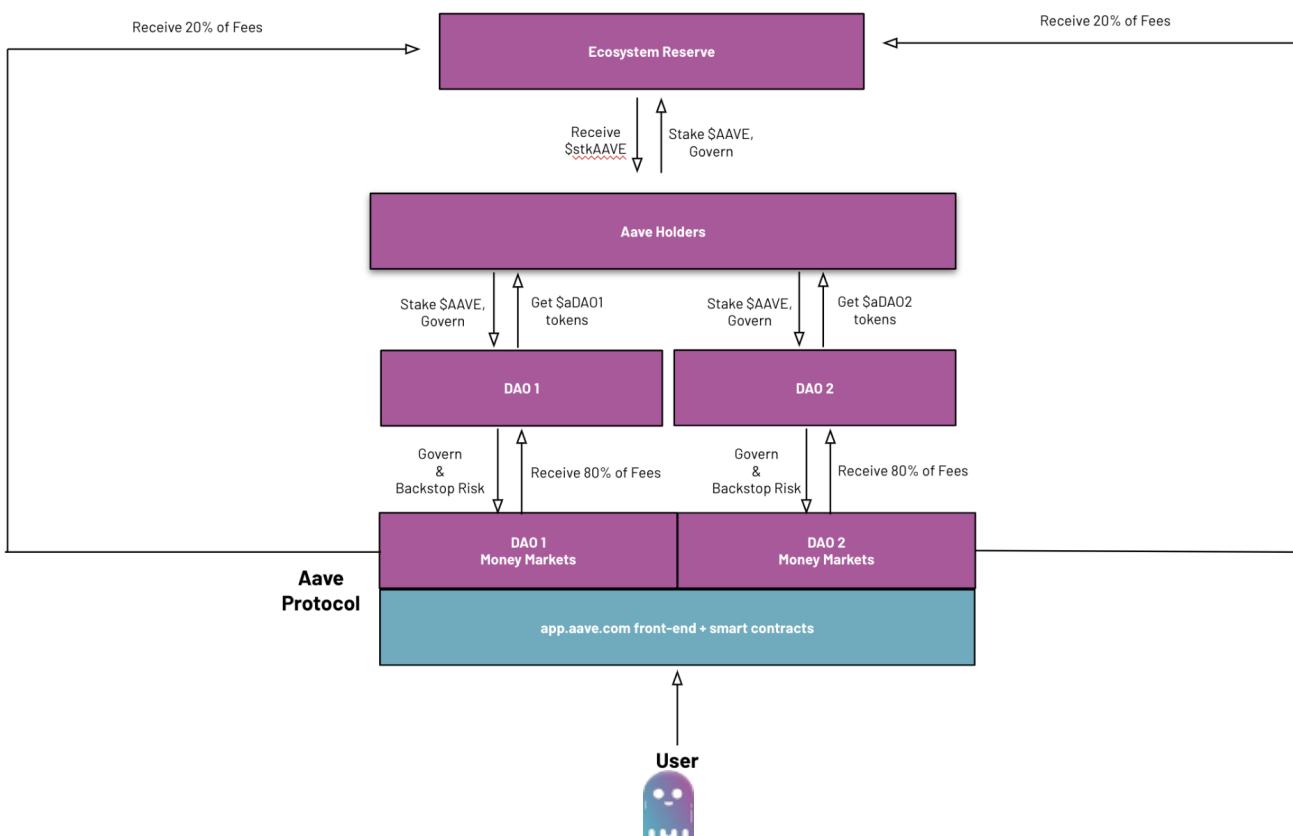
High-Level Description

At a high-level, we eliminate the idea of a system-wide safety pool and replace it with sharded safety pools in the form of aDAOs that underwrite specific, pre-defined risks. Rather than Aave being one set of money markets governed by all Aave holders, Aave becomes an ecosystem with many different sets of money markets being governed by groups of incentivised \$AAVE holders.

For comparison, this is a diagram of how Aave currently works:



This is a Diagram of our new proposed system:





As we can see, rather than a single pool of Aave holders governing all Aave markets and a single safety pool backstopping all Aave markets as in the first diagram, we now have segregated capital pools (represented by “aDAO 1” and “aDAO 2”) governing and backstopping the risk for their own money markets (represented by “aDAO 1 Money Markets” and “aDAO 2 Money Markets”).

Similarly, rather than fees being paid to all Aave holders, each aDAO earns its own fees based on the performance of the money markets it operates. aDAO token holders (i.e. Aave holders who stake to a specific aDAO) are entitled to 80% of the fees generated by that aDAO. Aave holders who stake to the ecosystem reserve receive 20% of the fees earned by each aDAO as payment for providing the infrastructure, governing the system, and bootstrapping initial liquidity.⁴

Crucially, while the aDAOs govern and backstop risk for their own money-markets, the user interacts with the Aave front-end and smart contracts. Thus, although aDAO holders have certain predefined rights and obligations towards the money markets they govern, Aave itself controls the smart contracts and consequently the user relationship and deposits.

Overview

Lenders and borrowers have access to a wide range of products on Aave. In the background, these products are operated by different aDAOs which are themselves governed and backstopped by subsets of incentivised Aave holders. Aave holders can therefore deploy capital to a variety of opportunities within the Aave ecosystem, making decisions based on their specific risk-reward profiles. To realize this goal, we propose the following structure:

- \$AAVE holders can either:
 - Stake \$AAVE into the ecosystem reserve, entitling them to govern the reserve and earn fees generated by it.
 - Stake \$AAVE into one or many aDAOs, receiving \$aDAO tokens.
- If an \$AAVE holder stakes \$AAVE into aDAO1 he or she is locked up for a period of time and receives \$aDAO1 tokens issued on a bonding curve with \$AAVE as the reserve asset. Use of the bonding curve has many benefits, including liquidity and encouraging efficient pricing of aDAO risk.
 - The exchange rate of \$AAVE to \$aDAO tokens depends on the bonding curve of that aDAO.
- The \$aDAO1 holder now has governance power within aDAO1, including:
 - Determining key parameters described later on in this document.
 - Determining how to allocate the \$AAVE in their capital pool, including the safety pool (which must be put into safe investments such as Balancer pools) as well as \$AAVE in the treasury.

⁴ These are preliminary numbers included for illustrative purposes and liable to change based on feedback and/or further research. It is even possible that rather than a fee share, Aave instead captures value via \$aDAO token ownership instead.





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- The \$AAVE in an aDAO's safety pool will be auctioned off to make depositors whole in the event of undercollateralized or delinquent loans. This is described in more detail later on in the document.
 - \$aDAO1 tokens can also be staked on other platforms, but while the \$aDAO1 tokens are staked the holder cannot engage in governance.
 - The \$AAVE tokens are a backstop to the tokens that are lent within the aDAO (the tokens available on each aDAO are determined by the aDAO (ex. ETH, USDC, DAI etc.).
 - \$AAVE is the reserve token for the Aave ecosystem, backing up all \$aDAO tokens. In addition, it has ultimate governance rights over all aDAOs and over the ecosystem reserve, which will itself include \$aDAO tokens.

Ecosystem Stakeholders

The Ecosystem Stakeholders are the following:

- \$stkAAVE Holder: Stakes \$AAVE, receiving \$stkAAVE entitling holder to govern the ecosystem reserve, which receives 20% of the collective aDAO earnings and may own assets such as \$aDAO tokens.
- \$aDAO1 Holder: Earns 80% of the lending origination fees from aDAO1 as well as benefiting from potential price appreciation in \$aDAO1. Backstops risk in aDAO 1.
- \$aDAO2 Holder: Earns 80% of the lending origination fees from aDAO2 as well as benefiting from potential price appreciation in \$aDAO2. Backstops risk in aDAO 2.
- aDAO1 lender: Lends from money-markets governed and backstopped aDAO1.
- aDAO1 borrower: Borrows from money-markets governed and backstopped by aDAO1.
- aDAO2 lender: Lends from money-markets governed and backstopped by aDAO2.
- aDAO2 borrower: Borrows from money-markets governed and backstopped by aDAO2.





Benefits

This design has several benefits:

- **Capital Efficiency:** Tranching risk increases capital efficiency, allowing \$AAVE holders to have access to different yield opportunities based on their risk-reward profiles. Holders who want the least risk can stake to the ecosystem reserve which doesn't backstop any risk, users who want low risk can stake to one of the aDAOs that underwrites high-quality assets such as stablecoins/BTC/ETH, and users who want higher risk can take idiosyncratic risk on more speculative or higher risk aDAOs.
- **Faster Innovation:** This design enables Aave to move even faster than it already does. Rather than the global safety pool in which any new product introduces the potential of contagion and systemic risk, the tranching model ensures risks are siloed and contained among those who are both willing to bear them and appropriately rewarded for doing so. This means Aave can launch higher-risk, more experimental products while providing higher safety assurances to users and eliminating systemic risk.
- **Better Products:** This results in a better product for users who not only have access to a broader variety of products but also have the comfort of bundled in insurance via the bonding curve capital pool. This capitalizes on Aave's liquidity and security network effects, making it very difficult for smaller competitors to be able to match Aave's product offering.
- **Open Platform:** The ability for anyone to create aDAOs that manage money markets transforms Aave from a credit facility managed by a central entity to a credit platform/protocol in which anyone can permissionlessly spin up money markets. Would-be competitors who see a product gap in the market are encouraged to create aDAOs rather than compete directly, taking advantage of Aave's existing liquidity and customer base to enable a better product and faster route to market.

Forming an aDAO

In order to form a aDAO, an Aave staker submits an Aave Improvement Proposal (AIP) which specifies the aDAO's charter. The following is a non-exhaustive list of potential parameters to be included in the AIP:

Mission statement: A subjective description, written in plain English, outlining the aDAO's broad mission statement, including the type of assets it wishes to underwrite, policy for adding new assets, general risk-tolerance, etc. This could potentially be enshrined into an [Aragon Agreement](#).





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- **Products offered:** Types of products offered, including initial assets accepted as deposits/collateral, assets that can be borrowed, collateralization ratios and liquidation policy. Ideally, an aDAO should have an exclusive license to the assets it proposes to accept as deposits/collateral. There can potentially be a cap on the number of assets an aDAO can offer to prevent efficient allocation of funds within the DAOs.
 - **System Capacity Formula:** The aDAO must propose a risk asset framework for how it will calculate its risk-weighted credit exposure. This metric should be defined as objectively as possible with reference to Aave's risk framework and fungible across aDAOs. For instance, this could be something like the weighted average for all assets of normalised volatility * market size / trading volume. More in-depth research work is required as well as discussion with the community to arrive at an appropriate metric here, but this is beyond the scope of this report.
 - **Minimum Safety Parameter (MSP):** The minimum percentage of "system capacity" in money markets that a DAO proposes to keep in its safety pool. This is to a bank's reserve ratio. Crucially, the safety parameter means that similarly to NXM, \$aDAO token holders are not always guaranteed to be able to withdraw as withdrawals may be blocked to ensure the system remains sufficiently collateralised. All capital over and above the safety parameter can either be kept in the reserve to support bonding curve price or otherwise allocated to the treasury, based on the Maximum Safety Parameter and Treasury Parameter below.

Note: Given its importance, the Minimum Safety Parameter could also be set by Aave at the system level or Aave could at least enforce a system-wide minimum value for the Minimum Safety Parameter.

- **Treasury parameter:** A percentage of each \$aDAO purchase on the bonding curve which is allocated to an \$aDAO holder-managed treasury which can be used for ecosystem incentives. This can be anywhere from 0-20%.
- **Withdrawal fee:** A percentage fee on each bonding curve withdrawal (exchange of \$aDAO for \$AAVE) which is charged and added to the bonding curve / treasury.
- **Mint:** Whether the aDAO has the ability to mint new \$aDAO tokens. We recommend this is switched off for most aDAOs.
- **Bonding curve:** Type of bonding curve \$aDAO tokens are minted on Interest Rate Model: How lending and borrowing rates are set.
- **Fees:** Fee rates for origination, flash loans, and any additional products offered.
- **Fee split:** By default, all fees generated are used to buy Aave and added to the bonding curve. Fee split allows a percentage of fees generated to be added to the treasury instead.





- **Waterfall:** Potentially allow governors to define a loss waterfall such that risk is split differently between depositors and the aDAO. While interesting, this introduces some principal agent risk to the system and we aren't sure the tradeoffs are worth it at this stage.

Note: All parameters can be changed later on via the governance process. However, any change in a key parameter means those on the winning side are locked for a predefined time period while losers can exit the system.

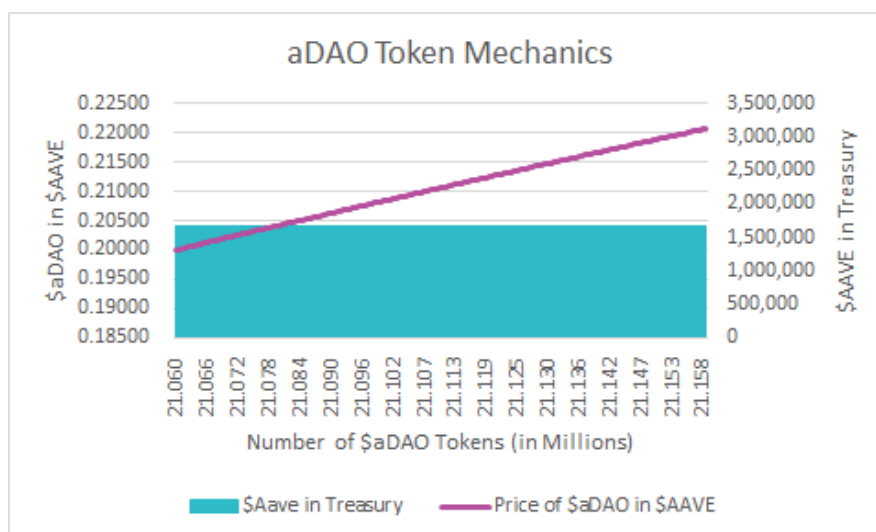
Rather than voting for/against it, **the AIP must instead attract a minimum quorum of Aave staked to it (e.g. 5%). Upon reaching this minimum quorum, the aDAO is automatically created, with staked Aave being converted into aDAO tokens on the proposed bonding curve and locked for some period of time (e.g. 3 months).** Initially, we would recommend AAVE either set an extremely high quorum for creating new aDAOs, operate all new aDAOs itself, or at least retain some level of veto power in order to ensure the quality of aDAOs being created.

Any changes to the aDAO after formation are voted on and governed by \$aDAO holders, with the result being submitted to Aave for execution.

aDAO Bonding Curve, Treasury and Balance Sheet

Bonding Curve Design

We suggest \$aDAO tokens are issued on a simple bonding curve with \$AAVE as the reserve asset. For simplicity, we've assumed a linear bonding curve shape and that all aDAOs utilise the same bonding curve shape. Due to the assumption that TVL in the platform is constant, the number of \$AAVE in the treasury is also constant. Based on the linear increase in token price, the price of \$aDAO in \$AAVE increases linearly.





We recognize that a linear bonding curve is not the optimal design for various reasons, the main one being that it does not sufficiently reward early adopters as compared to more exponential or logarithmic curves. At the same time, late adopters must not be punished too significantly such that early FOMO doesn't drive overcapitalization to begin with followed by undercapitalization as the aDAO grows. The shape of the curve must also take into account the expected growth of the aDAO and broader protocol such that we can model out \$AAVE locked at varying levels of adoption. Different aDAOs may benefit from different kinds of bonding curves and eventually we see bonding curve parameters being configurable by initial governors. **Investigating all this is beyond the scope of this paper and will be part of the workstream in phase 2 once the architecture has been agreed upon.**

Capital Pool as Insurance

Similar to Nexus Mutual, the capital in the bonding curve acts as the safety pool that insures aDAO's money markets against both smart contract and economic risk. In case of delinquent loans or hack, \$AAVE in the bonding curve is sold to make depositors whole, reducing \$aDAO's token price. This means Aave can now offer a bundled insurance and credit product to users, increasing its value and fee extraction potential.

The treasury is a separate pool of discretionary capital that \$aDAO holders have governance rights over. This capital is not in the safety pool or bonding curve and can be used by the aDAO for ecosystem incentives, yield-generating activities, paid out to \$aDAO holders or anything else determined by governors. The **minimum safety parameter** (which is also set by the aDAO governors) determines the mandatory ratio of capital in the bonding curve to system capacity. Depending on how we design the system, this may be different for the various aDAOs, reflecting the risk-return profile they represent. Alternatively, provided the system capacity metric already encapsulates the risk exposure of a given aDAO, the MSP may be the same for all aDAOs.

As the aDAO grows and \$aDAO token supply expands, overall system capacity grows alongside it as there is more \$AAVE backing the curve. This means, provided the risk is appropriately computed and reflected in the MSP, users will always have access to insured money markets as \$aDAO supply should grow alongside system capacity. For \$aDAO holders, this also means not all capital in the Bonding Curve will be liquid/withdrawable at a given moment in time since part of it will be a liability in the form of money market insurance for depositors. However, \$aDAO holders always have a claim to the \$AAVE in the safety pool. If they want to redeem, they will ultimately have to wind down the money markets in order to eliminate the insurance liability.

aDAO Balance sheet - Treasury and Capital Pool

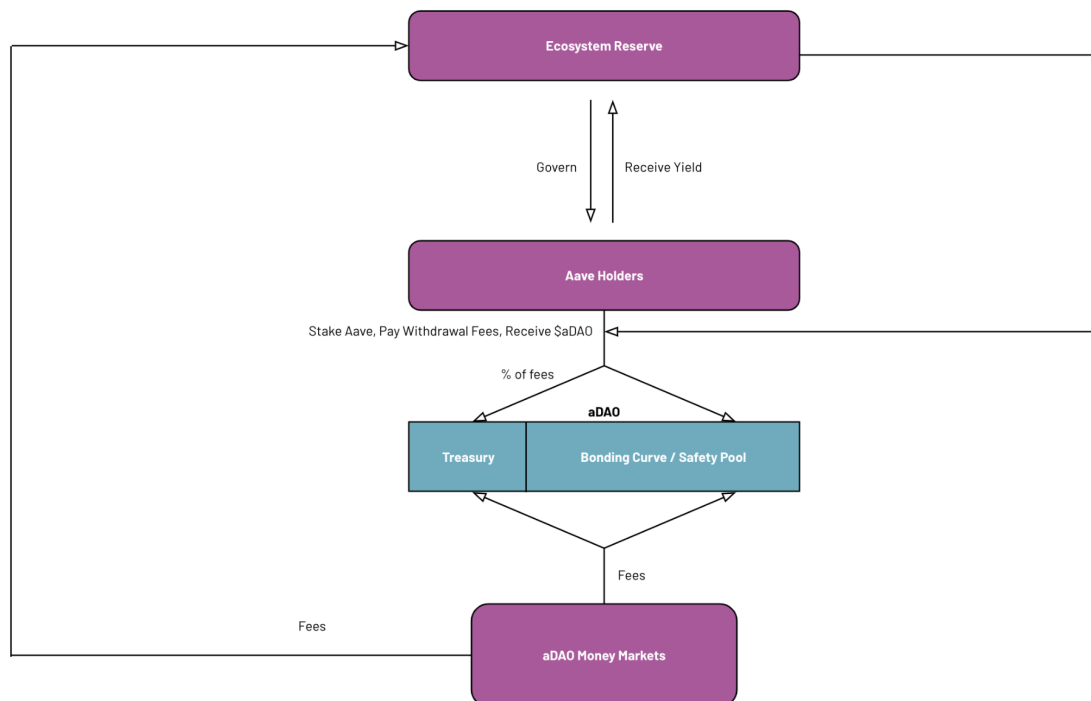
In addition to capital in the bonding curve / safety pool, aDAOs may also build up treasuries which are governed by \$aDAO holders with a one-token-one-vote system. There are multiple ways to for an aDAO to build up a treasury:

- Divert a percentage of \$aDAO token purchases to the treasury.





- Divert a percentage of fees generated to the treasury.
- Charge a withdrawal fee for bonding curve withdrawals and divert a percentage of this fee to the treasury.
- Implement a low maximum safety parameter, meaning capital flowing into the bonding curve gets diverted to the treasury early on.
- Receive a grant from the Aave ecosystem reserve.





The aDAO balance sheet can thus be seen as follows:

L	A
aDAO Equity	Treasury
\$aDAO I.O.U	\$AAVE Safety Pool
aDAO Money Market Insurance	

An aDAO token's **book value** is the excess capital in the safety pool above and beyond the amount necessary to satisfy the insurance liability (determined by System Capacity * MSP) plus the amount in the treasury.

$$aDAOBV = \$AAVET + (\$AAVEBC - (SC * MSP))$$

- aDAOBV = aDAO Book Value
- \$AAVET = \$AAVE in the treasury
- \$AAVEBC = \$AAVE in the bonding curve
- SC = System capacity
- MSP = Minimum safety parameter

As such, the bonding curve price can be rightly seen as the \$aDAO's token's **price floor**, with the market price most likely trading above this. This is because the bonding curve price doesn't take into account the additional \$AAVE in treasury which \$aDAO holders have rights to (aDAO equity in the balance sheet above).



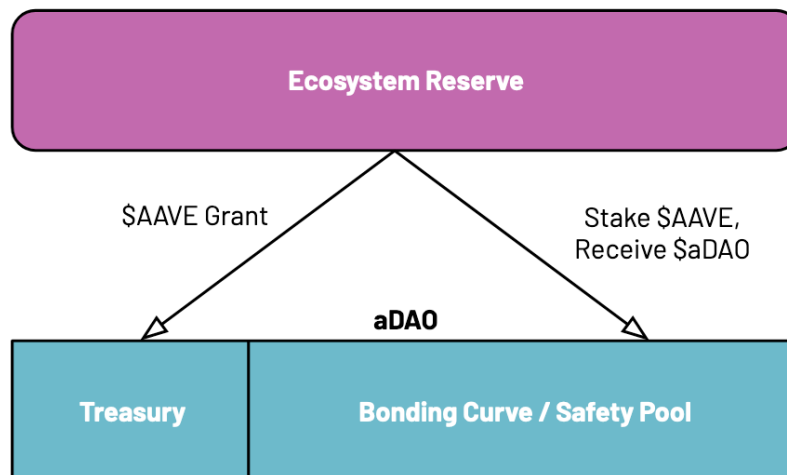


Ecosystem Reserve and aDAOs

As a metaphor, the Aave ecosystem reserve can be seen as the holding company while aDAOs are the subsidiaries. The ecosystem reserve has 3M \$AAVE tokens on balance sheet and may also hold \$aDAO tokens. The ecosystem reserves receives cashflows from all underlying aDAOs, allocating these cashflows to wherever it can achieve the highest return. While some of these fees must go to pay \$stkAAVE holders for governance, we believe the majority should be reinvested into the ecosystem for growth, specifically in the highest potential aDAOs.

20% of all fees generated by aDAOs are automatically funneled to the ecosystem reserve. In addition, the ecosystem reserve can interact with the aDAOs in a few ways:

- Grants: Providing a grant directly to the aDAO treasury. This grant can be programmed using codified rules and released over time as milestones are hit. Alternatively, it can be structured using an Aragon Agreement such that the aDAO must reach certain subjective milestones.
- Direct investment: Depositing \$AAVE in an aDAO Bonding Curve in exchange for \$aDAO.
- *Grant/Loan Hybrid: The Aave Ecosystem Reserve could lend money to the DAO, with the amount repayable going down as the DAO hits specific milestones. These loans can be uncollateralized or collateralized by the DAO's safety pool.*



In addition to receiving funding directly from the ecosystem reserve or from \$AAVE holders, aDAOs should also eventually be able to apply to be recipients of delegated credit lines from within the Aave ecosystem.





Governance

Ecosystem Governance

At a high-level, \$AAVE holders who stake to the ecosystem reserve receive \$stkAAVE which entitles them to govern the reserve and receive some yield from that. This should require a lock-up period and be the lowest yield available in the Aave ecosystem since \$stkAAVE holders are not backstopping any risk. As mentioned previously, the ecosystem reserve should primarily be used to bootstrap the Aave ecosystem by investing and providing grants to aDAOs, although working capital can also be invested as determined by the governors.

In case of a hack, \$stkAAVE holders may choose to use the ecosystem reserve to make depositors in an aDAO or aDAO holders themselves whole. However, it is not obliged to do so as each DAO is fully self-sovereign and liable for its own risks.

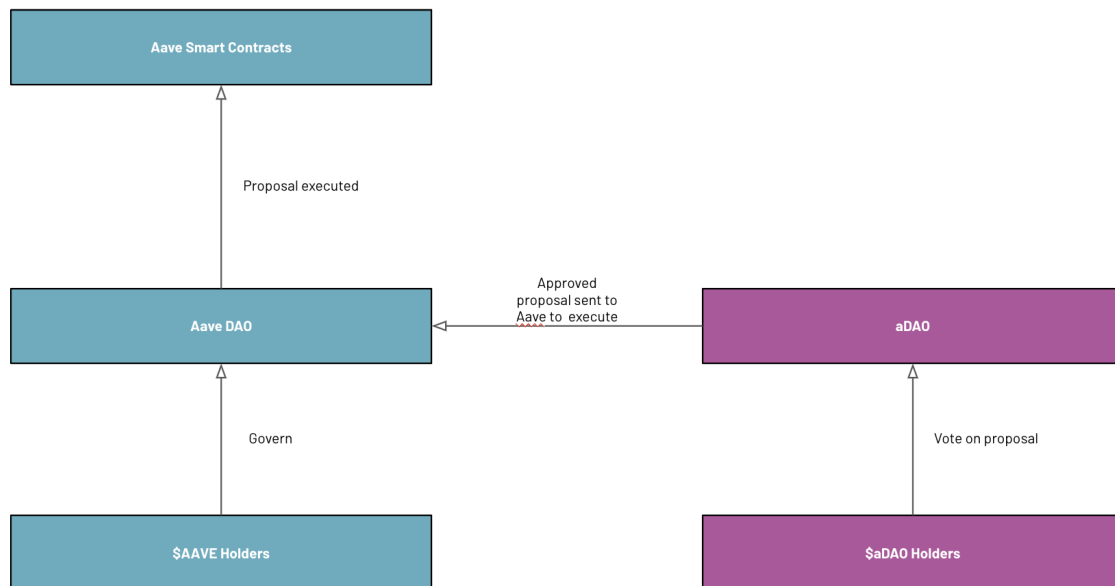
aDAO Governance

aDAOs are self-sovereign entities governed by \$aDAO holders with a one-token-one-vote system. In order to govern the system, only \$aDAO tokens held for at least 7 days are able to vote on any proposal. We propose that voting power scales logarithmically with time tokens are locked for, rewarding longer-term holders with more governance power without leading to excessive concentration.

We also suggest that any vote that alters a fundamental system parameter (i.e. one of the charter parameters outlined in the “Forming an aDAO section”) locks the winning side’s tokens for an additional 7 days after the vote finishes, with the losing side being unlocked immediately. This ensures that users are able to exit the system if the aDAO no longer operates by the charter they agreed to, with those proposing the change living with the consequences of their decisions.

While the aDAO is self-sovereign, it does not itself control the smart contracts of its money-market. Instead, any decision made by the aDAO is sent to the Aave DAO to ratify and execute. This ensures TVL always sits with Aave, maximising the ecosystem-wide network effects.





AAVE and aDAO Interactions

if \$AAVE holders believe the aDAO is taking too much risk or otherwise reflecting poorly on the \$AAVE brand, they have a few choices:

- They can issue a warning to the aDAO to alter its behaviour.
- If the warning isn't heeded, they can:
 - Refuse to ratify/execute proposals passed by the aDAO.
 - Invalidate the DAO's charter such that it is no longer an Aave DAO and doesn't benefit from Aave liquidity, community, brand and integrations. In this case, Aave would effectively take back control of the aDAO's money-markets, possibly spinning them out to a new aDAO.
- Alternatively, \$AAVE holders can also execute a hostile takeover, staking their tokens to receive \$aDAO and implementing the changes they want.





Model - Example aDAO

To exemplify the above, we have constructed a simple model showing the interactions between \$AAVE holders, the ecosystem reserve and two example aDAOs. *As mentioned in the “Methodology” section, these numbers are only illustrative and intended to show how the system could function at a high-level. More research will be conducted over the next few weeks after collecting initial feedback from the Aave community. In addition, the model assumes an \$AAVE price of \$47.62 for illustrative purposes.*

Based on the types of assets held in each aDAO there are different system capacities, fees, safety parameters, and allocations of where the lending fees are distributed. Below we have outlined some of the initial parameters (formulas are in **black** and hardcoded assumptions are in **blue**). These assumptions set the foundation for the initial distribution of \$AAVE within the ecosystem reserve and aDAOs.

Token Allocation		Notes
% Held for governance in ecosystem reserve	20.0%	This pool of \$AAVE receives the lowest yield since it is the least risky
\$AAVE for ecosystem reserve	2,600,000	
% of ecosystem reserve into aDAOs	50.0%	aDAO distributions can be in the form of a grant or investment
% of ecosystem reserve held in separate pool	50.0%	Pool of \$AAVE will act as protocol incentives or as a buffer when needed
% Held as unstaked	20.0%	\$AAVE is held in exchanges, wallets, or money markets and is not staked
\$AAVE Unstaked	2,600,000	
% Distributable to aDAOs	60.0%	\$AAVE not sitting in wallets or the ecosystem reserve
% Allocated to DAO1	60.0%	Split of \$AAVE across DAOs based on \$AAVE governance
% Allocated to DAO2	40.0%	Split of \$AAVE across DAOs based on \$AAVE governance
% Allocated to DAO1	36.0%	% of circulating \$AAVE supply in the DAO
\$AAVE in aDAO1	4,680,000	\$AAVE in the DAO
% Allocated to DAO2	24.0%	% of circulating \$AAVE supply in the DAO
\$AAVE in aDAO2	3,120,000	\$AAVE in the DAO
TVL Allocated to Each DAO		
% Allocated to DAO1	70.0%	Split based on lender and borrower behavior
% Allocated to DAO2	30.0%	Split based on lender and borrower behavior
% Allocated to Ecosystem Reserve	-	Split based on lender and borrower behavior

For simplicity, we have assumed TVL = system capacity. This is obviously inaccurate since TVL doesn't reflect the differing risk represented by the composition underlying assets (more work being done on this as well).

As shown above, we have assumed 20% of \$AAVE holders will stake in the ecosystem reserve and 60% will stake in the two aDAOs. aDAO1 is a safer DAO, perhaps lending based on asset-backed tokens or stablecoins, and operates with a safety parameter of 10%. There is no withdrawal fee but 5% of all bonding curve purchases are added to a treasury. There is a 0.25% origination fee and 0.09% flash loan fee, with 20% of this going to the ecosystem reserve, 60% going to buy \$AAVE and add it to the bonding curve and 20% going to a treasury.





aDAO2 is the riskier DAO, perhaps doing uncollateralised lending or accepting risky assets as collateral. As such, it operates with a safety parameter of 20%. There is a withdrawal fee of 5% and 10% of all bonding curve purchases are added to a treasury. The DAO operates a 0.5% origination fee and 0.09% flash loan fee, with 20% of this going to the ecosystem reserve, 40% going to buy \$AAVE and add it to the bonding curve and 40% going to a treasury. The differences between the two aDAOs (aDAO1 and aDAO2) are outlined below.

The MSP can be the same for both aDAOs if a risk adjusted metric is used instead of TVL.

aDAO Metrics	aDAO1	aDAO2
Min Safety Parameter	10.0%	20.0%
Withdrawal Fee	–	5.0%
% of Bonding Curve Purchases Added to Treasury	5.0%	10.0%
Lending Origination Fee	0.25%	0.50%
Flash Loans Fee	0.09%	0.09%
Fee Split: Ecosystem Reserve	20.0%	20.0%
Fee Split: Buy \$AAVE and add it to curve	60.0%	40.0%
Fee Split: Treasury	20.0%	40.0%
Bonding Curve	Linear	Linear
\$AAVE exchange rate	0.20000	0.20000

We assume the AAVE being staked across the two aDAOs is split 60/40 between aDAO1 and aDAO2, respectively, resulting in:

- 4,680,000 AAVE in aDAO1
- 3,120,000 AAVE in aDAO2.

Both aDAOs also use the same linear bonding curve where each token purchased increases by a constant K. K is assumed to be \$0.00001 and the initial token supply is based on an assumed initial conversion rate between \$AAVE and \$ADAO of 0.20 to 1.(see assumptions below):

$$\mathbf{aDAO\ Token\ Price = N * (Initial\ Token\ Price) + (Recent\ Token\ Price * N / 2)}$$





Assumptions	aDAO1
Bonding Curve	
Bonding Curve	Linear curve where each token increases by a constant K
Constant K Value	\$0.00001 << Assumed constant
Difference in token price along the curve =	$(N-1) * K$
Total price of purchased tokens on curve =	$(\text{Starting Price} * N) + (N * \text{Difference in price})$
Cost for N new tokens purchased =	$N * (\text{Initial Token Price}) + (\text{Recent Token Price} * N / 2)$
New tokens purchased =	$\text{Cost of Tokens} / (\text{Initial token price} + \text{Recent token price} / 2)$
Token Supply	
Starting Tokens \$AAVE in aDAO	4,680,000
# of \$ADAO	23,400,000 << Based on conversion rate of 0.2 to 1
Starting aDAO price	\$9.52 << Based on conversion rate of 0.2 to 1
Current TVL	\$1,330,000,000 << Assumed constant
Starting TVL in ADAO	\$798,000,000 << Assumed constant
\$AAVE in treasury	468,000
\$AAVE on bonding curve	4,212,000
aDAO's lending capacity in \$AAVE	42,120,000

Let's assume \$1.33B is currently locked on AAVE and 60% of that is in aDAO1, which means aDAO1 has a TVL of \$798M.

Under the first scenario, 468K AAVE of the 4.68M staked to aDAO1 goes into aDAO1's treasury while the remaining 4.21M AAVE are added to the safety pool bonding curve. Assuming a 10% safety parameter, aDAO1's lending capacity is ~42.1M AAVE (or ~\$2.01B). *Important to note we are currently evaluating alternative metrics to TVL to calculate System Capacity; ideally it's based on the risk-weighted credit exposure for each aDAO.*

\$AAVE Holder stakes tokens to aDAO		
Inflows (\$AAVE)	4,680,000	3,120,000
% added to treasury	234,000	312,000
% added to bonding curve / safety pool	4,446,000	2,808,000
Safety Parameter	10.0%	20.0%
ADAO1 Safety Parameter ("SP") Amount in \$AAVE	1,675,929	2,234,572
System Capacity in \$AAVE	44,460,000	14,040,000
Price per \$AAVE	\$47.62	\$47.62
System Capacity in \$USD	\$2,116,980,000	\$668,520,000
Withdrawal Capacity	\$1,318,980,000	\$136,520,000
Exchange Rate (\$AAVE / \$ADAO1)	0.200000	0.200000
Outflows (\$ADAO1)	23,400,000	15,600,000
TVL ADAO1	\$798,000,000	\$532,000,000
SP size in \$USD	\$79,800,000	\$106,400,000

We also assume an average loan duration of 3 months and a 50% utilization rate on the \$798M of assets in aDAO1, which equates to ~\$3,990,000 in origination fees (at 0.25%). Let's tack on another ~\$287k in fees on flash loans (details below) and total fees collected in aDAO1 comes out to ~\$4.28M.





aDAO Lending Fees		
Utilization of Lending Capacity	50.0%	50.0%
Lending Origination Fee	0.25%	0.50%
Avg Loan Duration (Months)	3	3
Loan Turnover (# of loans per year)	4.0x	4.0x
Assets Lent Annually in USD	\$1,596,000,000	\$1,064,000,000
Lending Origination Fees	\$3,990,000	\$5,320,000
Flash Loan \$ Lent as a % of TVL in DAO	75.0%	80.0%
Flash Loan \$ Lent	\$598,500,000	\$425,600,000
Flash Loan Fee	0.09%	0.09%
Flash Loan Fees Collected	\$538,650	\$383,040
Total Loan Fees Collected	\$4,528,650	\$5,703,040
Fee Split: Ecosystem Reserve	\$905,730	\$1,140,608
Fee Split: Buy \$AAVE and add it to bonding curve	\$2,717,190	\$2,281,216
Fee Split: Safety Parameter (or to bonding curve)	\$905,730	\$2,281,216

Under the current fee split, 20% goes to the Ecosystem Reserve, 60% is used to buy AAVE and add it to the bonding curve, and 20% is allocated to aDAO1's treasury.

The return on capital for \$aDAO holders under such a scenario would be ~2%:

$\$2,717,190 + \$905,730 = \mathbf{\$3,622,920}$ in total fees to bonding curve + treasury

$4,446,000 \text{ AAVE staked} * \$47.62 \text{ AAVE price} = \mathbf{\$211,698,000}$ value of AAVE staked

$\mathbf{\$3,622,920 / \$211,698,000 = 1.7\%}$

In addition, ~\$905k of total fees collected go to the Ecosystem Reserve, so AAVE holders staking in the ER earn ~0.73% just from aDAO1.

Combined with our hypothetical scenario for aDAO2, AAVE holders would earn ~1.7% for participating in the governance of the ER. *It's important to note this return on capital calculation does not include any AAVE issuance for those participating in the governance of the ER.*

Protecting from tail risk

While the system works well under normal circumstances, given that all aDAO safety pools/bonding curves are held in \$AAVE, a sharp fall in \$AAVE price could lead aDAOs to trade under the minimum safety parameter. While this isn't ideal, it isn't as bad as it sounds since there is no immediate way for this to be exploited by bad actors. Rather, it simply means the aDAO is not appropriately collateralised for the technical and market risks it is exposed to.





It's also worth understanding that there are natural market forces that should help collateralise the safety pool. Assuming the price of \$aDAO tokens have intrinsic value separate from the \$AAVE price, then as \$AAVE drops in price, users are able to acquire the same amount of \$aDAO tokens at a lower dollar price. This should encourage more \$AAVE to flow into the safety pool in order to arbitrage the price difference.

Nevertheless, crypto markets are rarely efficient and we thus propose a few additional layers of protection for the system:

- **aDAO Treasury:** The first layer of defense for an aDAO is its treasury. We propose that if the amount of value in the safety pool drops below the minimum safety parameter, the treasury is automatically transferred into the bonding curve.
- **Incentive pendulum:** If after transferring the treasury into the safety pool, it still remains undercollateralized, then we propose the following incentive mechanisms:
 - **Increase Staking Incentives:** \$aDAO pools issue \$aDAO credit tokens, entitling users who come in to stake while the pool is undercollateralized to receive a larger amount of future \$aDAO tokens.
 - **Reduce System Capacity:** If neither solutions work, then we suggest creating incentives to reduce system capacity, perhaps by implementing an increased fee on outstanding loans to incentivize users to pay their loans back.

Reputation

Encouraging governance participation and decision-making is crucial for both aDAOs and the ecosystem reserve. We don't like the idea of uniformly rewarding all voters merely for voting because it's a waste of resources and we don't feel this provides enough differentiation for truly outstanding community members.

In order to target rewards to incentivise quality participation, we believe some form of reputation is crucial. We have recently designed a revised reputation system for DXDAO and believe some of these concepts can be used by Aave.

At a high-level, we see reputation as a non-fungible, non-transferrable token that is distributed by the DAO in exchange for quality contributions. While \$AAVE staked remains the primary determinant of yield/voting power, reputation would act as a multiplier on both yield for voting and voting power itself. We suggest the following formula in terms of voting power multiplier.

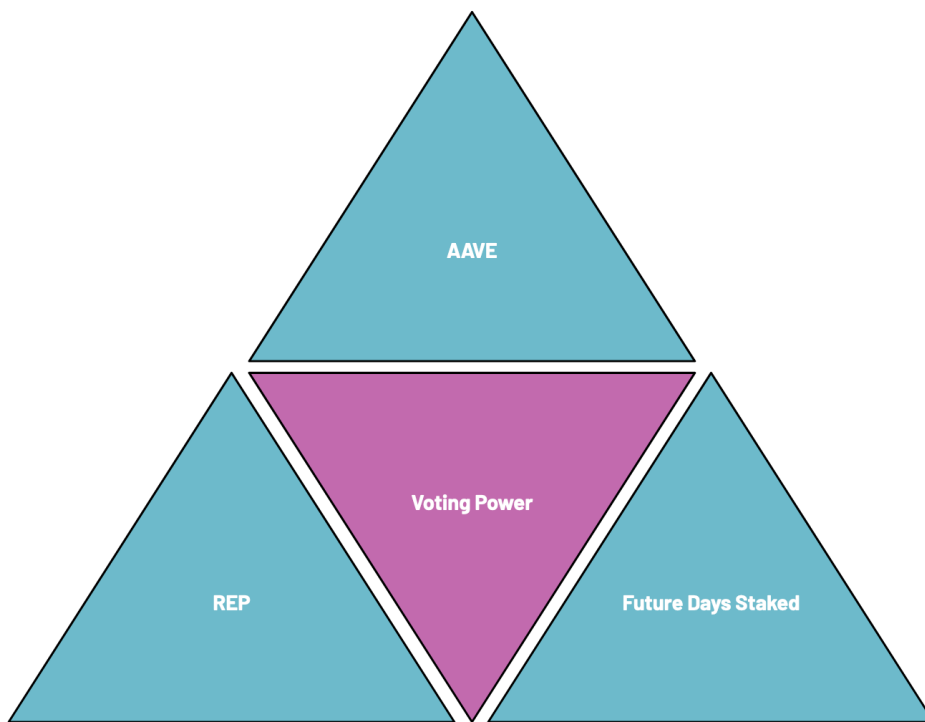
$$\text{Voting power} = \$AAVE \text{ staked} \cdot \text{Log}(\text{REP Balance}) \cdot (\text{Future Days staked})^{mb}$$





Category	Sub-Category	Description	Inputs	Notes
Voting Power	REP	a	1	Divisor to reduce multiplier from REP Balance
	FDS	b	1	Divisor to reduce multiplier from FDS. If you lower k, then raise b
		k	30	Less than this # penalizes voting power, greater than multiplies it
		m	0.5	Exponent that FDS is raised to

- \$AAVE staked - represents capital-at-risk; acts as the base voting power.
- REP Balance - non-transferable reputation, earned from past work / time spent staking; acts as a multiplier on voting power.
- Future Days Staked - a voluntary forward looking commitment that keeps a member's AAVE locked in staking; can act as a multiplier or penalty on voting power.



On their own, each component results in low voting power. It's only when all 3 are combined - financial skin in the game, reputation earned from past work , and a forward looking commitment - that voting power is maximized.

Using reputation also makes paying a yield on voting more feasible as we can selectively reward high-value community members. A similar multiplier could be applied to paying out yield on voting, but we are still fleshing out our ideas around this. Similarly, we are still working out our ideas around whether REP should be specific to each aDAO or function across the network. Nevertheless, we wanted to include these ideas here to stimulate discussion on our upcoming call.





Reputation has the added benefit of encouraging on-chain identity as contributors are incentivized to keep one wallet to accumulate REP and maximize their voting power and yield on the network.

In terms of distribution, a certain percentage of \$aREP can be initially distributed by Aave, while the remainder can be distributed over a certain period of time and voted on by both the initial \$aREP holders and all other Aave platform participants.

The reputation model requires more work and is also less urgent than some of the other changes. This will be part of a later workstream once the aDAO tranching risk model has been refined and launched.





Implementation

Types of aDAOs

At a high-level, we believe aDAOs should be segregated by their **risk-reward profile**, perhaps based on Aave's existing asset risk framework. This allows each DAO to be owned and operated by stakeholders with appropriate risk appetites. In addition to tranching risk, Aave can also use new aDAOs to **enable risk siloed experimentation hubs** such as the recently proposed DAO to DAO lending.

We suggest, at least initially, each aDAO should have an exclusive license over assets deposited into its protocol as well as the type of lending products it provides. Eventually, we believe it should be possible to open this up, allowing aDAOs to offer similar assets, competing on the way the particular combinations of assets they provide, the speed/quality of governance and/or the risk-reward provided.

Initial aDAOs

Initially, we propose all initial aDAOs will be operated by Aave itself, with the current money markets protocol being split into either one or multiple aDAOs, pending discussion with the team:

- Single aDAO
 - "Aave Classic": includes all existing money markets.
- Two aDAOs
 - Aave AA: includes the highest quality collateral (\$BTC, \$ETH, stablecoins), having a lower safety parameter and consequently lower yield.
 - Aave AB: includes lower quality collateral (\$YFI, \$BAT, \$ENJ, \$REN, \$KYBER, \$LINK, \$MANA, \$MKR, \$REP, \$SNX, \$WBTC, \$ZRX).
- Three aDAOs:
 - Aave asset-backed: includes asset-backed tokens such as stablecoins, WBTC and potentially others such as PAXG.
 - Aave AA: includes the highest quality collateral (\$BTC, \$ETH, \$LEND).
 - Aave AB: including lower quality collateral (\$YFI, \$BAT, \$ENJ, \$REN, \$KYBER, \$LINK, \$MANA, \$MKR, \$REP, \$SNX, \$WBTC, \$ZRX).





Initial \$aDAO Distribution

The initial aDAOs will likely be comprised of Aave's existing money-markets. As such, the initial \$aDAO token launch will have to use some distribution mechanism to avoid a rush of people trying to frontrun each other on the aDAO bonding curve. We have some ideas around how to do this that we will flesh out at a later stage.

Potential aDAOs

In terms of new aDAOs, there are many potential ideas here. Broadly, the goal should be either to either **group together assets with similar risk-reward profiles** or **allow for experimentation with new kinds of products**.

In addition to the aDAOs already mentioned above, these are some other potential ideas for aDAOs:

Risk-tranched

- **Aave asset-backed:** Money markets for asset-backed tokens such as stablecoins, \$PAXG, \$WBTC, \$REALT tokens, etc. In addition to traditional risk parameters such as liquidity, volatility, etc, risk framework should include custody risk, technical risk, and others.
- **Aave yTokens:** Money markets for yield-bearing tokens including \$YUSD, \$YETH, \$crUSD, \$pUNIUSDC, etc.
- **Aave BBB:** CREAM competitor operating money markets for the long-tail of more illiquid, volatile tokens such as \$UNI, \$wNXM, etc.

Experiments

- **Aave uncollateralised:** Money markets for uncollateralised stablecoin lending. This could have more stringent KYC requirements, operate using open law agreements and/or experiment with on-chain credit history, reputation or prediction markets.
- **Aave DAO2DAO:** Money markets for DAO to DAO lending. This could be bootstrapped by Aragon and leading Aragon DAOs.





Risk Framework

Given the fact that aDAOs **will be segmented primarily by the risk-reward they provide**, combined with **the importance of setting an accurate safety parameter for each aDAO to ensure system integrity**, it's extremely important to have robust risk frameworks to assess the risk being taken on by each aDAO.

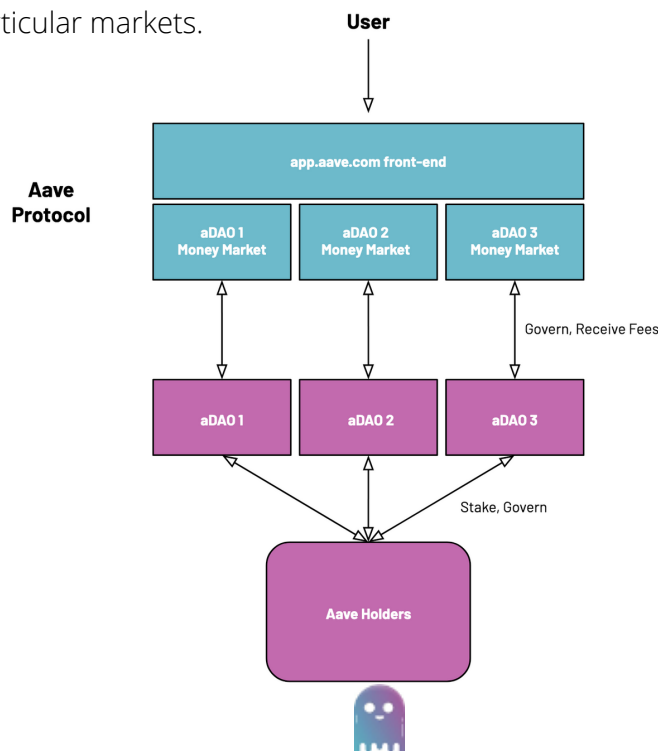
These can be based on the existing Aave risk asset framework, but we also recommend this is supplemented with specific frameworks for different kinds of assets such as asset-backed tokens which may require bespoke analysis around things like custody risk. We also recommend standards are created to classify the riskiness of different assets in order to be able to accurately group them into the correct risk bucket and corresponding aDAO, as well as to be able to estimate what an appropriate safety parameter looks like.

The goal should be to first settle on a metric that accurately reflects system capacity, i.e. the risk weighted credit exposure that a certain aDAO is taking on. Then, each aDAO will define its safety parameter in relation to that metric, based on its charter and targeted risk-reward ratio.

User Experience

While the aDAO system may seem complex, we believe the majority of this complexity can be abstracted away from users. Provided all aDAOs are appropriately collateralised (which should be guaranteed by the governance process), users don't care how the money markets are secured and governed, they just care about the variety, quality, and safety of the products they use.

As such, we propose all aDAO money market smart contracts are owned and operated by Aave and displayed on the app.aave.com website, similarly to how any new market would be displayed. Users interact with the money markets as normal and need not be aware of what aDAO is governing those particular markets.





Proposed Roadmap

We propose the following phased roadmap:

- **Phase 1 - System Architecture**

Discuss the high-level system architecture presented in this document.
Implement any changes presented by the community.

- **Phase 2 - Specification**

- Determine lower-level system specifications with goal of arriving at a minimum viable design: the simplest design that allows for the system to launch and begin testing assumptions in production. This will include:
 - Bonding curve shape - Model out different bonding curve shapes based on existing Aave data.
 - aDAO Risk Framework - Determine the best way to calculate “system capacity” and MSP across the ecosystem.
 - aDAO parameters - Model out different withdrawal fees, treasury parameters, etc to figure out optimal initial aDAO design.

- **Phase 3 - Implementation**

- Determine the best way to implement the system, including:
 - Which aDAOs to launch first.
 - How to conduct \$aDAO initial distribution.
 - Potential aDAOs to launch later.

- **Phase 4 - Additional workstreams**

- Reputation - Design reputation system to be used across Aave ecosystem.
- Ongoing monitoring - Ongoing monitoring of aDAO system health, including determining what metrics to track, etc.





Note: Interested users should be able to find out additional information such as the aDAO that governs the money market and its charter by clicking into the specific money market.





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