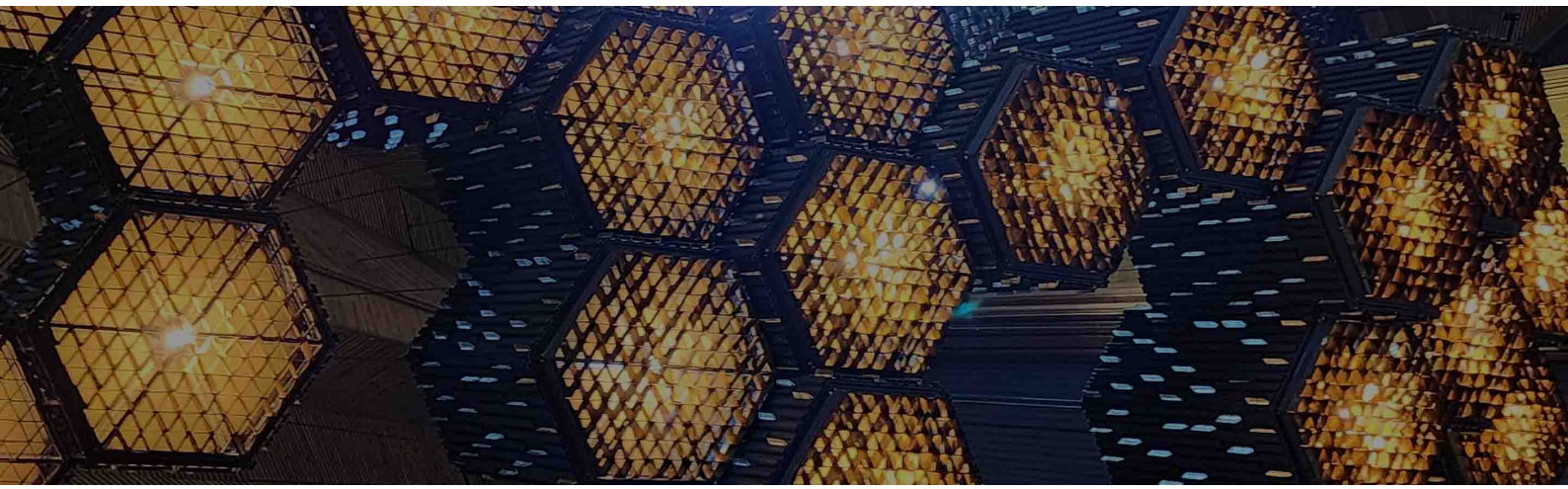


Regenerative growth and business model innovation: real-world asset tokenization—why is this time different?

Digital and Analytics / Article
November 15, 2023

Tokenizing real-world assets—why bother?

The recent downturn in crypto markets powered by blockchain technology sent shockwaves through financial markets and portfolios. Yet, despite this downturn and ongoing doubts from blockchain technology naysayers, blockchain technology is experiencing a resurgence of optimism. This is primarily driven by asset tokenization, either with real-world assets (RWA), digital product passports (DPP), or a range of asset tokenization.

In a recent interview with CNBC, Kraken Ventures' Stuti Pandey notes there a few key things that are different this time around—the economics, technology, and credibility of the space.

The appreciation for the value of tokenizing assets has become more concrete. The appetite for tokenizing RWAs is no longer limited to large institutions and high-net-worth individuals; it's now expanding to smaller participants as well. Pandey notes, "Over the past few years, interest rates have been

very depressed and that has favored very-high-growth, high-risk assets. In decentralized finance, you had synthetic yields between 80 percent and 200 percent, so RWAs did not really have a chance to thrive. Now that rates are down, it is these real-world assets that have interesting yield."

Accenture and J.P. Morgan estimate a $78 trillion growth opportunity to unlock non-bankable assets. What constitutes a non-bankable asset? They are assets sitting in garages, on living room walls, in bank vaults, and in wine cellars. "Historically, it has been difficult to exploit non-bankable assets outside of their traditional markets, limiting their role as collateral. The tokenization of assets is expanding rapidly, with an estimated $1 trillion in blockchain tokenized assets. This is predicted to grow to $24 trillion by 2025–2027." This is driven by a maturing understanding of new revenue opportunities from unlocking untapped corporate assets.

The technologies involved have matured and become more accessible. Maria Shen, general partner at Electric Capital, shares a similar sentiment, stating: "When you do tokenize a real-world asset, before you just held it and maybe transferred it to someone. Now you can use it as collateral for a loan. Suddenly the utility of holding a tokenized asset has increased because of the infrastructure that's come in since 2018."

"In 2018, when RWA first started trending, we looked at institutions like high-net-worth individuals, family offices, pension funds, [and] university endowments—and that's still true but there has been the emergence of what I would think of as on-chain institutions. When you look at a DeFi protocol like MakerDAO, which has more than $500 billion on its balance sheet, and since it started more heavily putting more of its balance sheet in RWAs, that's grown to more than $2 billion. That's been a really interesting shift that's never happened before," Shen adds.

The reality is that while digital art NFTs are crashing after having reached crazy valuations, the business case for tokens (fungible and non-fungible) remains valuable across industry sectors as more and more organizations around the globe use the technology to deliver real value to customers. Thus, it's no surprise that the RWA tokenization market has been estimated to reach between $4 trillion and $16 trillion by 2030, making it an important topic of discussion in the context of financial and investment markets. In fact, Wall Street has jumped in, creating tokens for virtually everything, from buildings to gold.

In this article, we will discuss whether tokenization is a viable strategy for your organization, break down the process of tokenization, and provide examples demonstrating how tokenization can make real-world assets more accessible with less friction, unlocking new utility and revenue potential.

So, what does it mean to "tokenize" real-world assets?

Simply put, tokenization is a process used to convert any real-world asset into a blockchain-based digital "token" that serves as a representation of the asset.

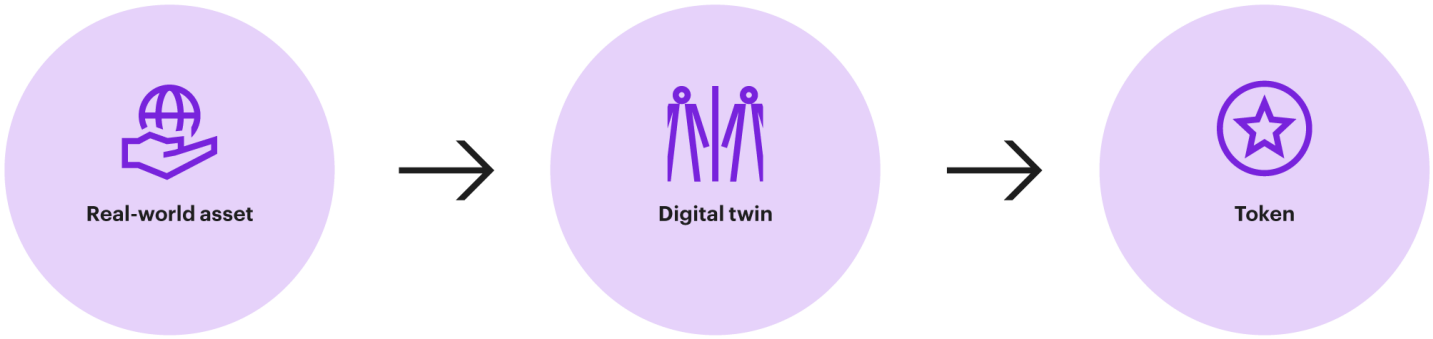
To understand what it means to "tokenize" a real-world asset, it helps to consider the attributes known about the asset.

Let's say we're tokenizing a luxury item such as a designer bag. We could start by creating a digital twin of the bag containing everything we know about it—its manufacturer, manufacturing date and location, size, color, model, list of components, cost, selling price, and more.

Tokenized assets differ from their original equivalents in some important ways. Tokens are cryptographically linked to the original assets, but typically store only minimal metadata about the original asset.

The digital twin is usually stored in a software system maintained by the manufacturer, but usually not shared with other people. A tokenized version of the asset containing a subset of the asset data can be created on a blockchain ledger, making it appropriate and easy to share with people outside the manufacturer's firewall. The token can also be digitally signed by involved counterparties to prove ownership, custody, or agreement with token metadata (see figure 1).

Figure 1
A real-world asset is typically tokenized via a digital twin



Source: Kearney analysis

Attributes of the original assets are exposed to counterparties only as needed, which allows multiple organizations to transact safely and efficiently with one another using these tokenized assets.

Fundamentally, tokenization of RWAs allows traditionally illiquid, hard-to-trade assets such as real estate to become more easily transactable. A $10 million building could be tokenized into 10 million tokens, so anyone can purchase and participate based on how much they can invest. Think real estate, stocks, and commodities—all prime for more liquid markets.

And that's just the tip of the iceberg.

But tokenization alone isn't enough. Businesses need to consider which RWAs are worth tokenizing, what can be done with the tokens, and more importantly—what business pain points they can help solve.

We consider three distinct steps in the tokenization process (see figure 2).

Figure 2
There are three distinct steps in the tokenization process

Source: Kearney analysis

Today, global luxury brands LVMH and Mercedes-Benz, among many others, are using NFTs to prevent counterfeiting, reduce fraud, and increase transparency in the movement of supply chain goods. Brands such as Starbucks have successfully started using NFTs in their loyalty programs. In healthcare, NFTs are being used to track and trace drugs in circulation as well as their location and condition, enhancing patient access and safety. They also help track and trace clinical trial data, increasing security and accountability.

Indeed, real-world asset tokenization is unlocking a realm of new opportunities—redefining how we own, interact with, and manage assets like never before.

An example: realizing the benefits of tokenization—quality control in the pharmaceuticals supply chain

Step 1: Define the problem

The counterfeit drug market is estimated to be between $200 and $432 billion. Counterfeit pharmaceuticals can pose a significant threat with far-reaching consequences to stakeholders in the supply chain. They may contain incorrect and potentially harmful ingredients that can critically endanger patients' health—as seen last month with Novo Nordisk's hugely popular drug, Ozempic, which has been authorized in the EU for the treatment of type 2 diabetes but been increasingly used as a weight loss medication for which it is not approved. Demand for Ozempic has exceeded Novo's supply of the drugs in the US and European markets—an opportunity that has been taken advantage of by bad actors, who have produced counterfeit versions of Ozempic and have found a way to get these into the supply chain. People using counterfeit Ozempic have become hospitalized, suffering serious side effects including hypoglycemic shock and coma.

Aside from the adverse effects on patient health, counterfeit drugs can cause reputational damage and potential legal consequences for manufacturers and distributors involved. The economic losses incurred and the strain on healthcare systems further compound the issue, as hospitals may inadvertently administer counterfeit medications or delay the dissemination of life-saving treatments.

To better elaborate on this problem statement, we'll look at the various counterparties involved that would benefit from addressing this problem and their individual goals. For this example, we've identified six counterparties: the manufacturer, regulator, logistics partner, distributor, healthcare provider, and the patient (see figure 3).

Figure 3
Counterfeit medications affect parties in a number of roles

Illustrative

Alice, Manufacturer	**Bob, Regulator**	**Charlie, Logistics**	**Dave, Distributor**	**Eve, Doctor**	**Frank, Patient**
Alice is a quality control manager at Gotham Therapeutics, a 150-year-old pharmaceutical company that manufactures innovative medications.	Bob is an inspector at the Food and Drug Regulatory Agency, safeguarding public health by ensuring the integrity and authenticity of pharmaceutical distribution.	Charlie is a logistics director at Grayson Logistics, responsible for the shipping and delivery of Gotham Therapeutics products to distributors.	Dave works at Arkham Distribution, a long-time distributor of Gotham Therapeutics medicines.	Eve is a primary care physician at Wayne Medical working closely with Frank in his patient journey.	Frank has long-term chronic illness with several comorbidities having developed in recent years.
Goal: To have all pharmaceuticals leaving the manufacturing facilities be certified for quality and authenticity	**Goal:** To ensure that all drugs going out to and circulating in the market are authentic and thereby complying with regulations and meeting quality standards	**Goal:** To make sure all products transported and shipped through them arrive in a timely fashion, ensuring quality and efficiency	**Goal:** To help Alice distribute and sell authentic medications and grow his clientele of similar clients	**Goal:** To help treat patients while at the same time be able to prescribe quality and authentic medications approved by regulators	**Goal:** To improve his health condition and be able to take medication confidently, without needing to worry about its authenticity

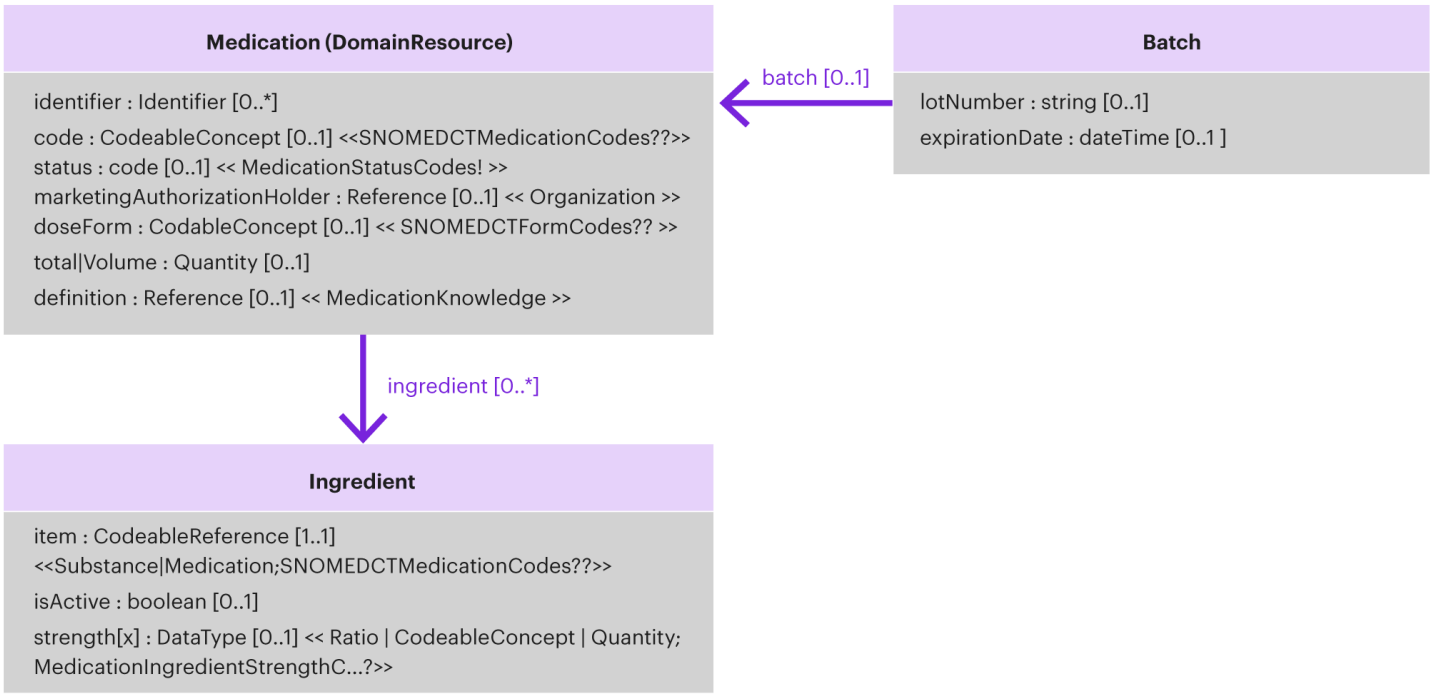
Source: Kearney analysis

Step 2: Tokenize relevant assets

Health Level Seven International (HL7) is the industry body creating standards for the representation and exchange of electronic health information. Since most healthcare software will be aware of the HL7 data formats, we can consider data for medication, ingredient, and batch as the RWAs we'll be tokenizing. Note that HL7 has an existing format for representing medication data, as seen in figure 4.

Figure 4

Health Level Seven International has an existing format for representing medication data



Source: Kearney analysis

To certify quality and discourage counterfeiting, a one-to-one correspondence between RWAs and their tokenized representations isn't necessary. In fact, we can simply mint (create) two types of NFT tokens:

1. **Manufacturing batches** of the products having metadata

- a. Lot number
- b. Expiration date
- c. Manufacturer
- d. Custody

2. **Certificates of quality and authenticity** for the batches having metadata

- a. Status (for example, pass or fail)
- b. Certificate signatory

These tokens as well as the attributes tracked within them allow all counterparties in the workflow to check the quality and provenance of the products that travel along the supply chain.

Step 3: Model workflows

Let's assume that all counterparties have agreed to use Gotham Therapeutics' Ivy mobile application and Wayne Medical's EHR that connect to the shared ledger as the way in which to check the quality of pharmaceuticals as they travel along the supply chain.

Figure 5 shows how counterfeit products can enter the supply chain at any point and can be detected at any time in the workflow.

Figure 5

Counterparties can check product ownership and verify authenticity at every stage of the supply chain

Alice, Gotham Therapeutics

Scans the QR code on the physical batch on the Ivy app to certify authenticity.

- **Mints 2 types of NFTs** on a ledger:
  - **Manufacturing batches**
  - **Certificates of quality and authenticity**
- **Custody** is registered to Gotham Therapeutics.

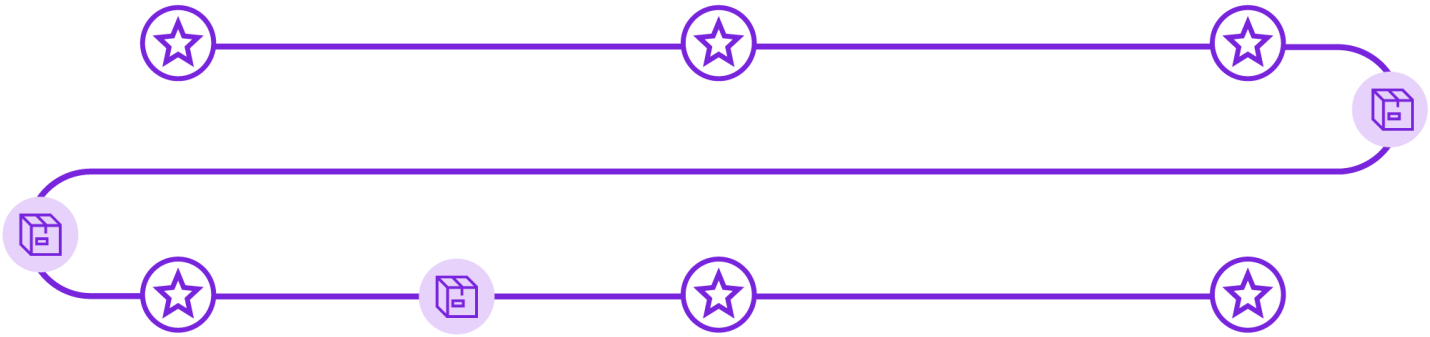
Bob, Food and Drug Regulation Agency

Scans QR code and reviews batch details in the token and may physically inspect the batch periodically.

- **Adds digital signature to the certificate token** as proof that the batch has passed inspection

Charlie, Grayson Logistics

Products are shipped and details such as location and temperature are updated through IoT devices.



Dave, Arkham Distribution

Scans QR code and reviews details of ownership and quality of products before distributing products to healthcare providers.

- **Custody** is registered to Arkham Holdings.

Eve, Wayne Medical

- Custody is registered to Wayne Medical.
- Wayne Medical's EHR links to the ledger so clinical staff can verify quality and authenticity as well as history of the medications before deploying them to patients.

Frank, Patient

Receives high-quality, authentic medication.

✓ Products are deemed quality assured if chain of custody details and certifications on quality and authenticity are accurate.

✗ Products are rejected if custody details are inaccurate, if no authenticity exists, or if the drug lot has already been sold earlier.

Asset tokens

Counterfeit

Source: Kearney analysis

Using the shared ledger, all counterparties can run verification checks on any goods in the supply chain at any given point in time. Any counterfeit goods appearing during these checks will fail verification since they won't find a matching token via its metadata.

This way, Eve and the other Wayne Medical clinical staff can visit their EHR system to check the authenticity of the batches of medications received at the hospital and confidently prescribe medications. Records on the quantity of drugs sold and lot numbers are recorded so any incoming batches with the same lot numbers could be easily flagged as counterfeit products and appropriate actions can be taken.

For Alice and Gotham Therapeutics this means being able to better track and trace the movement of their products in the supply chain, providing real-time visibility and optimized production and deployment processes. Distributors and other stakeholders in the supply chain can verify and reject product batches where needed. And ultimately, certification of the quality of pharmaceuticals gives healthcare professionals like Eve confidence in dispensing valuable medications to patients like Frank.

Is tokenization right for your organization?

If your organization frequently engages in complex transactions involving multiple parties, intricate financial structures, and lengthy contractual agreements, then almost certainly tokenization is right for you. Trusted third parties such as banks or financial institutions are often engaged as intermediaries as they can provide guarantees, insurance, or collateral management services that help large organizations manage and reduce risks that come with such transactions. But while intermediaries provide essential services for large organizations, blockchain technology and the enablement of smart contracts are challenging this status quo.

As shown in the previous example, tokenization shifts some of the responsibilities of trusted intermediaries into the protocols (data structures, rules, and capabilities) built into blockchain technology. This allows transactions to be conducted directly between counterparties with added trust and reduced reliance on intermediaries. In fact, blockchain, the underlying technology behind tokenization, is often called the "trustless" network—not because business partners lack trust, but because they no longer need to. Leaders identifying existing operational inefficiencies can therefore turn to tokenization to streamline and secure processes, potentially reducing operational costs for the organization.

It is also worth assessing the liquidity needs of your organization as tokenization can enable fractional ownership of illiquid and traditionally hard-to-trade assets. Tokenized assets can be divided into smaller, tradable units of digital tokens, which broadens accessibility to a wider range of investors. Tokenized assets can be traded 24/7 on digital platforms, and since the need for intermediaries is substantially reduced, tokenization trims transaction expenses and verifications, thus simplifying and speeding up the buying and selling of traditionally illiquid assets.

Furthermore, tokenization can prove beneficial for organizations operating in highly regulated industries or where greater transparency, traceability, and accountability are needed. Blockchain's transparency and immutability greatly contributes to maintaining accurate records, demonstrating compliance, and establishing trust with regulators and other counterparties.

Getting started

The future of NFTs and real-world asset tokenization will enable organizations to create substantial value in ways that extend far beyond what has already been explored in recent years. As the technology matures and diversifies, it will reshape the ways in which we own, invest in, interact with, and transact assets.

There is no fixed approach. Every organization will take a different course based on their pain points and unique attributes, such as organizational capabilities and risk appetite, among others.

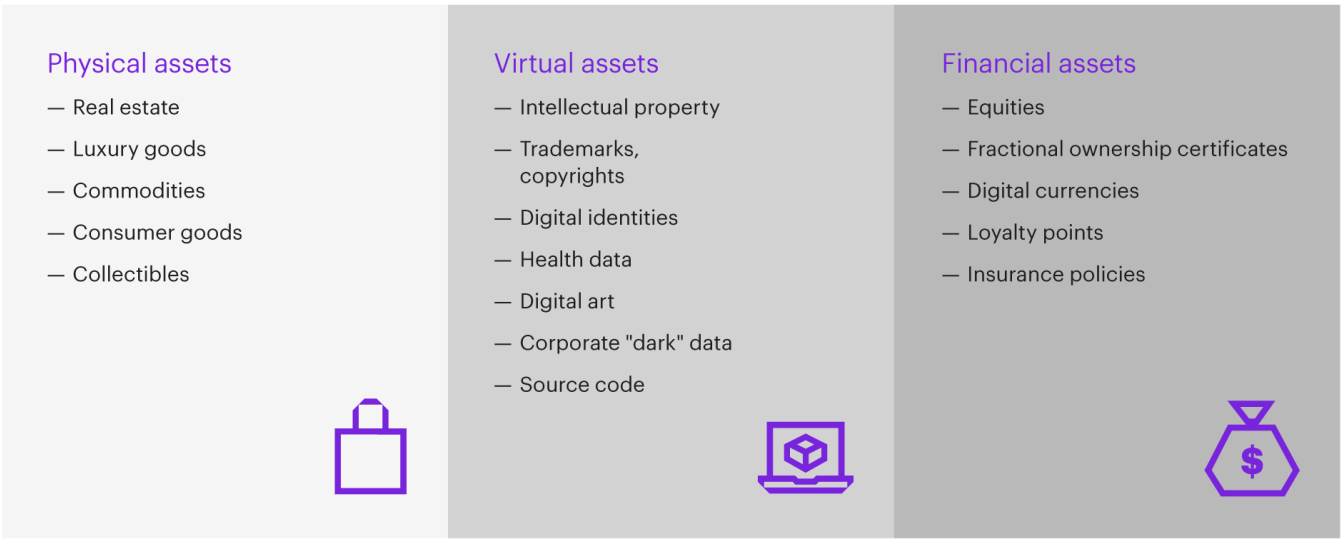
Kearney and IGNITE can support leaders in unlocking value in their organizations through real-world asset tokenization by identifying and prioritizing the assets to unlock. We work with leaders to activate a variety of blockchain technologies that enable tokenization, while carrying out standards bodies and ecosystem coordination with our extensive network of partners.

FAQ: the tech of tokenization

What is an asset? What can I tokenize?

Any physical or digital item owned by a business or individual can be considered an asset, as seen in the figure. An asset is assumed to have some quantifiable value in the "real world." Theoretically, any such asset can be tokenized by creating a cryptographically secured version, or representation of the asset on a blockchain.

Figure
Any physical or digital item owned by a business or individual can be considered an asset



Source: Kearney analysis

How does blockchain technology enable tokenization?

Blockchain technology is foundational to asset tokenization, serving as the underlying infrastructure that enables the creation, management, and trading of tokenized assets. Tokenization allows tangible or intangible assets to be represented, tracked, and transacted on a blockchain network. Although the term

blockchain refers to not one but a variety of distributed ledger technologies, they all share some common characteristics:

Decentralization means that there's no single person or organization that controls a blockchain. Instead, it's maintained as a network of computer nodes requiring multiple entities to reach consensus when recording transactions.

Immutability means that once something is written or recorded on a blockchain, it can't be changed or reversed. This introduces an element of non-repudiation, since once something is recorded on a blockchain that information cannot be changed or challenged.

Decentralized identity implies that unlike traditional identity management schemes, which are managed by centralized authorities such as governments or corporations, individuals exercise authority over their identity and data, determining in which transactions to participate and what data to disclose and to whom.

Programmability refers to the ability to create and execute "smart contracts," digital agreements on a blockchain that self-execute when specific conditions—predetermined and agreed upon by all parties involved—are met. This ensures that all participants can promptly determine the result without any requirement for intermediaries, manual intervention, or time delays.

What can I do with a tokenized asset?

Since a token is cryptographically linked to a corresponding RWA, it can be used as a proxy for the asset, thus allowing reliable transactions among counterparties. Blockchain capabilities including encryption, digital signatures, ownership transfers, and self-executing smart contract logic are being used to simplify and automate complex business workflows between counterparties.

Who are counterparties?

Counterparties are people or commercial entities involved in contractual workflows used to exchange things of value among themselves. Although many counterparty workflows involve financial transactions, they could involve the exchange of non-financial assets as well.

Unlike employees of a single company, counterparties usually interact with each other across company or organizational boundaries and may have competing incentives and therefore limited trust among each other. Counterparty transactions are often conducted using intermediaries that act as proxies introducing trust into transactions.

How does blockchain technology facilitate counterparty coordination?

Tokenization shifts some of the responsibilities of trusted intermediaries into the protocols built into blockchain technology. This allows transactions to be conducted directly between counterparties with added trust and reduced reliance on intermediaries.

Are there industry standards for asset tokenization?

Tokens are often based on standards from the Ethereum blockchain community called ERCs (Ethereum Request for Comment). Ethereum standards are being adopted or reimplemented by other blockchain platforms as well. Different standards specify how digital tokens should be represented and behave in a blockchain ecosystem:

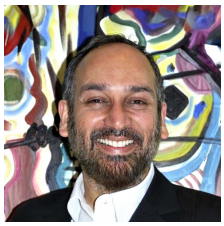
ERC 20 (fungible tokens): Fungible tokens are identical in value and can be exchanged on a one-to-one basis.

ERC 721 (non-fungible tokens): NFTs are distinct and not interchangeable like ERC 20 tokens.

ERC 1155 (combining fungible and non-fungible tokens): This is a more versatile token standard designed to support both fungible and NFTs within a single contract.

The authors wish to thank Piyush Dubey, Toni Horn, and Vagan Esaian for their invaluable contributions to this paper.

Authors



Faisal Siddiqi
HOPTEK Chief Engineer

David Jensen
Senior Advisor

Benjamin Glatz
Partner

Kim Leung
Consultant

About Kearney

For 100 years, Kearney has been a leading management consulting firm and trusted partner to three-quarters of the Fortune Global 500 and governments around the world. With a presence across more than 40 countries, our people make us who we are. We work impact first, tackling your toughest challenges with original thinking and a commitment to making change happen together. By your side, we deliver—value, results, impact.

For more information, permission to reprint or translate this work, and all other correspondence, please email insight@kearney.com. A.T. Kearney Korea LLC is a separate and independent legal entity operating under the Kearney name in Korea. A.T. Kearney operates in India as A.T. Kearney Limited (Branch Office), a branch office of A.T. Kearney Limited, a company organized under the laws of England and Wales.