Grants Management Blockchain Demonstration Project

November 2020

MITRE | SOLVING PROBLEMS FOR A SAFER WORLD

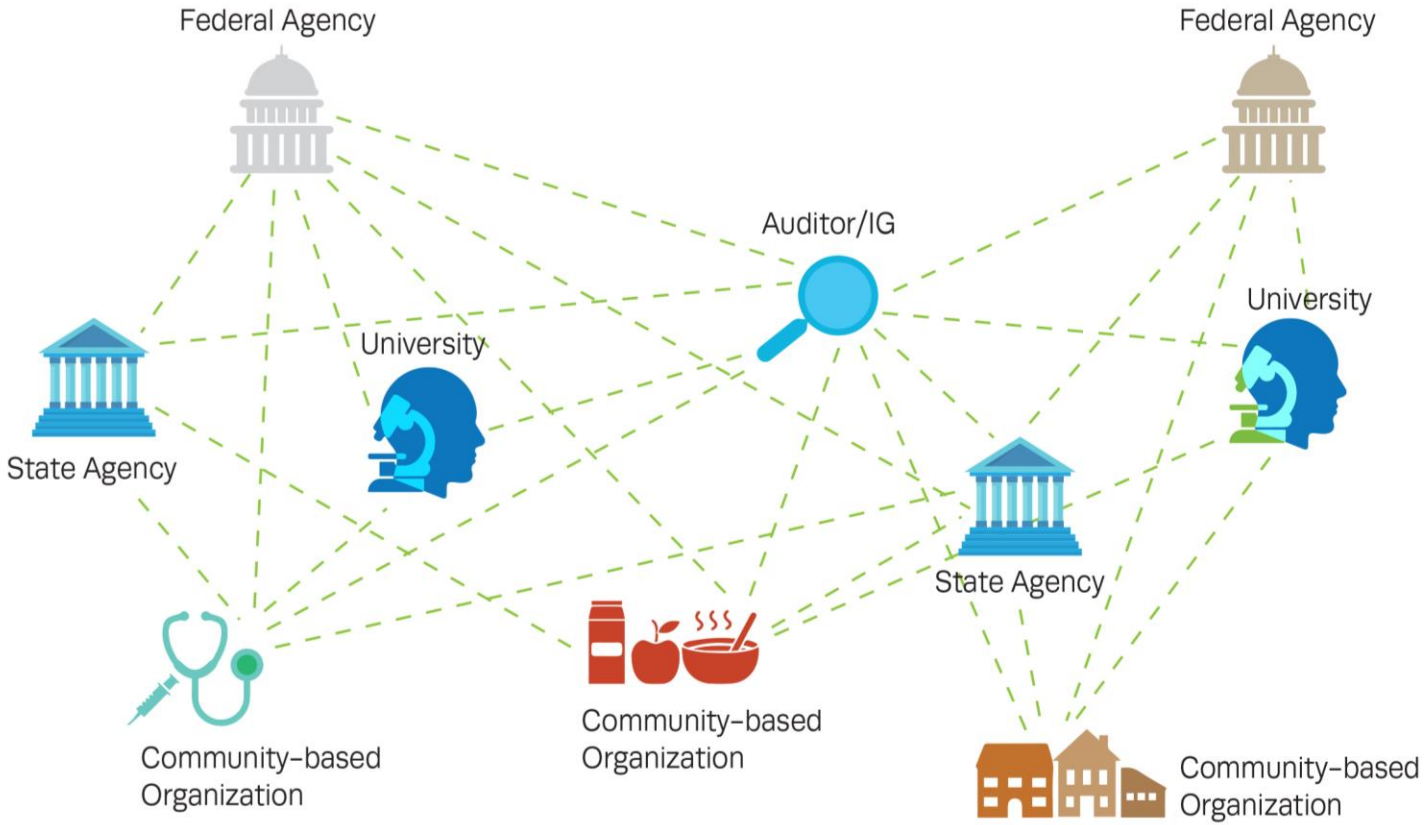
Government-wide Grants Management Problem

The Federal grants management process is burdensome, inefficient, and hampers the ability to see how Federal dollars are spent

- **Federal grants are subject to a complex and burdensome reporting model for grant recipients who receive funds from multiple sources**
- **Lack of timely, accurate, and complete data hampers the ability for sound oversight over Federal funds in the multi-tier grants ecosystem**

Federal Agency	Grant Dollars* (in B)	# of Grant Awards* (in K)
HHS	$509.2	83.2
DoT	$65.1	86.6
Education	$46.9	17.8
USDA	$34.9	26.2
HUD	$24.6	25.8
DHS	$13.6	5.4
NSF	$7	21.7
DOJ	$6.1	8.5
VA	$1.76	.7
NASA	$1.0	6.2
All Agencies	**$754.3B**	**343k**

*** FY18 (pre COVID-19)**



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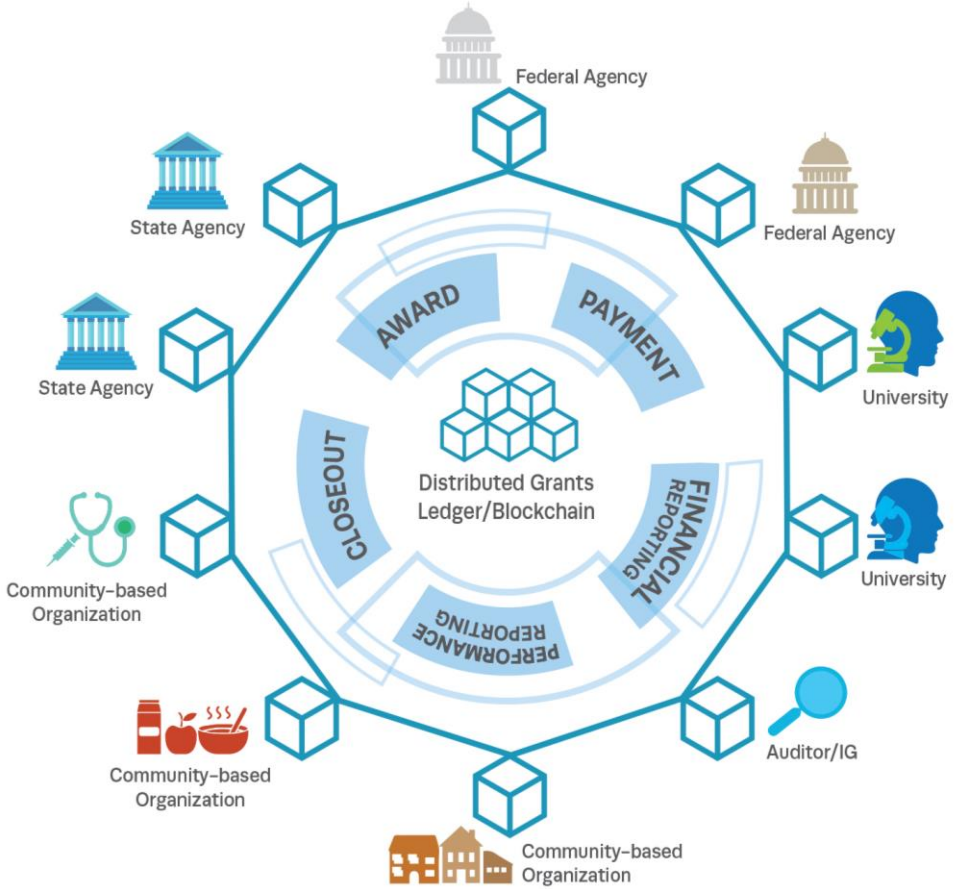
Solution Requires Federal and Non-Federal Action

The future Federal grants management processes and technology solution will reduce recipient burden, be more efficient, and enable better oversight of Federal government dollars

- **Less burdensome reporting, more timely payments, and greater availability of comparative financial and performance information**
- **More transparent, timely, and complete grants financial and performance information for all tiers of grants recipients**

Future state has been validated through:

- **MITRE-funded FY19 research study**
- **Interviews and discussions**
  - Federal Government Agencies
  - State and Local Government
  - Universities
  - Community-based Organizations
  - Inspectors General
  - Independent Auditors



MITRE-Funded FY19 Research Study

As a not-for-profit operator of federally funded research and development centers (FFRDCs), MITRE conducted a study in FY19 on improving grants management by using blockchain technology. The study concluded that:

1. **Improvements in grants management for Federal agencies and grant recipients could be enabled with a *modified* grants management business operating model**
2. **Distributed ledger technology ("blockchain") offers capabilities that are well-suited to implementing the future state business operating model**

And made a recommendation to:

Execute a grants management blockchain demonstration project (proof of concept) to validate a subset of benefits and further explore actions needed, challenges, and mitigation actions

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

Grant Recipients: Reduced redundant reporting to multiple grantmaking entities and auditors; and payment efficiency for second- and third-tier grant recipients

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

IG Community: Improved ability to detect fraud, waste, and abuse and improved ability to efficiently conduct audits

Grants Management Blockchain Demonstration Project – Phase 1

Phase 1

March 2020 – September 2020 (complete)

Workstream

Solution Business Needs Definition and Architecture/Design

Participants

Over 20 organizations representing:

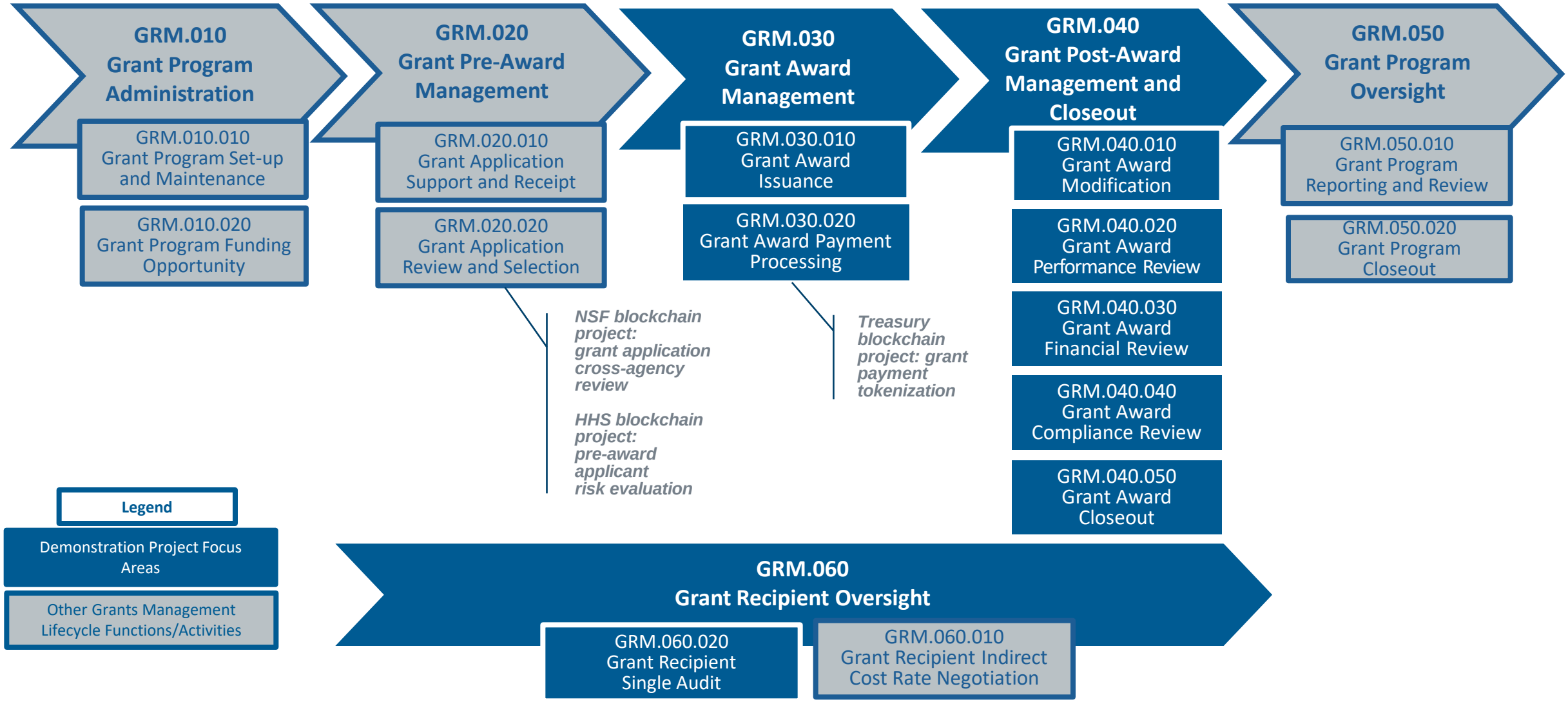
- Federal, State, and Local Government
- Universities
- Community-based organizations
  Inspectors general
- Independent auditors
- Industry blockchain and grants management solution providers
- Professional associations

Work Products

- Functional and Technical Definition
- Business Use Cases (User Stories)
- Conceptual Architecture
- Information Flow Diagrams
- Data Element and Business Rules Specifications

Federal Grants Management Lifecycle*
Demonstration Project Focus Areas

** The Federal government defined the Grants Management business lifecycle as part of its **Federal Integrated Business Framework (FIBF)** for shared services (https://ussm.gsa.gov/fibf/)*



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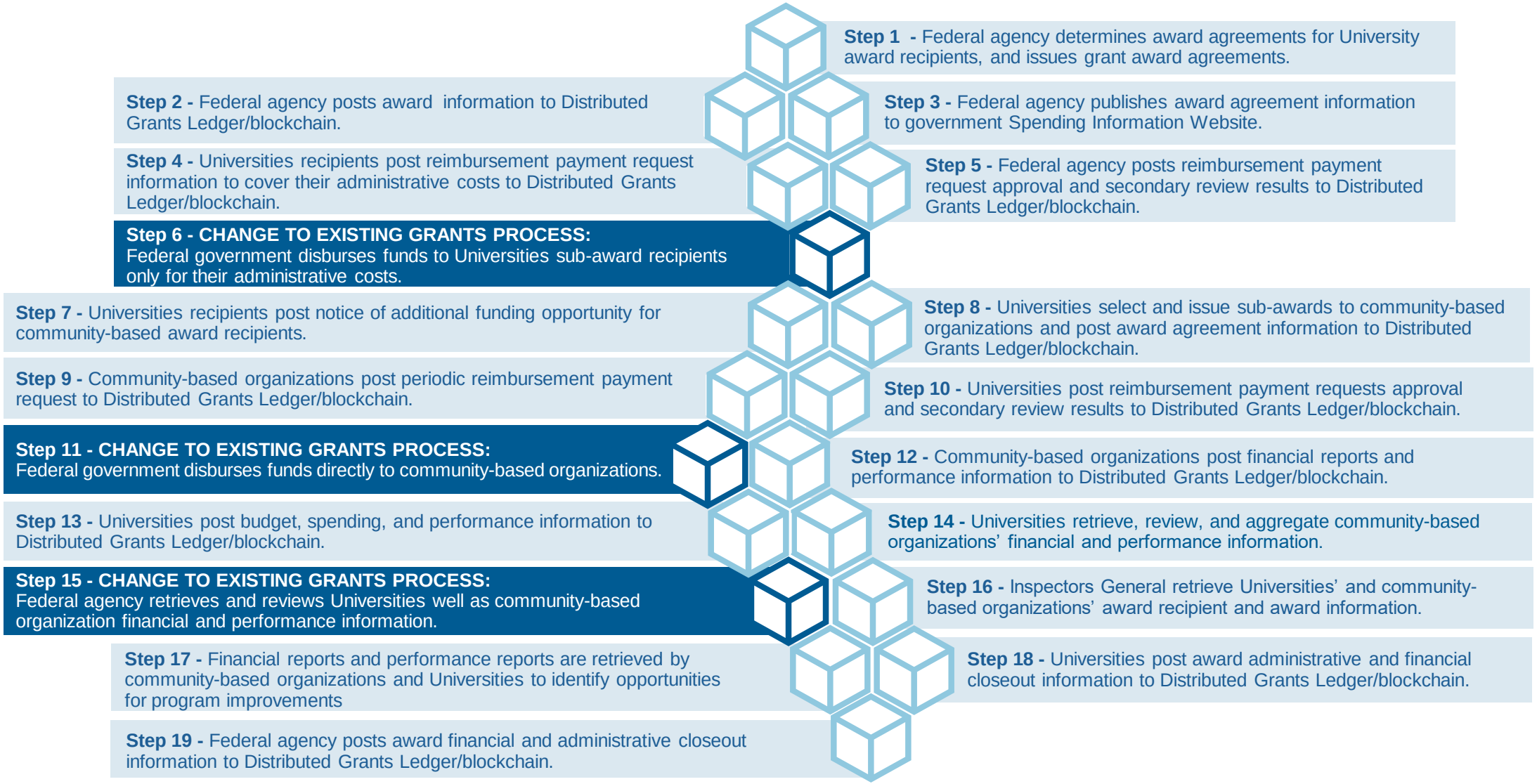
Future State Business Operating Model Example

Discretionary Multi-Tier Grant Award with Reimbursement Payment



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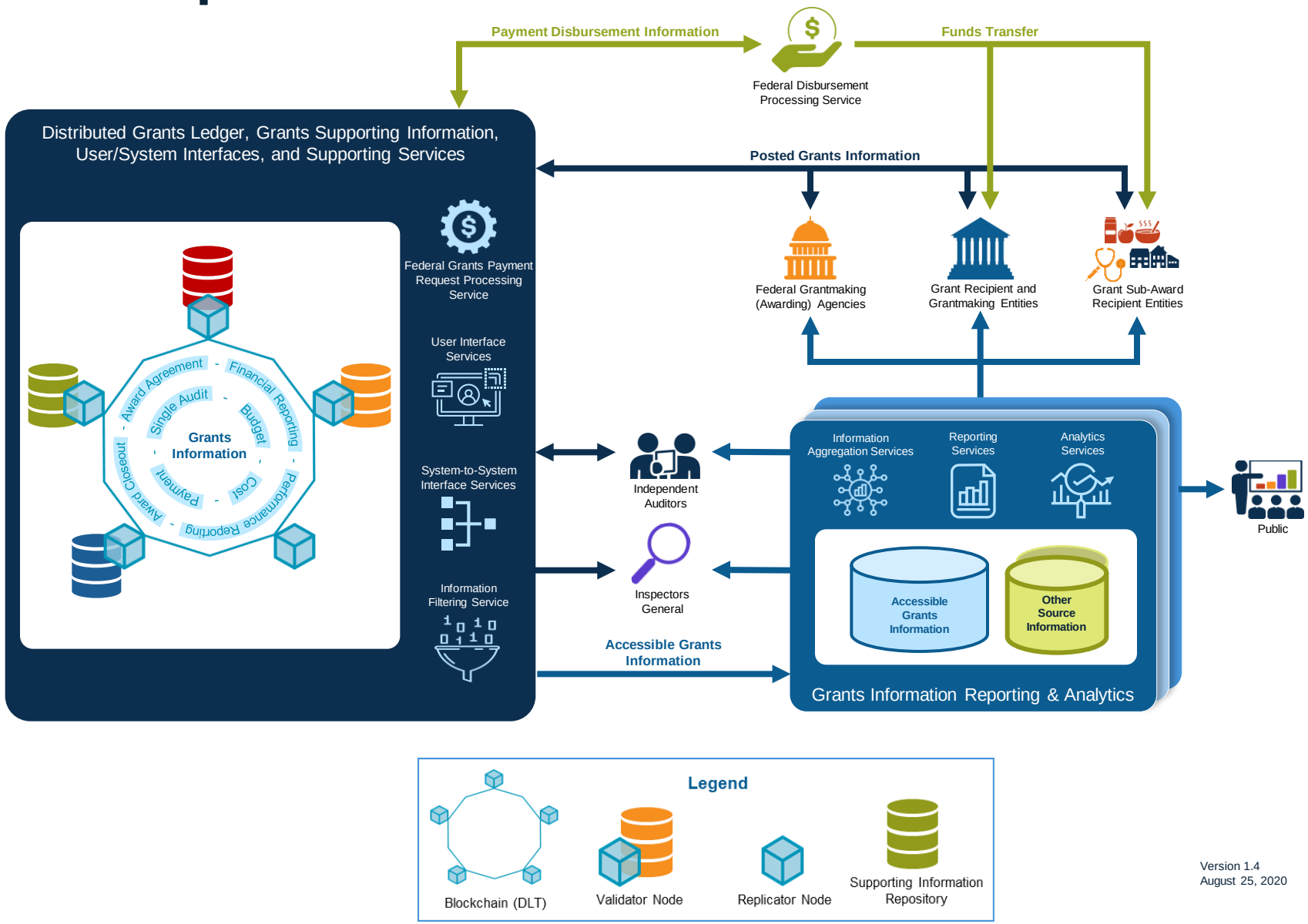
Future State Solution Conceptual Architecture

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 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



Version 1.4
August 25, 2020

Grants Management Blockchain Demonstration Project – Phase 2

	Phase 1 March 2020 – September 2020 (complete)	Phase 2 October 2020 – September 2021	
Workstream	**Solution Business Needs Definition and Architecture/Design**	**Solution Development, Demonstration, and Evaluation**	**Solution Adoption Analyses**
Participants	**Over 20 organizations representing:** • Federal, State, and Local Government • Universities • Community-based organizations Inspectors general • Independent auditors • Industry blockchain and grants management solution providers • Professional associations	**Teams consisting of experts in:** • Grants management lifecycle solutions • Blockchain technologies • Federal payment processing solutions • Reporting and analytics technologies • Grants management user experience	**Working Groups with expertise in:** • Public-private partnerships • Funding, cost sharing, and revenue models • Federal and State regulation • Organizational transformation • Data use, security, and privacy
Work Products	• Functional and Technical Definition • Business Use Cases (User Stories) • Conceptual Architecture • Information Flow Diagrams • Data Element and Business Rules Specifications	Proof of concept demonstrating end-to-end business use cases of the future state operating model	Recommended approaches to address solution adoption challenges • Governance model • Economic model • Regulations and policy • Organizational and workforce impact • Data use by public and other stakeholders

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Additional Information

Blockchain Basics

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

Alignment to Federal Government Objectives

P.O1: Further achievement of the President's Management Agenda (PMA) Cross-Agency Priority (CAP) Goal #8, "Results-oriented Accountability for Grants", in particular, "standardizing grant reporting data and improve data collection in ways that will increase efficiency, promote evaluation, reduce reporting burden, and benefit the American taxpayer"

P.O2: Further achievement of the Grant Reporting Efficiency and Agreements Transparency Act of 2019 (GREAT Act), in particular:

- "Reduce burden and compliance costs of recipients of Federal grants and cooperative agreements by enabling technology solutions, existing or yet to be developed, for use in both the public and private sectors to better manage the data that recipients already provide to the Federal Government"
- "Strengthen oversight and management of Federal grants and cooperative agreements by agencies by consolidating the collection and display of and access to open data that has been standardized and, where appropriate, increasing transparency to the public"
- "…require audit-related information reported…to be reported in an electronic form in accordance with the data standards"

P.O3: Further achievement of PMA CAP Goal #5, "Sharing Quality Services", in particular, "improving the effectiveness and efficiency of Federal administrative services"

P.O4: Further achievement of PMA CAP Goal #2, "Leveraging Data as a Strategic Asset", in particular:

- "Enable government data to be accessible and useful for the American public, businesses, and researchers."
- "Improve the use of data for decision-making and accountability for the Federal Government"

P.O5: Further achievement of the Foundations for Evidenced-Based Policymaking Act of 2018 (which incorporates the Open, Public, Electronic, and Necessary (OPEN) Government Data Act), in particular:

- The requirement for agencies to submit annually to OMB and Congress a plan that includes among other things "data the agency intends to collect, use, or acquire to facilitate the use of evidence in policymaking"
- The requirement for "public government data assets to be published as machine-readable data"

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MITRE's mission-driven teams are dedicated to solving problems for a safer world. Through our federally funded R&D centers and public-private partnerships, we work across government to tackle challenges to the safety, stability, and well-being of our nation.

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