



What Government Contractors Need To Know About Blockchain

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Use of blockchain (or distributed ledger) technology is gaining traction in all industries. The federal government has taken notice and has been exploring ways in which blockchain technology may be used for its benefit. Agencies such as GSA, HHS, DoD, DHS, the FDA, and others have blockchain projects underway. According to a recent report, federal government spending on blockchain will increase from \$10.7 million in 2017 to \$123.5 million in 2022.¹

While widespread use of blockchain in government likely will take time, it may be jumpstarted by the adoption of blockchain technology by government contractors. One example of this is in the aerospace and defense (A&D) arena, where such contractors can effectively utilize blockchain to track and trace component parts, mitigate supply chain vulnerabilities, and effectively store and share vast quantities of in-flight (and other) data. According to a recent survey, 86% percent of executives in the A&D industry are exploring blockchain technology and plan to utilize blockchain systems in their businesses within three years.² This is up significantly from a survey conducted last year, which reported only 20% of supply chain executives in the A&D industry were pursuing blockchain.³ Use of blockchain in the A&D industry is just a part of the story. As detailed below, blockchain will be used in many ways throughout the government.

Significant and rapid changes in the adoption of blockchain technology warrant the attention of government contractors. Potential blockchain solutions in government have the ability to, among other things, enhance secure data exchange and provide reliable access to information, facilitate device tracking, streamline the procurement process, and ensure supply chain security. This can lead to greater efficiency as well as significant cost savings.

¹ <https://www.idc.com/getdoc.jsp?containerId=US44935218>.

² See https://www.supplychainbrain.com/blogs/1-think-tank/post/28532-ads-ambitious-three-year-timetable-for-deploying-blockchain?utm_source=A%26D+Forum+Newsletter+%282019-08%29+August&utm_campaign=August+2019+Newsletter&utm_medium=email.

³ *Getting Real About Blockchain in Aerospace and Defense* (Oct. 24, 2018), available at <https://www.bcg.com/publications/2018/getting-real-about-blockchain-aerospace-defense.aspx>.

1. Why Government Contractors Should Get Involved Now

Although the blockchain market for government use currently is relatively small, now is the time for forward-thinking government contractors to get involved. According to a recent report by the Aerospace Industries Association:

As blockchain technology continues to evolve, A&D should develop a common approach to blockchain governance, standards, and our participation in the ecosystem.... We believe the time to act is now. Blockchain is revolutionizing business at a pace that will not allow industries to wait and see what happens. To keep up, A&D organizations must educate themselves and assess blockchain's impacts to determine its value. Consortiums are forming and attempting to gain agreement on industry use cases. Without participation, companies risk falling behind or having the future state of business dictated to them. That is why the A&D industry should ensure it is leading when it comes to this new technology and the way the world uses it.

Similar arguments apply for other uses of blockchain across the government sector.

2. How blockchain is being used by the Federal Government

Many federal government agencies are experimenting with and embracing the benefits of blockchain technology. This will undoubtedly lead to greater use of this technology in the coming years. According to the General Services Administration ("GSA"), "[f]ederal agencies are eager to better evaluate and adopt distributed ledger technologies (like blockchain) that use encryption and coding to improve transparency, efficiency and trust in information sharing."⁴ Agencies are exploring use of blockchain technology that may impact many areas. The following are just some of the areas being explored.

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| • Financial management | • Procurement |
| • IT asset and supply chain management | • Smart contracts |
| • Federal personnel workforce data | • Identity management, including government-issued credentials like visas, passports, and birth certificates |
| • Federal assistance and foreign aid | • Appropriated funds |
| • Digital title | • Micro-lending |
| • Voting systems | |

A report published in June 2019, *Bringing Blockchain Into Government: A Path Forward for Creating Effective Federal Blockchain Initiatives*, examines several blockchain projects underway in government in 2018-2019. Government entities reviewed in the report include the FDA, HHS, the Treasury Department/Bureau of the Fiscal Service, and GSA, as well as the Joint Chiefs of Staff. The report illustrates a range of potential uses of blockchain technology in government.

HHS is leading the pack, with major blockchain projects in production. One of these, HHS Accelerate, which received an Authority to Operate in December 2018, aims to save the agency time and money by providing greater access to secure, standardized data and significantly reducing administrative processing time.⁵ This efficiency will be applied to acquisition, with HHS using blockchain to combine procurement data sets in a secure cloud to identify cost savings and streamline contract formation.⁶ GSA also is looking to simplify acquisition by exploring the applicability of blockchain solutions to its Multiple Award Schedules program.

⁴ <https://www.gsa.gov/technology/government-it-initiatives/emerging-citizen-technology/blockchain>.

⁵ <https://www.publicissapient.com/news/us-federal-government-joins-blockchain-bandwagon>.

⁶ <https://www.fedscoop.com/hhs-combines-ai-automation-blockchain-acquisition-project/>.

The Department of Treasury and the Army are pursuing programs for device tracking using blockchain. Treasury is focused on mobile device tracking, which will allow it to better manage its resources and eliminate obsolete or underutilized technology, while the Army is pursuing medical device tracking. Meanwhile, the Department of Homeland Security has been pursuing blockchain solutions since 2016, including award of a contract focused on enhancing the security of Internet of Things (IoT) devices through its project titled “Blockchain Software to Prove Integrity of Captured Data From Border Devices.”

In addition, the Department of Defense is exploring use of blockchain projects to enhance security and better manage supply chain risk. Specifically, the Joint Chiefs are looking to blockchain to record and authenticate 3D printing activity in the field, which will promote security and allow for faster processing of contractor payments. According to the report, this blockchain solution allows for maximum security where “corrupting both the downloaded 3D print-file and the blockchain channel is nearly impossible.”

Most of these initiatives are in the early stages, but are likely to lead to an explosion of blockchain activity within the federal government as new benefits are realized. A listing of the blockchain-related projects reviewed in the June 2019 report are summarized in the chart below:

Appendix I: Identified Federal Blockchain Projects

AGENCY	ORGANIZATION	PROJECT	MATURITY	INTERVIEW
Food and Drug Administration	Oncology Center of Excellence / Innovation, Design, Entrepreneurship and Action (IDEA) Lab	FDA Health Data Exchange	Proof of Concept	✓ JAN. 7, 2019
Department of Health and Human Services	GrantSolutions	Grants Blockchain	In Production	✓ DEC. 20, 2018
Department of the Treasury	Bureau of the Fiscal Service	Device Tracking	Pilot	✓ DEC. 20, 2018
Food and Drug Administration	Office of Acquisitions and Grants Services	FDA RAPID Program	Proof of Concept	✓ DEC. 17, 2018
Department of Health and Human Services	HHS Assistant Secretary for Financial Resources	HHS Accelerate	In Production	✓ JAN. 7, 2019
Department of Defense	Joint Staff	3D Print File Security	Pilot	✓ FEB. 5, 2019
General Services Administration	Federal Acquisition Service	Acquisition Virtual Assistant	Prototype	✓ MAR. 13, 2019
Department of Defense	Defense Advanced Research Projects Agency	SHIELD (Supply Chain Hardware Integrity of Electronics Defense)	Pilot	✗
Centers for Disease Control	Center for Surveillance, Epidemiology, and Laboratory Services	Health crisis data	Proof of Concept	✗
Department of Homeland Security	Science and Technology Directorate	Internet of Things Security	Proof of Concept	✗
Department of the Army	Medical Research and Materiel Command	Medical Device Tracking	Proof of Concept	✗

3. What Is Blockchain Technology?

At its core, a blockchain is a distributed ledger for recording transaction data. A ledger is a recorded list of transactions. Traditional paper-based ledgers include consecutive pages where each line records a transaction and when the page is full, the process repeats on the next page. With many blockchains, each block is like a page. Transactions get verified by a consensus mechanism specified by the blockchain protocol. Validated transaction data is written into a block and time-stamped. When the block is full a new block is created. Unlike traditional ledgers, when a block is filled, the system creates a hash value, which is just a random number generated by an algorithm based on the contents of the block. This hash value is then written as the first entry in the new block, thereby “chaining” together the blocks, hence the term “blockchain.” If someone ever attempts to change an entry in a prior block, the hash value would no longer match what was written into the subsequent block and that attempt would be deemed invalid. In part, this is how blockchain creates immutable records. Only validated transaction data is recorded and time-stamped, and this data cannot be altered.

There are three main types of blockchain platforms—public, private and consortium. Organizations use these platforms based on their specific needs.

- Public Blockchains are a decentralized framework that allows anyone to add themselves to the network, run a node, read transaction data, transfer assets and participate in the consensus process, typically without any special permission. With public blockchains, the ledger is copied to and stored on multiple nodes (computers) across a network resulting in a distributed system where the data is stored in many locations. The system is decentralized because the system itself enforces rules that prevent a single entity from controlling the verification and storage of transaction data.
- Private Blockchains are centralized frameworks that are permissioned, allowing only a pre-approved set of members to read and send transactions and/or participate in the consensus process. This can help address privacy concerns and help with managing confidential business data.
- Consortium Blockchains are a hybrid of the public and private blockchain platforms. They leverage the decentralized nature of public blockchains and the permissioned capability of private blockchains. As with any consortium, the entire network, along with validation rules and policies, is defined and governed by members/nodes. They can control every aspect of the blockchain, including validation of transactions, addition of nodes, managing node privileges, smart contracts, deployment of chain codes, etc.

4. What are the Advantages of Blockchain?

Blockchain technology is being used across many industries for many purposes. It is not a solution for every technology issue, but it does have certain advantages for solving certain problems. According to a recent study of the potential use of blockchain in government solutions, the design of blockchains is especially relevant for certain conditions that affect public data sharing in established business processes, including: (1) establishing trust when individuals or entities may otherwise lack confidence in data accuracy; (2) maintaining quality when threats of tampering or adjustments to information may affect data reliability; and (3) facilitating transparency when individual actors lack trust in a central entity or repository, or when transparency is needed for other accountability purposes.⁷

⁷ *Bringing Blockchain Into Government: A Path Forward for Creating Effective Federal Blockchain Initiatives.*

The elements of blockchain that enable these advantages are that it is:

- **Immutable** – hashing the block contents and “chaining” the blocks, by writing the hash to the next block, renders the recorded data immutable
- **Distributed** – storing copies of the ledger on multiple nodes, under control of multiple entities, avoids data silos and single points of failure
- **Decentralized** – validating the transactions via a trusted consensus mechanism avoids the need to rely on and trust any single (central) authority
- **Transparent** – subject to privacy controls, the data on a blockchain can be visible to all parties, which for example, can create greater end-to-end transparency in supply chains and other application
- **Secure** – using cryptography, including digital signatures via public key infrastructure (PKI) encryption, provides state of the art security
- **Automated** – using smart contracts to automatically enforce business rules enables a greater level of automation and efficiency
- **Cost-effective** – eliminating unnecessary middlemen who add little if any value, reducing or eliminating manual processes and reducing fraud can all reduce operational costs and further increase efficiency
- **Auditable** – storing the verified transaction data in a serial, time-stamped, immutable manner facilitates auditing and regulatory reporting

As noted above, one of the main advantages of blockchain technology is trust. No one entity validates transactions and controls the data. And the transaction data is transparent among those who have access to the blockchain. Blockchain technology may be used to further establish trust between the government and its contractors where agencies can look to the technology to combat false certification issues as well as foreign threats to the supply chain. Many other uses also are sure to emerge.

5. What are Smart Contracts?

Smart contracts are an important and powerful tool enabled by blockchain technology. A smart contract is not necessarily a legal contract. It is self-executing computer code that includes the operational terms of an agreement, between two or more parties, where the operational terms are written into and executed by the lines of code. The code can be stored across a distributed, decentralized blockchain network. Smart contracts can automatically receive data from “oracles” (which are known reliable data sources, such as IoT sensors) and programmatically implement a series of “if-then” rules with little or no human interaction. Once programmed into the smart contract code, “if” certain conditions are detected to exist, “then” the smart contract causes certain programmed action(s) to occur. Smart contracts can be used to automate various processes, but in a very flexible and adaptable way. They can increase efficiency and reduce costs by removing middlemen who add little value and by automating tasks that are typically performed manually.

Smart contracts can be used to automate supply chains and facilitate the tracking and tracing of products such as airplane parts. They also are being used in other industry supply chains, e.g., to track diamonds from mine to consumer, and food from farm to consumer. In addition, food-based supply chains can improve food safety by tracking and recording the temperature of food as it is transported to detect spoilage. They also

can be used to prevent substitutions or tampering. Walmart has mandated that many of its fresh produce suppliers use its blockchain-based supply chain to track fresh produce from farm to consumer.⁸

6. Further Opportunities for Blockchain within the Federal Government

Blockchain solutions have the potential to enhance and streamline existing processes and limit opportunities for mishandling of data and materials exchanged between the government and its contractors. For example: Supply chain management – The federal government faces constant challenges associated with the security and trustworthiness of its contractor supply chains. DoD regulations include requirements for contractors to monitor sources for electronic parts in order to mitigate against distribution of counterfeit material as well as implement counterfeit parts detection and avoidance systems.⁹ Further, threats posed by foreign actors have caused the government to implement prohibitions on certain suppliers, and require contractor self-certifications regarding the elimination of these suppliers from contractor supply chains.¹⁰ Use of blockchain to track and verify the path of contractor components and assemblies can mitigate supply chain vulnerabilities and ensure the veracity of contractor certifications.

Additionally, blockchain-based supply chains can help ensure compliance with various legal requirements. For example, the Food Safety Modernization Act (FSMA) was implemented to transform the nation's food safety system by shifting the focus from responding to food-borne illness to preventing it. FSMA requires various steps including supply chain risk management procedures and traceability, foreign supplier verification, ensuring and documenting appropriate temperature controls during shipment, and much more. Blockchain-based supply chain technology is ideal for managing these tasks. Similarly, blockchain-based supply chains can be used to help comply with the Drug Supply Chain Security Act (DSCSA). The DSCSA outlines steps to build an electronic, interoperable system to identify and trace certain prescription drugs as they are distributed in the United States in an effort to enhance the FDA's ability to help protect consumers from exposure to drugs that may be counterfeit, stolen, contaminated, or otherwise harmful. The DSCSA is a motivating force for companies to embrace blockchain technology in an effort to provide secure, immutable histories for drugs in the supply chain.

Cybersecurity – Data security is top of mind for contractors, particularly those subject to DFARS 252.204-7012, DoD's safeguarding rule that requires a written system security plan and extensive security controls to ensure government data is properly protected. While the concept of blockchain as a technology with more actors to verify the authenticity of transactions may not seem to promote greater protection, use of private or consortium blockchains can promote security where the approved members control access to sensitive content and use encrypted keys to verify the authenticity of users. Further, broader use of IoT devices by the government is likely to lead to the pursuit of more blockchain solutions to secure and monitor these devices.

Data Management – The Federal Data Strategy Action Plan, released in draft form in June 2019, calls on agencies to adopt standards that would make their internal data more readily accessible and usable across government. Open data experts think the White House should think about using the federal data strategy to get more agencies to invest in blockchain technology, at least for a limited set of use cases. Though blockchain "is not a panacea" to the numerous data-related challenges that face government, in some cases it could help encourage agencies to more willingly share information with one another. "As the federal government moves forward in developing a federal data strategy, consideration can be given to how

⁸ For more information on smart contracts, see the Chamber of Digital Commerce's [white paper](#) on the topic.

⁹ DFARS 252.246-7008; DFARS 252.246-7007.

¹⁰ FAR 52.204-23 (prohibition on products and services from Kaspersky labs and affiliated entities); FAR 52.204-24, FAR 52.204-25 (prohibition on products and services from certain Chinese telecommunications companies effective August 2019).

blockchain might enable better recognizing data as a strategic asset for government,” researchers wrote in the June 2019 report. “A blockchain can bring a wider circle of participants into a project that produces open data for public use.”¹¹ Such data sharing has the potential to expedite the award of federal contracts and grants, where solicitation provisions and historical program information can be accessed from a wider source and distilled faster.

These are just a few of the opportunities for blockchain applications in the government sector. As with many new technologies, particularly as applied to regulated industries, new uses as well as new legal issues are sure to arise.

As government contractors spend more time thinking about the uses for blockchain in government solutions and developing systems to address some of the technical problems that need to be solved, many patentable inventions are being developed. The number of blockchain patents being applied for and granted is increasing. For information on patenting blockchain inventions see our white papers on Patent Strategies for Cryptocurrencies and Blockchain Technology and Drafting Effective Blockchain Patents.¹²

7. Conclusion

Blockchain solutions are gaining momentum every day, including among federal government agencies. Government contractors that get involved with blockchain now will have a leg up on those that come late to the party, and may be able to secure unique opportunities that otherwise would not be available. Many companies still are in the exploratory phase of figuring out how they can leverage blockchain and understanding the legal risks. To stay abreast of these legal issues, contractors can sign up to receive updates on Sheppard Mullin's Blockchain and Digital Currency blog Law of the Ledger or arrange for a private presentation on these issues.

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¹¹ June 2019, Bringing Blockchain Into Government: A Path Forward for Creating Effective Federal Blockchain Initiatives.

¹² <https://www.lawofthelevel.com/2018/01/articles/virtual-currency/strategies-cryptocurrencies-blockchain-technology/>; <https://www.lawofthelevel.com/2018/03/articles/virtual-currency/effective-blockchain-patents/>.