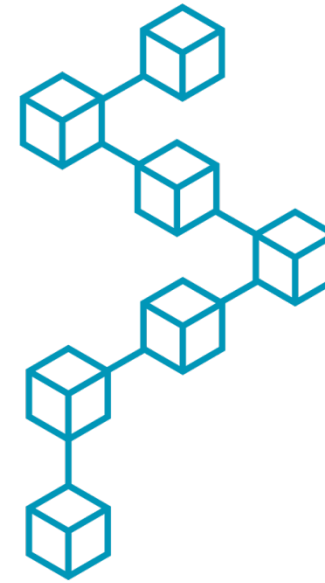


Improving Grants Management Using Blockchain Technology



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How Can MITRE Help Improve Grants Management?

- As an operator of a not-for-profit, Federally Funded Research and Development Center (FFRDC), MITRE can **collaborate openly and closely with government agencies, while also remaining independent and objective in our analyses, research, and interactions with industry on behalf of the government**
- Grants management is a government-wide business process and we are able to leverage our **whole-of-government perspective and established relationships with many federal and non-federal entities** to find the optimal solution that addresses each stakeholder's needs and risks
- We apply our **grants and financial management business domain expertise and engineering discipline** to develop data-driven and impartial recommendations

Recent MITRE Efforts to Improve Grants Management

- **Support cross-agency working groups** by developing common government grants management business capabilities, use cases, and data element standards, and a grants risk management framework
- **Conduct MITRE-funded research** to explore both business and technology changes that have the potential to address challenges faced by grantmaking and grant recipient entities
- **Exchange information with Federal Agencies such as**
 - **National Science Foundation (NSF)**, which is exploring sharing pre-award grant application information among Federal agency components using blockchain technology
 - **Treasury Fiscal Service**, which is exploring the ability to add, transfer, and redeem funding commitments (“vouchers”) using blockchain technology

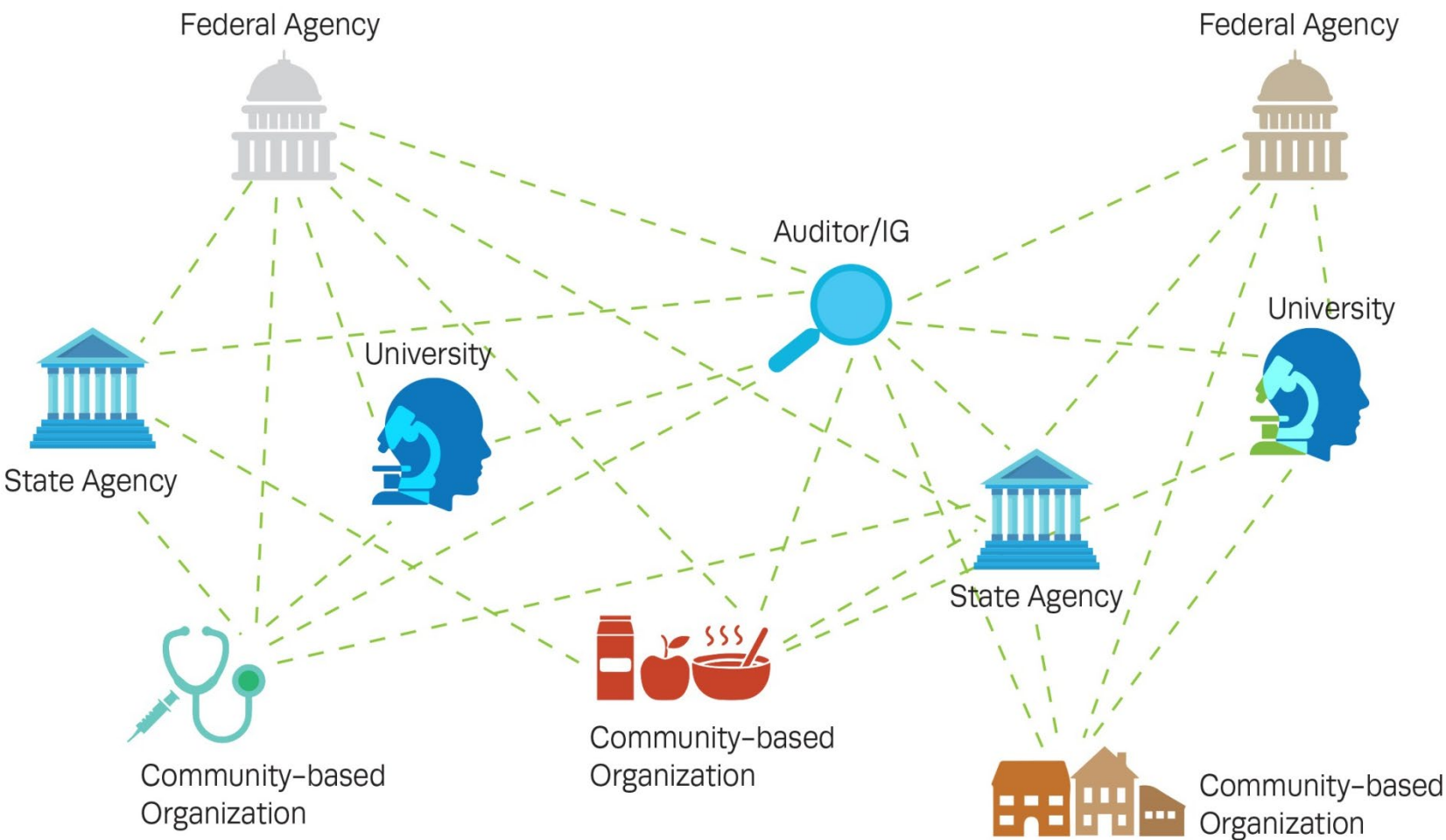
MITRE Research Study Background

- In October 2018, MITRE began working with a number of government agencies that were interested in the potential to improve grants management by using blockchain technology and needed independent, objective research on this topic
- **MITRE interviewed and analyzed input from:**
 - Agency personnel who work in **grants management, financial management, and Inspector General (IG)** offices
 - Grant recipients in the public and private sectors, including **state government agencies, public and private universities, community-based service organizations, and a tribal nation**
 - Agencies and subject matter experts working on **blockchain solutions in the government environment**
- **MITRE developed findings, conclusions, and recommendations for the Federal agencies should they decide to pursue this approach:** <https://www.mitre.org/publications/technical-papers/assessing-the-potential-to-improve-grants-management-using-blockchain>

Current Grants Management Business Operating Model

Grants Recipients: Burdensome and Redundant Reporting and Payment Processing

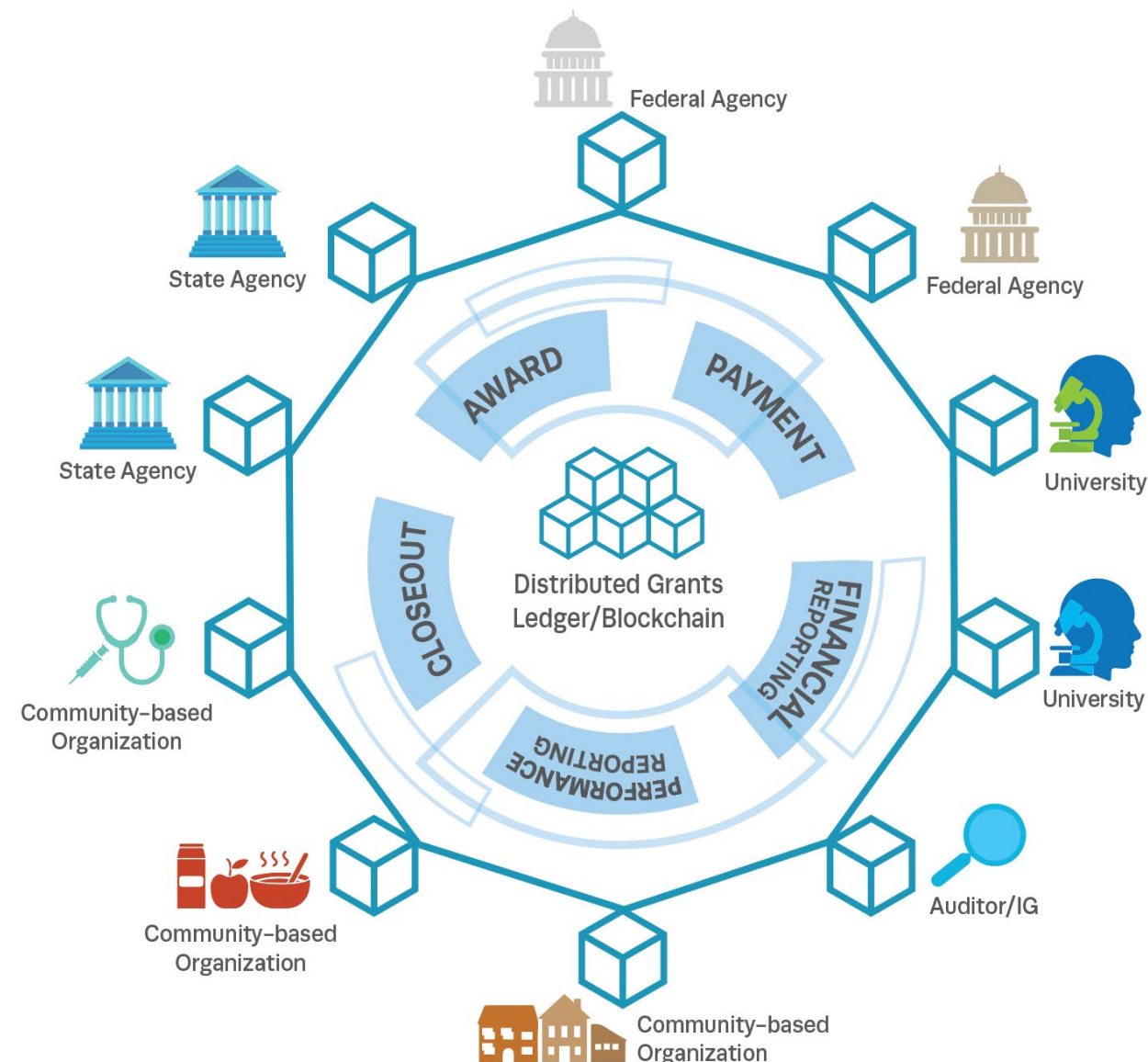
Grantmaking Entities, Auditors/IGs, and the Public: Lack of Transparency and Timeliness in Grants Financial and Performance Information Sharing



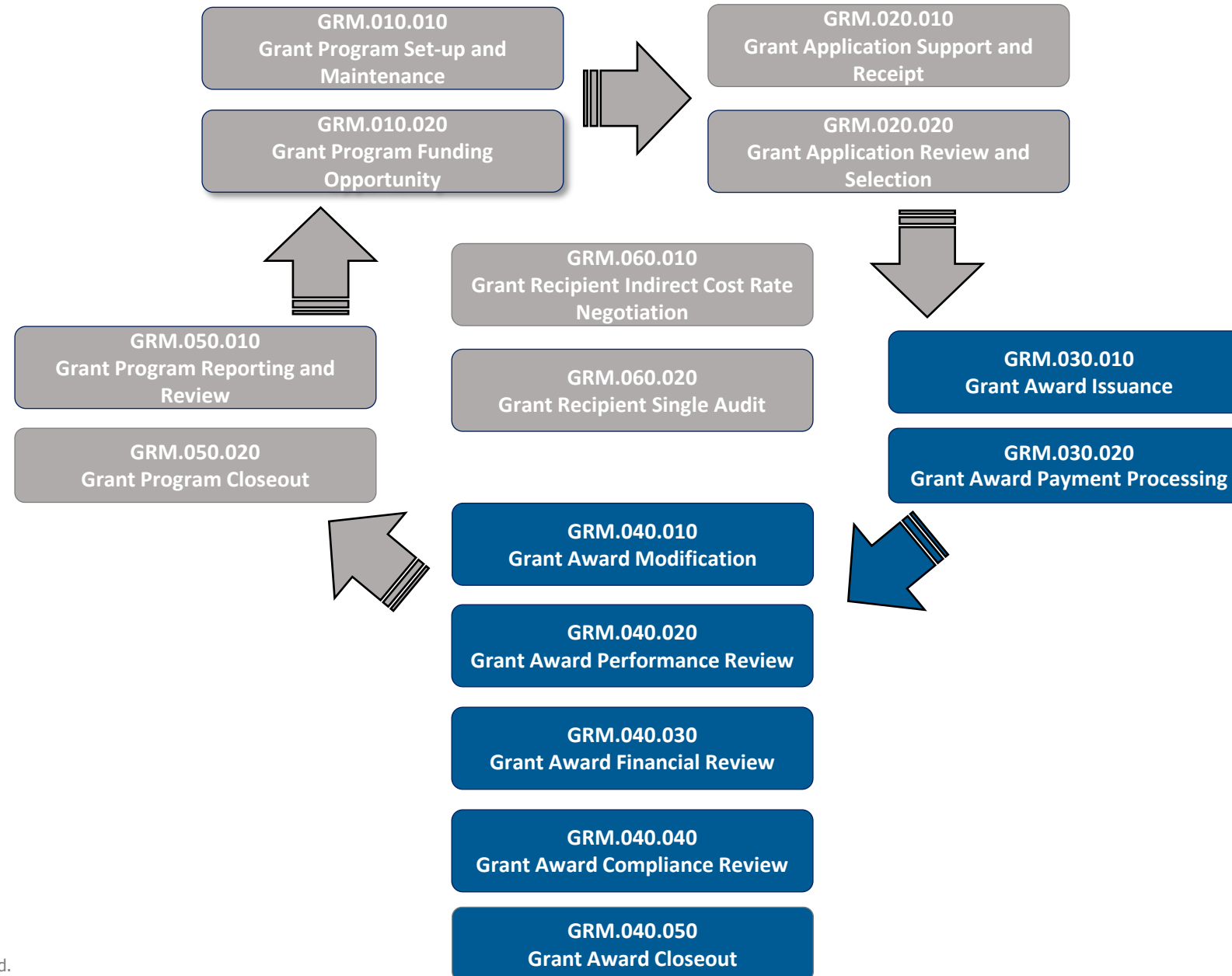
Potential Future State Business Operating Model

Grants Recipients: Less Burdensome Reporting and More Timely Payments

Grantmaking Entities, Auditors/IGs, and the Public: More Transparent and Timely Grants Financial and Performance Information



Which Grants Management Lifecycle Business Processes Did We Focus On?

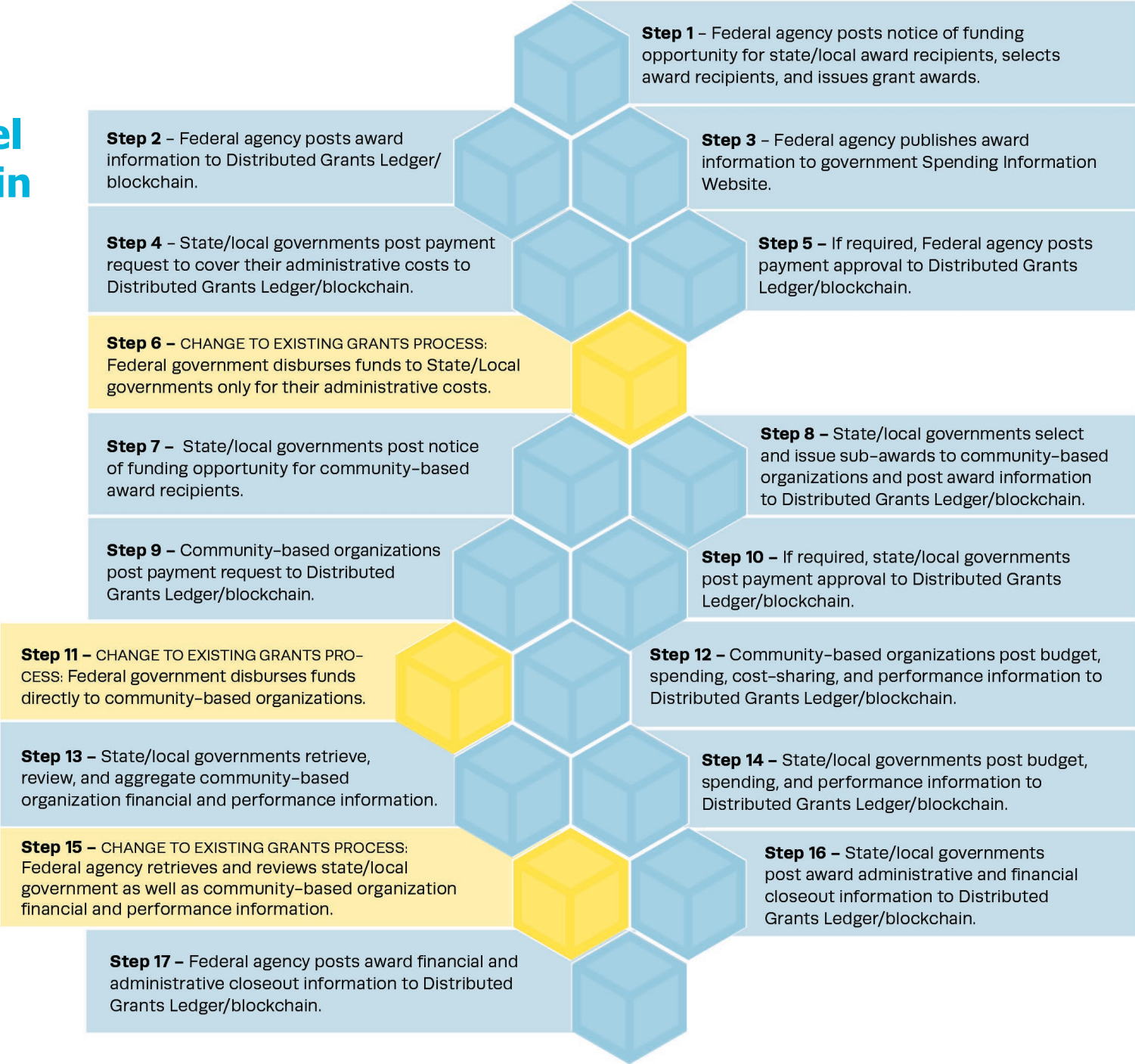


Why Was Blockchain Even Considered?

- Grants management ecosystem characteristics:
 - **Grants management is a decentralized set of business processes managed autonomously** by Federal, state, and local government agencies, universities, tribal nations, and community-based organizations, each with their own regulations, policies, and procedures
 - **Award (contract), financial, and performance information are the assets** to which all parties agree they need more timely and accurate access as they execute their grants management business processes
- Blockchain (distributed ledger) technology characteristics:
 - **Decentralized solution operations management** to align with decentralized business processing (e.g., self-determination of what information to share and when during the grants management process)
 - **Information integrity assurance** among the grants management ecosystem entities (i.e., digitally signed and tamper-resistant history of grants information)
 - **Incremental scalability** as grants management entities enter and leave the ecosystem

Proposed Business Operating Model Using Blockchain (Distributed Ledger) Technology

Multi-Tier Block Grant Example



MITRE Research Study Conclusions

- In March 2019, the MITRE study concluded that improvements in grants management for both Federal agencies and grant recipients could be enabled, but this **would require implementation of a modified grants management business operating model in addition to the use of blockchain technology**
- The MITRE study participants identified the following benefits of a modified grants management business operating model and use of blockchain technology:
 - **Federal Agencies: Improved decision making** through improved transparency, quality, and timeliness of grant financial and performance information
 - **Public: Improved transparency, quality, and timeliness of grant financial and performance information** made available by the Federal Government in addition to the current award information
 - **Grant Recipients: Reduced redundant reporting** to multiple grantmaking entities and auditors; and payment efficiency for second- and third-tier grant recipients
 - **IG Community: Improved ability to detect fraud, waste, and abuse** and improved ability to efficiently conduct audits

MITRE Research Study Conclusions (cont'd)

- Achieving the identified benefits will require addressing:
 - **Control of access to and protection of Personally Identifiable Information (PII) and sensitive/proprietary information** stored on the blockchain's linked grants documentation repositories
 - **Need for artificial intelligence and analytics** to make effective use of all the information
 - **Changes to grants and financial management regulations, policies, and procedures** to clearly define business operation responsibilities and accountabilities
 - **Barriers identified by states** that have implemented centralized grants management solutions or have laws that require Federal award funds to flow through the state treasury and be appropriated by state legislatures before they are awarded

MITRE Research Study Recommendations

- **Execute a grants management blockchain demonstration project** (proof of concept) to validate a subset of benefits and further explore a subset of actions needed, challenges, and mitigation actions
- **Establish a consortium of Federal, public, and private sector grantmaking and grant recipient entities** to govern, plan, fund, and assess the results of the demonstration project
- In parallel, **conduct further analysis of complex challenges and barriers** and determine the magnitude and the extent of the state-related barriers

Where Can We Go From Here?

- **Leverage the demonstration project proposal that won Honorable Mention in the Office of Management and Budget (OMB) Government Effectiveness Advanced Research (GEAR) Center Challenge**
 - Leverage OMB interest in the project to explore whether a consortium of Federal agencies, state agencies, universities, community-based organizations, and commercial entities are willing to partner with MITRE and commit resources to a joint demonstration project
 - Refine the proposal's notional project plan, resources, and schedule for the demonstration project
- **Continue to conduct research on** related technologies for authentication and proxy management in a blockchain technology environment

Reference Material

What makes blockchain different?

- Transactions are recorded into an [electronic ledger that is decentralized and replicated](#)
- It is [open and distributed](#), which allows anyone with the proper access permissions to the ledger to update and/or view it
- [Each transaction is digitally signed](#)
- Each transaction has one or more addresses (“to” and “from” endpoints for the transaction) and a record of what happened

Why is this distributed, decentralized ledger called a blockchain?

- Transactions are grouped together into a block
- A new cryptographic hash (unique key) is created for each new block and recorded within the block’s header data
- Each block is chained to the previous block by adding the hash of the previous block to the header of the new block, forming [an immutable chain](#)

Who gets to read or write to these blocks?

- Some blockchain systems are permission-less, meaning anyone can read and write to them
- Other implementations [limit participation to specific people or organizations and provide finer grained controls](#)

Who manages a blockchain?

- Information is accessed and/or updated using one or more “nodes”
- [Nodes may be managed](#) by a central entity or [separately by multiple entities](#) that have a documented agreement of how they will jointly manage the blockchain and its nodes

MITRE

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