



Hedera™

Exploring the Emerging Token Economy

Unlocking the potential of tokenized real-world assets

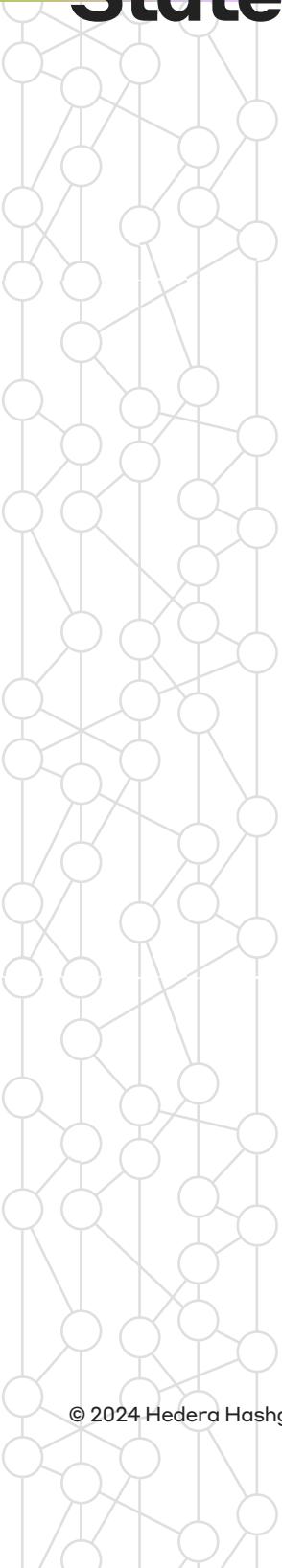


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High Level Statement



The creation and subsequent proliferation of distributed ledger technologies as we know them today, spurred by the creation of Bitcoin, did more than introduce the world to cryptocurrencies. As is being increasingly explored at every level of the emerging digital economy, the underlying infrastructure holds enormous potential to fundamentally revolutionize how institutions, enterprises, and individuals interact with one another - enabling new functionalities to disrupt traditional markets on a global scale across industries.

A critical topic ever-increasing both in interest and practical application is that of real-world asset tokenization: the digitization of physical or traditional assets represented on decentralized infrastructure such as blockchain or similar forms of distributed ledger technology (DLT). The benefits of tokenization are numerous and varied, and are why key players in traditional finance, real estate, payments, and more are experimenting with and implementing this new and powerful functionality. As web3 continues on its journey to becoming a core pillar of our future economy, asset tokenization introduces unprecedented opportunities - unlocking the true value of real-world assets through the utilization of DLT.



Current State of Asset Tokenization

Tokenization is currently revolutionizing global investment. This critical functionality - enabled by DLTs such as blockchain or hashgraph - has the potential to significantly streamline investment processes in both obvious and yet undiscovered ways. Whether it's a piece of real estate, a bond, a currency, or even a luxury good, tokenization provides enormous potential to unlock unprecedented value through improved accessibility, increased liquidity, and operational efficiency.

The total current market size for tokenized real-world assets today is difficult to assess accurately due to a combination of information asymmetry and lack of robust definition but is almost universally expected to grow exponentially over the next several years. Conservative estimates project the value of tokenized real-world assets to reach [more than \\$4 trillion by the year 2030](#)¹, while more "optimistic" estimates predict a value of [over \\$16 trillion by the same year](#)². This growth is fueled by the increasing institutional adoption of DLT, the growing demand for fractional ownership, and the need for more efficient and transparent asset trading. As DLT-enabled tokenization initiatives continue to be led by major institutions, the private banking, asset management, real estate, and environmental finance sectors are emerging as key distribution channels for tokenized assets.

Tokenization transcends mere convenience and accessibility, serving as a catalyst for the seamless exchange of assets and enhancing liquidity in markets such as real estate that typically lack it. By fractionalizing assets into smaller, more manageable units, a broader spectrum of investors can partake in ownership, improving market liquidity. The integration of decentralized infrastructure streamlines transactions, lowers costs, and diminishes the need for intermediaries, paving the way for a more economical financial framework. Looking to the future, the intersection of tokenization, investment opportunities, and payments will continue to be increasingly explored by institutions and enterprises, holding monumental potential to fundamentally redefine investment and financial interactions.

Projected Global Value of Tokenized Assets by 2030

| | |
|---------------|--------------|
| BCG | \$16T |
| Roland Berger | \$10T |
| CITI | \$5T |

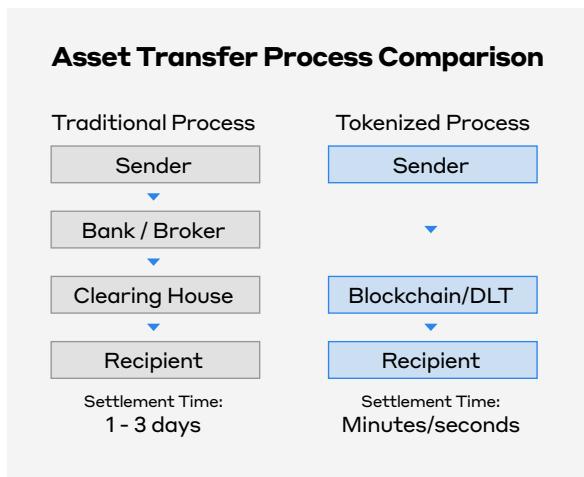
¹ <https://www.citigroup.com/global/insights/citigps/money-tokens-and-games>

² <https://www.bcg.com/publications/2022/relevance-of-on-chain-asset-tokenization>



Traditional Finance

The traditional finance (TradFi) market as it stands today suffers from a broad range of systemic operational inefficiencies. These include but are not limited to slow settlement times, limited access to investment opportunities, and a lack of market transparency, leading to unnecessary costs, asymmetric information, and untapped market potential. For institutions and enterprises, there is a growing trend of exploring how blockchain and other DLTs can address these aforementioned inefficiencies and transform the market as we know it today, with asset tokenization being at the heart of this revolutionary shift.



Tokenization enables cost-effective, real-time transaction settlement of digital assets, which can take days with traditional assets due to the inherent inefficiencies associated with multi-party interdependencies. What normally [takes 1-3 days](#)³ can now be accomplished in minutes, if not seconds (depending on the type of decentralized infrastructure used) unlocking massive, untapped levels of liquidity that would otherwise be locked up in legacy processes while intermediaries slowly reach consensus on the transfer of value.

As an example of the benefit this brings to investors and funds, we can look at money market fund dividends

intended to be immediately reinvested for optimal compounding. It is common for positions in money market funds to compound daily - maximizing returns whenever dividends are calculated and distributed. Since dividends regularly take multiple days to settle with the investor, any days spent processing the transaction is - for the investor - money lost on the interest that would have accrued had the dividend been paid out immediately and - for the fund - liquidity that could have been used to improve the fund's position.

Furthermore, tokenization enables the democratization of access to traditionally gated investment opportunities such as high-value bonds with high minimum investment requirements through "fractionalization": the practice of breaking-up an asset into smaller pieces that represent a portion of the collective asset. By breaking down these assets into more affordable units, fractionalization allows investors to purchase just a fraction of a bond and receive proportional returns from it. This not only lowers the barrier to entry allowing a wider range of investors to participate, but also greatly enhances liquidity through secondary markets and lower transaction costs compared to traditional trading methods.

³ <https://www.investopedia.com/ask/answers/what-do-t1-t2-and-t3-mean/>



Traditional Finance



CASE STUDY

As is to be expected given the still relatively nascent concept of tokenization, the vast majority of the fund industry is still subject to the inherent inefficiencies of legacy financial systems. Typically, money market funds - like all mutual funds - have relatively slow payout and settlement times, resulting in untapped liquidity and suboptimal returns.

Standing at the forefront of demonstrating the potential for tokenization to revolutionize fund management is leading UK-based fund management firm, [abrdn](#), and digital asset solutions provider, Archax. In collaboration with abrdn, [Archax](#) has begun to offer tokenized investments in abrdn's £multi-billion money market fund⁴, with interests tokenized by and secured on the Hedera network using the native [Hedera Token Service](#)

By tokenizing both investments and interest paid out to investors, abrdn is able to offer immediate and automatic reinvestment for its customers and reduce liquidity fragmentation. Investors no longer have to endure the typical waiting period for transactions to clear. Instead, they can see their transactions settled instantly, which is particularly beneficial in a fast-paced financial environment where timing can significantly impact investment outcomes - especially regarding funds that provide options for daily compounding.

abrdn and Archax are not only simplifying the investment process and reducing unnecessary operational overhead but also enhancing the potential for investors to realize greater returns on their investments. As institutions grow to realize the enormous benefits for both customers and providers that abrdn has already begun to reap, tokenization will cease to exist on the fringe and cement its place as a core pillar of modern finance.

⁴ https://blog.archax.com/resources/news/archax_tokenises_investment_in_abrdn_multi_bn_money_market_fund



"By partnering with Hedera, we can make previously restricted asset classes accessible to a wider range of investors. This aligns perfectly with our commitment to financial inclusion and creating a more equitable investment landscape."

Duncan Moir | Senior Investment Manager, abrdn



Carbon Market

The carbon market, an essential component to reducing greenhouse gas emissions, is currently experiencing significant growth. The World Bank reported in 2023 that revenues from carbon taxes and Emissions Trading Systems (ETS) reached about [\\$95 billion for the year⁵](#), covering almost a quarter of global emissions. However, the market faces challenges such as information asymmetry, inefficiencies, and lack of transparency, which can hinder its effectiveness and scalability.

Tokenization of Environmental, Social, and Governance (ESG) assets, including carbon credits, offers a solution to many of the market's current inefficiencies. By converting these assets into digital tokens, tokenization provides increased liquidity, auditable transparency, and improved accessibility to the still emerging industry.

The value of the carbon offset market is substantial and expected to increase dramatically. In 2020, the voluntary carbon market was valued at \$2 billion according to Boston Consulting Group and is projected to [grow to between \\$10 billion and \\$40 billion by 2030⁶](#). Long-term forecasts are even more optimistic, with Morgan Stanley estimating that the market could be [worth up to \\$250 billion by 2050⁷](#) as demand for instruments of carbon reduction increases.

However, tokenization will undoubtedly be heavily utilized to fully realize the potential of this growing market due to the high programmability, auditable transparency, and standardized discoverability that digital assets have the potential to provide.

Total Addressable Market of ESG Use Cases

\$800B - \$1.6T

Source:
[PwC, 'Carbon Credit Tokenization: Pioneering a Sustainable Future, April 2024'](#)

⁵ <https://www.worldbank.org/en/news/press-release/2023/05/23/record-high-revenues-from-global-carbon-pricing-near-100-billion>

⁶ <https://www.bcg.com/publications/2023/why-the-voluntary-carbon-market-is-thriving>

⁷ <https://www.morganstanley.com/ideas/carbon-offset-market-growth>



Hedera™

Carbon Market



CASE STUDY

As governments, institutions, and enterprises drive towards net-zero goals, effective and trusted methods of decarbonization are increasingly sought after and valued for a greener tomorrow. In an effort to advance decarbonization practices and provide accurate, granular emissions data, Hyundai Motor and Kia have developed the [Supplier CO2 Emission Monitoring Systems \(SCEMS\)](#)⁸ - built on the Hedera network - for their supply chains.

Integrated with the highly scalable Hedera Consensus Service, SCEMS is designed to compute accurate, auditable, and verifiable carbon emissions data for stakeholders connected to Hyundai and Kia's supply chain. This new system enables real-time traceability and management of carbon emissions data - offering unprecedented visibility and information for stakeholders to meet net-zero emission targets and comply with fast emerging environmental regulations.

The Hedera network - as the distributed ledger technology with the [lowest carbon footprint in the market](#)⁹ - proved to be the ideal infrastructure for Hyundai Motor and Kia to base the foundation of their blockchain-based carbon emissions monitoring system on. From the inception of Hedera, sustainability has consistently been a core part of the network's mission; this collaboration between Hyundai/Kia and Hedera shows deep alignment in values both in execution and in vision.

With the implementation of this revolutionary new system and in partnership with Hedera, Hyundai and Kia are setting new standards for environmental accountability. The future of decarbonization looks promising, with solutions like SCEMS leading the charge towards a more sustainable world.

⁸<https://www.hyundai.com/worldwide/en/newsroom/detail/hyundai-motor-and-kia-to-introduce-blockchain-based-carbon-emission-monitoring-system-to-foster-a-sustainable-value-chain-0000000280>

⁹<http://blockchain.cs.ul.ac.uk/blockchain-energy-consumption/>



"We stand proudly at the forefront of this transformative journey, collaborating with our partners to shape a greener and brighter future for all."

Seung Hyun Hong | Head of Materials Research and Engineering Center, Hyundai Motor and Kia



Digital Currencies / Cross-Border Payments

The current landscape of global finance is a complex web of intermediaries, inefficiencies, and legacy systems. Traditional cross-border payments are often slow and expensive, foreign exchange transactions are subject to fluctuating rates and high fees, creating uncertainty and risk, and the fragmented nature of currencies has resulted in an environment lacking in standardization and interoperability.

Projected Value of Remittances 2024

\$883B USD

Source:
[World Bank Group and KNOMAD, 'Migration and Development Brief 40, June 2024'](#)

DLTs and the tokenization capabilities they enable have the potential to revolutionize this landscape. By providing a decentralized, transparent, and secure method of recording transactions, these technologies can eliminate many of the inefficiencies inherent in the current system. For instance, stablecoins such as USD Coin can enable faster, cheaper, and more transparent cross-border payments by removing the need for intermediaries. Similarly, DLT can provide a more stable and efficient method of conducting foreign exchange transactions, reducing risks and uncertainties.

These technologies have the potential to fundamentally reshape the way we conduct international transactions, creating a more inclusive, efficient, and secure global financial system. By democratizing access to financial services, DLT and blockchain could empower individuals and businesses around the world, fostering economic growth and financial inclusion. While challenges remain, the potential for DLT to transform cross-border payments and foreign exchange is immense.

Average Remittance Fees 2024

6.35%

Source:
[World Bank, 'Remittance Prices Worldwide, March 2024'](#)



Digital Currencies / Cross-Border Payments



CASE STUDY

The international money transfer industry is fraught with challenges - high transaction fees, slow processing times, and a lack of transparency. These issues are particularly pronounced for migrant workers and their families, who often rely on these remittances for their livelihoods.

Shinhan Bank - the oldest financial institution in South Korea - in collaboration with SCB TechX and Cathay Bank recently completed a [proof-of-concept stablecoin remittance pilot](#)¹⁰ on the Hedera network - achieving real-time settlement and real-time foreign exchange rate integration across tokenized representations of the Thai Baht (THB), New Taiwan dollar (NTD), and South Korean won (KRW).

The pilot's success is a testament to the transformative potential of tokenized assets, demonstrating that it is possible to conduct cross-border transactions that are not only faster and cheaper but also more transparent than traditional methods.

By harnessing the power of tokenization in the form of stablecoins, Shinhan Bank, SCB TechX, and Cathay Bank have shown that it is possible to overcome the limitations of the current paradigm and pave the way for a more efficient, transparent, and equitable financial system.

¹⁰ <https://hedera.com/blog/shinhan-bank-scb-techx-successfully-pilot-stablecoin-remittances-on-the-hedera-network>



We are pleased to have partnered with Hedera to explore the potential of stablecoins as a means of facilitating cross-border remittances... The successful completion of this second PoC marks an important step forward in our efforts to make cross-border payments faster, cheaper, and more accessible to people around the world.

Byunghee Kim | Chief of Blockchain, Shinhan Bank



Real Estate

Real estate is one example of a traditionally illiquid asset, the market of which is set to be greatly disrupted with the introduction of tokenization. While the market for commercial and residential real estate turns over trillions of dollars every year regardless of macroeconomic conditions, the relatively high capital requirements for those looking to purchase and/or invest in such assets make the market largely prohibitive to the majority of prospective participants. This affects not only buyers but sellers as well, where a lack of adequate liquidity restricts both the number of people available to purchase and, consequently, reduces the collective capital available to potentially be used for buying or investment on any given property.

Through tokenization, the traditionally illiquid nature of real estate can now be challenged to bring improved liquidity, effective price discovery, and increased accessibility to the market. A key functionality enabled by tokenization is fractionalization. This relatively new concept of “fractional ownership” enabled through tokenization brings unprecedented benefits to an increasingly inaccessible real estate market, reducing capital-intensive barriers to entry for buyers and increasing the number of potential buyers for sellers.





Real Estate

For example, imagine a scenario with a property on the market for \$100,000. The seller is looking for someone with either \$100,000 to spend or enough capital to secure a mortgage through which he will then be in debt and required to make payments towards. Both options are restrictive in their own ways: the former requires capital that a vast majority will not have or be willing to spend, and the latter involves taking on long-term debt (in addition to any down payment which in itself may be unfeasible). The inherently high capital requirements of the real estate market means that sellers are unable to tap into the true potential of the collective market and potential investors or buyers are restricted from participating due to a lack of sufficient capital.

56%

of institutional investors see **increased liquidity** as the top driver to invest in tokenized assets.

EY-Parthenon, 'Institutional Investor Tokenization Survey, May 2023'

Now let's introduce tokenization into the equation. The seller tokenizes the property, enables fractional ownership, and lists it on the open market. Whereas before, the pool of prospective investors was made up of those able to pay \$100,000, through tokenization, that pool now includes those willing to pay just \$50,000 for a 50% share of the property, those willing to pay \$10,000 for a 10% share of the property, those willing to pay \$1,000 for a 1% share of the property, and so on. Sellers can market their property to a wider base of potential buyers, and buyers are no longer restricted due to a lack of capital. In this way, a traditionally and relatively illiquid real estate asset becomes highly liquid with minimal friction in buying and selling.



Real Estate



CASE STUDY

In the rapidly evolving world of commercial real estate, [RedSwan CRE](#) is making waves by leveraging distributed ledger technology.

Recognizing the potential of DLT, RedSwan has launched its [token studio on the Hedera network for asset tokenization](#)¹¹. This innovative approach allows for the tokenization and fractionalization of real estate, leading to increased liquidity, improved price discovery, and reduced operational fees. By fractionalizing assets on the platform, RedSwan is democratizing access to real estate investment opportunities.

Utilizing the native Hedera Token Service and Hedera's [Asset Tokenization Studio](#), RedSwan can tokenize institutional-grade real estate efficiently and securely with a combination of speed, sustainability, security, and low fixed fees. Network-native KYC and AML functionalities mean that RedSwan can both issue their tokens as securities and adjust their product offering in line with regulatory bodies, with protocol-enforced royalties to ensure equitability throughout asset lifecycles.

With \$5B in tokenized assets and an expectation of growing to \$25B in the next year, RedSwan is not just disrupting the commercial real estate market but also shaping its future - broadening opportunities for investors and introducing unprecedented liquidity to traditionally illiquid assets.

¹¹ <https://www.hbarfoundation.org/blog-post/redswan-cre-builds-its-token-studio-on-hedera-for-real-world-asset-tokenization>



"The Hedera network is the backbone of our platform. Its speed, security, and global reach allow us to provide a truly accessible and efficient marketplace for tokenized real estate investments worldwide."

Ed Nwokedi | Founder & CEO, RedSwan CRE



Commodities

The commodity market is characterized by volatility and complexity, and is not immune to the structural inefficiencies. One of the main issues commonly referenced with discussing the commodity market is the lack of transparency, resulting in market opacity, fragmentation of reporting, and insufficient data¹².

Tokenization can significantly mitigate the inefficiencies of information asymmetry and lack of transparency in commodity markets. By representing commodities as tokens, each transaction is immutably and transparently recorded, providing an auditable chronological record of ownership and trades. This transparency helps reduce the opacity that often leads to market inefficiencies, as all market participants have access to the same information regarding the supply, demand, and provenance of commodities.

Furthermore, tokenization can enable more granular data to be collected at each step of a given commodity's lifecycle. DLT allows for the integration of real-time data from various sources, such as IoT sensors and supply chain updates, which can be attached to the tokenized asset, resulting in a richer dataset that is readily available to all market participants for enhanced decision-making processes and more accurate price discovery.

The increased data availability and improved market intelligence can lead to more efficient and fair markets, ultimately benefiting all stakeholders involved.

 EY Parthenon

Both institutional and HNW investors are most motivated to invest in tokenized products due to the following benefits:

1. Increased liquidity
2. Lower transaction costs
3. Improved performance/returns
4. Increased transparency

[EY-Parthenon, 'Driving Meaningful Opportunity: Tokenization in Asset Management'](#)

¹² <https://www.hbarfoundation.org/blog-post/redswan-cre-builds-its-token-studio-on-hedera-for-real-world-asset-tokenization>



Commodities



CASE STUDY

Diamonds have long been considered symbols of wealth and exclusivity for the elite, but as investment vehicles they have lagged due to information asymmetry and inadequate market liquidity. However, the advent of diamond tokenization by Diamond Standard is disrupting this status quo, democratizing access to diamond investments for a broader audience using distributed ledger technology and introducing unprecedented liquidity to the market.

Diamond Standard's suite of asset-backed tokenized diamond investments - Carats, Coins, and Bars respectively in ascending value - is a pioneering step in this direction. By leveraging the Hedera network and the native Hedera Token Service, Diamond Standard has created a secure digital alternative to traditional commodity investing, making diamond investment accessible to anyone with as little as \$100.

Investors are constantly seeking ways to diversify their portfolios and hedge against market volatility and inflation. Diamond Standard's tokenized diamond solution provides a digital asset that combines the security of physical commodities with the increased liquidity and accessibility enabled by distributed ledger technology.

By tokenizing diamonds, Diamond Standard is not only creating a new asset class but also ensuring that this asset class is inclusive, secure, and poised for the future. It's a revolutionary step forward, one that could pave the way for the democratization of various other traditionally exclusive investment assets.



"We chose to build on Hedera because its speed, security, and transparency were essential to our vision of democratizing access to diamonds as an asset class. Hedera's enterprise-grade distributed ledger technology will enable Diamond Standard to offer investors unprecedented transparency and liquidity."

Rajiv Sohal | CTO, Diamond Standard



Benefits of Tokenization On Hedera

ENHANCED SECURITY AND FAIRNESS

The Hedera network's hashgraph consensus algorithm provides improved security and fairness in transaction ordering¹³ compared to traditional blockchain solutions. Its consensus mechanism ensures that transactions are finalized in the order they are received, reducing the potential for fraud and manipulation, which is vital for maintaining trust when trading any asset.

STRONG GOVERNANCE MODEL

Hedera is governed by a council of diverse, reputable, world-leading organizations across a broad range of industries, ensuring a stable and reliable network governance model¹⁴. This governance structure provides a level of trust and stability that is appealing to institutions, enterprises, and investors looking for a reliable platform to tokenize assets.

UNMATCHED CARBON EFFICIENCY

Hedera is designed to be an energy-efficient network that addresses the environmental concerns associated with blockchain technology. For businesses and investors increasingly concerned about sustainability, Hedera's low energy consumption for processing transactions is a significant advantage.

COMPLIANCE AND REGULATORY FEATURES

The Hedera Token Service provides native and programmable whitelisting capabilities designed to ensure compliance with various regulatory frameworks¹⁵ - a critical factor for tokenized registered assets trading. These features enable the enforcement of Know-Your-Customer (KYC) and Anti-Money Laundering (AML) regulations by allowing token issuers to control who can buy, sell, or hold their tokens. This is particularly important in the real estate sector, where regulatory compliance is stringent.

¹³ <https://hedera.com/blog/fair-timestamping-and-fair-ordering-of-transactions>

¹⁴ <https://hedera.com/council>

¹⁵ <https://hedera.com/blog/get-started-with-the-hedera-token-service-part-2-kyc-update-and-scheduled-transactions>



Benefits of Tokenization On Hedera

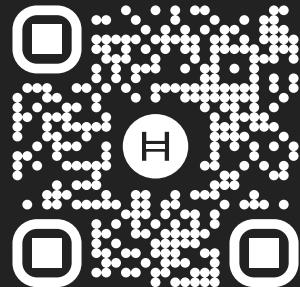
CUSTOMIZABLE COMPLIANCE RULES

Hedera allows for the customization of compliance rules according to specified requirements. Token issuers can set up their whitelisting criteria based on various factors, such as geographical location, investor accreditation status, or transaction limits. This flexibility ensures that tokenization projects can be tailored to meet different jurisdictions' specific legal and regulatory requirements.

Asset Tokenization Studio on Hedera

Asset Tokenization Studio is an open source toolkit for the configuration, issuance, and management of tokenized securities and equities on the Hedera network—all in less time and with less risk.

Jumpstart testing and development with a production-grade SDK or WebUI.



[Learn More](#)



Hedera™