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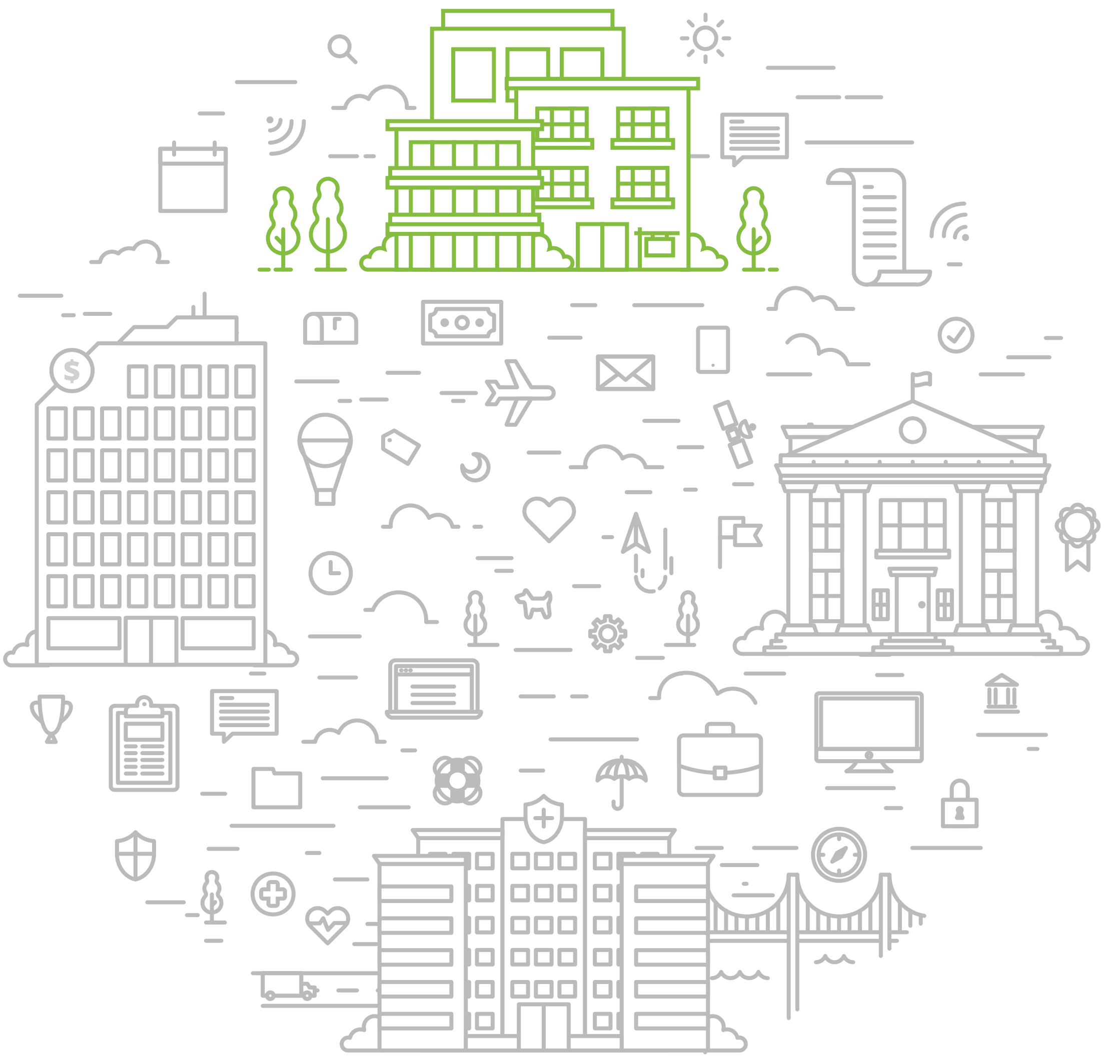

Blockchain in commercial real estate
The future is here!

Deloitte Center *for* Financial Services




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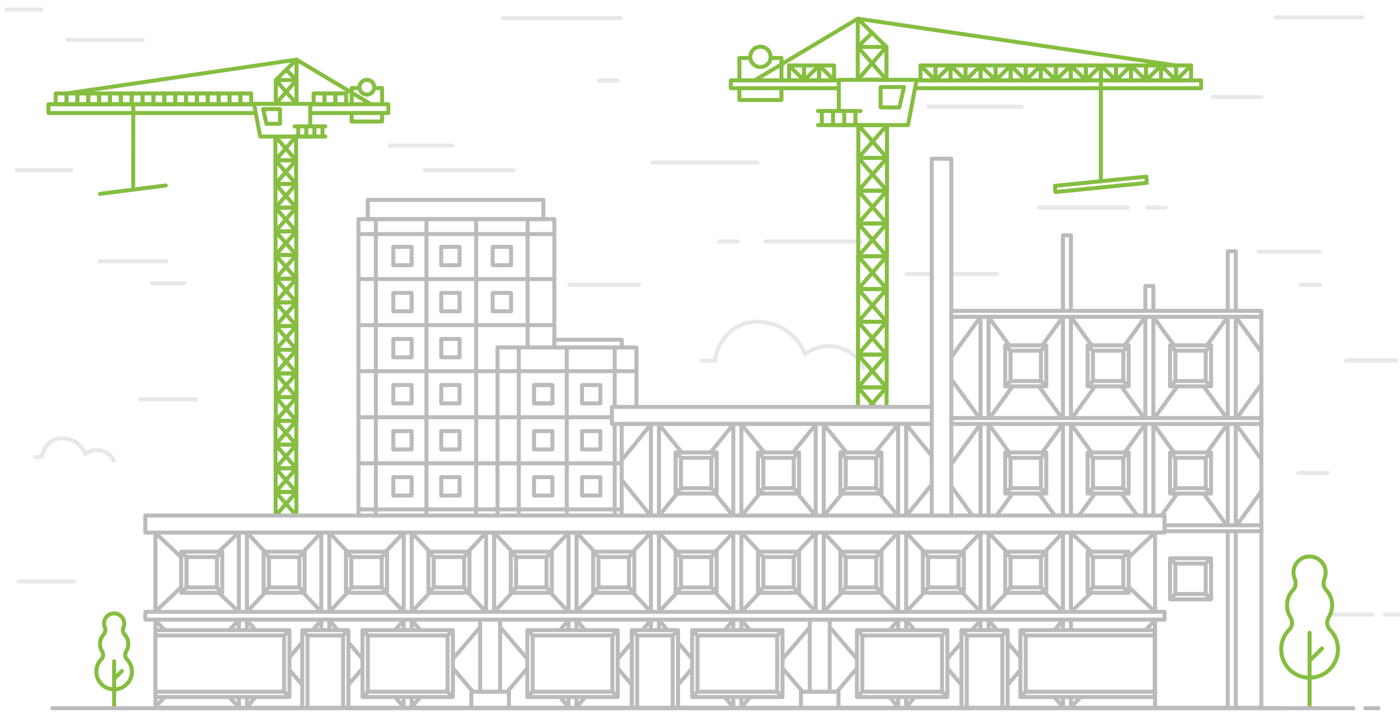


The new technology on the “block”

The commercial real estate (CRE) industry appears to take pride in keeping several aspects of its operations secret, such as comparable lease rental rates, property prices, and valuations, to create a possible competitive advantage. However, secrets are hard to keep—and may not even be desired—in today’s hyperconnected and digitized world. In response to greater demand for transparency, technology advancements and the disintermediation by startups are gradually making some of this information public.[1] As a result, property-related information is increasingly available in digital and paper form. However, a significant portion of the digitized information is hosted on disparate systems, which results in a lack of transparency and efficiency, and a higher incidence of inaccuracies that creates a greater potential for fraud.

Blockchain technology—a digitized, distributed ledger that immutably records and shares information—could enable the CRE industry to address these inefficiencies and inaccuracies. According to a 2015 World Economic Forum survey of 800 executives and information and communications technology sector experts, 57.9 percent of the respondents believe that 10 percent of the global GDP information will be stored on blockchain technology by 2025.[2]

Until recently, blockchain was known more as the technology powering Bitcoin. However, industry players now realize that blockchain-based smart contracts can play a much larger role in CRE, potentially transforming core CRE operations such as property transactions (purchase, sale, financing, leasing, and management). Over time, blockchain adoption can have a broader impact, as it can be linked to public utility services such as smart parking, waste, water, and energy billing, and also enable data-driven city management.

In this report we will dive deeper into the value proposition of blockchain technology and its applicability to property leasing and management processes.

But is CRE ready for blockchain technology?

As CRE companies invest in a multitude of technologies to meet their varied business requirements, it may be worthwhile to first understand the benefits of blockchain technology that are highlighted in Figure 1.

Figure 1: Benefits of blockchain technology

1 Near real-time

The blockchain enables near real-time settlement of recorded transactions, removing friction and reducing risk, but also limiting ability to charge back or cancel transactions.

2 Trustless environment

Blockchain technology is based on cryptographic proof, allowing any two parties to transact directly with each other without the need for a trusted third party.

3 Distributed ledger

The peer-to-peer distributed network records a public history of transactions. The blockchain is distributed and highly available; it also retains a secure source of proof that the transaction occurred.

4 Irreversibility

The blockchain contains a certain and verifiable record of every transaction ever made, which mitigates the risk of double spending, fraud, abuse, and manipulation of transactions.

5 Censorship resistant

The crypto economics built into the blockchain model provide incentives for the participants to continue validating blocks, reducing the possibility of external influencers to modify previously recorded transaction records.

Source: Deloitte LLP

Companies should then assess whether and where blockchain can be useful, as the technology has its own unique characteristics and perhaps may not address each inefficiency in current processes. The technology should meet certain prerequisites for blockchain to be relevant (see prerequisites in Figure 2 on the following page).
Once companies identify a process that is ready for blockchain technology, they should evaluate costs and benefits. While doing so, they will potentially benefit from assessing the extent of overhauling existing systems and interoperability with the various technology systems used by different stakeholders of CRE transactions.

Figure 2: Prerequisites for adopting blockchain technology

Why consider blockchain for real estate leasing?

Need for a common database

Shared databases are critical for leasing transactions. One of the key examples is a multiple listing service, which collates property-level information from private databases of brokers and agents.

Multiple entities can modify database

Managing real estate properties involves several entities, such as owners, tenants, operators, and service providers, who provide, access, and modify a variety of information.

Lack of trust among entities

Many times, different participants in the leasing lifecycle do not have pre-existing relationships, which results in mistrust.

Opportunity for disintermediation

Trusted intermediaries in real estate, such as notaries, can be disintermediated through blockchain, as transactions can be independently verified and automatically reconciled.

Transaction dependence

Many leasing and property management transactions are correlated and part of the same database. For instance, in case of a net lease structure, the tenant pays a base rent amount to the landlord and maintenance expenses directly to the vendor.

Source: Gideon Greenspan, "Avoiding the Pointless Blockchain Project," Linkedin, November 24, 2015; Deloitte Center for Financial Services analysis.

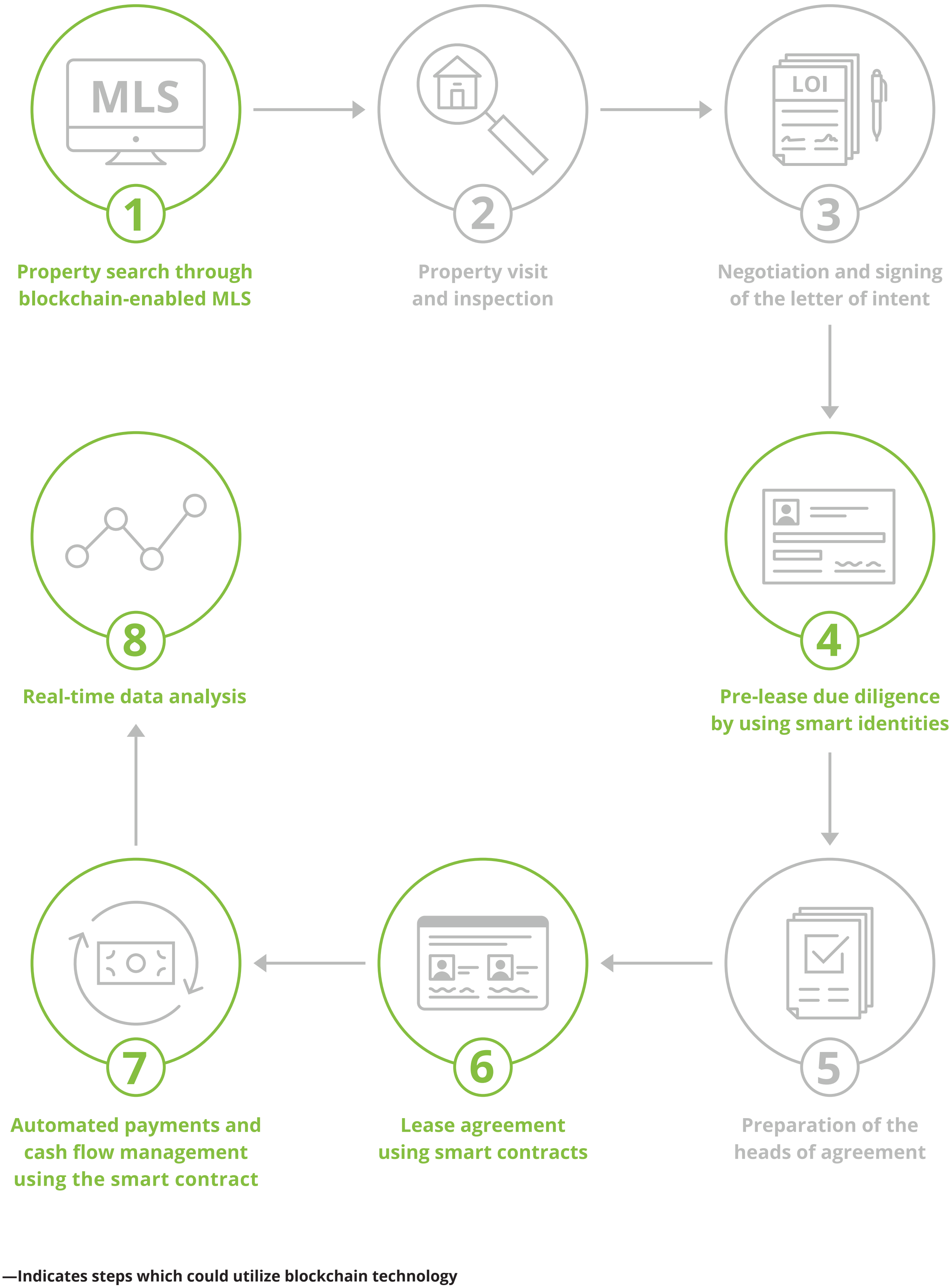
As set forth in Figure 2, we believe that among the core CRE processes, leasing is ripe for blockchain adoption, as it can take advantage of its inherent benefits and meets the prerequisites for using the technology.

How can blockchain technology elevate CRE leasing processes?

CRE owners have an opportunity to alleviate some of the existing challenges in their leasing transactions using blockchain technology (also visualized in Figure 3 on the following page):

Inefficient property search process due to fragmented listings data	Time-consuming, paper-driven, predominantly offline due-diligence process
Complexity in managing ongoing lease agreements, property operations, and cash flows	Absence of real-time rich data affects management's decision-making capability

Figure 3: Using blockchain technology in a CRE lease transaction



(Figure 3 cont'd)

1 — Property search through blockchain-enabled MLS

The lessor and the lessee or their respective brokers list their requirements on the multiple-listing services (MLS).

A transparent MLS system enables all parties to view the available listings based on their requirements.

2 — Property visit and inspection

The brokers discuss their clients' requirements and arrange for property visits and inspection.

3 — Negotiation and signing of the letter of intent

Both sides negotiate the terms and value of the deal.

The lessee sends the letter of intent (LOI) to the lessor, expressing interest in the property.

4 — Pre-lease due diligence by using smart identities

Using blockchain-based digital identities of individuals and assets, the lessor conducts a background check on the lessee and the lessee checks the prior transactions and liens on the property.

5 — Preparation of the heads of agreement

The heads of agreement, containing all the clauses and terms agreed between the two sides, is prepared and verified by the accounts and legal teams on both sides.

6 — Lease agreement using smart contracts

The key terms of the agreement are recorded on the blockchain and this becomes the smart contract.

The smart contract initiates payment of security deposit/advance rent either through Bitcoin wallets or bank accounts using a payment interface.

The lessor then transfers the possession of the property to the lessee.

The transaction agreement is officially recorded.

7 — Automated payments and cash flow management using the smart contract

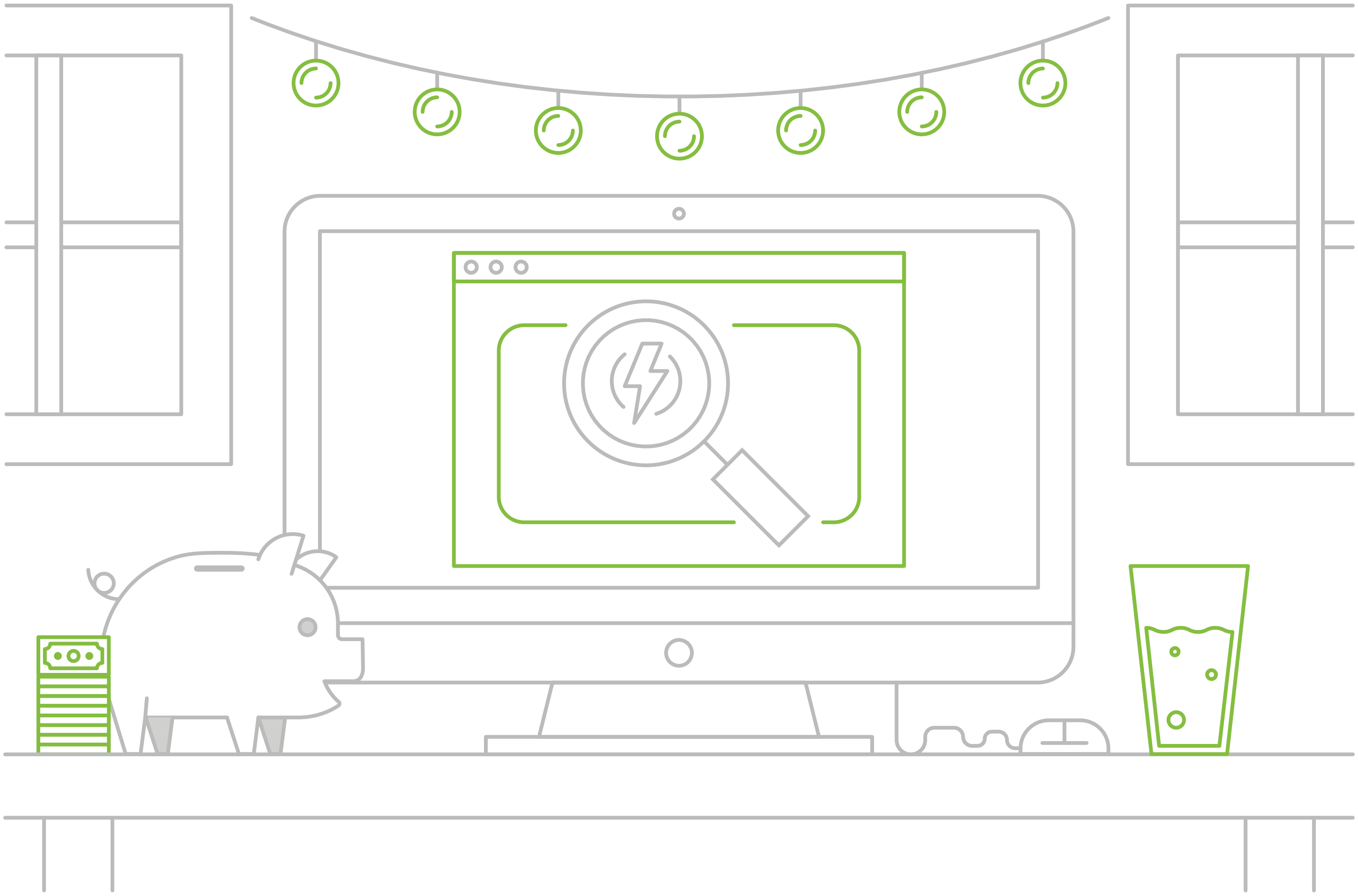
Based on the terms of the agreement, the smart contract initiates the regular lease payments from the lessee to the lessor, after paying the outstanding maintenance expenses to the contractors, using the preferred mode of payment.

On completion of the lease term, the smart contract initiates the transfer of the security deposit to the lessor.

8 — Real-time data analysis

As several payments and transactions are recorded on the blockchain along with the digital identities of individuals, properties, and organizations, the lessor can perform real-time data analyses using appropriate analytics tools.

—Indicates steps which could utilize blockchain technology



Opportunity I: Improve property search process

Existing challenge: Inefficient property search process due to fragmented listings data

Today, CRE brokers, owners, and tenants often use MLS to access property-level data such as location, rental rates, and property features. These platforms are typically subscription-based, commanding high access fees from users.[3] The accuracy and detail of property-level data is completely dependent on the preferences of the brokers, due to a lack of standardized processes and substantive human intervention. This may result in the information being inaccurate, dated, or incomplete.[4] Further, the search process itself tends to be inefficient, as the data, in general, is fragmented across multiple platforms.[5] As a result, there are delays in decision-making for landlords and tenants, and low levels of trust on the quality of information available on MLS.

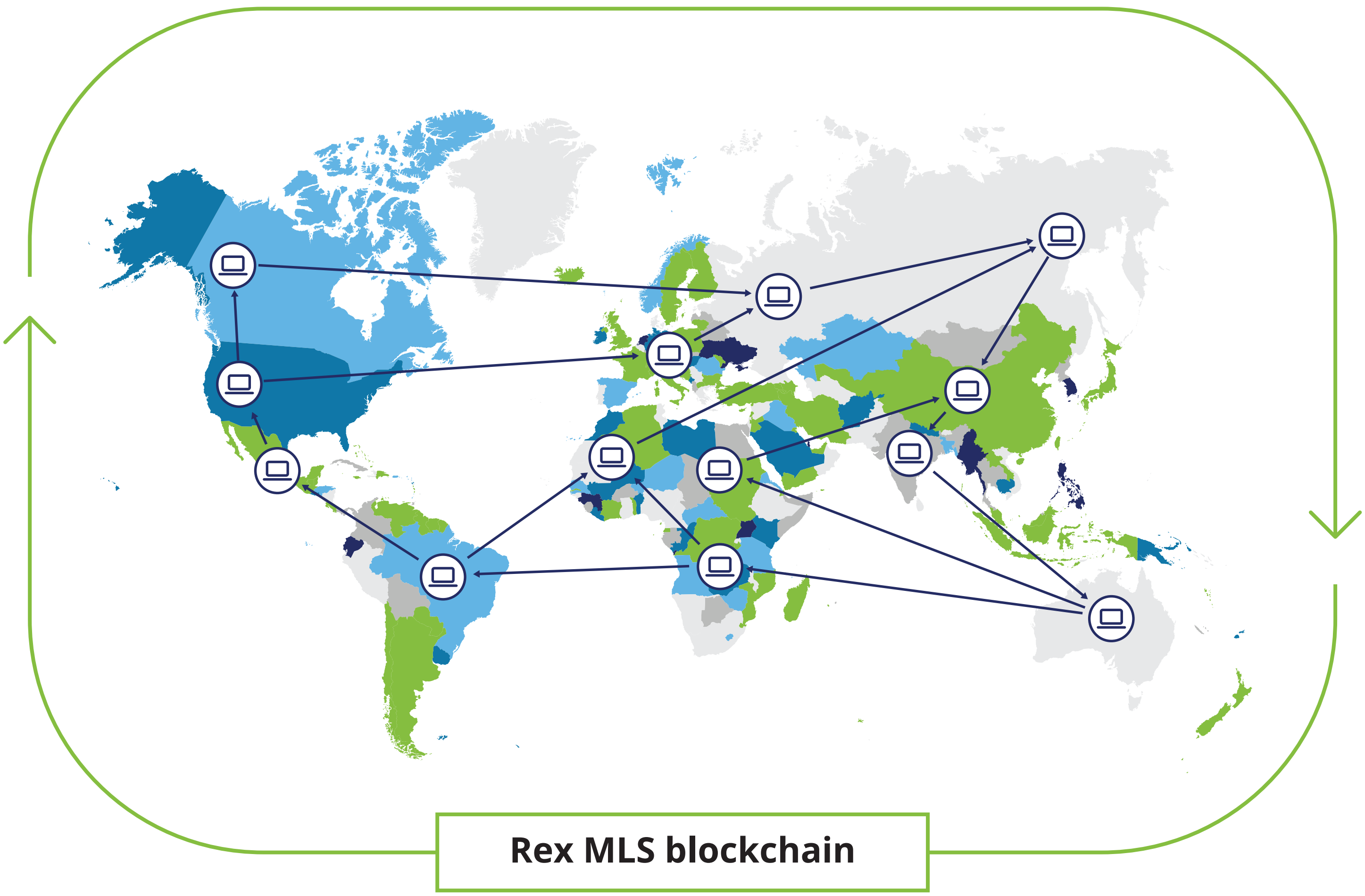
The blockchain opportunity: Efficient and reliable property search

A blockchain-based MLS would enable data to be distributed across a peer-to-peer network in a manner that allows brokers to have more control over their data, along with increased data democracy, as listings would be more freely accessible.[6] Available for each property listing would be clear details on property location and address, comparable rental rates, ownership history, tenant details, age of the property, and title clarity.[7] As a result, market participants could have access to more reliable data at a lower cost. In fact, per a recent Deloitte survey of 308 executives, 36 percent of respondents perceive efficiencies (lower costs/greater speed) as one of the key benefits of using blockchain technology.[8] While many blockchain uses are in proof-of-concept stage, companies such as Rex MLS have started testing the technology for property listings (Figure 4).

Figure 4: Rex MLS—revolutionizing CRE listings globally

Type of blockchain	Public blockchain based on Ethereum
Development stage	Initial testing completed, final roll out in the works
Service offering	Freely available multiple listing service based on the blockchain platform providing users access to listing information

Process:



Users upload the property listing on the Rex MLS blockchain; in turn, they are rewarded Rex's cryptocurrency.

Rex MLS allows users across the platform to freely access data on the MLS and also make transactions using Rex's cryptocurrency.

Outcomes

- Increased transparency
- Enhanced process efficiency and accuracy
- Easier access to international listings
- Lower transaction costs

Source: Evander Smart, "Rex: Decentralizing and Disrupting Real Estate Listing Services," BTC Manager, June 7, 2016; Rex company website.

Opportunity II: Expedite pre-lease due diligence

Existing challenge: Time consuming, paper-driven, predominantly offline due diligence process

In a CRE lease transaction, usually significant time is spent on due diligence activities related to financial and legal review. This is predominantly due to using physical documents for proof of identity, documents that are often stored in siloed places and have limited flexibility to be customized to suit various needs.[9] For a property, these could include documents supporting the history of ownership, tenants, and repairs and maintenance activities. This inefficient manual verification process increases administrative tasks and is prone to loss of information and errors. Further, involvement of numerous third-party service providers tends to elongate the due diligence process.

The blockchain opportunity: Drive efficiency and accuracy in due diligence process

CRE market participants should consider developing digital identities for a property to keep pace with the growing preference for digital transactions. As the name suggests, digital identity with respect to a real estate property would imply a digital identifier that consolidates information such as vacancy, tenant profile, financial and legal status, and performance metrics in digital form.[10] A combination of blockchain technology along with digital identity can alleviate the above-discussed challenges of physical identity proofs. An August 2016 Deloitte-World Economic Forum report titled “A Blueprint for Digital Identity: The Role of Financial Institutions in Building Digital Identity” mentions that a “digital identity would allow financial institutions to perform critical activities with increased accuracy over that afforded by physical identity, and to streamline and partially or fully automate many processes.” In fact, if companies experimenting with blockchain technology also consider using the digital identity of property and people, the result can have a powerful impact on reducing the current inefficiencies and inaccuracies. This is because digital identities of properties linked to the digital identities of owners and tenants can create valuable online records for a property, improve lease information management, and greatly ease the due diligence process. Figure 5 on the following page illustrates a digital identity-based system for real estate transactions, linking digital identities of individuals, organizations, and assets.

Figure 5: Telia, ChromaWay, Lantmäteriet, and Kairos Future—digitizing the identity of individuals, organizations, and assets

Type of blockchain	Private blockchain (can be replicated on a public blockchain, like Bitcoin or Ethereum)
Development stage	Proof of concept and technical demonstration
Service offering	Digital identity based system for real estate transaction processing

Process:

1

Buyer and seller login to the app using their Telia (telecom provider) IDs

- The buyers' and sellers' identities are verified by Telia's digital ID solution on Chromaway's (blockchain start up) app developed for Lantmäteriet (Swedish land registry).
- Telia's ID solutions can be used on mobile phones and can register individuals with or without a personal identification number.

2

RE agent and bank are appointed and due diligence is done

- Using the app, the seller appoints the RE agent who does the property due diligence and invites potential buyers.
- The interested buyers invite their bank to the transaction through the app.
- The interested buyer's bank verifies the property ownership through the app.

3

Agreement is signed

- The seller and the buyer both sign the contract using digital signatures and identification.

4

Payment is completed

- The buyer instructs its bank to make the payment to the seller. Both parties are intimated once the payment is complete.

5

Property title is transferred

- Upon payment, the registrar receives a notification to initiate title transfer.
- The registrar digitally transfers the title from the seller to the buyer.
- Title transfer is updated on the app and visible to all parties.

Outcomes

- Reduced transaction time
- Enhanced data security
- Less manual errors and duplication of verification process

Source: ChromaWay company website; John Camdir, "Sweden Conducts Trials of a Blockchain Smart Contracts Technology for Land Registry", Bitcoin Magazine, June 23, 2016; "The Land Registry in the blockchain," Telia, ChromaWay, Lantmäteriet, Kairos Future, and International Council for Information Technology in Government Administration (ICA), July 2016.

Opportunity III: Ease leasing and subsequent property and cash flow management

Existing challenge: Complexity in managing ongoing lease agreements, property operations, and cash flows

There are complexities in managing a CRE property due to dependencies among landlords, tenants, property managers, and various vendors. Right from the start of a lease, there are numerous payment and service transactions that need to be executed, tracked, and recorded on a regular basis. There are also several checks on the same data. For instance, periodic cash flows are investigated by real estate owners and:

- **Auditors as part of preparation and review of financial statements**
- **Banks for (re)financing related decisions**
- **Financial regulatory authorities for monitoring purposes**
- **Appraisers for property appraisals**

As a result, real estate companies have rigorous accounting, compliance, and cash flow management needs and related costs.

The blockchain opportunity: Smart contracts enable easier, transparent, and efficient management of property and cash flows

Executing a real estate lease using smart contracts can address many of the challenges associated with property and cash flow management. According to Nick Szabo, a prominent thought leader of blockchain and smart contracts, "a smart contract is a set of promises, specified in digital form, including protocols within which the parties perform on these promises."[11] For the real estate sector, the traditional lease contract can morph into a smart tenancy contract. The use of a smart tenancy contract on a blockchain platform would enable transparency in lease terms and transactions. The contract could use rent or bonds for automated payments to real estate owners, property managers, and other stakeholders along with near real-time reconciliation.[12]

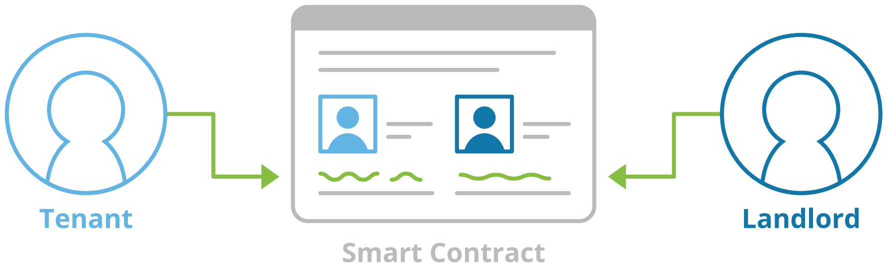
Figure 6 on the following page highlights how smart tenancy contracts used by the London-based startup, Midasium, can enable efficient property management and cash flows. In general, there is openness in using smart contracts within the business community. Deloitte's aforementioned blockchain survey suggests that about 46 percent of respondents would be comfortable contracting with another party using a blockchain-based smart contract instead of a traditional paper-based legal contract, and 40 percent believe there is value in recording existing contracts on the blockchain.

Figure 6: Midasium—Enabling smarter property and cash flow management

Type of blockchain	Private (permission-based) blockchain
Development stage	Prototype ready
Service offering	Property and cash flow management using smart contracts based on the blockchain

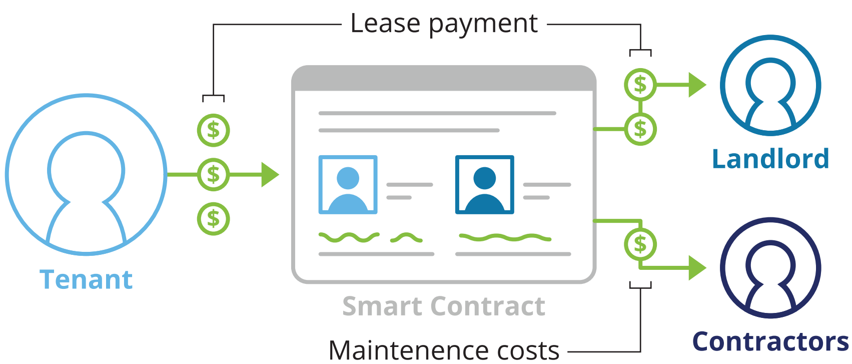
Process:

1



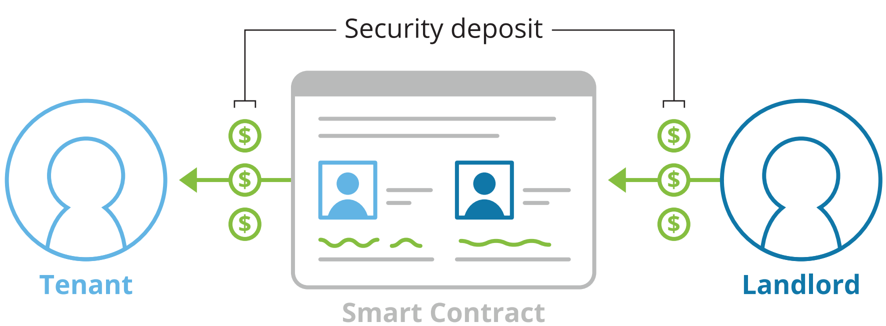
Both parties digitally sign the smart contract (agreement), which includes details such as rental value, payment frequency, and tenant and property details.

2



Based on the terms of the contract, the smart contract periodically initiates the lease payments from the tenant to the landlord and the contractors.

3



On termination of the lease, the contract triggers the payment of security deposit back to the tenant after adjusting for any damage repair charges.

Outcomes

- Instant settlement and management of cash flows
- Simplified property management
- Legally enforceable contracts
- Faster reconciliation of payments

Source: "Blockchain, Bitcoins and rental payments", Property Council of Australia, November 15, 2016; Midasium website.

Opportunity IV: Enable smarter decision-making

Existing challenge: Absence of rich real-time data impacts management's decision-making capability

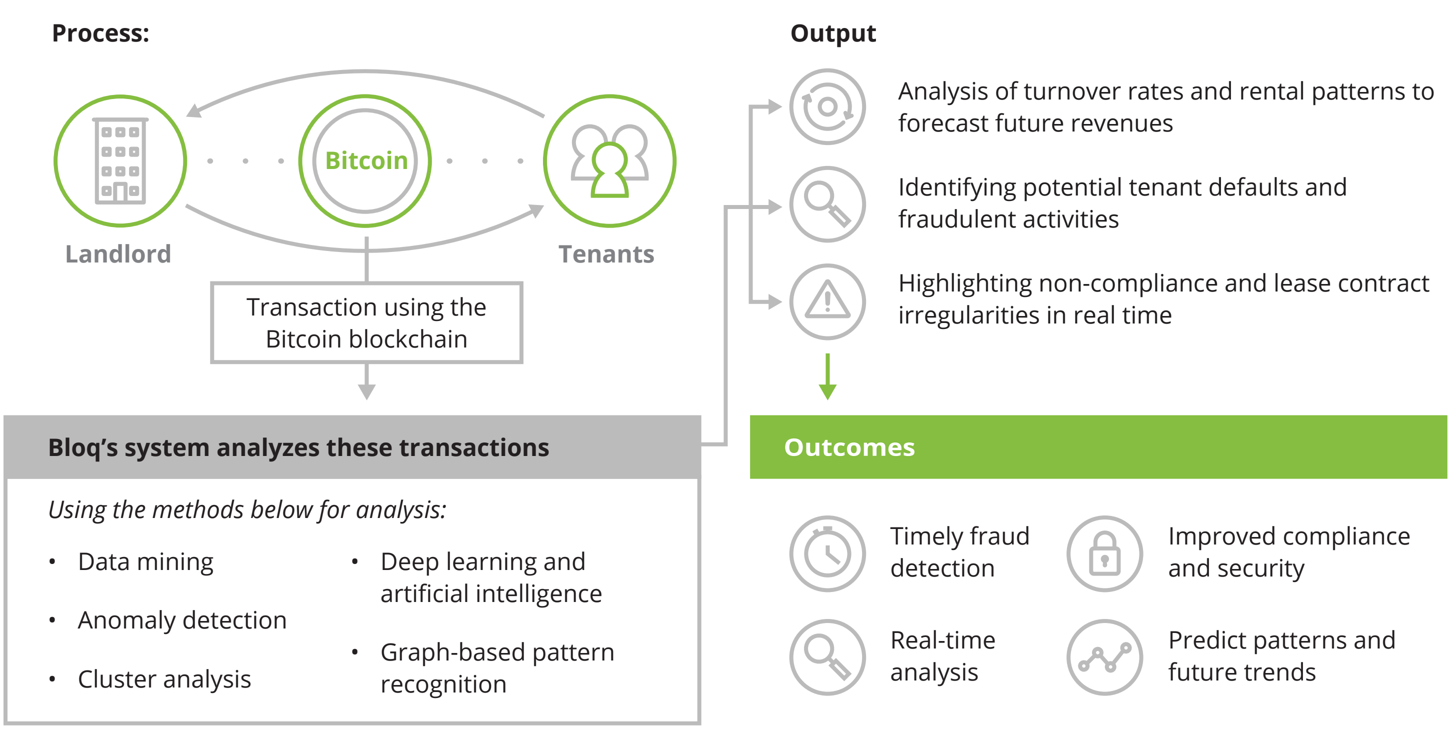
Currently, many CRE systems and processes are siloed, and information is consequently scattered on different point solutions. This lack of interoperability results in data redundancies, duplication of records, and opaqueness. As such, RE management's decisions are frequently based on data sets, which do not provide a real-time view of ongoing activities.

The blockchain opportunity: Connective tissue between varied technology systems refines quality of data, analysis, and decisions

Blockchain technology can be the connective tissue between technology systems of CRE companies and other participants in a leasing transaction by providing a more open and shared database for all involved parties. This would enhance data quality and also enable real-time recording and retrieval. As a result, CRE players can address some of the interoperability issues and use predictive analytics to draw smarter and near real-time insights from the blockchain data, which may eventually enhance the quality of leasing-related and property operating decisions. While players can use their own capabilities to analyze internal data, they could hire third-party blockchain vendors as intermediaries to analyze aggregated industry data. In Figure 7, we show Bloq's use of advanced analytics and artificial intelligence on blockchain data to identify patterns and predict future behavior.

Figure 7: Bloq—enabling analytics on blockchain

Type of blockchain	Currently on the Bitcoin blockchain with plans to expand to other blockchains
Development stage	Product development and planning
Service offering	Analytics service on blockchain data



Source: Bloq company website

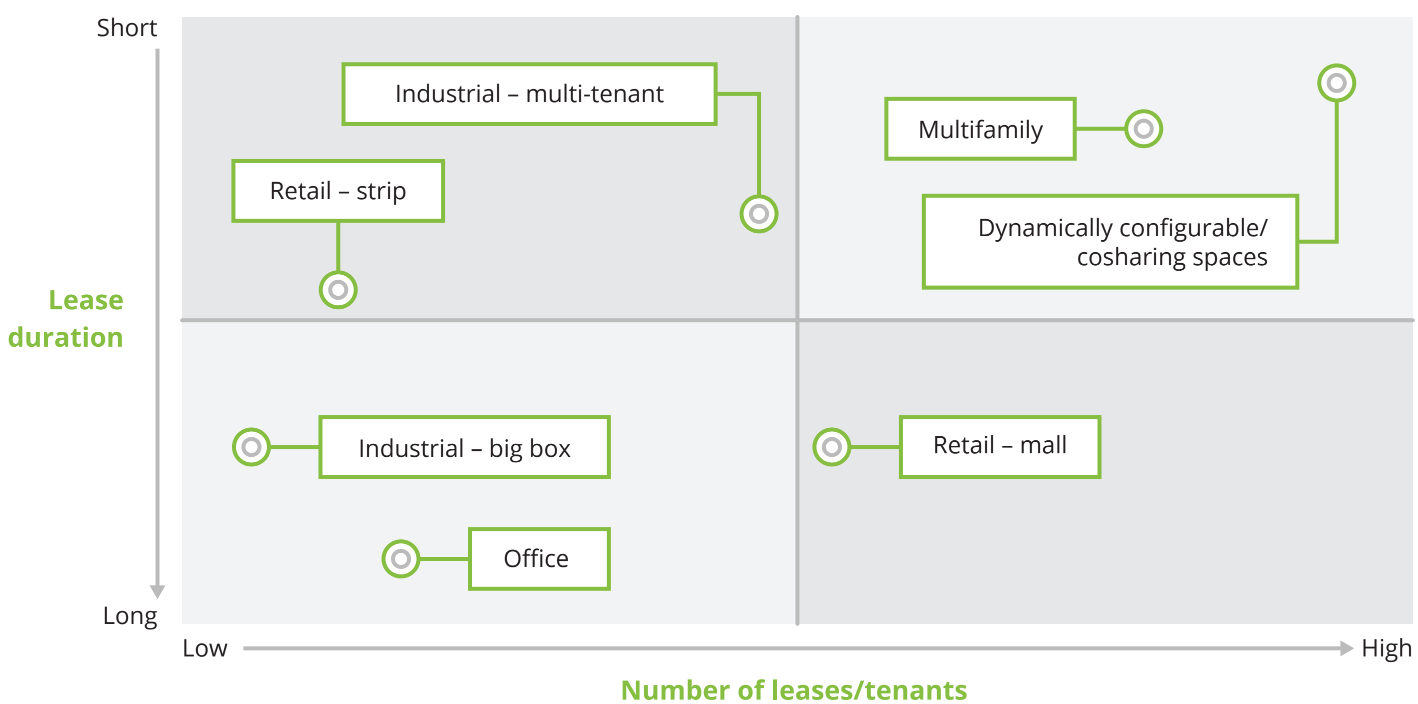
Get real, get ready

Currently, blockchain technology is at a nascent stage, particularly in the CRE sector. Many of its applications will likely be determined through a process of continuous experimentation. However, the underpinning thought is that blockchain technology is not an answer to all the inefficiencies in existing processes. CRE industry participants should acknowledge that it may not be possible to completely automate transactions, as a few trusted intermediaries would still be required to meet contractual obligations, such as an assessment of the building to understand renovation requirements.[13] In fact, if blockchain technology is not implemented correctly, it can increase costs.[14]

With that said, we believe that the value proposition in using blockchain technology for leasing contracts is potentially greater for properties with shorter-duration leases and a higher number of tenants. In such scenarios, there tends to be relatively higher number of lease contracts, which results in increased documentation and transaction costs. Using the illustrative framework in Figure 8, we've assessed the applicability of blockchain technology to leases of different property types. For simplicity's sake, we have restricted our analysis to different traditional CRE property types (office, apartment, retail, and industrial), and some of the newer CRE formats such as dynamically configurable and co-sharing spaces.*

As the framework illustrates, blockchain seems to be most applicable to dynamically configurable or co-sharing spaces, which have a relatively higher number of tenants and shorter duration leases compared to traditional property types, especially office and big-box industrial.

Figure 8: Illustrative framework to assess applicability of blockchain



Source: Deloitte Center for Financial Services analysis.
*Dynamically configurable spaces are fluid spaces that can be adjusted in size or design, based on specific tenant needs. Co-sharing spaces are collaborative spaces used by anyone and anytime, based on specific tenant needs. So far, co-sharing spaces are available for office use and residential accommodation.

However, companies may also consider the focus areas below as they embrace blockchain technology. These areas are among many others identified in Deloitte's "Blockchain: Democratized trust: Distributed ledgers and the future of value" report:[15]

Figure 9: Key focus areas for adopting blockchain technology

EDUCATE

First, companies need to educate themselves on blockchain:

- What are the benefits and limitations of blockchain?
- How does it apply to real estate?
- What are the real value propositions of blockchain vs. traditional system solutions?

COLLABORATE OR CREATE?

Next, companies need to decide on collaboration opportunities:

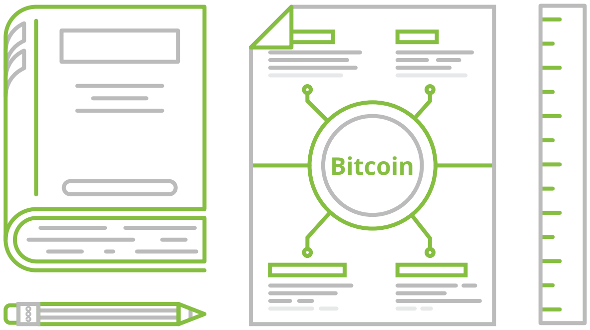
- What is the opinion on "build vs. collaborate" and which business area is the focus?
- What issues or opportunities do we have in common with peers and competitors?
- Which blockchain technology platform (Monax, Symbiont, Hyperledger) should we leverage, keeping in mind the compatibility and long-term usage?
- Which organizations should we collaborate with?

FACILITATE

Then, companies need to facilitate the implementation:

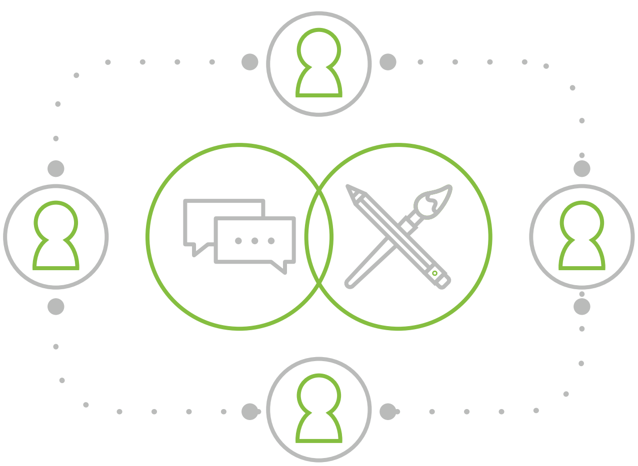
- Which are the existing solutions that can help in our digital identity journey?
- How can we integrate digital identities to make smarter applications?
- Is privacy a priority for our blockchain applications?
- What type of blockchain are we comfortable with—public, private, hybrid?
- How do current regulations impact our blockchain design?

Source: Eric Piscini, Joe Guastella, Alex Rozman, Tom Nassim, "Blockchain: Democratized Trust, Distributed Ledgers and the Future of Value," Deloitte University Press, February 24, 2016. Vimi Grewal-Carr and Stephen Marshall, "Blockchain: Enigma. Paradox. Opportunity." Deloitte LLP, January 2016.



Educate

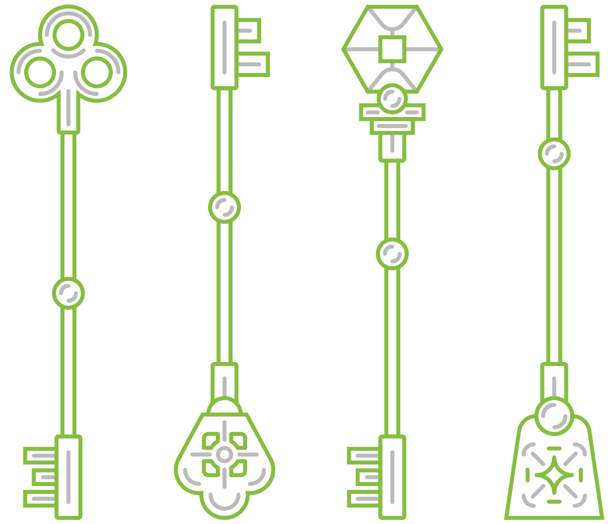
Unlike other emerging technologies such as mobile, analytics, or even the cloud, blockchain can be confusing—what it is, how it works and, most importantly, why it matters. Moreover, some of the earliest and most public use cases involving Bitcoin may be deemed irrelevant or underwhelming. Concerted education efforts are likely required, ideally coupled with a disciplined approach to innovation and a prototype demonstrating potential use cases specific to a given organization and industry.



Collaborate or create?

Given the limited experience of blockchain technology among traditional CRE companies and the continuous growth of the blockchain ecosystem, CRE companies should consider partnering with one or more vendors. But before signing on the dotted line, they should try to understand what makes a prospective partner's offering unique. Is the partner willing to co-invest in solutions (or even in proofs of concept) that will meet your specific needs? Typical caveats apply for tapping start-ups: understanding the leadership team, board, VCs, funding level, and financial viability.

Whether the partner is big or small, consider defining the exit strategy up front, to remove hard dependencies and imbalances in future negotiations. Given the nature of the blockchain, partnerships with peers and competitors might be options as well.

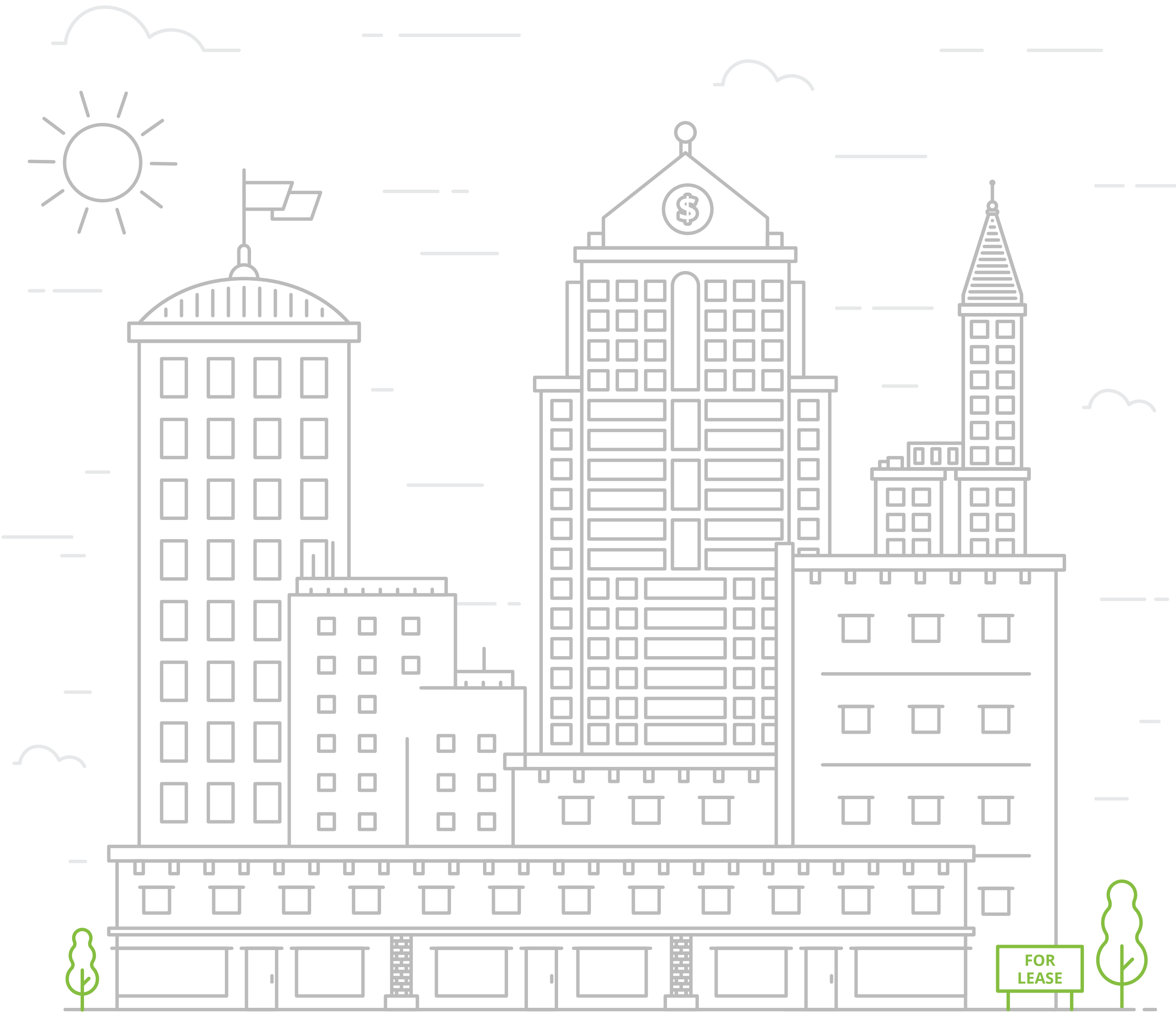


Facilitate

Once companies are more informed about the blockchain technology and have deliberated over strategic alliances, they can focus on facilitating the implementation. Companies can look for ways to create digital identities of their people, properties, and enterprise as key enablers to blockchain-based applications, including smart contracts.

Despite blockchain's immutability, there can be areas of security and privacy vulnerabilities, and so appropriate focus is needed in this regard. For instance, one of the key aspects is to choose the type of blockchain—public, private (permissioned), or hybrid, based on the risk assessment and level of trust.

From a regulatory and compliance standpoint, progress seems to be outpacing regulation, which may help users gain momentum with their blockchain initiatives in the short term. Eventually, regulation—and legal precedents that recognize blockchain transactions—will almost certainly catch up with this technology. Public blockchains will most likely be subject to oversight by governing bodies similar to those overseeing various aspects of the Internet. Private blockchains will be managed under private agreements.



Think about it, question it, but don't ignore it

In our world of continued technological revolution, most new technology comes with a promise to improve business and profitability. And whether one likes it or not, there can be a threat to survival if a business doesn't adapt to the changing times. As blockchain technology continues to evolve, it is challenging status quo and perhaps requires CRE companies to better understand the technology and revisit their existing business model, strategy, processes, and financial plan. CRE companies can consider answering the questions listed in Figure 9 on the previous page as they perform a detailed assessment of adopting blockchain technology.

In summary, blockchain technology has significant potential to drive transparency, efficiency, and cost savings for CRE owners by removing many of the existing inefficiencies in key processes. While this report focuses on property leasing and management processes, our future publications will provide an in-depth analysis of blockchain technology's applicability to purchase-sale transactions and financing. Hence, CRE companies and industry participants evaluating an upgrade or overhaul of their current systems should have blockchain on their radar as its demonstrated usefulness has the ability to bring significant value to the industry.

Endnotes

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[8]This survey was commissioned by Deloitte and conducted online between November 14 and December 1, 2016. The survey polled a sample of 308 senior executives in the USA at companies with $500 million or more in annual revenue. Respondents had at least a broad understanding of blockchain and were familiar with and able to comment on their company's blockchain investment plans, https://www2.deloitte.com/us/en/pages/about-deloitte/articles/press-releases/deloitte-survey-blockchain-reaches-beyond-financial-services-with-some-industries moving-faster.html.

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