Grants Innovation Exchange Session

B is for Blockchain: Proof of Concept using Distributed Ledger Technology for Multi-Tier Grants Payments

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February 27, 2020

PRESIDENT'S MANAGEMENT AGENDA

Session Overview

- Welcome
- Speaker Introduction
- Innovation Exchange Presentation
- Cross Agency Priority Goal 8: Results-Oriented Accountability for Grants
- Q&A
- Stay Informed!

Speaker Introductions

Mike Wetklow has over 25 years of progressive leadership, management, and audit experience with Federal, State, and local governments. He currently serves as the Deputy CFO at the NSF, focused on transforming NSF financial management functions to include robotic processing automation, blockchain, cyber security, and data analytics. Prior to his work at the NSF, Mike led OMB efforts to develop the Federal Government's first formal Enterprise Risk Management guidance and update OMB Circular No. A-123. While previously at DHS, Mike established internal control over financial reporting, eliminated pervasive material weaknesses, and obtained DHS' first balance sheet opinion in FY 2011. Mike is presently upskilling through his pursuit of a M.S. in Data Science at UVA., and has a M.P.A. in Public Sector Finance and a B.S. in Accounting from the University of Maryland at College Park.

Justin Poll is a professional with 20 years' experience in accounting, grants management, and leading teams in the state and federal sectors of government, as well as in the private sector. Justin currently serves as a Senior Accountant for the Division of Financial Management at the National Science Foundation, supporting grant financial management and oversight. Justin has 6 years' experience at the NSF and previously spent 12 years at Arizona State University, where he primarily focused on grant and contract financial compliance, reporting, audit activities, and business information systems' support. Justin has a B.S. in Accounting from Western International University and a M.S. in Information Management from the W.P. Carey School of Business at Arizona State University.

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Fiscal Service
U.S. DEPARTMENT OF THE TREASURY

TRANSFORMING FEDERAL FINANCIAL MANAGEMENT

B is for Blockchain:
Proof of Concept using Distributed Ledger Technology (DLT) for Multi-Tier Grants Payments

February 27th, 2020

Agenda

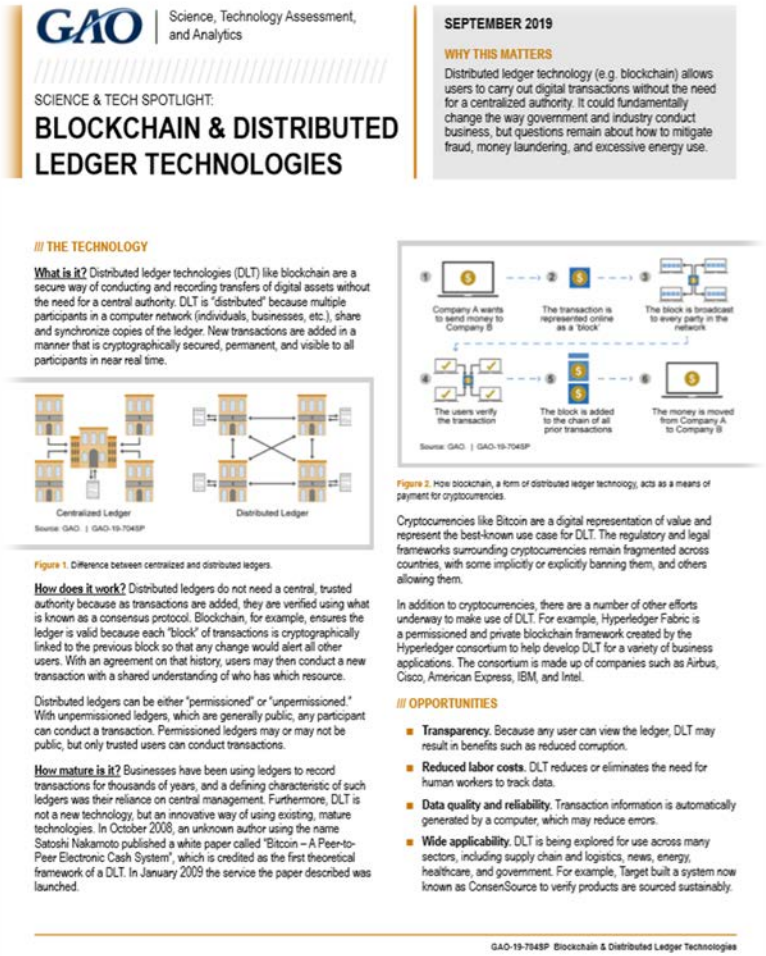
1. Background: The President's Management Agenda and OMB Memorandum 18-24, *Strategies to Reduce Grant Recipient Reporting Burden*

2. *What is a blockchain and how does it work?*

3. *What is the value of a blockchain?*

Source: https://www.gao.gov/assets/gao-19-704sp.pdf

Blockchain and Distributed Ledger Technologies



GAO | Science, Technology Assessment, and Analytics

SCIENCE & TECH SPOTLIGHT:

BLOCKCHAIN & DISTRIBUTED LEDGER TECHNOLOGIES

SEPTEMBER 2019

WHY THIS MATTERS

Distributed ledger technology (e.g. blockchain) allows users to carry out digital transactions without the need for a centralized authority. It could fundamentally change the way government and industry conduct business, but questions remain about how to mitigate fraud, money laundering, and excessive energy use.

/// THE TECHNOLOGY

What is it? Distributed ledger technologies (DLT) like blockchain are a secure way of conducting and recording transfers of digital assets without the need for a central authority. DLT is "distributed" because multiple participants in a computer network (individuals, businesses, etc.), share and synchronize copies of the ledger. New transactions are added in a manner that is cryptographically secured, permanent, and visible to all participants in near real time.

Centralized Ledger

Distributed Ledger

Source: GAO. | GAO-19-704SP

Figure 1. Difference between centralized and distributed ledgers.

How does it work? Distributed ledgers do not need a central, trusted authority because as transactions are added, they are verified using what is known as a consensus protocol. Blockchain, for example, ensures the ledger is valid because each "block" of transactions is cryptographically linked to the previous block so that any change would alert all other users. With an agreement on that history, users may then conduct a new transaction with a shared understanding of who has which resource.

Distributed ledgers can be either "permissioned" or "unpermissioned." With unpermissioned ledgers, which are generally public, any participant can conduct a transaction. Permissioned ledgers may or may not be public, but only trusted users can conduct transactions.

How mature is it? Businesses have been using ledgers to record transactions for thousands of years, and a defining characteristic of such ledgers was their reliance on central management. Furthermore, DLT is not a new technology, but an innovative way of using existing, mature technologies. In October 2008, an unknown author using the name Satoshi Nakamoto published a white paper called "Bitcoin – A Peer-to-Peer Electronic Cash System", which is credited as the first theoretical framework of a DLT. In January 2009 the service the paper described was launched.

Company A wants to send money to Company B

The transaction is represented online as a 'block'

The block is broadcast to every party in the network

The users verify the transaction

The block is added to the chain of all prior transactions

The money is moved from Company A to Company B

Source: GAO. | GAO-19-704SP

Figure 2. How blockchain, a form of distributed ledger technology, acts as a means of payment for cryptocurrencies.

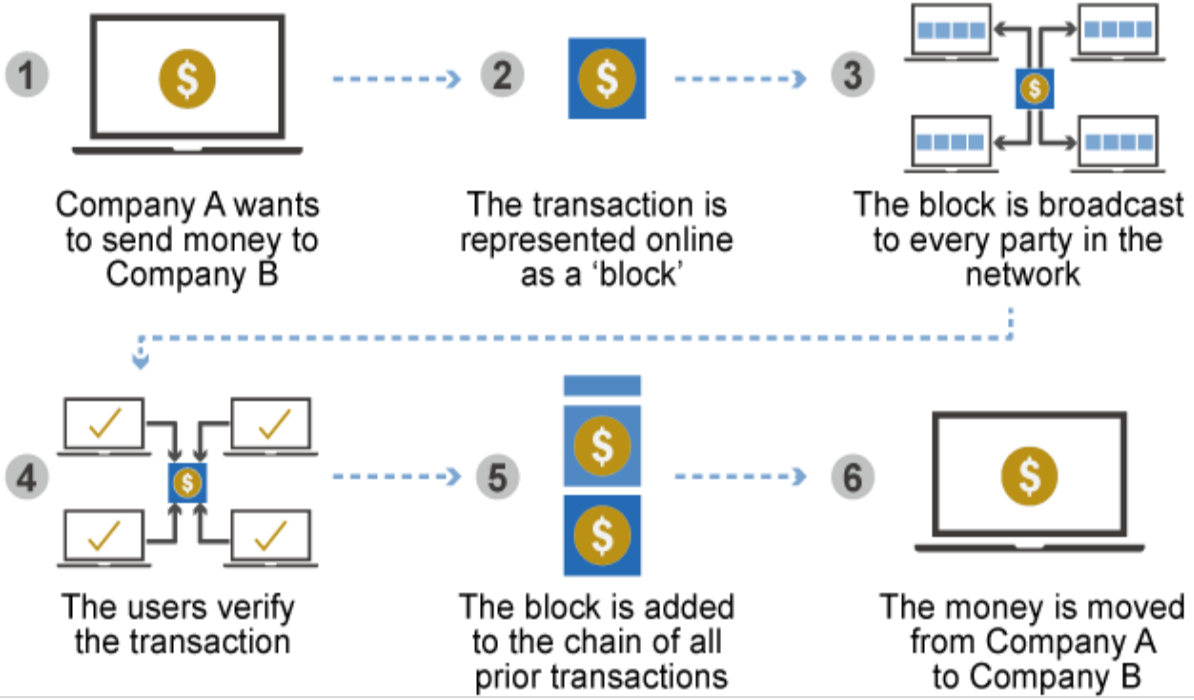
Cryptocurrencies like Bitcoin are a digital representation of value and represent the best-known use case for DLT. The regulatory and legal frameworks surrounding cryptocurrencies remain fragmented across countries, with some implicitly or explicitly banning them, and others allowing them.

In addition to cryptocurrencies, there are a number of other efforts underway to make use of DLT. For example, Hyperledger Fabric is a permissioned and private blockchain framework created by the Hyperledger consortium to help develop DLT for a variety of business applications. The consortium is made up of companies such as Airbus, Cisco, American Express, IBM, and Intel.

/// OPPORTUNITIES

- **Transparency.** Because any user can view the ledger, DLT may result in benefits such as reduced corruption.
- **Reduced labor costs.** DLT reduces or eliminates the need for human workers to track data.
- **Data quality and reliability.** Transaction information is automatically generated by a computer, which may reduce errors.
- **Wide applicability.** DLT is being explored for use across many sectors, including supply chain and logistics, news, energy, healthcare, and government. For example, Target built a system now known as ConsenSource to verify products are sourced sustainably.

GAO-19-704SP Blockchain & Distributed Ledger Technologies



Source: GAO. | GAO-19-704SP

Source: https://www.gao.gov/assets/gao-19-704sp.pdf

DLT Project Scope and Goals

This POC helps FIT to gain a hands-on understanding of how DLT can enable peer-to-peer transfers of value through tokenizing (digitally representing) grant letters to enable automated payments

Project Goals

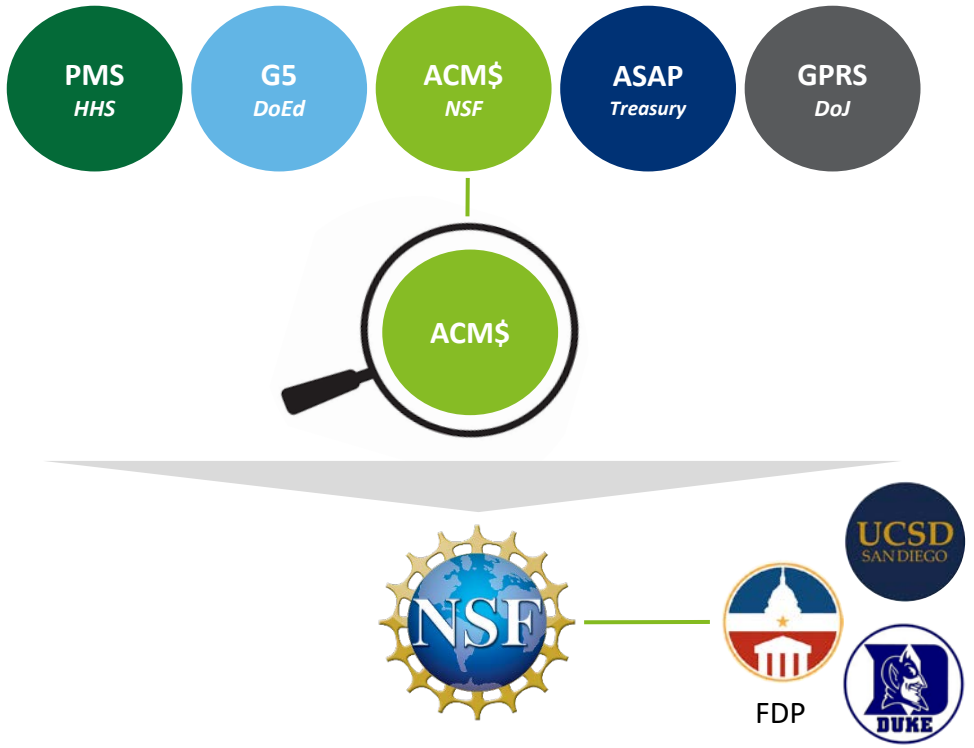
Assess how blockchain/DLT technology could be used to:

- Increase payment efficiency and transparency for sub-recipient payments
- Reduce prime and sub-recipient reporting for Federal payments that “pass through” multiple parties.

Potential areas for further exploration:

- Identify and deter fraud, and reduce improper payments
- Improve user experience (Grantees, Prime Recipients, and Sub-Recipients)
- Assess the benefits, challenges, and impediments to using a blockchain-based payment application

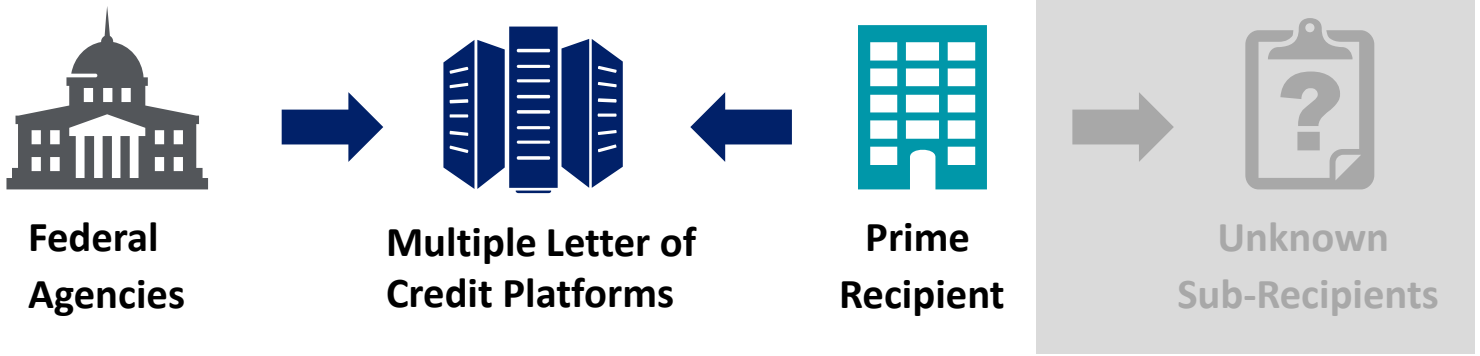
Project Scope



Improving the Letter of Credit Process – Enabling Visibility into Sub-Recipient Payments

Currently prime recipients have to navigate multiple, redundant Letter of Credit platforms and Federal agencies have little visibility into the identity or spending information of sub-recipients

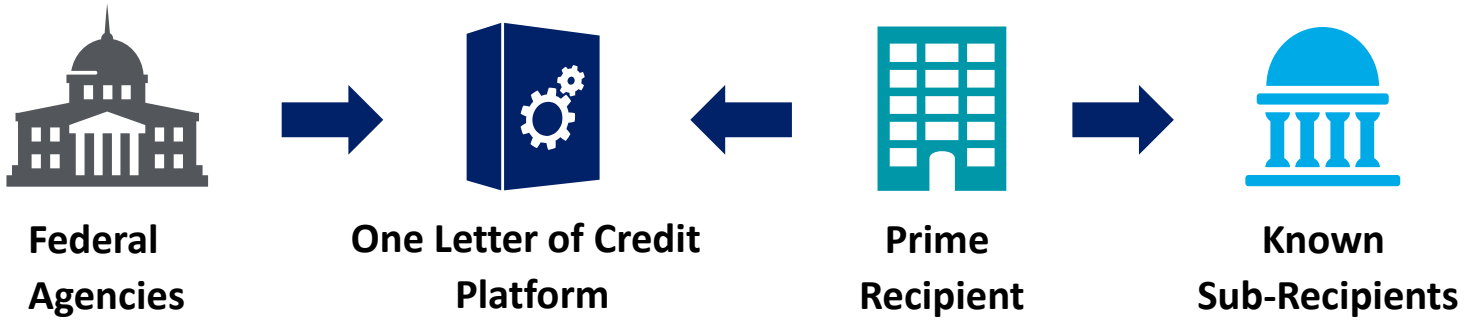
Current State



"We need better visibility into how federal funds are spent."

Chris Berner
NSF Section Head, Grants Cash Management Section

Future State

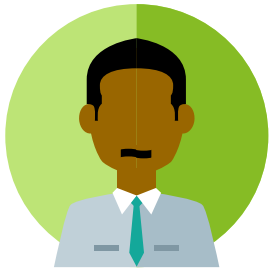


"Getting paid shouldn't be so hard!"

Stephanie Endy
Associate VP for Research at Case Western University

The Case for Change – Improving Grant Payments to Prime Awardees and Sub-Awardees

The POC strived to understand the value proposition of using DLT for grant payments through the eyes of four unique personas

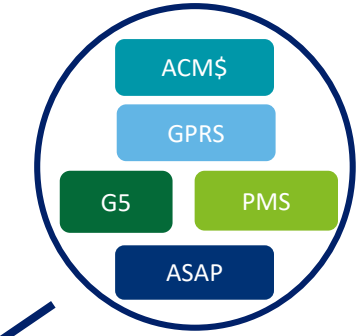


Federal Agency

Kevin Smith
Grants Officer, NSF

"I spend a lot of time chasing down grantee financial reports, instead of evaluating the progress and impact of active grants."

Letter of Credit Payment Request Systems



Tom Johnson
Data Transparency, Treasury

"It's very difficult to accurately and reliably show how the government is spending taxpayer funds without transparency into sub-grantee spending activity."

Treasury

Prime Grantee

Pam Fuller, Prime Grantee
Accountant, State University

"I waste time managing sub-grantees reimbursements, when I could be conducting meaningful financial analysis and planning."

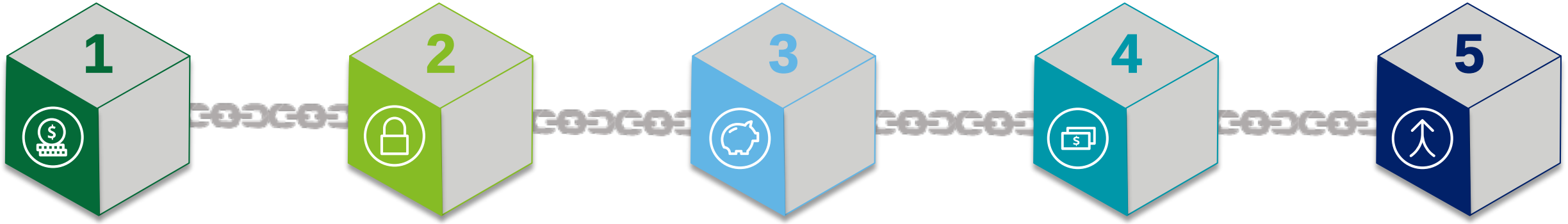
Maria Ramos, Sub-grantee
Preparer, Research Lab

"Not having visibility into who, or what, may be delaying the execution of payments hampers our ability to do our work."

Sub-Grantee

Five Key DLT-Enhanced Functions

Today's demonstration will walk through various scenarios to show the functionality of tokenized payments driven by smart contracts and the value DLT provides to current grants payment processes



Tokenize Grant Letter

*Federal Agency **generates a digital representation** of a grant letter (i.e., digital tokens) and **automates** the **enforcement** and **execution** of the grant letter terms. Grantee does the same for sub-awards, thus **integrating sub-grantees** into the grants payments ecosystem.*

Set Thresholds/ Constraints

*Grantee sets a threshold on amount that sub-grantee can request without additional oversight, allowing for the **automation of internal controls** and **automated reimbursement** of all requests that adhere to the grant letter parameters.*

Request Reimbursement

*Grantee/Sub-grantee submits request for reimbursement on **specific line-item amounts** specified in the Grant Letter and **receives tokens in digital wallet**.*

Redeem Tokens/ Initiate Payment

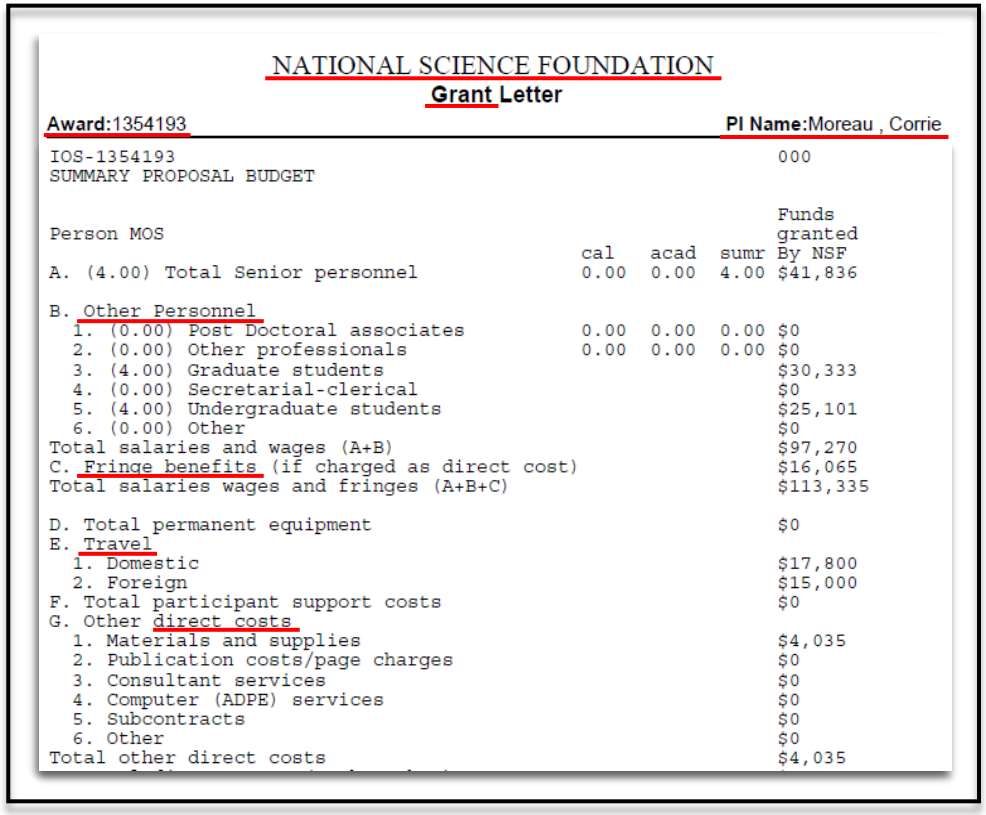
*Grantee/Sub-grantee submits redemption request for tokens, effectively **initiating** the ACH or Fedwire **payment** process to **"cash out"** the tokens.*

Streamline Reporting

*Treasury is able to view the **lifetime activity** of federal grant funds, across primary and sub-grantees, and can **easily generate reports** to improve public **transparency** and **trust** of government data.*

Tokenizing a Grant Letter

A Grant Letter becomes “tokenized” by extracting, digitizing, and storing specific data elements onto a blockchain token where those data elements are permanently stored and can be transferred



NATIONAL SCIENCE FOUNDATION

Grant Letter

Award:1354193 **PI Name:**Moreau , Corrie

IOS-1354193 000
SUMMARY PROPOSAL BUDGET

Person MOS	cal	acad	sumr	Funds granted By NSF
A. (4.00) Total Senior personnel	0.00	0.00	4.00	$41,836
B. Other Personnel				
1. (0.00) Post Doctoral associates	0.00	0.00	0.00	$0
2. (0.00) Other professionals	0.00	0.00	0.00	$0
3. (4.00) Graduate students				$30,333
4. (0.00) Secretarial-clerical				$0
5. (4.00) Undergraduate students				$25,101
6. (0.00) Other				$0
Total salaries and wages (A+B)				$97,270
C. Fringe benefits (if charged as direct cost)				$16,065
Total salaries wages and fringes (A+B+C)				$113,335
D. Total permanent equipment				$0
E. Travel				
1. Domestic				$17,800
2. Foreign				$15,000
F. Total participant support costs				$0
G. Other direct costs				
1. Materials and supplies				$4,035
2. Publication costs/page charges				$0
3. Consultant services				$0
4. Computer (ADPE) services				$0
5. Subcontracts				$0
6. Other				$0
Total other direct costs				$4,035

Grant Letter Information and Other Data Elements that are Digitized and Stored on the Token

Grant Info: Agency, Payment Type, Award ID, Description

Key Dates: Appropriation Expiration and Award Start, End, and Closeout

Awardee Information: Awardee Name, Principal Investigator (PI)

Award Amount: S&B, Travel, Direct Costs, Indirect Costs, Subgrants

Tokenization and Sub-Grants – Demonstrating Multi-Tier Payments

To demonstrate value of tokenization for multi-tier payments, funds allocated to a Prime Grantee for Sub-grant activities can only be redeemed for cash by the Sub Grantee, reducing the cash management burden

Prime Award

Agency: NSF
Payment Type: Grant
Award ID: NSF-34708
Description: Grant to research health effects of e-cigarettes

Award Start Date: 10/30/19
Award End Date: 10/31/20
Appropriation Period: 10/30/19 – 10/15/20

Awardee Name: University of Nebraska
PI: Dr. Herbie Husker

Salary & Benefits: 5,000,000
Travel: 20,000
Direct Costs: 40,000
Indirect Costs: 10,000
Subgrants: 400,000

Sub Award

Agency: University of Nebraska
Payment Type: Grant
Award ID: NSF-34708
Description: Grant to research health effects of e-cigarettes

Award Start Date: 10/30/19
Award End Date: 10/31/20
Appropriation Period: 10/30/19 – 10/15/20

Awardee Name: Ohio State University
PI: Dr. Brutus Buckeye

Salary & Benefits: 100,000
Travel: 100,000
Direct Costs: 100,000
Indirect Costs: 100,000

Business Value of DLT to Federal Grants Management

In 2018, GAO identified key challenges in managing the nearly $700B spent by the Federal government on grants. DLT provides a business value to grants management by improving cost effectiveness and reducing burden.

INCREASED TRANSPARENCY

Award Records were

< 1%

***fully* consistent with Budget Data**

REALTIME VISIBILITY can enable upstream and downstream accountability

REDUCED FINANCIAL & ADMINISTRATIVE BURDEN

Grants Managers spend

40%

of their time on compliance

AUTOMATION of internal controls and grant compliance can decrease the cost and effort of compliance

IMPROVED CUSTOMER EXPERIENCE

Grantees returned

$20 Billion

in overpayments to the government

COMMON DATA SOURCE can provide consistent, accurate, and trusted data across the network

GREATER MISSION FOCUS & PROGRAM IMPACT

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Smart contract automation
Distributed ledger
Immutability

DLT enables grantees and funding agencies to focus their efforts on their missions and the impact of their work, instead of the administration of grants.

What's Next?

Continued demonstrations with key stakeholders to solicit and incorporate feedback as well as increase buy-in

1 **Incorporate Feedback from the community**

2 **Host webinars and demonstrations**

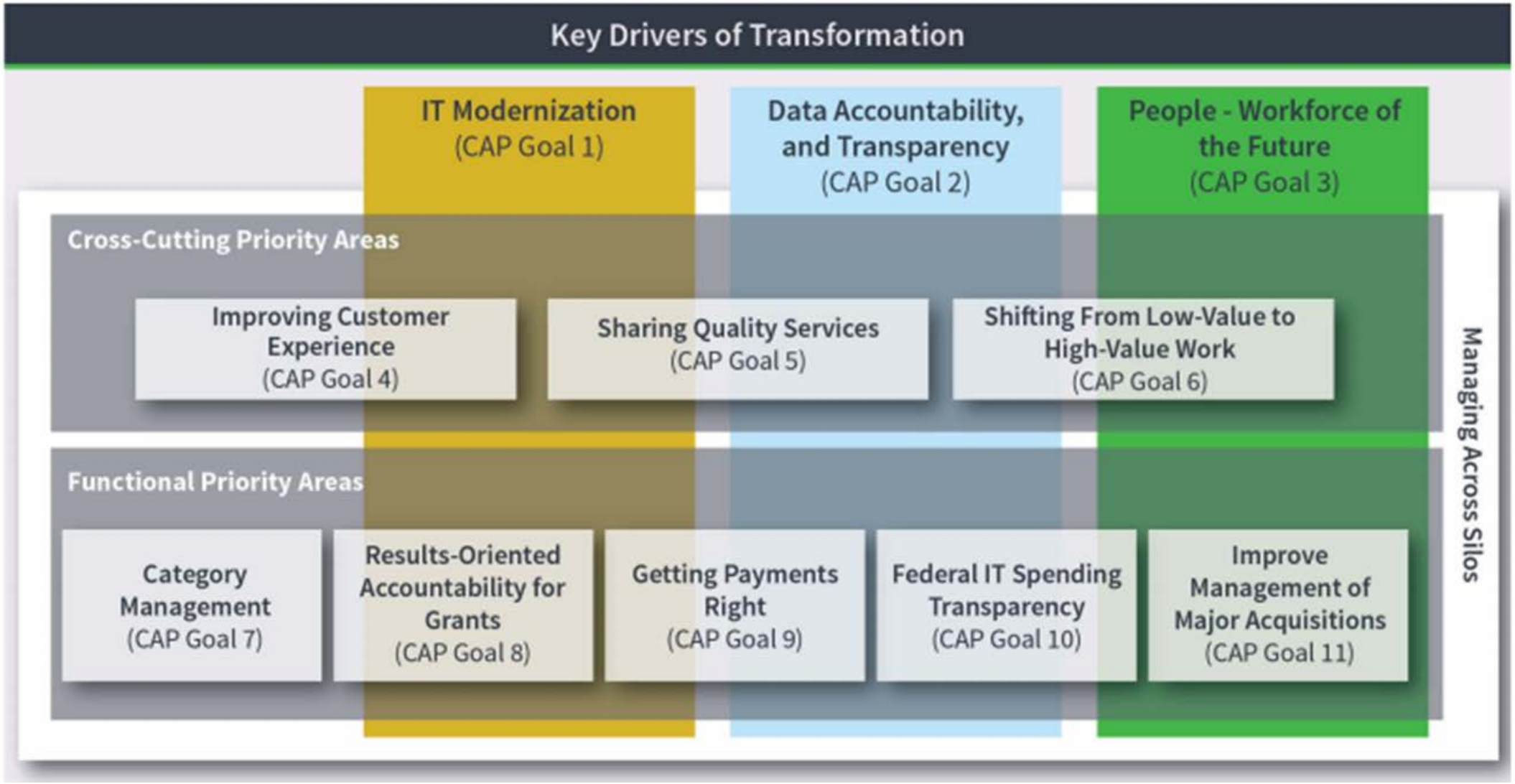
3 **Engage universities and explore partnership opportunities**

Results-Oriented Accountability for Grants Cross Agency Priority Goal (Grants CAP Goal)

Maximize the value of grant funding by applying a risk-based, data driven framework that balances compliance requirements with demonstrating successful results for the American taxpayer.

GOAL STATEMENT

Cross Agency Priority Goal Environment



Grants CAP Goal Strategies

Hold recipients accountable for good performance practices that support achievement of program goals and objectives; & streamline burdensome compliance requirements for those that demonstrate results.

Achieve Goals and Objectives

Manage Risk

Leverage data, including data from annual audits, to assess & manage recipient risk.

Build Shared IT Infrastructure

Use standard business processes & data to identify opportunities to build shared solutions that reduce burden & improve the user experience.

Standardize Business Processes & Data

Standardize grants management business processes & identify, operationalize, standardize, & link data.

OMB Updates

Proposed Revisions to 2 CFR, Subtitle A – OMB Guidance for Grants & Agreements

- **Federal Register Link:** https://www.federalregister.gov/documents/2020/01/22/2019-28524/guidance-for-grants-and-agreements
- **January Grants Innovation Exchange & 2 CFR Listening Session materials can be found at:** https://www.performance.gov/CAP/grants/
- ***Comments due on or before March 23, 2020*.**

The Grant Reporting Efficiency & Agreement Transparency (GREAT) Act of 2019

- Signed into law on Dec 30, 2019.
- Watch for an upcoming Grants Innovation Exchange Session on the GREAT Act.

Q & A

Instructions:

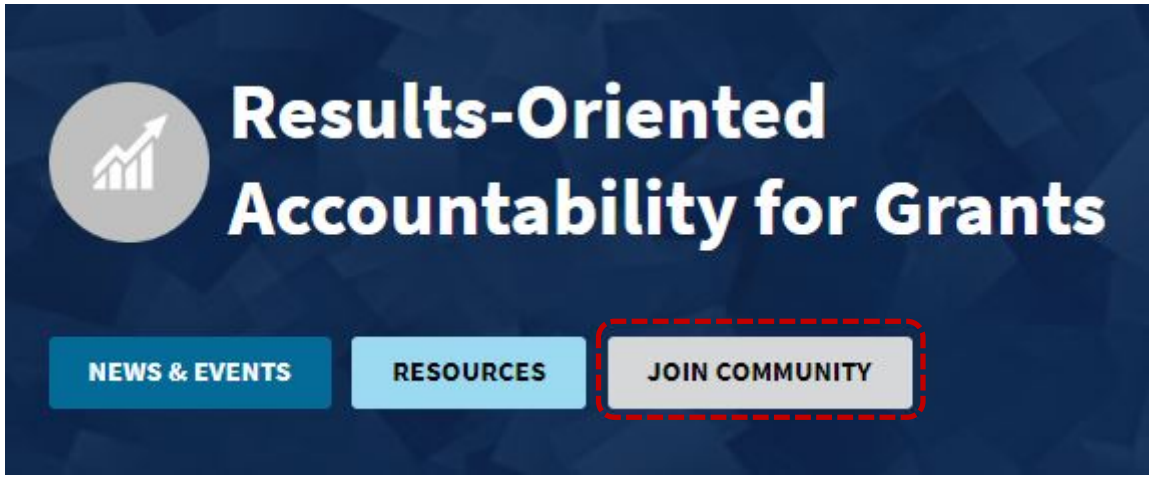
Please enter your questions via the chat feature via Adobe Connect; or

Email them to GrantsTeam@omb.eop.gov

Stay Informed

Join our Community Today!

https://www.performance.gov/CAP/grants/



Next Innovation Exchange Session :

March 26, 2020

Do you have an innovation you would like to share?

Please email the Grants Team at GrantsTeam@omb.eop.gov