



The DAO Playbook.

How to build DAOs using SSI
and NFT solutions.

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Chapter 1 | Introduction to DAO

What is a Decentralized Autonomous Organization?

Decentralized Autonomous Organizations, more frequently referred to as DAOs, is a blockchain-based type of organization or company that is governed by code instead of a typical hierarchical leadership structure defined by law. Usually the governance is made through the use of native crypto tokens (also called governance tokens) and anyone who holds those tokens also holds the opportunity to vote when new proposals are made and to participate in the management of the DAO. In this process, smart contracts are used in order to help DAO members to achieve their common goal.

Why are they useful?

DAOs make it possible for strangers with a common goal, to get together and create an organization represented by an encoded set of rules in a public and transparent way without the need to know or even trust each other while removing bureaucratic barriers and time consuming processes. Blockchain is the technology that enables trustless interaction and transactions and DAOs provide a way for people to organize themselves in a safe decentralized and well defined environment with likeminded people. Bitcoin is often considered by its advocates to be the first DAO, because the Bitcoin network opened the way to a peer-to-peer consensus mechanism upon which DAOs nowadays are built. The main benefits and downsides of DAOs are the following.

Benefits

- **Trustless:** Using blockchain technology, DAOs can operate in a trustless environment and safe transactions can be made between strangers as everyone can see what is happening in real time; hence only trust or understanding in the protocol is needed and not trust in other participants.
- **Decentralization:** The governance of the organization is decentralized, which allows democratic processes.
 - **No single point of failure:** Its decentralized characteristic prevents a single point of failure and makes it impossible to be shut down by a single entity (without having the control over the majority of the tokens).
 - **No middlemen:** Not relying on middlemen or third parties can make processes more efficient and be cost effective.
- **Open source:** Thanks to being open source, DAOs are often reliable and up to date because contributors from outside the organization can improve it.
- **Cheap to create:** DAOs do not require a lot of money to create. In fact you can even raise money by issuing tokens.
- **Automation:** Smart contracts permit a high degree of automation with any transactions and decisions taken by the organization.

Downside

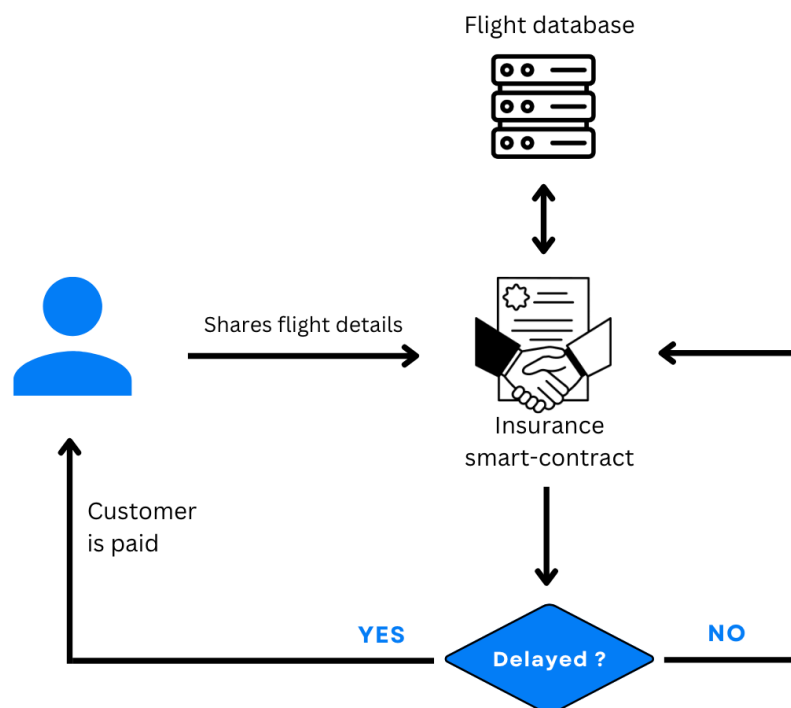
- **Vulnerable to attacks:** This is a downside to being open source, because hackers can see the code and use bugs (if there are any). The longer and the bigger a DAO becomes, the more reliable it is.
- **No clear regulations (legal uncertainty):** There are few laws and regulations regarding DAOs at the moment, which can make a DAO stand in a legal gray area. Many countries are in the process of creating new regulations for that type of organization, so anticipating the impact of those laws is important. Setting up a DAO in a strict legal environment could be a serious challenge.
- **Decentralized decision making / time for transactions:** Sometimes it is better to have a centralized decision making process. For example, in a time of crisis, when an important decision needs to be taken in a very short amount of time, a democratic decision making process might not always be the best option. The lack of a “single leader” might also create difficulties when it comes to sharing and reaching a common vision.

How does it work?

The rules of a DAO are established by early members of the community and they are operated through smart contracts. The rules (code of the DAO) can be changed and improved overtime by members (usually through voting processes). A smart contract is a crucial aspect of DAOs and can be explained as follows:

A smart contract is a set of promises, specified in digital form including protocols within which the parties perform on these promises¹. The code and the agreements contained therein are self-executable, and transactions are trackable and irreversible. Smart contracts permit trusted transactions and agreements to be carried out among disparate, anonymous parties without the need for a central authority, legal system, or external enforcement mechanism.

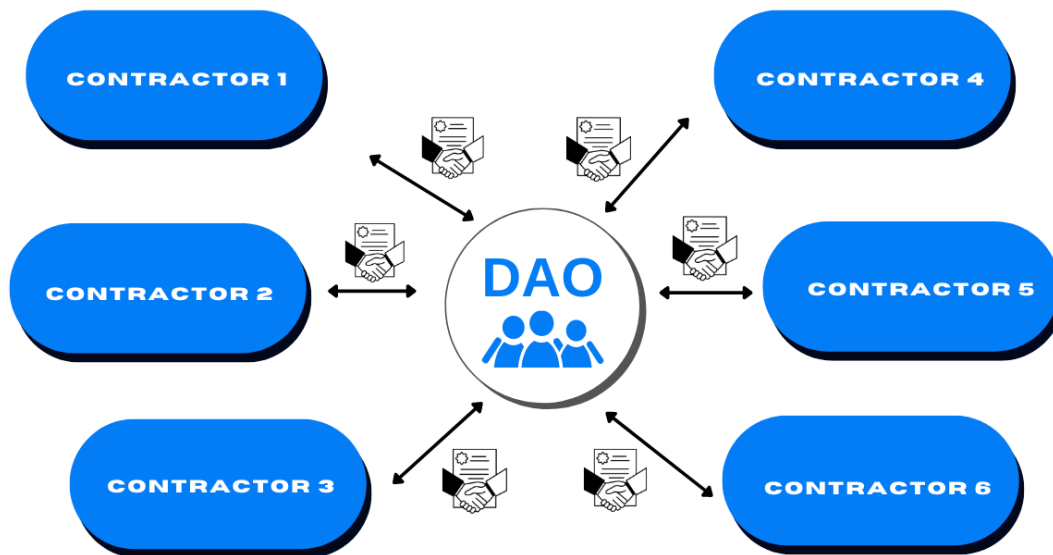
Example of a smart contract with flight insurance.



A smart contract is used to automate the process of refunding flight passengers whenever they are eligible for it. The smart contract has access to the flight details, and the passenger's wallet and if the predefined rules are met, it automatically sends the right amount of money to the passenger's wallet.

¹ Nick Szabo. Source: https://en.wikipedia.org/wiki/Smart_contract

Basic DAO architecture:



Dapp vs DAO

If you feel like a DAO is very similar to a Dapp at that point, it is because there are some overlapping concepts between the two. A decentralized application (dapp) is an application (or program) that exists and runs on a blockchain or peer-to-peer (P2P) networks of computers instead of a single computer.² The difference with a DAO, is that a dapp is application specific and not necessarily autonomous, whereas a DAO is autonomous and is forming an organization. Dapps are created to perform certain functions (e.g. money management), while DAOs are designed to serve as a decentralized platform for communal decision-making.

²Investopedia;

<https://www.investopedia.com/terms/d/decentralized-applications-dapps.asp>

Adoption & critics

DAO is a relatively new concept, thus some people criticize current projects which are unsuccessful for the time being (and some critics are valid about the state of some DAOs: see image below).

Most DAOs are not Decentralized.

Most DAOs are not Autonomous.

Most DAOs are not an Organization.

Most DAOs are communities on Discord with useless proposals on Snapshot.



108 comments • 10 shares

Usually DAOs are centralized at the very beginning because a small team needs to have control to create the basics of the project, but once the governance tokens are issued, the power over the organization starts to be decentralized. DAOs increased over eight-fold in a year from May 2021 (around 700) to June 2022 (6 000) increasing the number of votes from 448 000 to 3.7 million in the same period, which proves a growing interest worldwide.³

DAOs have become more popular in the past years thanks to the mass adoption of blockchain technology, and you will be able to discover some of them in the next section, on top of future use cases.

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<https://cointelegraph.com/news/finance-redefined-number-of-daos-surge-solana-launches-100m-defi-fund>

Inspirational Use Cases

The first attempt to create a DAO was simply called The DAO, and it is famous for its innovation (being the first) but also for its failure. Since then, many successful DAOs have emerged, here is a small list of them.

- **MakerDAO:** It is one of the most famous DAO and one of the first of its kind. MakerDAO is a DeFi project on the Ethereum blockchain governed by a governance token (MKR). This protocol is behind the DAI stablecoin (pegged to USD), which is the 4th biggest stablecoin in the world.
- **MetaCartel:** MetaCartel is an ecosystem of creators and operators building decentralized applications (Dapps). They are funding and helping early teams to build Dapps on Ethereum.
- **Ocean DAO:** OceanDAO is the DAO created by the Ocean protocol. It funds a large number of teams that build projects across core DAO pillars. By utilizing OceanDAO, successful projects can in time deliver value greater than their grant, creating a positive feedback loop.
- **Aave:** Aave is an open source protocol to create non-custodial liquidity markets to earn interest on supplying and borrowing assets with a variable or stable interest rate. They created Aave DAO to approve the funding and development of new projects.
- **Uniswap:** Uniswap was originally a Dapp that enabled its users to swap their tokens in a peer to peer and decentralized fashion. It is what we call a DEX (decentralized exchange). After the issuance of their governance token (UNI) Uniswap's governance became autonomous and decentralized which made it a DAO.

On top of those concrete examples, DAOs can also be very useful for the following use cases (non-exhaustive list):

- **Charities and nonprofits:** Many people have low trust in charities and the main reason is that it is not easy to see their transactions and how their donations were used. By creating a charity as a DAO, donors would be able to vote on where the money should be used and to track it directly. The same goes with non-profits in general working on public welfare.
- **Governments:** DAO advocates often see this form of organization as a very democratic system and argue that it could be used for public and governmental projects and decision making.
- **Clubs:** Decision making in clubs is not always easy (whether they are sports club, corporate clubs, or passion related clubs). A decentralized autonomous organization would make every member of the club participate in its improvement and vote on new proposals in a fast and safe manner (even from the other side of the world).
- **Investment company (e.g. VC):** Investors can now join from all around the world and create an investment fund without having to trust each other or a CEO. This system would work whether it is evolving in a DeFi or CeFi (centralized finance) environment.
- **Cooperative:** Important decisions in small and big companies owned by a high number of investors (seeking profit or not) can also be made easier using DAOs without having to change the shareholder plan.

Chapter 2 | Requirements to build a DAO

What do you need to create a DAO ?

On top of needing an organization that works towards a common goal and vision, a DAO also needs access management solutions which will be used to model identity and ownership, as well as a voting system that will make the members involved into the organization, make decisions and improve it.

Before you start to build your pilot project, it is important that you ask yourself: “What type of DAO do we want to be?”. Answering that question will make you build the architecture of the organization, define its core values and purposes but also its accessibility and functions.

Voting

As voting is an essential part of a DAO, choosing or creating a voting system is a crucial step in the creation of your DAO. The first point you should consider is “How will the voting rights be distributed?”.

The easiest way to do it would be to attribute each token one voting right. However, you can be more creative than that and design your unique voting right distribution system. For example, you could decide that one wallet = one vote or that active members receive a multiplier ratio (e.g. 1.5) which would multiply the number of tokens they have by the established ratio to get their number of votes, which incentivises members to be more active.

The two main solutions to distribute voting power are:

- **Governance tokens:** This is the type of token that we mentioned the most in this playbook. They are ideally suited for DAOs and they have a market price, and can be traded freely and easily between users. On top of that, governance tokens can also be delegated to other users. Some tokens also allow its holders to delegate only the voting right to someone else while keeping ownership over the tokens.

- **NFT access management:** NFTs can also be used as a badge or membership card to the DAO. Meaning that only wallets containing a specific NFT could connect to the DAO and participate in the votes. DAO members would connect their wallet to the official website of the DAO, and they would be redirected towards the DAO platform if they can prove that the required NFT is in their wallet (that they are the owner of the membership pass).

Note that the ERC-1155 token standards allow users to mint and deploy an infinite number of tokens all under a single smart contract, which reduces gas fees for the DAO. ERC-1155 tokens can act as both fungible (ERC-20) and non fungible (ERC-721) tokens.

After deciding how the governance rights will be given out, you still need to decide “How will new proposals be accepted?”.

One way to do it is by using a threshold for the propositions to be accepted. Most of the time this threshold is 50% of the votes in favor of the proposals, but it can also be 66% or any other number. If there are multiple proposals “competing” between each other, the voting process can be held in multiple rounds, or the one with the most votes directly gets accepted.

- **Quadratic Voting**

This is the most common voting mechanism (also referred to as 1T1V or 1P1V) which consists of one token per vote. The idea behind this mechanism is to allow a single person to vote multiple times for the same option in order to express his confidence in that option. However, this method comes with a way to avoid monopolistic situations in which one person would hold the majority of the tokens and have absolute control over the decisions. The idea is to increase the number of tokens necessary for any additional vote. For example, one vote will consume one token, two votes for the same option will consume four tokens. Three votes will consume nine tokens, etc... To identify a simple formula; the number of votes is the square root of the number of tokens needed to vote. This mechanism is great to allow more votes to people with more tokens while keeping small holders relevant and keeping decentralization.

- **Delegation of voting rights**

Some DAOs allow its members to delegate their votes to other members. Even though this aspect can be counter intuitive at first because it can lead to a more centralized organization, it is useful in some situations. Proposals can be time consuming for members who may lack knowledge on specific topics. Hence some members prefer to delegate their votes to “experts” in the topic which should result in better decision making.

- **Weighted voting**

Also referred to as reputation-based voting or activity-based voting, is a voting system which rewards members based on their activity, reputation or seniority. This system can also reduce the price volatility of the governance tokens as tokens can be locked for a set period of time to benefit from those rewards (additional voting rights). It is also a widely used way to incentivise members.

Treasury management

With a combined value of several billion dollars, the treasury management of these DAOs is of paramount importance. Many voting decisions will concern resource allocations, and the treasury system should be designed with the idea that DAO’s projects are often long-term oriented. Resources are often allocated to develop new projects and recruit people.

Depending on the purpose of the DAO, fund spending can look very different, however, one point that is usually advised to every DAO is to reward individual contributors, or business projects with tokens. DAOs can also have part of their treasury in stablecoins (for various resources such as not being subject to price volatility, use the money in DeFi protocols, etc...), however, that money can also be used to buy back governance tokens of the DAO.

Maintaining regular accounting practices and doing so in a transparent manner through great communication and tracking tools is key to keep the trust of members and to plan treasury operations in advance.

The role of Identity and ownership in DAOs

Web3 enables the ownership economy. Meaning that now people are able to own digital assets, and own their data. Ownership solutions lead you to “who owns what”. The “who” part is related to identity management and the “what” part is referring to digital assets which are digital tokens.



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web3 = ownership

|

who owns what

|

identity

|

assets

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Chapter 3 | How to build a DAO

What are DAOs ecosystems and why are they important?

Choosing your DAO ecosystem and the corresponding blockchain on which it will evolve is a crucial part of the process. Ecosystem selection is vitally important because it will have a major impact on whether you can actually achieve your goals as well as on the technical planning and implementation of your project, including technology selection.

There are plenty of blockchain ecosystems and choosing the right one can be difficult. The most famous and most used ecosystem for DAOs is Ethereum, mainly because it is well ranked across multiple dimensions and key adoption criteria (see next section). Even though the properties of the blockchains on which smart contracts will be executed are a main factor to steer your adoption decisions, the environment in which your applications will evolve is also important. In other words, make sure to consider existing applications (dapps), developer tooling and infrastructure built around the blockchains you intend to use.

Finally, remember that your choice is important: Firstly, migrating from one ecosystem to another might require a lot of effort (or may even be impossible). Secondly, picking the right ecosystem early on ensures positive follow on effects typically associated with first mover advantages.

How to choose a DAO ecosystem?

Here are some criteria for evaluating DAO ecosystems:

- **Security / Reliability of the blockchain:** Some blockchain, applications and platforms are more secure and reliable than others and depending on your project you may want a high level of security.
- **Smart contract ability:** Although most blockchains nowadays offer smart contract capabilities, it is not the case for all of them (e.g. Bitcoin) and they are not equal in that area. Some specific ecosystems allow you to easily integrate smart contract features which can be very valuable. This is a crucial criteria as smart contracts are at the heart of a DAO ecosystem.

- **Scalability (and maybe TPS - Transaction Per Second):** If your project requires a lot of transactions but mostly if the transactions need to be verified in a short time frame, than this criteria can be crucial and you will have to evaluate not only the TPS of blockchains but also the frequency at which the network can be “congested” and the time needed for transactions to be verified (often linked to the block time). It is closely related to “*Transaction costs*” because when TPS is limited, you will augment transaction fees in order to be included quickly into the next block.
- **Transaction costs:** This point is important when your project requires a high number of transactions and smart contract executions, as the network transaction fees differ from one blockchain to another.
- **Blockchain Trilemma:** The criteria mentioned above are connected to the “blockchain trilemma” which was introduced by Vitalik Buterin (co-creator of Ethereum). Blockchains are forced to make trade-offs that prevent them from achieving all of the following three aspects: security, decentralization, scalability. You can only have two, never all three.
- **Interoperability:** Consider if your ecosystem must be able to communicate with other ecosystems and if your targeted audience is already part of this ecosystem.
- **Blockchain ecosystem maturity:** Consider the maturity of an ecosystem which can be measured across multiple dimensions like the number of developers; documentation; libraries, frameworks and tools within an ecosystem; number of active wallets / wallet addresses; standards or even the market cap.

Conclusion

DAOs offer many advantages compared to traditional organizations and can be implemented in many different industries. The number of DAOs is growing as well as the pace at which blockchain protocols are improving to always offer better and easier to use solutions. After reading this playbook you might think that building a DAO is technically complex, and to some extent that is the case. However it is also important to keep in mind the administrative and regulatory complexities required to build a company in some countries and the inflexibility that those legal entities can have.

Lastly, we want to remind you to not lose sight of the most important things you can take with you from building a pilot project:

Build up knowledge

Decentralized Autonomous Organizations are still a new approach of management and decision making. Despite the rising number of DAOs in the past few years, the number of developers capable of building resilient smart contracts for DAOs is still very limited. That is why it is crucial to maximize learning while building your pilot project and to hold the know-how in your organization before building your final version.

As a result, one of the most important things about setting up your pilot project is to make sure that the right people are involved. We recommend to bring in a diverse team comprised of individuals with the ability to

- understand the impact of DAOs on your organization and its stakeholders,
- understand the technologies behind DAO (enough to build the appropriate solutions for your use cases),
- communicate the opportunities and implications of DAOs across your organization (including product, R&D, operations, marketing, sales, human resources and event teams).

Let's start building !



Walt.id is building identity, NFT and wallet infrastructure for developers and enterprises.

The company's products are used by governments, public authorities, enterprises and DAOs (Decentralized Autonomous Organizations) to build applications and use cases with web3 identity, NFTs and wallets fast and without much complexity.

All products are open source (Apache 2) and industry-leading experts provide holistic services from conception over implementation and support to managed cloud services.

For more information visit walt.id or get in touch via [mail](mailto:info@walt.id).

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Our solutions

For Non-Fungible-Tokens

Our [NFT Kit](#) is an open source infrastructure for developers and enterprises that can be used to build applications and use cases around NFTs. It helps you with the creation, distribution and verification of NFTs. With a strong focus on interoperability, we support many blockchains, thereunder Ethereum, Polygon and many more.

This kit allows you to create and issue NFTs that would serve as a voting right. This would be especially useful if you plan to build a model in which 1 member = 1 vote, unlike the classical model in which 1 token = 1 vote.

For Self-Sovereign-Identity

Our [SSI Kit](#) is an open source infrastructure that offers developers and organizations an easy way to integrate SSI. The Kit is about enabling 3 different functionality profiles:

- **Issuers:** who provide people and organizations (Holders) with digital credentials that contain identity data.
- **Holders:** who manage and share their credentials (issued by Issuers).
- **Verifiers:** who verify credentials (presented by Holders).

In the case of a DAO, the SSI Kit is the best solution if the organization requires to verify the identity of their members (example: through a simplified KYC process). Meaning the DAO would act as the issuer (and would issue credentials to its members). The members (holders) would present those credentials to have access to the organization and participate in the voting process. The credentials can be verified easily by the DAO itself. However, keep this is quick theoretical and it might actually still require a centralized party to work in practice. Nonetheless, this technology is very usually for the club use cases, in which the verifiable credential would act as a membership card.

Identity Provider

With our [IDP Kit](#) you can build NFT gated access to the DAO and its applications as well as expand the utility which comes with DAO membership NFTs to the web2 world, by enabling login with NFTs in your current identity and access management (C/IAM) solutions.