

# DEMYSTIFYING BLOCKCHAIN



Cognizant



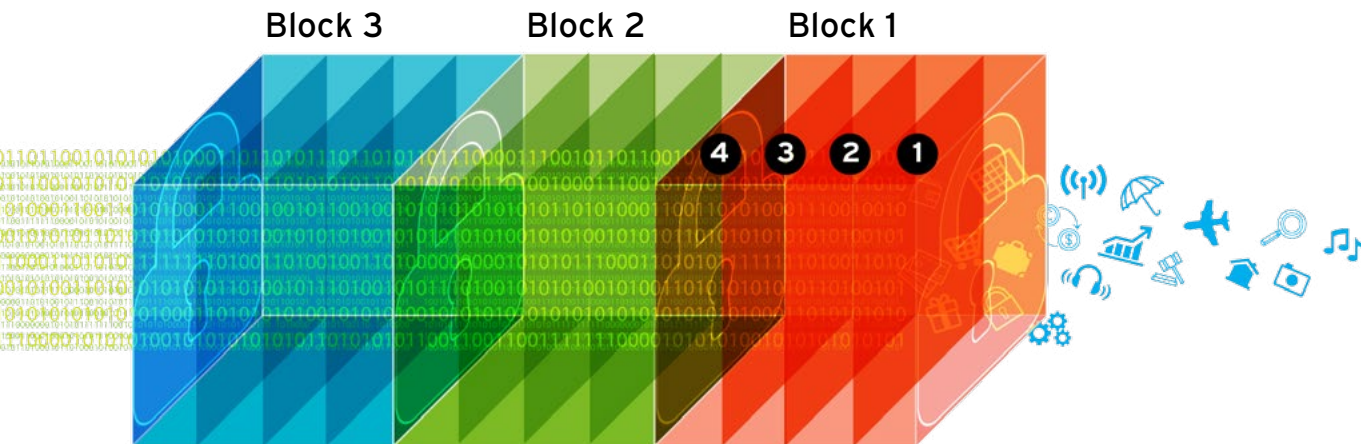
# SETTING THE CONTEXT

Amid unprecedented industry hype, the unique combination of technologies known as blockchain has emerged as a possible antidote to one of today's most vexing online business challenges – how to create greater trust, transparency and accountability for all who wish to transact and interact online.

Despite the fact that the technology isn't quite ready for prime time, blockchain is consuming strategic planning cycles of decision makers across industries.

At its essence, blockchain is a decentralized software mechanism that enables a public distributed ledger system. It allows the tracking and recording of assets and transactions without the presence of a central trust authority such as a bank. Importantly, it relies on public key encryption, or cryptography which makes it difficult for hackers and other cyber criminals to change or steal data. It enables peer-to-peer exchange of data, assets and currencies through rules-based smart contracts in a more efficient, transparent and cost-effective manner.

# HOW BLOCKCHAIN WORKS



**Think of blockchain as a series of data blocks, each containing information about events that have recently occurred.** This data can cover any online activity, such as a product purchase, an ownership transfer, a property sale, or a royalty payment. Blockchain data verification and validation is carried out by “miners,” individuals who use cryptographic software and the processing power of their computers to confirm the activity.

**Each block is securely hashed** – meaning it is rendered into a digital representation and the hash is stored in the next block which makes it nearly tamper proof.

**Each data block typically contains four pieces of information:** a reference to the previous block, the list of included transactions including the transaction summary which is created by hashing all the transactions in the block, a time stamp, and optionally a

cryptographic proof that ensures that the nodes stay true. The cryptographic proof algorithm varies by blockchain framework, the choice of which is determined by the positioning of the framework’s network security model (public, private, etc.).

**The blocks are strung together into a chain and broadcast across the network to various nodes.** Each node independently validates the blocks and comes to a consensus about the block’s validity before the block is added to the decentralized ledger. This makes it difficult for hackers and fraudsters to introduce fraudulent transactions (as long as a majority of nodes are true), thus ensuring trust and integrity without the need for a central authority (e.g., a bank).



# POTENTIAL FOR FINANCIAL SERVICES

We believe that through targeted approaches, many of which are being piloted today, banks can explore blockchain's potential and grab some quick wins using **smart contracts** in document exchange, record-keeping, multi-signature and digital asset transfer.



## Banking and Finance

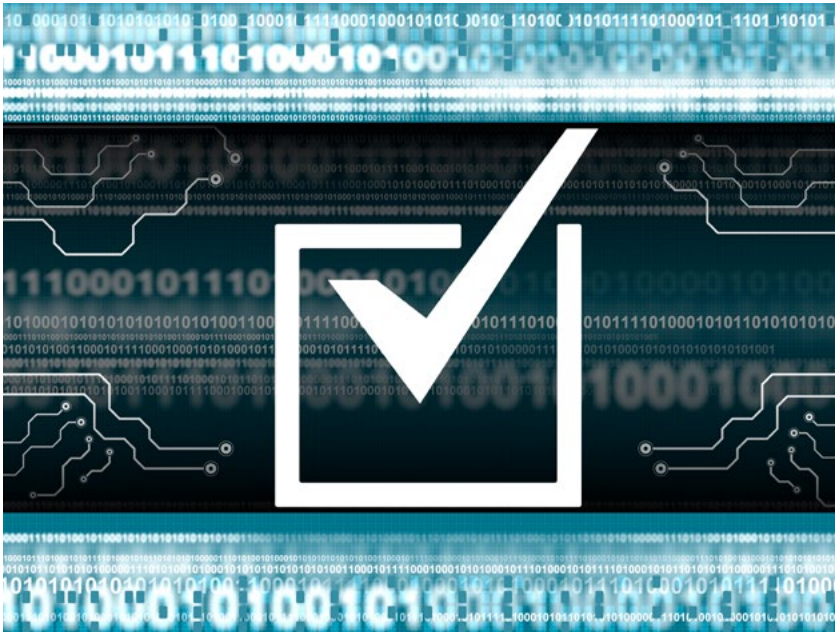
Banks and financial institutions are among the first to sense the potential of blockchain. R3, a blockchain technology company devoted to research blockchain's use in the financial sector, leads a consortium that already includes

45 financial firms.<sup>1</sup> The "Open Ledger Project" launched in December 2015 by tech and finance majors such as IBM, Intel, JP Morgan and the London Stock Exchange "aims to build blockchain technology that can bring a new level of automation and transparency to a wide range of services in the business world, including stock exchanges and other financial markets."<sup>2</sup>

We believe that through targeted approaches, many of which are being piloted today, banks can explore blockchain's potential and grab some quick wins using smart contracts in document exchange, record-keeping, multi-signature and digital asset transfer. In this way, blockchain can be applied to help solve today's efficiency problems and also create new opportunities and business models.<sup>3</sup>

Focal points include:

- **Enhanced security** through cryptography and a tamper-resistant design, while eliminating the risk of a single point of failure. If a breach does occur, its location can be determined and isolated, precisely and quickly without impacting the rest of the network.
- **Simplification and cost reduction**, by removing the need for intermediaries and automating process elements through smart contracts. The shared infrastructure can help reduce costs within the bank and with other parties across the value chain.
- **Transparency**. With access to blockchains, authorities can see the specifics of transactions for themselves instead of relying on the veracity of banks' reporting.



A smart insurance contract would pay out against the insurable event **without the policyholder having to make a claim or the insurer having to administer the claim.** This will essentially remove the cost of claims processing and minimize fraud.



### Securities Brokerage: Trade Settlement

Trade settlement processes typically require two to three days for payments and securities to change hands.<sup>4</sup> A decentralized trade settlement platform could eliminate or change the role of intermediaries, resulting in reduced commissions and other costs. Ideally, trades could be settled instantaneously.

Such a model will allow seamless trade globally by keeping securities positions on a decentralized ledger, allowing trades beyond existing regional systems, such as Target 2 Securities (T2S) for the Eurozone.

Decentralizing the clearing process will eliminate the considerable amount of risk in the trading of over-the-counter (OTC) products such as swaps, raising trust levels. By executing transactions in real-time, a decentralized platform could reduce counterparty risk and improve the regulation of speculative trading.

Easier access to transactional information for regulators could reduce the cost of regulatory reporting for market participants.



### Insurance

Having trusted blockchain ledgers of various events and identities could eliminate the need for human triggers. For example, a travel insurance policy could be “activated” at the time of purchase of a cruise ticket, “de-activated” when the cruise ship docks at its final destination, and trigger a claim if the cruise ship could not depart due to a weather event.<sup>5</sup>

A smart insurance contract would pay out against the insurable event without the policyholder having to make a claim or the insurer having to administer the claim. This will essentially remove the cost of claims processing and minimize fraud.<sup>6</sup>



Peer-to-peer insurance, or a crowd-funded model, is another potential play for blockchain in insurance. Smart contracts will ensure payments that comply with terms agreed to by all parties. Blockchain will make administration and execution simpler, almost fully automated, transparent and inexpensive. For instance, claims management

could be sourced to a third party that via blockchain could connect related ledgers to verify and settle a personal property claim. This process would be activated and completed by machines, automatically, thus saving time and money.<sup>7</sup>

# POTENTIAL FOR NON-FINANCIAL INDUSTRIES

Industry experts and blockchain evangelists Don and Alex Tapscott reference the tracking of immutable records, such as property ownership in India and the trading/tracking of carbon emissions to address global warming, as two potential ripe vines where **blockchain can democratize information, protect civil rights and help solve global challenges.** Other examples abound.



Blockchain holds tremendous potential for industries such as the entertainment industry. It can transform everything from proof of creation to ownership, transfers of digital assets, rights management, micropayments and creative collaboration. It can eliminate or reduce the need for centralized registries of intellectual property. It can bring

transparency to the art market, tracking the sale of art work and the payment of resale royalties.<sup>8</sup>

Creative projects that are created on blockchain technology could be recorded upon creation. Smart contracts can be embedded with licensing terms and when consumers purchase music, for example, the royalties can flow immediately to each of the participating parties. Blockchain can make the creation of projects such as a screenplay truly collaborative by logging each contribution.

In their book, ***Blockchain Revolution: How the Technology Behind Bitcoin Is Changing Money, Business and the World***, Don and Alex Tapscott reference the tracking of immutable records, such as property ownership in India and the trading/tracking of carbon emissions to address global warming, as two potential ripe vines where blockchain can democratize information, protect civil rights and help solve global challenges. Other examples abound.



Blockchain is poised to disrupt the manufacturing sector. Manufacturing value chains are complex, multi-tiered combinations of various types of organizations providing design, sourcing, manufacturing, delivery and service across multiple geographies. Even a single component of a single product may involve myriad possible transactions requiring a number of financial and regulatory intermediaries, each requiring its own contract and trust relationship among the parties. Blockchain quickly and inexpensively provides trust in the identity and legitimacy of any partner in any financial or trading relationship. This reduces manufacturing cost and time to reconcile transactions. It could also help to establish new business relationships. For example, since trust is built into a smart contract, new partner possibilities can flourish, fortifying innovation and revealing new business opportunities.





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With the Internet of Things (IoT), blockchains in manufacturing will automatically monitor prices, delivery times and other conditions, and automatically negotiate and complete transactions in real time.

Blockchain can be used not only for transactions, but as a registry and inventory system for any asset ranging from raw materials to intellectual property.

For manufacturers, and their suppliers or logistic partners, an individual block might contain bills of lading for raw materials or finished goods, proof of the origin, quality or operations performed on a part, or instructions for the place and time of delivery of a shipment. In each case, the information could be stored, trusted, shared and changed by

the partners in the value chain without the cost, expense and delay of negotiating formal contracts, getting letters of credit from a bank or a bond for a transportation provider.<sup>9</sup>

This system of distributed trust allows lower transaction costs in the short term. In the long run it will enable more agile value chains, closer cooperation with business partners and faster insights from the IoT.



In healthcare, blockchains could address interoperability challenges in clinical, research as well as administrative areas. Digital transaction ledgers could be securely shared among a wide group of stakeholders, who could directly exchange data using a virtually impenetrable and immutable ledger.

Electronic health records (EHR) is a critical area of interoperability where blockchain would offer an array of benefits and capabilities that align with the Office

of the National Coordinator for Health Information Technology (ONC), the Personalized Medicine Initiative (PMI) and Patient Centered Outcomes Research (PCORI) objectives as well as the industry's need to cut costs, improve quality and shift to value-based, patient-centric care while maintaining the security and privacy of personal health information (PHI).

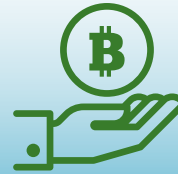
# WORDS TO THE WISE

Things to know about blockchain before proceeding.

With blockchain sitting outside the corporate firewall and managed by many different and unconnected parties, the cyber criminal no longer has a single target to attack. Potentially, blockchain is immune to all of the conventional cyber threats that corporations worry about.<sup>10</sup> However, software bugs, colluding attacks by verifying nodes, etc. can crash blockchains permanently.<sup>11</sup>

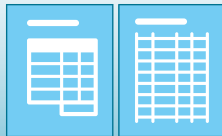


There are enduring concerns tied to the volatility of bitcoin and everything connected to it.<sup>12</sup>



Automated execution, and the potential to simplify B2B payments<sup>13</sup> and resolve issues surrounding cross-border payments can also mean a ceding of control by organizations. For example, a policyholder does not have to rely on the insurer's decision to cover damages. The insurer will pay before claims managers even know about the claim.

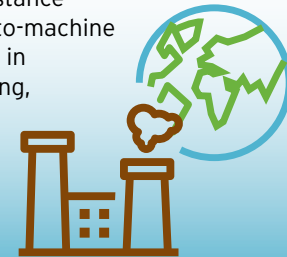
Putting software "on a blockchain" is an inconvenience, justified only in cases involving a global public ledger.<sup>14</sup>



Blockchain is not a guarantor of authenticity. "When people talk about a single source of truth, they should really be talking about a single, mutually agreed, version of record, but being careful that this is not over-sold as "truth" or "fact"."<sup>15</sup>



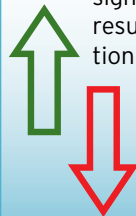
There will likely be cultural resistance – to machine-to-machine transactions in manufacturing, for example.



Blockchain is still a work in progress, making it hard to predict its course, potential roadblocks, snags, etc.



It has the potential to cause significant economic upheaval resulting from the disintermediation of banks and other financial institutions, and the transformation of how business is conducted across industries. The potential ramifications of disintermediation could be extensive.



Working with legacy systems during the transition will be a challenge. Organizations will need test and deploy blockchain technology that coexists with existing systems – rip-and-replace isn't an option. Systems integration challenges will naturally be quite formidable.





# NAVIGATING THE CHALLENGES

As is typical with disruptive technologies, **we recommend first executing proofs of concept to understand its potential and limitations**, rather than measuring early deployments on their return on investment.

**We expect the next 12 to 18 months to be extremely important for companies looking to develop their blockchain strategies.**

As is typical with disruptive technologies, we recommend first executing proofs of concept to understand its potential and limitations, rather than measuring early deployments on their return on investment.

Take manufacturing for example. We recommend that manufacturing companies implement blockchain technology evaluation and selective proofs of concept, begin developing and testing innovative blockchain business models and products, leverage experienced partners to build a blockchain technology (hardware and software) lab to understand the ever-changing potential and challenges.

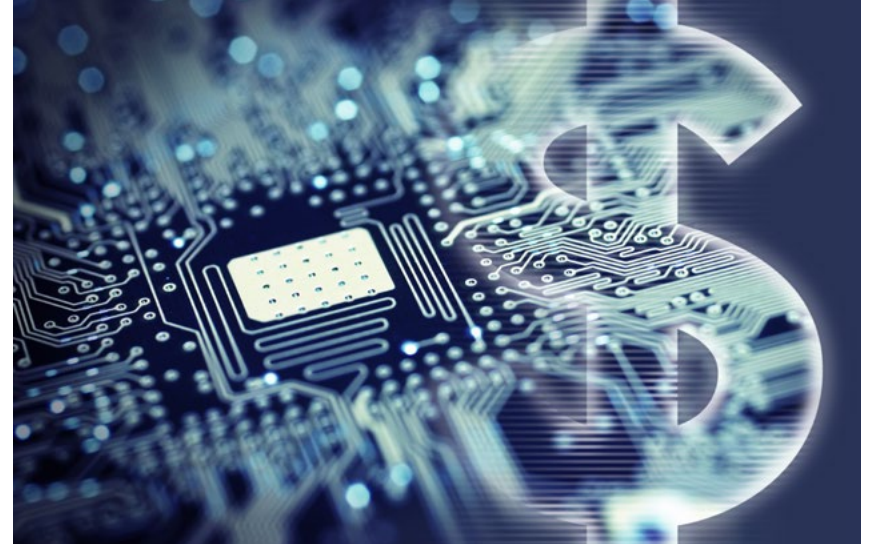
Insurance companies need to think about running **hackathons** and start building developer

communities. They must consider crowdsourcing innovation rather than trying to do everything in-house. Both imperatives will not come easy to traditional conservative insurers.

Your organization doesn't need to wait for interoperability with the outside world to reap blockchain rewards (e.g., streamlining costly internal processes). Banks for example can start by identifying opportunities for innovation; determine feasibility and impact on existing systems; test proofs of concept; understand the regulatory and data security implications; and dissect the implementation challenges: open versus permissioned. They then should plan for transactional scalability; form partnerships; and establish cross-functional and cross-industry collaboration.<sup>16</sup>

## Blockchain Pilots

To practice what we preach, we have a variety of initiatives underway to test the potential of blockchain.<sup>17</sup>



They include:

- Accelerators for digital identity assurance and verification using blockchain.
- Secure document exchange, authentication and storage within a blockchain solution for multiple counterparty transactions.
- Accelerators for integration with various blockchain frameworks.
- A platform for cryptocurrency acceptance.
- A digital securities settlement platform.
- A decision engine to compare exchange rates across multiple payment providers.
- Fund transfers over blockchain between a bank and its subsidiaries.

# ADDITIONAL RESOURCES

Visit the [Blockchain section](#) of our website for additional insights.

## Watch video



## Listen to podcast



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# FOOTNOTES

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