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

Report

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

March 2, 2026

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 Internet Governance Forum (IGF)[x], the GBA saw an opportunity to explore how blockchain could be leveraged to fulfill this global mandate and strengthen institutions.

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[x] See Appendix C: Dynamic Coalition Disclaimer.

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 with the Dynamic Coalition on Blockchain Assurance & Standardization of the 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** for insight into 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, pain points, key challenges and barriers to the adoption of blockchain, considerations for implementation, and covers a wide variety of use cases for which these technologies demonstrate 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 Why is This Important?

Linda Miller, who led the development of U.S. Government Accountability Office's Framework for Managing Fraud Risks in Federal Programs and served at the agency for 10 years, has asserted the U.S. Federal Government's annual fraud losses are much higher than initially reported. In a recent CBS 60 Minutes report,[1] she concluded that such losses may become closer to $750 billion and may even be approaching the $1 trillion mark when including fraud committed on U.S. government programs by external, nation-state actors like China and Russia.

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[1] "Fraud Costing U.S. Government Hundreds of Billions a Year as Crime Rings Use Stolen Identities" by Celia Vega, May 11, 2025, CBS News.

The Estimated Scale of Mounting Fraud Losses in US Government

Fraud losses annualy reported
$375Mavg.

Initially reported fraud

Estimated total annual fraud losses
~$750B to ~$1T

Context: Losses may approach $1T when including fraud committed on U.S. government programs by external nation-state actors (e.g., China and Russia).

Fragmented systems and bureaucratic silos make it difficult to track where funds go and whether outcomes are achieved.

* Source: CBS News reporting on U.S. government fraud estimates

Today 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 for 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.

GBA

IGF Blockchain Assurance+
Standardization
Dynamic Coalition

2 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 prevention and detection of fraud, waste, and misapplication of funds difficult.

2.1 Fragmented, Outdated, and Siloed Financial Systems

Governments rely on financial and accounting systems to record, manage, and report budgetary resources, obligations, and outlays across agencies, bureaus, departments, and programs. However, these systems are often outdated, opaque, and highly fragmented, limiting effective oversight and informed decision-making. When financial information is siloed across separate applications and organizational units, a comprehensive view of fund flows is lost. Without adequate visibility of the funds flow, the risks of misallocation, improper spending and reduced accountability increase. This compartmentalization also creates barriers to communication and collaboration, making it difficult for management to identify and address issues in a timely manner. Integrating financial systems through blockchain can help unify data, improve transparency, and eliminate these blind spots.

2.2 Lack of Transparency and Traceability

Fraud, improper payment distribution and cyber crimes 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 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 theorigin 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 authorized participants (e.g. the trusted network) with visibility in 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. This helps to ensure a clear chain of custody as transactions are completed.

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[2] An "indisputable source of truth" means that the ledger's history is permanent and unalterable, which is guaranteed because any attempt to change it is computationally infeasible.

2.3 Inadequate Controls and Limited Line of Sight

Strong internal controls and properly established financial 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 of inter-agency fund transfers, and
● Ineffective 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 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 informed financial decision-making and opens the door to errors or fraud.

Blockchain systems, however, can be designed to align with recognized financial management and accounting standards, including Generally Accepted Accounting Principles (GAAP), while strengthening internal controls and audit readiness. Through robust role-based access controls and the use of smart contracts (e.g., self-executing code that automatically enforces predefined rules and approval chains) blockchain platforms can ensure that reallocations, disbursements, and fund movements occur when properly authorized and fully compliant with statutory, regulatory, or policy requirements.

Every authorized transaction is time-stamped, cryptographically signed, traceable to responsible individuals, and permanently recorded on an immutable ledger. This creates a complete and auditable chain of custody for financial activities, improves internal control effectiveness, reduces reliance on retrospective manual reconciliation, and enhances the ability of auditors and oversight bodies to verify compliance in real time. By embedding accountability and GAAP-aligned controls directly into the financial transaction process, blockchain and smart contracts significantly elevate transparency, accountability, and fiscal stewardship in government financial management systems.

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 technologies.[3] 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 fact through audits, investigations, or whistleblower 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.

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[3] 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.

3 Blockchain Technology Use Cases

The following sub-sections describe several use cases and examples of how blockchain can and is being used to reduce fraud, waste & abuse.

3.1 Logistics and Military Operations

3.1.1 U.S. Army Materiel Command (AMC)

3.1.1.1 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.[4] 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.

Defense Accountability: The Visibility Gap in Massive Logistics

Case Study: DoD & Army Materiel Command

Nearly
$850 Billion
Budget

**$4 Trillion
Liabilities**

7 Consecutive
Audit Failures

**The Solution: Pilot
Success (AMC Operation
Mission Truth)**

- Partners: SIMBA Chain, AKUA Inc., Air Force Research Lab

- Tracked 600+ tons of equipment via blockchain

- Result: Real-time visibility for Ukraine aid assets

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[4]"Pentagon Fails 7th Audit in a Row But Says Progress Made"', 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.

3.1.1.2 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.[5] 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.

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[5]75th USARIC Soldier Develops Blockchain Solution to Revolutionize the Military Supply Chain," Lt. Col. Charles An, Defense Visual Information Distribution Service, March 12, 2025.

3.1.1.3 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 is to improve visibility, auditability and accountability of assets moving under Presidential Drawdown Authority (PDA) missions.[6] 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 assets;[7]

- SIMBA Chain – Contributed the blockchain platform and expertise in delivering a "single source of truth" ledger for DoD logistics and supply chain processes.[8]

- 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.

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[6] https://www.dvidshub.net/news/492690/75th-usaric-soldier-develops-blockchain-solution-evolutionize-military-supply-chain.

[7] https://akua-inc.com/

[8] https://simbachain.com/

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;
- **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 military 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 chains. 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. The military 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 chains. 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.

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

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 record.[10] 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.

3.1.2 Military Sensor Data Security & Integrity

3.1.2.1 Problem Statement

The scale and complexity of sensor data used by the U.S. Army and Department of War have grown significantly. Modern operations depend on data from many interconnected sensors and systems, increasing situational awareness but also introducing new risks. Existing architectures were not designed to prove that data has remained accurate and unchanged as it moves across organizations, systems, and networks.

These gaps create real risks of fraud, waste, and abuse. Decisions based on altered or unreliable data can lead to misdirected resources, unnecessary use of intelligence assets, flawed targeting, and reduced trust in automated and AI-enabled tools. Even small changes to data can cascade through downstream systems and undermine mission outcomes. To support future operations, data integrity and traceability must be treated as foundational requirements, ensuring that sensor data is trustworthy, auditable, and tamper-evident from collection through decision-making.

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

3.1.2.2 Proposed Solution

To address these challenges, the Army is funding the Walacor Corporation[11] to develop and demonstrate a data integrity platform that ensures sensor data can be trusted at every stage of its life cycle. The solution applies built-in cryptographic protections and immutable audit mechanisms that provide a verifiable chain of custody for each data record. This allows leaders and operators to confirm that data has not been altered and remains reliable for critical decisions. Each sensor record is secured individually, using encryption and validation techniques that remove dependence on centralized control points. Data is protected in a way that allows rapid verification while preserving security. Integrity and audit functions are embedded directly into the platform and cannot be bypassed, ensuring accountability by design rather than by policy alone.

The Walacor platform is being integrated into existing Army and DoD environments using standard interfaces that support on-premise as well as hybrid cloud deployments. To ensure broad usability, the effort includes tools that allow both technical and non-technical users to interact with data securely. Users can explore and analyze information through intuitive queries and visualizations, while all outputs remain linked to the original, verified sensor records. This ensures that insights and conclusions are grounded in trusted data.

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[11] https://www.walacor.com

3.1.2.3 Expected Result

The Walacor platform is designed to deliver measurable improvements in reducing fraud, waste, and abuse across sensor-driven operations. Expected outcomes include:

- **End-to-end data provenance,** providing a verifiable chain of custody across the entire data life cycle (e.g., collection to use);
- **Fraud detection and prevention,** identifying spoofed or manipulated data before it affects decisions;
- **Reduced waste,** by limiting redundant collections, re-tasking, and actions based on low-confidence of data;
- **Improved decision confidence,** enabling faster action based on verifiable information;
- **Auditability and accountability,** supporting oversight, investigations, and compliance with tamper-proof records; and
- **Assurance for AI and automation,** protecting training data and outputs from manipulation and supporting explainable decisions.

Sensor data combined with blockchain can create impactful results by making data trustworthy, auditable, and actionable across organizational and trust boundaries. While sensors capture what is happening in the physical world, blockchain ensures that what is recorded cannot be altered, selectively hidden, or disputed after the fact. Beyond military operations, sensor data is applicable wherever decisions depend on accurate, trusted sensor data, including manufacturing, fleet operations, supply chains, healthcare, agriculture, utility management and many others.

3.1.3 U.S. Air Force Transportation Command (USTRANSCOM)

3.1.3.1 Problem Statement

The USTRANSCOM, through Air Mobility Command (AMC) and the 618th Air Operations Center (AOC), coordinates thousands of global air mobility missions each year involving military aircraft and commercial partners operating under the Civil Reserve Air Fleet (CRAF). These missions are critical to meeting combatant commander requirements, humanitarian response timelines, and global force projection objectives.

However, mission tasking, contractual authorization, execution confirmation, and billing documentation are often managed across multiple, non-interoperable government and commercial systems. These inconsistencies require manual reconciliation and post-mission clarification, diverting operational, contracting, and financial personnel from mission planning and execution. Delays in task confirmations or resolving contractual questions slow mission acceptance, complicate re-tasking, and reduce flexibility during high-tempo or contingency operations. Financially, these gaps contribute to delayed payments, disputed charges, and increased administrative costs.

The resulting friction reduces responsiveness, constrains surge capacity, and increases operational risk, demonstrating that fragmented systems are not only a financial management issue, but a direct impediment to meeting mission requirements.

3.1.3.2 Proposed Solution

The Iron SPIDR program was developed by Constellation Network in partnership with the U.S. Air Force and the 618th AOC to address these operational and financial challenges by creating a provable communication layer for USAF mission coordination with CRAF partners. The program relies on the Hypergraph Transfer Protocol (HTGP) developed by Constellation Network and smart contracts, and multi-author data exchange framework developed by SIMBA Chain. Several other organizations also participated in the program. Iron SPIDR enables mission details, bids, acknowledgments, and contract actions to be represented as verifiable digital events. It is designed to enhance rather than replace existing systems. Mission information is initiated and is cryptographically signed using standard government credentials and is transferred through the blockchain-backed workflow.

The operators review and sign mission acceptance, producing a complete, immutable record of the transaction. Throughout the process, government and industry partners participate in validation, security review, and preparation for future authority-to-operate requirements. The program is advanced by leveraging a scalable blockchain security and multi-author data exchange and is preparing to pilot an expansion to additional CRAF partners.[12]

3.1.3.3 Actual or Expected Results

The Iron SPIDR program demonstrates that mission data can be exchanged between government and commercial partners with verifiable integrity, protected storage, and full traceability. By creating an authoritative, tamper-resistant ledger of mission communications and related contract actions, Iron SPIDR strengthens financial stewardship and operational accountability. This approach reduces the risk of misinterpretation, data loss, or unauthorized modification, and provides a consistent foundation for reconciling charges and resolving discrepancies.

Importantly, capturing mission details as they occur gives leadership earlier visibility into anomalies and emerging issues, rather than relying on after-the-fact audits. The same model can be applied more broadly across logistics, command and control, and other operational data exchanges where accurate, verifiable, multi-party communication is essential to reducing errors, managing costs, and ensuring mission assurance.

3.2 Property Management

Blockchain systems have demonstrated the capability to secure land, property, and motor vehicles by establishing an unbroken, digital chain of custody that tracks every ownership change from the point of origin to the current holder. By recording each transfer on a decentralized ledger, the technology ensures that the "provenance" or historical trail of a deed or vehicle title is transparent and tamper-proof, making it impossible to "break" the chain with forged documents. This permanent record allows buyers and regulators to verify that the seller has the legal right to transfer the asset, effectively eliminating the risk of double-selling or fraudulent title claims.
The following sub-paragraphs describe some of these use cases from around the world.

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[12] "Constellation Network Achieves Scalability, Security and Defense Approval in Executing US Air Force Phase II Blockchain Contract" (PR Newswire / Defense Industries) — provides status update on the Phase II contract and partner Kinnami.

3.2.1 California Department of Motor Vehicles

3.2.1.1 Problem Statement

Vehicle title management in large U.S. states involves millions of records, complex lien relationships, and frequent title transfers. Historically, title data has been maintained in centralized state databases and often still involves paper processing for title issuance, lien recording, and transfer of ownership. This creates multiple opportunities for errors, fraud, and administrative delays. Duplicate titles, forged documents, disputed lien releases, and inconsistent record synchronization across agencies and financial institutions undermine trust and increase operational burdens. Moreover, manual verification processes limit the DMV's ability to provide real-time assurance, slow consumer transactions, and generate avoidable costs.

3.2.1.2 Proposed Solution

The California DMV launched an initiative to digitize vehicle titles on blockchain, placing tens of millions of titles on a permissioned Distributed Ledger controlled by the DMV. The system tokenizes vehicle titles, records lienholder relationships, and immutably tracks title transfers. Each transaction is time-stamped, permission-controlled, cryptographically secured, and auditable. The ledger acts as a single source of truth hared across DMV operations, dealers, lenders, and future consumer-facing applications. Smart-contract workflows automate verification, title issuance, and lien releases while ensuring that changes cannot occur without authorized approval.

3.2.1.3 Actual or Expected Results

By anchoring vehicle titles to blockchain, the DMV is positioned to significantly reduce fraud associated with forged documents, duplicate title issuance, or unauthorized record alterations. Immutable transaction histories support stronger oversight and reduce investigative burden. Digitization of titles is expected to streamline transfers, accelerate lien processing, and reduce in-person service requirements, lowering administrative costs and improving citizen experience.

3.2.2 City of Baltimore, Maryland – Vacant Properties

3.2.2.1 Problem Statement

With numerous vacant properties that contribute to blight and the loss of property tax revenue, Baltimore is working on a solution to move vacant properties back into productive use faster and more equitably by cutting the waste that comes from slow and fragmented government systems. Even as vacancy numbers improve, the same inefficiencies, delayed

transactions, preventable administrative mistakes, and contracting breakdowns, continue to impact efficiency, and they hit hardest in the neighborhoods that can least afford lost opportunity. Baltimore's vacant housing crisis has undeniably improved, but it remains a major driver of inequity, public safety concerns, and inefficient government operations. Property transactions are still slow and expensive because title verification often requires "looking backward" as far as 50 years each time a property changes ownership. Administrative errors and poor interoperability also trigger costly rework, for example, when tax sale redemptions are not recorded in time, properties can be mistakenly sold, forcing the City to unwind transactions that should never have happened. When systems lack transparency and efficiency, the City pays twice: once in wasted dollars and again in wasted time and neighborhood opportunity.

3.2.2.2 Proposed Solution

To address this, Baltimore is building modern infrastructure designed to reduce waste by increasing speed, transparency, and accountability, using blockchain, smart contracts, and improved interoperability. First, the City is modernizing deed infrastructure by recording deeds on a blockchain so verification can "look forward" from the last confirmed transaction instead of constantly reviewing decades of history that was previously verified. This reduces time, cost, and delays that slow reinvestment. Through partnerships with Medici Land Governance, pro bono counsel at Ropes & Gray, and collaborators at Johns Hopkins Carey Business School, alongside pending research with Princeton University's DeCenter, Baltimore has recorded over 228,000+ properties on blockchain, including the approximately 13,000 vacant properties, creating a citywide platform built for efficiency. Baltimore is also improving interoperability across city systems so key actions, like tax sale redemption—are recorded accurately and timely, reducing human error and minimizing costly unwinds, disputes, and corrective legal work.

Blockchain Property Registration:
City of Baltimore
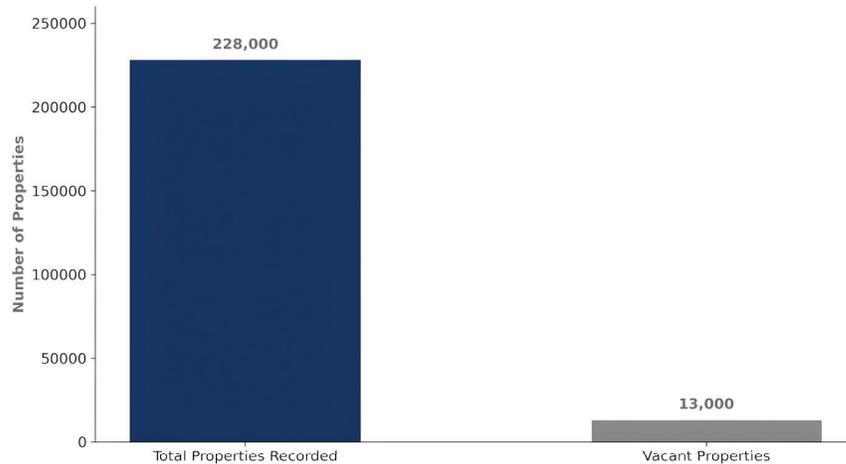
Impact: ~13,000 vacant properties recorded on blockchain.

Scale: 228,000+ properties successfully recorded on blockchain.

Efficiency: Title checks look back up to 50 years.

* Source: Bergen County / Medici Land Governance / Johns Hopkins Carey Business School

3.2.2.3 Actual or Expected Results

These solutions are designed to deliver measurable outcomes that align with one overarching goal: reduce waste, improve efficiency, and accelerate equitable redevelopment. Faster, lower-cost property transactions mean fewer delays, lower administrative overhead, and quicker movement of vacant properties back into productive use. Stronger system interoperability reduces legal and administrative work by preventing avoidable errors that lead to invalidated deeds and corrective actions. More reliable contracting improves compliance, reduces payment disputes, prevents projects from stalling, and lowers the enforcement burden on the City. As the infrastructure improves, it also creates expanded pathways to ownership and wealth-building, including future responsible tokenization models that help more residents participate in revitalization without displacement. The City will be able to expand its property tax base and neighborhood stability, driving long-term fiscal gains.

3.2.3 Bergen County, New Jersey – Land Records Integrity & Fraud Prevention

3.2.3.1 Problem Statement

County land records are critical to property ownership, taxation, lending, and commerce, yet many jurisdictions still relyon outdated, document-centric workflows not designed to handle modern fraud risks. While digitization has improved efficiency, it has also introduced vulnerabilities that fraudsters exploit using AI tools, advanced editing software, and publicly accessible identity data to forge deeds and other documents.

These tactics have enabled criminals to illegally transfer, mortgage, or sell properties without the owners' knowledge, as seen in Brooklyn, NY ($2.2 million brownstone), Raleigh, NC ($4 million home), and Harris County, TX (80+ forged documents across 35+ properties). Such fraud is often discovered only after financial or legal damage occurs.

In Bergen County, New Jersey, these risks revealed a systemic weakness: fraud prevention was largely reactive. Once a fraudulent deed was recorded, the harm was done. And with land records relied upon by clerks, title companies, attorneys, lenders, and the public, the lack of a shared, tamper-evident verification mechanism limited early detection and undermined trust. This also impacts title insurance underwriting, driving up premiums and delaying closings due to increased risk exposure.

Illustrative High-Value Real Estate Fraud Losses

Bar chart — Loss Amount (USD Millions). Raleigh, NC: $4.0M; Brooklyn, NY: $2.2M.
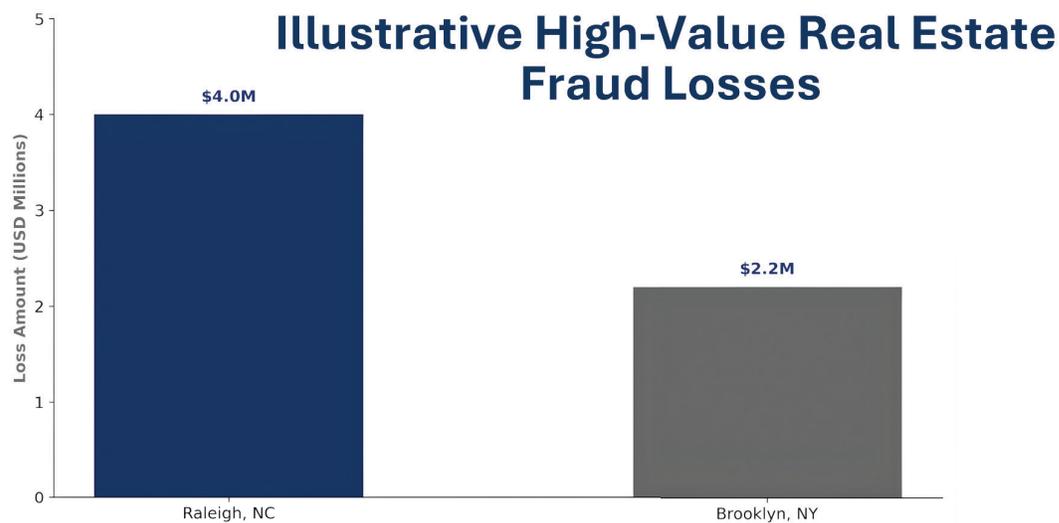
* Source: Bergen County Land Records Integrity Report / Case Studies

| **Exposure:** Document fraud causes individual losses of $2.2M to $4.0M. | **Prevention:** Shift from reactive recovery to proactive title protection. | **Security:** Cryptographic hashing enables real-time detection of forgery. |

3.2.3.2 Proposed Solution

To address these challenges, Bergen County partnered with Balcony[13] to implement a blockchain-based integrity layer for land records. Balcony offers a purpose-built solution for government use that anchors deed data to a public blockchain, enabling real-time fraud detection, third-party verification, and seamless integration with existing workflows.

At the time of recording, a unique cryptographic fingerprint, or "hash", is generated from the document. Even a minor alteration produces a different hash, which, along with a timestamp and metadata, is recorded on a distributed blockchain ledger. This creates an immutable, time-stamped reference that can be independently verified by authorized parties at any time, enabling instant detection of tampering.

3.2.3.3 Expected or Actual Results

Bergen County's implementation of the Balcony solution[14] shifts land records management from reactive detection to proactive prevention. By anchoring these documents on an immutable ledger, the system enhances transparency, deters fraud, and strengthens trust in public records.

This reduces underwriting risk, enables faster verification, and minimizes insurance and legal claims, supporting more competitive premiums and shorter closing timelines. Ultimately, the solution provides a scalable model for reducing systemic risk and financial exposure across the real estate ecosystem.

3.2.4 Sytemap (Nigeria)

3.2.4.1 Problem Statement

In many developing and emerging economies, land administration systems remain highly fragmented, paper-based, and vulnerable to fraud, disputes, and abuse. Inconsistent recordkeeping, duplicate land allocations, forged documents, and opaque ownership histories undermine public trust and create barriers to investment, economic development, and social stability. These weaknesses disproportionately affect low-income populations and women, who often lack formal documentation or access to reliable land registries.

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[13] https://www.govtech.com/biz/blockchain-takes-on-big-property-records-job-in-new-jersey

[14] https://www.balcony.technology

Government land registries and planning authorities frequently operate with limited interoperability across cadastral, survey, tax, and registry systems. As a result, officials struggle to verify ownership, track transactions over time, or ensure that land allocations and transfers are properly authorized. Disputes are often resolved manually through courts or administrative processes, increasing costs, delays, and opportunities for corruption. The absence of tamper-resistant records makes it difficult for oversight bodies to detect fraud or enforce accountability, while citizens face uncertainty regarding the security of their property rights.

3.2.4.2 Proposed Solution

Sytemap provides a blockchain-enabled land administration platform designed to digitize, secure, and modernize land allocation and transaction management. Currently deployed in Nigeria and used by more than 100 private real-estate developers and estate management firms, the platform demonstrates a practical pathway for strengthening land governance in markets where government systems are not yet fully digitized or trusted.

Sytemap records land allocations, ownership assignments, payment milestones, and supporting documentation on a tamper-resistant blockchain ledger, establishing a verifiable chain of custody for property records. Each transaction is time-stamped and cryptographically secured, reducing the risk of duplicate sales, unauthorized alterations, or document forgery. The platform integrates geospatial mapping, satellite imagery, digital documentation, and automated record tracking, enabling stakeholders to verify plot locations, ownership status, and transaction history in real time.

While deployed primarily in a commercial context, Sytemap's architecture is designed to complement government registries and planning authorities rather than replace them. By creating standardized digital records that can integrate or interoperate with official land administration systems, the platform provides a scalable foundation for auditable, accountable land registry modernization initiatives. In environments where government registries remain paper-based or inconsistent, Sytemap effectively serves as a trusted digital layer that can ultimately align with national systems as they evolve.

3.2.4.3 Actual or Expected Results

The use of blockchain-based land records is expected to significantly reduce land-related fraud, disputes, and administrative inefficiencies.

Immutable transaction histories improve auditability and strengthen oversight, whiledigital records reduce reliance on manual processes and paper documentation. For governments, this approach enhances confidence in land registries, improves revenuecollection tied to land transactions, and supports evidence-based planning and development decisions.

More broadly, secure and verifiable land records promote economic inclusion, protect property rights, and align with United Nations Sustainable Development Goal 16.6 by strengthening institutional transparency and accountability. This use case demonstrates how blockchain can modernize land administration systems and reduce fraud, waste, and abuse in one of the most critical areas of public records management.

3.3 Grants and Aid Management

3.3.1 U.S. Department of the Treasury

3.3.1.1 Problem Statement

The Federal Government distributes over $1 trillion in grants annually across a wide range of programs, agencies, and jurisdictions.[15]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.

3.3.1.2 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.[16]

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

[16] The 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.

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.[17] 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 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.

3.3.1.3 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[17] 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.

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

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.

3.3.2 United Nations World Food Program

3.3.2.1 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.

3.3.2.2 Proposed Solution

To overcome these challenges, the WFP launched *Building Blocks*, a blockchain-based aid distribution system designed to increase efficiency, accountability, and security.[18] 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.

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[18] Center 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

Key elements of the system included:

- Real-time, tamper-proof tracking of aid disbursements;
- Elimination of third-party banks and intermediaries;
- Biometric authentication to prevent identity fraud and/or duplicate claims; and
- Immediate, auditable data access for WFP administrators and authorized oversight bodies.

3.3.2.3 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.

Case Study: United Nations World Food Program (WFP) "Building Blocks"
98% ($2.4 million USD) reduction in transaction fees

Traditional Banking Fees	
Blockchain Fees	**98% Reduction**

- **$2.4 Million USD** saved in transaction fees
- Replaced third-party banks with a private, permissioned blockchain
- Utilized biometric identity verification (iris scans)
- **Result:** Increased aid to refugees; reduced fraud and duplicate claims

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.

3.3.3 West Bank and Gaza Financial Aid Disbursement

3.3.3.1 Problem Statement

In the West Bank and Gaza, cash remains the dominant medium for payments, making the flow of funds opaque and difficult to track. Fragmented financial systems, weak oversight, and reliance on manual processes create opportunities for fraud, waste, and abuse. Although the Palestinian Authority is a member of the Middle East and North Africa Financial Action Task Force (MENAFATF), they have not undergone a full evaluation or audit, leaving significant gaps in financial transparency. These challenges slow the delivery of critical services, undermine public trust, and perpetuate economic fragility in an already volatile region.

3.3.3.2 Proposed Solution

Blockchain technology offers a way to rebuild trust and accountability in real time. By creating a secure, auditable digital ledger for aid disbursements, every transaction, from donor funding to beneficiary receipt, can be verified and reported instantaneously. The use of smart contracts automatically enforce the rules of each transfer, ensuring that funds are released only when conditions are met. Piloting such a system in the West Bank and Gaza would not only prevent fraud and mismanagement, but also accelerate humanitarian assistance, strengthen local institutions, and provide a repeatable model for fragile economies worldwide. A small-scale pilot, in partnership with key donors and local authorities, would help validate the feasibility for implementing a broader deployment to include a wide range of donor partners and aid disbursement organizations.

3.3.3.3 Actual or Expected Results

This blockchain initiative could demonstrate high value by delivering end-to-end traceability of aid funds, creating an immutable and tamper-resistant record that enables real-time visibility into how resources are allocated and used. This transparency will materially reduce the risk of diversion to bad actors by ensuring that only vetted recipients can receive funds and that any anomalous or non-compliant transactions are immediately detectable. Automated controls will minimize duplicate payments, unauthorized transfers, and off-ledger cash handling, while providing donors, oversight bodies, and auditors with continuous access to standardized, verifiable records aligned with international financial integrity standards, including MENAFATF principles.

Faster settlement and reduced administrative friction will accelerate the delivery of humanitarian assistance, ensuring that resources reach intended beneficiaries more quickly during periods of acute need. Collectively, these improvements are expected to strengthen institutional accountability, rebuild trust among donors and communities, and validate a scalable, repeatable model for preventing fund diversion and improving aid effectiveness in fragile and conflict-affected contexts worldwide

3.3.4 U.S. Department of Energy

3.3.4.1 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.[19] 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.[20] These incidents underscore a broader lack of real-time visibility and accountability in federal clean energy spending.[21]"

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[19] "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.

[20] "FBI Takes Up EPA Probe Amid Pushback from Judge, Prosecutors", Spenser S, Hsu, Maxine Joselow, and Nicolas Rivero, The Washington Post, February 27, 2025.

[21] "EPA Releases Statement Following Favorable D.C. Circuit Court of Appeals Ruling", U.S. Environmental Protection Agency Press Office, September 2, 2025.

3.3.4.2 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 andcompliance 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.

3.3.4.3 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 andaccountability 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.

DOE Oversight Capacity Gap:
Monitoring Disbursements in Real Time
Case Study: U.S. Department of Energy (DOE) - $30 Billion Disbursed

Result: Retrospective audits are time-consuming, costly, and after misuse occurs.

Traditional Audit

Blockchain Oversight

Result: Continuous, tamper-proof visibility and real-time, audit-ready data.
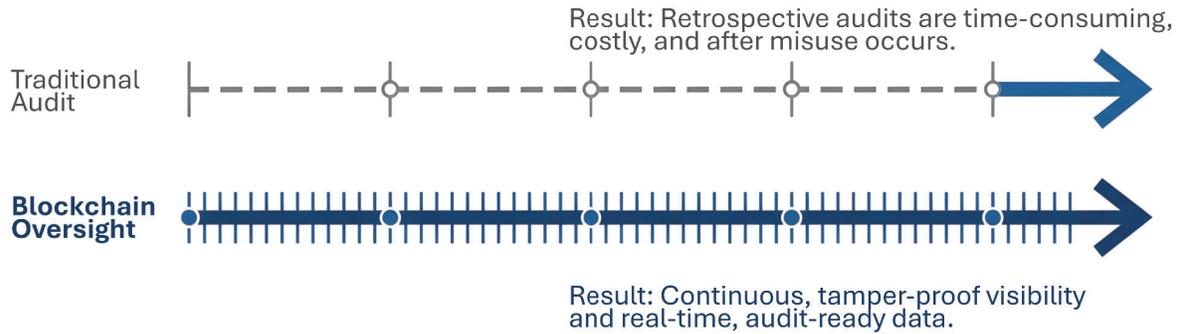
Risk: Rapid outflow exceeded oversight capacity (OIG Warnings).
Solution: Smart Contracts enable automated compliance before funds move.
Preventing the "Pay and Chase" cycle in high-velocity climate funding.

3.4 Identity Management

3.4.1 United Nations Joint Staff Pension Fund (UNJSPF)

3.4.1.1 Problem Statement

The United Nations Joint Staff Pension Fund (UNJSPF) manages pension payments for [22] over 80,000 beneficiaries in more than 190 countries. 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.

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

3.4.1.2 Proposed Solution

To address these challenges, the UNJSPF developed a "Digital Certificate of Entitlement" (DCE) using blockchain technology and biometric verification.[23] 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.

3.4.1.3 Actual Results

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

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[23] https://www.unjspf.org/newsroom/facial-recognition-and-blockchain-to-replace-paper-un-pension-fund-enters-digital-age/

3.5 Procurement and Contract Management

3.5.1 U.S. Health & Human Services
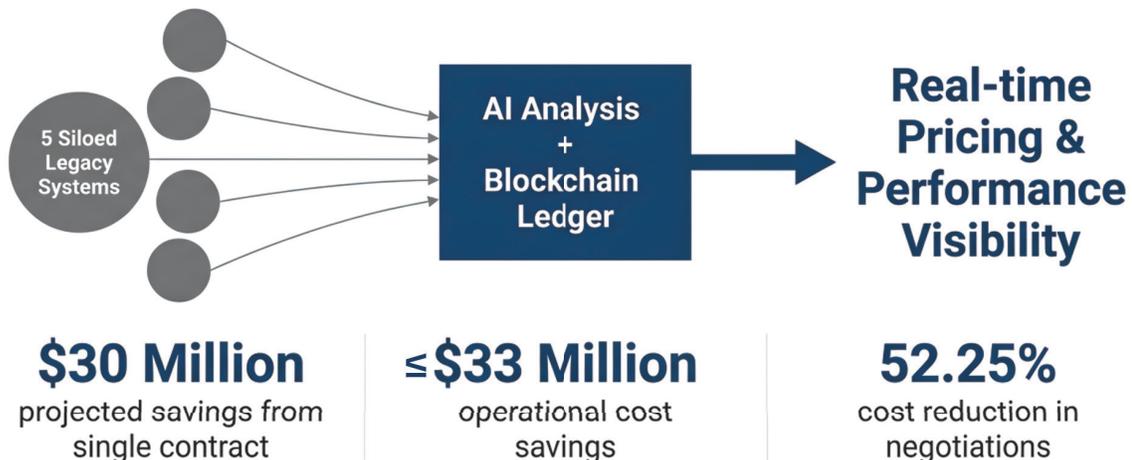
3.5.1.1 Problem Statement

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.

3.5.1.2 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.[24] 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.

Procurement Optimization: Smarter Acquisition via AI and Blockchain

Case Study: U.S. HHS "Accelerate" Programm

$30 Million	≤$33 Million	52.25%
projected savings from single contract	operational cost savings	cost reduction in negotiations

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

3.5.1.3 Actual or Expected Results

This project showed great promise with expected results including:

- $30 million in projected savings over five years[25] 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 visionary CIO Jose Arrieta to transform federal procurement through blockchain, AI, and automation. Arrieta foresaw the convergence of emerging technologies that would soon revolutionizegovernment 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 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.

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[25]"Blockchain Saving HHS $30M on First Accelerate Contract", Katie Malone, February 11, 2020.

3.6 Budget and Financial Management

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

3.6.1.1 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 theaters, 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.

3.6.1.2 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 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.

3.6.1.3 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.

3.6.2 Utah County

3.6.2.1 Problem Statement

Utah County is undergoing rapid population growth, accounting for 43% of the state's total population increase in 2024.[26] 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.

3.6.2.2 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.

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

3.6.2.3 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.

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

3.6.3.1 Problem Statement

In 2025, USAID was effectively shut down, its operations scaled back, and remaining salvaged programs transferred to the U.S. Department of State.[27][28] Over 80% of the agency's budget was cut, and approximately $55 billion in multi-year foreign aid contracts[29][30] terminated 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.

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

[28] https://www.cato.org/blog/good-start-congress-cuts-funding-usaid-other-foreign-aid-programs.

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

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

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.

3.6.3.2 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.

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

Applicability Across Levels of Government: Local to Global

Utah County (local)

43% of state population growth in 2024.
Challenge: Budget deficits.
Solution: Blockchain-enabled fund tracking distinguishes grant-funded programs from those relying on local tax revenue.

UN Joint Staff Pension Fund (Global)

Over 80,000 beneficiaries in more than 190 countries.
Outcome: Biometric + blockchain verification enabled real-time eligibility verification without paper forms or the use of mail services.

4 Key Challenges and Barriers to Adoption

Over the past decade, governments and organizations around the world 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.

4.1 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.

4.2 Modernization Resistance

Despite growing recognition of blockchain's potential to bring transparency, automation, and auditability to financial and budgeting systems, many organizations remain reluctant to overcome the inertia required for meaningful modernization. Legacy processes are deeply embedded in policy, governance structures, and workforce routines, creating a strong bias toward maintaining the status quo even as inefficiencies persist. Concerns over risk, regulatory uncertainty, and integration with existing systems further slow adoption, while the upfront effort to redesign workflows and controls is often perceived as outweighing near-term benefits. As a result, financial and budgeting functions frequently default to incremental improvements (e.g., further increasing the cost of technical debt) rather than pursuing transformative approaches, allowing institutional inertia to delay the adoption of blockchain-enabled solutions that could fundamentally improve accountability and trust.

4.3 Institutional Commitment Required for Adoption

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. Successful adoption of blockchain modernization initiatives require a comprehensive approach to change management.

4.4 Skills & Knowledge Gaps

To fully realize the benefits of blockchain, government business analysts, process architects, and technical personnel must develop a comprehensive understanding of blockchain paradigms, core components, operating mechanisms, and the fundamental shift toward decentralized architectures. This includes familiarity with wallets, tokens, tokenization models, exchanges, smart contracts, and the interplay between on-chain and off-chain processes, as well as how these elements integrate within a broader system architecture. Blockchain is not simply another application or database. It combines:

- Distributed systems architecture
- Cryptography and key management
- Data governance and trust models
- Executable business logic through smart contracts, and
- Legal, audit, and compliance considerations.

In practice, many government IT departments are highly specialized and siloed (e.g., Bnetwork operations, database administration, cybersecurity, and application development) while blockchain requires systems-level thinking across all of these domains. This persistent knowledge and skill gap inhibits adoption.

4.5 Scalability & Performance

Early blockchain platforms were constrained by limited scalability and performance, leading to a widespread perception that blockchain technology could not operate at the speed or capacity required for government processes. These early implementations were also viewed as inefficient in terms of energy consumption and operational cost. As a result, this perception became deeply ingrained among many government technology professionals and, in many cases, persists today. However, significant advances in blockchain engineering have produced modern platforms capable of high throughput, large-scale capacity, and cost-efficient operation suitable for government use. To address lingering misconceptions, the Government Blockchain Association (GBA) publishes a directory of independently rated blockchain solutions, enabling government officials to evaluate and compare the proven capabilities of specific platforms.

5 Planning for Blockchain Implementation

Government officials planning a blockchain implementation should anticipate and proactively address these organizational, cultural, and technical realities from the outset. Successful initiatives are designed not merely as technology pilots, but as structured change programs that align leadership, governance, workforce capabilities, and incentives around greater transparency and accountability. This includes setting clear expectations that transparency may surface uncomfortable insights, securing institutional commitment through formal governance and continuity plans, and investing early in workforce education to close knowledge gaps across architecture, cryptography, smart contracts, and compliance. Officials should also resist incrementalism by pairing blockchain adoption with deliberate process redesign, while grounding platform selection in demonstrated performance rather than outdated assumptions. Leveraging resources such as the Government Blockchain Association directory of independently rated solutions can further help decision-makers validate scalability, cost efficiency, and operational readiness, reducing risk and building confidence among stakeholders.

5.1 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 the gaps related to data integrity, viability, and transparency. Identify where the existing technology and processes enable waste, fraud, and abuse. Blockchain should be proposed with improvements in data integrity, 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.
This includes a technology assessment to determine the best approach (see Paragraph 5.2 Technical Factors)

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) **Establish 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.

    Organizations may also leverage maturity models, such as the Blockchain Maturity Model (BMM), to assess readiness and guide phased adoption within existing legal, financial, and operational constraints.

5) **Prepare for Iteration -** Commit to begin with a small scale, controlled pilot implementation using real systems anddatatodetermine if the blockchain solution performs as expected. Ensure successsbymanaging 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.

Planning for Blockchain Implementation:
A Structured Path to Adoption

5. Prepare for Iteration

4. Establish Cultural Readiness

3. Conduct a Business Case Analysis

2. Perform a Feasibility Analysis

1. Define the Use Case

Recommendations:
- Incentivize modernization via tech challenges.

- Adopt BMM for acquisition requirements.

- Propose blockchain with improvements in data integrity, transparency, traceability, and trust as mandatory objectives.

5.2 Technology Selection Factors

Governments can use the BlockchainMaturity Model (BMM) as a structured, objective framework to evaluate andselectblockchain technology solutions based on defined levels of maturity, reliability,and trustworthiness. The BMM provides acquisition professionals with a setofstandardized criteria to assess and compare proposed blockchain solutions acrossmultiple technical and operational elements, such as governance, interoperability,performance, security, and sustainability.

These assessments, conducted bytrained and certified professionals, support informed decision-making by identifyingwhether solutions meet expectations for operational deployment and long-termviability. By leveraging publicly available assessment results and engaging withGBA-certified assessors or consultants, governments can mitigate procurementrisks, ensure compliance withdomain-specific requirements, and foster confidence in the selected solutions' ability to support mission-critical services over time.

The Blockchain Maturity Model (BMM) Supplements provide domain-specific extensions to the core BMM framework that help governments refine and tailor technology requirements for particular industry needs. While the core BMM defines the foundational elements and maturity levels applicable to all blockchain solutions, many government use cases demand additional criteria that address unique operational, regulatory, and risk considerations.

To meet this need, GBA working groups have developed supplements for areas such as:

- Banking & Financial Services
- Elections & Voting
- Emergency Management
- Healthcare
- Gaming
- Token systems, and
- Identity Management

Among others, which embed specialized requirements into the maturity assessment process. By using these supplements, government acquisition teams can articulate more precise solution requirements, ensure evaluations reflect sector-specific expectations for security, privacy, data integrity, and functional capability, and align procurements with internationally recognized best practices. This refined approach enables procurement officials to compare proposals on criteria that are not only technically sound but also relevant to their policy and operational domain, improving confidence that selected solutions will deliver the intended public value and manage domain-specific risks effectively.

In addition, planning for 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 a 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 successful implementation.

6 Resources

The following resources are available to support the modernization of systems with blockchain to prevent fraud, waste, and abuse in government.

6.1 General
6.1.1 Web3 Emerging Tech Directory
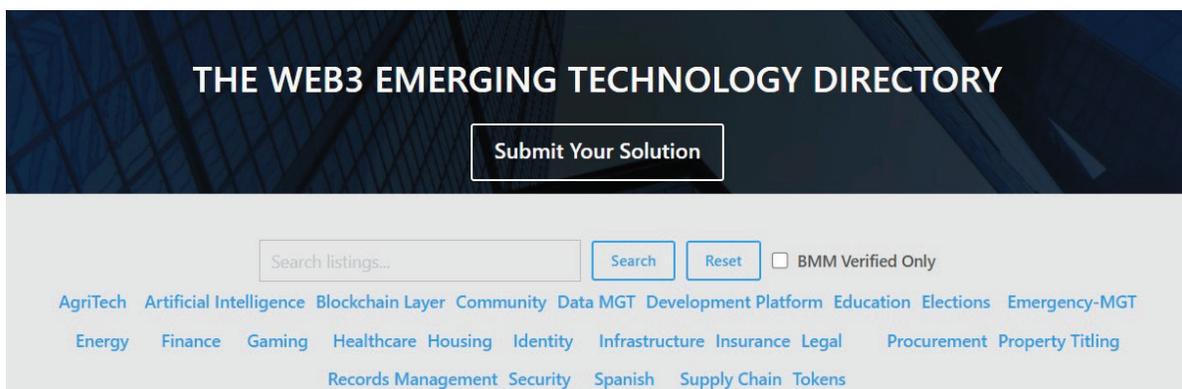
The GBA Web3 Emerging Tech Directory is a vital resource for public officials, procurement officers, private companies, and reform advocates seeking vetted blockchain tools to combat fraud, waste, and abuse. It curates solutions aligned with transparency, auditability, and accountability standards in public finance.

Through a searchable catalog of providers, technologies, and verified use cases, the directory helps decision-makers quickly identify and deploy compliant, standards-based solutions that support institutional reform and strengthen public trust.

6.1.2 Blockchain Maturity Model (BMM)

The Blockchain Maturity Model (BMM) is a globally recognized framework developed by the Government Blockchain Association (GBA) to help organizations evaluate and improve the maturity, trustworthiness, and reliability of blockchain solutions. It provides a structured roadmap with defined criteria and maturity levels that assess key dimensions such as security, governance, performance, and transparency. These elements enable stakeholders to distinguish credible blockchain implementations from early-stage prototypes or unproven systems.

The BMM is used by tech giants including the Oracle Corporation and is showcased by the Dynamic Coalition on Blockchain Assurance & Standardization[31] under the United Nations Internet Governance Forum (UNIGF), reinforcing its role as a trusted international standard for evaluating blockchain solutions. This recognition highlights its applicability across governments, enterprises, and industries seeking assurance and alignment with best practices.

By leveraging the BMM, solution providers can demonstrate maturity and operational integrity to customers and investors. Acquisition professionals gain a standardized basis for evaluating and comparing blockchain solutions. The model also supports continuous improvement and helps align implementations with evolving expectations for quality, accountability, and lifecycle sustainability.

6.2 Topical Resources

The following sub-paragraphs contain publications and BMM-rated technology solutions as of the publication of this report, organized by industry category. For a real-time list of all the BMM-rated solutions, visit the BMM Results page.[32]

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[31]https://intgovforum.org/en/content/dynamic-coalition-on-blockchain-assurance-and-stan dardization-dc-bas

[32] https://gbaglobal.org/blockchain-maturity-model/results

6.2.1 Artificial Intelligence

Blockchain ensures that AI models are trained on verifiable, tamper-resistant data and that their outputs can be audited, while AI enhances blockchain systems by optimizing processes, detecting anomalies or fraud, and enabling smarter automation. The result is a more transparent, accountable, and intelligent digital ecosystem than either technology can deliver on its own.

6.2.1.1 Publications

BMM - Artificial Intelligence[33] - 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.

6.2.1.2 BMM Rated Technology Solutions

AIVP (Artificial Intelligence Verification Platform[34] - Is an advanced artificial intelligence model specialized in providing comprehensive information about AI startups, companies, and AI models.

CESS Network[35] - 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.

6.2.2 Banking & Financial Services

Blockchain can make government financial processes significantly more fraud-resistant than traditional off-the-shelf technologies by combining immutability, transparency, and automated enforcement in ways conventional systems typically cannot.

6.2.2.1 Publications

BMM Banking & Financial Services Supplement[36] - This document is applicable to banking and financial services blockchain, or distributed ledger technology solutions applied to any form of value transfer whether it is money, securities, commodities, tokens, derivatives or financial transaction life-cycle obligations.

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[33] https://gbaglobal.org/blockchain-maturity-model/supplements

[34] https://aivp.ai

[35] https://cess.network

[36] All BMM documents are at https://gbaglobal.org/blockchain-maturity-model/supplements

6.2.2.2 BMM Rated Technology Solutions

TapestryX [37] - 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.

6.2.3 Blockchain as a Service (BaaS)

With Blockchain as a Service (BaaS), the blockchain platform provider hosts the platform and provides all infrastructure, security, updates, and maintenance, rather than companies having to build and maintain their own blockchain network from scratch. This reduces the need for companies to hire blockchain developers and allows subscribers to scale the system as their needs expand.

6.2.3.1 Publications

None Identified

6.2.3.2 BMM Rated Technology Solutions

The Oracle Blockchain Platform [38] - Enables organizations to rapidly deploy, operate, and govern permissioned blockchain networks without managing underlying infrastructure. Built on enterprise-grade distributed ledger technology, the platform provides managed network provisioning, identity and access controls, smart contract lifecycle management, and seamless integration with existing Oracle and third-party enterprise systems. By abstracting infrastructure complexity, Oracle's BaaS model allows governments and enterprises to focus on governance, compliance, and business outcomes rather than blockchain operations.

SIMBA Chain [39] – Designed to simplify blockchain adoption through low-code tooling, managed smart contracts, and multi-chain support. Its BaaS approach enables organizations to deploy blockchain-backed applications quickly while maintaining control over data access, permissions, and integration with legacy systems. By providing managed blockchain infrastructure, automated API generation, and compliance-ready architectures, SIMBA Chain helps organizations operationalize blockchain solutions without requiring deep blockchain engineering expertise.

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[37] https://L4SCorp.com

[38] https://www.oracle.com/blockchain

[39] https://simbachain.com

TapestryX[40] - Focuses on high-performance, real-time transaction synchronization and enterprise-scale data integrity. Delivered as a managed solution, it enables organizations to record, share, and reconcile transactions across multiple parties without traditional blockchain mining or token dependencies. Its service-based deployment model supports secure integration with existing financial and operational systems, making it well suited for regulated environments that require continuous auditability, strong governance, and operational scalability.

6.2.4 Elections

6.2.4.1 Publications

BMM Voting Supplement – This document builds on the Blockchain Maturity Model (BMM) by adding specific requirements for blockchain-based ballot marking and return voting solutions. It outlines additional criteria that must be met when evaluating blockchain-based mobile or hybrid voting solutions with the objective of ensuring the security, privacy and auditability of elections.

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.

6.2.4.2 BMMRatedTechnologySolutions

● DeVOTE[41] – 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 (TM)[42]– An award-winning, mobile-first elections platform backed by cutting-edge security, biometrics and an auditable blockchain infrastructure. Voatz has successfully served over 5 million voters across 140 elections.

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[40] https://l4scorp.com

[41] https://www.devoteusa.com

[42] https://voatz.com

6.2.5 Identity

6.2.5.1   Publications

BMM Identity Management Supplement - This document builds on the BlockchainMaturity 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.

6.2.5.2 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.

6.2.6 Tokens

6.2.6.1 Publications

BMM Token Systems Supplement – This supplement extends the Blockchain Maturity Model (BMM) to address blockchain solutions that rely on tokens as a core functional component. It defines domain-specific criteria for assessing the governance, lifecycle management, and operational controls of token-based systems, including both fungible and non-fungible tokens.

6.2.6.2   BMM Rated Technology Solutions

The KIROS token is a blockchain-based utility token developed by Black Wallet Group as part of its broader digital asset and wallet ecosystem. KIROS is intended to support transactional functionality and ecosystem operations, serving as a native mechanism for value transfer, access, and system-level interactions within Black Wallet enabled environments. The token operates within a governed framework that emphasizes transparency, auditability, and controlled lifecycle management, aligning with enterprise and public-sector expectations for tokenized systems. As an ecosystem token, KIROS enables practical, non-speculative use cases rather than functioning solely as a standalone cryptocurrency.

7 Recommendations

History has shown that, regardless of political affiliation, governments have consistently struggled to steward complex financial and payment systems across agencies in a way that truly serves the public interest. While legislators often respond by creating watchdog and oversight bodies intended to promote efficiency and reduce fraud and corruption, these mechanisms are largely reactive—identifying misconduct only after public funds have already been lost and fiscal damage has occurred. As a result, fraud, waste, and abuse persist as systemic weaknesses rather than isolated failures.

This challenge is unfolding against the backdrop of a historic expansion in global public debt. Worldwide government debt now stands at roughly 235% of GDP (and GNP). Unlike prior debt cycles, today's expansion is occurring in a higher-interest-rate environment. While advanced economies carry the largest absolute debt burdens, the impact is often more severe in developing countries, where borrowing costs exceed economic growth and crowd out essential public investment.

Broad global debt stands at approximately 235% of GDP (and GNP).

~235%

Broad measure of global debt
(GDP & GNP)

Rising debt meets a higher-interest-rate environment.

Interest payments crowd out public services.

Developing countries face the sharpest strain.

* Global Debt Remains Above 235% of World GDP, by Vitor Gaspar, Carlos Eduardo Goncalves, and Marcos Poplawski-Ribeiro, International Monetary Fund, September 17, 2025.

In this environment, high debt and weakfinancial controls reinforce one another in a dangerous and accelerating cycle. As debtgrows faster than GDP, governments lose fiscal flexibility and are forced to prioritizeinterest payments over public services and long-term stability.

GBA

IGF Blockchain Assurance + Standardization Dynamic Coalition

That pressure is compounded when fraud, waste, and abuse are allowed to continue unchecked, draining public resources and deepening deficits. Addressing fraud, waste, and abuse is therefore not merely a matter of good governance, it is a fiscal necessity. Proactive oversight, transparency, and accountability can immediately reduce unnecessary losses, slow debt accumulation, restore public trust, and give governments a credible path to stabilize their finances without raising taxes or taking on additional debt.

GBA recommends a number of actions be considered to help accelerate the adoption of blockchain technologies as a strategic asset for preventing financial fraud, waste, and abuse in government. These include the following:

1. Incentivize Modernization
   - Establish competitive technology challenge programs to incentivize government investment in blockchain solutions that demonstrate strong taxpayer ROI.
   - Dedicate funds specifically for blockchain development and implementation initiatives.
   - Allocate grant funding to support state, local, national and international government investments in blockchain-enabled systems.

2. Governance and Executive Collaboration
   - Strengthen collaboration among Chief Financial Officers (CFOs), Chief Information Officers (CIOs), and Chief Security Officers (CSOs) across government and industry.
   - Leverage existing bodies to identify high-value blockchain use cases and promote cross-agency sharing of best practices.

3. Adopt Blockchain Maturity Models and Industry Standards
   - Leverage freely available:
     - Blockchain Maturity Models (BMMs) and supplements to guide design, development and implementation of blockchain solutions.
     - Blockchain training resources are available from the GBA.
   - Use the BMM to establish acquisition requirements, verification, and validation processes.
   - Utilize the resources available through the Dynamic Coalition on Blockchain[43] Assurance & Standardization of the United Nations Internet Governance Forum

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[43] https://intgovforum.org/en/content/dynamic-coalition-on-blockchain-assurance-and-stan dardization-dc-bas

4. Performance Management and Accountability

- Require agencies to implement performance management plans focused on preventing fraud, waste, and abuse.
- Mandate transparent mid-year and annual reporting that demonstrates how modern technologies (e.g., blockchain, AI, automation) contribute to measurable outcomes.
- Integrate these requirements into government-wide frameworks to track key modernization investments and their direct contribution to savings realized and costs avoided, for taxpayers.

5. Public–Private Partnerships and Innovation

- Promote public–private partnerships that bring together government practitioners, blockchain vendors, and independent research organizations.
- Task these partnerships with developing actionable recommendations and implementation strategies for blockchain adoption across government.

8 Conclusions

The Imperative for Modernization
The global research and advisory firm Gartner Inc. estimates that by 2028, 65% of government organizations will rely on performance outcomes to meet rising demands for transparency and accountability.[44] Achieving this future requires decisive action today—specifically, sustained funding for systems modernization and a cultural shift within government organizations to embrace transformational change.

Proven Value of Blockchain and AI
The use cases outlined in this paper demonstrate how blockchain and artificial intelligence can materially strengthen financial management. Together, these technologies deliver immutability, transparency, security, and traceability, significantly reducing vulnerability to fraud, misuse, and corruption. While not exhaustive, these examples highlight a broad set of opportunities that GBA's Blockchain Maturity Model (BMM) was designed to systematically evaluate.

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

Applicability Across Levels of Government

The use cases outlined in this paper demonstrate how blockchain and artificial intelligence can materially strengthen financial management. Together, these technologies deliver immutability, transparency, security, and traceability, significantly reducing vulnerability to fraud, misuse, and corruption. While not exhaustive, these examples highlight a broad set of opportunities that GBA's Blockchain Maturity Model (BMM) was designed to systematically evaluate.

Investment, Readiness, and Governance Considerations

Effective implementation requires more than technology. Governments must account for skilled talent, integration with legacy systems, and robust data engineering to support AI capabilities. Equally important are strong business case and investment governance processes to measure and justify value. While upfront costs may be significant, the cost of inaction, continued fraud, waste, improper payments, and mounting technical debt poses a far greater risk to accountability and public trust.

Financial Impact and Return on Investment

As an example, the U.S. Presidential Executive Order on "Protecting America's Bank Account Against Fraud, Waste and Abuse"[45] underscores how fragmented financial systems undermine oversight and traceability. With an estimated $500 billion lost annually to fraud and improper payments, even a 20% reduction enabled by blockchain-based solutions could yield approximately $100 billion per year in prevented losses representing a compelling return on investment for taxpayers. This same rationale could be extended to governments around the world.

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

Project ROI: The $100 Billion Opportunity

$500B+
Annual
Fraud
(Conservative)

✕

20%
Reduction
via Smart
Contracts

=

**$100
Billion**
Annual Savings

Equivalent to the entire discretionary
budget of the Department of Education.

Methodology: Shifting from 'Pay and Chase' to 'Prevent and Protect' using immutable ledgers.

A Transformational Shift, Not Just a Technology Upgrade

Blockchain-enabled financial management systems are not merely incremental investments; they represent a fundamental shift in how governments ensure integrity, transparency, and accountability in public spending. As governments worldwide face growing scrutiny over fraud and corruption, these technologies offer a credible path forward

The Time to Act

While blockchain's early hype has faded, real-world deployments have demonstrated tangible and measurable value. Though disruptive and sometimes uncomfortable, the transparency these technologies introduce is a catalyst for progress and reform. The opportunity is clear, the stakes are high, and the time to act is now.

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 (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 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 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 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.
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.
Rudolf J. Livingston, CPA Contributor	Public finance expert, chief deputy auditor, former finance director & government budget manager with more than 20 years of experience in program evaluation, performance measurement & fiscal transparency initiatives within state & local agencies.

Paul F. Dowding
Contributor

Global institutional capital markets and financial services operations and market infrastructure expert. He has 35+ years' experience in banking, brokerage, exchanges, ATS's/ECN's, custody, clearing houses, depositories, prime brokerage, hedge funds and fund administration. He has been involved in the blockchain industry since 2015, with L4S Corp., has designed and built a differentiating networked accounting ledger technology. Paul is a GBA Board member, leads the GBA banking & finance working group and is co-author of the blockchain maturity model.

Eugene Morozov
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.

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.

Bob Miko
Contributor

Bob functions as operations director for GBA, managing active working groups, supporting GBA in person events and public relations efforts . He has decades of experience in the news, public relations and event business. He has lecture for USIA in Jamaica and Tanzania and with the Defense Information School in Washington. His first blockchain event was produced in 2014. With Ohio Senator Bernie Moreno he help launch Blockland and effort to bring block chain technologies to the Midwest and has been active with GBA since 2018.

Paul Meyers
Contributor

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.

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.

Appendix B: Glossary

Acronym	Definition
AFRL	Air Force Research Laboratory – The U.S. Air Force's primary scientific research and development center.
AI	Artificial Intelligence – Technologies that enable machines to perform tasks requiring human-like intelligence.
AIVP	Artificial Intelligence Verification Platform - an advanced artificial intelligence model specialized in providing comprehensive information about AI startups, companies, and AI models.
AKUA	AKUA Inc. – A technology company providing IoT-enabled tracking devices used in blockchain logistics pilots.
AMC	Army Materiel Command – A major U.S. Army command responsible for materiel readiness and logistics.
BMM	Blockchain Maturity Model – A framework developed by GBA to assess blockchain readiness and reliability.
CE	Certificate of Entitlement – A document verifying eligibility for UN pension payments.
CIO	Chief Information Officer – Senior executive responsible for IT strategy and systems.
DCE	Digital Certificate of Entitlement – Blockchain-enabled biometric verification system for pension eligibility.
DiBaT	Digital Blockchain Budget Accountability and Tracking – USAF blockchain platform for financial transparency.
DLA	Defense Logistics Agency – DoD logistics combat-support agency.
DoD/DoW	Department of Defense/War – U.S. federal department responsible for national defense.
DOE	Department of Energy – U.S. federal agency overseeing energy policy and clean energy funding.
DOGE	Department of Government Efficiency – Federal entity focused on improving government efficiency.
EPA	Environmental Protection Agency – U.S. federal environmental regulator.
FIT	Office of Financial Innovation and Transformation – Treasury office modernizing financial systems.
FM	Financial Management – Systems and processes for managing public funds.

GAO	Government Accountability Office – Independent audit and oversight agency to Congress.
GAAP	Generally Accepted Accounting Principles – Standard framework of accounting rules and practices.
GBA	Government Blockchain Association – Organization promoting blockchain in government.
GDD	Grant Recipient Digital Dossier – Blockchain tool for grant risk assessment.
GGRF	Greenhouse Gas Reduction Fund – Federal clean energy funding program.
GSA	General Services Administration – U.S. agency supporting federal operations.
GRIP	Grid Resilience and Innovation Partnerships Program – DOE grid modernization program.
HHS	Department of Health and Human Services – U.S. public health and social services agency.
ICAM	Identity, Credential, and Access Management – Framework for managing digital identities and access.
IoT	Internet of Things – Network of connected physical devices and sensors.
KYB	Know Your Business – Process for verifying the organizational affiliation of a document's originator or certifier.
KYC	Know Your Customer – Process for verifying the identity of a document's originator or certifier.
KYD	Know Your Document – Framework for verifying digital document authenticity.
LLM	Large Language Model – AI model for understanding and generating language.
NFT	Non-Fungible Token – Unique blockchain-based digital asset.
OIG	Office of Inspector General – Independent audit and investigation office.
PDA	Presidential Drawdown Authority – Authority to transfer defense assets to foreign partners.
PG&E	Pacific Gas & Electric – U.S. utility company.
RAG	Retrieval-Augmented Generation – AI technique combining retrieval and language generation.
ROI	Return on Investment – Measure of financial benefit relative to cost.

SBIR	Small Business Innovation Research – Federal R&D funding program for small businesses.
SDG 16	Sustainable Development Goal 16 – UN goal for peace, justice, and strong institutions.
SIMBA Chain	SIMBA Chain Inc. – Enterprise blockchain platform provider.
TMF	Technology Management Fund – GSA's fund to help federal agencies accelerate the implementation of critical IT modernization projects.
UNICC	United Nations International Computing Center – UN technology services provider.
UNJSPF	United Nations Joint Staff Pension Fund – UN pension management organization.
UNODC	United Nations Office on Drugs and Crime.
USAF	United States Air Force – Branch of DoD/DoW.
USARIC	United States Army Reserve Innovation Command – Army innovation organization.
WFP	World Food Programme – UN humanitarian food assistance agency.

Appendix C: Dynamic Coalition Disclaimer

Dynamic Coalitions are open, multistakeholder and bottom-up initiatives, formed by individuals or organizations to coalesce around a set of Internet governance issues of common interest, identify specific policy problems and provide targeted solutions. Anyone interested is welcome to join and contribute to DC activities.

While Dynamic Coalitions operate autonomously outside of the IGF decision-making structures, Dynamic Coalitions, which are recognized by the IGF Secretariat, function within the IGF framework and comply with the IGF principles and its code of conduct.

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