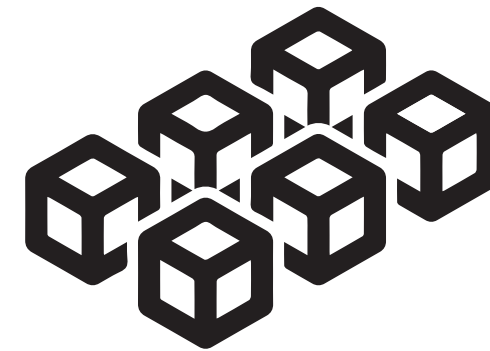


Breaking down the

# blockchain

---



The buzz has been bandied about with abandon when it comes to blockchain.

Yes, you know it's about more than bitcoin, but what else do you know?

We queried some of the most notable names in payments to get the lay of the land, with focus on where blockchain has been, where it's going, and what the real world might demand of the digital ledger.

# Breaking down the blockchain

## Table of contents

---



### 01 Crowe Horwath LLP

#### PLETHORA OF POWERS

*David Uhryniak,*  
Head of Blockchain

### 09 Emailage

#### MORE THAN JUST A DATABASE

*Amador Testa,*  
Chief Product Officer

### 17 Fiserv

#### INTELLIGENT INNOVATION

*Marc West,*  
Chief Technology Officer

### 25 Identity Mind

#### IDENTITY IN THE ONLINE WORLD

*Jose Caldera,*  
Chief Marketing and Products Officer

### 33 Modo Payments

#### THE BLOCKCHAIN BANDWAGON

*Brian Billingsley,*  
Chief Revenue Officer

### 41 Renovite Technologies

#### TO TRUST OR NOT TO TRUST

*Jim Tomaney,*  
Chief Operating Officer

### 05 Diebold Nixdorf

#### BREAKING DOWN THE HYPE

*Douglas Hartung,*  
Head of Global Software Innovation

### 13 Entersekt

#### IMPERSONATION WITH EASE

*Sherif Samy,*  
SVP North America

### 21 Geobridge

#### EXPERTS ONLY

*Donna Gem,*  
Vice President of KEES™

### 29 Interac

#### RACE TO THE FINISH LINE

*Oscar Roque,*  
AVP, Mobile Products and Platform

### 37 nanopay

#### NOW OR NEVER

*Nicko van Someren,*  
Chief Security Officer

# Plethora of powers

---

**T**he instinct that we need to be doing more on the blockchain front is right. In particular, we must develop our consumer payments capabilities to respond to emerging consumer demands, including speed, security, efficiency and convenience.

In terms of hype, blockchain technology rivals just about any technological advancement of the last several decades. Its purported powers are astronomical, ranging from making financial services and products available to everyone in the world and eliminating the need for financial services intermediaries, to

the global adoption and use of decentralized cryptocurrencies.

Blockchain is already driving a swift evolution in payment mechanisms. In the peer-to-peer (P2P) arena, blockchain can overcome some of the limitations of today's most popular money transfer apps. For example, many of the existing apps are extremely vulnerable to cyberattacks. Blockchain can reduce the risk by providing immutability, security, privacy and transparency.

Blockchain is also driving advances in business-to-business (B2B) payments. A

blockchain-powered payment system can cut the settlement time of a bank-to-bank transfer from up to three days to mere minutes while eliminating the costs associated with third-party clearing agencies. The technology can also provide automatic verification and execution of payments via smart contracts, expediting the process even more.

In both the consumer and business areas, blockchain offers notably enhanced security, which is critical in a time when the public has a fundamental lack of trust in the financial services industry. Its powerful encryption and lack of a central authority or database makes transactions nearly impenetrable for hackers. Blockchain also ensures privacy in transactions, restricting access to the details to approved parties. In addition, it is highly auditable. Its systems are built on decentralized, distributed ledgers where transactions are inalterable once confirmed and validated by the network. All transactions leave a traceable audit trail.

Any doubts about whether blockchain is gaining traction in our sector should be erased by the rapid rate at which larger financial services organizations are launching blockchain-backed payment systems – Visa and Mastercard – and filing related patent applications for certain blockchain functions and processes – American Express and JPMorgan Chase. Bank of America already holds almost 50 patents related to blockchain technology, including approximately 20 specifically covering payment systems. These organizations are reducing their own costs and risks, and are positioning themselves to become gatekeepers to essential technology down the road. This could force us to incur licensing fees in the future.

To be frank, though, blockchain technology is not yet on our road map due to several obstacles, including budget and infrastructure limitations and a resistance to innovation. To put it on the map, we must:

- 
- Increase the budget allocation for new technologies.
  - Update aged core systems to handle new technologies.
  - Increase speed to market with new offerings.
- 

Our investments in blockchain should be accomplished through focused market and technology partnerships and collaboration, in addition to dedicated resources. These investments should be made with the expectation that we will not see any significant monetary return within the next three years. Rather, we should make them as part of a strategy to stay apace, and enable quick deployment as required to satisfy consumer and competitive demands.



# Breaking down the hype

---

**T**here's a lot of hype with blockchain technology, but few use cases currently in production.

Why? Because, we read about the rise and fall of bitcoin pricing, and it is a common misconception that bitcoin and blockchain are the same thing when, in fact, they are two different concepts: one built upon the other. Blockchain is a technology whereby information or transactions involving two individuals or entities can be captured and stored in a decentralized system. Bitcoin is basically an application that utilizes this distributed ledger technology. However, blockchain extends beyond the world of cryptocurrencies and generates a technology

framework for creating, storing and validating different forms of data — and resulting in endless opportunities. At this time, most blockchain technologies are not ready for the mass market and require a lot more research and testing.

First, we need to simply separate the hype from the reality. Blockchain is essentially a distributed database in which transactions are written into a block of data containing other transactions, and these blocks are linked together — hence, the “chain” — and stored in a ledger. This is where the entire ledger is saved on multiple computers, which is a

distributed ledger technology system. Changes to the ledger are accepted when a majority of the ledgers agree, and the record cannot be altered. Certain aspects of distributed ledger technology are being used for insurance and some very specific investment banking, which are typically higher value but lower frequency use cases. The use cases specific to payments and retail banking are less obvious.

When implementing blockchain, something you should ask yourself is, “What problem can I solve with blockchain technology that I couldn’t address as effectively without the use of the technology?” To many, blockchain may look like the new hammer, and every problem looks like a nail when in reality it is not. There is a need to cut through the hype and look at the capabilities of the underlying technology. For near-term deployment, a distributed ledger needs to solve a new problem, or solve an old problem in a better way. Those use cases are non-obvious. For example, the number of transactions per second successfully completed by Visa and how quickly, versus the velocity and timeliness of payments via blockchain.

Bitcoin is the most recognized form of a cryptocurrency. Tracking cryptocurrency transactions is one early application that is made possible through distributed ledger technology. But, fundamentally distributed ledger technology is about two parties agreeing to some action: I give you a bitcoin in exchange for USD, and if I agree to take your stuff out of a locker and buy it, the funds transfer begins. That action is initiated automatically with the consensus function tracking to ensure that the transaction is not changed or tampered with.

Before you can talk about a blockchain project, there are few fundamental questions that need to be addressed. First, one needs to be able to explain specifically what is contained in the block that is being written in the ledger. One also needs to be able to articulate how consensus is assured across the nodes participating in the blockchain network and who controls those nodes, whether public or private or some hybrid. There are also a number of use cases being thought through related to payments, and initiatives across the globe are now focused on instant payment

capabilities. What volume of payments can be handled by the system, and how long will it take to populate the status of the transactions across the network? And, most importantly, before we start investing, we should be able to clearly articulate how blockchain technology solves a specific problem, or takes advantage of a specific opportunity, in a manner that is better, cheaper, faster and at larger scale than how the problem is being addressed today. Without a clear articulation of the problem and why blockchain leads to the best solution, we’re just pounding nails with our new hammer.

Blockchain is a very specific design pattern, but there are some significant drawbacks that need to be addressed before it can become a more mainstream technology platform for transactions at scale. It is highly energy-intensive, and transactions are not posted to the multiple ledgers quickly enough to satisfy the needs of a payments platform at scale.

And, most important from an enterprise perspective, there are a number of technology trends that are currently affecting both

the financial services and retail markets, including open banking, artificial intelligence (AI), machine learning, the Internet of Things (IoT), improving security through the use of biometrics while improving the client experience, etc. With most companies facing resource constraints, it probably makes more sense to focus attention on the technology trends most likely to affect the business in the relatively near future, where the technology and use cases can be clearly defined and articulated. Again, think about what problem you are actually trying to solve, and will it benefit your business model? Or, even... the consumer experience your customers are demanding.

Or, if we just want to short-circuit the discussion, we can just ask, “Exactly how is this blockchain use case General Data Protection Regulation (GDPR)-compliant?” That should buy time to go do the hard work of defining the appropriate use cases where blockchain may be of value.

# More than just a database

---

In a similar way that blockchain helps ensure the security of transactions, we leverage the power of our consortium network to segregate positive signals associated with good consumers and negative signals associated with fraudster activity. This feat could not be accomplished in a siloed database environment. Digital banking and payments services are rapidly developing, and the security that underpins them must keep up with the speed and openness of the new services.

Blockchain is a great technology, and bursting with enormous potential. Its potential for

eliminating theft, combined with the potential to increase the speed and efficiency of transactions, makes it an appealing prospect. Essentially, the blockchain is a database just like any other, but with a few unique qualities that make it very interesting to people fighting fraud in online transactions.

Of course, most everyone is aware of its use by digital currencies, but it can also be utilized in other financial segments, lending an approach and methodology that can serve as a foundation for fraud prevention capabilities. These capabilities include validation of all parties, which helps keep everyone — and their



money — safe. While it adds an extra layer of security, it cannot detect or predict fraud or criminal behavior on its own. There will always be a need to ensure that the human beings who make and authorize payments can be trusted.

As I previously mentioned, we actually use a very similar concept to blockchain tech in our current offering. An example of this is utilizing consortium signals and crowdsourced data to validate events and identities instead of relying on single-factor feedback.

When fraud cases are reported to our network, we consider the number of times and transactions where the email address was used by how many distinct companies

compared to the number of companies who reported fraud. So, instead of a black-and-white approach, we achieve a fraud rate. This rate isn't determined by one transaction, but the combination of several. Today's fraud patterns are evolving much too quickly for human-coded, rules-only systems to operate effectively.

This network approach, which is validated, confirmed and monitored by many, ensures the accuracy of both the data and our intelligence — which is essentially what blockchain offers, all things considered.





# Impersonation with ease

---

Any bank knows that its customers' money isn't safe in its accounts unless it has good security in place. Unfortunately, a trend is now emerging in which fraudsters don't even need to impersonate a real person in order to steal from banks. They simply create a fictional identity and apply for credit in that user's name. How is this possible?

First of all, remote (online or mobile) account opening is crucial to achieving scale in most consumer businesses in the digital age. Wherever regulation allows it, banks are waiving the requirement for new applicants

to visit a branch or prove possession of a government issued-identity, even for loans. As finance moves away from the physical and into the virtual realm, fraudsters are capitalizing on the anonymity of the web to get their hands on banks' money. Mobile capture technology provider Mitek predicts that 2018 will see 150 million new account opening fraud attempts at financial institutions, up from 80 million last year.

In countries like the United States, where there is no strict national identity system in place, it's not difficult to make up a plausible name and address with a rarely used or made up

Social Security number with which to apply for credit. Synthetic identity fraud entails the fraudster putting together a fake persona, and giving that persona credibility over months or years by transacting small amounts in their name, [therefore] establishing a history that enables the persona to qualify for credit. Once a worthwhile limit of credit has been granted, whether in the form of a card or a loan, the fraudster spends or “busts out” up to that limit and disappears, abandoning the synthetic identity.

This type of theft is difficult for banks to prevent in the absence of definitive, government-managed identity records. In the U.S., the government has established the Consent-Based Social Security Number Verification (CBSV) service to assist in this regard, but the service doesn't currently allow for the cross-checking of an identity with a Social Security number without the consent of the individual under investigation – and, incredibly enough, this consent must be given via surface mail.

Insisting that credit applicants visit a brick-and-mortar branch improves security, but makes for the kind of second-rate customer experience that 21st century banking users simply will not tolerate. This is especially true considering that in-person identification as a fraud prevention measure is designed to protect the bank, not the applicant. Instead of inconveniencing the already unsympathetic customer, banks should start thinking about how they can draw on technology to simplify things. For example, as machine learning improves, banks will have to improve the identity verification to filter the genuine applicants from the synthetics.

The emergence of what is referred to as “self-sovereign identity” may offer a solution. In countries that do not have robust, government-hosted [ID] systems to rely on, independent identity networks based on blockchain can be established. An individual would then get a group of facts about themselves (e.g. that they are over 18, or that a scanned passport belongs to them) attested by a widely trusted third party, such as their bank, and get this

attestation recorded on a cryptographically secured distributed ledger.

When the individual then applies for, say, a mobile phone contract, he would instruct the mobile operator to check the legitimacy of the information in his application via the distributed ledger. The mobile operator would be able to check the ledger for an attestation of the individual's information by a reliable party – in this case the individual's bank. The individual would be able to select only the relevant facts from the group of attested information to be shared with the mobile operator, and, at the moment of sharing, provide consent for that sharing in real time.

Self-sovereign identity systems show much promise as an everyday use case for distributed ledger technology. However, the success of such systems would be dependent on the buy in from large organizations, governments and online service providers, seeing the business benefit of a distributed approach and making the effort to develop a liability framework for public attestations.

# Intelligent **innovation**

---

**B**lockchain holds the potential to fuel business growth by improving the transparency, auditability, security and speed of financial transactions and applications.

Those characteristics are fundamental reasons why Fiserv cares about this technology. Along with leading institutions and industry participants, we are actively engaging to define practical applications of blockchain that drive value for our clients and their customers. This includes investment in our own research and development efforts, focused on how blockchain can enhance the

functionality of Fiserv solutions, as well as investment in third-party companies, such as Chain, that are dedicated to the application of blockchain in financial services.

With our commitment to purposeful innovation, we are focused on leveraging blockchain not just for the sake of delivering buzzworthy capabilities, but also to deliver impactful and meaningful value to our clients. Fiserv has completed active investigation of blockchain protocols, a deep dive to fully explore underlying technology and evaluate if promises would live up to the hype. This has included an exploration of how blockchain



could be best applied to specific sectors and needs across financial services.

We are actively engaging with clients to “test and learn” through working pilots and proofs of concept in areas that matter to them. These include identity management, lending, smart contracts, data sharing and payments. We are also mapping how blockchain protocols will ultimately underpin other critical areas of technology, such as biometrics, cybersecurity and fraud prevention. Our fundamental perspective is that blockchain is an evolution of current technologies, not a revolution.

Practically, blockchain is a network that lets participants transfer ownership of digital assets and then records those transactions on the ledger in real, or near-real, time. All the participants have access to the ledger, making it a single source of truth for all transactions. While blockchain has the potential to play a role in many areas of financial services, we’ve honed in on three core areas with significant potential for near-term impact: identification, lending and data recordation and sharing.

- 
1. Identification: Blockchain offers compelling capabilities to both accurately identify customers and protect their identities across many types of banking services and digital transactions.
  2. Lending: Blockchain, by its design, has the potential to significantly advance lending processes and workflows — specifically by improving the management and ownership of documents, and the trading of information between parties. Blockchain-based smart contracts will play a major role in this space.
  3. Data recordation and sharing: Blockchain protocol offers a significant improvement in creation of “immutable” data recordation and “single source of the truth.” The combination of clearly evidenced ownership and transfer tracking through sophisticated encryption offers numerous improvement opportunities over current approaches.
- 

Data is an increasingly valuable commodity, and the ability of blockchain to record and maintain data is a significant asset on which financial service providers can capitalize. And the benefits can go beyond that. The security features work toward enhancing confidence in the network and driving cost benefits in areas such as exchanges. The real-time functionality may lead to shorter — and less costly — settlement cycles on trade day. The characteristics of blockchain can open the doors to multiple applications that, in turn, can position financial institutions to achieve growth.

No matter how it’s used or which applications are still on the horizon, blockchain has transformative potential for those who dig in and understand it. Fiserv is taking a long-term, purposeful approach to finding the most valuable areas, and smart ways, to leverage the value that blockchains create.



# Experts only

---

**W**ell, we are certainly familiar with all the buzz associated with blockchain. It's really funny that you should ask about this today, because over the weekend, I had seen some updates from acquaintances on LinkedIn who had posted that they now possessed some type of blockchain expert certification. Seeing their new certifications caused me to search and determine what was involved in obtaining such a certification for myself. I located several different offerings. The general gist of these collective offerings was to download about four hours of course material, and then I could take an online test at the end to become "certified." Suffice it to say, the real expertise

is still rooted in legitimate experience with general cryptography and key management.

Blockchain offers some efficiencies for interdependent applications and services with specific use cases, but there are a few reasons we're not more focused on it at this time. First, this is an advanced cryptographic technique. Most companies do not have in-house cryptographic expertise. Deploying an advanced cryptographic technique is akin to one of your Air Force friends obtaining access for you to have your private Cessna pilot fly you from New York to L.A. in an F-16. Your private pilot may figure out how to get it off



the ground, but there's a strong likelihood that he will crash before he gets you to L.A.

The point is that if we want to invest in the utilization of blockchain technology, we should be experts in standard cryptographic technology before attempting to administer more advanced techniques. From here, we would then be capable of recognizing that a particular use case could gain efficiency by leveraging blockchain as opposed to standard techniques.

Still, both from a compliance perspective as well as a strategic planning perspective, there are risks associated with the use of blockchain technology, specifically with software utilization and asymmetric cryptography. As we know, any cryptography that is not performed in hardware is subject to exploitation of the clear key value. Moreover, the anticipated advances in quantum

computing are considered to be a ticking time bomb for asymmetric cryptography in general.

While cryptography is simple to use, as evidenced by everyone from three years of age to 103 years of age using an iPhone — they are effectively demonstrating the use of encryption. Managing cryptography is far more challenging. Even the utilization of National Institute of Standards and Technology (NIST)-certified algorithms rely upon proper handling techniques. Once data is encrypted, the protection of that encrypted data is entirely dependent upon the keys used for encryption and decryption. If the keys become lost or in some other way unrecoverable, all data protected by the keys becomes lost. If the keys are compromised either intentionally or by nefarious mechanisms, all the data protected by the keys can be compromised.

Consequently, the focus needs to be on investing in cryptographic key management programs and personnel. Once the enterprise achieves a substantial maturity level for such a program, it can more efficiently manage the ebbs and flows of newer cryptographic techniques, or the immediate obsolescence of status quo techniques, because a new vulnerability or exploit is published.



# Identity in the online world

---

**W**e recognize that just mentioning blockchain in our content will increase readership. Others in the industry, perhaps anecdotally, have doubled their company value by just saying they “will be” adopting blockchain technology, and all the investment going into initial coin offerings (ICOs) — \$6.3 billion in Q1 of 2018 — is going to blockchain-based companies.

It is very tempting to announce that we are ripping out our core technology and replacing it with a blockchain. We could do that. At the end of the day, oversimplifying — a blockchain

is a cryptographic hash of a database with some very unique properties — means, ostensibly, every application that relies on databases could use blockchain technology. However, it would be nonsensical to do that. Databases and data warehouses have been and will continue to be optimized for real-time applications that handle very large volumes of data, like our platform. The use of blockchain requires meeting a very specific criterion for it to make sense.

I assume that if you are reading this, you have some basic knowledge of blockchain technology and its use, so I won't spend any



time talking about it. Instead, I will talk about how blockchain technologies can be utilized in our space, and, ostensibly, by our platform.

IdentityMind works with digital identities. Our technology builds and maintains a digital construct that represents an identity in the online world. We store these identities in our database. We monitor these identities' behaviors to assess the risk of the transactions they perform. Based on this monitoring, we can assess risk and compliance of dealing with such an identity in the context of a financial transaction.

The most common use of blockchain, in our industry, has been around identity ownership. It may include an ecosystem in which providers like IdentityMind can validate pieces of an identity and store this validation in a blockchain. The owner of the identity then would have control of the use of the identity and perhaps its proven validity, as attested by trusted third parties. There are a few companies working on this, and every week there seems to be a new one popping up. The focus of these applications is targeting

consumers and their/our right to own how our information is used by others.

The biggest question is whether organizations would embrace this approach, [particularly] when it is far from known whether a "self-proofed" identity would satisfy regulators.

This brings me to the flipside of the previous application: how to satisfy regulators. In this application the regulatory organizations — FinTech, financial institutions, etc. — need to present auditors with a trail of information that represents that a user and their transactions were properly evaluated.

Recently, I was having this conversation with a partner of ours who is very experienced with building blockchain applications. He mentioned that a great use of blockchain is to use it as an enforcement of regulation, meaning events written to the blockchain comply with a set of requirements that are vetted prior to the event being recorded. One can see that if the requirements are the compliance requirements, then meeting these

requirements would enable the event being written and therefore compliance.

There are several challenges to this approach, but perhaps the most difficult, as stated before, would be to convince regulators that such a trail is self-enforced and evidence of proper procedure. I suspect that non-governmental compliance enforcement would find it easier to adopt than governmental regulatory bodies. There are significant incentives for both, but the former would be easier to persuade for adoption than the latter — and rightfully so.

Identity ownership, identity proofing and compliance regulation are three key areas in our industry where blockchain will be meaningful. There are many applications that are well-suited and enabled by it. There is also, unfortunately, too much hype around it. To be quite honest, too many companies are just trying to ride the hype. Product innovators will do themselves — and the industry — a great favor by thinking well through its application, and putting a stop to some stakeholders that just want to be part of it for the sake of it.

# Race to the finish line

---

**T**he starting pistol has gone off and the marathon for blockchain has just begun. Some have sprinted ahead, others have taken a detour and some have decided to sit this particular race out entirely. But, as any runner knows, a lot can happen before anyone reaches the finish line. With a focus on driving value, Interac has started strong and so far maintains a solid pace, ready and focused for the distance ahead.

Blockchain is rightfully part of every payment trends story, and it would be myopic to dismiss it as simply an overhyped trend or

a disruptive force to keep at arm's length. At Interac, we've taken a balanced approach, recognizing it is arguably one of the least understood technologies with the potential to change how businesses transact. We've had fun mining — pun intended — for opportunities to experiment, to build a lean center of excellence, to learn how it works and how it can potentially broaden our core value proposition to new and existing business networks down the road. Some in our position might consider blockchain a disruptor, sure, but we consider it an enabler, given its ability to transform industries by allowing different parties to work together within this new business network.

Take a step back for a moment and think about how we work at Interac. Think payment fundamentals like real-time, irrevocable, good funds, push payments technology and an operational model that's built on partnerships and collaboration with financial institutions and FinTech. When we overlay the principles and technology of blockchain over our payments platforms, we see a lot of synergy.

When we began exploring how to leverage blockchain, we were very clear to focus first on customer value propositions and solving real problems rather than on the solution itself. It is critical for organizations to focus on business value first, or risk being caught in the blockchain hype: a solution looking for a problem.

One of the most important takeaways for us has been to focus on the creation of new business networks, where previously independent organizations come together

using blockchain. Traditionally, these value chains required extensive and potentially cumbersome multiparty contracts, limiting the ability to scale. With a permissioned blockchain network and the use of smart contracts, though, each participant is relatively known to the network and has the permission to transact or to see transactions based on who they are and the role they play, making the creation and scaling of the value chains more straightforward.

With features like these, blockchain can make a significant impact on commerce and how industries are fundamentally (re)structured. It could better enable industry and regulatory participation for new entrants. As a system of secure, transparent and irrevocable transactions shared on a distributed ledger, it has the potential to make it easier to do business with a wider and more flexible scope while reducing single-party risk and constraints.

### **So, where do we go from here?**

With a strong start, grounded in customer value proposition, we will continue our pace and momentum by further building out the concept with more use cases and pivoting where relevant. With all its potential, blockchain technology will only grow in importance, and we want to make sure we're part of the cohort that's pushing the boundaries on what's possible.



# The blockchain bandwagon

---

**B**lockchain is a method to cryptographically secure and verify ownership of something. It's a ledger, and it's a database. Ledgers and databases used to be hidden away in data centers — "a cop and a box," so to speak — but now they can be hidden in plain sight, without trusting anyone or anything. The assets that you store securely and [of which you] verify ownership could be anything: a stock, rights to gold, birth certificates, commodities, shipping invoices, voting records or virtual cats (yes, really).

Wherever our business has assets that we need to secure and verify ownership of, and we can't trust anyone centrally — because we don't trust whomever is already there, or there isn't anyone already there — that's where I would be testing, conducting experiments and working with prototypes. So, for instance, if we want to store records of our legal agreements securely where they can't be hacked or modified, and we can prove to the whole world precisely when they were stored, blockchain — or any similar secure distributed network — would be great.



As far as us jumping on the blockchain bandwagon, I don't feel like it's the right move for us right now. Because we are still early in the evolution of blockchain, there are multiple different blockchains focusing on solving different problems. Beginning to understand the specific value of blockchain to our business is the only valuable investment at this point. We need to start from the beginning and ask fundamental questions before choosing a specific technology like blockchain. We need be clear on:

- 
- What problem are we looking to solve?
  - Where is trust missing from the market or our business?
  - What elements of our business could benefit from a cryptographically secure audit trail of ownership?
  - Are we prepared to experiment, fail and learn from both?
  - Can we be confident we're capable of making those experiments secure?
- 

And, furthermore, we need to be clear that in a very direct way, blockchain is a standard — and sometimes standards don't work out the way you'd hope. The crew over at Modo doesn't think that standardization is the way to create connections between systems, interoperability is. Instead of making you choose a standard and then asking tech to conform to our systems and application program interfaces (APIs) to that standard, the good folks at Modo let and encourage the companies we work with to keep whatever standards we use today and don't make any changes to our systems.

We can connect using any standard and any technology, no matter how disparate, using Modo's utility for interoperability between systems. We don't have to choose — which, by the way, also means that while different blockchain standards fight it out for market share, we will be able to grow our business and switch between the leading solutions. [We'll be able to do that] for as long as there is not a single standard across the industry.

When it comes specifically to payments, either B2B, business-to-consumer (B2C) or consumer-to-business (C2B), blockchain is not yet a great solution for large amounts of volume, nor in sub-second timeframes. Oh, and it's not clear exactly how the relationship between cryptocurrencies and fiat currencies is going to play out. We should be careful about going too far with cryptocurrencies and ending up with large balances of "wampum." The payments technology that runs fiat currency payments is 40-plus years old. These systems are scaled and iron-clad, but working with other payment methods or standards, like blockchain, is virtually impossible for them.

That's another plug for an interoperability solution, I think.

Blockchain is not going to take over payments — or any other industry — overnight, but companies will start to find important use cases where blockchain solves a real problem: maybe in things like healthcare records, or other places where a central, secure database has eluded the market. The growth opportunities will be in specific and clear use cases that solve known problems in the market, and particularly where trust is an issue. Those use cases may be small to begin with, but they will be anchors of the technology and lead to bigger use cases in the future — all of which is hard to predict.

I think the hype is real for blockchain, but the realization that interoperability can change the way financial companies relate to each other and to their customers is just beginning. It is important to remember the famous Bill Gates quote: "We always overestimate the change that will occur in the next two years, and underestimate the change that will occur in the next 10."



# Now or never

---

**W**ith blockchain, just like with any new technology, there is the potential utility, there is the current utility and then there is the hype. What seems to be different about blockchain is just how wide the disparity is between these three.

At their heart, blockchain systems are just distributed ledgers for recording data in which the decision as to the true state of the ledger is determined by consensus rather than by a central authority. Being a ledger rather than a general database means [the technology is] great when you want to be able to look

back at the history of the records, but also means that complex queries can be rather slow. Being distributed means that every user has his own full copy of the ledger under his own control, but also means that he has to bear the storage and communication costs of replicating all that data. Determining truth through consensus can be useful when parties either do not trust each other or any other authority, but it also means that it can be slow and cumbersome to achieve agreement on the current state — and it is always possible that no agreement is reached.

These characteristics mean that, despite the huge hype around blockchain, the number of use cases for which blockchain is a good solution is limited – and the number for which it is the best solution is even smaller. That, in turn, means that if you’ve not yet deployed blockchain, don’t worry!

Many companies seem to have started to “deploy blockchain technology” without knowing what they are going to use it for. While it certainly can be useful to have a technology team that learns about new tools before they are needed, one needs to be careful not to start with a solution and then go out looking for a problem that fits it. If you just bought a blender, for example, then you’ll start making soup even if you really wanted steak. Instead, it is important to start with your business problems and then find the right technologies to solve them. Maybe those solutions use blockchain and maybe they don’t.

So, what are the use cases for which blockchain is the best solution? There are a few questions that you can ask about a use case to see if blockchain is a good fit: Will multiple, autonomous parties need to add to and query some record of transactions or events? Do these parties distrust each other? Is there no third party that these parties can choose to trust, either implicitly or by contract? Is it okay if it takes a little while for the parties to agree on the true state of the record? Is the total size of the ledger likely to remain fairly small? If your answer to all these questions is “yes,” then a blockchain solution may well be best.

If you answered “no,” then don’t worry about being late to the blockchain party. Just because others are doing it doesn’t mean you have to!





**JIM TOMANEY**

*Chief Operating Officer, Renovite Technologies*

# To trust or **not to trust**

---

**S**ometimes, I feel slightly cynical and just describe blockchain as a new generation of database technology. Yes, it supports distribution of the data across, effectively, an infinite number of nodes, where each node is visible to all participants in the service rather than just to the service provider. But, then, I have to admit that this distributed ledger technology is undoubtedly a useful concept – [particularly] when participants need to trust each other rather than simply trusting the provider of the database.

So far, ideas for exploitation of this technology have focused on new use cases [in which]

that intra-participant trust is required. Some of these, such as cryptocurrencies, seek to create a parallel payments infrastructure. Personally, I believe that the really useful applications of distributed ledger technology will be new peer-to-peer (P2P) trading applications. I recently saw a really innovative Canadian scheme for trading the output of domestic electricity generation with grid feed-in tariffs. Another use case that could benefit from this technology would be a refresh of the domestic property purchase process in many economies. These processes often involve chains of home purchases, each technically separate but linked because each player is both a seller and a buyer. Crucially,

in these example cases, the new distributed ledger schemes will still access the existing payments networks rather than replacing them.

Blockchain didn't exist as a requirement when our payment switch was architected in 2015. However, that integration with this new requirement requires no rework of the products. We simply need to develop the relevant service requests for adding and retrieving a record for a given ledger, and then publish those services to our existing service library. Doing so makes the services available to users of the system configuring the transaction workflows. In this way, Renovite will be able to integrate blockchains with the payment infrastructure rather than gambling on whether blockchain will replace the existing, established payment systems.

Renovite stopped making assumptions about what the future payments landscape would look like. The emergence of distributed ledger systems with the requirement to integrate has validated that approach and proved the implementation. Financial services organizations that want to prepare themselves for the regular arrival of new payments models must act now to eliminate their dependence on legacy platforms, [and that's] based on the assumptions of 20th century payment requirements.



# about

## PYMNTS.com

PYMNTS.com is where the best minds and the best content meet on the web to learn about "What's Next" in payments and commerce. Our interactive platform is reinventing the way in which companies in payments share relevant information about the initiatives that shape the future of this dynamic sector and make news. Our data and analytics team includes economists, data scientists and industry analysts who work with companies to measure and quantify the innovation that is at the cutting edge of this new world.

The PYMNTS eBook: Breaking Down The Blockchain may be updated periodically. While reasonable efforts are made to keep the content accurate and up-to-date, PYMNTS.COM: MAKES NO REPRESENTATIONS OR WARRANTIES OF ANY KIND, EXPRESS OR IMPLIED, REGARDING THE CORRECTNESS, ACCURACY, COMPLETENESS, ADEQUACY, OR RELIABILITY OF OR THE USE OF OR RESULTS THAT MAY BE GENERATED FROM THE USE OF THE INFORMATION OR THAT THE CONTENT WILL SATISFY YOUR REQUIREMENTS OR EXPECTATIONS. THE CONTENT IS PROVIDED "AS IS" AND ON AN "AS AVAILABLE" BASIS. YOU EXPRESSLY AGREE THAT YOUR USE OF THE CONTENT IS AT YOUR SOLE RISK. PYMNTS.COM SHALL HAVE NO LIABILITY FOR ANY INTERRUPTIONS IN THE CONTENT THAT IS PROVIDED AND DISCLAIMS ALL WARRANTIES WITH REGARD TO THE CONTENT, INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, AND NON-INFRINGEMENT AND TITLE. SOME JURISDICTIONS DO NOT ALLOW THE EXCLUSION OF CERTAIN WARRANTIES, AND, IN SUCH CASES, THE STATED EXCLUSIONS DO NOT APPLY. PYMNTS.COM RESERVES THE RIGHT AND SHOULD NOT BE LIABLE SHOULD IT EXERCISE ITS RIGHT TO MODIFY, INTERRUPT, OR DISCONTINUE THE AVAILABILITY OF THE CONTENT OR ANY COMPONENT OF IT WITH OR WITHOUT NOTICE.

PYMNTS.COM SHALL NOT BE LIABLE FOR ANY DAMAGES WHATSOEVER, AND, IN PARTICULAR, SHALL NOT BE LIABLE FOR ANY SPECIAL, INDIRECT, CONSEQUENTIAL, OR INCIDENTAL DAMAGES, OR DAMAGES FOR LOST PROFITS, LOSS OF REVENUE, OR LOSS OF USE, ARISING OUT OF OR RELATED TO THE CONTENT, WHETHER SUCH DAMAGES ARISE IN CONTRACT, NEGLIGENCE, TORT, UNDER STATUTE, IN EQUITY, AT LAW, OR OTHERWISE, EVEN IF PYMNTS.COM HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

SOME JURISDICTIONS DO NOT ALLOW FOR THE LIMITATION OR EXCLUSION OF LIABILITY FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES, AND IN SUCH CASES SOME OF THE ABOVE LIMITATIONS DO NOT APPLY. THE ABOVE DISCLAIMERS AND LIMITATIONS ARE PROVIDED BY PYMNTS.COM AND ITS PARENTS, AFFILIATED AND RELATED COMPANIES, CONTRACTORS, AND SPONSORS, AND EACH OF ITS RESPECTIVE DIRECTORS, OFFICERS, MEMBERS, EMPLOYEES, AGENTS, CONTENT COMPONENT PROVIDERS, LICENSORS, AND ADVISERS.

Components of the content original to and the compilation produced by PYMNTS.COM is the property of PYMNTS.COM and cannot be reproduced without its prior written permission.

You agree to indemnify and hold harmless, PYMNTS.COM, its parents, affiliated and related companies, contractors and sponsors, and each of its respective directors, officers, members, employees, agents, content component providers, licensors, and advisers, from and against any and all claims, actions, demands, liabilities, costs, and expenses, including, without limitation, reasonable attorneys' fees, resulting from your breach of any provision of this Agreement, your access to or use of the content provided to you, the PYMNTS.COM services, or any third party's rights, including, but not limited to, copyright, patent, other proprietary rights, and defamation law. You agree to cooperate fully with PYMNTS.COM in developing and asserting any available defenses in connection with a claim subject to indemnification by you under this Agreement.