

TruDoss Delivers a Public Records Validation Process Using Patented Distributed Ledger Technology

Abstract

This white paper discusses how the patented blockchain technology of TruDoss can potentially transform the public records management where various forms of digital records (land records, births, marriages, deaths) can be effortlessly captured, verified, and authenticated. This results in cost savings, faster turnaround time, and enhanced customer service for the department responsible for public records management at the county level.

Executive Summary

Citizens around the world are familiar and comfortable with digital technologies like mobile devices and social networks. Most commercial organizations are transforming digital customer interactions to deliver more convenient and personalized experiences and citizens also expect the same experience when interacting with government departments, so governments around the world are adopting new digital services. Many counties aspire to deliver citizen-centric services to its residents through secure, effective, and innovative technology solutions. However, there are several challenges including a rapidly changing digital technology landscape, privacy rules, threats of data theft and misuse, managing resident records and proving trustworthiness of those records. As with other government agencies trying to reduce the risk of data breaches, it is necessary to architect decentralized records management systems, which would be connected via a distributed network.

TruDoss has created a patented solution which uses blockchain technology to enable any individual or organization to remotely confirm the authenticity of a digital proof of record issued by county offices in real time as opposed to the current process of in-person or via mail authentication.

The primary goal of TruDoss is to modernize paper-centric operations and reflect the expectation of citizens through a new digital-centric approach. The TruDoss platform will improve the security and data privacy for identities, credentials, and personally identifiable information. It will also solve the paper records storage issues for government departments and

enable the different departments and agencies in the county to work together in a collaborative manner, minimizing duplication of effort, increasing access to accurate documentation in real time.

Present scenario and challenges

"Trust is the cornerstone of every relationship" That is also true for the interactions that take place between citizens and governments. Although paper is still preferred as a medium by some government offices to create, store and prove authenticity or set up the 'trust' element of records, paper-centric processes are manual, time-consuming, and expensive. Many state regulations still require outdated and inefficient procedures that rely on manually- generated paper records using security paper to set up the trustworthiness of the record. The customary practice is to authenticate a particular document by using security papers, wet signatures, or office seals.

With easy access to specialty papers globally, advanced printers, Photoshop etc. these types of authentication processes often create avenues for fraud and do not guarantee authentic sources of information. There is a need for a common platform where valid credentials can be issued digitally, bypassing paper-centric processes, and where proof-of-record verification can be done by any individual or organization in real-time. Government departments and agencies handle storing and making available an extraordinary amount of data including public records. However, issues of data security and privacy in the paper-centric approach limit the ability of governments to share data across departments or agencies. Since citizens expect greater transparency and faster delivery of their record requests, integration and access become paramount. Interacting with the government is often perceived as inconvenient for citizens because of redundant paper-centric operations across multiple agencies/departments.

In many cases, citizens and businesses must wait until the physical copy of their proof-of-records/credentials are generated and authenticated, highlighting inefficiencies in the process, and diminishing their experience.

Governments are embarking on digital transformation projects to meet the rising expectations of citizens for digital interactions, as part of the digital government strategy of the US Department of State. Federal, state, and local government agencies are tasked with building a 21st century digital government that delivers better digital services to the people. Unfortunately, too often the continued use of legacy tools and paper-centric processes make these user interactions cumbersome and frustrating as well as vulnerable to fraud.

It is not unusual to find required procedures of managing, storing, processing, and issuing citizen records on specialized "official" paper. Because of the Health and Safety Code, citizens across the US (and around the world) who need to obtain their vital records from counties either must go through the postal service process that takes an average of 3 days or drive to office locations to obtain the paper record in person. This is a direct result of paper- centric regulations that are not in keeping with citizens expectations and technological advancements.

Blockchain - A broad perspective technological solution

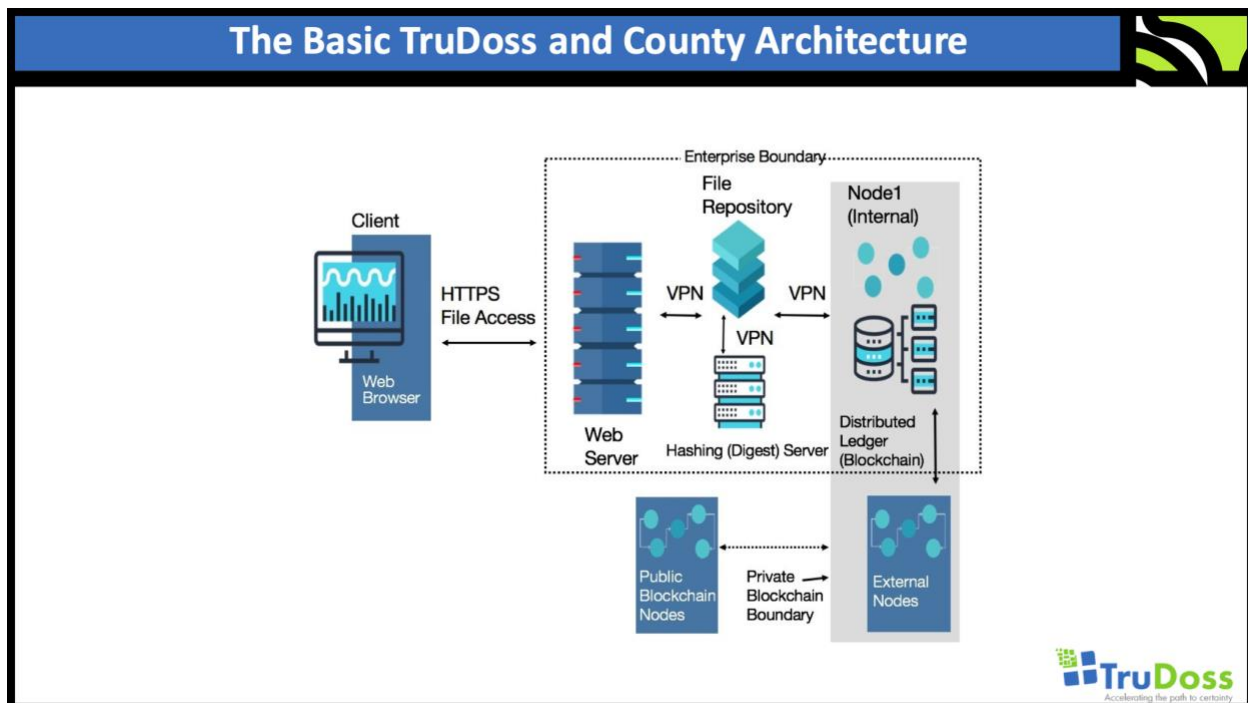
We have seen multiple examples of how blockchain technology can deliver solutions to organizations as they embark on their digital transformation. While the list of potential applications for blockchain in the public sector is always increasing, here are four main drivers of the adoption of blockchain in the public sector today:

- A. Process Complexity and Information Silos:** Manual processes are error prone and arduous, and most government departments rely on manual record generation and verification systems. This often results in redundancy of processes and data, eventually creating information silos, which increases the processing time for a citizen's request and increases the cost of government operations.
- B. Intermediaries:** As a solution to cumbersome government agency processes, third party intermediaries (brokers/agencies) step in to improve citizen experience. This adds more cost to the citizen's request and often complicates the process, leading to a further delay in meeting the citizen's request.
- C. Cost-Efficiency:** Governments need to fulfil their departmental goals while responsibly managing scarce resources. Lack of automation and cumbersome manual paper-centric processes can lead to increased time and cost of compliance while having a negative impact on citizens' experience and satisfaction.
- D. Fraud and Error:** Citizens are on the move, so their day-to-day physical location and even their home/ residence can be fluid, requiring creative processes to manage citizen records and data. When citizens move, it becomes more difficult to access records stored in a siloed government ecosystem. The likelihood of errors and fraud also increases because of non-uniform/inconsistent data across the government ecosystem.

What is a blockchain or distributed ledger?

Blockchain is a decentralized system of records or 'ledger' that stores every transaction detail that is happening in the network. Transactional data stored in a blockchain is cryptographically secured, which means encoding data using a mathematical algorithmic function that creates an alphanumeric code or 'hash'. These transactional data or 'blocks' are bound to each other in an unbreakable bond or chain. Blockchain technology supports collaborative networks where participants can see and verify data in a trusted and transparent manner. It also reduces reconciliation needs and process and data redundancies, improving efficiency and minimizing cost. The TruDoss blockchain can deliver accuracy and trust among government departments, commercial sector organizations and public users by helping a secure and trusted exchange of records and information. Through its cryptographic techniques, only certain metadata and the

hash of the public records/credentials are stored in the blockchain ledger and can be retrieved from the ledger while verifying the authenticity of the same. Blockchain technology has the potential to cause a change in thinking in the way private and public organizations work today. Using its core strength of trust, unalterable source of truth (immutability) transparency and privacy, blockchain supplies the foundation to the digital-centric processes by making transactions fast, exact, and secure.



The TruDoss/TransCend approach for county records

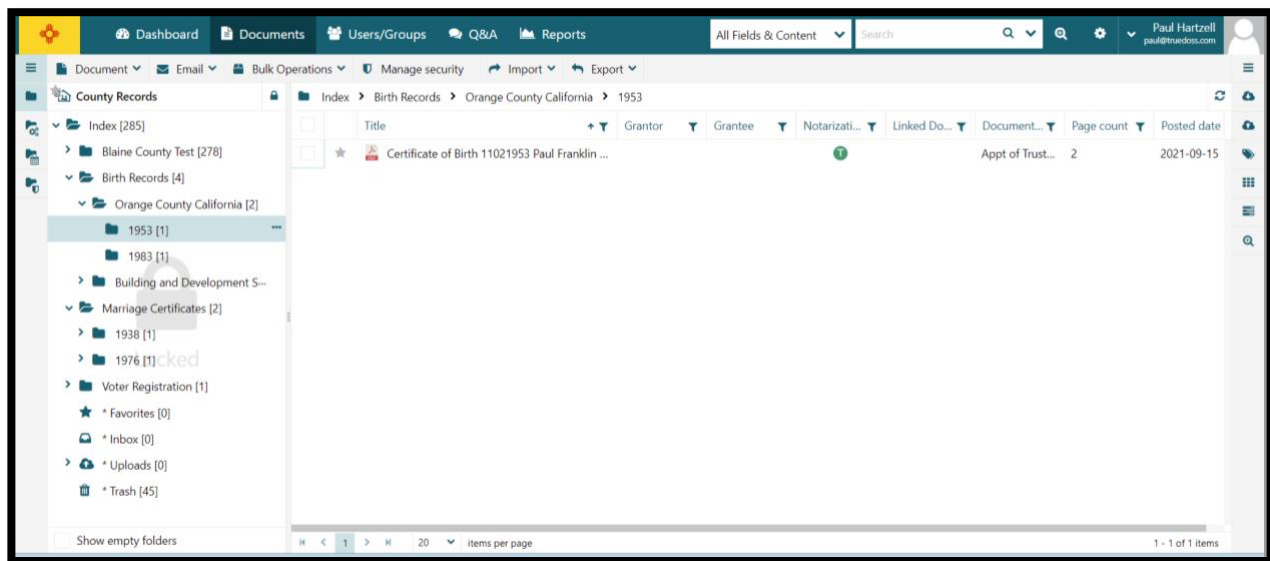
TruDoss collaborated with TransPerfect, a global company with more than \$850M annual revenue, to develop a blockchain-based, digital records fulfillment solution for county’s records offices. The TruDoss patent (USPTO #11,061,866) covers the use of the TransCend document platform from TransPerfect and a multiple node distributed ledger platform hosted by TruDoss. The technology can be integrated with any agency’s existing internal or outward-facing electronic commerce system. This is done through Application Programming Interfaces (APIs) where the process from service request to digitally fulfilling the request is seamless for the citizen using a web-based user interface.

A user interface is used to show blockchain records authenticated/certified/notarized digital records onto its immutable ledger. The administrator from the county recorder's office logs in to

the admin portal of the application and completes the request to find a record by using the 100% text search or metadata search for a particular proof of record which has been issued by the County Recorder’s office.

Initially, he/she will drag and drop the PDF copy of the proof of record into an appropriate folder in the user interface to create the hash (encrypted alphanumeric output of a fixed length). Then the admin can automatically store this information including the hash that has been generated into the blockchain and a success message is displayed next to the document name. The TruDoss icon of notarization will appear on the UI. As a result, only agencies that are participants of the private blockchain ecosystem can make entries onto the ledger. Therefore, citizens can trust that the digital record obtained is an official record.

Folder and Document Custom Configuration and Notarization Status

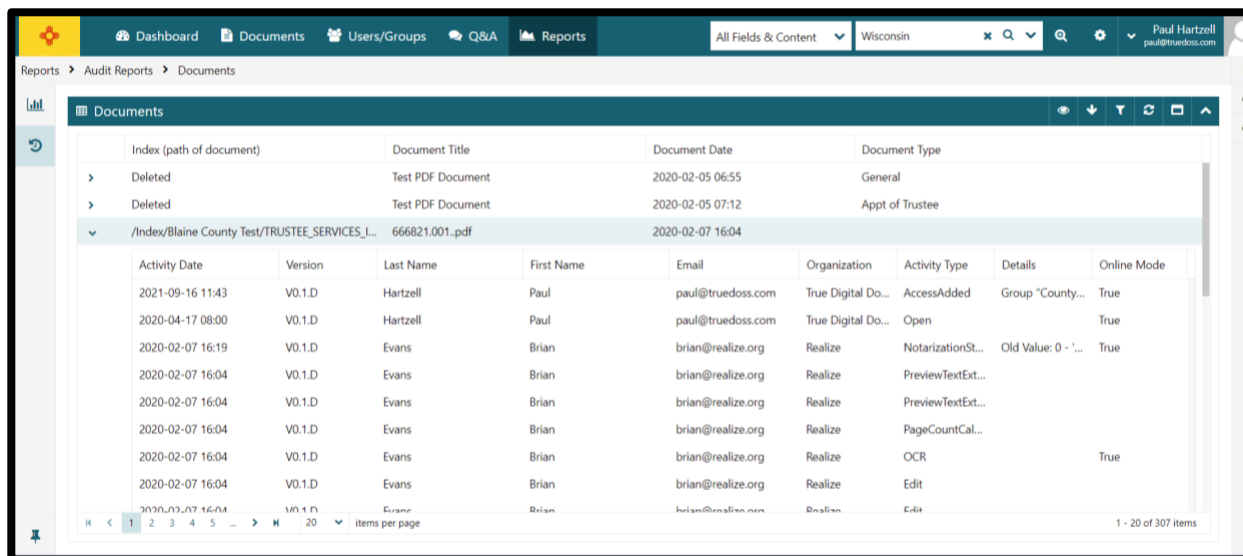


Digitally issued records can be authenticated by entities/agencies apart from the issuing agency by using an internet-hosted verification portal. Using the private blockchain, anyone can visit a public portal hosted by the county to check the authenticity of the digital copy (PDF) that was issued by the agency. The website allows the user to drag and drop a digital record file to calculate the hash, which the application matches with the stored version in the blockchain ledger.

The solution enables reporting and audit log features in the admin portal. The admin can use the reporting feature to view and export a list of records/credentials that have been processed and the

corresponding hashes stored in the blockchain ledger along with the timestamps. The audit feature can also be used by the admin to check the instances a particular proof of record has been downloaded or processed for verification.

Reporting Functions for all users



The screenshot shows the 'Reports' section of the TruDoss application, specifically the 'Audit Reports' for 'Documents'. The interface includes a navigation bar with 'Dashboard', 'Documents', 'Users/Groups', 'Q&A', and 'Reports'. The main content area displays a table of document activity.

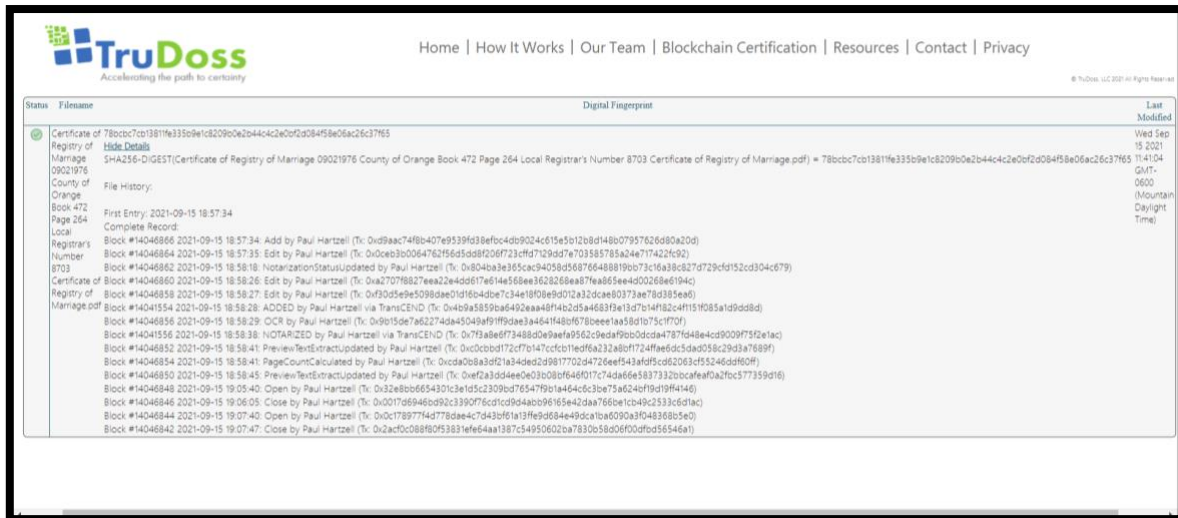
Index (path of document)	Document Title	Document Date	Document Type
> Deleted	Test PDF Document	2020-02-05 06:55	General
> Deleted	Test PDF Document	2020-02-05 07:12	Appt of Trustee
▼ /Index/Blaine County Test/TRUSTEE_SERVICES_I...	666821.001.pdf	2020-02-07 16:04	

Activity Date	Version	Last Name	First Name	Email	Organization	Activity Type	Details	Online Mode
2021-09-16 11:43	V0.1.D	Hartzell	Paul	paul@truedoss.com	True Digital Do...	AccessAdded	Group "County...	True
2020-04-17 08:00	V0.1.D	Hartzell	Paul	paul@truedoss.com	True Digital Do...	Open		True
2020-02-07 16:19	V0.1.D	Evans	Brian	brian@realize.org	Realize	NotarizationSt...	Old Value: 0 - '...	True
2020-02-07 16:04	V0.1.D	Evans	Brian	brian@realize.org	Realize	PreviewTextExt...		
2020-02-07 16:04	V0.1.D	Evans	Brian	brian@realize.org	Realize	PreviewTextExt...		
2020-02-07 16:04	V0.1.D	Evans	Brian	brian@realize.org	Realize	PageCountCal...		
2020-02-07 16:04	V0.1.D	Evans	Brian	brian@realize.org	Realize	OCR		True
2020-02-07 16:04	V0.1.D	Evans	Brian	brian@realize.org	Realize	Edit		

Administrative and Access controls

The **County Assessor, County Clerk or Recorder** are the issuers and verifiers. The County Recorder can either issue or revoke a proof of record. The Administrator at the County Recorder’s office can store a hash and metadata of a proof of record in the blockchain ledger. Various **Agencies and Departments** can function as verifiers by checking the authenticity of a state issued proof of record from any public portal. **Residents and individual users** can function as verifiers can also check the authenticity of a proof of record issued by the County Clerk-Recorder from any public portal. The proof of record validation process will become more efficient as validation can be done online by anyone. From a user perspective, the proof of record verification process during any service completion will be mostly contactless and paperless.

Verification and history of a document



Status	Filename	Digital Fingerprint	Last Modified
📄	Certificate of Registry of Marriage SHA256-DIGEST(Certificate of Registry of Marriage.pdf) = 78bcb7cc13811fe335b9e1c82090e2b44c4c2e0f2d004f58e06ac26c37f65		Wed Sep 15 2021 17:41:04 GMT-0600 (Mountain Daylight Time)
	File History:		
	First Entry: 2021-09-15 18:57:34		
	Complete Record:		
	Block #14046866 2021-09-15 18:57:34 Add by Paul Hartzell (Tx: Dvd9aac74f8b407e9339f039efcc4db92c4c615e5012b0d148b079576326d80a20d)		
	Block #14046864 2021-09-15 18:57:33 Edit by Paul Hartzell (Tx: D0eae3b206476219f5d5d882009f72cfd71296d7e70358783a4e774226392)		
	Block #14046862 2021-09-15 18:58:18 NotarizationStatusUpdated by Paul Hartzell (Tx: Dv804ba3e355cac94058d568765488190b73c16a38-c827d729cfd152cd304c679)		
	Certificate of Block #14046860 2021-09-15 18:58:26 Edit by Paul Hartzell (Tx: Dva2707f8827eea22e4dd617e614e568ea362d68ea87fae865ee4d00268e6194c)		
	Registry of Block #14046858 2021-09-15 18:58:27 Edit by Paul Hartzell (Tx: Dv930d5e9e50980ae01d16b4d0e7c34e18f08e9d012a32cae80373ae78d385ea6)		
	Registry of Marriage.pdf Block #14041554 2021-09-15 18:58:28 ACDED by Paul Hartzell via TransCENd (Tx: Dv4b9a5859ba6492eaa48f4b2d5a4e683f8e13d7b14f182c4f115f085a1d9dd8d)		
	Block #14046856 2021-09-15 18:58:29 OCR by Paul Hartzell (Tx: Dv9b15de7a62274da45049a9f9f9daea4641480f678beee1a580b75c1f70f)		
	Block #14041556 2021-09-15 18:58:38 NOTARIZED by Paul Hartzell via TransCENd (Tx: Dv73a8edf7348830e9a995629e9a9903d0ca7176484c4cd900975f2e1ac)		
	Block #14046852 2021-09-15 18:58:41 PreviewTextExtractUpdated by Paul Hartzell (Tx: Dv0c0cbdd12c7f0147ccfcb1ed6a23248bf724f6e6dc5da955bc29d3a7689f)		
	Block #14046854 2021-09-15 18:58:41 PageCountCalculated by Paul Hartzell (Tx: Dvca0b8a3df21a34de02d987702d4726ee543afdf5c652063cf55246dd60f)		
	Block #14046850 2021-09-15 18:58:45 PreviewTextExtractUpdated by Paul Hartzell (Tx: Dv6f2a3d4ee0e03008f646f017c74da66e583732b0cfaef0a2f0c577359d16)		
	Block #14046848 2021-09-15 19:05:40 Open by Paul Hartzell (Tx: Dv32e8bb6654301c3e1d5c2309bd7654792b1a464c6c3be75a624ef9d19f4146)		
	Block #14046846 2021-09-15 19:06:05 Close by Paul Hartzell (Tx: Dv0017d6946bd92c339076c01c904ab096165e42daa766b6c49c2533cd6f1ac)		
	Block #14046844 2021-09-15 19:07:40 Open by Paul Hartzell (Tx: Dv0c1789774cd77930ae4c73430f61a13f6e99084e499ca1b06090a39048368b5e0)		
	Block #14046842 2021-09-15 19:07:47 Close by Paul Hartzell (Tx: Dv2acfb088f053831ef64aa1387c54950620ba7830b58026f00f0b65646a)		

Advantages of using the TruDoss solution

A. Ease of use

Immediate productivity for both administrators and users. Folder structures uses familiar icons and nesting of related folders. For administrators, documents can be either selected by browsing and selecting them to add to a folder or by dragging and dropping. Adding new users requires a valid email address and access is then approved by the administrator. The ability to allow view, print or download documents is done to individual users. Custom watermarking protects copying and distribution upon printing.

B. Lower operational cost

The TruDoss solution will reduce redundancy and streamline the proof of record verification process. Eventually, this will help reduce the cost of compliance by enabling automated validation and cutting paperwork.

C. Increased process efficiency

The solution will accelerate service completion time by any government department. It will also ensure data integrity by making sure the credentials have trusted and error-free information.

D. Improved transparency

Any individual user or organization can independently verify the digital copy of the credentials from a public website. By being extendable to the departments or agencies of

other county governments, the solution can multiply the benefits of transparency across municipalities.

E. Increased data security

A blockchain-based public records management solution removes the need to support a large pool of data, which might attract potential hackers. By decentralizing the proof of record verification system, the risk of data theft or manipulation becomes negligible.

F. Greater trust

The TruDoss solution offers privacy by design and complete control to the individuals over their information. The blockchain ledger does not store any personal information from the proof of record and the issuing authority also does not need to store the whole digital file. Rather, the metadata and the hash of the proof of record gets stored in the TruDoss blockchain. Users can store credentials in their local devices. If required, the user can share it with a third party, who can check the authenticity of the digital copy of that file making the system more trustworthy.

G. Expanding the network

While the initial solution might focus on the proof-of-records issued by the office of County Assessor or County Clerk- Recorder, the blockchain network can integrate more government departments across any geographic region. However, harnessing the complete value from the proposed distributed ledger-based records management solution would require more considerations like expanding the digital community by connecting counties, local agencies, individuals, and private institutions to create a common platform for digital record issuance and verification.

In Summary

Through the TruDoss solution, departments or agencies can remove paper-centric processes and convert to digital-record processes that can be trusted and verified. Participants in the digital records issuance and verification network will continue to use their existing systems. The existing IT systems will connect with the TruDoss blockchain network using APIs. There will be no need to replace any of the existing core systems where the source of truth exists, and security and privacy will not be compromised. Defining proper applications and the scope of adoption is the next logical step in finding more agencies that share the same vision of a digital transformation strategy. Multiple departments and agencies can build a consortium that will strengthen the security of the blockchain ecosystem, set up standards for sharing data, and collectively drive change to modernize regulations for the future.