SPRING DAO GOVERNANCE MODEL

MARKUS JUNGNICKEL

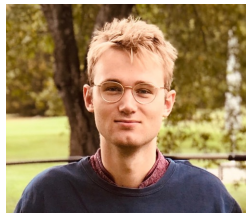
Agenda

The presentation will give a high-level overview with deep-dives reserved for Q&A

PRESENTATION OUTLINE

- Project Objectives
- Governance Analysis
- Governance Model
- Demonstration
- Technical Design
- Evaluation

CONTRIBUTORS



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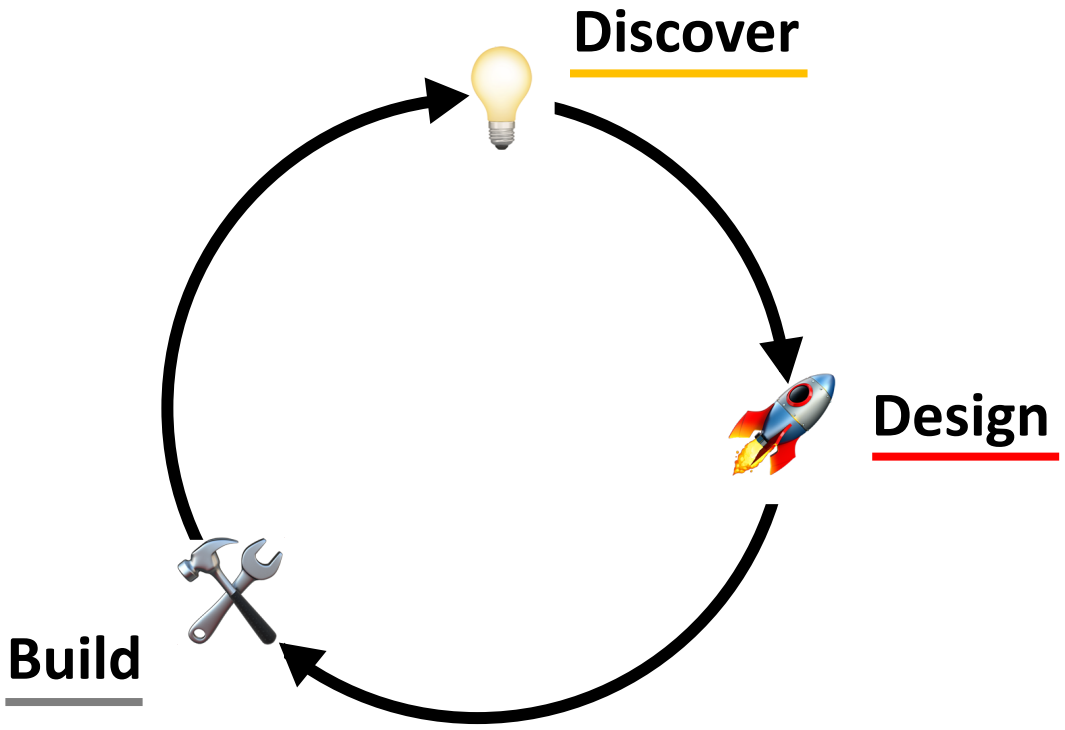
Objectives & Contributions

The thesis performed a full loop around the product development cycle

PRODUCT CYCLE



1	Conduct Governance Analysis
2	Formulate Governance Model
3	Implement Governance Components

Governance Analysis

Overview of Analysis

Compared three governance models across key dimensions

SCOPE OF ANALYSIS

Governance Models

Share-Based | Token Gov | Reputation

Governance Dimensions

Centralization | Participation | Controversy

SUMMARY OF RESULTS

	Gini Coefficient	Voter Participation[1]	Median Majority Size
DAO Haus	0.74	78%	**98.15%** !
DAO Stack	0.46	97%	97.76%
Protocol DAOs	**0.98** !	**99%** !	96.99%
Snapshot	N/A	92%	90.49%

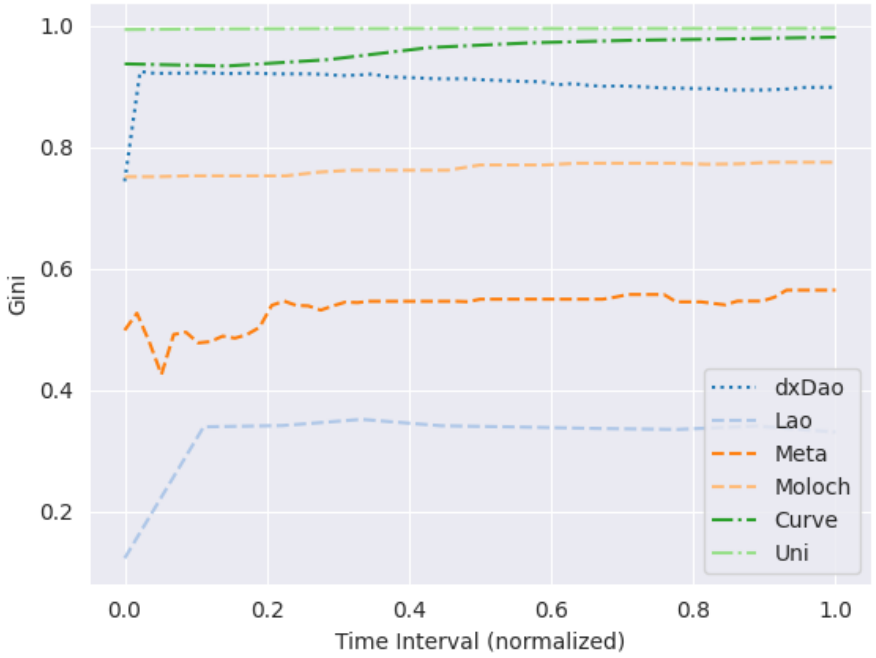
! = worst performer

[1] Percent of voters who participated in less than 10% of votes. Only a small subset of DAOs were considered.

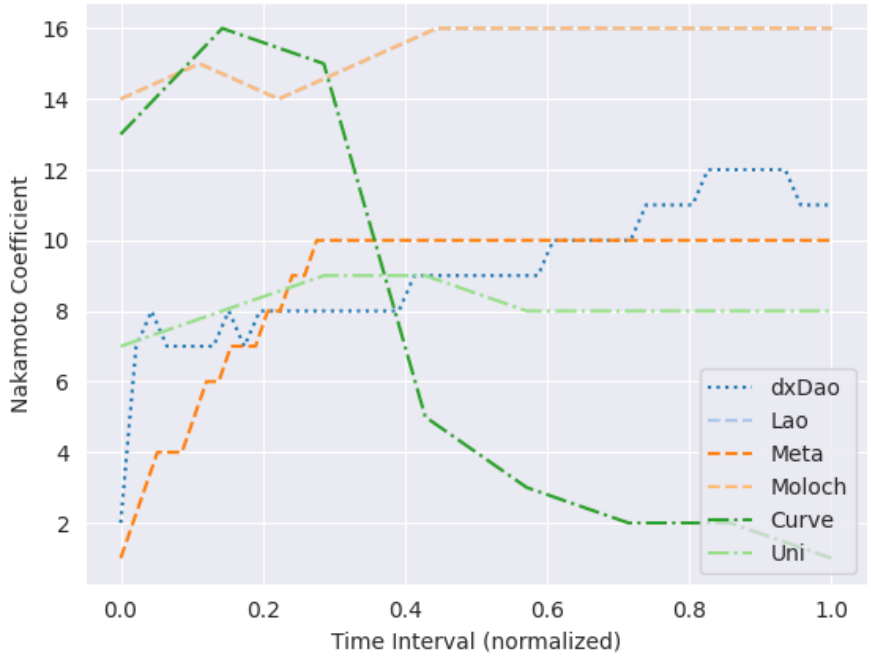
Centralization

Many DAOs are highly centralized, especially token-based DAOs

GINI COEFFICIENT



NAKAMOTO COEFFICIENT

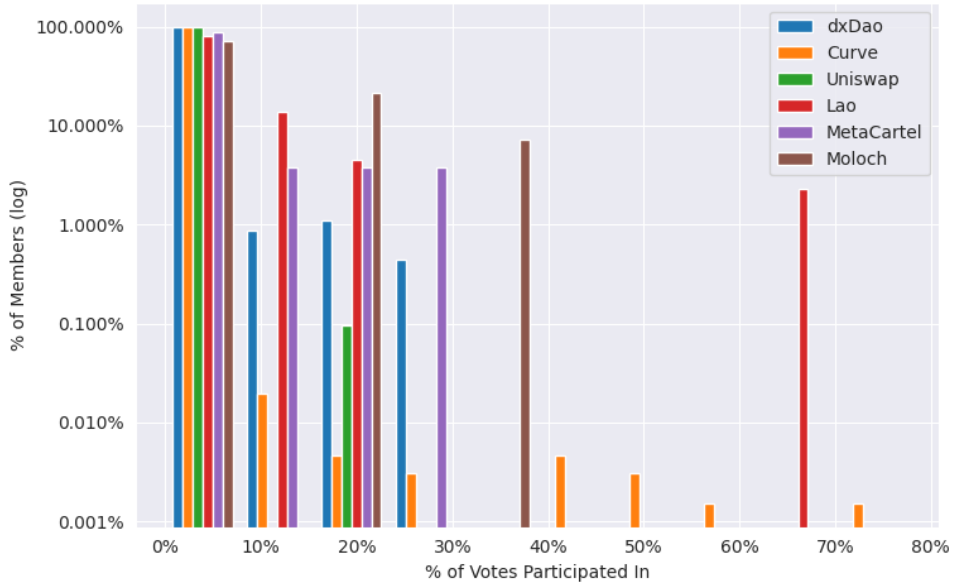


💡 **Insight:** Transferability, financial value and initial allocation of tokens are problematic

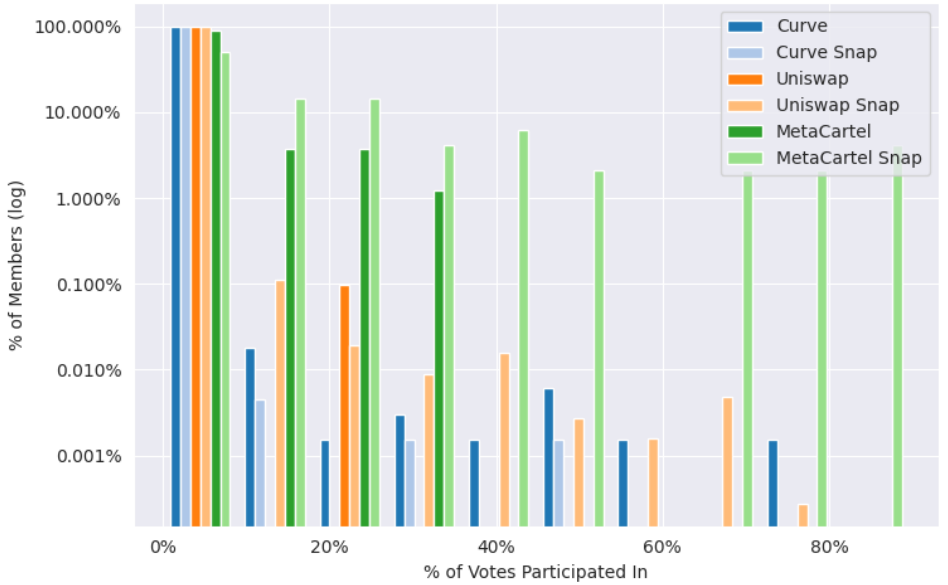
Participation

Low member engagement is present across governance models

ON-CHAIN PARTICIPATION



ON VS OFF-CHAIN PARTICIPATION

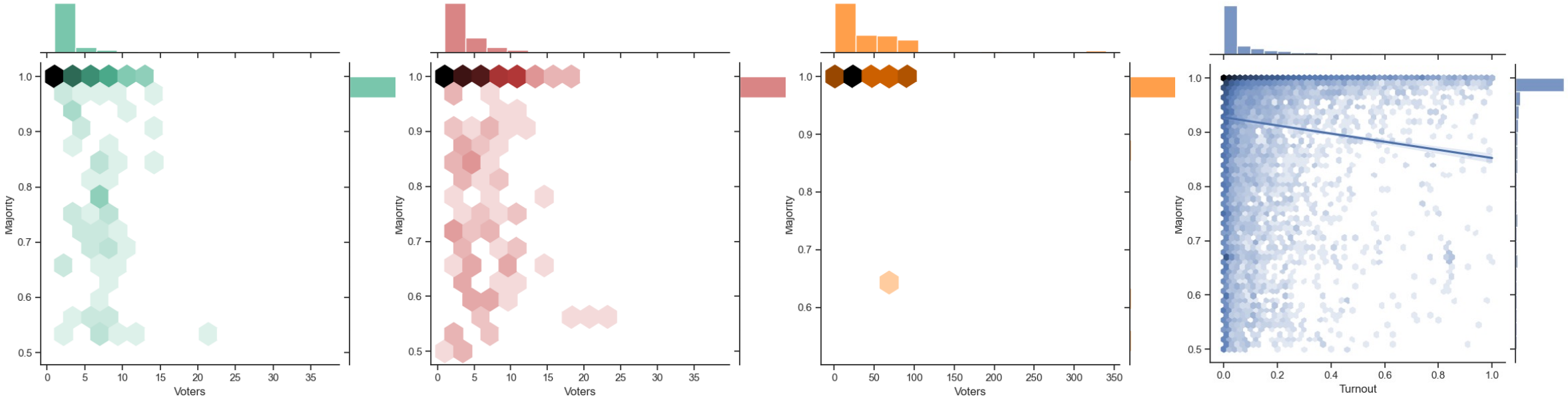


💡 **Insight:** Low participation results from centralization and direct democracy

Decision Controversy

Disagreement and turnout are low, both on and off-chain

CONTROVERCY



DAO Haus **DAO Stack** **Protocol DAOs** **Snapshot**

💡 **Insight:** While controversy is lacking, it may be partially masked by low participation

Summary of Insights

The proposed governance model addresses the key issues identified here

GOVERNANCE CHALLENGES

A high degree of centralisation, constant over time

Votes have low participation

Proposals are largely uncontroversial

Proposed Solutions

- Non-transferable token, no financial value, fair initial allocation
- Decrease decisions, focus on representative democracy
- Optimistic Governance

Governance Model

Three Governance Components

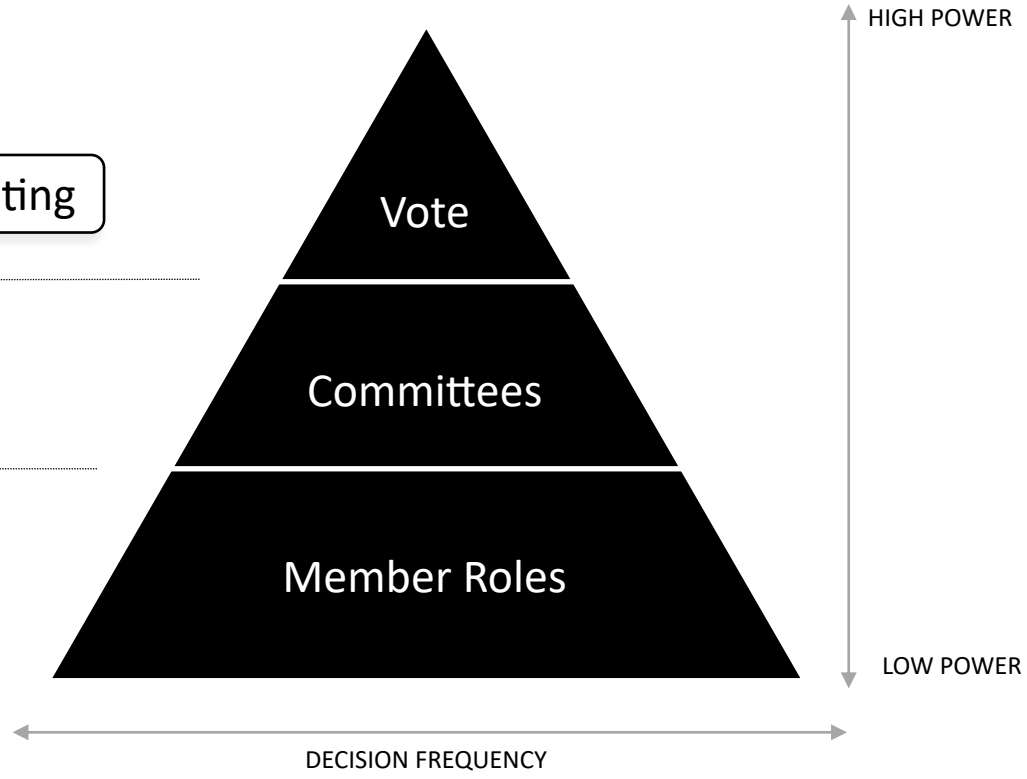
The overall DAO governance will be divided between voting, roles and committees

GOVERNANCE MODEL

Non-Transferrable | Optimistic Gov | Quadratic Voting

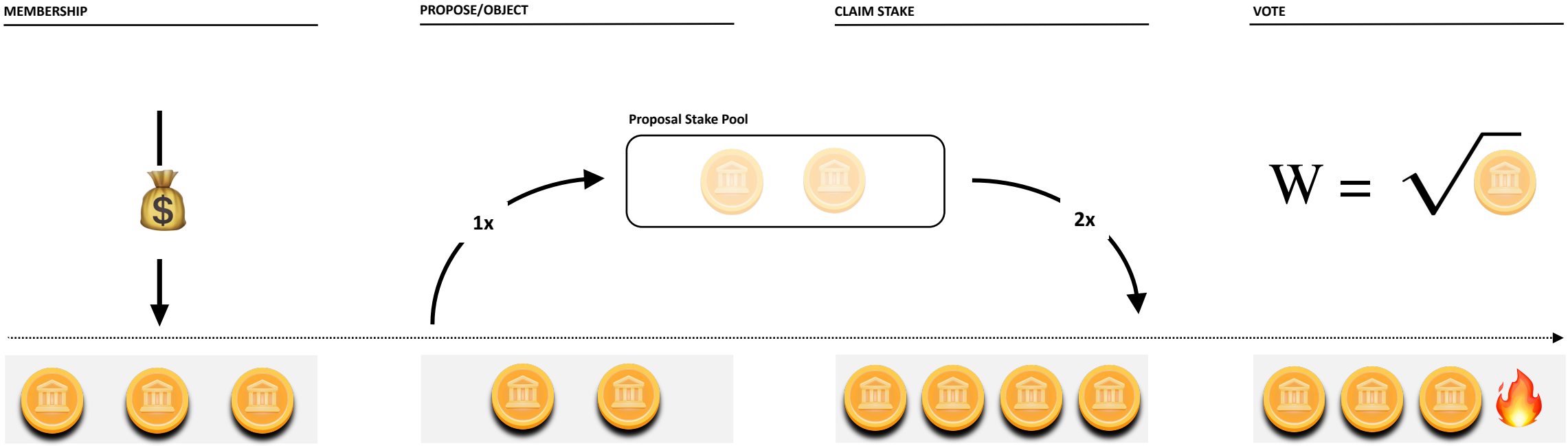
Multi-Sig | Elected | Decision Power

Elected/Appointed | Decision Power



Member Lifecycle

Governance Token balance across different lifecycle stages

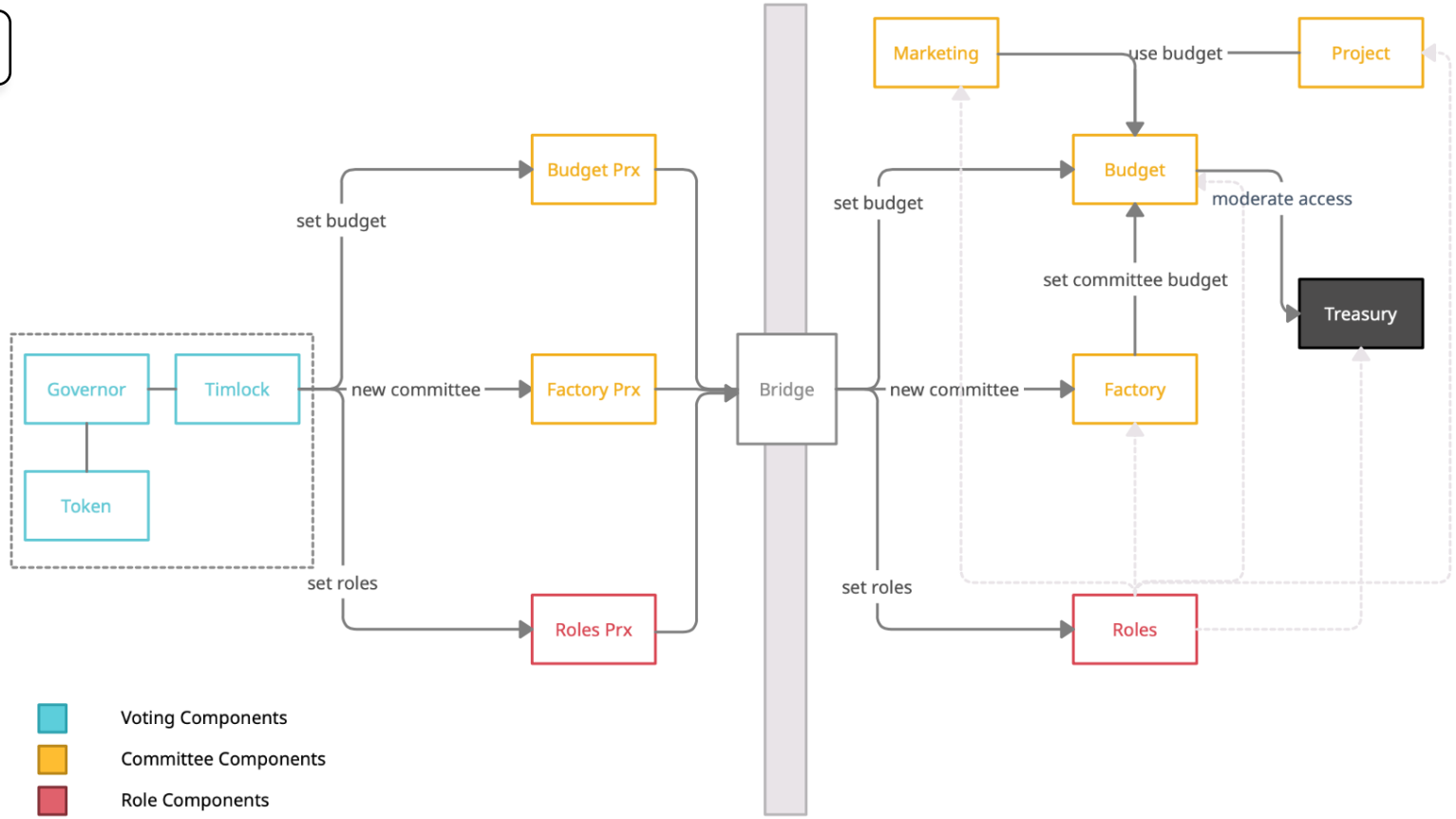


Prototype Demonstration

Prototype Architecture

The Prototype architecture demonstrates the use of the technical components

Link to Prototype



Technical Implementation

Zodiac Standard

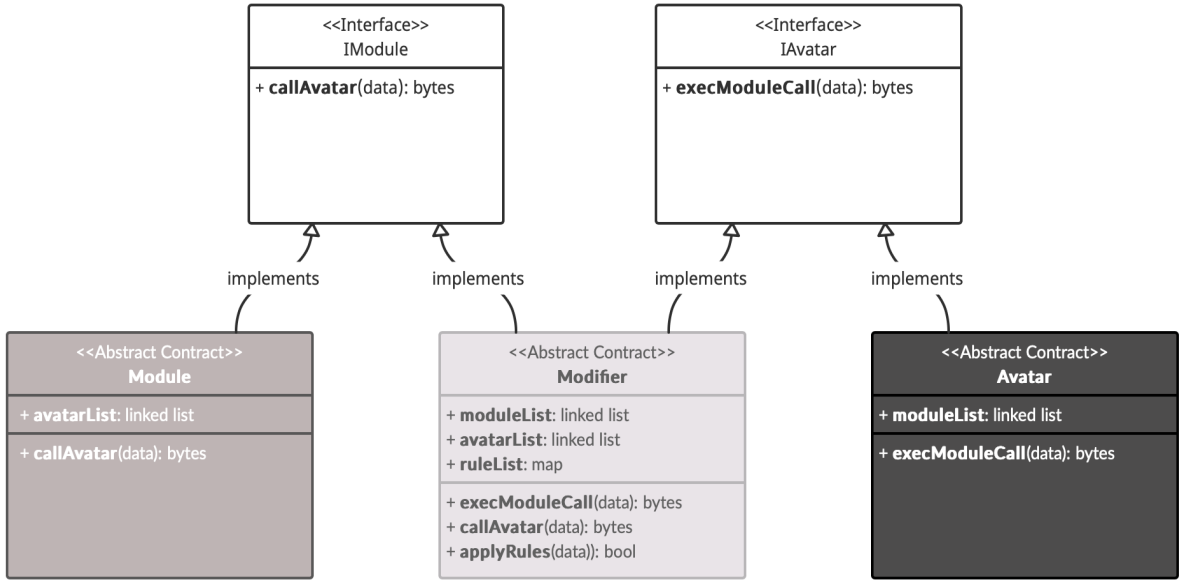
Building on the first open-source modular design standard for DAOs

ZODIAC STANDARD INTERFACES

Improved Extensibility

Easier Interoperability

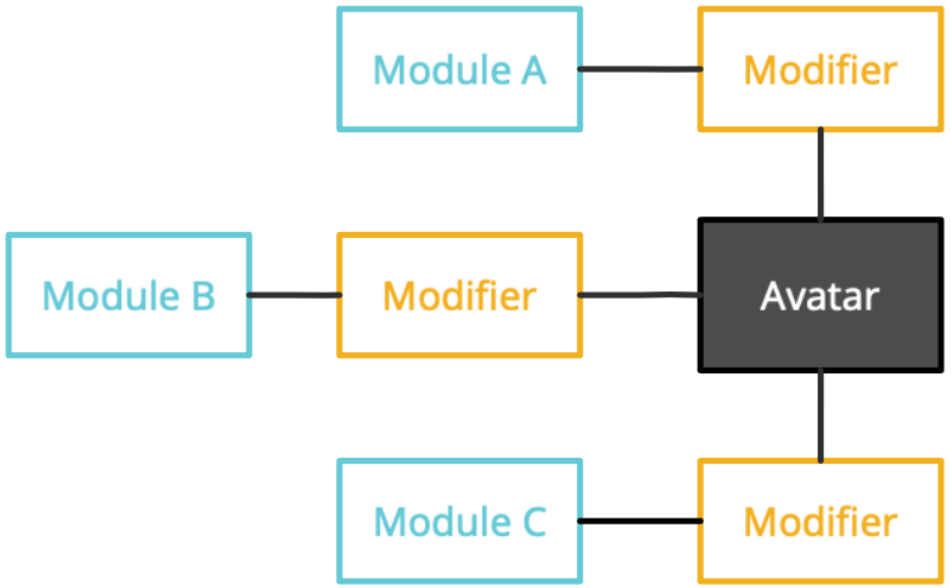
Greater Reusability



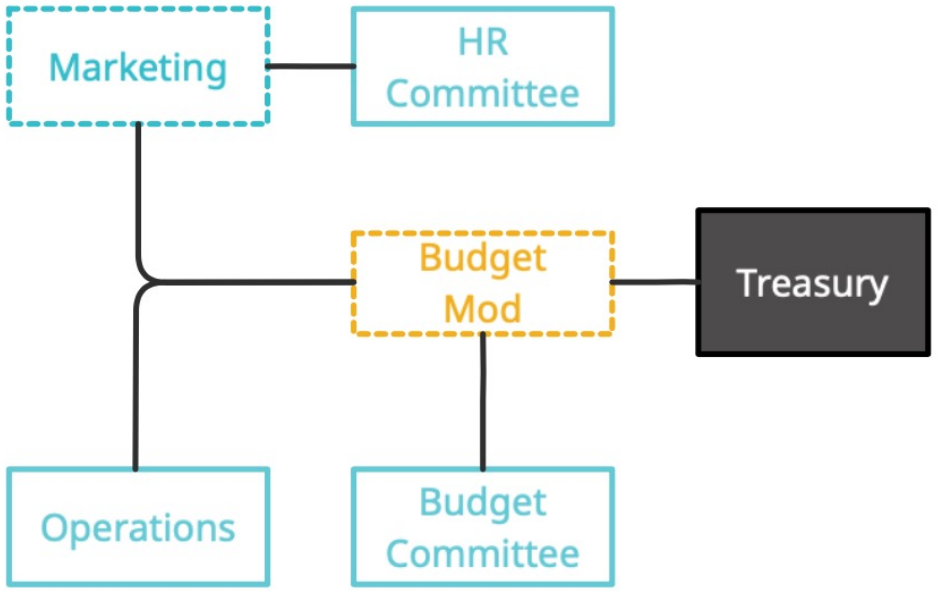
Improved Zodiac Standard

The Zodiac standard was improved without breaking compatibility

SIMPLE ZODIAC DESIGN



ADVANCED ZODIAC DESIGN

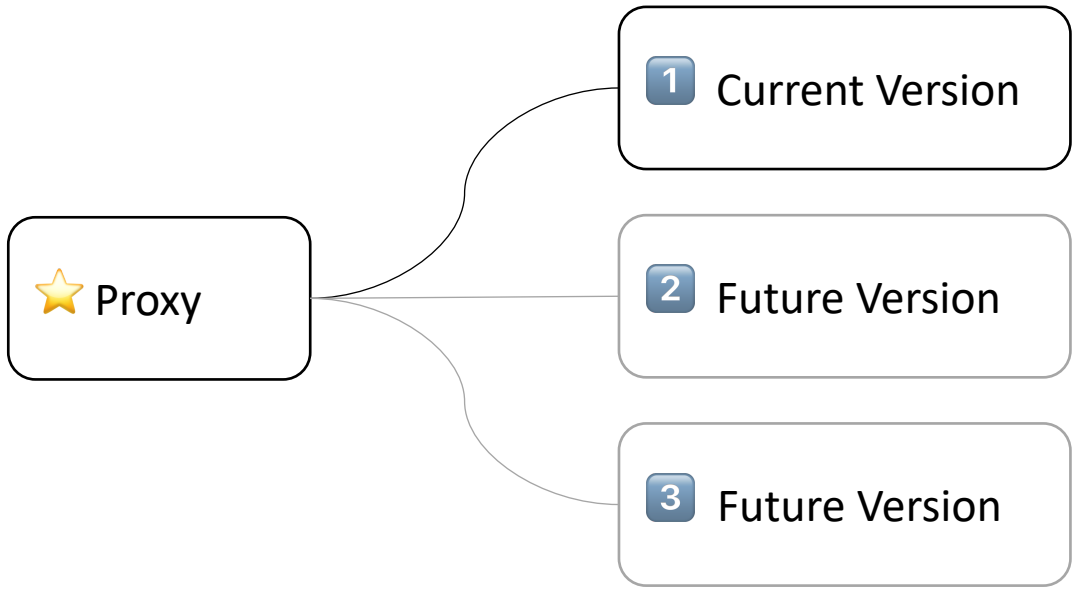


🛠️ **Consideration:** The simple design requires many modifiers and does not allow networks of control

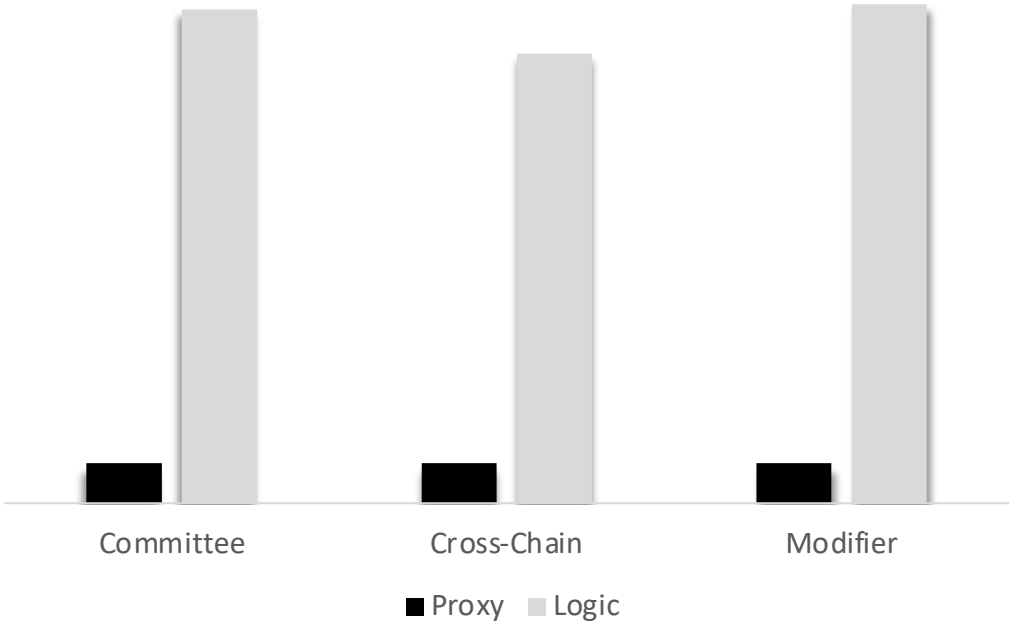
Proxy Pattern

Using the UUPS Proxy Pattern

UPGRADEABILITY



COST EFFICIENCY

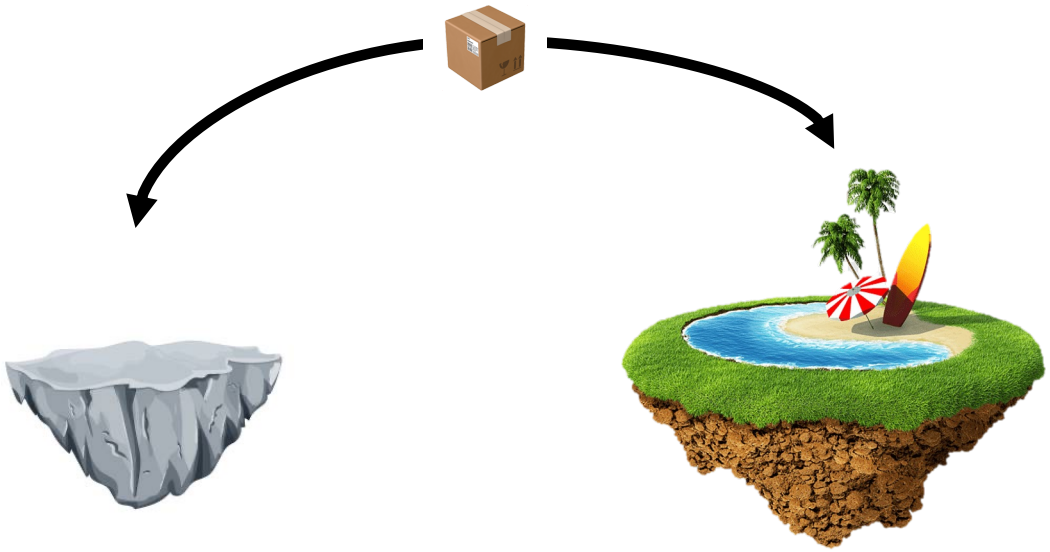


🛠️ **Consideration:** A flexible and extensible governance model needs cheap & upgradeable contracts

Cross-Chain Smart Contracts

Proxies were used to realize cross-chain interactions

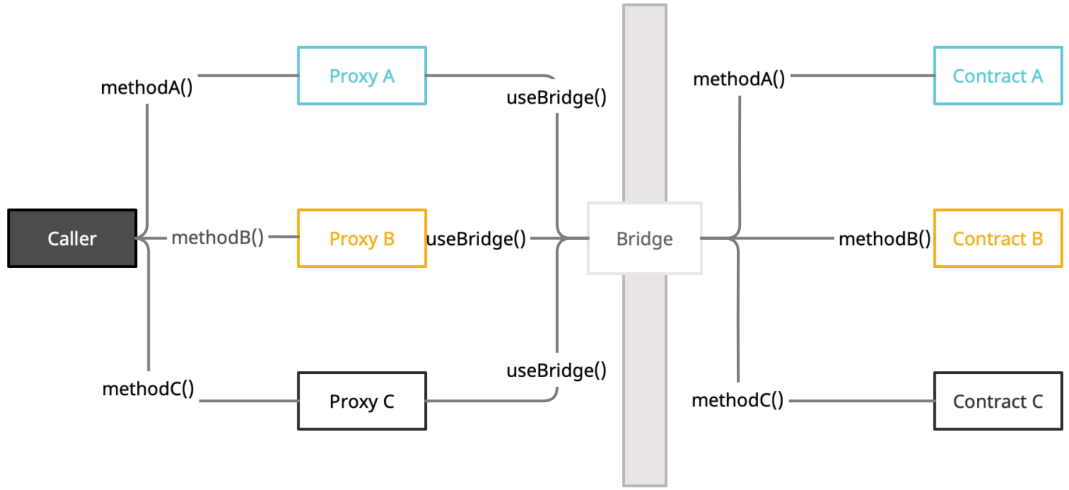
CROSS-CHAIN GOVERNANCE



xDai Chain: <$0.01

Mainnet: $4.65

BRDIGE ARCHITECTURE



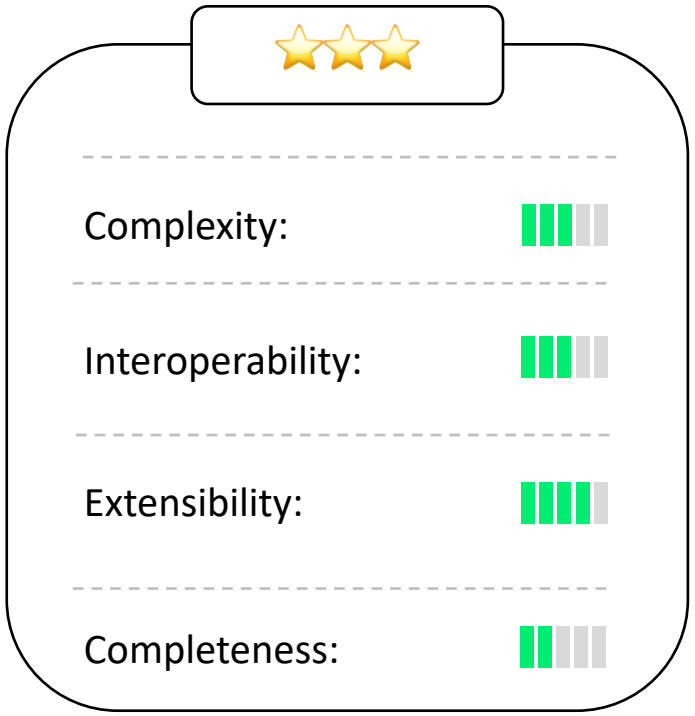
🛠️ **Consideration:** Cross-chain governance is only attractive if bridge interactions are safe and seamless

Prototype Evaluation

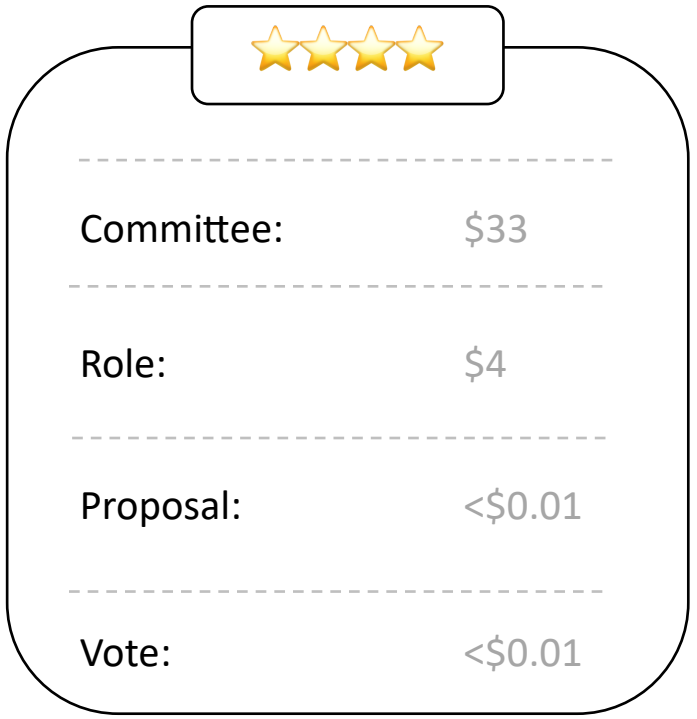
Prototype Evaluation

The Prototype was evaluated along three key dimensions

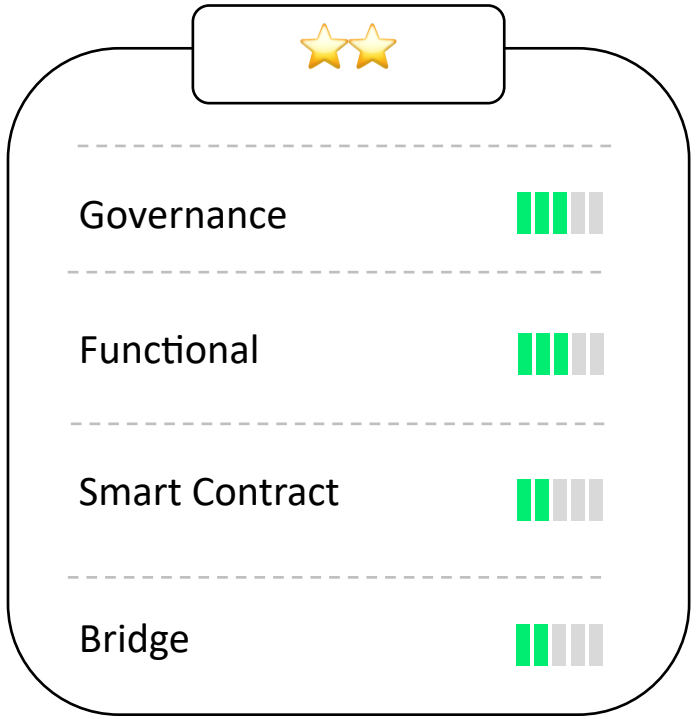
FUNCTIONALITY & DESIGN



COST



SECURITY



🧐 **Conclusion:** Overall good design but security, complexity, interoperability and completeness need improvement

Thank You!

Deep-Dive Slides

Governance Analysis

Deep Dive: Literature Review

REVIEW OF EXISTING RESEARCH

Centralization

- Extensive research on token-based DAOs
- Limit research on DAO Haus and DAO Stack, including comparison
- Missing focus on comparison of different models

Participation

- Research available on all governance models
- Some comparative analyses
- Insufficient focus on off-chain voting

Controversy

- Some research on all models, but insufficient comparisons
- No focus on understanding share vs voter majorities
- Insufficient analysis of off-chain voting

Governance Analysis

Deep Dive: Methodology & data

LIMITATIONS

Heterogenous across DAOs and Models

Possible sample bias and limited sample size

Limited governance dimensions and metrics

Exploratory without statistical validation

METHODOLOGY

Voting Power

Gini Coefficient, Nakamoto Coefficient, Lorenz Curves, Temporal Analysis

Participation

% of votes in which members participate, proposal turnout

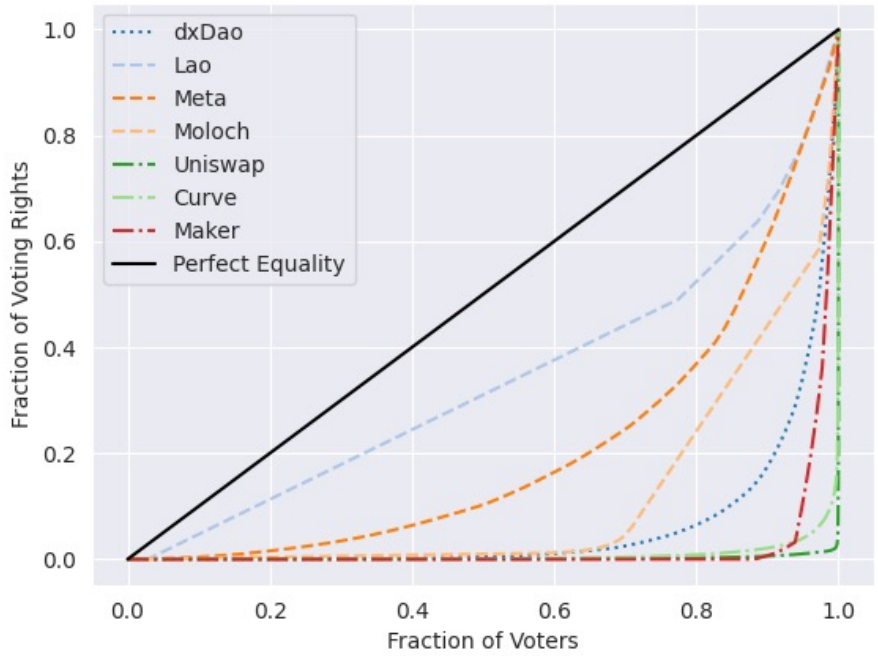
Controversy

majority sizes, voter turnout, comparison of types of majorities

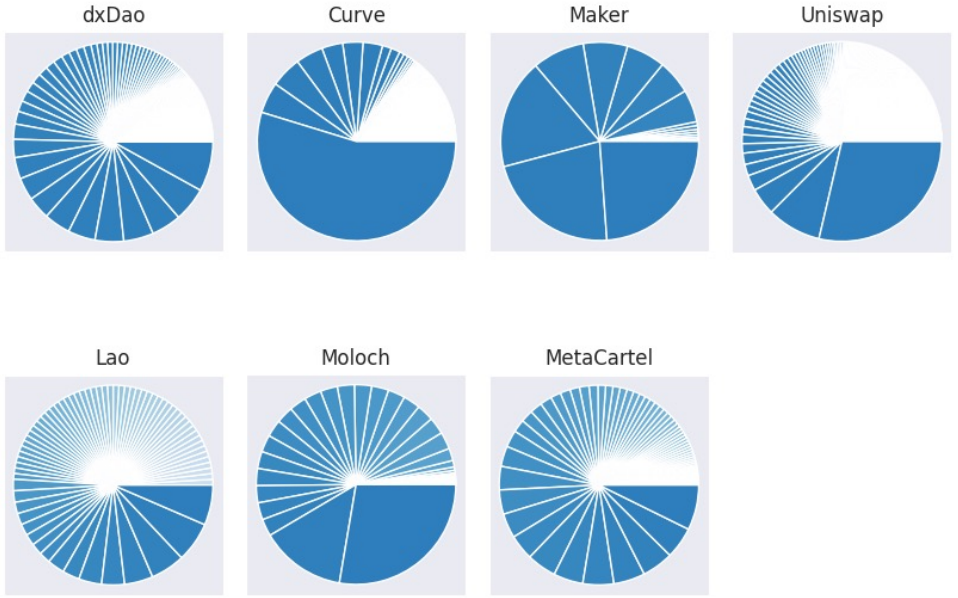
Centralization

Deep Dive: Voting power distribution

LORENZ CURVES



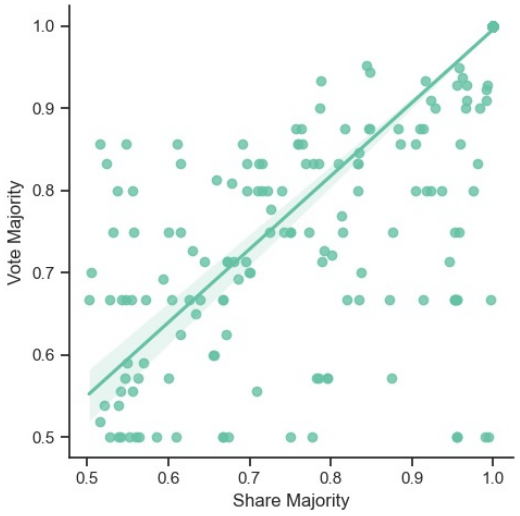
VOTING POWER DISTRIBUTION



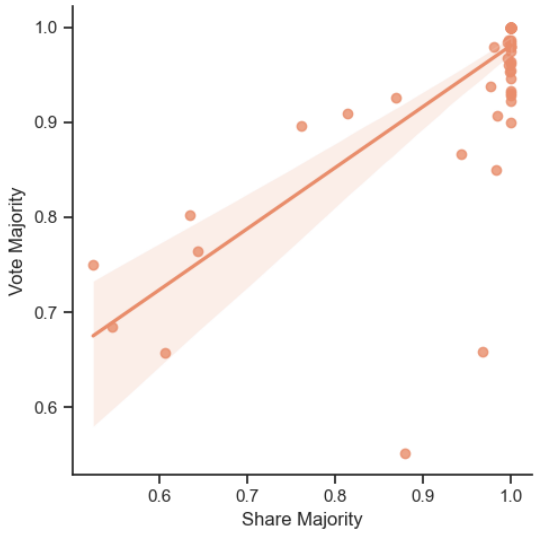
Controversy

Deep Dive: Share vs voter majority

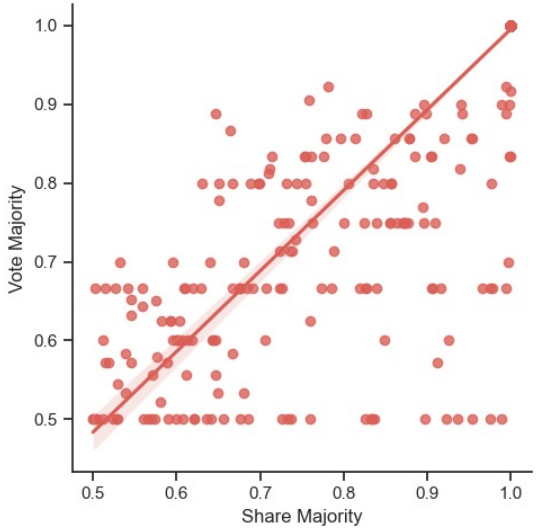
MAJORITY SIZES



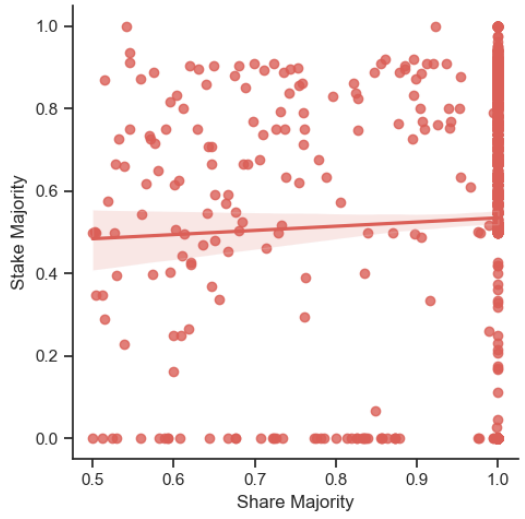
DAO Haus



Protocol DAOs



DAO Stack

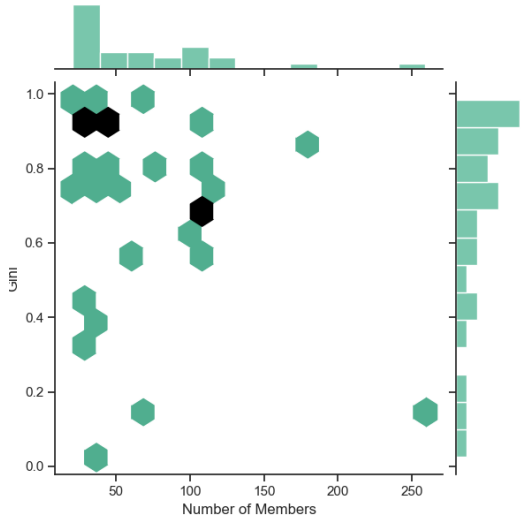


DAO Stack

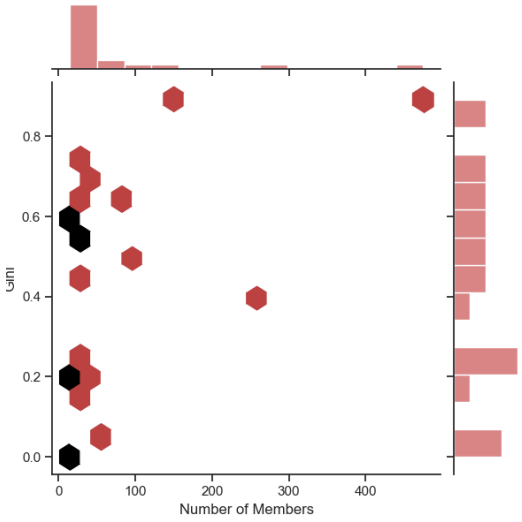
Centralization

Deep Dive: DAO Stack and DAO Haus

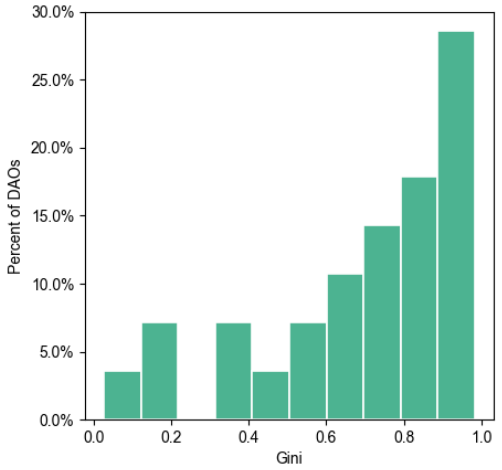
DAO STACK & DAO HAUS



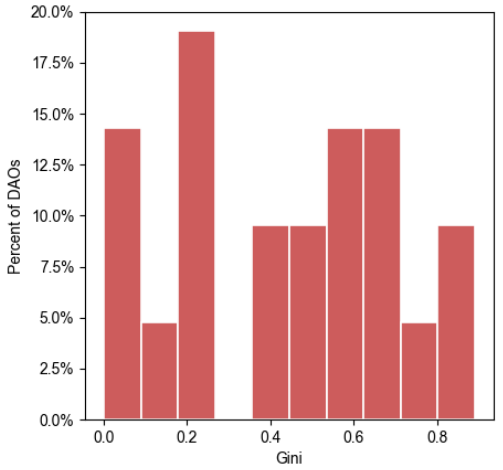
DAO Haus



DAO Stack



DAO Haus



DAO Stack

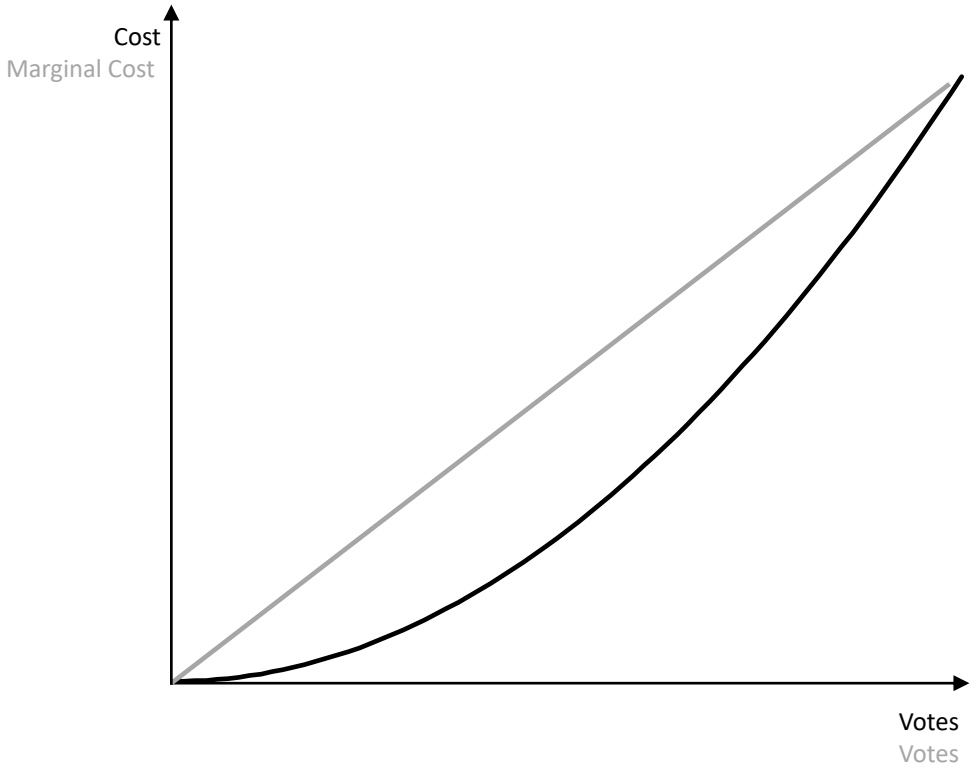
Quadratic Voting

Deep Dive: Decreases centralization and improves preference satisfaction

ADVANTAGES & CHALLENGES

- **Preference Optimization**
- **Decreased Centralization**
- **Sybil Attacks**
- **Proposal Gaming**

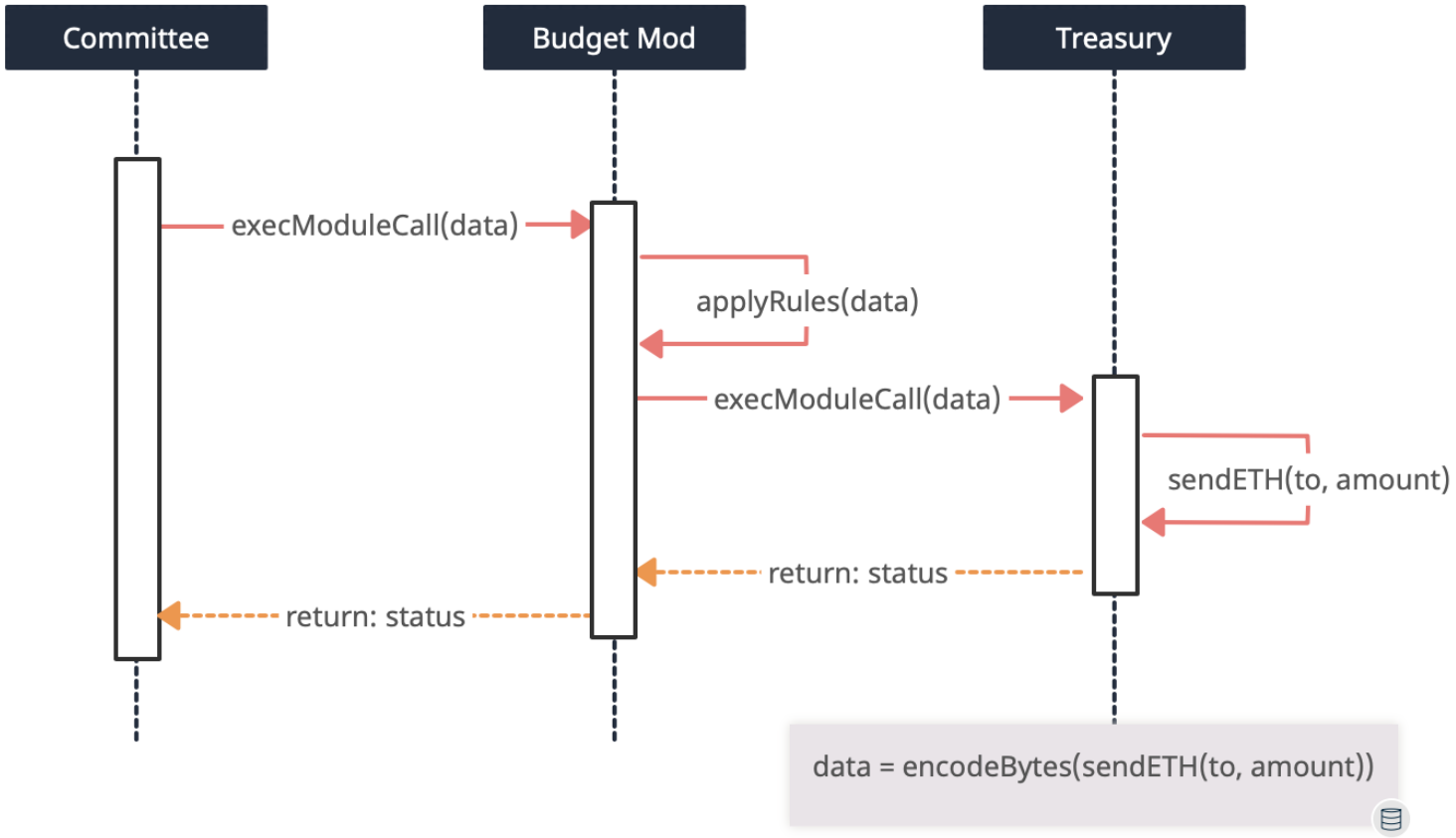
QUADRATIC COST CURVES



Zodiac Standard

Deep Dive: Generic function call

GENERIC FUNCTION CALL

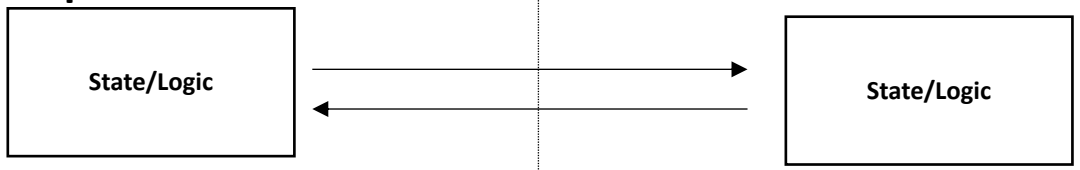


Bridge Architecture

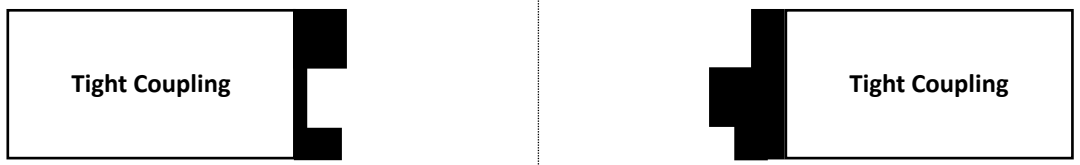
Deep Dive: Cross-Chain Smart Contracts

PROBLEMS WITH EXISTING APPROACHES

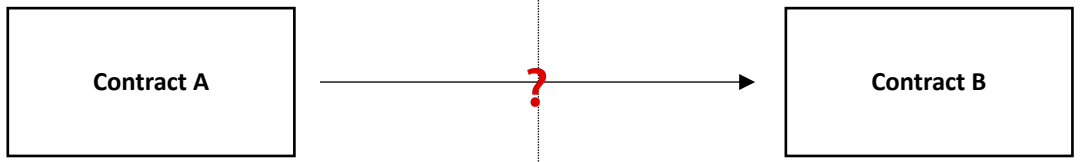
Duplication



Interoperability



Usability



PROPOSED DESIGN

- Better Usability
- Improved Interoperability
- One-Directional Bridge
- Insufficient Security Precautions

Example dxDAO

Bridge Architecture

Deep Dive: Security

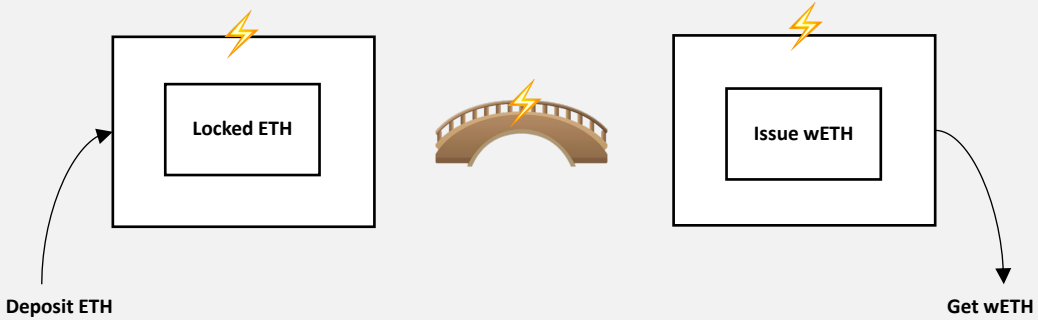
SECURITY RISKS[1]

51% Attacks

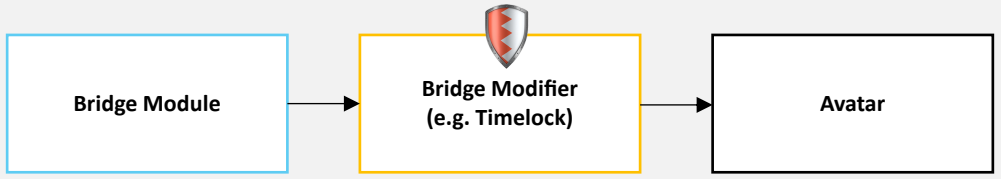
Bugs

MITIGATING MEASURES[1]

Token vs Gov:



Safeguards:



[1] Information taken and diagrams adapted from Certik

Key Project Challenges

Deep Dive: Issues encountered during the project

GOVERNANCE ANALYSIS

- Accessibility of Data
- Heterogeneity of Data
- Limited Scope

GOVERNANCE MODEL

- Voting Mechanism Design
- Computer Science Focus
- Limited Scope

TECHNICAL IMPLEMENTATION

- Implementing Modularity
- Working with AMB