

Turn-key DAOs that function as non custodial, private resource allocation platforms for communities of all sizes

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Motivation

Economics:

Adam Smith's *The Wealth Of Nations* is a timeless text that has been cited by economists for centuries when referencing the true source of a country's wealth. In the text, Smith conducts a thorough inquiry into the nature and causes of the wealth that a nation comes to possess. He reveals many thought-provoking conjectures and justifications pertaining to the source of a nation's wealth. Among them, none more fundamental than the declaration that the most important factors influencing a nation's wealth are: the size of its labor force and the nation's ability to mobilize its labor force efficiently. An efficient labor force is one in which productivity is maximized with respect to cost.

Ray Dalio, in his renowned case study on the macroeconomic principles that led to the ascent and descent of 11 different empires over 500+ hundred years, makes a conjecture even more fundamental than that of Adam Smith. The conjecture: The Source of wealth creation is productivity. In simpler terms, productivity begets wealth.

Both Smith and Dalio, as well as a myriad of other distinguished economists, have proposed a theory that has been supported by many case studies of observable populations with labor forces of similar sizes, but feature financial institutions that are dissimilar in their effectiveness at mobilizing their respective labor forces. Canada and Nigeria serve as prime examples of this phenomenon. Canada has a labor force of approximately 26 million people, while Nigeria has a labor force of 122 million people- nearly 5 times the size of Canada's. Yet, the GDP of Canada dwarfs that of Nigeria by a factor of approximately 6 times. Many factors affect this outcome, but I argue that none is more influential than the difference in efficiency of the two countries' lending institutions.

Lending institutions are influential because they provide the infrastructure needed for allowing participants who have unproductive cash (i.e. cash savings) the opportunity to route said cash into the custody of economic participants who are looking to contribute to productive output by building businesses, making investments and employing local community members. My thesis (the thesis upon which Personal DAO is built) is that by eliminating the cost barriers associated with creating community-governed lending institutions while simultaneously providing communities with full autonomy over how they issue loans, we may improve the efficiency with which communities can accumulate and deploy capital- thereby maximizing productivity and wealth creation for economies around the world.

Sovereignty:

Builders within the crypto industry are infamous for offering services that they claim are decentralized, while they simultaneously occupy the role of a key intermediary. Many crypto wallets and protocols market themselves as democratic alternatives to traditional financial services. They boast about the fact that they don't store the cryptographic keys needed to authorize on-chain transactions. They use this fact to justify the claim that their services are non-custodial. While it may be true that these protocols don't store your cryptographic keys, it doesn't certify them as non-custodial. MetaMask, for example, doesn't store cryptographic keys; however, they do store: names, dates of birth, contact information, wallet addresses, home addresses, telephone numbers, user preferences, credit card information, bank accounting/routing numbers, and financial data. This horde of information is collected for each of their users (here is a link to the privacy policy MetaMask currently implements: <https://consensys.io/privacy-policy/>). Even Though MetaMask holds custody of an invasive amount of data on their users, they still claim to be a non-custodial service merely because they refrain from storing one piece of data in particular: the users' private keys.

Perhaps the most important object of custodianship that the overwhelming majority of crypto projects never mention is the actual code that facilitates blockchain transactions. Consider the following:

1. 1. The User Interface (UI) of an application is the component that allows users to be able to interact with their assets/data stored within an application. This component is critical for the vast majority of app users since most users have no idea how to interact with an application without the use of a user interface.
- 2.
3. 2. The Application Program Interface (API) of an application is the component that allows user-generated data to be securely manipulated before being stored on the servers where the data lives until it is erased or changed by the users. This component is critical for all users of an application.
- 4.

The UI and API are necessary for a user of a crypto wallet to be able to access the funds within their wallet. Wallets like MetaMask, which claim to offer non-custodial services, maintain full custody of both the UI and the API components that their many millions of users rely on. As a consequence of this, the User Interface & Application Program interface of MetaMask both serve as major points of centralization while simultaneously cementing Metamask as an intermediary for every single transaction that is administered by MetaMask. When bad actors execute mass hacks on wallets that are supposed to be non-custodial, they do so by targeting the UI and/or API that are, again, within the custody of an intermediary. I cited MetaMask as a reference, but the

information I've provided here applies to every crypto wallet in the industry except Personal DAO.

True crypto proponents often look to DeFi protocols as a place to achieve maximum user sovereignty when exchanging value. There are two major risks inherent in the nature of DeFi protocols:

1. 1. They rely on an architecture in which substantial sums of value are stored within a single protocol- making them a gold mine for hacker groups & malicious states looking to execute mass hacks. Any users storing their funds on DeFi protocols do so at heavy risk to their assets.
- 2.
3. 2. They often feature UIs and APIs that are in the custody of the organization/foundation that spearheads development. As a result, the same vulnerabilities that are featured in MetaMask exist within DeFi protocols- with the added risk that DeFi protocols aggregate large sums of value.
- 4.

Solution

Personal DAOs are turnkey DAOs in which every component of the DAO (UI, API, and Database) is coded within smart contracts that rest under the sole custodies of the respective communities that operate them. This provides communities with 100% sovereignty over the digital product that they rely upon and it avoids the aggregation of vast sums of value to a single point of attack. Personal DAOs operate as self-sustaining financial institutions that allow communities to conduct peer-to-peer lending without the need for any intermediaries at any level of the technical stack.

Use Case

Personal DAO is built to serve the role of a readymade lending institution and revenue source for communities, families, and organizations of all nations, but especially developing nations that have been unable to cultivate effective lending institutions due to a combination of political instability, corruption, unreliable judicial systems, degenerate infrastructure, unsecured property rights and sheer incompetence from their governments. In the past, a community within an underdeveloped nation had no chance of establishing an efficient lending institution without first resolving all of the tremendous barriers that plague them. Today, using a Personal DAO, communities can deploy a peer-to-peer lending institution for less than \$50 USD and can begin seeding a treasury that is owned, controlled, and governed by the community- with no intermediaries whatsoever. Property rights to profits, debts, and assets within a Personal DAO

are upheld by the Personal DAO protocol itself which is secured by the Internet Computer Protocol.

In addition to functioning as a lending institution, Personal DAOs allow communities to carry out investments in a collaborative fashion by allowing them to grow and govern a treasury that may fund community initiatives to increase productive output. Contributions to productive output may come in the form of business ventures, educational campaigns, local infrastructure development projects, and any other objectives that a community might agree on.

Features

NOTE: The following is not an exhaustive list. More features will be added to Personal DAO with time.

Financial Services:

1. Fractionalized Neuron staking
2. Receive loans backed by staked [\\$ICP](#)
3. Receive loans backed by ckBTC (in the roadmap)
4. Receive loans backed by ckETH (in the roadmap)
5. Receive loans issued in ckUSDT (in the roadmap)
6. Receive loans issued in ckUSDC (in the roadmap)
7. Automated debt reduction using rewards issued from DAO contributions
8. Automated lending to borrowers that have been approved to solicit financing via a proposal.
9. DAO-controlled liquidity pools that provide liquidity to decentralized exchanges on the internet computer (in the roadmap)
10. Peer-to-peer over-the-counter exchange services for trading currencies (in the roadmap)
11. Currency swap functionality for swapping currencies via a DEX (in the roadmap)
12. BTC ⇌ ckBTC bridge (in roadmap)
13. ETH ⇌ ckETH bridge (in roadmap)
14. USDC ⇌ ckUSDC bridge (in the roadmap)
15. USDT ⇌ ckUSDT bridge (in the roadmap)
16. Crypto onramp access via Personal DAO UI.
17. Portfolio dashboard that allows users to view balances of external wallets from within the Personal DAO UI (in the roadmap)

Other:

1. Push notifications (in the roadmap)
2. DAO controlled management of external canister smart contracts (in the roadmap)
3. Individual data archive for DAO members (in the roadmap)
4. Community data archive (in roadmap)
5. DAO controlled AI Small Language Model for parsing data archive (in the roadmap)

6. xAI integration for answering FAQs on how users can operate their Personal DAOs (in the roadmap)

Value Proposition

When explaining the value that Personal DAOs offer, we must consider several different perspectives as these DAOs offer solutions for both the communities that utilize them and the Internet Computer ecosystem at large.

- First, we consider the communities that utilize Personal DAOs:

Privacy, Autonomy & Security:

In response to the opaque nature of the traditional finance industry, as well as the misleading & risky nature of “non-custodial” wallets & DeFi protocols, I’ve innovated a software architecture that enables users to have true custodianship of the entirety of the application that they rely on for sending, receiving, lending and borrowing their cryptocurrencies and storing their private data. When communities create their Personal DAO, they receive custodianship of the User Interface (UI), The Application-Program Interface (API), and all smart contracts critical to the functionality of the application. Each Personal DAO is completely disjoint from all other Personal DAOs that exist. This means that two communities who each have their own respective Personal DAOs will have no point of centralization between their assets, governance nor operations. Each community has full autonomy to operate independently of each other.

Unlike MetaMask, where every user shares a single UI and API that they use to access their wallets, with personal DAO every instance has its own UI and its own API that is accessible only to the members of that particular Personal DAO. Consequently, the funds stored across all Personal DAOs are never accumulated into a single protocol. This means that every Personal DAO deployed to the Internet is its own independent protocol. This sort of architecture is inherently safer than all other wallet/DeFi protocols currently in existence because it makes it impossible for mass hacks to be carried out. Even in the event that a bad actor finds a way to breach Personal DAO’s security protocols, that bad actor still would be unable to execute mass hacks against Personal DAO users because each DAO is a separate entity that would have to be identified, targeted and breached in order to be looted. This makes targeting Personal DAOs much less lucrative- resulting in a project that is fundamentally safer than all other competitors.

Financing:

In speaking directly with people from developing nations of Africa, Latin America, and Southeast Asia, I've found that opportunities are limited concerning access to finance. Furthermore, within developed nations, such as the United States, finance is more accessible, but often at interest rates that range from unattractive to downright predatory. The current average interest rate for a small line of credit via any major credit card provider in the United States is ~24.62%. This is absurd by any borrower's standards. Interest rates of this size create an environment where the risk of wide-scale loan defaults is elevated and is preceded by large amounts of borrowers falling into debt traps. In such an environment, borrowers are placed at the mercy of big financial institutions- only ever achieving freedom after becoming bankrupt.

Personal DAOs allow communities to bootstrap their own financing vehicle in which all of the participants have some sort of shared values or interests. Community members can leverage their reputations as well as their monetary assets when requesting loans from their peers. The community is the entity that sets the interest rates on loans. This creates an environment in which preferred interest rates are assured by the fact that the people setting the interest rates are incentivized to set a precedent of reasonable interest rates, lest they face unreasonable interest rates when it's their turn to borrow. The result is a more fair and constructive lending system where checks and balances on interest rates are inherent.

Revenue Sources:

Personal DAOs generate revenue for their respective communities through three different means:

1. Rewards generated from the DAO's neurons. Each DAO member has the option to stake \$ICP within neurons that are controlled by their Personal DAO. In doing so, DAO members are rewarded with voting power over the Personal DAO and with the maturity that their \$ICP stake earns from its contribution in securing the NNS.
2. Interest earned from loans issued. DAO members can issue collateralized loans to their fellow DAO members. In cases where loans are fully repaid, lenders are compensated with interest yielded from the loans. In cases where loans are not fully repaid, lenders are compensated with the collateral deposited by the borrower.
3. Rewards earned from providing liquidity to decentralized exchanges (DEXs) on the IC (Feature not yet available). Personal DAOs will allow communities to create liquidity pools that are controlled by the DAO. These liquidity pools will be used to provide

liquidity to various DEXs on the internet computer- yielding rewards from the DEXs in return for the liquidity provided.

- Now, let us consider the solutions offered by Personal DAO as it relates to the Internet Computer Ecosystem as a whole:

Increased Adoption of the Internet Computer:

Personal DAOs are built such that anyone familiar with the Internet Computer Protocol, regardless of their level of technical experience, can present and onboard people to their DAO where they can participate in DeFi immediately. This sets the stage for a massive grassroots style marketing campaign for the Internet Computer in which every participant has both:

1. the tools needed for advancing adoption, and
2. an economic incentive to advance adoption since they stand to benefit from the revenue sources that Personal DAOs create.

Increased Utility and Staking for the \$ICP token:

Personal DAOs offer additional utility to the Internet Computer's native token (\$ICP). The reason is that each Personal DAO instance, rather than having its own unique governance token, utilizes \$ICP as the governance token. In order for someone to receive voting power within a particular Personal DAO, they must stake \$ICP within said Personal DAO. The result is that if a community wants to take advantage of the benefits that Personal DAOs offer, they must stake \$ICP to do so.

Furthermore, Personal DAOs encourage increased \$ICP staking as it allows users to collateralize their staked \$ICP in order to secure loans. This renders more benefits to users as it allows them to utilize their stake similarly to how credit scores are used in traditional finance: to determine what amount of credit is appropriate to allocate to a particular borrower.

Sustainable Funding and Increased Productivity:

Personal DAOs are poised to become the go-to tool for developers in need of funding for creating solutions. These DAOs allow developers to leverage the very communities that they're looking to service in order to fund their proposed solutions. This grants communities all the autonomy that they need in order to work fast and efficiently while being protected against the counterparty risks associated with centralized fundraising. With increased efficiency comes

increased productivity. For early-stage projects, Personal DAOs are a great alternative to SNS launches as they require no technical development before deploying.

Previously, end users were only allowed to participate as clients and investors, while developers were the only participants within the ecosystem capable of creating new DAOs. Now, this is no longer the case. Personal DAOs equip the end user with the tools they need in order to contribute to the number of DAOs deployed to the internet computer. This allows every end user within the ICP ecosystem to become a direct contributor to the total productive output of the ecosystem. The economic impact of this can not be understated.

Tokenomics: Personal DAO Payment Token (\$DAO)

The full details of the \$DAO tokenomics can be found [here](#).

Governance

Autonomy:

Each Personal DAO is governed independently of all other Personal DAOs that exist. In other words: Each Personal DAO is fully autonomous. The voting proposals submitted to one particular Personal DAO are not visible by any other DAO, nor do their outcomes affect the performance or functionality of any other Personal DAO.

Voting Power:

Voting power is administered proportionately to Personal DAO members who have contributed \$ICP to their DAO's neuron(s). Voting power multipliers(i.e. age bonus, dissolve delay bonus) are awarded to DAO members who contribute to neurons that receive voting power multipliers from the NNS. There is no way for a user to delegate their voting power to a fellow DAO member.

Proposals

Any action that affects the operation of a Personal DAO, the distribution of voting power for a Personal DAO, or the transfer of monetary value that is within the custody of the Personal DAO's treasury can only be carried out by way of a proposal that is submitted and voted on by the Personal DAO members who have voting power. Proposals are NOT executed if a minimum of 1/8th of the DAO's total voting power does not participate in the proposal. Furthermore, for a proposal to be executed, more voting power must be in favor of adopting rather than rejecting.

The Technical Details

Personal DAO is hosted completely on the Internet Computer Protocol Blockchain. The DAO consists of five different smart contracts responsible for housing each of the five components that comprise the DAO. Those components are as follows:

1. *User Interface Canister*: This is the component of the DAO that users interact with directly. The web address, buttons, pictures, text boxes, and anything else that a user directly encounters while interacting with the DAO are all stored in this section of the DAO. In layperson's terms, it is the face of the DAO.
2. *API Canister*: This component of the DAO is responsible for keeping a record of which user principals have access to the app, which canisters belong to which user, which principal is the admin of the DAO, and many more things. It's worth mentioning that the API canister is responsible for delivering upgrades to the manager canister as the manager canister cannot upgrade itself. In layperson's terms, the API canister is the brain of the application.
3. *Manager Canister*: This component of the DAO is responsible for communicating with the canister that is responsible for storing new Personal DAO updates (aka the wasm store). Whenever new updates are made available, the DAO members get to decide whether or not they wish to implement the new updates. If consensus is reached in favor of implementing the updates, the manager canister is responsible for retrieving those updates from the wasm store and then promptly delivering those updates to the rest of the DAO's canisters.
4. *Treasury Canister*: This component of the DAO is responsible for storing the assets deposited by the DAO members. This component keeps track of each DAO member's respective contributions and computes the voting power that they are owed as a result of their contributions.
5. *User Data Canister*: This component of the DAO is responsible for storing DAO members' individual data and assets. Every member permitted to enter the DAO will have a unique User Data Canister created solely for their individual data usage.

There are many instances of Personal DAOs deployed to the Internet Computer. Each Personal DAO that is deployed has its own URL, UI canister, API Canister, Manager Canister, Treasury Canister, and for each member within that Personal DAO, there is a User Data Canister.

Each API canister is assigned as the controller for:

1. The API canister (Itself)
2. The UI canister
3. The manager canister
4. The treasury canister
5. All user data canisters

Each manager canister is assigned as the controller for:

1. The API canister
2. The UI canister
3. The manager canister(Itself)
4. The treasury canister
5. All user data canisters

Note: both the API canister and the manager canister are controllers of all other canisters that comprise the Personal DAO, including themselves respectively.

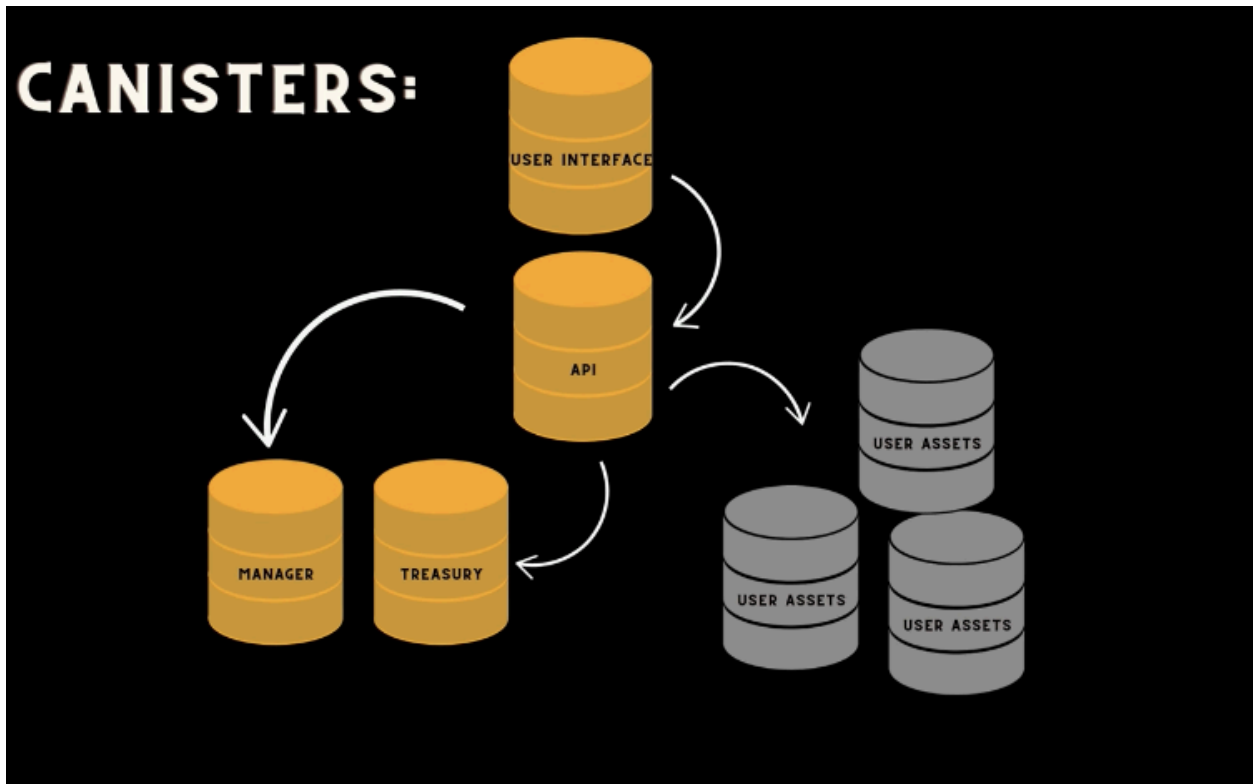
The API canister is coded with functions that allow it to perform all canister controller operations upon itself, as well as upon all other canisters that it controls within the application. The manager canister is coded with functions that allow it to perform upgrades on all of the DAO's canisters whenever upgrades are available.

Note: The canisters will only execute canister controller operations if consensus among dao members is reached first. This leaves access to Personal DAOs' controller settings in the sole custody of the respective DAO members.

Architecture

Canisters and Flow of Data:

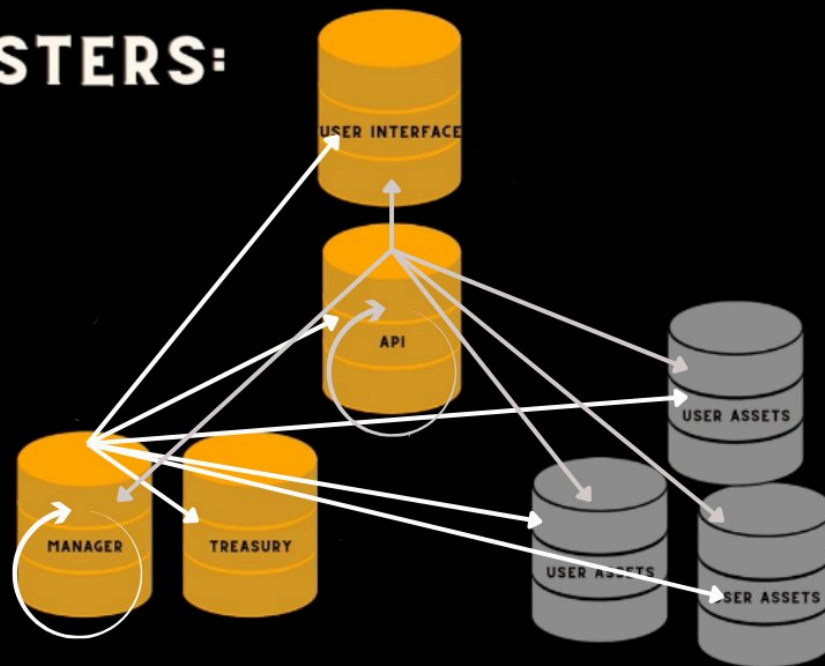
The diagram below illustrates the different canister types that constitute a Personal DAO as well as the flow of data when data is received from a user interacting with the User Interface of the DAO. All data is submitted by the user to the User Interface canister. From the User Interface canister, data is then sent to the API canister. API canister then manipulates and sends the data to the appropriate canister based on what action the user performs.



Canister Controller Settings:

The diagram below illustrates the canister controller settings for a Personal DAO deployed to the Internet Computer. The arrow indicates that a canister controls another, with the canister on the pointed end of the arrow being controlled by the canister at the opposite end of the arrow.

CANISTERS:



Update Propagations:

The diagram below illustrates how Personal DAOs are updated while preserving user sovereignty and canister controller settings of each Personal DAO. The Updates are directly uploaded to the master copy, which the dev team maintains control over. From there, the Wasm

Store canister pulls those updates from the master copy and stores them. The other Personal DAO copies deployed to the internet computer may then make a request for those updates and then install those updates upon themselves.

