

**The Government Blockchain Association (GBA)
and the
Dynamic Coalition on Blockchain Assurance & Standardization
of the United Nations (UN)
Internet Governance Forum (IGF)**

Report

**Modernizing Systems with Blockchain to Prevent
Fraud, Waste and Abuse in Government**

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Modernizing Systems with Blockchain to Prevent Fraud, Waste and Abuse in Government



Foreword

This report was developed in response to the U.S. 2024 presidential campaign, when candidate Robert F. Kennedy Jr. pledged to place the entire U.S. federal budget on a blockchain. He declared, “We’re going to have 300 million eyeballs on our budget... if somebody is spending \$16,000 for a toilet seat, everybody’s going to know about it.” Although he did not win the election, his subsequent appointment as Secretary of the U.S. Department of Health & Human Services (HHS) raised speculation within the Government Blockchain Association (GBA) community about whether he might pilot blockchain-based budget transparency within one of the largest and most complex federal agencies.

In parallel, when President Trump assumed office, he established the Department of Government Efficiency (DOGE), with a clear mandate to reduce fraud, waste, and abuse in federal spending while improving transparency, accountability, and performance across government programs.

These actions, both Kennedy’s campaign vision and DOGE’s operational mission, sparked a global conversation about how technology could transform governance. They also influenced governments worldwide to adopt similar goals focused on efficiency and public trust.

The GBA recognized that these efforts also aligned directly with United Nations Sustainable Development Goal 16 (SDG 16): Peace, Justice, and Strong Institutions, and particularly Target 16.6, which calls for “developing effective, accountable, and transparent institutions at all levels.”

As host of the Dynamic Coalition on Blockchain Assurance and Standardization under the United Nations Internet Governance Forum (IGF), the GBA saw an opportunity to explore how blockchain could be leveraged to fulfill this global mandate, strengthening institutions.

With the convergence of high-profile pledges for blockchain transparency, the establishment of a federal agency dedicated to efficiency, and the international movement toward SDG 16.6, it became clear that a thoughtful study was needed. The topics addressed in this report emerged from that reflection. The GBA Budget, Accountability, and Transparency Working Group along the Dynamic Coalition on Blockchain Assurance &



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Standardization of the UN IGF concluded that a structured, multidisciplinary analysis would be invaluable to policymakers and administrators navigating the complexities of budgeting, procurement, and inter-agency coordination.

Please see [Appendix A \(About the Authors\)](#) to gain an insight into the organizations and individuals including the authors, contributors, and reviewers that made this report possible.

It is our hope that this report will inform and serve as a strategic resource for government decision-makers worldwide, those committed to achieving efficiency, transparency, and accountability in alignment with both national reform initiatives and the United Nations' vision for strong, trustworthy institutions.



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1 Introduction

1.1 Purpose

When most people hear the word “blockchain” they immediately think of the cryptocurrency Bitcoin. Although related, the two concepts are not the same, as the practical uses of blockchain technologies stretch far beyond the realm of cryptocurrency applications. System architectures designed with blockchain, are technologies that promote the creation of public ledgers as an instrument to introduce full transparency and immutability of bookkeeping and transaction processing in real time. One need not venture far, nor wait too long, to read about yet another case of financial corruption or misuse of government funds, to understand how technology such as blockchain can substantially improve governance.

This report explores opportunities for leveraging new technologies like blockchain and artificial intelligence (AI) to prevent fraud, waste and abuse (e.g., improper payments) across a wide variety of practical use cases in government. The focus herein is on blockchain, but recognizes that AI solutions can be used in conjunction with blockchain. The report presents the current landscape, challenges and limitations for the tracking and oversight of spending on budgetary outlays, grants management funding, and foreign assistance, for which these technologies present a strong value proposition for improving budget literacy, enhancing financial transparency, increasing efficiency, reducing risks and rebuilding trust in government.

While we recognize that blockchain technologies can be utilized by government organizations to address a wide variety of use cases, this report focuses primarily on the uses of blockchain for financial applications.

1.2 Background

Billions of taxpayer dollars flow through local, state, and federal programs each year. Public sector officials face serious challenges in tracking and reporting

government spending with accuracy, clarity, and timeliness. Fragmented systems, outdated technologies, and bureaucratic silos have made it difficult, especially for internal oversight bodies, to understand where funding is going, how it is being spent, and whether the expenditures are achieving intended outcomes. These systemic issues erode public trust, reduce accountability, and can result in waste or misuse of public resources.

1.3 Benefits of Blockchain

Emerging technologies, particularly blockchain, offer a compelling path forward. With its inherent transparency, immutability, and ability to provide real-time access to transactional data, blockchain can serve as a powerful tool for securely modernizing government financial management systems and ultimately restoring confidence in public institutions.

2 The Current Landscape and Pain Points

Government financial and records management is complicated by the involvement of many entities, platforms, vendors, data structures, financial systems, and record types (e.g., expenses, invoices, inventories, etc.). These records vary by usage period (e.g., single-year vs. multi-year) and require coordination across diverse stakeholders, approval layers, and disconnected systems. Despite efforts to promote accountability, many public sector environments still rely on manual processes, outdated software, and fragmented subsystems, making the timely detection of fraud, waste, and misapplication of funds difficult.

2.1 Fragmented and Outdated Financial Systems

Governments use financial and accounting systems to record, manage, and report budgetary resources, obligations, and outlays by agency, bureau, department, organizational function or program purpose. Government agencies at all levels tend to be independent from one another. These agencies, as well as component bureaus or organizations within them, use different budgeting, planning, and performance systems that are rarely integrated. This fragmentation often makes it

difficult to assemble a complete picture of how public funds are allocated, spent, and managed for programs that cross agencies or that engage the whole government to meet an intended outcome. Additionally, the opaque nature of these applications, being so fractional and segmented, can impede effective oversight and decision-making.

2.2 Lack of Transparency and Traceability

Fraud, improper payment distribution, and cybercrimes have become persistent, and are a growing threat to conventional financial systems. Applications used in accounting, budgeting, procurement, grants management, payments processing, and other financial environments are usually designed with system security that may limit upper management's visibility into detailed transactional flows. Hence, their centralized structure limits governance, auditability and visibility by a broader network of participants. Verification and tracking of financial transactions in sub-ledgers and the movement of funds is restricted to a few, potentially increasing the risk of errors or allowing flagrant corruption to go undetected. Strong internal controls are needed to ensure that transactions are properly accounted for and errors are detected in a timely manner.

This problem is compounded with traditional budgeting and financial systems in government, where emphasis is placed on independent and siloed systems rather than on universally standardized and commonly shared architectures. For example, the design of one federal agency's financial system that links spending outlays from its approved annual budget, to specific contract transactions, and to specific programs and their allocated project activities, is often vastly different from that of other agencies. Consequently, when spending is called into question by oversight agencies or Congressional committees, the very nature of the bureaucratic systems makes investigations more costly and time-consuming.

Financial systems built on blockchain architectures help mitigate these issues and risks head-on. Through their distributed, decentralized and immutable ledger design, blockchain applications have the potential to provide a more tamper-resistant record of government spending and activities – raising the bar for accountability and fostering greater trust. When a transaction or record is added to the blockchain, it is

essentially timestamped, its validators (or approvers) are known, and it cannot be altered without the consensus of the network participants. Blockchain makes it easier to trace the origin and movement of funds by creating a clear audit trail, safeguarding against retrospective alterations, and serves as an effective deterrent to unethical behavior or malicious intent.

The increase in transparency further enhances accountability. Blockchain provides all authorized participants (e.g. the trusted network) with visibility into transactions and funds movement, ensuring that financial decisions are properly documented and recorded. In this manner, a system's "blockchain of transactions" serves as an indisputable source of truth. Executed actions, whether they be payments made to a contractor or grantee, or funding allocations to a program are linked to a cryptographic signature of the individual responsible for approving the transaction, ensuring a clear chain of custody as transactions are completed.

2.3 Inadequate Controls and Limited Line of Sight

Strong internal controls and properly established finance systems with appropriate cost centers are intended to provide auditable tracking of funds. Without a consistent ledger or real-time accounting system, cash receipts and expenditures may not be accurately linked. This can result in:

- Insufficient transaction authorizations;
- Incorrect or improperly allocated funds;
- Inability to trace financial flows;
- Limited reporting transparency;
- Limited oversight over inter-agency fund transfers; and
- Inadequate management accountability.

While a properly designed accounting and financial system may include checks that limit expenditures to a maximum budgeted amount for an account, cost object, or activity, it may not generate "red flag" indicators if funds are transferred from one account to another, nor indicate whether the transfer was inappropriately authorized.

Consequently, the lack of a clear line of sight to acceptable and authorized shifts in funding allocations undermines one's ability to make informed financial decisions and opens the door to errors and fraud. Blockchain systems, however, can be

designed to implement robust role-based access controls for configured transactions, scripts or smart contracts. This ensures that only authorized individuals or entities can access specific data or perform certain actions based on their assigned roles.

2.4 Outdated Applications and Architecture

Many government entities rely on legacy financial applications that lack the sufficient modular design and functionality necessary to provide agility with integration and interoperability of emerging technologies¹. In addition, many systems are built at the enterprise level and do not provide the reporting granularity that is needed at the program level. This often leads to organizations developing one-off manual spreadsheets or using separate data collection tools to provide and manage financial and budgeting data to the level that meets their needs. This gap in reporting functionality has even led some organizations within the same agency to compete against others to demonstrate that they have a better handle on detailed data than rival departments. In the end, however, these poorly architected systems may not be equipped to provide the real-time data and insights needed for effective fiscal management across the entire agency – especially given the heightened focus on agencies’ financial spending transparency in today’s environment.

2.5 Reactive Oversight

Most government oversight mechanisms today are inherently reactive rather than preventive. In the absence of integrated real-time controls that constrain obligations and disbursements to authorized appropriations, expenditures can exceed approved funding levels before corrective action is possible. Instances of waste, misuse of funds, or budgetary overruns are typically uncovered only after the

¹*Critical Actions Needed to Urgently Address IT Acquisition and Management Challenges*, Federal Agencies Need to Modernize Legacy Systems (pg. 25), U.S. Government Accountability Office (GAO), Report to Congressional Committees, January 2025.

fact through audits, investigations, or whistleblowing disclosures when financial losses and reputational damage have already occurred.

Blockchain technologies offer a path toward transforming this paradigm. By enabling immutable, time-stamped transaction records and continuous visibility into the flow of public funds, blockchain can shift oversight from retrospective detection to proactive prevention that strengthens fiscal discipline, accountability, and public trust.

3 Blockchain as a Solution

Blockchain technology offers a viable solution and a path forward for modernizing government financial systems, and would allow for more proactive oversight, improved fiscal decision-making, and drive a reduction in fraud, waste, and abuse, including improper outlays. By enabling real-time, immutable tracking of funds from source to expenditure, blockchain can create a consistent, tamper-proof ledger accessible to all relevant stakeholders. Smart contracts can automate compliance and disbursement verification, while transparent ledgers can improve, accelerate, and facilitate external audits. Financial and accounting records designed on-chain can facilitate accounting for grant funding and specific expenditures that span multiple years. Most federal and state grants cover multiple fiscal years with the grantor's fiscal year often differing from the local government's year (e.g., September 30, December 31, or June 30). Additionally, grant expenditures often do not follow a regular pattern and will likely span multiple years. Blockchain systems can facilitate tracking grant awards, grant program expenditures, reimbursement of expenditures, and remaining grant funds. Additionally, they aid in tracking and auditing grant expenditures at the sub-recipient level. This is something that has been a challenge for many organizations.

4 Blockchain Technology Use Cases

There are many ways that blockchain technology can be used. The following subsections describe several use cases and examples of how blockchain can and is being used.

4.1 Budget Transparency and Management

Blockchain offers significant potential for improving budget transparency and management, but several challenges remain. These include data integrity issues, difficulty integrating with legacy financial systems, and a lack of standardized reporting formats. Governments must also balance transparency with privacy concerns and address limited public understanding of blockchain tools. High development costs, regulatory uncertainty, and internal resistance to change further complicate adoption. Overcoming these is essential to realize blockchain's full potential in public finance.

4.1.1 Utah County

4.1.1.1 Problem

Utah County is undergoing rapid population growth, accounting for 43% of the state's total population increase in 2024.² The population growth and resultant surge in demand for public services, especially in healthcare, is placing significant strain on the county's limited resources. The Utah County Health Department, which oversees 23 distinct programs, has operated at a budget deficit for several years. County Commissioner Amelia Powers-Gardner, a member of the Board of Health, identified a lack of financial transparency as a critical obstacle to rebalancing the department's budget. The county's legacy financial system consolidates all incoming revenues into a single fund with department and cost center codes indicating the division within the fund where specific program revenues belong. Expenses are paid from the division cost center or allocated to the cost center without tracking the specific expense to the original source of funds. This is particularly true for revenues not derived from grants or fees. As a result, decision-makers cannot easily distinguish between programs funded by external grants and those supported by local tax dollars, undermining their ability to make informed policy and budget decisions.

² Interview with Utah County staff by GBA Budget Transparency and Accountability Working Group authors, August 6, 2025.

4.1.1.2 Proposed Solution

To solve this traceability issue, the Commissioner proposed the use of blockchain technology to enhance financial transparency. By recording both grant revenues and program expenditures on-chain, the county could create an immutable and auditable ledger of all fund flows. This would allow stakeholders to track each dollar from its funding source to its final use within a specific program, enabling accurate and real-time insight into program-specific financing, even across fiscal years. The use of smart contracts on-chain would facilitate revenue and expenditure tracking.

4.1.1.3 Expected Results

Due to limited finance personnel in the Health Department administration, Utah County must have a solution that enables the use of blockchain without increasing staff workload. The Auditor's office is working with a financial software vendor to develop an integration that will allow the financial system to seamlessly work with blockchain technology. With blockchain-enabled fund tracking enhancing the traditional financial system, the county will be able to more effectively distinguish which programs are fully or partially grant-funded, and which rely on local tax revenue. This insight will help avoid unnecessary cuts to externally funded programs and provide clarity on trade-offs between tax and fee increases, as well as service reductions. Ultimately, this approach will support more fiscally responsible governance, protect essential services, and build public trust by empowering citizens and officials to participate in more transparent and data-driven budgeting decisions.

4.2 Data Integrity / Records Management

4.2.1 Ghana

4.2.1.1 Problem

Like many governments, Ghana has historically struggled with challenges related to data integrity, transparency, and public trust in official records.³ Issues such as

³"Corruption in Ghana: Peoples Experience and Views", United Nations Office on Drugs and Crime (UNODC), 2022 at: https://www.unodc.org/documents/data-and-analysis/statistics/corruption/Ghana/UN_ghana_report_v4.pdf.

land registry disputes, inconsistent tax records, and bureaucratic inefficiencies have undermined service delivery and contributed to fraud and corruption. Without a unified, tamper-resistant digital infrastructure, citizens and institutions lacked confidence in the accuracy and security of government data.

4.2.1.2 Proposed Solution

In 2024, Vice President Dr. Mahamudu Bawumia announced a national initiative to become Africa's first blockchain-powered government.⁴ Building on the success of the Ghana.gov digital services platform, used by 99% of government agencies, the initiative seeks to integrate blockchain technology across many key sectors including land administration, taxation, healthcare, and education.

The plan involves using X-Road Integration, modeled after Estonia's e-governance framework, to interconnect databases and create a secure digital backbone for all data exchanges. Blockchain will then be the underlying infrastructure upon which the financial applications will be layered to help ensure that all government records are immutable and tamper-proof. This approach will ensure that any change to government data is recorded transparently and cannot be altered, reinforcing data security and enabling real-time auditing.

4.2.1.3 Expected Results

Ghana's blockchain initiative is expected to significantly reduce the risk of fraud, waste, and abuse in the country's public administration. As examples, by securing land titles, automating tax verification, and protecting citizens' records, the government aims to boost institutional integrity, improve service delivery and attract investments. Blockchain's transparency and auditability are projected to increase public trust, reduce corruption, and streamline operations across many agencies. While implementation is still underway, the initiative positions Ghana as Africa's leader in digital governance adoption and a model for other developing nations seeking to modernize and secure their public infrastructure.

⁴ <https://africa.businessinsider.com/local/leaders/ghana-to-become-africas-first-blockchain-powered-government/lw11k8y>.

4.3 Grant & Aid Management

4.3.1 General Issues & Challenges

Grant outlays and expenditures pose several challenges.

- The fiscal year of the grantor agency is often different from that of the grant recipient;
- Grants often span multiple years and are usually reimbursable;
- For reimbursable grants, the expenditures are made and then a request for reimbursement is submitted to the grantor agency, which is often delayed for several months;
- Expenditures can be tracked to the original grant revenue with a good accounting system, but the timing of the grant award, allocations of budgets over the life of the grant, the timing of actual expenditures, billing for reimbursements, reconciliation of advances, and timing of receipts can create difficulties for the staff and administration; and
- Inadequate staffing and under-qualified staffing can create difficulties in tracking grant revenues and expenditures.

4.3.2 U.S. Department of Defense (DoD)

4.3.2.1 Problem Statement

In 2024, the U.S. Department of Defense (DoD) failed its seventh consecutive annual financial audit, and remains unable to fully account for its nearly \$850 billion budget.⁵ Despite overseeing approximately \$3.8 trillion in assets and \$4 trillion in liabilities, the DoD has struggled to provide sufficient, verifiable data to support complete accounting of its finances. A key challenge lies in the lack of end-to-end visibility across decentralized and complex logistics and financial systems, undermining public trust and limiting Congress's ability to oversee defense spending effectively.

⁵"Pentagon Fails 7th Audit in a Row But Says Progress Mad", Brad Dress, The Hill, November 15, 2024

One area where this lack of transparency carries particularly high stakes is in the management of military aid to foreign partners, such as with the ongoing assistance to Ukraine. In such dynamic, high-risk environments, traditional supply chain systems have proven inadequate for tracking sensitive assets with the speed, precision, and accountability required.

4.3.2.2 Proposed Solution

In response, the U.S. Army Materiel Command (AMC) has piloted an initiative to enhance aid tracking by integrating blockchain technology, big data analytics, and artificial intelligence.⁶ In a landmark pilot initiative, an innovation officer from the 75th U.S. Army Reserve Innovation Command (USARIC) has developed and deployed a blockchain-based supply chain solution designed to transform the way the U.S. military tracks materiel. The effort brings together key partners across the Department of Defense and industry, and includes SIMBA Chain, AKUA Inc., the Defense Logistics Agency (DLA), the U.S. Army Materiel Command (AMC) and the Air Force Research Laboratory (AFRL). The solution is now ready to scale.

The blockchain solution being piloted provides an immutable ledger for recording all aid transactions, capturing who sent what, when, and where. Big data platforms consolidate information from disparate sources such as shipping manifests, warehouse inventories, and field reports. AI-powered analytics tools interpret these inputs in real time, generating alerts, forecasts, and decision-ready insights for military logisticians and leadership. In addition, the DoD plans to further develop the blockchain application through the tokenization of assets to clarify ownership and automate transfers, while maintaining a comprehensive audit trail for any changes in custodianship.

4.3.2.3 Actual or Expected Results

Led by Maj. Matthew Goyette, the innovation officer with USARIC's Support Group, the program was launched under AMC's Operation Mission Truth. Its core objective

⁶"75th USARIC Soldier Develops Blockchain Solution to Revolutionize the Military Supply Chain," Lt. Col. Charles An, Defense Visual Information Distribution Service, March 12, 2025.



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is to improve visibility, auditability and accountability of assets moving under Presidential Drawdown Authority (PDA) missions.⁷

The pilot utilized advanced asset-tagging to track over 600 tons of equipment with real-time verification and a tamper-proof record of every transaction. This outperformed traditional tracking methods used over the prior 31 months, combined. Ten pieces of equipment were tagged as part of a real mission, demonstrating workable integration of the system. The following partners were involved:

- AKUA Inc. – Provided advanced commercial tracking devices (AKUA tags) that enable real-time location, tamper detection and environmental monitoring of containers and sensitive assets⁸;
- SIMBA Chain – Contributed the blockchain platform and expertise in delivering a “single source of truth” ledger for DoD logistics and supply chain processes⁹.
- DLA (Defense Logistics Agency) – As the DoD’s logistics combat-support agency, provided infrastructure support, global equipment movement networks and served as a key stakeholder in the pilot; and
- Air Force Research Laboratory (AFRL) – Helped design and adapt blockchain infrastructure, leveraging earlier work to support this new pilot.
- Army Materiel Command & USARIC: AMC oversaw logistics movement and coordination, while USARIC provided the innovation platform and pilot lead.

This integrated system has been piloted, offering real-time visibility and accountability for billions of dollars in U.S. military aid to Ukraine. The initiative expects to yield several significant outcomes:

- **Improved transparency and auditability**, ensuring that every item delivered can be tracked and verified from point of origin to deployment;

⁷ <https://www.dvidshub.net/news/492690/75th-usaric-soldier-develops-blockchain-solution-revolutionize-military-supply-chain>.

⁸ <https://akua-inc.com/>

⁹ <https://simbachain.com/>



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- **Faster decision-making**, enabled by AI-driven insights by helping to identify bottlenecks, discrepancies, and underutilized resources;
- **Restored confidence** in the DoD's ability to manage and report on high-value, high-risk assets in challenging environments; and
- **Scalable blueprint** for broader adoption of blockchain-based solutions to improve financial stewardship and help mitigate gaps in visibility that have led to repeated audit failures.

By leveraging cutting-edge technology in a high-stakes context, the DoD has taken a concrete step toward restoring fiscal discipline and operational transparency, demonstrating how innovation can drive measurable improvements in government accountability.

The DoD acknowledges that supply-chain visibility has been a persistent challenge, especially when assets are moving globally, across services, through coalition partners, and through complex logistics chains¹⁰. By combining IoT-enabled tracking (via AKUA) with blockchain's immutability and audit-trail capabilities (via SIMBA Chain), the pilot offers a way to reduce manual data entry, error-prone spreadsheets, disconnected systems and hidden accountability gaps.

Moreover, the success of moving a large equipment load in a single pilot event sends a signal that this technology is not just theoretical, but can scale to real logistics operations, including missions in contested or multinational environments. The ability to tag, encrypt and monitor assets from point of origin through delivery and handover provides significant promise for readiness, operational transparency and cost savings.

The team is moving toward drafting a formal requirements document to define needs and justify further deployment of blockchain systems across DoD logistics. The next phase will likely involve tokenizing assets (to clarify ownership and automate transfer along the chain), replicating the system across services and theaters, and integrating with existing databases and systems of record¹¹.

¹⁰ <https://breakingdefense.com/2025/01/blockchain-big-data-and-genai-us-army-uses-novel-tech-to-track-billions-in-ukraine-aid/>

¹¹ <https://neuron.expert/news/75th-usaric-soldier-develops-a-blockchain-solution-to-revolutionize-the-military-supply-chain/11670/en/>



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Funding, leadership buy-in and interoperability across services and allied partners remain key enablers for the next phase, along with scaling and validating it across more missions, to justify broader adoption.

4.3.3 Inter-agency Blockchain Initiative

4.3.3.1 Problem Statement

The Federal Government distributes over \$1 trillion in grants annually across a wide range of programs, agencies, and jurisdictions.¹² This massive financial footprint remains highly vulnerable to fraud, waste, and abuse due to outdated systems, inconsistent oversight, and fragmented reporting structures. Federal auditors and oversight bodies (e.g., GAO) routinely struggle to follow the flow of the money, leaving significant gaps in accountability and potentially exposing taxpayers to ongoing misuse of public funds.

4.3.3.2 Proposed Solution

To address these challenges, the U.S. Department of the Treasury's Office of Financial Innovation and Transformation (FIT) launched a pilot in 2021 to use blockchain for federal payment processes.¹³ In addition, an earlier effort led by the Department of Health and Human Services (DHHS) ReInvent Grants Management Team, created the Grant Recipient Digital Dossier (GDD), a tool for evaluating the risks posed by grant applicants prior to an award being made as well as ongoing risks for actual grant recipients.¹⁴ Assessments were stored on-chain to provide insight into risk exposure over time. Both of these initiatives envisioned designing more secure, transparent, cohesive, and automated grants management systems.

The two efforts sought the use of blockchain to understand previously unavailable data, such as sub-recipients of federal grant funding. Detailed data at this level has

¹²"Federal Grants to State and Local Governments: Trends and Issues", Adam G. Levin, Congress.Gov, CRS Product No. R40638, June 26, 2025

¹³The Department of Treasury, Office of FIT pilot project to test the use of blockchain for federal grants payment processing was conducted in 2021-2022 under the direction of Adam Goldberg and Craig Fischer.

¹⁴The Department of Treasury's Grant Recipient Digital Dossier (GDD) initiative was led by Michael Peckham from 2020-2021.

long been requested as critical information for government oversight. The initiatives featured:

- Immutable blockchain records that traced grant funding from federal agencies to recipients;
- Smart contracts that enforced predefined conditions for disbursement;
- Real-time auditability accessible to both internal and external oversight entities;
- Automated risk alerts and compliance verification based on standardized and integrated metadata; and
- Modernized applications to eliminate redundancies, reduce costs, and promote the sharing of sensitive data on a need-to-know basis.

4.3.3.3 *Actual or Expected Results*

Technically, these initiatives succeeded in demonstrating how blockchain could streamline the grants life cycle, reduce administrative overhead and provide end-to-end financial visibility. The prototype showed that blockchain could significantly enhance fraud prevention by flagging anomalies in real time and ensuring that payments were made only when legally and contractually appropriate.

However, the initiative was never implemented beyond the proof-of-concept stage. While legacy system integration, regulatory uncertainty, and procurement complexity presented significant challenges, the main barrier to implementation appeared to be the agency's cultural resistance to transparency and change.

With its transparent nature, a blockchain-based system would have exposed questionable histories, affiliations, as well as performance records of certain recipients. Consequently, testing the waters with a blockchain pilot threatened to make visible what many people may have grown comfortable keeping hidden. Ultimately, the initiative demonstrated how blockchain would have prevented fraud, which some insiders were willing to tolerate, or even facilitate.

This case reveals a harsh but necessary truth. It is that often the biggest obstacle to government reform is not technical, but cultural. Real transparency can be disruptive. For blockchain to fulfill its promise in the grants management arena,

leaders and management alike must be willing to embrace accountability as a critical feature, rather than perceive it as a threat.

4.3.4 United Nations World Food Program

4.3.4.1 Problem Statement

The World Food Program (WFP), a humanitarian arm of the United Nations, delivers food assistance to millions of displaced individuals across conflict-affected and resource-limited regions. In refugee camps such as Azraq and Zaatari in Jordan, the WFP historically relied on traditional cash-based transfers or food vouchers processed through third-party financial institutions to deliver food to refugees. These systems incurred significant transaction fees, involved bureaucratic delays and were susceptible to fraud, duplication, and corruption. In environments where institutional trust is weak and infrastructure is underdeveloped, ensuring that humanitarian aid and assistance reaches the right people at the right time has proven to be both critical, and increasingly difficult.

4.3.4.2 Proposed Solution

To overcome these challenges, the WFP launched *Building Blocks*, a blockchain-based aid distribution system designed to increase efficiency, accountability, and security.¹⁵ The system created a private, permissioned blockchain that recorded each beneficiary's transactions, linked to biometric identity verification through iris scans. Refugees could purchase food directly from participating local retailers using their biometric credentials, with each transaction logged immutably on the blockchain.

Key elements of the system included:

- Real-time, tamper-proof tracking of aid disbursements;
- Elimination of third-party banks and intermediaries;

¹⁵Center for a Digital Future, "Building Blocks: Global Ethereum Smart Contracts NFT", Crypto Council for Innovation, 2024, and see UN World Food Program, Building Blocks at <https://innovation.wfp.org/project/building-blocks>

- Biometric authentication to prevent identity fraud and/or duplicate claims; and
- Immediate, auditable data access for WFP administrators and authorized oversight bodies.

4.3.4.3 *Actual or Expected Results*

The pilot deployment of *Building Blocks* in Jordan demonstrated measurable improvements in efficiency, security, and transparency. WFP reported a 98% (\$2.4 million USD) reduction in transaction fees and faster reconciliation of accounts. Because each voucher transaction was directly linked to a verified individual and recorded on an immutable ledger, the potential for fraud or misuse was dramatically reduced. The system also empowered beneficiaries with greater dignity and autonomy, allowing them to choose from a variety of local food providers.

More broadly, the initiative validated blockchain's role as a critical enabler of trust and accountability in humanitarian operations. By embedding financial integrity into the aid distribution process, *Building Blocks* positioned WFP at the forefront of innovation in global relief logistics and laid the groundwork for scaling blockchain solutions across the humanitarian sector.

4.3.5 U.S. Department of Energy

4.3.5.1 *Problem Statement*

Before President Biden left office, the U.S. Department of Energy (DOE) accelerated disbursement of more than \$30 billion in funding for clean energy initiatives. This included a \$15 billion loan to Pacific Gas & Electric (PG&E) and \$7.6 billion awarded under the Grid Resilience and Innovation Partnerships (GRIP) Program. These actions were intended to cement climate policy priorities before a change in administration. However, the unprecedented pace of disbursement far exceeded the DOE's internal capacity for oversight.

The DOE Office of Inspector General (OIG) warned that the rapid outflow of funds, combined with the use of outdated legacy financial systems and limited staff

resources, significantly increased the risk of fraud, waste, and abuse.¹⁶

Congressional hearings echoed these concerns. Similar vulnerabilities surfaced at the Environmental Protection Agency (EPA), where a \$20 billion Greenhouse Gas Reduction Fund (GGRF) came under FBI investigation for alleged fraud and mismanagement.¹⁷ These incidents underscore a broader lack of real-time visibility and accountability in federal clean energy spending.¹⁸

4.3.5.2 Proposed Solution

Blockchain technology offers a compelling alternative to reactive oversight models. A blockchain-based system could have provided the DOE with continuous, tamper-proof visibility into how taxpayer funds were disbursed. Smart contracts would have enforced compliance with program conditions, while automated alerts could have flagged deviations from approved timelines, funding limits, and spending categories.

In this case, a blockchain-enabled system could have improved transparency and reduced administrative overhead by automating and simplifying reconciliation and compliance reporting processes through:

- Recording all fund transfers and project expenditures on an immutable ledger;
- Applying and enforcing conditional rules and controls to restrict disbursements in accordance with authorization or compliance criteria; and
- Providing real-time, audit-ready data to both internal managers and government oversight entities.

¹⁶“Opportunities to Improve Internal Control Gaps for the Office of Clean Energy Demonstrations’ Implementation of the Advanced Industrial Facilities Deployment Program”, U.S. Dept. of Energy, Office of Inspector General, Inspection Report DOE-OIG-25-26, July 24, 2025.

¹⁷“FBI Takes Up EPA Probe Amid Pushback from Judge, Prosecutors”, Spenser S, Hsu, Maxine Joselow, and Nicolas Rivero, The Washington Post, February 27, 2025.

¹⁸“EPA Releases Statement Following Favorable D.C. Circuit Court of Appeals Ruling”, U.S. Environmental Protection Agency Press Office, September 2, 2025.

4.3.5.3 *Actual or Expected Results*

In the absence of such a system, multiple investigations were commissioned to audit more than \$15 billion in DOE grants and loans. Preliminary findings revealed inconsistent documentation, limited traceability of expenditures, and gaps in compliance monitoring. These retrospective audits are time-consuming, costly, and conducted after the misuse occurs, the root cause of which may never be identified.

Had blockchain been implemented, the agency could have mitigated the potential for misuse of funds, proactively verified compliance, reduced manual reporting burdens, and provided Congress and watchdog agencies with timely, transparent insights. The case illustrates a critical lesson for public finance – proper stewardship of funds and accountability cannot depend solely on post and ad-hoc audits. To protect taxpayer funds and strengthen public trust, government systems must be equipped to monitor and transparently report disbursements in real time –blockchain solutions provide the ability to do so.

4.4 Governance

4.4.1 U.S. Department of Government Efficiency (DOGE)

4.4.1.1 *Problem Statement*

Federal financial oversight has long been hindered by fragmented, siloed data systems across agencies. Spending information is dispersed across multiple, non-interoperable platforms, making it difficult to trace federal funds from appropriations down to specific programs and projects. This lack of cohesion has resulted in data discrepancies, inefficiencies, and erosion of public trust in reported financial figures.

4.4.1.2 *Proposed Solution*

In January 2025, the U.S. Department of Government Efficiency (DOGE), was authorized by Presidential Executive Order to access federal technology systems.¹⁹

¹⁹“Presidential Executive Order, “Establishing and Implementing the President’s Department of Government Efficiency”, The White House, January 20, 2025.



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Leveraging this authority, DOGE deployed data-driven analytics on top of both internal and public financial systems, including the U.S. Department of Treasury ledgers and USASpending.gov. The approach aimed to establish a more comprehensive, unified view of federal expenditures by detecting gaps, overlaps, and inconsistencies in financial reporting.

4.4.1.3 *Actual or Expected Results*

Through its enhanced cross-platform access and advanced analytics, DOGE uncovered critical discrepancies between reported spending and actual disbursements. This shed light on longstanding issues that have plagued federal financial system transparency. By integrating data from systems such as the Treasury's internal ledgers and USASpending.gov, DOGE offered agencies and oversight bodies a unified, program-level view of how federal dollars are allocated and spent.

DOGE's intervention has had a transformative impact on how federal spending is monitored. Policymakers now have some of the tools needed to help detect inefficiencies and funding inconsistencies that were previously hidden or difficult to extract from agency systems. The result has been a more accurate, real-time understanding of government expenditures, which lays the foundation for stronger fiscal accountability and more informed decision-making. Over time, these efforts will help reestablish public trust by demonstrating a commitment to financial integrity and transparent governance.

A platform designed on blockchain would have strengthened and reinforced DOGE's mission by establishing a framework to allow the breaking down of siloed data repositories associated with federal agencies' spending.

4.4.2 U.S. Agency for International Development (USAID)

4.4.2.1 *Problem*

In 2025, USAID was effectively shut down, its operations scaled back, and remaining salvaged programs transferred to the U.S. Department of State.^{20,21} Over

²⁰"USAID Programs Now Being Run by State Department as Agency Ends Operations", Mary Kekatos and Chris Boccia, July 1, 2025.

²¹ <https://www.cato.org/blog/good-start-congress-cuts-funding-usaid-other-foreign-aid-programs>.



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80% of the agency's budget was cut,²² and approximately \$55 billion in multi-year foreign aid contracts terminated²³ due to concerns about transparency and the effectiveness of its humanitarian assistance and development programs. Across administrations, Congressional committees struggled with assessing the effectiveness of the agency's spending on foreign aid programs and the absence of reporting on evidence-based outcomes. Since established, USAID operated largely as a federation of independent bureaus with financial, budgeting, procurement, and program reporting systems that provided little to no integration. The absence of interoperability between these fragmented legacy applications led to inadequate traceability of funds and outcomes, from the bureau level down to the project level. Consequently, this obscured oversight and made it difficult to assess whether taxpayer dollars were being used effectively or were aligned to U.S. foreign policy interests.

4.4.2.2 *Proposed Solution:*

The implementation of blockchain technology could have revolutionized USAID's financial management and program tracking. By placing all foreign aid transactions "on-chain," the agency could have offered real-time, immutable, and transparent records of how, when, and who approved, the allocation and spending of program funds. Each transaction, linked from bureau to project, would have been verifiable by Congress, GAO and the public. As a result, this would have improved accountability and reduced reliance on after-the-fact audits.

4.4.2.3 *Expected Outcomes:*

With blockchain integration, USAID would have improved transparency, enabled more frequent and accurate congressional oversight, and potentially avoided the sweeping budget cuts and public backlash that it endured. A platform designed on blockchain would have strengthened public trust, provided greater clarity in funding allocations, and reinforced USAID's mission by demonstrating alignment

²²"USAID Budget Slashed By 83%, and Other Top Health Stories", Shyam Bishen, World Economic Forum, June 3, 2025.

²³"Trump Administration Says It's Cutting 90% of USAID Foreign Aid Contracts", Politico, as reported by the Associated Press, February 26, 2025.

with U.S. interests and measurable results. In doing so, it may have preserved the agency's operational integrity and 60-year legacy.

4.5 Identity Management

4.5.1 United Nations Joint Staff Pension Fund (UNJSPF)

4.5.1.1 *Problem*

The United Nations Joint Staff Pension Fund (UNJSPF) manages pension payments for over 80,000 beneficiaries in more than 190 countries.²⁴ To ensure continued eligibility, retirees are required to submit an annual Certificate of Entitlement (CE) proving that they are still alive. This traditional paper-based process has been slow, error-prone, and vulnerable to fraud. Delays in international mail or clerical errors have led to suspended payments for legitimate recipients as well as continued payments to deceased individuals, resulting in both financial losses and increased administrative burden.

4.5.1.2 *Proposed Solution*

To address these challenges, the UNJSPF developed a "Digital Certificate of Entitlement" (DCE) using blockchain technology and biometric verification.²⁵ In partnership with the UN International Computing Centre (UNICC), the system was designed to allow retirees to securely verify their identity via a mobile app using facial recognition. Each verification generates a tamper-proof certificate that is time-stamped and recorded on a permissioned blockchain ledger (Hyperledger Fabric). This creates an immutable, auditable record that allows for real-time verification without the need for paper forms or the use of mail services.

4.5.1.3 *Actual Results*

Launched as a pilot in 2020, the Digital Certificate of Entitlement (DCE) has produced measurable results in efficiency, transparency, and fraud prevention.

²⁴"Financial Highlights", United Nations Joint Staff Pension Fund (UNJSPF) Financial Statements for 2023, October 9, 2024.

²⁵ <https://www.unjspf.org/newsroom/facial-recognition-and-blockchain-to-replace-paper-un-pension-fund-enters-digital-age/>



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This innovation has improved the accuracy and timeliness of pension payments, eliminated fraudulent or duplicate claims, reduced administrative costs, and strengthened data privacy and auditability.

The DCE's success has earned significant international recognitions:

- In 2021, it received the **United Nations Secretary-General's Award for Innovation and Sustainability** for its contribution to trust, accountability, and service delivery across the UN system.
- In 2023, the **Government Blockchain Association (GBA)** presented its **Annual Achievement Award for Organizational Excellence in Social Impact** to UNJSPF, recognizing the Fund's pioneering use of blockchain technology to strengthen transparency and reduce the risk of fraud, waste, and abuse in public-sector operations.

These achievements underscore how blockchain can operationalize United Nations Sustainable Development Goal 16 (SDG 16) and Target 16.6 by building effective, accountable, and transparent institutions. The DCE stands as one of the first operational blockchain applications within the UN system specifically designed to prevent fraud, waste, and abuse, and serves as a scalable model for other global public pension programs.

4.6 Procurement / Supply Chain

4.6.1 U.S. Health & Human Services

4.6.1.1 *Problem Statement*

The U.S. Department of Health and Human Services (HHS) faced persistent challenges in its procurement processes, including data fragmentation across five different and siloed contract systems, lengthy acquisition life cycles, limited visibility into vendor performance and pricing, and inefficient manual workflows. These issues hindered transparency, drove up costs, and delayed mission-critical acquisitions.

4.6.1.2 *Proposed Solution*

Under the leadership of its Chief Information Officer (CIO) Jose Arrieta, HHS developed and launched HHS Accelerate, a blockchain-based procurement

platform that leveraged artificial intelligence and machine learning to automate and streamline acquisition workflows.²⁶ By creating a decentralized, immutable ledger of procurement data, Accelerate provided real-time access to historical contract data, enabled cross-agency collaboration, and supported more informed decision-making.

4.6.1.3 Actual or Expected Results

This project showed great promise with expected results including:

- \$30 million in projected savings over five years²⁷ from a single negotiated contract using AI-generated insights from the platform;
- Up to \$33 million in operational cost savings through automation and efficiency improvements;
- 52.25% cost reduction in select contract negotiations due to enhanced market intelligence;
- Near real-time procurement analytics, reducing acquisition cycles from months to seconds;
- Integration of data from across five legacy systems, improving transparency and auditability; and
- Set a federal precedent for the successful use of enterprise blockchain in government operations.

HHS Accelerate was a groundbreaking initiative launched by visionary CIO Jose Arrieta to transform federal procurement through blockchain, AI, and automation. Arrieta foresaw the convergence of emerging technologies that would soon revolutionize government operations, and he worked to position HHS at the forefront of that transformation. However, many of the IT professionals tasked with implementing the project could not envision the near-term potential of these technologies and viewed the initiative with skepticism. Lacking a shared

²⁶ <https://federalnewsnetwork.com/ask-the-cio/2019/07/hhs-new-contract-writing-system-testing-more-than-an-innovative-technology-approach/>.

²⁷ "Blockchain Saving HHS \$30M on First Accelerate Contract", Katie Malone, February 11, 2020.

understanding of the technological trajectory, his peers withheld support, and institutional resistance grew.

When Mr. Arrieta resigned in 2020, Accelerate lost its strongest advocate and the project was quietly dismantled. In hindsight, it is clear that the innovative tools he anticipated – AI-powered analytics, blockchain-based transparency, and intelligent automation – have by now become mainstream. The barriers that once seemed insurmountable no longer exist, and the failure to adopt Accelerate serves as a cautionary tale: that the cost of resisting innovation is not merely a lost opportunity, but also a prolonged inefficiency and avoidable waste.

4.6.2 U.S. Air Force – Digital Blockchain Budget Accountability and Tracking (DiBaT)

4.6.2.1 Problem Statement

When agencies tasked with identifying fraud, waste, and abuse within the Department of Defense (DoD) seek more effective tools, innovative technology can play a critical role. This effort, using SIMBA Chain’s blockchain-based solution, provides a compelling model for how the DoD can enhance accountability, auditability, and traceability across financial management (FM) and supply-chain operations. Large and complex defense supply chains and financial systems, spanning multiple services, vendors, logistics networks and geographic theatres, create significant visibility gaps.

The U.S. Air Force (USAF) manages one of the largest and most complex budgets in the federal government, with funds flowing through multiple commands, programs, and external vendors. Legacy financial systems provide limited end-to-end visibility, making it difficult for leadership to monitor spending in real time. Budget fragmentation, outdated IT systems, and delayed reporting have historically resulted in inefficiencies, audit challenges, and vulnerabilities to fraud, waste, and abuse. In 2024, these challenges were amplified by rising operational tempo and the need for rapid, transparent fund allocation to critical defense and logistics programs.

4.6.2.2 Proposed Solution

To address these systemic gaps, USAF partnered with SIMBA Chain under a Small Business Innovation Research (SBIR) contract to develop the Digital Blockchain



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Budget Accountability and Tracking (DiBaT) platform. DiBaT developed an advanced blockchain-based solution engineered to address longstanding visibility challenges within the U.S. Air Force’s complex financial management (FM) and supply chain systems. The initiative’s core objective was to enhance transparency, accountability, and data-driven decision-making by securely tokenizing and immutably recording financial transfers and supply chain transactions on the blockchain, establishing a single, auditable source of truth.

At the heart of the solution lies a blockchain-enabled system powered by smart contracts that tokenize each financial transaction as a non-fungible token (NFT). This approach transforms every transaction into a unique, immutable digital asset on the blockchain.

To structure and interpret this data, SIMBA Chain developed a custom ontology defining the vocabulary of the Air Force’s financial domain. Information from each tokenized transaction was extracted and mapped into a graph database, or a knowledge graph, which stored financial events as individual entities and illustrated complex relationships between participants. This enabled the system to visually trace how, where, and by whom funds were allocated across programs and suppliers.

The use of a graph-based data structure provided a powerful foundation for advanced analytics. Graph algorithms were deployed to produce detailed intelligence reports for Air Force stakeholders, uncovering intricate spending patterns and financial interdependencies that were previously difficult to detect.

Because each graph element originated from on-chain transactions recorded as NFTs, every data point was verifiable and tamper-proof, ensuring that insights were backed by an immutable audit trail. Stakeholders could therefore rely on the system’s integrity, with full confidence that the data was accurate and unaltered.

One of the most transformative aspects of the solution was its integration with Large Language Models (LLMs) and Retrieval-Augmented Generation (RAG). Through a natural language “chat” interface, users could query the system in plain English, asking questions such as *“Which supplier had the highest contract value?”* or *“Who supplied the cheapest actuator?”*.

The AI system translated these queries into complex graph searches, retrieving precise and verifiable answers. Unlike generic AI chat systems prone to “hallucinations,” the responses from this system were grounded in blockchain-anchored data, ensuring reliability and trustworthiness. This empowered Air Force subject matter experts to make informed, strategic decisions without requiring technical expertise in graph databases or blockchain technology.

4.6.2.3 *Actual or Expected Results*

DiBaT was designed to deliver:

- End-to-end fund traceability, linking each dollar to its originating budget line and final spending outcome;
- Real-time oversight, enabling leadership to detect anomalies and bottlenecks as they occur;
- Automated compliance, with smart contracts ensuring funds are used only for authorized purposes;
- Improved audit readiness, reducing manual reconciliations and providing a tamper-proof transaction history; and

The success of this project demonstrates how blockchain, AI, and graph-based data technologies can converge to modernize financial oversight within large, complex organizations. By creating a unified, tamper-proof record of financial transactions and enabling intuitive access through natural language interaction, DiBaT has delivered a model of transparency and accountability that could scale across other branches of the military and the broader DoD enterprise.

5 Barriers to Blockchain Adoption

Over the past decade, governments and international organizations have launched hundreds of blockchain pilots aimed at improving transparency, accountability, and operational efficiency. These initiatives have spanned diverse areas such as financial management, land titling, procurement, voting, identity management, and humanitarian aid. However, despite this widespread experimentation, there have been few, if any, full-scale production implementations that are sustained, integrated, and institutionalized within core government systems.

The following section highlights several barriers that have prevented organizations from moving forward to adopt blockchain technologies, as well as factors that must be considered to ensure blockchain initiatives realize their full potential.

6 Key Challenges

6.1.1 Transparency Is Powerful Yet Often Unwelcome

Many failed pilots (e.g., the Department of Treasury's grant initiative and HHS's Accelerate) revealed that blockchain didn't fail due to technical shortcomings, but because it introduced a level of transparency that some stakeholders considered to be threatening. Systems that reveal spending patterns, vendor relationships, and grant recipient histories can disrupt entrenched interests, expose misuse, and even create resistance from within.

6.1.2 Leadership Must Be Followed by Sustainability

Visionary leaders like HHS CIO Arrieta often champion groundbreaking efforts by anticipating the convergence of AI, blockchain, and automation. However, when these advocates leave, projects can falter due to a lack of institutional backing. Sustainable innovation requires good governance, a culture committed to change, and continuity plans, not just individual vision.

6.1.3 Financial Information Systems are Often Siloed

Siloed financial systems across agencies hinder full visibility into funds flows. This fragmentation makes it possible for funds to be wrongly allocated or spent without accountability. In addition, when information and responsibilities are compartmentalized within separate units, this can often lead to barriers to communication and collaboration, hindering management's ability to identify and address issues effectively. Integrating systems through blockchain offers a way to unify data consistently and eliminate these blind spots.

6.1.4 Ensure Accounting Systems are GAAP Compliant

The ledgers should be formatted and recorded to meet regulatory requirements on good bookkeeping and Generally Accepted Accounting Principles ("GAAP"), and proactively make the financial reporting able to meet audit standards.

Solutions used for government financial services should be compliant with globally recognized standards for government blockchain and financial services²⁸. See “[Blockchain Maturity Model](#)” in paragraph 8.1.2 of this document.

6.1.5 The Need to Modernize Legacy Systems

Many government agencies continue to rely on outdated, incompatible systems that cannot support real-time tracking or data sharing. Additionally, agencies struggle with the high costs of “technical debt” in maintaining and enhancing these systems over time. Consequently, until these systems are modernized or integrated with blockchain, full accountability is likely to remain out of reach.

6.1.6 Choose Real-Time Oversight over Postmortem Audits

Traditional audits occur months after funds are spent, often too late to correct missteps or prevent abuse. Blockchain enables proactive oversight by providing real-time, immutable records of financial activity, making fraud and inefficiency more likely, or easier to detect early.

6.1.7 Smaller Governments Are Ideal Innovation Testbeds

Local governments like Utah County demonstrated readiness to pilot blockchain for transparency. Such jurisdictions are often more agile than larger governments, closer to constituents, and motivated to adopt practical solutions to pressing fiscal challenges.

6.1.8 Emerging Technology Is No Longer Emerging

Many initiatives stalled because stakeholders failed to see the potential near-term and future value of blockchain, AI, and smart contracts during their infancy. Today, these tools are mainstream. Resistance based on outdated assumptions is no longer justifiable. Continued delay only increases the risk of waste and fraud, while also exacerbating the problems of inefficiency and waning public trust.

²⁸ <https://www.gbaglobal.org/blockchain-maturity-model>

6.1.9 Accountability By Design is Critical

Blockchain does not simply record data. It enforces rules, automates oversight, and makes noncompliance more difficult to hide. Government systems must be intentionally designed with accountability as a core feature, not an afterthought. Moreover, governance and control processes must be implemented along the system to ensure effective execution and oversight.

6.1.10 Impact of Staff Shortages

Most local governments are struggling to adequately staff accounting and departmental functions. Accordingly, personnel do not have the time to input or track data in multiple systems (e.g., financial system & blockchain). Blockchain must be seamlessly integrated with financial systems or automated to pull data from these systems without creating more work for staff. However, once integrated, blockchain may help with staff shortages.

7 Planning for Blockchain Implementation

7.1 Planning and Decision Steps

Management must consider several factors and perform a comprehensive decision analysis to determine if implementing a blockchain solution is the right course of action for their organization. Five critical planning and decision steps include the following:

- 1) **Define the Use Case** - Establish a clear definition of the business problem and how blockchain will solve it. Blockchain is not a universal solution but should be considered with improvements in transparency, traceability, and trust as mandatory objectives.
- 2) **Perform a Feasibility Analysis** - Ensure that the business problem being addressed cannot be solved by using another simpler system or approach, and assess whether it is feasible given costs of implementation, potential regulatory issues, and privacy considerations.
- 3) **Conduct a Business Case Analysis** – Quantify the benefits of implementing the blockchain solution (including cost savings, cost avoidance, as well as

business process labor productivity gains), and ensure the initiative will deliver a positive projected ROI.

- 4) **Cultural Readiness** - Engage stakeholders across the organization to help identify areas best suitable for blockchain implementation. Ensure all are prepared for the transformational paradigm shift that blockchain will bring, and that there is strong buy-in for adoption.
- 5) **Prepare for Iteration** - Commit to begin with a small scale, controlled pilot implementation using real systems and data to determine if the blockchain solution performs as expected. Ensure success by managing to iterative delivery of functionality and value rather than building too much too soon only to discover that the system does not achieve its intended means. It is better to successfully implement a pilot program in a subset of the agency rather than try to implement it agency-wide. Once the pilot is successfully implemented and there is stakeholder “buy in”, elected officials, managers, and staff will be more comfortable with blockchain. Blockchain can then be expanded to other operations within the agency.

7.2 Technical Factors

In addition, planning for a blockchain implementation must include an analysis of the following technical factors that will affect success or failure of the project.

- **Scalability** - Ensure the solution will accommodate the size of the organization, required data volumes, and expectations for future growth. Growth in users and transaction volume can affect the performance of the system, so it’s best to address these factors early.
- **Data Privacy** - Determine the required level of data visibility. While public blockchains are transparent, other private and hybrid models allow for restrictions on data. Cryptographic mechanisms such as ring signatures and zero-knowledge proofs can also be used to enhance privacy and confidentiality.
- **Security** - Blockchains are secure by design but, as with all systems, they are not immune to malicious attacks. Consequently, securing a blockchain system should be approached by incorporating strong security and application development best

practices, robust encryption, identity, credential and access management (ICAM), and other Zero Trust security solutions to mitigate security risks.

- **Integration and Architecture** - During feasibility assessment, when blockchain is being considered as a potential solution, it is important to begin mapping out how the system should interface with existing data stores and applications of the organization. Additionally, if there are plans to integrate an artificial intelligence (AI) solution with the blockchain system, then data collection, preparation, and model development requirements should be addressed early. Finally, it is critical to determine if the organization has sufficient in-house expertise to perform system development and integration work, or if outside expertise will be necessary to ensure a successful implementation.

8 GBA Resources Repository

8.1 General

8.1.1 Web3 Emerging Tech Directory

The GBA [Web3 Emerging Tech Directory](#) is an essential resource for public officials, procurement officers, private companies and reform advocates seeking vetted blockchain-based tools to combat fraud, waste, and abuse. This dynamic directory curates cutting-edge solutions that align with transparency, auditability, and accountability standards, and key requirements in public sector financial management. By offering a searchable catalog of service providers, technologies, and verified use cases, the directory empowers decision-makers to explore proven and emerging tools that can be tailored to specific challenges. Whether addressing grant mismanagement, procurement opacity, or disjointed reporting systems, the directory facilitates rapid discovery and deployment of compliant, standards-based solutions that support institutional reform and enhance public trust.

8.1.2 Blockchain Maturity Model (BMM)

GBA's Blockchain Maturity Model (BMM) provides a structured framework for evaluating and improving blockchain solutions across ten key domains, including governance, security, interoperability, and auditability. For governments, the BMM

serves as a practical tool to assess the readiness and reliability of blockchain implementations before scaling. By applying the BMM, agencies can ensure that blockchain systems are designed with embedded accountability mechanisms, strong internal controls, and adherence to internationally recognized standards. This reduces the risk of deploying immature or insecure technologies that could potentially enable new forms of fraud or inefficiency. The BMM guides public institutions in selecting and managing blockchain solutions that can support real-time oversight, automate compliance, and deliver transparent, tamper-resistant records—critical features for eliminating opportunities for fraud, waste, and abuse in government operations.

8.2 Topical Resources

The following sub-paragraphs contain publications and BMM rated technology solutions organized by industry category. For the full list of rated and unrated technology solutions, visit the [Web3 Emerging Tech Directory](#)²⁹

8.2.1 Artificial Intelligence

8.2.1.1 Publications

BMM - Artificial Intelligence³⁰ - The BMM AI Supplement adds criteria for blockchain solutions using AI to qualify as Trusted AI Solutions. It applies to systems that use blockchain to secure outputs from AI, including virtual assistants, autonomous vehicles, fraud detection, and more.

8.2.1.2 BMM Rated Technology Solutions

- **CESS Network**³¹ - A decentralized cloud infrastructure optimized for AI, offering secure, scalable, and cost-efficient data storage and sharing to support high-performance AI model training and deployment.

²⁹<https://gbaglobal.org/web3-solutions>

³⁰<https://gbaglobal.org/blockchain-maturity-model/supplements/>

³¹<https://cess.network>

- **AIVP (Artificial Intelligence Verification Platform)**³² is an advanced artificial intelligence model specialized in providing comprehensive information about AI startups, companies, and AI models.

8.2.2 Banking & Financial Services

8.2.2.1 Publications

BMM Banking & Financial Services Supplement³³ - This document is applicable to banking and financial services blockchain, or distributed ledger technology solutions applied to any form of value transfer whether it be money, securities, commodities, tokens, derivatives or financial transaction life-cycle obligations.

8.2.2.2 BMM Rated Technology Solutions

TapestryX³⁴ - TapestryX enables scalable, real-time distributed ledger networks for finance, government, and industry, featuring event-driven scripting, GAAP-configurable accounting, self-synchronizing architecture, and interoperability with legacy infrastructure.

8.2.3 Document & Data Integrity

8.2.3.1 Publications

"Know Your Document (KYD): Forging the New Standard in Digital Trust" – This foundational white paper introduces the Know Your Document (KYD) framework, designed to address the critical vulnerability of electronic documents in a world where approximately 93% of documents originate digitally. While existing standards like "Know Your Customer (KYC)" and "Know Your Business (KYB)" effectively establish trust in personal and business identities, KYD uniquely extends this crucial trust to the digital document itself, thereby innovating a new standard in digital document verification. The publication thoroughly outlines the three core dimensions of the KYD Framework that are essential for underpinning digital document trust:

- **Identity:** Verifying the identity (i.e., KYC) and organizational affiliation (i.e. KYB) of the document's originator or certifier;

³²<https://aivp.ai>

³³All BMM documents are at <https://gbaglobal.org/blockchain-maturity-model/supplements>

³⁴<https://L4SCorp.com>

- **Provenance:** Confirming the document's complete chain of custody and historical metadata; and
- **Content:** Ensuring the absolute integrity and authenticity of the document's content, safeguarding against unauthorized alterations.

The report explains how KYD directly mitigates common vulnerabilities exploited in document-related fraud, including false attribution of sources, uncertain document histories, and unauthorized alterations. By doing so, it significantly safeguards organizational integrity, enhances regulatory compliance, reduces legal exposure, and protects brand reputation across critical sectors such as banking, healthcare, law, and supply chains.

8.2.4 Elections

8.2.4.1 Publications

BMM Voting Supplement – This document builds on the Blockchain Maturity Model (BMM) by adding specific requirements for blockchain-based mobile remote ballot marking and return voting systems. It outlines additional criteria that must be met when evaluating mobile and hybrid voting solutions, with the goal of strengthening the integrity and trustworthiness of the voting process.

GBA Voting Resources Page – The GBA Voting Working Group has assembled a list of resources that have been prepared by the members with the experience and knowledge to modernize election systems.

8.2.4.2 BMM Rated Technology Solutions

- **DeVOTE**³⁵ – An open-source, blockchain-based mobile voting system using Zero Knowledge Proofs to deliver secure, accessible, and verifiable elections—ensuring votes are cast, recorded, tallied, and reported accurately.
- **VOATZ**³⁶ – A secure, blockchain-based mobile voting platform that enhances election accessibility. Since 2016, it has powered over 125 elections, including historic U.S. federal and Canadian municipal votes.

³⁵<https://www.devoteusa.com>

³⁶<https://voatz.com>

8.2.5 Identity

8.2.5.1 Publications

BMM Identity Management Supplement - This document builds on the Blockchain Maturity Model (BMM) by adding specific requirements for blockchain-based identity management systems. It outlines additional criteria that must be met when evaluating identity management solutions, with the goal of strengthening the integrity and trustworthiness of identity management.

8.2.5.2 BMM Rated Technology Solutions

EarthID - EarthID is a multi-award-winning decentralized identity platform that enables organizations to safeguard, minimize and reuse personally identifiable customer data. EarthID helps organizations prevent identity fraud, drive compliance, increase operational efficiency and foster customer trust, while empowering users with data ownership, privacy, and consent. EarthID's mission is to build a user-centric identity which is resistant to threats from generative AI and quantum computing. EarthID's longer term vision is to drive social, financial, and digital inclusion.

8.2.6 Healthcare

8.2.6.1 Publications

BMM Healthcare Supplement - This document builds on the Blockchain Maturity Model (BMM) by adding specific requirements for blockchain-based healthcare systems. It outlines additional criteria that must be met when evaluating healthcare solutions, with the goal of strengthening the integrity, privacy and trustworthiness of healthcare solutions.

9 Conclusion and Recommendations

History has shown that regardless of the political affiliation of a U.S. President's administration, that the stewardship of financial and payments systems across federal agencies has not only been a daunting task, but one which has failed the American public. Congress created several non-partisan watchdog agencies, such as the Government Accountability Office (GAO) established over 100 years ago, as well as the independent Offices of Inspector General (OIG) within agencies, to



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promote efficiency and reduce fraud and corruption in government. Yet, these oversight bodies largely identify financial damage done only after the fact – thus placing reactive discovery ahead of accountability.

At the time of the writing of this paper, the U.S. national debt has eclipsed \$37 trillion. An aging population with more beneficiaries receiving Social Security and Medicare, rising interest on debt, and an increase in fraud, waste, and improper payments across government programs are all contributing factors exacerbating the problem. GAO has previously reported that the federal government loses between \$233 billion and \$521 billion annually to fraud.³⁷ Additionally, estimates of federal improper payments have eclipsed \$2.8 trillion since 2003. However, this figure is largely underestimated because only a small number of federal programs issue official annual reports on improper payments.

Recently, the global research and advisory firm Gartner Inc. estimated that by 2028, 65% of government organizations will meet the growing demand for transparency and accountability by utilizing performance outcomes in their financial management and budgeting processes.³⁸ However, in order to make government systems more transparent and secure for tomorrow, what's needed today is a bold call to action from policymakers to fund modernization efforts, and to promote change within organizations' culture to welcome and embrace radical transformation.

The use cases presented in this paper clearly demonstrate the value proposition that technologies such as blockchain and artificial intelligence bring to the table. Together, these modern solutions provide immutability, data transparency, security, and traceability through authorization of credentials to make financial transactions less susceptible to acts of corruption, misuse, and fraud.

While this paper focuses mainly on challenges within the US federal government, it highlights lessons that can easily be applied to state, local, and other national governments. Blockchain is neither a holy grail nor the answer for all. A critical

³⁷ Fraud Risk Management: 2018-2022 Data Show Federal Government Loses an Estimated \$233 Billion to \$521 Billion Annually to Fraud, Based on Various Risk Environments, GAO-24-105833, Published: Apr 16, 2024.

³⁸ "Improve Government Budgeting With a Performance-Based Approach", CM_GBS_3747931, Gartner Inc., 2025.

aspect of implementing a blockchain solution for any organization, is assessing its suitability for a given use case. GBA's BMM was specifically designed for this purpose.

Additional factors that must be considered include the availability of expert resources in both financial management and blockchain technology (e.g., trained talent), integration with legacy infrastructure, and requirements for effective data engineering with AI implementation. To justify investments in blockchain technologies (e.g., both pre and post-implementation) government organizations must ensure that effective business case governance processes are in place to evaluate and quantify the benefits that these investments will deliver for both the government and the public. One thing can be certain: while initial investment costs for new blockchain applications may not be cheap, the cost of the status quo – continued fraud, waste, improper payments, and the technical debt costs for aging legacy systems – significantly undermines accountability and the public's trust in government.

Presidential Executive Order "*Protecting America's Bank Account Against Fraud, Waste and Abuse*" echoed how the "fragmentation of disbursing authority, together with the proliferation of non-standard financial management systems across the government, leads to expensive, disjointed, and duplicative financial reporting, lack of financial traceability, complicated financial management, opacity, increased operational risks and decreases the ability of the Treasury to provide centralized oversight."³⁹ When one considers the low-end estimate of \$500 billion in taxpayer funds lost each year to fraud and improper payments, it becomes obvious that the adoption of blockchain solutions, if successful at recapturing just one fifth of this financial loss, would demonstrate a strong return on investment (ROI) for American taxpayers through roughly \$100 billion in annual financial loss prevention.

In closing, GBA recommends the following five actions to help accelerate the adoption of blockchain technologies as a "strategic asset" aimed at preventing financial fraud, waste, and abuse in government:

³⁹Presidential Executive Order "Protecting America's Bank Account Against Fraud, Waste, and Abuse", March 25, 2025, President Donald J. Trump, The White House.



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- Incentivize government organizations to invest in blockchain by establishing competitive “Tech Challenges” to increase funding for system modernization efforts. In the United States, for example, the GSA’s Technology Management Fund (TMF)⁴⁰ should consider allocating a portion of funding strictly for the development and implementation of blockchain solutions. Governments at the state, local, and international level, should all consider implementing similar programs to drive blockchain efforts for those initiatives that would deliver the strongest return on investment (ROI) for taxpayers and citizens;
- Develop and/or enhance engagement between chief financial officer, chief information officer, and chief security officer professional organizations across government and the private sector. Within the federal government, leverage the Chief Information Officers Council⁴¹ to examine high-value areas across government for the introduction of blockchain technology and sharing of best practices;
- Establish blockchain centers of excellence in critical industry sectors (e.g., banking, finance, healthcare, supply chain, etc.) as well as for key government financial outlay areas (e.g., grants, entitlement programs, financial assistance, economic development lending, foreign aid, etc.) to help identify strong blockchain use cases, establish industry standards and guidance, and share best practice to foster adoption;
- Create performance management plans at agencies and organizations that focus on measures to prevent fraud, waste, and abuse in government. Require transparent reporting on both a mid-year and end-of-year basis across various sectors to show progress, and how the use of modern technologies such as blockchain have helped to deliver success. In the U.S. for example, the President’s Management Agenda should be redesigned to require a measure for relevant agencies for how it intends to prevent fraud, waste, and abuse throughout its mission, and the amount being invested in new technologies

⁴⁰<https://www.gsa.gov/technology/government-it-initiatives/technology-modernization-fund>

⁴¹<https://www.cio.gov/>

(e.g., blockchain, AI, automation, etc.) to help in this regard, as well as a quantification of money saved, and costs avoided, for taxpayers;

- Promote public-private partnerships that include personnel from government organizations, blockchain vendors, and independent blockchain research and thought leader organizations to examine and make practical recommendations for investments in blockchain solutions across government; and
- Allocate federal grant funds for state and local governments to incentivize and pay for investments in blockchain technology.

Just as it has been argued that bitcoin is not merely an investment, but a revolutionary act, (D. Held)⁴² it is equally true that financial management systems designed with blockchain are not simply investments, but a revolutionary approach that will reset the ground rules for ensuring excellence in the integrity, transparency, traceability, and reporting of government funding. On a global level, governments at the national, state, and municipal levels struggle with the embarrassment (as well as risk to their party's reputations) of having to report a growing tide in financial fraud, waste, abuse, improper payments, and outright corruption.

Disruptive technologies such as blockchain may seem complex or even intimidating due to the level of transactional transparency they bring to the table. However, these technologies serve as a catalyst for progress, innovation, and positive change. The initial speculative "hype cycle" of blockchain has subsided, with real-world implementation proving their tangible business value across a wide variety of applications. The time to act is now.

⁴²Dan Held, "@danheld, "Twitter, January 8, 2023.



Appendix A: About The Authors

About the Government Blockchain Association (GBA)

The Government Blockchain Association (GBA) is a global nonprofit organization that connects public and private sector professionals to promote blockchain solutions that advance transparency, accountability, and efficiency in government. Operating in over 500 government offices worldwide, the GBA serves as steward of the Blockchain Maturity Model (BMM)—an internationally recognized framework for assessing the trustworthiness, security, and performance of blockchain solutions. The GBA co-hosts the Dynamic Coalition on Blockchain Assurance and Standardization within the United Nations Internet Governance Forum (UN IGF), furthering global efforts to align blockchain adoption with UN Sustainable Development Goal 16 (SDG 16) for effective, accountable, and transparent institutions.

About the Dynamic Coalition on Blockchain Assurance & Standardization

Formed under the UN Internet Governance Forum, the Dynamic Coalition on Blockchain Assurance and Standardization (DC-BAS) brings together governments, international organizations, academia, and industry to develop standards and assurance mechanisms for trusted blockchain ecosystems. The Coalition works to harmonize policy frameworks and assessment criteria so that blockchain technologies are implemented safely, ethically, and in support of sustainable development.

Todd S. Carolin
Author

Leads the GBA Budget, Accountability & Transparency Working Group. A Senior Principal at Eagle One Solutions, Inc., Mr. Carolin has over 25 years of experience driving financial and technology modernization initiatives across the federal and international sectors, including projects in healthcare, defense, energy, and IT policy. He has authored



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numerous publications on digital governance and blockchain innovation.

**Gerard R. Dache
Contributor**

Founder and Executive Director of the Government Blockchain Association and Co-Leader of the UN IGF Dynamic Coalition on Blockchain Assurance and Standardization. He has established over 200 blockchain chapters and 50 working groups worldwide, authored multiple international standards and frameworks (including the BMM), and advised governments and enterprises on blockchain assurance and policy integration.

**Dino Cataldo Dell’Accio
Contributor**

Deputy Chief Executive Officer of the United Nations Joint Staff Pension Fund and Co-Leader of the UN IGF Dynamic Coalition on Blockchain Assurance and Standardization. He has over 25 years of experience in digital governance, risk management, and enterprise IT oversight, and has led UN-wide initiatives on cybersecurity, data integrity, and blockchain-based trust frameworks.

**Michael S. Peckham
Contributor**

Recognized federal leader in financial and grants management, Mr. Peckham has pioneered the use of emerging technologies to enhance transparency, compliance, and performance outcomes in government. His work in blockchain and intelligent automation has advanced innovation in shared services and accountability across federal agencies.

**Paul F. Dowding
Contributor**

Blockchain strategist and advisor specializing in digital identity and supply-chain transparency. Mr. Dowding has supported numerous GBA initiatives on financial oversight and data interoperability and contributes expertise in standards development and governance frameworks.

**Rudolf Livingston
Contributor**

Public finance expert and former government budget analyst with more than 20 years of experience in program evaluation,



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performance measurement, and fiscal transparency initiatives within state and federal agencies.

**Eugene Morrow
Contributor**

Information security architect and blockchain auditor focusing on risk management and data protection for public sector systems. He has helped organizations develop Zero-Trust and blockchain-enabled security architectures to protect financial and citizen data.

**Ian Taylor
Contributor**

Blockchain policy advisor and researcher with deep experience in regulatory frameworks and economic development. He has served as an advisor to multiple GBA working groups and industry associations on distributed-ledger adoption for public administration.

Paul Meyers

Emerging technology consultant with expertise in government modernization, digital transformation, and blockchain integration for financial systems. Mr. Meyers has supported federal and state initiatives focused on reducing fraud and improving service delivery through automation.

**Amelia Powers Gardner
Contributor**

Commissioner of Utah County, recognized nationally for her leadership in government innovation and technology-driven transparency. She championed one of the first county-level blockchain initiatives for budget and health department accountability, making Utah County a model for local government modernization.

**Sandy Barsky
Contributor**

Federal innovation executive with decades of experience in public financial management, federal budgeting, and strategic planning. Mr. Barsky has served as a senior advisor on federal enterprise initiatives that apply blockchain and data analytics to improve efficiency and oversight.



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