Information Builders

A White Paper

The Beginner's Guide to Using Blockchain Successfully

WebFOCUS iWay Software Omni

Information Builders provides the industry's most scalable software solutions for data management and analytics. With one smart platform for integration, data quality, and analytics, we help companies manage their data, generate insights, take action, and deliver impact.

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Introduction

Industry experts agree that in this age of digital transformation, blockchain distributed ledger technology (DLT) has the potential to revolutionize many important business processes. Blockchains offer new levels of visibility, traceability, and accountability, enabling businesses to reduce costs and waste, optimize processes, enforce compliance, and reduce human error.

With all the promised benefits of blockchain, why have many enterprises elected to disengage, stop experimentation, or cancel prototypes at the early stage of implementation? To answer this question, this white paper seeks to understand what blockchain is, what benefits can be derived from it, and what obstacles are preventing blockchain from accelerated implementation.

What Is Blockchain?

Consulting giant PwC[1] defines blockchain, at a high level, as a distributed ledger technology that enables business processes to store and manage business records securely and reliably, without the intervention of an external "traffic cop" or controller.

For example, electronic funds transfers are currently managed by external intermediaries (banks, brokerage houses, and clearinghouses such as SIAC), which provide a fee-based, safe, reliable, and auditable means of exchanging records electronically. A user of any one of these systems "trusts" the bank/brokerage house to execute a transaction, at a cost between a few cents to as much as $25 per transaction, within their network or across networks. The SWIFT Financial Network or the EU's Euroclear® are good examples of this, executing millions of transactions daily around the world.

Like any comparable system in any industry, the sophistication of these networks is elaborate and very expensive to implement and maintain. Blockchain distributed ledger technology eliminates the need for the middleman, enabling businesses to build and maintain elaborate electronic record transfer and storage systems, within an enterprise or across enterprises and without the need for a trusted intermediary.

Essentially, a blockchain-oriented process allows entities that do not necessarily trust one another to engage in trustworthy business activity.

At a deeper level, a blockchain is a distributed database. Typical distributed databases store information in disparate locations, referred to as "nodes," and communicate with one another using an established protocol. A distributed transaction (unit of work) is "committed" across all instances of the distributed database or "rolled back" across all instances by an intermediary traffic cop (transaction manager).

Blockchain units of work function in a similar way, but without the need for an intermediary. They use a consensus protocol, ensuring that the nodes remain in sync. The nodes on a blockchain vote whether or not to commit a transaction. When the involved nodes reach consensus as to whether the transaction is valid, the transaction is committed and cannot be rolled back, making a permanent, inalterable record of the transaction. The inalterability of blockchain records makes it extremely useful when traceability and auditability are important.

[1] Marsh, Cathryn. "What Is Blockchain," PwC, January 2016.

Blockchain Uses and Benefits

To understand the benefits of blockchain, we must examine potential uses in different industries. We'll start with manufacturing and supply-chain management, drilling into some details, and then continue with somewhat less detail in other industries.

Blockchain in Manufacturing and Supply-Chain Management

Supply chains encompass the end-to-end flow of information, products and services, and money. The way these components are managed affects an organization's competitive positioning in areas such as product cost, working capital requirements, speed-to-market, and service perception.

Advances such as blockchain distributed ledger technology are collapsing linear supply chains into dynamically connected and "always on" digital supply-chain networks (DSN). These DSNs transform how businesses exchange and share information and assets. Despite DSN enhancements, paper-based processes are still common, resulting in reduced transparency and collaboration between trading partners. According to Deloitte supply-chain experts,[2] organizations have spent the past two decades exploring ways to enhance transparency and data sharing within and across their enterprises. These experts have identified four key supply chain pain points that blockchain technology can address:

- **Traceability** – The capability to monitor events and metadata associated with a product. Blockchain provides a complete audit trail of data, creating an everlasting means of record-keeping along the supply chain
- **Compliance** – Standards and controls to provide evidence that regulatory conditions are met. All blockchain transactions are timestamped and tamper-proof, providing a single source of data integrity
- **Flexibility** – The ability to rapidly adapt to events or issues, or run various "what if" scenarios, without increasing operational costs. Continuous real-time tracking of data is facilitated through the use of "smart contracts" across the supply chain
- **Stakeholder Management** – Effective governance to enable communication, risk reduction, and trust among all involved parties. Blockchain enables peer-to-peer interactions, which can be trusted based upon digital signatures

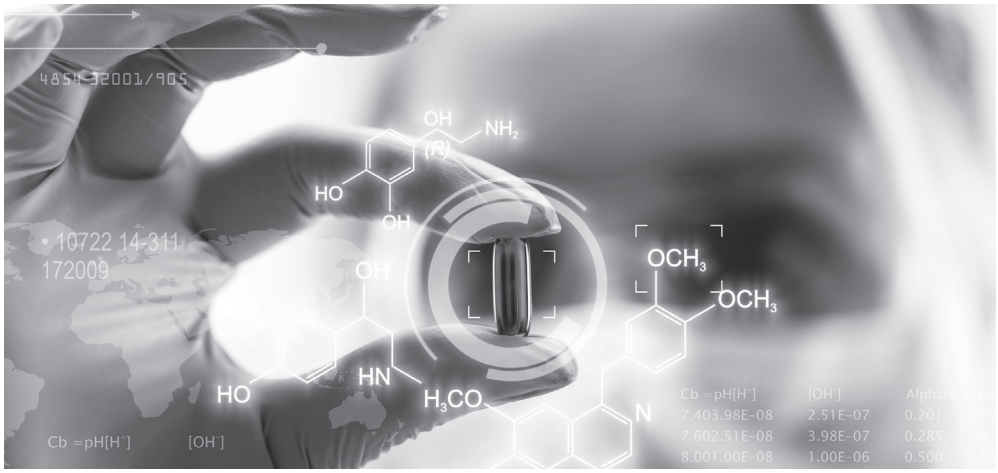
In an article entitled "How Blockchain Will Transform the Supply Chain and Logistics Industry," Bernard Marr,[3] a contributor to *Forbes* magazine cites several examples of how blockchain will benefit vertically oriented supply chains:

[2] Andrzejewski, Danielle; Dalal, Darshini; Gindner, Kai; Kehoe, Lory; O'Connnell, Niamh. "When Two Chains Combine," Delotte Development LLC., 2017.

[3] Marr, Bernard. "How Blockchain Will Transform the Supply Chain and Logistics Industry," Forbes, March 2018.

Pharmaceutical Supply Chain

The World Health Organization estimates that up to $200 billion dollars of counterfeit pharmaceuticals are sold globally every year, with 50 percent of these drugs sold online. Counterfeiting usually occurs at the manufacturing source, where the contracted manufacturer enters counterfeit drugs into the supply chain as authentic units. Consequently, pharmaceutical companies are under continuous pressure from regulatory organizations such as the FDA to develop innovative ways to track, report, and share information across all stages of the supply chain. Current solutions don't have the granularity needed to satisfy new regulations.



Product tracking refers to the tracking of unit-level items (i.e., drugs and medicines) across the end-to-end supply chain. Using blockchain technology, all stakeholders can access drug provenance, authenticate items, and prove compliance to facilitate counterfeit drug identification or assist in drug recall management.

Food Industry Supply Chain

Like the pharmaceutical industry, the food industry faces increasing regulatory pressure from the FDA, FTC, and others to comply with standards for safety and waste disposal procedures. It must also provide better visibility into food management activities across the product life cycle. Blockchain delivers the traceability required to provide higher levels of assurance regarding the chain of custody of food products. Sales volume of counterfeit products can, in different parts of world, be five or ten times that of authentic ones. Blockchain enables transparency of the supply chain and provides traceability to the origins.

Automobile Industry Supply Chain

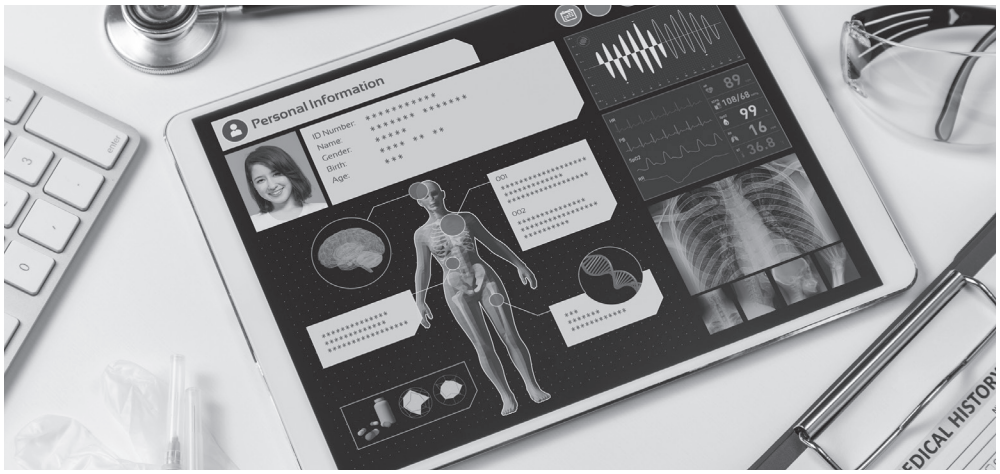
Automotive industry players are striving to streamline their processes, leading to shorter product lifecycles and new business models to meet on-demand preferences and to develop different types of vehicles and in-house vehicle services. Many OEM parts suppliers to the automotive industry are implementing blockchain to improve tracking and tracing of parts in the upstream supply chain. This will enhance the immutability and transparency of vehicle records in order to create an aftermarket opportunity and a shared purchasing platform.

Blockchain in Banking and Financial Service

The banking and financial services industry initially used blockchain for currency and payment transactions and has been expanding ever since. Barclays, for example, has implemented the security and transparency aspects of blockchain technology into its transaction processes, including the first trade documentation to be encrypted and managed on a blockchain network. The use of decentralized ledger technology to store and send documents saved the bank significant time and money on transactions, a far cry from the costly 10-day process it would have taken via traditional channels.

Blockchain in Healthcare

Mainstream digitization of health records has solved accessibility problems, heralding opportunity for analyzing medical trends and assessing quality of care. However, security, privacy, and auditability considerations still make it difficult to store and share data in productive ways. Using blockchain applications to process surgery receipts between the hospital, patient, and insurance provider can cut costs and improve security, privacy, and interoperability of health data. Similarly, a blockchain ledger could be used to supervise drug intake, distribution, and regulatory compliance, or to manage healthcare supplies. These blockchain applications would need to interact with electronic health records (EHRs) and other systems in order to deliver more accurate diagnoses, better treatment choices, and more cost-effective care.



Adding Caution to Optimism

Blockchain has immense potential, yet many organizations have delayed or abandoned early implementations. Reuters[4] found that several blockchain projects launched by major financial institutions have been shelved as distributed ledger technology enters the hype-meets-reality phase. Institutions like Depository Trust and Clearing Corporation (DTCC), BNP Paribus SA, and SIX Group decommissioned projects as a result of blockchain's failure to displace existing infrastructure, cut out the middlemen, speed transactions, or reduce costs for things such as securities and payments processing.

This is not to say that these organizations are abandoning blockchain. Many of them are working on new implementations or working with additional partners. But it does mean that we should examine what's necessary to be successful.

[4] Irrera, Anna; McCrank, John. "Wall Street Rethinks Blockchain Projects as Euphoria Meets Reality," Reuters, March 2018.

Getting the Blockchain Ecosystem to Work Together

The Reuters article further states,[5] "creating an enterprise-wide robust blockchain implemen-tation requires the full cooperation of the whole post trade ecosystem." This involves, among other things, integrating a wide variety of siloed and incompatible systems: homegrown and packaged application systems, databases, files, and proprietary networks that businesses rely on, but were never designed to interoperate.

For years, businesses have struggled to integrate their information assets and systems within a single enterprise. A network of blockchain participants, each having its own interoperability challenges, poses even greater obstacles. The scale of the integration needed to implement even a small private blockchain can be complex, time consuming, and expensive.

[5] Ibid.

Typical Implementation Using Only Blockchain Technology

Many manufacturing companies have built their business processes around ERP vendor SAP. A blockchain manufacturing or supply-chain implementation would have to interoperate with the versions and modules of SAP that the enterprise uses. The same is true for a variety of sales, marketing, fulfillment, and other systems.

Since blockchains themselves don't provide a means of integrating with these systems, it's easy for implementers to go down the road of creating and managing hundreds, if not thousands, of integration interfaces to implement blockchain-involved processes. This approach simply does not scale. It's too complex, too costly, and takes too much time to make end-to-end blockchain implementations practical within or across enterprises, if the only means of integration is coding custom interfaces between systems.

Blockchain in Context

The key to understanding how to implement blockchain in a cost-effective, less-complex way is to first understand that a blockchain is only one piece of a distributed software environment. Many of the other information assets in that environment represent large company investments, and they provide very high value. They're not going away, and working with them is not optional.

In that sense, a blockchain – though it's new technology with its own unique requirements – is just like the rest of the information assets that comprise the infrastructure of most modern businesses. Information assets have never played very well together, so companies have invested in integration technology to easily and cost-effectively implement full-fledged applications on a production scale.

To be successful, a blockchain application needs to be thought of in the same way – as a specific, high-value business application that will use application development and integration technology to manage a full-fledged business process that engages multiple other information assets – and not just another silo.

Conclusion

The benefits of blockchain are clear – enabling levels of visibility, traceability, and auditability that were difficult to achieve before. In spite of these advantages, many organizations abandon their blockchain projects when integration challenges arise. They perceive the manual creation of integration interfaces as a task too big to take on.

The key to blockchain success is an ecosystem that interoperates seamlessly. Siloed, incompatible information assets from across and beyond the enterprise must work together. Advanced application development and integration technologies make this possible – without the need for costly and time-consuming custom coding.

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