

What to Make of Blockchain as an Enterprise Architect

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INTRODUCTION

One of the top promising trends on the tech landscape is blockchain. Blockchain technology is sweeping the world with possibility and has the potential to spark a considerable change in the workflow of business procedures and pave the way for innovation and growth. In the business world, blockchain will radically change the enterprise by eliminating third-party facilitators, increasing data security and efficiency, and increasing the speed of transactions. Gartner projects that blockchain's business value-add will grow to \$176 billion by 2025.¹

Blockchain technology is poised to be one of the highest priorities for enterprises. This white paper will explore three key enterprise use cases, explore corporate blockchain pioneers, and give enterprise architects the foundations to begin investigating suitable platforms that may benefit their companies in the future.

¹ <https://www.gartner.com/doc/3627117/forecast-blockchain-business-value-worldwide>

BLOCKCHAIN EXPLAINED

Blockchain is a type of distributed ledger technology (DLT) that is mostly known for being the supporting technology for cryptocurrency. Blockchain is: a shared ledger distributed across a business network that records information in a growing list of records containing a cryptographic hash of the previous block, a timestamp, and the full transaction data. By its immutable design,

a blockchain is inherently resistant to unsolicited modification. Blockchain records transactions between two parties efficiently, permanently, and transparently. Blockchain is typically managed by a peer-to-peer network, which means that, once data is recorded, it cannot be retroactively altered without altering all of the previous blocks.

This simplified image shows the key components of a blockchain: users, nodes, ledgers, and the private key.

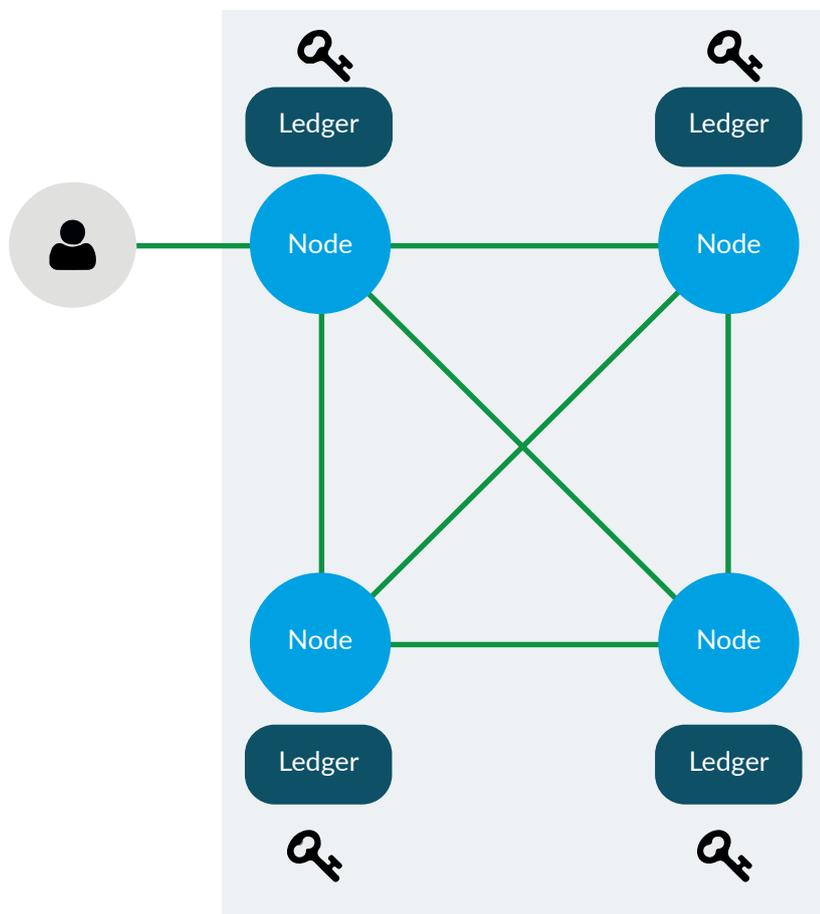


Figure 1: The key components of a blockchain

Users - may include auditors, administrators, developers, etc.

Nodes - make additions to the ledger by passing around transaction and block data.

Ledger - lists who owns what.

Private Key - is an encrypted large integer number that is used to generate a signature for each blockchain transaction a user sends out. This private key prevents the transaction from being altered by anyone once it has been issued.

TYPES OF BLOCKCHAINS

Having a ledger that is easily accessible by anyone may be beneficial for certain situations and detrimental for others. For this reason, there are both public and private blockchains. A public blockchain is open for everyone to read, send transactions, and participate in the consensus process. The most prominent examples of public blockchains are the blockchains underlying Bitcoin and Ethereum.

Fully private blockchains are centralized to one organization. Consortium blockchains are private blockchains centralized to one industry. Consortium blockchains are mostly used in the banking sector where the cumulative process is controlled by a pre-selected set of participants. For instance, three prominent banks might create a consortium blockchain for inter-bank trading purposes.

Conducting business over a decentralized consortium blockchain reduces transaction costs, eliminates data redundancy, and speeds up transaction times. Whether a blockchain is private or public will, as the name suggests, determine the user group that has access to the information on that blockchain.

CORPORATE BLOCKCHAIN PIONEERS

The true opportunity lies in integrating and orchestrating multiple blockchains across a single value chain. For example, if your organization is in the banking industry, the true potential is unlocked by creating a consortium blockchain between various banks. If your organization has not allocated a budget for blockchain research, you can sit back and learn from blockchain beta testers.

As blockchain networks have no standardized guidelines, it is imperative for alliances to form, learn from early implementation, and create their own best practices.

B3i - Blockchain Insurance Industry Initiative

The B3i initiative, which is a collaboration of insurers and reinsurers, was formed to explore the potential of using DLT in that industry. Established in 2016, B3i is comprised of 15 members, around the world, whose mission is to improve the way data, claims, capital, and payments are disclosed, used, automated, and managed. Each member shares equal rights and obligations in terms of financial contribution, resources, and decision making.²

Proof of Concept (POC) – B3i created a “smart contract” called Property Catastrophe XOL. From this smart contract, B3i has developed common standards and best practices under which all following blockchain networks operating in the insurance industry will operate going forward.

Enterprise Ethereum Alliance

The Enterprise Ethereum Alliance is the world’s largest open-source blockchain initiative. EEA connects Fortune 500 enterprises, startups, academics, and technology vendors with Ethereum subject matter experts, with an aim to learn from and build upon Ethereum to define enterprise-grade software capable of handling the most complex, highly demanding applications at the speed of business. The EEA is organized into three groups: Digital Identity Working Group, Energy Working Group, and MultiPlatform Working Group. The goal of EEA is to activate participation in these three areas.³

Hong Kong Monetary Authority

The Hong Kong Monetary Authority (HKMA) is Hong Kong’s currency board and de facto central bank founded on 1 April 1993 when the Office of the Exchange Fund and the Office of the Commissioner of Banking merged. The HKMA formed a working group involving five leading banks in Hong Kong to investigate possible blockchain use cases. Under the leadership of the HKMA, the working group deliberated on issues of regulatory uncertainty in relation to the operating model and spearheaded efforts to solve real business problems. Given the scale of the participating banks within the global trade finance market, the working group was able to adopt a global perspective.

² “About Us - B3i.” <https://b3i.tech/about-us.html>. Accessed 9 Feb. 2018.

³ “Enterprise Ethereum Alliance.” <https://entethalliance.org/>. Accessed 9 Feb. 2018.

HKMA conducted a thorough investigation of how DLT can potentially address a wide range of business, regulatory, and technical issues related to trade finance. HKMA developed a DLT prototype with the goal of visualizing the target operating model and evaluating the feasibility of the technology and its commercialization potential.

ENTERPRISE BLOCKCHAIN USE CASES

A major challenge for enterprises is to see clearly through the hype around blockchain technology, sift through the use cases, and look for a possible fit. This is where an enterprise architect's holistic view of the enterprise will come in handy. Organizations must ask themselves what their role in the blockchain world will be and, from there, devise an integration plan. Adoption to blockchain should be a gradual and steady venture with significant contributions by the enterprise architect.

1. Supply Chain Management

Digitization has caused many industries to revisit their supply chain processes. Industry 4.0 requires supply chains to become more precise, faster, and more agile. At each step of the supply value chain, from the extraction of raw materials to the customer, blockchain technology can be used to store and record all the transactions and exchanges of ownership. It will be easy to tell where materials are sourced, which type of labor was used, and the exact position of the good at any given moment.

In the supply chain management use case, Blockchain technology enables companies to:

- Verify materials and how the materials were created (e.g., child labor, slave labor, or reputable methods).
- Identify asset quantity as the assets move through the supply chain.
- Coordinate orders and shipment notifications
- Verify the constitution of materials.
- Increase scalability, security, and innovation.
- Link physical materials to serial numbers, barcodes, and digital tags.

- Share important information about the manufacturing process, assembly, delivery, and vendors.

Provenance is building a traceability system for materials and products using a new type of data system based on a blockchain. The blockchain base serves a data system for securely storing information - inherently auditable, unchangeable, and open. The UK's largest consumer co-operative, The Co-op, uses Provenance software to track fresh produce and their product claims from origin to supermarket.⁴

2. Healthcare Data Regulation

Organizations are testing the sustainability of storing biometric information on a shared blockchain. By design, the encrypted information would not be able to identify any particular patient. That means sensitive data that includes age, gender, immunization history, and vital signs can be safely stored on a shared blockchain without privacy concerns.

Change Healthcare launched its blockchain-enabled Intelligent Healthcare Network, powered by Hyperledger Fabric - a business blockchain framework hosted by the Linux Foundation. The Intelligent Healthcare Network uses blockchain technology to accurately track the status of claim submissions and remittance across the claim lifecycle. A transparent view ensures greater auditability, trust, and faster service for the end user.

3. Contract Management

One of the more obvious use cases, blockchain technology can be used as a shared repository of pertinent legal documents and their update histories. The real estate industry produces many contracts, as the average homeowner sells his or her home every five to seven years, and the average person will move nearly 12 times during his or her lifetime.⁵

With such rapid movement, the real estate market could use blockchain technology to cut down on transaction costs and expedite home sales by quickly verifying finances, reduce fraud, and offer transparency throughout the entire selling and purchasing process.

⁴ "Pioneering a new standard for trust in food retail | Provenance." <https://www.provenance.org/case-studies/co-op>. Accessed 9 Feb. 2018.

⁵ <https://fivethirtyeight.com/features/how-many-times-the-average-person-moves/>

Ubiquity LLC powers a Software-as-a-Service (SaaS) blockchain platform that enables companies to verify a clean record of ownership, thereby reducing future title search time and increasing confidence and transparency.⁶

Keep in mind that use cases do not have to be industry-specific for your enterprise to benefit from the knowledge.

QUESTIONS TO ASK

As with any emerging technology, it is imperative to gauge the potential scope for your company, and subsequently, the level of readiness to implement new technology. Blockchain can solve many problems, but not all. To gauge whether your company should implement the technology, ask yourself:

- Is blockchain technology poised to disrupt our industry? Should we adjust our business strategy?
- Is blockchain the right technology for our current and future endeavors?
- How do we ensure that the technology is resilient, scalable, secure and recoverable?
- Are there opportunities for blockchain technologies to reduce cost, strengthen security, or improve customer service within our company?
- How will it be governed? Which teams will control identity, roles, and rights?
- Do we need to cooperate with others in order to fully realize the benefits that blockchain can bring?
- How long should our blockchain implementation timeline be?
- Are there any relevant alliances that we can join?

If you do consider adding blockchain, the questions change to consider the features required:

- Which data will be stored in the blockchain?
- How much data would be stored in the blockchain?
- Should all of the data be stored in the ledger, or will some of it be stored outside of the ledger?

- If off-chain storage will be used, how will this data be referenced by the transactions in the ledger?
- How large is the business network?
- Will each network participant be able to access all information?
- Do the transactions need to be divided across the network?
- Is there a need to automate business processes across the network?

SETTING THE GROUNDWORK FOR BLOCKCHAIN TECHNOLOGY

The true potential of blockchain technology will be reaped in the future, but now, companies must set the initial framework to reap the benefits later. Enterprises considering blockchain technology should be sure to select an enterprise-ready platform with the following five key attributes:

Security:

Take the appropriate steps to protect sensitive data in your blockchain network. Require permission to join, ensure transaction confidentiality, and encrypt your data going in and going out.

Open governance:

If there is a problem that needs a resolution, choosing a platform with open governance will enable your company to go in and make minor changes. Select a code base that is known by your developers so they can establish clear processes for making changes, updates, and developments.

Confidentiality:

As privacy is an integral part of blockchain technology, confidentiality is of the utmost importance. Establish confidentiality by having control of who can access your network and who can access certain parts of the network but not others.

A wide array of developer tools:

An enterprise is only as good as its tools. The appropriate tools will simplify and accelerate the process of modeling your network. Be sure to research the proper supporting tools for your IT architecture, including tools to accelerate the process of modeling assets, participants, access controls, and transactions. Tools will help you create application user interfaces quickly.

Scalability:

As your blockchain business network grows, you'll need a platform that can easily grow with it.

SUMMARY

Blockchain has the potential to positively affect businesses and people alike. Various factors must be considered to determine if blockchain technology is appropriate for your company. Enterprise architects can gauge the need, readiness, and relevant use cases and alliances to prepare a blockchain roadmap for their company. There is tremendous disruptive potential in blockchain technology, as well as many business opportunities. Enterprise architects should keep blockchain on their radar and gauge the best position from which to investigate use cases, explore tech talent, and consider platforms that will drive future blockchain initiatives.

About LeanIX

LeanIX offers a Software-as-a-Service (SaaS) for Enterprise Architecture (EA), which enables organizations to take faster, data-driven decisions for their IT landscape. More than 80 leading brands such as adidas, DHL, Merck, Vodafone, and Zalando use the innovative solution worldwide. Users of LeanIX gain insights on how to organize and leverage their IT landscape to increase competitiveness and enable innovation going forward. LeanIX addresses the frequent problem that the required information about the IT landscape is missing, outdated, or difficult to analyze. Use cases include application rationalization, technology risk management, and the shift from monolithic architectures to microservices. LeanIX was founded in 2012 by Jörg Beyer and André Christ. The company's headquarter is in Bonn, Germany, with offices in Boston, Massachusetts, and Houston, Texas. A wide network of partners provides support in America, Europe, and Australia.

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