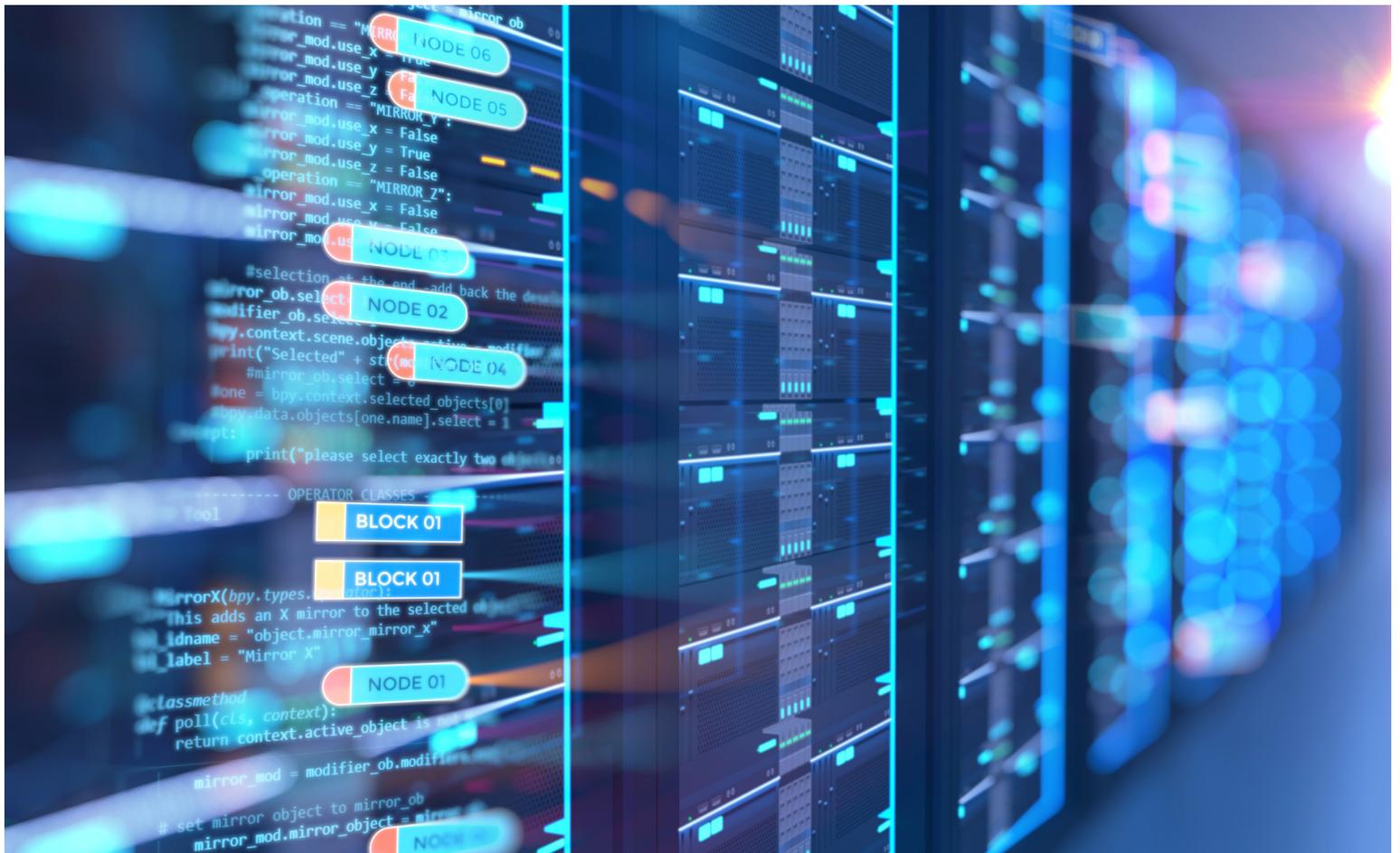


Brief

Five Things to Know about Blockchain and Manufacturing



Blockchain technology has the potential to transform business operations in the manufacturing industry by improving efficiency, transparency and proof of authenticity. BakerHostetler's Technology in Manufacturing team has prepared this introduction to some key concepts that make blockchain a transformative technology, specific blockchain applications for manufacturing, and critical issues to consider before designing and implementing a blockchain solution.

1

What is blockchain technology? How does it work?

Blockchain is a decentralized distributed ledger. A standard ledger system requires that the central agent be trusted: If a bank verifies an electronic funds transfer, for example, that transfer is deemed to have been made even if one party or the other contends that it was not. A decentralized ledger is a database that is synchronized across a peer-to-peer network of computers. The ledger permanently records changes to the database using cryptographic hash-linked "blocks." When a transaction occurs, a block is added to the ledger, forming a sequential chain with previous transactions – thus the name blockchain. Each block contains data from the previous block, so each transaction can be validated by computers and viewed and affirmed by consensus among the participants in the network. No single party controls the data or the information. Every party can verify the records on the ledger directly, without reliance on any central authority.

Blockchains can be either public/permissionless or private/permissioned. Anyone can join and participate in a public blockchain. The network typically has an incentivizing mechanism to encourage more participants to join the network. Bitcoin is one of the largest public blockchain networks.

A private/permissioned network, which is generally the choice of business consortia, requires an invitation. A permissioned network places restrictions on who is allowed to participate in the network and the type(s) of transactions that can be made.

2

What are the advantages of blockchain?

Blockchain technology offers greater efficiency, transparency and security than centralized, trust-based systems and processes. Centralized systems can be slow and expensive. While blockchain transactions are not instantaneous, they usually take several minutes rather than several days for standard bank transactions. Every transaction on the blockchain is visible to anyone in the computer system. Each user (known as a node) on the blockchain has a unique alphanumeric address, and everyone on the network can monitor each transaction.

Distributed ledger transactions also offer security advantages over those enabled by a central authority. Because the ledger is chronologically ordered and stored on many computers across the network, a "hack" of a distributed ledger would require simultaneous changes to data on all systems. The algorithm behind the blockchain has (thus far) been very secure.

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Who is using blockchain and why?

Financial services, healthcare and pharmaceutical businesses, manufacturers, shippers, real estate entities, and government agencies are all exploring blockchain technology. Here are a few of the applications under study:

- **Smart contracts.** They embed code in the blockchain network, which defines the conditions to which all parties to the contract agree. When required conditions of the contract are met, the contract self-executes.

If a contract for the shipment of goods requires that the goods reach a destination by a certain date, when the goods are confirmed to have arrived on time the code will trigger an automatic payment.

- **Provenance.** Blockchain provides a secure and immutable way to establish provenance – where something came from and where it's been since. Questions of provenance are at the core of many legal issues, including the origin, receipt and authenticity of shipped goods. The immutable mechanisms of blockchain eliminate the need for costly audits, registrations and validation.
- **Self-sovereign identity.** Several projects are exploring the use of blockchain technology to create a self-sovereign identity – a single, secure and immutable identity record for each person that is portable, cannot be taken away and does not depend on any centralized authority.

Recent global surveys by Deloitte and PwC indicate that most business executives believe that blockchain technology is scalable, will reach mainstream adoptions, and will disrupt and revolutionize their industries. Another 43 percent indicate that blockchain is a “top five strategic priority.” They list potential projects such as:

- Supply chain-focused systems.
- Internet of Things integration.
- Digital records.
- Digital currency projects.
- Payments applications.

Thirty percent of surveyed executives report that their organizations already are participating in blockchain-focused consortia, with another 45 percent indicating that they are likely to join one within the next year.

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Manufacturing applications

In the manufacturing sector (and many others), blockchain need not have any connection to digital currencies. Instead, the same immutable, decentralized, transparent technology can be used to streamline processes and eliminate the need for intermediaries. For example, manufacturing uses can include:

- Predictive maintenance.
- Asset tracking and management.
- Business process optimization.
- Logistics and supply chain management.
- Workforce tracking and management.
- Quality control and compliance.
- Counterfeit management.

Research and proof-of-concept projects underway include two new manufacturing industry consortia, announced on Oct. 2, 2018, by the SAP Blockchain Consortium Program.

- For pharmaceuticals and life sciences (participants include AmerisourceBergen, SAP, Arvato Bertelsmann, GlaxoSmithKline).
- For agribusiness, consumer products and retail (participants include Cona Services LLC – Coke One North America, Maple Leaf, Johnsonville, SAP).

On May 1, 2018, four of the world's largest auto manufacturers launched a consortium focused on applying blockchain to the automotive sector (Ford, GM, Renault, BMW, with Bosch, Accenture, IBM, ZF). The Mobility Open Blockchain Initiative (MOBI) aims to create common standards and APIs to enable payments and data-sharing between cars. Its focus areas include vehicle identity and data tracking, ride sharing, mobility ecosystem commerce, and data markets for autonomous and human driving.

Several pilot projects are seeking to track metals, precious stones and jewelry through blockchain use. These pilots may pave the way for eventual integration with the manufacturing sector.

5

Practical Legal Considerations

It is important to remember that blockchain is an emerging technology that has not been widely adopted and there are many questions yet to be resolved, including issues surrounding its regulatory and legal status and significant questions regarding data privacy laws. In addition, companies considering a blockchain solution should keep in mind these points:

Costs of hosting a private/permissioned blockchain

- Cloud service agreements.
- Node cybersecurity standards, periodic reviews.
- Process for adding/removing nodes, other participants.
- Selecting, renewing or changing chosen platform.

Establishing membership tiers and rights/responsibilities

- Levels of data access rights for different participants.
- Voting rights vs. rights to access, sell or license data.

Aligning interests in data standards and integrity

- Acceptability of source data and documentation.
- Anti-fraud/Anti-corruption programs.
- Remedies for technical failures (e.g., smart contracts).

For more information about technology issues affecting the manufacturing sector, including blockchain technology, contact BakerHostetler's Technology in Manufacturing team.

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