

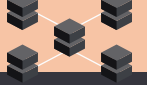


The Case for **Blockchain Application** in Association Credentialing



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The Case for Blockchain Application in Association Credentialing

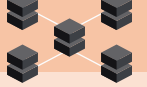


Introduction

Blockchain is designed for applications where trust is critical and there is a desire to decentralize control away from any one entity. No single authority “owns” or controls the data and processes around it. Additionally, no single entity can modify the data — making it possible to have trust in a “trustless” environment.

Although not infallible, this trust and security are key advantages for the not-for-profit sector and associations, impacting a wide range of offerings including standard-setting bodies, event ticketing and speaker management, member data and credentialing.





In this eBook, we will explain what blockchain is, the considerations for designing association-focused blockchain applications and how associations might approach a future blockchain integration with a focus on credentialing.

At the start of this project, we began with credentialing in mind because its core use case not only appears tailor-made for blockchain disruption — more on that later — but the area is a core function of many associations. Not only does credentialing serve as a foundational piece of non-dues revenue for many associations, but it is also crucial for mission-focus, especially in medical, construction and education sectors, among many others, where association certifications serve as the standards-setting bodies. Associations are often part of a complex web of credentialing bodies including state and local authorities and other association counterparts where the transparency afforded by blockchain can help unify these credentials.

This eBook, produced as a partnership between Sidecar, Blue Sky eLearn and Cimatri, is the result of interviews with association industry executives and vendors, technology expert insights and research into the rapidly evolving world of blockchain. We believe this technology, which is just one part of the next generation of the Internet known as [Web3.0](#), is poised to become a game-changer in the world of associations.

Read on to learn why that is and what potential use cases are already starting to emerge.





Can Blockchain Impact the World of Associations?

Associations help people within a specific industry organize themselves around educational, professional, social and sometimes political goals. Creating new projects with **blockchain** technology can unlock a world of potential for these organizations to better serve their audience, improve organizational function and work toward mission fulfillment.

Originally, blockchain was developed for Bitcoin as a way to bring together an infinite number of people in a then-new [peer-to-peer electronic cash system](#). Now, crypto enthusiasts want to see blockchain used to create a new financial system — a vision that is still unrealized.

Meanwhile, as companies have seen how the distributed technology underlying Bitcoin worked, they sought to leverage or duplicate it to improve their own ways of working. Blockchain is often a way to level the playing field and bring competitors together to the same data-sharing table. Firms that have to interact with several other companies on a daily basis using complicated transactions and multiple contracts use it as a way to avoid missing any data among disparate, siloed systems.

So what does that mean for associations and what can they learn from these experiments and developments?

The world of credentialing

Many professions rely on credentials to ensure that the quality of education remains in alignment with standards, to verify professional achievements and competencies and to ensure ongoing professional development for individuals.

Traditionally, credentialing has been managed, maintained and delivered manually and has required “trust” to exist among participating organizations. In some cases, the verification of credentials relies on hosted third-party systems requiring complicated data exchanges and system integrations.

Blockchain can be used to create an open database, or public ledger, for credentials that allow for tremendous improvements to credentialing workflows for associations, government agencies and private organizations.





What is Blockchain?

Put simply, a [blockchain](#) is a distributed ledger for recording transactions. Distributed means that the data isn't stored on a central computer, but rather is replicated across many computers in what is called a "Peer-to-Peer Network" or P2P network.

Blockchains use a set of cryptographic techniques to add a layer of security, ensuring that data cannot be modified and keep it consistent across the P2P network. Once data is entered into a blockchain, it can never be modified — a key concept referred to as immutability. This is ensured through a combination of the cryptography mentioned above and a consensus protocol that the blockchain nodes all abide by.

This approach has many advantages including transparency, security and redundancy. A blockchain is not controlled by any central party and is considered transparent because it is visible to all of the participants in the P2P network — with many blockchains available for the general public to view as well.

So, what normally would have been kept inside an institution's walls — only for auditors, officials and regulators to see — is out in the open.

Blockchain in action

In a classic game theory problem, a group of generals are trying to besiege the ancient Greek city known as Byzantium. All of the generals have to attack Byzantium at once in order to win, but the generals also don't have a secure means of communication to indicate to each other when they should attack. The problem illustrates how difficult it is to get multiple people to reach a consensus. Blockchain solves the Byzantine Generals Problem.

In the traditional world, we solve the Byzantine Generals Problem through typical power structures where a centralized entity is treated as the source of truth. The head of an organization, a regulator or an auditor will say what something is and how it should function.

But that's not always the best course of action. Not only is it undemocratic, it's slow. In today's world, it requires extreme trust in a chosen source of truth, and the processes put in place to ensure that trust are often inefficient.

Take, for example, the number of steps required to check out at a grocery store with a debit card: To complete a purchase, you have to have a bank-issued card. With every card swipe, you have to trust that the grocery store has a good Internet connection, and the grocery store has to trust that your chosen bank can instantly verify that you're good for the cash it'll take to pay for the transaction. Then, the bank has to transfer that money into an account owned by the grocery store.

In a blockchain version of this transaction, instead of relying upon one or more intermediaries (the card processor and the bank) to confirm that you have the cash to buy your weekly groceries, the store would immediately know you have the money and you'd be able to virtually transfer it without ever involving another institution.

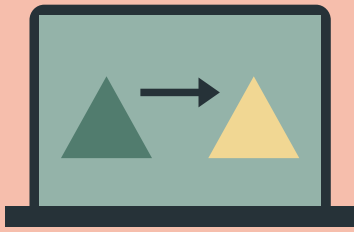




HOW DOES BLOCKCHAIN WORK

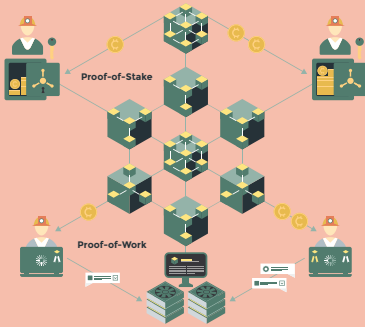
1

The Transaction Is Submitted for Verification



2

PoW or PoS Verification



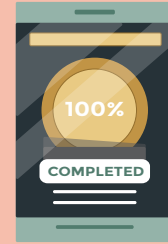
Proof-of-Work (PoW) requires powerful computer hardware to solve difficult puzzles.

Proof-of-Stake (PoS) requires validators to lock-up a portion of their crypto-currency for the chance to verify the transactions in a block.



4

The Transaction is Complete

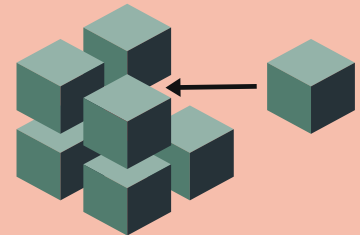


When any record is officially added to the chain, it is incredibly difficult to change and so becomes "immutable." Altering any of the records will show up immediately because the changes will not align with the information on the other versions of that ledger.



3

The Transaction Is Approved and Added to the Blockchain



Once that transaction is verified, the transaction is added to the chain. In this manner, a blockchain continually grows in size, and all these records may be inspected by all parties.

As an example, let's look at how Bitcoin, which relies on blockchain, works: In a Bitcoin transaction, the system uses a **proof-of-work consensus** mechanism. To add information to the blockchain, a **node** must prove that it's invested computer power to reach consensus with the other nodes about a transaction, validating that it can and should occur.

Ethereum, on the other hand, is looking to transition to a **proof-of-stake consensus** mechanism in its latest upgrade, Ethereum 2.0. In this method, users attempting to add information to the blockchain would need to lock away Ether (the cryptocurrency of Ethereum) in order to become validators. Not only does this help cut down on computing power, but it also ensures that users adding and modifying information on the blockchain are invested in the underlying cryptocurrency.





How Could Blockchain Apply in Associations?

Both associations that offer credentials as a requirement in a regulated industry and associations that have a credentialing program for professional development need to be able to quickly distribute verified credentials. This process often includes auditing a member's work to prove they actually achieved the credential or relying on other parties to provide various continuing education, licenses and degree matriculation data privately from approved/trusted sources, which is then incorporated into the association's decision to issue its own credential.

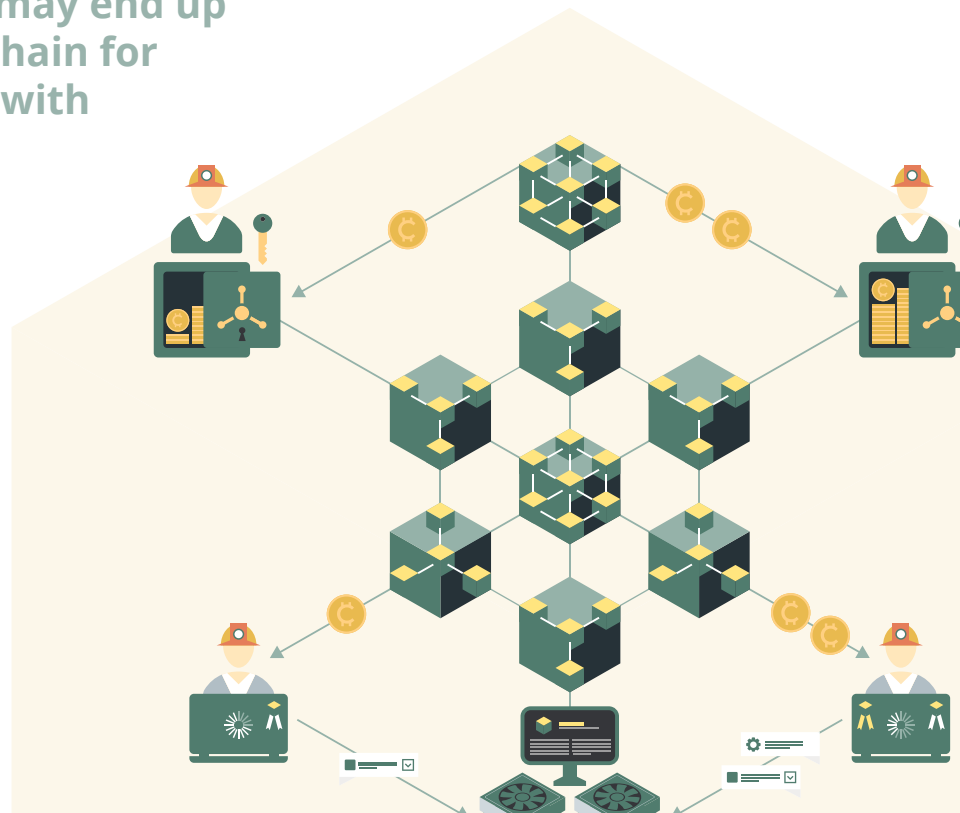
Moving this process onto the blockchain would free up staff time while also creating a practically fail-safe process for confirming that an applicant has completed the necessary steps to achieve a credential.

Offering a trail on blockchain would allow anyone to be able to work more quickly when evaluating a member's credential and can automate the entire process end-to-end.

Verifying credentials can often be a haphazard process, as some associations will report a member's education hours for them while others ask members to submit the work themselves. For associations that can do the former, it makes working with the association more attractive than pursuing another avenues for credentialing, said Amanda Davis, vice president of client experience at Blue Sky eLearn, an eLearning experience and virtual event company.

Renewing credentials also poses a challenge for organizations and members, with various credentials running on different timelines and members often having to remind themselves to renew them.

Additionally, associations may end up offering training on blockchain for members who are dealing with blockchain in their own industry before putting a credential on a distributed ledger,





Enterprise Blockchain as an Association Starting Point

In considering the world of associations, which are charged with furthering missions in various industries, [enterprise blockchain](#) provides a wide range of possibilities.

Enterprise blockchain allows users to restrict who can see data on a chain, who can run a node and who can change data that's recorded on-chain.

In this sense, it has little to do with multi-party consensus protocols that have been becoming more decentralized over the years like the Bitcoin blockchain, but it does borrow the technology that crypto enthusiasts have used to create a decentralized way of transferring sensitive data.

In a 2019 [study](#) by Cambridge University, researchers found that most enterprise blockchains exist in the financial services industry. Most of them take more than two years to go from proof-of-concept to being used in the real world, and some of the larger enterprise blockchain projects took four years to build, the researchers found.

Because of this, associations that serve the financial services industry will likely have already had conversations about enterprise blockchain. Using blockchain for non-**fintech** applications is still common, however, and companies and universities have reported various use cases from being able to [collect and store survey data in real-time](#) to just having a simpler way to track the different versions of a large project.

According to Cambridge researchers, the most dominant use cases for enterprise blockchain were applications for supply chain tracking, trading infrastructure and document certification. The majority of blockchains were used to reduce costs but also provide new revenue-generating services.

"In multiple industries, enterprise blockchains are perceived as a solution to establish common data standards across organizations, eliminate organizational silos and facilitate record reconciliation to help improve overall efficiency and enable the creation of new services," the researchers [wrote](#).





The three enterprise blockchain buckets

Crypto news outlet CoinDesk puts enterprise blockchain into three buckets: **Private blockchain**, **consortium blockchain** and **public decentralized blockchain** used for commercial purposes. The third option takes advantage of a public blockchain's consensus protocol by stamping data about a document or other data onto the blockchain along with the crypto transaction data that already exists on that chain.



**Private
Blockchain**



**Consortium
Blockchain**



**Public Decentralized
Blockchain**

Private Blockchains

The first type of blockchain would be a closed system that's generally determined by one party. This would be like how JP Morgan Chase created an Ethereum-like blockchain called Quorum to allow its corporate clients to [move](#) US dollar deposits between accounts quickly and on a 24/7 basis through its own digital currency called JPM Coin.

Consortium Blockchains

Consortiums involve two or more companies together defining the rules of a blockchain. Meta (formerly Facebook) tried to form such a consortium with Diem, a **stablecoin** that was to be backed with a basket of currencies before it [was shut down](#) by the company in the face of Congressional scrutiny.

Marco Polo is another type of blockchain consortium for trade finance. It's run by dozens of [banks](#) interested in providing financing to companies involved in trade, allowing corporations as well as small-to-medium enterprises to plug into the blockchain to record trade data.

Marco Polo aims to simplify what would normally be a complex relationship between banks and corporations along the supply chain. Open account financing [requires](#) that goods be shipped and delivered before payment is due, and banks use letter-of-credit financing to guarantee a buyer's payment ahead of time.





One drawback of both consortium and private blockchains is that they are often run on a ledger that can be changed, store sensitive user data, and run **smart contracts** that are complex, [notes](#) Paul Brody, the blockchain lead at EY, a multinational professional services company.

However, consortium blockchains are [often seen](#) as more secure by corporations since all the nodes on the blockchain are trusted entities. Companies can do due diligence on the vendors they choose to give a node.

A consortium blockchain is then often used by corporations to try to change the way they do business. Since the blockchain doesn't allow any single entity to control the ledger, it makes data sharing automatic and uniform.

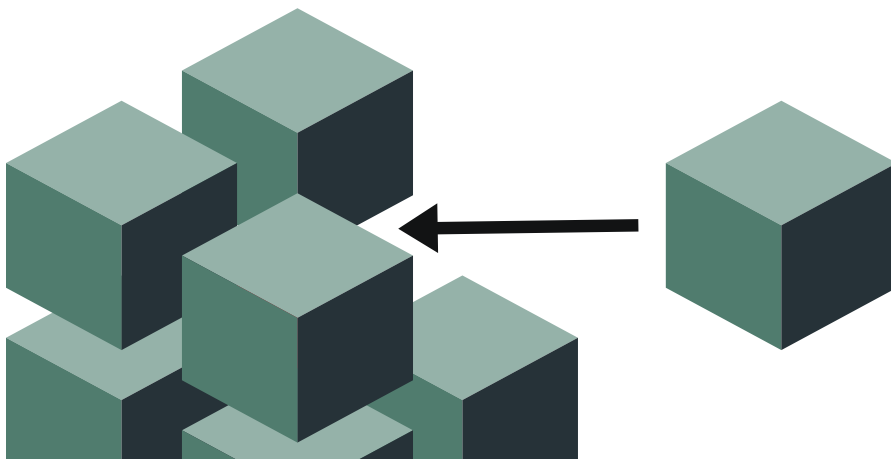
A consortium blockchain also doesn't require a business to make sure data is encrypted like it would need to be on a public blockchain. (Although, data could still be encrypted on a consortium blockchain).

Public Blockchains

Companies have used public chains, like Bitcoin and Ethereum, to record transactions, which presents several new possibilities.

One example of this was Microsoft's development of [Ion](#), which [digitizes](#) identifying documents like diplomas or driver's licenses and uses the Bitcoin blockchain to create a record of the ID. In this case, the tool operates independently — even from Microsoft itself — and the IDs [are timestamped](#) into the bitcoin blockchain by Ion nodes. Any updates made to the digital ID are also [stamped by the Ion nodes](#) if whoever is holding the private key that corresponds with that ID makes an update to it.

Transferring digital IDs over a blockchain maintained by a consortium, or digital IDs that are stamped into a public blockchain may be the best way for associations to verify that credentials are correct and that members have gone through the necessary training steps to keep their credentials.





Blockchain-Facilitated Certification Solutions for Associations

For associations, the issuance of various forms of credentials including accreditation, certification, certificates and continuing education credits are all critical for different professions and industries to maintain professional standards, which are important not only for the members of an association but for the people those members serve.

Government agencies, often with various forms of licensing bodies, industry associations, and third-party education providers, often need to collaborate to maintain and validate this credentialing industry.

But how, specifically, can associations use blockchain-based credentials?

Blockchain for sharing data between organizations

Some corporations try to go beyond creating an environment to share encrypted data that can be used for better understanding customers.

For instance, scientists in the research and development arm of credit card company Visa [developed](#) a blockchain that would allow financial institutions to share encrypted customer data with each other. That data would then be used in underwriting decisions after it had been put through a trusted execution environment (computers that can make decisions with encrypted data without decrypting it).

If adopted, this blockchain would allow banks to no longer have to rely on third-party financial data aggregators to feed data into popular fintech apps like Acorns and Robinhood. While associations aren't nearly as competitive as US banks are in guarding their customers, sharing data between similar associations can help them discover new members or people who could benefit from continuing education.

Similarly, Jamar Wright, director of credentialing at the American Society of Association Executives (ASAE), said that his association struggles to discover new people eligible to take advantage of ASAE's Certified Association Executive (CAE) credential. The society issues the CAE credential for association executives who are identified as having met certain standards of leading these organizations. "If we had more access to people's qualifications and knew exactly who's in the pipeline, it would be easier to find who would be eligible to sit for an exam," Wright said. "Maybe you've been in an association and you're doing all of this professional development. You'd be technically qualified, but if you've never submitted any information to us, then you're not in our database."





Associations could move beyond just general marketing and into targeted offers for their credentials if they found safe ways to analyze and share data. The kind of professional development that's required to qualify to attain the CAE credential includes webinars and conferences that association professionals may already be going to, but ASAE doesn't necessarily have access to all of that data.

“A lot of people are already doing a lot of things that it takes to actually qualify,” Wright said. “They just don't know, like, ‘Hey, I'm actually three-quarters of the way there. I didn't realize I'd actually be eligible and I could sit for the exam next year.’”

Additionally, data sharing across organizations could create new opportunities for non-dues revenue and/or mission-focused databases. For example, if healthcare or transportation industry associations were able to contribute to a database with anonymous data on surgeries, crashes or specific illnesses, associations could build predictive mechanisms or identify priceless analysis with consolidated and regularly updated information.

Blockchain could also play a part in associations exploring new ways of offering micro-credentialing, according to Jeremiah Kendall, the chief technology officer at Blue Sky eLearn. Micro-credentialing would give users credit for shorter periods of learning and allow them to batch different kinds of learning (such as watching videos, listening to a podcast, reading an article, attending a conference, or participating in a webinar) into one larger credential, and blockchain could also serve to sync all of these qualifications together into larger certifications, Kendall noted.

Reducing fraud while promoting renewals through the blockchain

While issuing a digital ID can help third parties identify credentialed members, associations don't have time to check LinkedIn to see if someone is advertising a credential when they shouldn't be, said Elena Gerstmann, executive director of the Institute for Operations Research and the Management Sciences (INFORMS), an association for advanced analytics professionals. INFORMS is often competing to show its members that its certificate program (currently the smallest component of the association's services) is a significant add-on for master's students who want to be certified analytics professionals (CAPs).

“One of the reasons I think it's an interesting idea to verify this with blockchain is we think that people should hire people with CAPs because it means that they've hit a very high level of standard in their intelligence and their ability to do data analytics,” Gerstmann said. “We have data analysts in operations research who are deciding during the height of COVID who gets vaccines first. If there's three ICU beds, which patients are the most likely to benefit? Those are life and death questions that are answered by experts.”





Just like not all credentialed professionals are the same, not all credentials are the same either, Gerstmann said. The CAPs certification has been reviewed by the American National Standards Institute (ANSE), which is a high bar that INFORMS meets every year to prove that a psychometrician (someone who evaluates what tests are measuring) has reviewed the credential. Reviews done by ANSE each year may be another data point that associations can record on blockchain.

“It might be something cool to think about: Is blockchain a type of added protection in which ANSE is an insurance to say that we’ve jumped through the psychometrician hoops?” Gerstmann said.

In the future, Gerstmann hopes to make the CAPs credential successful enough for the association to have a reason to create more specific analytics degrees in cybersecurity, aviation and supply chain logistics. Adding a layer of security through blockchain could be a way for the program to become more valuable.

While some of the industries that associations serve are worth billions of dollars and focus on tech transformations often, nonprofit associations usually operate with a tech lag, said Deborah Bowen, the president and CEO of the American College of Healthcare Executives (ACHE), which offers a credential in hospital management. Because of the complex nature of hospital management, the credential has a rigorous set of standards that have to be met before a member can qualify. The member has to have a master’s degree, at least five years of healthcare management experience, references and leadership experience in community service — all of which must be verified.

“It’s really predicated on this idea that you’re in healthcare and you expect your physicians and nurses to be licensed and to meet qualifications of board certification. You should expect the same of your healthcare leaders,” Bowen said.

At ASAE, a small percentage of credentialed members will forget to renew their credentials, Wright said. CAEs have to be renewed once every three years, but a recipient of the credential may lose track of time and have their certification lapse.

In both cases — ASAE’s renewal structure and INFORMS’ and ACHE’s complicated standards requirements — a certification process built on the blockchain could not only ensure a certification holder has met every requirement but will also have their certification removed if the standards aren’t met or have expired. This would promote regular renewals, and, in the case of healthcare, science and safety standards, safer and more trustworthy outcomes for practitioners.

Regarding security, however, it should be noted that, as with any platform, blockchain is not capable of solving all security issues. That is why a thorough cybersecurity analysis should be part of any tech transition of this type.





Improving transparency in data sharing

Part of the problem with issuing and verifying credentials is ensuring that people are who they say they are, said Kurt Frankhouser, the chief technology officer at the Alliance Safety Council (ASC), an association that provides safety training for high-risk workplaces. ASC has both basic training for industrial workers and also specific training that applies to sites that need to teach unique workplace rules in places like industrial plants.

ASC has already created multiple tools to digitize its credential training and verification process. One such tool is the Gatekeeper app, which allows workplaces that train their employees through ASC to quickly scan a QR code on a worker's digital badge to make sure that they have the correct training to work in a facility. Employers also have the ability to attach a background check and a drug test to the digital badge.

"They can put in all of their criteria they need to enter into their site to work, which is always changing," Frankhouser said. "But now they have one place all the contractors can go to make sure their employees have everything you need besides just safety training." Eventually, ASC was able to also integrate warnings attached to employees' digital badges that would alert contract companies when safety training credentials or other documents were going to expire.

When the pandemic hit in March 2020, ASC introduced artificial intelligence tracking into its virtual proctoring. This AI follows test takers' eye movements to see whether or not they're cheating on a test, and it also verifies their government-issued ID at the beginning of a test to ensure the test taker is who they say they are. (ASC found AI to be a more reliable method of virtual proctoring than hiring a company that would watch test takers for them, Frankhouser said.)

ASC is currently working on facial recognition AI that would also confirm workers' identities when they sign into work with digital badges. The facial recognition AI then connects to a federal registry using an API that ASC built. This way, it would be impossible for another worker to try to enter a plant with someone else's phone and digital ID.

In the future, ASC could also look to integrate blockchain technology into its credential verification system.

"If you do a digital transformation and you're a platform-based company like us, we're still the Achilles heel of our own data," Frankhouser said. "If something happens — (the signal) goes off where our servers are with Amazon — how long is it going to take them to spin the data up somewhere else?"

The theory behind this idea suggests that if there are multiple nodes running a blockchain, then there would be multiple entities that could confirm the validity of the same data and not have to rely on one company's data servers working all the time.





“Transcripts and real important critical records will always be accessible,” Frankhouser said. “The ecosystem that you’re involved in can always access that data.”

This approach could also mean that both employers and employees that work with their respective associations would have more control over who accesses data. Each node would vote on whether or not to grant a new entity a node on the blockchain, and a majority of the nodes would decide when to remove someone’s access to that data.

Blockchains are more reliable and more rules-based than traditional databases, Frankhouser said. If this kind of record keeping is valuable to members, it may allow them to trust more data to association blockchains, such as their past work experiences. This could eventually lead to members using association blockchains to get their resumes to future employers.

“If you’re looking for a job on a job board, you could put all your credentials and certifications out there, and make it public to any recruiter,” Frankhouser said.

Digital tokens for association events and credentialing

Access **tokens** for events could be a next step for associations looking to experiment in the digital asset space, said Rick Bawcum, CEO of Cimatri, a technology firm that serves associations and nonprofits.

“Maybe your smartphone is connected to the blockchain with a golden ticket, and you’re going around the event and you can get into all the venues, the VIP spaces, all of that, because your phone can validate that you are that person without carrying around a ticket or a badge,” Bawcum said.

In addition to tracking where an event attendee can go, blockchain can also help determine where an attendee has been. Under its credentialing program, the Association of Professional Dog Trainers (APDT) offers both webinars as well as multi-week courses. APDT certifies dog trainers and renews their certification every three years through this program so that those trainers can prove to their clients that they’re aware of the latest dog training scientific research while training is still an unregulated industry.

One of the biggest hurdles for the APDT credentialing program is tracking what events a member went to at an in-person conference so that the member doesn’t have to rewatch those talks online to get their credential, said Jennifer Franco, director of education at the APDT. But with a blockchain-backed event entry system, APDT could be certain a member attended the right events to fulfill their credential requirements, much like tracking whether someone fulfilled requirements through disparate institutions, as noted previously.





Credentialing as revenue drivers for association management companies and vendors

Half the battle can sometimes be in trying to get members interested in a certification, said Mona Johnson, executive director at Rees Group, Inc., an association management company.

One of the associations that Rees Group, Inc. serves is the Society for Research on Nicotine and Tobacco. The certificate that the society offers is for people who are new to nicotine and tobacco research along with folks who are in low-to-middle income countries who may not be trained researchers but want to gain the skills necessary to do foundational research.

"It's everything from how to design a study, how to do a literature review, how to collect data, how to analyze data and how to present data," Johnson said.

While the certificate has gained traction among undergraduate students applying for graduate schools to further study public health, the program hasn't caught on with people in low-to-middle income countries.

"One thing is if you're in a low-to-middle income country, you probably don't have the funds to do the research," Johnson said. "So why learn how to do it? It's only a handful of very motivated people who are doing research."

Credentialing innovation isn't necessarily the SRNT's highest priority either because the association is focused on healthcare equity, public health, and fighting the tobacco industry.

It may make sense for organizations that serve associations to be considering tech upgrades that don't require a lot of work on behalf of the association. An association management company could build a blockchain solution for credentialing that could be easily replicated and then rolled out to serve multiple organizations' credentialing options all at once, potentially driving down the cost for associations, and thus members, for the program. AMCs or any tech vendor who produces this kind of solution would still have to support organizations interested in connecting to the blockchain by building application programming interfaces (APIs) that could connect to it.

Eventually, association management systems (similar to customer relationship management tools, but designed specifically for associations) may also run on blockchain.





How Should Credential-Focused Blockchain Be Designed?

As is now clear through the previous examples, the type of blockchain being considered by associations has very little to do with transacting with digital currencies like Bitcoin, Ethereum, Dogecoin, or any other kind of cryptocurrency that's made headlines in the past decade.

Associations should be more interested in taking a look at the technology underlying these assets, which is **distributed ledger technology** that can work as a decentralized database with unique cryptographic identifiers serving to represent authentic credentials.

Data recorded with new blocks on the blockchain can be tracked and verified by nodes running the network so long as the majority of node participants are acting truthfully, [wrote](#) researchers in a recent paper published in the National Bureau of Economic Research.

Mechanism design is a part of economics that aims to create incentives for self-interested agents to reveal information truthfully, writes economists Joshua Gans from the University of Toronto and Richard Holden from the University of New South Wales.

In the case of putting credentials on blockchain, associations would need to decide on a consensus mechanism that would encourage associations, their members, association vendors and regulators all to use the chain in a truthful manner.

How much data is stored on blockchain and transferred between users on it depends on who is running a node on the chain and how much data they're incentivized to share on it.

Associations want to create credentials that are easy to access and teach their members valuable skills. Increasing access to a credential or making it easier to verify should in turn reinforce the value of holding that credential.

"I don't know that (blockchain) creates markets, but it makes the market more accessible and more transparent, which are two of the accelerators that you need to make something valuable," Bawcum said.

Associations offer a variety of incentives for members to join: Discounted continuing education, affinity





programs and lobbying are a few. For most associations, the majority of their revenue comes from program services of which education is just one slice.

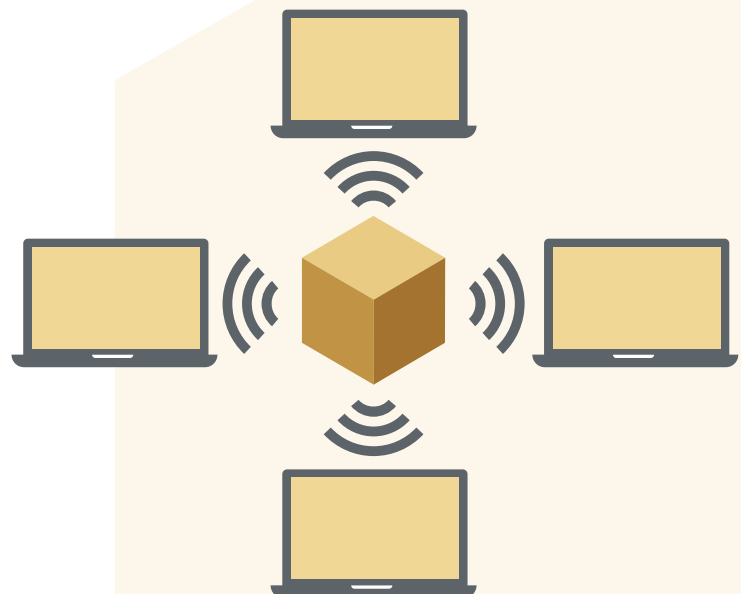
To understand what kind of new program services members need, the industry is working to modernize its tech stack, said Kendall of Blue Sky eLearn. Associations are trying everything from application programming interfaces (APIs) to standardizing their member data so it can be used to gain insights about their members, and blockchain could be a crucial element of that.

In creating a credential-focused blockchain, associations would be well-served to also consider standardization across the industry to ensure transparency and easy data sharing.

“One of the primary drivers behind the interest is the promise of something like blockchain to solve the dumpster fire that every single organization has a different way of doing things, from industry to industry, state association to state association,” Kendall said. “How do they manage their credentials? Are they stored in the LMS? Are they stored in the association’s database? At a storage credentialing provider? Who does it all report to? There’s just no consistency, no standardization in the industry.”

Members, regulators and other associations may push an association to upgrade their tech stack. But a key driver of innovation in the association space comes from vendors, like Cimatri and Blue Sky eLearn, who make it easy for associations and similar organizations to begin experimenting with concepts like blockchain without bringing that level of expertise in-house.

“You could pretty transparently just start using blockchain on the back end,” Bawcum said. “It would be almost transparent to the people who were using them to validate those things.”





Tokenizing non-financial assets

In June 2015, the idea of digital collectibles was proposed by Dieter Shirley to use blockchain technology to create “non-fungible” items that would prove ownership and could be traded securely among participants of the network. This idea gave rise to the concept of **Non-Fungible Tokens (NFTs)**.

For an association, a credential is an asset that isn't like a security or financial instrument but instead provides value to the professional lives of members and revenue or member loyalty for the association. So, NFTs can embody a license, an accreditation, a certification or certificate, continuing education courses/curricula and the links among those items.

Soulbound tokens

In 2022, Ethereum founder Vitalik Buterin, economist and social technologist Glen Weyl, and lawyer Puja Ohlaver [suggested](#) a non-fungible token (NFT) that was also non-transferable so that it could be used as a way to represent identity documents like a driver's license or a university degree on-chain. The group called these tokens **Soulbound Tokens**, or SBTs.

“Imagine a world where most participants have Souls that store SBTs corresponding to a series of affiliations, memberships and credentials,” Weyl [wrote](#) for CoinDesk. “For example, an individual might have a Soul that stores SBTs representing educational credentials, companies they've worked for, hashes of works of art or books they've written, etc. In their simplest form, these SBTs can be 'self-certified,' similar to how we share information about ourselves in our resumes. But the true power of this mechanism emerges when SBTs held by one Soul can be issued by other Souls, who are counterparties to these relationships. These counterparty Souls could be individuals, companies or institutions.”

Some crypto [users](#) see SBTs as a way to manage medical records, assess the creditworthiness of a borrower and avoid having decentralized autonomous organizations be attacked by bad actors hoarding governance tokens.

In a future imagined with Soulbound Tokens, both individual users and associations would be Souls, and the organization could issue their credentials as SBTs. These would exist on-chain, just like NFTs, but wouldn't be transferred from one user to the next.





Blockchain and Your Industry

Depending on what industry your association serves, your members may already be playing around with blockchain, and associations may also be called on to help navigate this space for their members. Here's a quick look at some of the ways industries often represented in the association space are utilizing the technology:

Finance: Accounting firms have been looking at blockchain as a potential way of recording all transactions in an easily auditable way. In 2019, accounting and business consulting firm Armanino [launched](#) their own blockchain tool called TrustExplorer 2.0 which aimed to do firm-originated financial audits in seconds.

Ernst and Young (EY) has been [building](#) a blockchain product along with Microsoft to collect gaming rights and royalties for Xbox. This includes real-time calculations of royalties across multiple game development partners.

Construction and Project Management: Tracking the version history of a project with blockchain would allow builders to be able to represent changes without having to come back to a centralized authority every time a change is made, Bawcum said.

The construction industry is also [looking](#) into blockchain as a way to track building materials, resources and equipment to reduce costs and make physical inspections more efficient. The industry is also interested in storing data on a building's progress on blockchain.

Healthcare: Provenance is another popular reason hospitals consider blockchain technology, Bawcum noted. Tracking where items are using QR codes that are then scanned and stamped with location information on a blockchain could allow a hospital to track where the parts of an MRI machine have all come from.

Healthcare also views distributed ledger technology as a way to track medical records and reduce healthcare-related fraud. In 2018, NYC-based Mount Sinai Hospital [created](#) a biomedical blockchain research unit within its Icahn School of Medicine. The research unit [studies](#) how blockchain could be used in drug development, preventing counterfeit drug sales, clinical trials and research reproducibility.



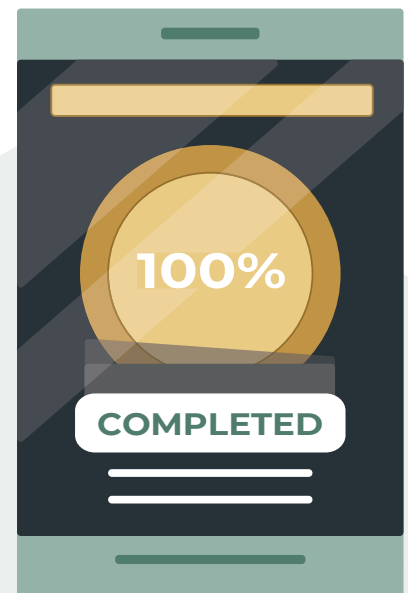


Conclusion

Blockchain's implications on the association and not-for-profit industries are vast. Not only can it impact the way certifications are stored and verified, but also it can create untapped revenue drivers for associations and the organizations that serve them, like association management companies and vendors.

Additionally, if associations can learn how to experiment with various consensus mechanisms, run nodes, and develop [smart contracts](#), they can also provide their members with educational resources to help them better integrate blockchain into their own industries.

We hope this eBook helps association leaders and organizations identify some of the ways to begin experimenting with blockchain and understand the ways emerging technologies may impact the systems many organizations rely on in the very near future.





Glossary

Blockchain

A public ledger, either virtual or digital, that is used to record any and all transactions using cryptography and duplication across a network of nodes. This duplication is what helps create a secure process because all changes are tracked and recorded on the ledger, which allows for complete transparency.

Node

One of the computers on a blockchain network that is also responsible for validating any information that is added to the blockchain. Blockchain networks often have hundreds of nodes, creating copies of all information on the ledger, helping with the security and transparency of the information on the blockchain.

Consensus Mechanism

In order to add information to the blockchain, it first needs to pass a consensus mechanism or a methodology used to create an agreement. The two primary methods are proof-of-stake and proof-of-work.

Proof-of-Stake (PoS) Consensus

One of the methods used to confirm transactions on the blockchain. Users stake their own cryptocurrencies to validate transactions that are being added to the blockchain. Once confirmed, they are also given portions of the cryptocurrency as payment.

Proof-of-Work (PoW) Consensus

Unlike PoS, where you need to put your own cryptocurrency as stake, PoW works by solving mathematical problems. Once solved, the miner is also awarded cryptocurrency.

Enterprise Blockchain

A permissioned blockchain that uses the principles of public blockchains — duplication and transparency — to record information on a chain owned and controlled by a private corporation or entity. The controlling entity can also limit what information goes on the blockchain, who runs the nodes and how much of that information is visible to users.

Private Blockchain

A closed system blockchain that's completely controlled by one party. These blockchains are generally used internally by a corporation to securely record and access information when the structure of the organization is distributed — like in the case of a large banking institution.

Consortium Blockchain

A semi-decentralized blockchain where two or more companies together define the rules of a blockchain. Node access is also limited, which means transactions can be recorded but not added without being verified by another node.

Public Decentralized Blockchain

A public blockchain that has no controlling entity, allowing anyone to access the information on it and add to it as needed. These are often used for commercial purposes including industry-wide verification for credentialing.





Glossary

Distributed Ledger Technology

Often used interchangeably with blockchain, distributed ledger technology (DLT) is a technological infrastructure that allows users to access, validate, update and record information in a virtual database that's decentralized and duplicated across multiple nodes or locations.

Token

An immutable piece of code issued on a blockchain taking the form of a cryptocurrency or cryptoasset.

Non-Fungible Token

"NFT" stands for "nonfungible token." It's a unit of data on blockchain that represents digital files or collectibles. While many of the current applications and use-cases of NFTs are artwork, creators will be able to use NFTs to represent things like certifications or licenses, deeds for homes or even tickets to an association event.

Stablecoin

A type of cryptocurrency with a value connected to another type of currency or financial system. These coins aim to combat the volatility of cryptocurrencies, which also prevents them from seeing huge spikes in value.

Soulbound Tokens

A virtual CV that may include data like merits, memberships, licenses and accreditations that are recorded on the blockchain — like an NFT — but cannot be traded or sold.

Smart Contracts

An agreement that's converted into computer code and stored on the blockchain and self-executes when the terms of the agreement are complete. The program that defines the logic for the smart contract is not changeable after it is established, guaranteeing execution in a specific manner. By relying completely on blockchain networks, there is no need for an intermediary and agreements are always executed, assuming the terms have been met.

Fintech

Financial technology, also known as fintech, is emerging technology aimed at modernizing and improving offerings from financial services companies. This can include tools like peer-to-peer lending apps, crypto investment apps and AI that allows financial services providers to streamline their offerings.





APPENDIX B

How blue chip companies and governments approach blockchain

CoinDesk puts enterprise blockchain providers into three broad categories: R3's Corda, Hyperledger, and Ethereum knock-offs like Quorum. These are also some of the categories that subject experts like the Blockchain Council [name](#) as the most popular enterprise blockchains. The Cambridge researchers found that the majority of projects used Hyperledger Fabric (48%), then R3's Corda (15%), and then Coin Science's multi-chain framework (10%).

While there has been competition among enterprise blockchain companies to see who could get the most corporate contracts, some of them have [begun working](#) together in the interest of making sure that the different kinds of blockchain can operate with each other.

Enterprise blockchain projects aren't without their ups and downs, however. Much like the rest of the tech sector, enterprise blockchain was hit hard by the pandemic's initial shock.

In February 2021, CoinDesk reported that IBM's blockchain unit missed its revenue target two years in a row after IBM had lost 6% in revenue in 2020. Its blockchain team was cut down to "almost nothing," even after it had launched a blockchain for farm-to-supermarket tracking and one for shipping container logistics.

Another project, called we.trade, which was built by IBM on a blockchain called Hyperledger Fabric, was shut down in June 2022 during the latest bear market, according to a Tech Monitor report. We.trade was a blockchain-based trade finance platform, and trade finance is an area that includes many different types of complex transactions and financing that banks thought would be a prime area to be transformed by blockchain.

We.trade was launched by 12 major European banks in 2019, and it [provided](#) those banks with access to insurance, credit rating and financing and logistics services, among other things. But the 2020 recession took out half the nascent startup's staff, and it couldn't survive the current downturn.

In other ways, the pandemic was a [boon](#) for distributed ledger technology. European states [debated](#) using decentralized contact tracing applications so that they could track citizens' COVID-19 status while also complying with the European Union's strict data privacy law called General Data Protection Regulation (GDPR).

The Austrian government [awarded](#) a more than \$67,000 [grant](#) to blockchain-based QualiSig to build its contact tracing app while Singapore [developed](#) a blockchain-based digital health passport that carried medical records. New York City's COVID-19 vaccination record app, called Excelsior Pass, was also [based](#) on IBM's blockchain technology.

During the pandemic, governments have continued to award enterprise blockchain companies millions of dollars for non-COVID-related issues as well. In January 2021, the US Navy [gave](#) Indiana-based blockchain firm SIMBA Chain \$1.5 million to secure its weaponry supply chain. IOHK, the company behind the cryptocurrency Cardano, [partnered](#) with the Ethiopian government in April 2021 to track student's academic performance. In December 2021, Gibraltar [began](#) a pilot project to test whether or not it could improve the delivery of its public services via blockchain.





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About Cimatri

Cimatri provides strategic leadership and world class IT services to associations and non-profits looking to make technology an advantage in delivering on their mission.

Cimatri's North-America-based, fully remote team, works tirelessly on behalf of their clients, ensuring that people, process, and technology are aligned to mission and strategy. Cimatri is committed to fostering, cultivating, and preserving a culture of diversity, equity, and inclusion.

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