# NFTs & Digital Assets: Ownership in a Copy-Paste World

## Mini-Lecture — 30 Minutes

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Blockchain, Crypto Economy & NFTs

**Learning Objectives:**

1. Explain how ERC-721/1155 create digital scarcity
2. Describe IPFS/Arweave metadata storage trade-offs
3. Apply a valuation framework to NFTs and tokenized assets
4. Evaluate real-world asset tokenization readiness

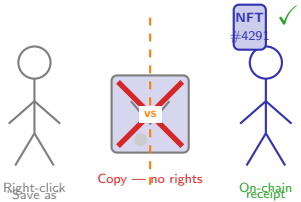
# You Right-Clicked and Saved It. Do You Own It Now?

## A Thought Experiment

In 2009, Amazon remotely deleted *1984* from customers' Kindles — buyers discovered their "purchase" was a revocable license.

In 2023, Ubisoft shut down game servers for *The Crew* — players lost access to a game they paid $60 for.

Every digital purchase you have made — music, movies, games, ebooks — is a **permission**, not a **possession**. The seller can revoke it at any time.




**The question:** Can a blockchain receipt make digital ownership *real*?

**Digital purchases today are permissions, not possessions — NFTs attempt to change that.**

# What Is an NFT — And What Isn't It?

## Definition

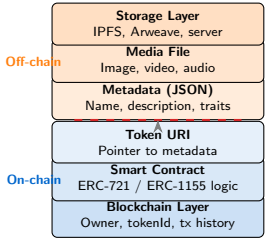
A unique identifier on a blockchain pointing to metadata describing a specific asset.

**Three key properties:**

- **Unique**: each token has a distinct `tokenId` — non-interchangeable
- **Verifiable**: ownership is cryptographically provable on-chain
- **Transferable**: can be sold, gifted, or used as collateral

**What an NFT is NOT:**

- Not the image itself (the image lives elsewhere)
- Not a copyright transfer (unless explicitly stated)
- Not inherently valuable (value comes from context and demand)



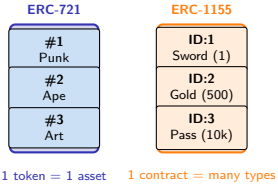

**The NFT lives on-chain; the art lives off-chain — this separation is the source of most NFT risks.**

# ERC-721 vs ERC-1155: Choosing the Right Standard

| Dimension | ERC-721 | ERC-1155 |
|---|---|---|
| Token type | Unique only | Unique + fungible |
| Contract | 1 per collection | 1 for all types |
| Transfer | One at a time | Batch transfers |
| Gas cost | Higher | 40–90% lower |
| Use case | Art, PFPs | Gaming, tickets |

**Decision rule:**

- Pure 1-of-1 art → ERC-721
- Mixed assets (sword + gold + pass) → ERC-1155
- High-volume mints → ERC-1155 (gas savings)




**ERC-1155 was introduced in 2019 to solve the gas inefficiency of deploying one ERC-721 per asset type.**

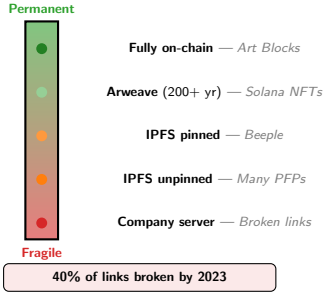
# Where Does the Art Actually Live?

**Beeple's $69M sale (March 2021):**

- Buyer received an ERC-721 token on Ethereum
- Token points to an IPFS hash for the metadata
- IPFS hash points to the actual 319 MB image file
- **None of the art is on-chain**

**The link-rot problem:**

- By 2023, ∼40% of NFT metadata links were broken
- If the server shuts down, your token points to nothing
- Permanence spectrum: on-chain > Arweave > IPFS > server



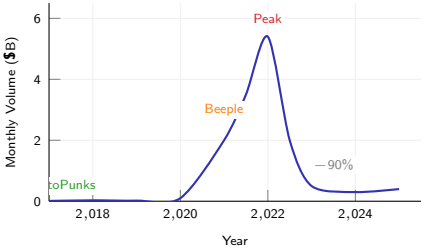

**The most expensive NFTs often rely on the weakest storage — always check where the metadata lives.**

# The NFT Boom-Bust Cycle

**Key events:**

- **2017**: CryptoPunks launch (free mint, now $100k+ floor)
- **Mar 2021**: Beeple sells for $69M at Christie's
- **Jan 2022**: Monthly volume peaks at ∼$5.4B
- **2022–23**: Market drops >90% from peak
- **2024–25**: Stabilization around art, gaming, RWA

**Lesson:** Speculative manias inflate, but underlying technology persists.




**Source: NonFungible.com, DappRadar. NFT infrastructure outlives speculative cycles.**

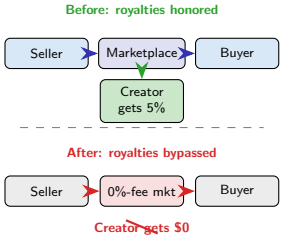
# Why Did Creator Royalties Collapse?

**The promise:** 5–10% royalty on every secondary sale, forever. Creators would earn as their work appreciated.

**The reality:**

- Blur launched with 0% marketplace fees (Oct 2022)
- Blur captured ∼60% market share within months
- OpenSea was forced to make royalties optional (Feb 2023)
- Creators earning $50K/month saw revenue drop to $2K in 90 days

**Root cause:** ERC-721 has no on-chain royalty enforcement — marketplaces choose whether to honor the request.




**Royalty enforcement requires protocol-level solutions (EIP-2981 is advisory only, not mandatory).**

# Play-to-Earn: Growth Dependency and Collapse

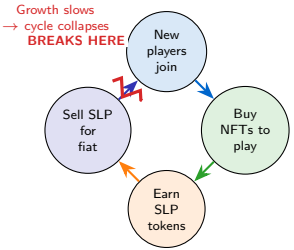
**Axie Infinity at its peak (Nov 2021):**

- 2.7 million daily active players
- SLP (Smooth Love Potion) token: $0.39
- Players in Philippines earned $200–$400/month

**The collapse:**

- SLP fell from $0.39 to $0.003 (99.2% decline)
- New player growth slowed — rewards exceeded demand
- Ronin bridge hack ($625M, Mar 2022) destroyed remaining trust

**Root cause:** Token emissions funded by new entrants — a structure that requires perpetual growth.




**Sustainable gaming NFTs need in-game utility that does not depend on new player inflows.**

# From JPEGs to BlackRock: Real-World Asset Tokenization

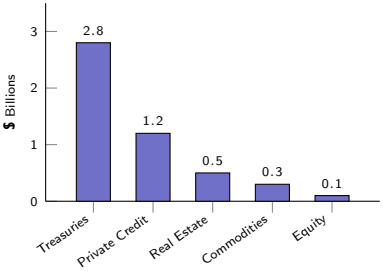
**RWA tokenization:** converting physical or financial assets into blockchain tokens with legal backing.

**BlackRock BUIDL (Mar 2024):**

- Tokenized US Treasury fund on Ethereum
- Exceeded $500M AUM within months
- Institutional-grade: KYC (Know Your Customer), custody, SEC-compliant

**6-step workflow:**

1. Identify asset & legal structure
2. Create SPV (Special Purpose Vehicle) / legal wrapper
3. Design token (ERC-20 or ERC-3643 for regulated assets)
4. Deploy smart contract with compliance
5. Arrange regulated custody
6. List on compliant marketplace




Source: rwa.xyz, Jan 2026 estimates. Excludes stablecoins.

**Tokenized Treasuries grew from $0 to $2.8B in under two years — institutional adoption is accelerating.**

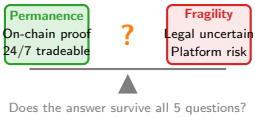
# Five Questions to Evaluate Any NFT or Tokenized Asset

## Your Evaluation Toolkit

Apply these five questions to any NFT or tokenized asset:

1. **Where is metadata stored?**
   On-chain, IPFS pinned, Arweave, or company server?
2. **What do you legally own?**
   Token only, license, IP rights, or fractional equity?
3. **Who controls the smart contract?**
   Immutable, upgradeable proxy, admin key, or multisig?
4. **What creates demand beyond speculation?**
   Utility, community, yield, access, or nothing?
5. **What if the platform closes?**
   Can you still access, transfer, and prove ownership?

**Apply it:** "Tokenized Apartment at $100/token"




**Most NFT losses come from failing question 1 (broken links) or question 4 (no demand driver).**

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**C** – Approximately 40% of NFT metadata links had broken by 2023 due to server shutdowns.

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**Answers reveal on click. Review any incorrect answers before proceeding.**

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**B** – EIP-2981 signals a royalty preference but has no on-chain enforcement mechanism.

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**Score: 9–10 Excellent | 7–8 Good | 5–6 Review slides | <5 Re-watch lecture.**