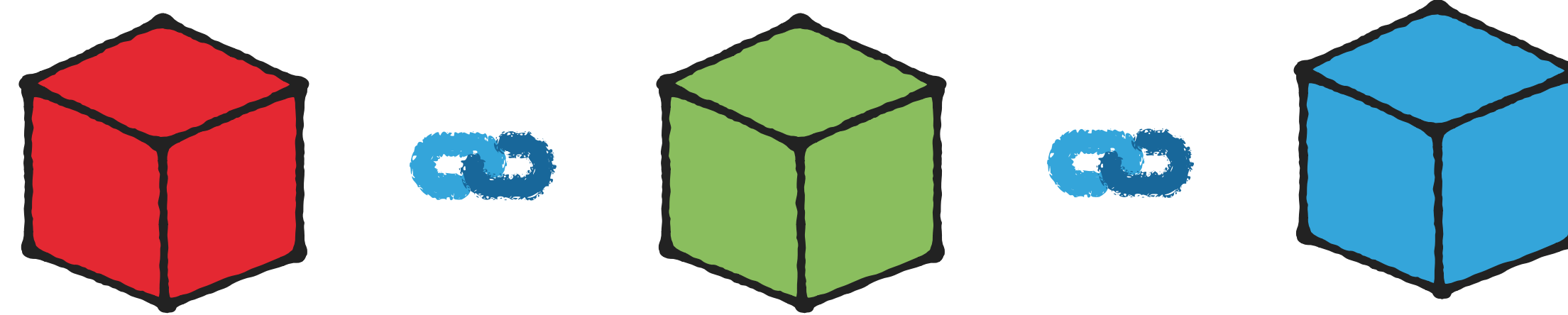




Fairness in Token Delegation: Mitigating Voting Power Concentration in DAOs

 Johnnatan Messias, PhD

  @johnnatan_me

3rd Edition of the TUM Blockchain & Cybersecurity Salon

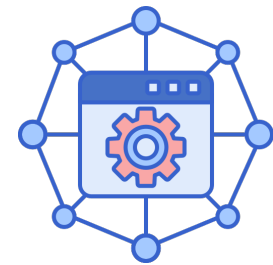
May 28th, 2025

johnnatan-messias.github.io



MAX PLANCK INSTITUTE
FOR SOFTWARE SYSTEMS

What Is a Decentralized Autonomous Organization (DAO)?



Decentralized Governance

- **Decision-making** authority is **distributed among members** instead of being concentrated in a central entity.
- **Benefits:** Increased inclusivity, resistance to centralized power abuse, and enhanced resilience.



Transparency

- Operations, decisions, and treasury **management are recorded on a blockchain, visible to all members** and stakeholders.
- **Benefits:** Builds trust and accountability within the community.



Smart Contract Automation

- **Rules and operations** of the DAO **are encoded in smart contracts**, enabling autonomous execution of tasks **without intermediaries**.
- **Benefits:** Efficiency, reliability, and reduced risk of human error.



Token-Based Membership and Voting

- **Members hold** tokens that represent **voting power** or rights within the DAO. Governance **often operates on principles like one-token-one-vote** or quadratic voting.
- **Benefits:** Aligns incentives, fosters active participation, and enables scalable governance.



Community-Driven Purpose

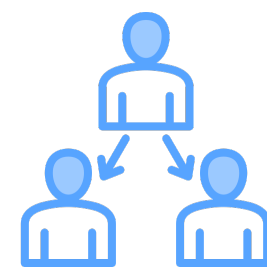
- DAOs are **typically mission-oriented**, focusing on goals such as funding projects, managing decentralized protocols, or creating shared value for members.
- **Benefits:** Engages a global, like-minded community united by a common vision.

What Are the Key Characteristics?



Token ownership

- It represents a **stake in the system**, allowing participation in decision-making.



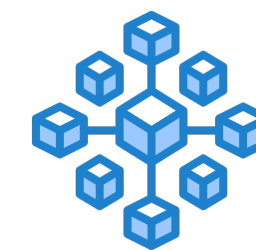
Token delegation

- It enables holders to transfer **voting power to trusted representatives**, similar to liquid democracy.



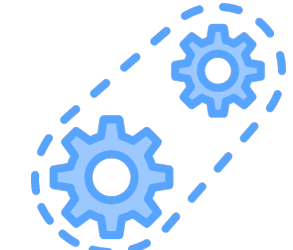
Who can vote?

- Anyone with governance **(delegated) tokens can vote** on proposals via secure blockchain platforms.



On-chain vs off-chain voting

- On-chain voting ensures **transparency and immutability**.
- Off-chain voting is **faster** but less transparent.



Most typical voting systems

- Majority voting and quadratic voting.
- Locking tokens.
- Continuous voting.
- Fixed or dynamic quorum.

DAO Operating Systems

-  ARAGON
-  MolochDAO
-  COLONY
-  Orca Protocol

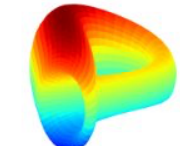
Investment DAOs

-  MetaCartel Ventures
-  theLAO
-  Flamingo
-  GCR
-  Komorebi
-  Duck DAO
-  UdacityFund

Collector DAOs

-  PleasrDAO
-  FlamingoDAO
-  Gremlins
-  FingerprintsDAO
-  BRRDAO
-  herstoryDAO
-  MUSE0DAO
-  Whale

Protocol DAOs

-  MAKER
-  Compound
-  UNISWAP
-  AAVE
-  Yearn
-  SYNTHETIX
-  Index Coop
-  PieDAO
-  LIDO
-  Sushi
-  Curve
-  pool together
-  tornado
-  KeeperDAO
-  Badger
-  hDAO
-  RaribleDAO

Service DAOs

-  RAIP GUILD
-  DXdao
-  PartyDAO
-  MetaFactory
-  Fire Eyes
-  Reverie
-  NeptuneDAO
-  LexDAO
-  MetaverseDAO
-  Llama

Social DAOs

-  FWB
-  Seed Club
-  GITCOIN
-  FiatLuxDAO
-  Metafam
-  KrausHaus
-  Bright Moments
-  SquiggleDAO
-  ProsperDAO

Media DAOs

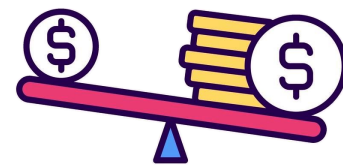
-  BanklessDAO
-  FOREFRONT
-  GCR
-  DarkstarDAO

Case Study: Compound and Uniswap



Characterize governance protocols

- They are **active and regularly used**, with a steady flow of proposals.
- The majority of the **proposals receive significant support**.



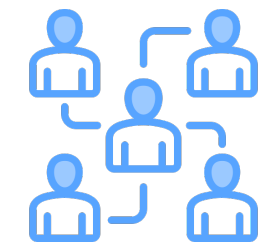
Analysis of token concentration

- A small group of **10 voters holds a significant voting power**.
- **Proposals** only **required** an avg. of **3—5 voters to obtain at least 50% of the votes**.



Analysis voting cost

- We reveal a **huge variation in voting costs**.
- **Voting costs can be unfairly expensive for small token holders**, which has fairness implications for the decision-making process.



Voting pattern of voters

- We discover **potential voting coalitions** among the top voters in  **Compound**  **UNISWAP**
- This could exacerbate concerns of **voting concentration**.

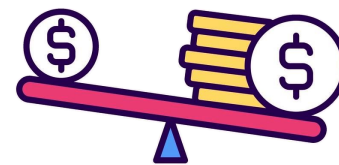


Case Study: Compound and Uniswap



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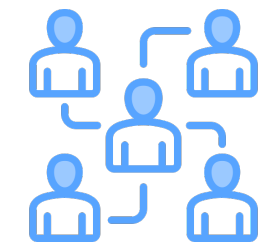
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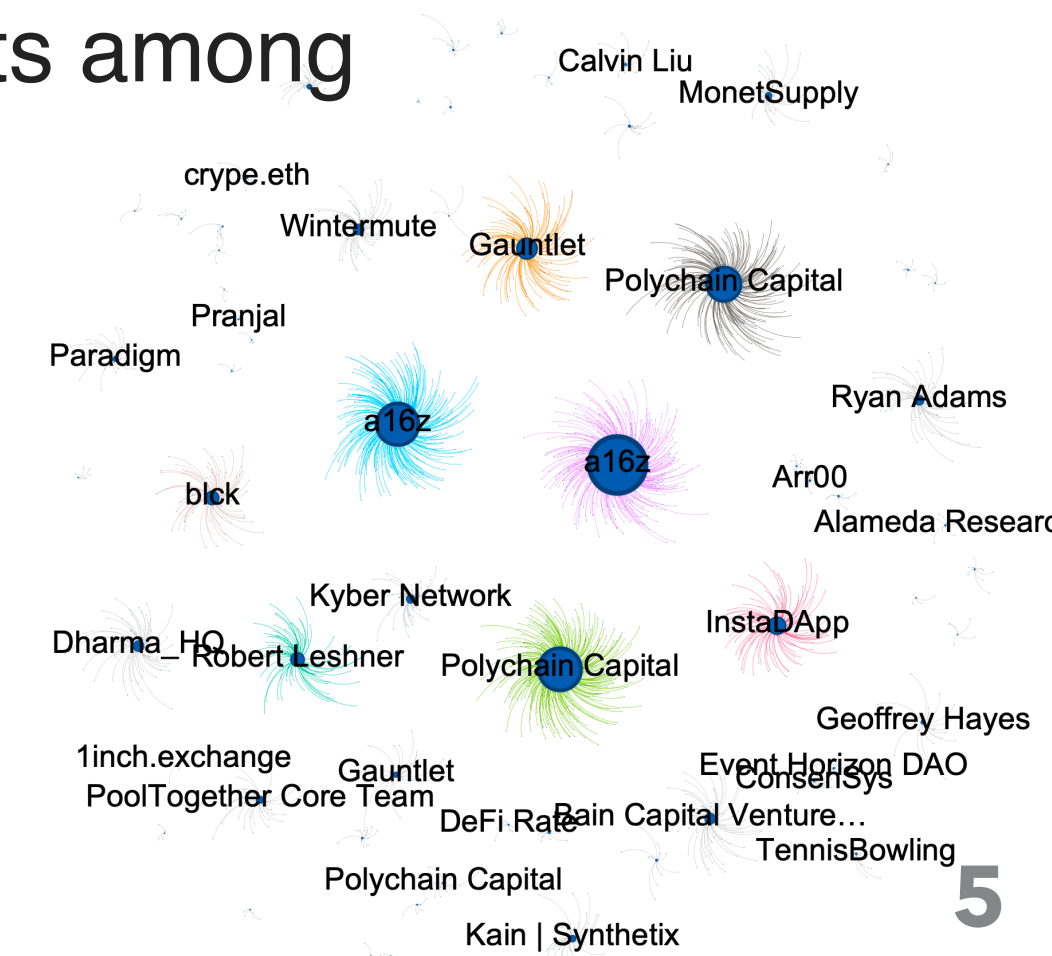


- It leads to real-world consequences.
- Smaller voices are drowned out.
- Participation might decrease.
- Open doors for vulnerabilities.

How Does Delegation Typically Work Today?



- **DAO vs. Traditional Elections:** Unlike traditional systems (nationality-based voting power), DAOs require active delegation of voting power (to self or others).
- **Key Question:** **Amongst all participants, who should token holders choose as their delegate?**
- **Platform Influence:** Dashboards displaying DAO information (delegated tokens, voting records) can inadvertently bias choices towards highly-ranked participants.
- **Consequence:** Potential "*rich get richer*" dynamic, concentrating power and undermining decentralization.
- **User Challenge:** Difficult for token holders to identify delegates truly aligned with their interests among numerous options.



Tally: a Platform Designed To Support DAOs



Key Features of Tally

- Token Launch:** It provides tools for deploying tokens, ensuring scalable distribution and seamless integration with EVM chains.
- Governance Management:** It enables on-chain proposal creation, voting, and execution. It supports frameworks like OpenZeppelin Governor and offers features such as delegate registration and transparent voting power management.
- Staking Solutions:** Its staking system allows protocols to distribute fees to token stakers, aligning economic incentives between protocol usage and token holder rewards. It supports features like liquid staking tokens (LSTs) and integrates with restaking protocols.
- Tally Protocol:** It introduces a liquidity layer for governance tokens, enabling token holders to earn staking rewards while maintaining voting rights.



Compound

Home

Proposals

Community

Stake

Treasury

More

Connect wallet

EthereumERC2010,000,000 Supply



Compound

Compound is an algorithmic, autonomous interest rate protocol built for developers, to unlock a universe of open financial applications.

Delegates

13.68K

219.32K token holders

Proposals

398

There are active proposals

Treasury

\$ 8.4M

1 treasury source

My voting power

Connect your wallet to see your voting power and start delegating

Connect Wallet

</> Contracts and parameters

Notifications

Proposals

Onchain

[Gauntlet] - COMP Rewards Recommendations (Part ...

ACTIVE

May 21st, 2025

Compound Governor

554.58K

0.71

554.58K

27 addresses

WOOF! <> Compound 2025

PENDING EXECUTION

May 18th, 2025

Compound Governor

797.21K

0

798.09K

24 addresses

Initialize cWRONv3 on Ronin

EXECUTED

May 14th, 2025

Compound Governor

700.94K

0

700.94K

46 addresses

[Gauntlet] Supply Cap Recommendations (04/28/25)...

EXECUTED

May 5th, 2025

Compound Governor

520.07K

0

520.07K

23 addresses

Initialize cWETHv3 on Unichain

EXECUTED

May 2nd, 2025

650.94K

0

650.94K

58 addresses

Used by  ARBITRUM  UNISWAP  Compound   and others...

[johnnatan-messias.github.io](https://github.com/johnnatan-messias)

6

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	 Compound	 Home	 Proposals	 Community	 Stake	 Treasury	 More	
Onchain + New proposal								
Proposal		Votes for		Votes against		Total votes		
[Gauntlet] – COMP Rewards Recommendations (Part – 1)		554.58K		0.71		554.58K		
ACTIVE May 21st, 2025						27 addresses		
Compound Governor								
WOOF! <> Compound 2025		797.21K		0		798.09K		
PENDING EXECUTION May 18th, 2025						24 addresses		
Compound Governor								
Initialize cWRONv3 on Ronin		700.94K		0		700.94K		
EXECUTED May 14th, 2025						46 addresses		
Compound Governor								
[Gauntlet] Supply Cap Recommendations (04/28/25) pushed b...		520.07K		0		520.07K		
EXECUTED May 5th, 2025						23 addresses		
Compound Governor								
Initialize cWETHv3 on Unichain		650.94K		0		650.94K		
EXECUTED May 2nd, 2025						58 addresses		
Compound Governor								
Add weETH as collateral into the cUSDCv3 on Mainnet		701.17K		0.04		701.17K		
EXECUTED May 1st, 2025						54 addresses		
Compound Governor								
Add weETH as collateral into cUSDSv3 on Mainnet		701.17K		0.05		701.17K		
EXECUTED May 1st, 2025						57 addresses		
Compound Governor								

Used by 



and others...

Tally: a Platform Designed To Support DAOs



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Compound

Home

Proposals

Community

Stake

Treasury

More

Connect wallet

Delegates

All Focus Areas

All Delegates

Sort by: Voting Power



a16z

361.02K COMP

No bio provided

Trusted by 350 accounts



Delegate



bryancolligan

198.03K COMP

No bio provided

Trusted by 15 accounts



Delegate



Ox7E95...1318

170K COMP

No bio provided

Trusted by 10 accounts



Delegate



Event Horizon DAO

94.46K COMP

A public-access voter block which onboards new voters and delegates to DAOs by g...

Trusted by 28 accounts



Delegate



Gauntlet

90.07K COMP

No bio provided

Trusted by 41 accounts



Delegate



MonetSupply

85K COMP

delegate, risk analyst @ BA Labs (Block Analitica), defi lending and stablecoin ...

Trusted by 41 accounts



Delegate



Arr00

80K COMP

Long time Compound delegate. Creator of Governor Bravo, borrow caps, proposer wh...

Trusted by 14 accounts



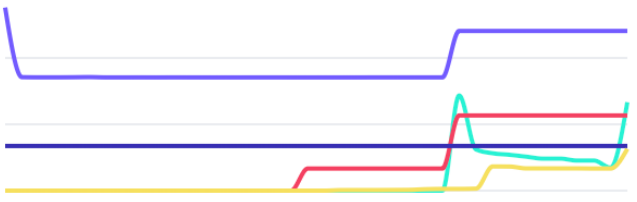
Delegate

Who are the delegates?

Delegates create and vote on proposals. Token holders can update their delegate at any time.

Learn more

Top Delegates



a16z

3.6%

bryancolligan

1.9%

Ox7E95...1318

1.7%Geoffrey HayesEvent Horizon DAO

Details

Total Supply

10M

Delegated Tokens

2.87M

Quorum (Compound Governor)

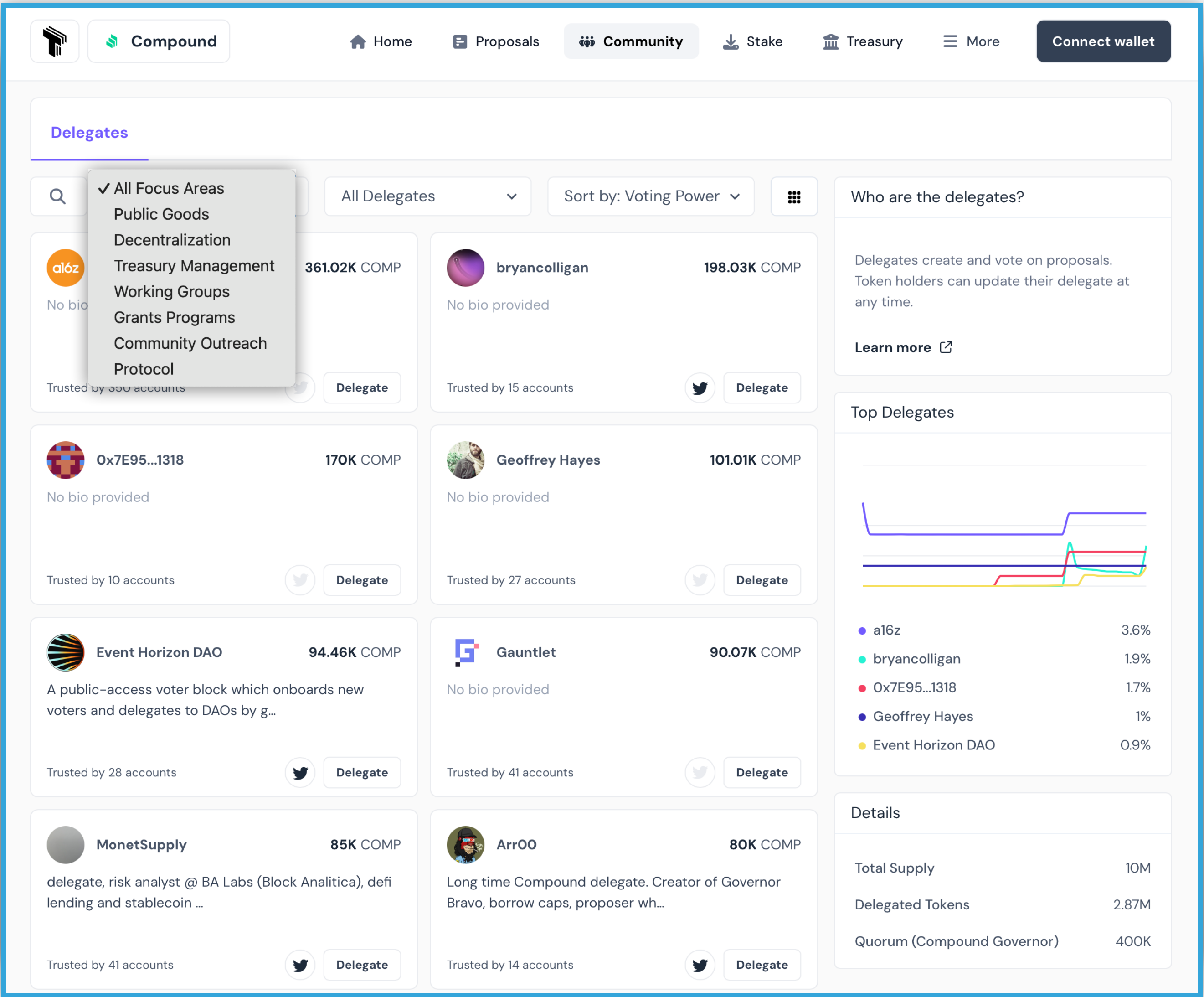
400K

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The screenshot shows the Tally platform interface for the Compound DAO. The top navigation bar includes links for Home, Proposals, Community, Stake, Treasury, and More, along with a 'Connect wallet' button. The main section is titled 'Delegates' and features a search bar, a dropdown for 'All Delegates', and a 'Sort by: Voting Power' option. A list of delegates is displayed, each with a profile picture, name, bio, and voting power in COMP. A dropdown menu is open over the first delegate, showing focus areas: All Focus Areas, Public Goods, Decentralization, Treasury Management, Working Groups, Grants Programs, Community Outreach, and Protocol. On the right, there is a section 'Who are the delegates?' with a description and a 'Learn more' link. Below that is a 'Top Delegates' section with a line chart and a table showing the top delegates and their percentages.

Delegate	Voting Power (COMP)	Percentage
a16z	361.02K	3.6%
bryancolligan	198.03K	1.9%
Ox7E95...1318	170K	1.7%
Geoffrey Hayes	101.01K	1%
Event Horizon DAO	94.46K	0.9%

Details:

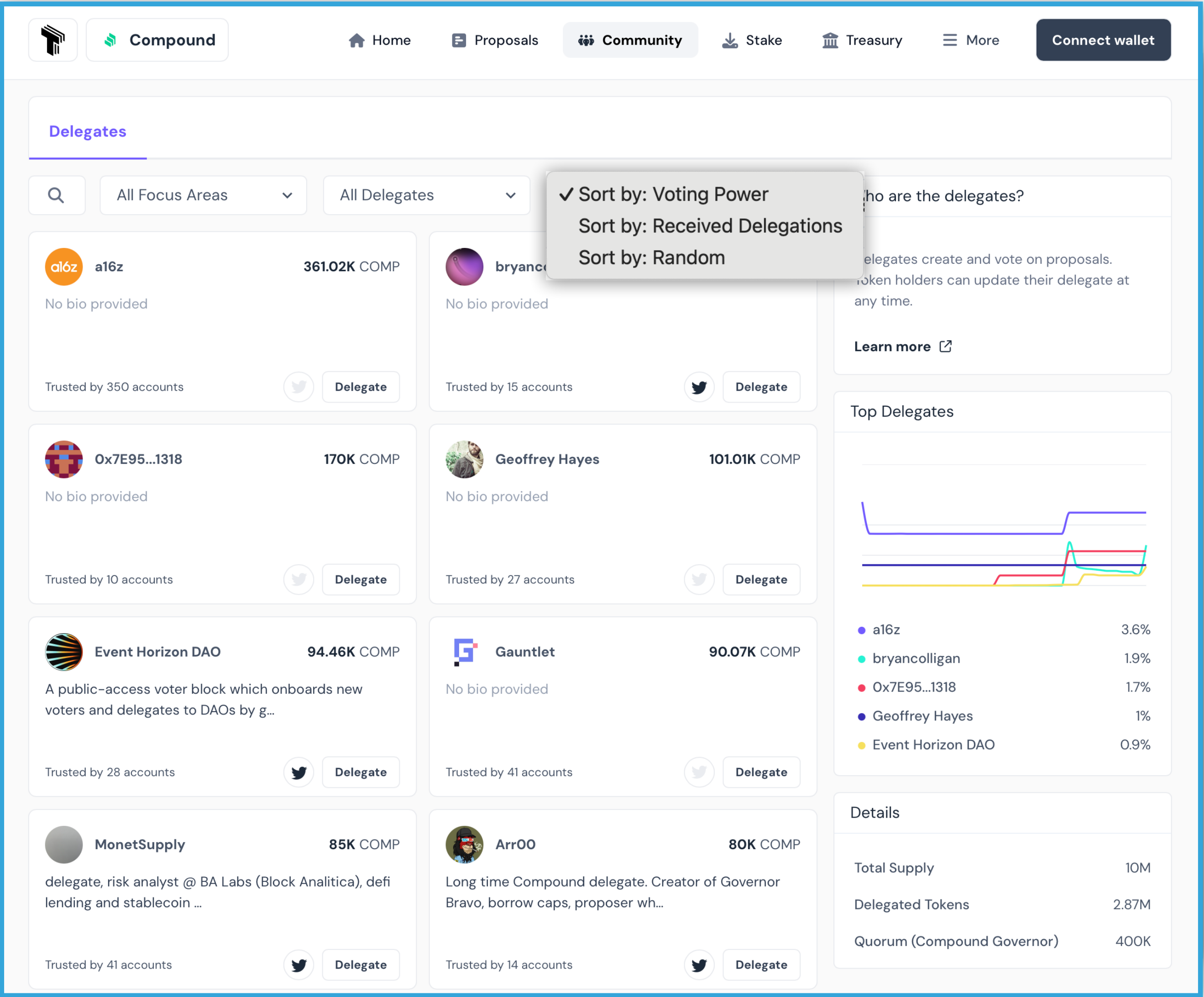
Detail	Value
Total Supply	10M
Delegated Tokens	2.87M
Quorum (Compound Governor)	400K

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The screenshot displays the Tally platform's 'Delegates' section. At the top, there's a navigation bar with links for Home, Proposals, Community, Stake, Treasury, and More, along with a 'Connect wallet' button. Below the navigation bar, the 'Delegates' section is active, showing a list of delegates with their avatars, names, and voting power in COMP tokens. A dropdown menu is open, showing sorting options: 'Sort by: Voting Power' (selected), 'Sort by: Received Delegations', and 'Sort by: Random'. The delegates listed are:

- a16z**: 361.02K COMP, Trusted by 350 accounts
- bryancolligan**: No bio provided, Trusted by 15 accounts
- Ox7E95...1318**: 170K COMP, Trusted by 10 accounts
- Geoffrey Hayes**: 101.01K COMP, Trusted by 27 accounts
- Event Horizon DAO**: 94.46K COMP, Trusted by 28 accounts
- Gauntlet**: 90.07K COMP, Trusted by 41 accounts
- MonetSupply**: 85K COMP, Trusted by 41 accounts
- Arr00**: 80K COMP, Trusted by 14 accounts

On the right side, there's a 'Top Delegates' section with a line chart showing the voting power of the top delegates over time. Below the chart, a table lists the top delegates and their percentages:

Delegate	Percentage
a16z	3.6%
bryancolligan	1.9%
Ox7E95...1318	1.7%
Geoffrey Hayes	1%
Event Horizon DAO	0.9%

At the bottom right, there's a 'Details' section for the Compound Governor, showing the total supply (10M), delegated tokens (2.87M), and quorum (400K).

Ranking Order Can Influence User Choices



how many pages users look at when searching on Google

AllImagesVideosShort videosWebForumsNewsMore

Tools

AI Overview

Learn more

Most Google users primarily focus on the first page of search results, with a significant majority (over 91%) not going beyond. While the first page is the most heavily utilized, the second page does see some traffic, though less than the first. It's also important to note that the specific pages users see can vary based on their location, search history, and other factors.

Here's a more detailed breakdown:

First Page Dominance:
Over 91% of users don't go past the first page of search results.

Second Page Engagement:

Show more

It's crucial to be on the first page of the search results. According to one survey, 93.4% of all Google users will only look at the first page when choosing the result that they want to select. A mere 6.6% will continue on and check the results that are on the second page.

contentcustoms.com

https://www.contentcustoms.com › 2024/03/29 › do-user...

Do users actually look at the second page of search results?

About featured snippets

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People also ask

How many visits does Google search have?

What percentage of Google searches go past the first page?

How many pages does Google search?

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Google

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contentcustoms.com

https://www.contentcustoms.com · 2024/03/29 · do-user...

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amazon.de

Delivering to Kassel 34117

Update location

All

flash drive

EN

All

tegut...

Best Sellers

Amazon Basics

New Releases

Today's Deals

Books

Prime

Shopper Toolkit

Fashion

Gift Cards

Home & Kitchen

Gift Ideas

Electronics & Photo

1-16 of 569 results for "flash drive"

Eligible for free delivery

☐ Free Delivery by Amazon

Free Shipping by Amazon to eligible destinations

Flash Drive Capacity

☐ Up to 2 GB

☐ 4 GB

☐ 8 GB

☐ 16 GB

☐ 32 GB

☐ 64 GB

☐ 128 GB & above

Hardware Interface

☐ USB

☐ USB 2.0

☐ USB 3.0

☐ Lightning

☐ USB 3.2 Gen 1

☐ USB 3.2 Gen 2

☐ USB 1.0

See more

Brands

☐ SanDisk

☐ Intenso

☐ Samsung

☐ Kingston

☐ Hama

☐ PHILIPS

☐ Verbatim

See more

Customer Reviews

★★★★☆ & Up

Price

€2 – €4,400+

Go

Deals & Savings

ALL

Results

Learn about these results. Check each product page for other buying options.

Amazon Basics 256GB USB 3.1 Flash Drive - Read Speed up to 130Mbps - Black

Options: 2 sizes

★★★★☆ 24,267

500+ bought in past month

€20⁴²

Get 60 days of Audible free

FREE delivery Wed 28 May on eligible first order

Or fastest delivery Tue 27 May

Add to basket

Amazon product ranked first 🥵

KOOTION USB Stick 64GB Pack of 5 Memory Sticks USB 3.0 Memory Stick Metal 64GB 5 Flash Drives Memory Sticks High Speed Data Storage Backup for PC/Mac/Desktop/Laptop/Game Consoles

Options: 8 sizes

★★★★☆ 1,798

50+ bought in past month

€26⁹⁹

FREE delivery Tue 3 Jun on eligible first order

Or fastest delivery Tue 27 May

Add to basket

Sponsored products next 🤖

KOOTION USB C Stick, 128 GB USB 2.0 Memory Stick OTG 2-in-1 USB Stick 128G Flash Drive Type C Flash Drive 128 GB for PC/Laptop, Android Type-C Mobile Phone

Options: 14 sizes

★★★★☆ 12,128

1K+ bought in past month

Limited time deal

Marketing Research Survey: Google Search Behaviors — <https://www.teknicks.com/blog/marketing-research-survey-google-search-behaviors>

FaiRIR: Mitigating Exposure Bias from Related Item Recommendations in Two-Sided Platforms – arxiv.org/abs/2204.00241
johnnatan-messias.github.io

7

What Can We Do About It? 🤔

A Proactive Solution: Interest-Aligned Delegation Matching



- **Address a critical challenge in DAO governance:** Optimizing delegation matching!
- **Like in traditional democracy:** voters vote for a politician when they have their interests aligned.

Why not do the same with token delegation in DAOs?

- **Goal:** Provide governance systems with tools to:
 - Users delegate to voters who are better aligned with their interests.
 - Reduce delegation bias.
 - Improve transparency of voting power distribution.
- **Example:** A "*Delegation Advisory*" system, similar to voting advisories in democratic elections.
- **Enhanced Decision-Making:** Lead to more secure, decentralized, and effective DAO governance.

Roadmap



Data Acquisition

- On-chain data (Ethereum & other archive nodes).
- Text-based data: Off-chain discussions (Forums, Discord).
- Other relevant data platforms (e.g., Nansen, Messari, Tally).



Voting Behavior Analysis

- Analyze how voters engage on proposal discussions.
- Extract topics of interest for each voter.
- Publish results in an academic paper.



Implement Delegation Matching Algorithm

- Design and build a MVP of delegation matching system.
- Implement a simulation environment framework to test the system.



Test and Evaluate

- Deploy the matching algorithm by partnering with delegation platforms / DAO projects.
- Evaluate the performance via A/B testing and/or simulations.



ethereum



ARBITRUM

OPTIMISM



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ethereum



ARBITRUM

OPTIMISM



How can we improve DAOs?



▶ Fairness is Fundamental

- ▶ Fair token delegation is not a luxury but a necessity for the legitimacy and long-term success of DAOs and DeFi.

▶ Problem

- ▶ Delegation matching is a critical, unsolved challenge in DAO governance, impacting decentralization and fairness.

▶ Proposed Solution

- ▶ An interest-aligned delegation matching mechanism.
 - ▶ Address voting power concentration and participation barriers.
 - ▶ Enhanced transparency, reduced bias, stronger security, and more effective, truly decentralized DAO governance.
 - ▶ To promote genuine fairness, increase decentralization, and build more robust and representative DAO ecosystems.

▶ Key Questions

- ▶ How many delegates are actually available?
- ▶ Are their opinions diverse?
- ▶ How wealthy are the delegates?

Contact

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Research Scientist

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