



110 Horizon Drive, Suite 210, Raleigh, NC 27615
919.459.2081

Blockchain Basics

(# 1 draft, Date of Issue)

www.pria.us

DATE Disclaimer: *This is a proposed-for-adoption draft.*

There are still known deficiencies in format which PRIA's Style Committee will clean up following final approval.)

PROPERTY RECORDS INDUSTRY ASSOCIATION

Copyright Notice, License, Disclaimer
For
Incomplete Work

November 2023

A. **COPYRIGHT NOTICE:** Copyright © 2023 – Property Records Industry Association (“PRIA”). All rights reserved.

B. **LICENSE:** This draft document (the “Incomplete Work”) is made available by PRIA to members and the general public for review, evaluation and comment only. This document is under development and not a final version.

PRIA grants any user (“Licensee”) of the Incomplete Work a worldwide, royalty-free, non-exclusive license (“License”) to reproduce the Incomplete Work in copies, and to use the Incomplete Work and all such reproductions solely for purposes of reviewing, evaluating and commenting upon the Incomplete Work. NO OTHER RIGHTS ARE GRANTED UNDER THIS LICENSE AND ALL OTHER RIGHTS ARE EXPRESSLY RESERVED TO PRIA. Without limiting the generality of the foregoing, PRIA does not grant any right to: (i) prepare proprietary derivative works based upon the Incomplete Work, (ii) distribute copies of the Incomplete Work to the public by sale or other transfer of ownership, or (iii) display the Incomplete Work publicly. Comments on the Incomplete Work must be sent to PRIA.

Any reproduction of the Incomplete Work shall reproduce verbatim the above copyright notice, the entire text of this License and the entire disclaimer below under the following header:

This document includes Incomplete Works developed by PRIA and some of its contributors, subject to PRIA License. “PRIA” is a trade name of the “Property Records Industry Association.” No reference to PRIA or any of its trademarks by Licensee shall imply endorsement of Licensee's activities and products.

C. **DISCLAIMER: THIS INCOMPLETE WORK IS PROVIDED "AS IS." PRIA AND THE AUTHORS OF THIS INCOMPLETE WORK MAKE NO REPRESENTATIONS OR WARRANTIES (i) EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, TITLE OR NON-INFRINGEMENT; (ii) THAT THE CONTENTS OF SUCH INCOMPLETE WORK ARE FREE FROM ERROR OR SUITABLE FOR ANY PURPOSE; AND, (iii) THAT IMPLEMENTATION OF SUCH CONTENTS WILL NOT INFRINGE ANY THIRD-PARTY PATENTS, COPYRIGHTS, TRADEMARKS OR OTHER RIGHTS. IN NO EVENT WILL PRIA OR ANY AUTHOR OF THIS INCOMPLETE WORK BE LIABLE TO ANY PARTY FOR ANY DIRECT, INDIRECT, SPECIAL OR CONSEQUENTIAL DAMAGES FOR ANY USE OF THIS INCOMPLETE WORK, INCLUDING, WITHOUT LIMITATION, ANY LOST PROFITS, BUSINESS INTERRUPTION, LOSS OF PROGRAMS OR OTHER DATA ON ANY INFORMATION HANDLING SYSTEM OR OTHERWISE, EVEN IF PRIA OR THE AUTHORS, OR ANY STANDARD-SETTING BODY CONTRIBUTORS TO THIS INCOMPLETE WORK ARE EXPRESSLY ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.**

Table of Contents

Executive Summary	4
What Is Blockchain?	5
Terminology	6
Types of Blockchains.....	7
Public Blockchain	7
Private Blockchain	7
Hybrid Blockchain.....	7
Consortium Blockchain.....	7
Implications of Blockchain Technology.....	8
Conclusion	11

DRAFT

Executive Summary

Blockchain is a proprietary peer-to-peer (P2P) network of computers connected via the internet that is used to store information in a distributed append-only ledger. Built on 1980s P2P distributed and decentralized network technologies, blockchain originally was intended to be an autonomous network of computers that could eliminate the need for any human central authorities or intermediaries.

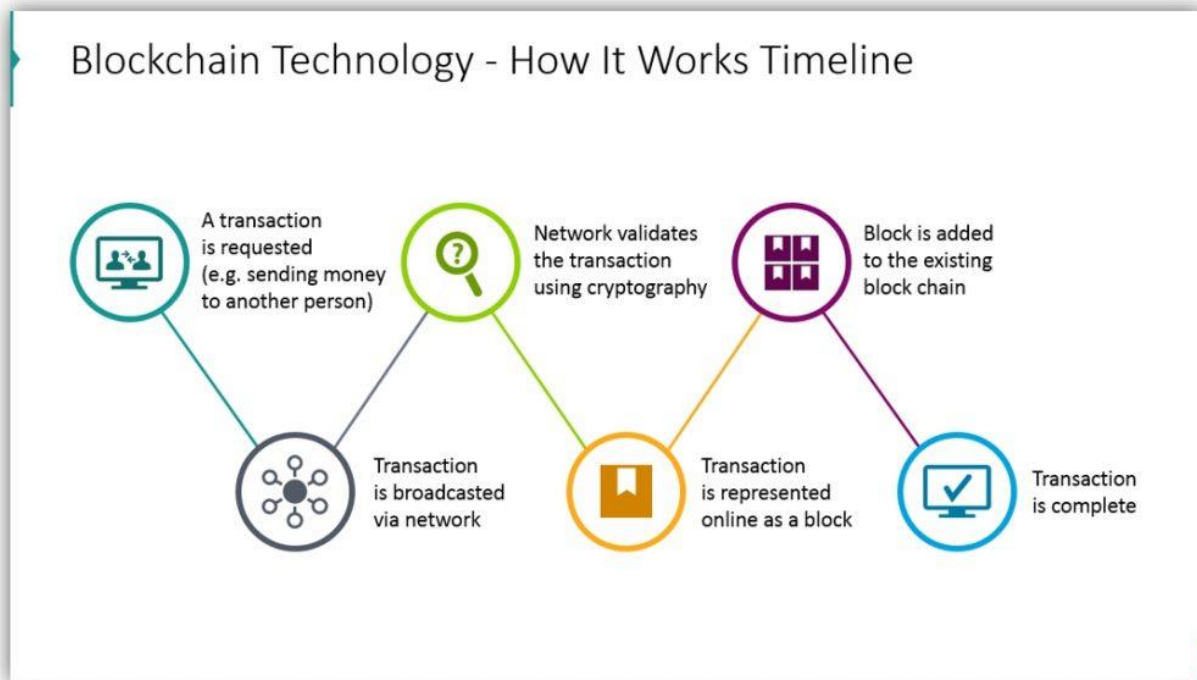
Decisions on how the blockchain network was to be funded and operated was first delegated to a decentralized autonomous organization (DAO) which then created an independent network of computers and software, e.g., Smart Contracts, that autonomously operated without human intervention. Most blockchains today are highly centralized systems that utilize a private network of computers and software and store limited, selected information.

[Uniform Electronic Transactions Act](#) (UETA) is the foundational law that supports electronic transactions, including those on the blockchain.

DRAFT

What Is Blockchain?

Blockchain is a digital ledger technology that is used to store limited information in a proprietary, P2P network of computers connected via the internet. Information is stored in blocks that are consecutively chained together. The digital ledger is then replicated to all authorized computers called nodes on the blockchain's network.



Terminology

The following terms may be encountered when describing software and processes related to blockchain technology. While not an exhaustive list, these terms will be most frequently encountered in conjunction with the property records industry.

1. **Block:** A place on the ledger where information is stored. These append-only blocks are made immutable using cryptography.
2. **Consensus Mechanism:** A software protocol that authorizes a node on the blockchain network to create a block on the ledger. Only one node on the blockchain can initially validate and create a block on the ledger. Once a new block is created, that block is replicated to all nodes on the network.
3. **Cryptography:** The process of encrypting and securing information on the block.
4. **Decentralized Autonomous Organization (DAO):** An entity or a group of individuals which create and operate a proprietary blockchain network.
5. **Digital Asset:** Generally anything electronically created and stored which represents ownership of tangible or intangible property.
6. **Distributed ledger:** An append-only record of information stored on a network of peer-to-peer computers.
7. **Encryption:** Secures the transfer of digital information between computers.
8. **Hash:** The encrypted mathematical representation of a block of information. A hash is a long string of letters and numbers created by a mathematical operation that is easy to perform, but difficult to reverse.
9. **Immutability:** The inability to reverse, modify or delete information on the block once stored on the ledger.
10. **Non-fungible Token (NFT):** A token created by a proprietary blockchain to represent a unique tangible or intangible asset, e.g., a real estate property.
11. **Node:** A computer that authorizes, validates, and stores information on a blockchain network.
12. **Peer-to-peer (P2P):** A decentralized network that links two or more computers together.
13. **Permissioned:** Only known entities with credentials can write to a private blockchain; anyone can read in a public blockchain.
14. **Permissionless:** Allows anyone to read or write to a public blockchain.
15. **Private key:** A password that uses cryptography to create an alphanumeric code with hundreds of digits to protect ownership of digital assets.
16. **Public Key:** An address or identifier for an authorized user within the blockchain to see the information sent by another user.
17. **Smart Contract:** A software program stored on the blockchain that runs when predetermined conditions are met. They are self-executing, self-enforcing contracts with the terms of the agreement between relying parties being directly written into lines of code.
18. **Token:** A representation of a digital asset on a proprietary blockchain.
19. **Wallet:** A repository for storing digital asset information and private keys, e.g., password.
20. **Web3:** The evolution of open-source (non-proprietary) internet applications which convert tangible and intangible assets to tokenized digital assets.

Types of Blockchains

Public Blockchain

Allows any node to read or write information and conduct transactions (permissionless). No central authority has control of the blockchain.

Private Blockchain

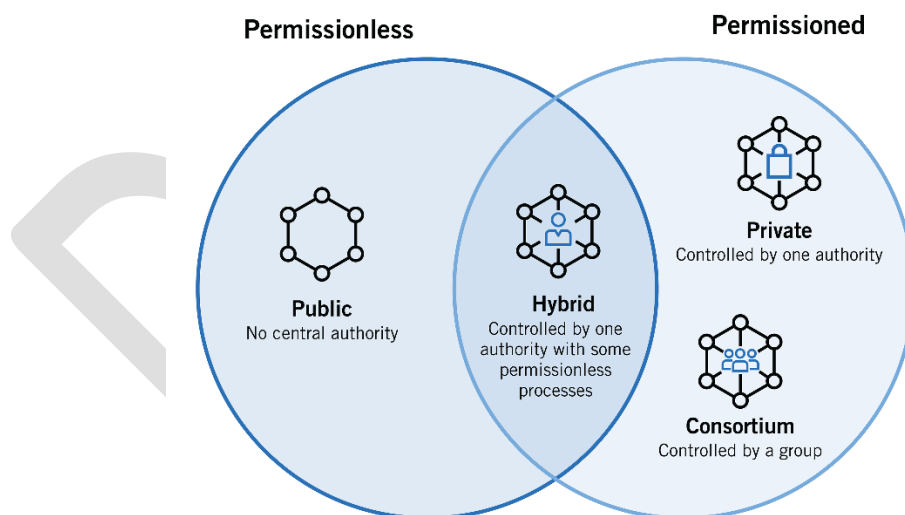
Only authorized nodes can read or write information that is stored on the blockchain's distributed ledger (permissioned). The blockchain is controlled by a central authority.

Hybrid Blockchain

Combines the features of both the public and private blockchains and controlled by a central authority.

Consortium Blockchain

Involves a group of various organizational members working together on a blockchain network.



Implications of Blockchain Technology

Blockchain technology has gained attention and adoption in various industries because of its distinguishing features and capabilities. Like any technology, it comes with its own set of pros and cons.

Pros	Cons
Append-only blocks: Information can only be added to the blockchain in append-only sequential order, providing a complete transactional history.	Append-only blocks: In a traditional database, a user can perform four functions: create, read, update, and delete. With blockchain, the user cannot update or delete information.
Control: No central authority has control of the public blockchain. There is no one human intermediary controlling the blockchain.	Control: There is no control of the nodes in a public blockchain. Loss of all nodes would equal loss of the entire blockchain.
Cost and Resources: By removing intermediaries and automating processes, blockchain has the potential to significantly lower costs for transactions involving multiple parties and complex interactions.	Costs and Resources: There are very few business use cases where the capabilities of blockchain will create any meaningful efficiencies or eliminate human intermediaries and will potentially add to system costs.
Decentralization: Information is copied to multiple computers (e.g., nodes) which makes it harder to gain control of the entire network.	Decentralization: Disagreements among network participants can result in splits in the blockchain, potentially leading to multiple versions or a complete shutdown of the blockchain.
Digital Wallet: Allows user to store and exchange digital assets.	Digital Wallet: Loss or hacking of a password to a digital wallet can result in the total loss of digital assets.
Distributed ledger: A proprietary append-only ledger that stores information on multiple nodes offering an alternative to centralized databases, which rely on a single server or small network to function.	Distributed ledger: Has very limited storage capabilities. Digitized copies of documents cannot be stored on the blockchain but will still need to be maintained off the blockchain.
Efficiency and Speed: Blockchain can streamline various processes by eliminating intermediaries and reducing paperwork leading to more efficient transactions.	Efficiency and Speed: A properly decentralized blockchain will have limited capabilities to store information. Some blockchain networks, especially those with slower consensus mechanisms, can experience long confirmation times for transactions.
Global Accessibility: Blockchain technology operates on a decentralized network, making it accessible to anyone with an internet connection.	Global Accessibility: Internet-based systems increase exposure to hackers.

<p>Innovation and New Business Models: Blockchain has been seen as a way for developing new business models and concepts.</p>	<p>Innovation and New Business Models: Despite the potential of blockchain, there is continued fear and lack of understanding about the technology to allow for widespread adoption and integration into existing systems.</p>
<p>Interoperability: Enhances the ability of blockchain networks to communicate with each other, sending and receiving messages, information, and tokens.</p>	<p>Interoperability: Individual blockchain platforms cannot communicate with other blockchains without an independent intermediary.</p>
<p>Private keys: These protect your tokenized digital asset like passwords, which are stored in a digital wallet.</p>	<p>Private keys: The loss of a private key means permanent loss of the tokenized digital asset and puts a high burden on users to safeguard their keys.</p>
<p>Security: Each block of information that is stored on the blockchain is hashed and then copied to all the nodes on the blockchain to ensure that the history cannot be deleted or altered.</p>	<p>Security: Without enough nodes, a hacker could gain control over the blockchain (e.g., 51% control).</p>
<p>Smart Contracts: Self-executing software programs, e.g., similar to stored procedures, with the information directly written into the blockchain. The programs automatically execute when predefined conditions are met, reducing the need for human intervention, and minimizing the risk of errors or disputes.</p>	<p>Smart Contracts: Relatively new software with a limited number of developers and still evolving. Such contracts, once implemented, in theory cannot be altered by any human, including software upgrades or changes. Smart contracts are not legal contracts and may not be enforceable.</p>
<p>Software: Blockchain code is open source which is free and available to anyone for any purpose.</p>	<p>Software: Blockchain open-source coding is still developing.</p>
<p>Tamper-resistant: Information on the blockchain is immutable.</p>	<p>Tamper-resistant: Once a transaction is recorded on the blockchain, it cannot be reversed, which can be problematic in situations involving errors, fraud, or disputes.</p>
<p>Tokenized digital asset: A non-tangible representation of a physical asset that can be easily bought and sold.</p>	<p>Tokenized digital asset: Tokens are proprietary to a specific blockchain and have no value if the blockchain is corrupted or goes out of business. The same digital asset can be tokenized on other blockchains making it difficult to prove ownership.</p>
<p>Transparency: A public blockchain is visible for anyone to see the information.</p>	<p>Transparency: Storing sensitive or personal information on a public blockchain can expose that information to the entire network, potentially leading to privacy issues.</p>
<p>Trust: Software and math generate and validate the information to be recorded on the blockchain network.</p>	<p>Trust: No human intermediary can intervene if problems arise on the blockchain network.</p>

Traceability and Auditability: Blockchain enables a transparent and traceable record of transactions and information.

Traceability and Auditability: Information cannot be removed, edited, or converted to another blockchain or traditional database. Likewise, historical information cannot be converted to a blockchain.

DRAFT

Conclusion

Blockchain technology has emerged as an innovative force with the potential to reshape some industries. The fundamentals of blockchain, including decentralized consensus, immutability, and smart contracts, lay the groundwork for a new era of digital modernization. This technology may transform the way transactions are conducted, how trust is established and information verified in the digital age. With continuing developments and increasing adoption, blockchain has the possibility to bring about changes in the way businesses and individuals interact, transact, and collaborate.

DRAFT