L11: DAOs & Governance

Extended Slides – BSc Blockchain Course

Digital Finance

Outline

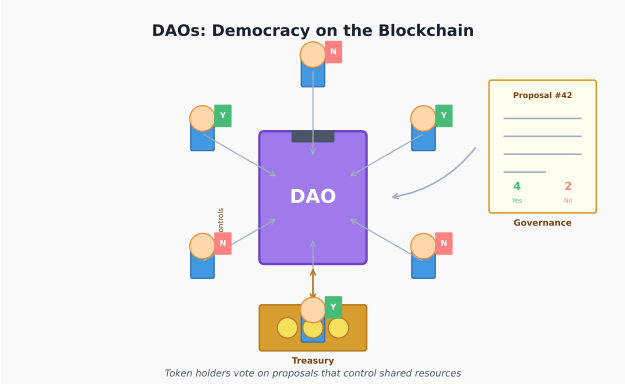
Learning Objectives

By the end of this lesson, you will be able to:

1. Understand DAO structure and components
2. Explain different voting mechanisms
3. Describe treasury management approaches
4. Analyze proposal lifecycles
5. Evaluate DAO governance models

Prerequisites: L05 Ethereum, L06 Solidity.

Governance On-Chain



Purpose: DAOs enable collective decision-making through token voting. They represent a new model for organizational governance and resource allocation.

Billions of dollars managed by code-enforced voting systems.

What is a DAO?

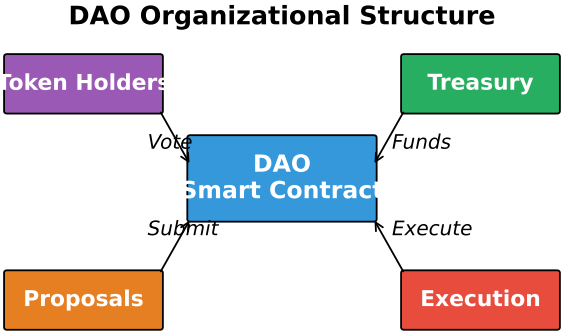
Decentralized Autonomous Organization:

- Organization governed by smart contracts
- Token holders make decisions collectively
- No central authority or management
- Rules encoded transparently on-chain

Key Properties:

- Permissionless participation
- Transparent treasury
- Programmable governance

The DAO hack (2016) led to Ethereum's hard fork.



DAOs replace hierarchies with smart contract governance.

DAO Components

Core Elements:

- **Governance Token:** Voting power representation
- **Treasury:** On-chain funds (ETH, stablecoins)
- **Proposal System:** For submitting changes
- **Voting Contract:** Tallies and executes votes

Optional Components:

- Timelock for delayed execution
- Multi-sig for emergency actions

OpenZeppelin Governor is a popular implementation.

DAO Voting Mechanisms

1 token = 1 vote
Simple but plutocratic

Cost = votes^2
Reduces whale power

Time-weighted
Long-term alignment

Vote delegation
Liquid democracy

Quadratic voting reduces plutocratic control.

Token Voting Deep Dive

1-Token-1-Vote:

- Simple and straightforward
- Whales have disproportionate power
- Used by most early DAOs

Quadratic Voting:

- Cost scales quadratically with votes cast
- 1 vote costs 1 token, 2 votes cost 4, 3 votes cost 9
- Reduces whale dominance by making marginal votes expensive

Gitcoin uses quadratic funding for public goods.

Delegation and Liquid Democracy

Vote Delegation:

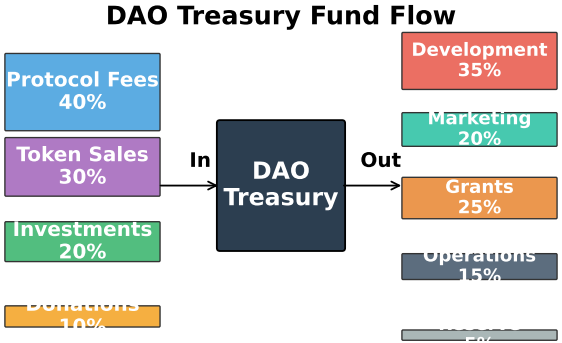
- Delegate your voting power to experts
- Can revoke delegation anytime
- Creates “liquid democracy”

Benefits:

- Increases effective participation
- Rewards active community members
- Reduces voter apathy impact

Compound and Uniswap use delegation extensively.

Treasury Management



DAO treasuries hold billions in protocol-owned assets.

Treasury Sources

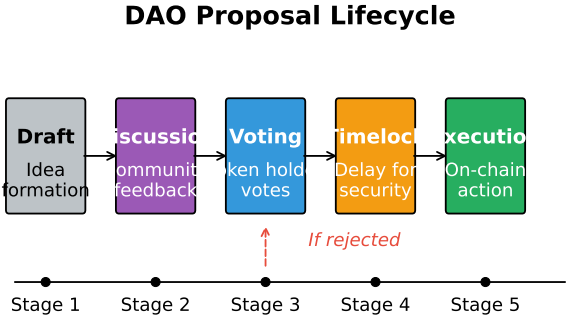
Revenue Streams:

- Protocol fees (trading, lending)
- Token sales and emissions
- Yield on idle treasury assets
- Partnerships and grants received

Notable Treasuries:

- Uniswap: billions in UNI (value fluctuates with price)
- MakerDAO: diversified holdings

Treasury values in native tokens fluctuate significantly with market prices.



Timelocks provide security against malicious proposals.

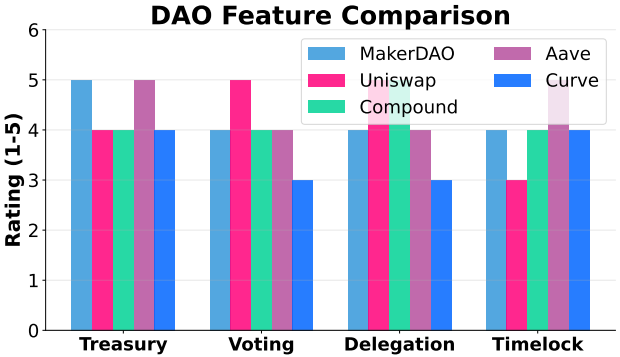
Proposal Stages Explained

Stage Details:

- **Draft:** Initial idea, off-chain discussion
- **Temperature Check:** Gauge community interest
- **Formal Vote:** On-chain token-weighted vote
- **Timelock:** Delay before execution (24-48 hours)
- **Execution:** Smart contract calls executed

Snapshot allows off-chain voting to save gas.

DAO Comparison



Different DAOs optimize for different governance goals.

Governance Challenges

Common Issues:

- Low voter participation (often under 10%)
- Whale dominance in token voting
- Governance attacks (flash loans)
- Coordination costs for complex decisions

Mitigations:

- Minimum quorum requirements
- Vote escrow (veTokens)
- Snapshot block for voting

Beanstalk lost $182M to a governance attack in 2022.

Treasury Diversification Strategy

The Volatility Problem:

- Most DAO treasuries are 80–95% in native governance token
- Bear market can cut runway from 5 years to under 1 year
- Contributors cannot be paid in volatile tokens reliably

Best-Practice Allocation:

- **Operating reserve:** 12–24 months in stablecoins (USDC/DAI)
- **Strategic reserve:** ETH/BTC as inflation hedge
- **Protocol tokens:** Retain for governance, minimize cash concentration
- **Yield:** Deploy stable portion to low-risk DeFi for passive income

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MakerDAO and Compound have led treasury diversification governance proposals.

Governance Attack Vectors

Flash Loan Attack (Beanstalk 2022):

- Attacker borrowed $1B in assets via flash loans
- Used borrowed tokens to acquire majority voting power
- Passed malicious proposal to drain treasury ($182M)
- Repaid flash loans — net cost: gas fees

Other Attack Surfaces:

- **Sybil attacks:** Many wallets accumulate small positions
- **Whale collusion:** Large holders coordinate off-chain
- **Proposal spam:** Overwhelm voters to pass by fatigue

Mitigations: Snapshot voting at block before proposal; veToken lock-ups; mandatory 48h timelocks.

Governance security requires social AND technical safeguards.

Delegation Mechanisms

Simple Delegation:

- Token holder assigns full voting power to a delegate
- Delegate votes on all proposals on holder's behalf
- Revocable at any time (liquid democracy)

Advanced Patterns:

- **Split delegation:** Different delegates for different proposal types
- **veTokens (vote-escrowed):** Lock tokens for 1–4 years to earn boosted voting weight; reduces short-term speculation
- **Reputation delegation:** Weight delegates by historical voting accuracy

In practice: Compound and Uniswap delegate portals show top delegates by voting power and participation history.

Delegation concentrates real power in a small set of engaged community members.

Key Takeaways

Remember These Points

1. DAOs are on-chain organizations governed by token holders
2. Voting power can be 1-token-1-vote or quadratic
3. Treasuries fund development, grants, and operations
4. Proposals go through discussion, voting, timelock stages
5. Delegation enables liquid democracy
6. Governance attacks are a real security concern

Next Lesson: Controversies and Future.