



**McBride**  
Consulting LLC

# How Blockchain Can Transform the Grants Management Arena

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## Executive Summary

With increasing societal challenges prompted by socio-economic inequality, unanticipated world events, a changing climate and a swiftly modernizing civilization, there are commensurate growing opportunities that these issues afford. Federal and State grants have become one important tool to assist all facets of a society, including organizations, small businesses, families, and individual civilians. The growing prevalence of grants makes a seamless grants management process even more critical for grant-makers and grant recipients alike. Like any business operation involving cross-functional teams and diverse tasks, it becomes more challenging to manage the process effectively, especially in centralized platforms.

This paper will explore the challenges associated with the current grants management model and will identify how the grants management process can be improved and managed efficiently by leveraging blockchain technology. Ultimately, this paper will determine whether blockchain can simplify an important social benefit that has been riddled with complications and inefficiencies.

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## Grant Management Current Process

The grants management process includes three main stages: pre-award, award, and post-award.



Figure 1: Current Grants Management Process

The pre-award stage is the preliminary point where the grantor creates the grant by setting program objectives, policies, regulations, and timelines. The grantor will delineate the eligibility criteria to define which applicants can receive funds. Once these items are finalized, the grant program is published, and applicants may begin submitting their applications.

As applications are received, the grantor begins the award stage’s initial review to determine submission completeness, applicant eligibility, and corroborate applicant identity. The review will often entail several iterations between the grantor and the applicant to collect all the necessary information, additional requests for ancillary attestations in cases where information is difficult to retrieve, and further due diligence checks. After completing their applicant assessment, the grantor accepts or rejects the applicant’s application.

The grantor notifies applicants regarding their application status and proceeds with their reviews if the applicant is denied or to formally disburse funds in the event of

acceptance. The grantor will require final attestations from the applicant to ensure the information was accurate, confirm the applicant's payment information and then disburse the funds.

After the applicant has received the funds, the process has reached the post-award stage. Herein the grantor prepares the documentation for reporting requirements and prospective auditor reviews. At the end of the program, the grantor will organize all applicant documentation to ensure their information is secure and retained, consistent with the policies that often establish a retention duration.

## What are the challenges in the current process?

The current grants management process is riddled with inefficiencies and disjointed activities that make it difficult to oversee. These complications can arise at all stages of the grant disbursement process, which could stall the disbursement of funds to those in urgent need and delay the review for future applicants as well. Some of the difficulties emanate from different facets of the managerial process, and include, but are not limited to the following:

- **Multiple Systems and Platforms:** The grants management process is not managed on a single platform where all involved parties can have one unified repository to edit, monitor, communicate and govern requests.
- **Review Process:** The review process is incredibly time intensive. There is often a massive influx of applications that are difficult to manage and engage at one time. There are 4 types of reviews involved:
  - **Completeness Review:** During this review, there are several iterations between the grantor and the applicant due to missing information and documents.
  - **Eligibility and Application Review:** During this review, the applicants' information along with their supporting documents are assessed to determine whether they meet the eligibility criteria.
  - **Due Diligence Check:** Grantors or sub-grantees (when relevant), conduct due diligence checks on applicants to corroborate their submissions and maintain compliance with due diligence requirements, thereby minimizing legal and financial risks.
  - **Duplicates Check:** Since all grants are not managed on a single source, grantors face a challenge in which applicants might apply to various grant sources for the same need. The grantor must then check various databases to ensure a duplicative benefit is not provided. This check entails significant effort from grantors, as it requires, they manually



check several systems to confirm if a specific applicant has applied more than once for the same grant type.

- **Communication:** Due to the involvement of multiple program administrators, handling communication between grantors and grant applicants is extremely challenging. Again, there are no standard platforms for managing communication when interfacing with applicants.
- **Monitoring:** The process of auditing and reporting after the grant disbursement lacks visibility and transparency. With no centralized reporting systems in place, it is almost impossible to provide real-time visibility on fund disbursement levels.
- **Downtimes:** Grantors suffer from downtimes or deferred processes when they encounter an influx in applications or when applicants are unresponsive to requests. These downtimes are due to the existing infrastructure lacking scalability features.

# The Blockchain Opportunity

## What is Blockchain?

Software applications are primarily composed of three main layers: user-interface, business logic, and data access layers. The user-interface is the front-end of the application such as the web portal or mobile app. The business logic layer comprises all the operations that should take place upon any interaction with the user interface layer (for example, functions such as “add to cart” or “place an order”). For the business logic layer to compute operations, it relies on the data access layer to fetch the data stored in databases. Traditionally, software architects tend to build applications with centralized databases serving multiple digital channels and applications.

As illustrated in Figure 2, the image on the left demonstrates the centralized architecture where systems have a central database serving multiple parties. This model presents significant issues, including those associated with security, trust, single point of failure, and when limited to a singular authority.

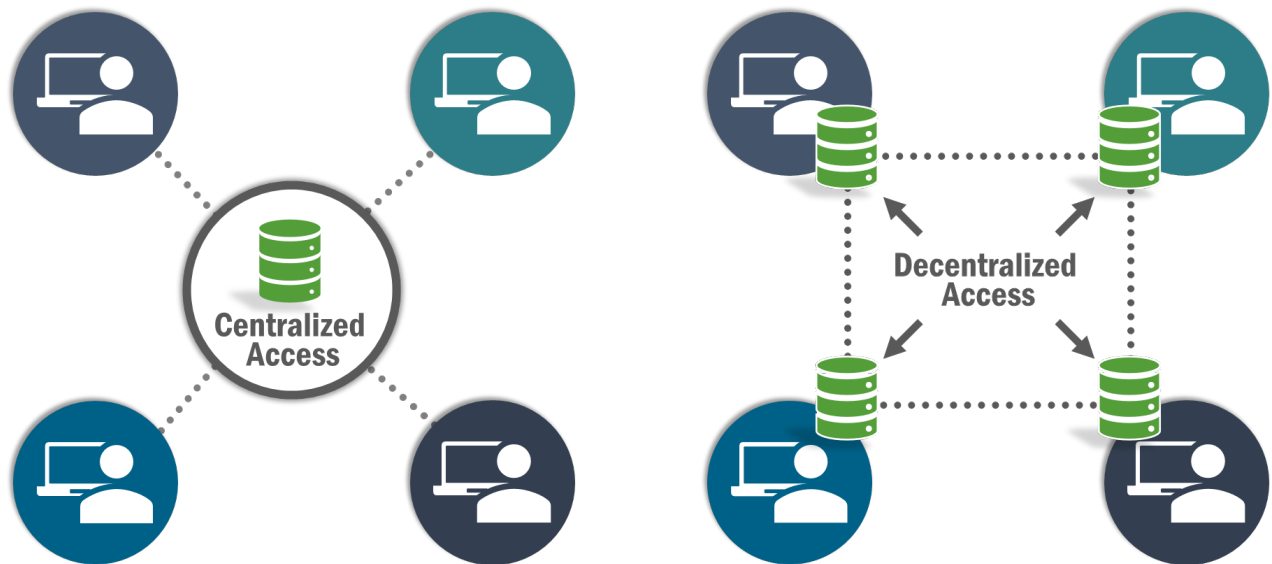


Figure 2: Centralized vs. Decentralized databases

Blockchain transforms the centralized concept of databases into a distributed design with a trust protocol ensuring real-time transactions and no central authority. In a blockchain-enabled system, a copy of the database is installed on each device, called a “ledger,” as illustrated in the right image in Figure 2.

The distributed ledger establishes rules that govern who can update what and controls the flow of information depending on who is granted access. These functional guardrails are referred to as “Smart Contracts,” which serve as a means of protecting information, delegating tasks to various teams, and reducing operational inefficiencies that might disrupt normal processes. It also allows the delegated authority to approve the project reports published on blockchain systems through a personalized signature, further amplifying security.

## Blockchain Features

There are various features associated with blockchain technology that are particularly relevant to the question of how it can help the grants management process. Some of those features include the following:

- **Secured:** Each entry on a blockchain ledger is encrypted. Each user has a public key to receive addresses from other entities and a private key for the owner to access this block. That individual control is a unique feature of the blockchain model.
- **Speed:** The blockchain’s ability to process transactions in a matter of seconds reduces the operational hurdles, removes unnecessary intermediaries, and ultimately can impact a company’s bottom line.

- **Immutable:** Records on the ledger cannot be altered, with each block containing its own data and unique identifier of the previously added block in the chain. To make any change a new block would be added, preserving the link in the chronology.
- **Permissioned:** Each member of the network has curated access rights so that confidential information is shared on a need-to-know basis.
- **Distributed:** The ledger is shared across all participating entities, thereby ensuring there is no single point of failure or singular authority. This facilitates the exchange of information from different entities in a manner that is absent in processes that lack blockchain functionalities.

## Grants Management over Blockchain

Blockchain can solve some of the challenges described above that are endemic to the grants management process. However, our approach combines automation with blockchain to maximize the potential benefit to grants management. Our proposed solution also ensures that the process is managed from start to end over a permissioned private blockchain.

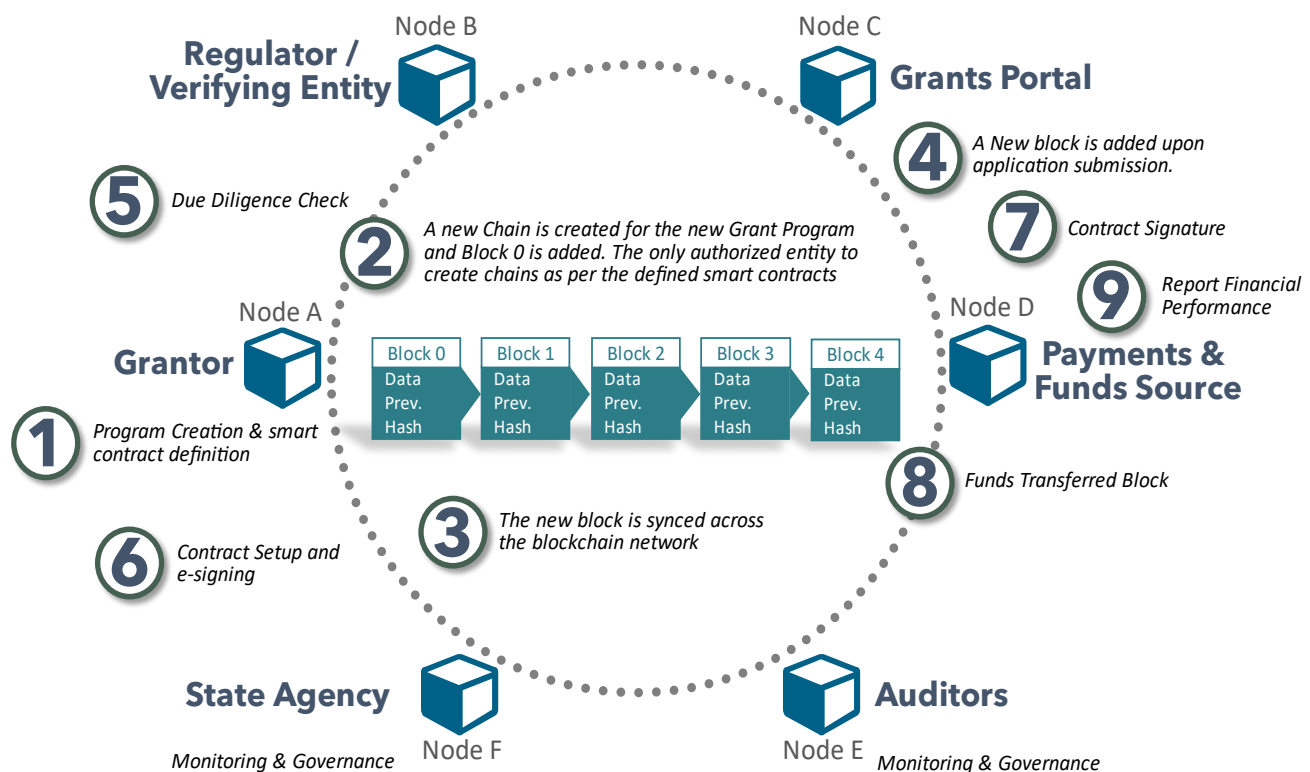


Figure 3: Grants Management over Blockchain

Figure 3 illustrates how the grants management process would function over the distributed ledger network:

**Step 1:** As soon as the grantor defines the grant policies and regulations, sets eligibility criteria, and creates the program a new chain on the blockchain is created.

**Step 2:** The policies, regulations, and eligibility criteria will be listed as business rules for the smart contracts to execute upon designated steps.

**Step 3:** The block is replicated on all ledgers (databases) that participate in the network.

**Step 4:** The grant is made available on the portal, allowing an applicant to submit their application. This will then add a new block in the chain, assuming it complies with the rules set on the smart contract. In addition, the smart contract will verify the application against the submission criteria such as filling all the required fields, uploading all the necessary documents, and ensuring that information provided is authentic when applicable.

**Step 5:** Grantors will be notified as each application is submitted. They will be able to retrieve an applicant's information and supporting documents. During their review, they will be able to perform due diligence checks with the comfort that the applications are fully submitted and with little interaction with the applicant.

**Step 6:** As soon as the grantor has made the decision on an applicant's eligibility, a new block will be added in the chain with the decision and attestations for signature.

**Step 7:** Applicants will be notified on the grant portal concerning the status of their application and will sign their attestation that their information is accurate.

**Step 8:** After obtaining the applicant's signature, the grant is ready for disbursement. Upon the transfer of funds, a new block will add the fund transfer details.

**Step 9:** Grant receivers will submit their financial reports over the portal, with the ability to customize the reports. This will initiate another replicated block to all nodes, thereby providing grantors, state agencies, and auditors the means for real-time monitoring.

**Step 10:** Upon completion, grantors will close-out the grant. The distributed ledger will apply the retention policy as per its configuration and regulatory stipulations (ex: 5 years).



## Solution Benefits

Transforming the process from multiple systems into a unified platform built with trust and transparency will ensure a seamless experience for grantors, applicants, state agencies, auditors, and all other grant stakeholders.

- **Trust & Transparency:** The blockchain architecture has blocks that are governed by all participants with no individual authority dictating transaction processes or timelines. Normative fears associated with business transactions and operations such as mutability and discordant systems or altered and modified data are absent in the blockchain.
- **Single Point of Truth:** Having an end-to-end platform for managing grants ensures that all parties will rely on a single distributed repository, thereby preserving the integrity of the information flow.
- **Automated Checks & Reviews:** Smart contracts help automate the lengthy and expansive review processes while deferring to human decisions for information that can't be verified against a set of rules.
- **Duplicates Elimination:** Like automated checks, smart contracts will preclude duplicate applications by using unique identifiers to reject replicated applications for the same grant in the same period.
- **Reduced Time & Costs:** With automated checks and duplicate elimination, grantors will save significant time and effort iterating with applicants or manually checking other systems.
- **Real-time Monitoring:** With the process being managed on a single network of distributed ledgers in which grant recipients will be able to provide their financial reports, auditors and grantors will be capable of monitoring the grant usage at any point in time.
- **Guaranteed Security & Uptime:** The distributed structure of databases ensures that the platform is not relying on a single database server, thereby guaranteeing its uptime. In addition, the encryption features (discussed above), guarantee the platform security, as none of the participants will be able to access a piece of information for which they lack authorization. This further preserves the operational fluidity by avoiding disruptive security breaches or when an individual point of authority is unresponsive.

## Challenges of Blockchain

As blockchain is a new technology, there are some challenges that would need to be considered with implementation.

- **Technological Wherewithal:** Verifying, validating, and adding transactions to the blockchain requires computational work that is complex. Therefore, any usage and implementation will likely require extensive resources and technological know-how, with technical frontend support.
- **Lacking Precedent:** Because the technology has not yet been widely used, its applicability in other contexts and environments will be invariably more challenging. Again, the frontend investments will likely be more costly, and its implementation more time intensive.
- **No Established Standards:** Some in the investor community are concerned about the lack of universal standards for blockchain, which could portend to operational and cost inefficiencies. Likewise, it's difficult to promote mass adoption of blockchain due to the limited regulatory precedent, making any projected outlook difficult to predict.
- **Cohesion Hurdles:** There are technological risks when integrating multiple core systems with a blockchain platform from design and architecture perspectives. It is unlikely that a first iteration will be devoid of any kinks or mishaps.
- **Environmental Issues:** Blockchain has been shown to consume a significant amount of energy with its intense computing demands. This is not only problematic from the environmental standpoint but may pose future regulatory hurdles as environmental standards and rules progressively expand.

Many of these challenges are those that any new product or technological innovation would likely face. Technological advancements require upfront investments in training, technologies, and personnel to specifically counter these issues. Though they certainly must be accounted for to elicit a successful implementation, they are in no way inhibiting to an endeavor whose benefits will far exceed its difficulties.

## Implementation Strategy

To account for the real challenges associated with a blockchain implementation while also attempting to realize its real economic and operational benefits, entities should create a pilot program to administer a singular or a component of a grant. This would provide an important insight into the tools tangible impacts while minimizing the upfront cost before broader enterprise adoption. From a grantor perspective, this would manifest as leveraging an existing blockchain-enabled technology platform that can help manage a program lifecycle and its administrative requirements. This could take the form of utilizing the decentralization offerings to manage the communication and document exchanges between disparate teams or organizations that might be involved in a singular grant.

Entities can also be selective and limit how deeply they delve into the blockchain space when entertaining this opportunity. There are many technology solutions that incorporate blockchain functionalities in their platforms that can showcase how it can tangibly improve the preexisting grants management processes.

Finally, entities are fortunate to have contemporary examples of successful implementations of blockchain both within grants management and in other administrative programs. Officials at the Department of Health and Human Services and the National Science Foundation have started incorporating blockchain technology in their systems within the grant management space. The International Aid Transparency Initiative (IATI), which began as an effort to increase the transparency of transactions in NGOs, has also started using blockchain to achieve its noble aims. This will complement the necessary research associated with other emerging blockchain functionalities that will further buttress the grants management process, as well as a holistic understanding of cost trajectories associated with the blockchain.

Initiating a smaller scale pilot and extrapolating from successful and ongoing implementation stories would help uncover any unanticipated risks in using blockchain within grants management broadly and help an entity maximize its tools in a more robust future endeavor.

## **Conclusion**

Blockchain technology will improve the grants management process exponentially. Built over trust and transparency, blockchain will provide stakeholders a single platform to create, apply, and verify, as well as monitor and audit grant programs. While there are challenges associated with the technology complexity and solution implementation, the benefits associated with a distributed ledger will transform stakeholders' experience, overcoming the downsides of the existing grants management process.

A comprehensive solution would leverage the precedents of success as well as other sophisticated technologies (like machine learning and artificial intelligence) that could supplement blockchain offerings with enhanced predictive and prescriptive analytics. The reticence prompted by the complications associated with blockchain and ancillary tools will only forestall their capacity to simplify the future of grants management.



## How has our work impacted our clients?

McBride Consulting has collaborated with teaming partners and our clients to create organizational and managerial frameworks which effectively disbursed millions of dollars in relief aid for our clients. We also established a system to disseminate stimulus support that can be replicated for other states and international communities during the pandemic or for future disaster recovery challenges. Through effective collaboration with client leadership and public institution heads, we have helped clients successfully conduct eligibility reviews for hundreds of applications and iterated with civic leaders to ensure compliance with all Federal, state, and local standards. Our work has resulted in the delineation of equitable disbursement methodologies to account for the severity of the spread and the socio-economic and demographic realities that culminated in varying degrees of damage. Our team's support for our clients will have a lasting impact that will help them be prepared for future disasters or public crises.

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