

Content Reference: Tokenized Assets

Digital Finance — BSc Course

Section 1: Key Definitions

- **Tokenization** — creating a digital representation of a real-world asset on a blockchain; the token is a claim on a legal entity (SPV) that holds the asset, not the asset itself.
- **Fractional ownership** — dividing an asset into many small units so investors with limited capital can participate (e.g. \$50 of a \$500,000 property).
- **Security Token Offering (STO)** — a regulated public or private sale of asset-backed tokens; subject to securities law (Reg D in the US; prospectus in Switzerland).
- **Real-World Assets (RWA)** — off-chain assets (property, bonds, commodities, art) whose ownership rights are mirrored on-chain via tokens.
- **Custodian** — a regulated third party (bank or trust company) that holds the physical asset or title deed on behalf of token holders.
- **ERC-20** — the Ethereum standard for *fungible* tokens (each unit identical and interchangeable); used for most DeFi tokens.
- **ERC-721** — the Ethereum standard for *non-fungible tokens* (NFTs); each token is unique, used for art, collectibles, and one-of-a-kind assets.
- **ERC-1155** — a multi-token standard that handles both fungible and non-fungible tokens in a single contract; reduces gas costs for mixed portfolios.
- **Atomic settlement** — simultaneous, irreversible exchange of tokens and payment in a single blockchain transaction; eliminates counterparty risk and achieves T+0.
- **Secondary market** — a trading venue where investors can buy and sell tokens after the initial issuance (e.g. tZERO, INX, or on-chain DEX with compliance hooks).

Section 2: Core Formulas

Tokenized Asset Yield Formulas

$$\text{Gross Rental Yield} = \frac{\text{Annual Rental Income}}{\text{Asset Value}} \quad \text{Net Yield} = \frac{\text{Annual Income} - \text{Annual Fees}}{\text{Asset Value}}$$

$$\text{Token Price} = \frac{\text{Asset Value}}{\text{Number of Tokens}} \quad \text{Market Cap} = \text{Token Price} \times \text{Circulating Supply}$$

Worked Example: \$500,000 property; 10,000 tokens at \$50 each; rent \$36,000/yr; 2% mgmt fee.

Gross Yield = \$36K/\$500K = 7.2%. Net rent = \$36K - \$720 = \$35,280. Net Yield = \$35,280/\$500K = 7.06%.

Per-token income: \$3.528/yr.

Section 3: Asset Class Comparison

Asset Class	Min (Traditional)	Min (Tokenized)	Liquidity	Key Challenge
Real Estate	\$100,000+	\$50	Low → Medium	Custody, legal title transfer
Fine Art	\$10,000+	\$10	Very Low	Valuation, provenance verification
Commodities	\$1,000+	\$1	Medium	Physical storage, delivery risk
Government Bonds	\$1,000	\$100	High	Regulatory approval, KYC at scale
Private Equity	\$250,000+	\$100	Very Low	Lock-up periods, illiquid exits

Section 4: Traditional vs. Tokenized Ownership

Aspect	Traditional	Tokenized
Minimum investment	\$10,000–\$250,000	\$1–\$100
Trading hours	Business hours only	24/7/365
Settlement	T+2 (equities) to T+30 (real estate)	Near-instant (T+0)
Intermediaries	Broker, custodian, transfer agent	Smart contract
Transparency	Quarterly reports	Real-time on-chain
Geographic access	Local/regional (jurisdictional limits)	Global (wallet suffices)

Section 5: Key Facts & Figures

- Global illiquid assets: ≈\$326 trillion (real estate alone exceeds \$326T — Savills, 2024).
- **BlackRock BUIDL fund** (2024): first major TradFi tokenized treasury fund on Ethereum; reached \$500M+ AUM within months of launch.
- **Centrifuge**: over \$250M in tokenized real-world assets (invoices, mortgages, trade receivables) financed via DeFi protocols.
- **Paxos Gold (PAXG)**: each token backed by 1 troy oz of physical gold held in LBMA-approved London vaults; redeemable for physical delivery.
- **Boston Consulting Group**: tokenized assets could reach \$16 trillion by 2030 (BCG/ADDX report, 2022).
- **Switzerland DEBA (DLT Act, 2021)**: first country with a comprehensive legal framework explicitly recognising DLT-based securities as uncertificated ledger-based rights.

Section 6: Key Risks

1. **Custody gap** — holding a token does not automatically confer legal ownership; enforcement depends on whether the off-chain legal framework recognises the token.
2. **Thin secondary markets** — tokens may be labelled “liquid” yet have too few buyers to sell without a large price discount; illiquidity premium remains.
3. **Oracle dependence** — on-chain price feeds (e.g. Chainlink) reflect reported off-chain valuations and can be manipulated or stale, leading to mispriced tokens.
4. **Legal uncertainty** — token classification (security vs. commodity vs. utility) varies by jurisdiction; cross-border transfers may violate local securities law.
5. **Smart contract risk** — bugs or exploits in the token contract can freeze transfers, drain funds, or enable unauthorised minting; audits reduce but do not eliminate risk.

Section 7: Further Reading

- OECD (2020). *The Tokenisation of Assets and Potential Implications for Financial Markets*. OECD Capital Market Series.
- centrifuge.io — open protocol for real-world asset tokenization; white paper and documentation available on-site.
- RealT.co — tokenized US residential real estate; publicly documented deal structure and yield data.
- Swiss Federal Act on the Adaptation of Federal Law to Developments in Distributed Ledger Technology (DLT Act), in force 1 February 2021.