# Digital Assets: From NFTs to Real-World Tokenization

## An Ultra-Simple Visual Guide with Deep-Dive Appendix

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Spring 2026

# Learning Objectives

**By the end of this lecture, you will be able to:**

1. **Explain** what NFTs are and how they create digital ownership on a blockchain [Understand]
2. **Describe** how digital assets are created, stored, and traded [Understand]
3. **Compare** the risks and opportunities of NFTs, gaming tokens, and real-world asset tokenization [Analyze]
4. **Evaluate** whether a digital asset project creates real value or is pure speculation [Evaluate]

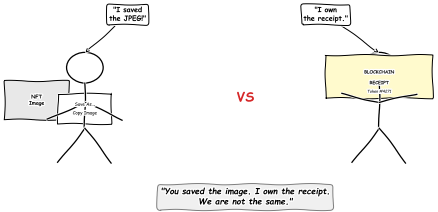
**No math required.** Main slides use only plain English and pictures.
Technical details are in the Appendix for those who want them.

**Bloom's levels covered: Understand, Analyze, Evaluate. The Appendix adds Apply and Create.**

# The Right-Click Problem

**Someone just paid 69 million dollars for a JPEG.** Your friend asks: "Can't you just right-click and save it?" What makes the original worth anything?

- Physical art = one original, easy to verify
- Digital files = perfect copies, free
- NFTs = a blockchain receipt proving who owns the original



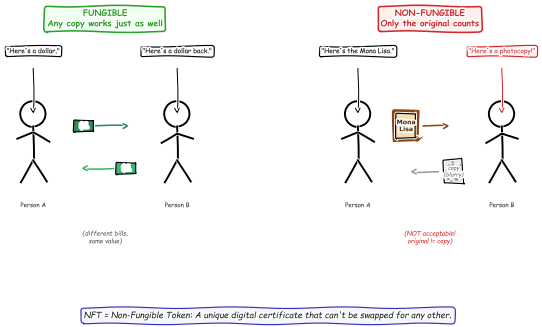

**Beeple's "Everydays" sold for $69.3 million at Christie's in March 2021. The buyer got a token, not a frame.**

# Fungible vs Non-Fungible

**Fungible** = interchangeable. Every dollar bill is the same as every other dollar bill.

**Non-fungible** = unique. The Mona Lisa is not interchangeable with any other painting.

- Tokens can be fungible (Bitcoin, ETH) or non-fungible (NFTs)
- NFTs prove uniqueness and ownership on a blockchain



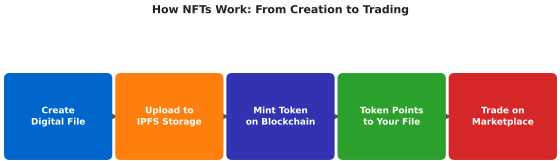

**Fungible comes from Latin "fungi" (to perform). Two things are fungible if one can substitute for the other.**

# How NFTs Actually Work

An NFT is **NOT** the image. It is a smart contract entry that says:

> Token #4237 is owned by 0xABC... and points to metadata at ipfs://Qm...

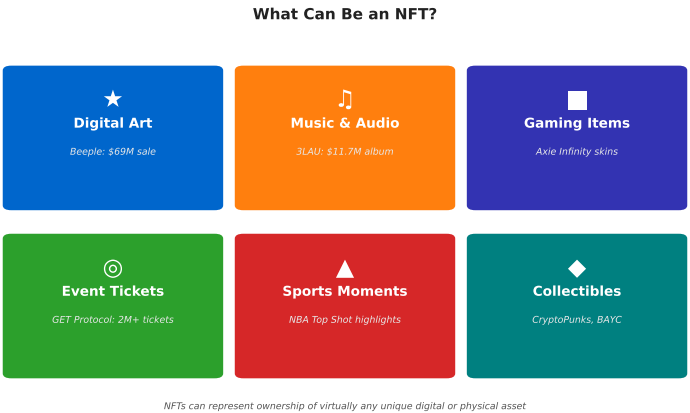
- The blockchain stores the ownership record
- The metadata describes the asset
- The actual file lives somewhere else




**Common misconception: the image is NOT stored on the blockchain. Only the ownership proof is.**

# What Can Be a Digital Asset?

NFTs started with art, but digital ownership applies to almost everything:

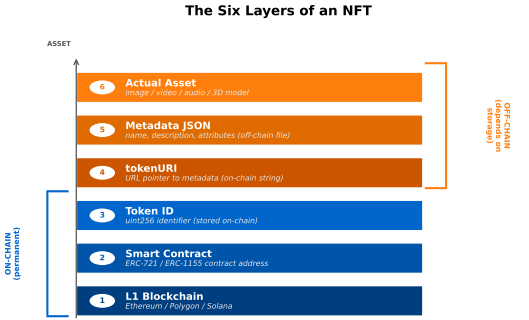



**The real question is not “what can be an NFT?” but “what benefits from provable digital ownership?”**

# The Technology Stack

**Four layers, bottom to top:**

- Blockchain = the trust layer (Ethereum, Solana, Polygon)
- Token standard = the rules (ERC-721, ERC-1155)
- Metadata = the description (name, image, properties)
- Marketplace = where you buy and sell (OpenSea, Blur)

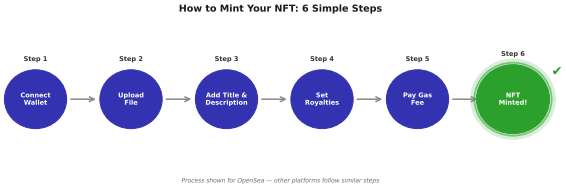



**Each layer can fail independently. A secure blockchain does not guarantee safe metadata storage.**

# How to Mint an NFT

**Minting** = creating a new NFT on the blockchain.
Like publishing a book:

- Create your digital file (image, music, video)
- Upload to storage (IPFS or Arweave)
- Connect wallet and click “Mint”
- Pay gas fee — the NFT is now on-chain



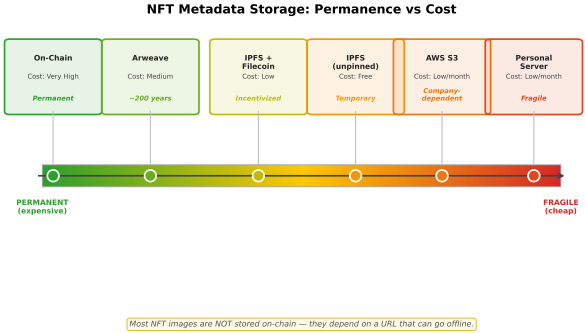

**Minting costs range from free (lazy minting on OpenSea) to over 100 dollars on Ethereum mainnet during high congestion.**

# Where Does the Data Live?

**The most important question nobody asks:**

- On-chain = permanent but expensive (fully on blockchain)
- IPFS = decentralized and cheap (content-addressed, pinned)
- URL = cheapest but fragile (server goes down, image disappears)

**Your NFT is only as permanent as where its data lives.**




**A 2023 study found that 12% of NFT metadata links were already broken. Always check where the data lives before buying.**

# ERC-721 vs ERC-1155

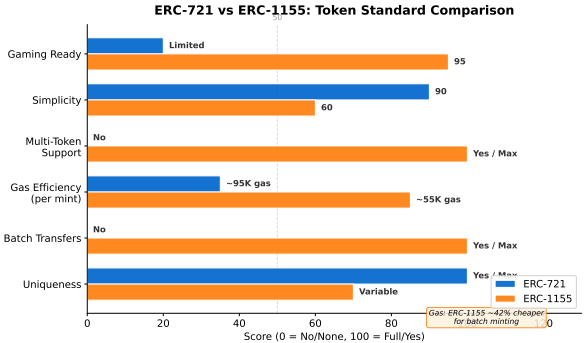
**Two standards, two use cases:**

### ERC-721: Each token is unique

Perfect for 1-of-1 art, domain names, identity.

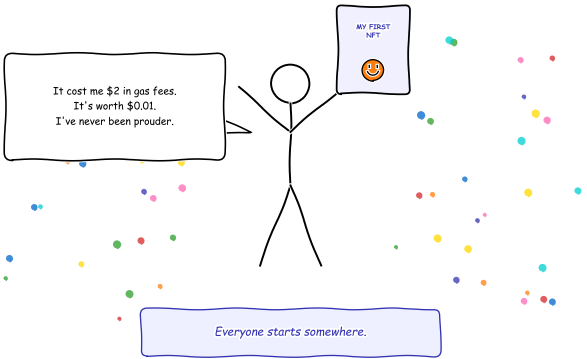
### ERC-1155: Semi-fungible tokens

Perfect for game items (1000 identical swords), event tickets.




**ERC-1155 is more gas-efficient because one contract handles both fungible and non-fungible tokens.**

# Your First NFT



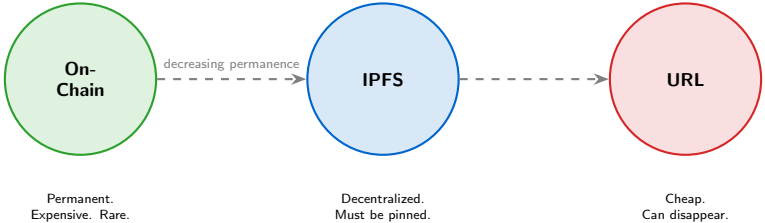

**It takes about 5 minutes:**

- Install MetaMask (free browser extension)
- Get some ETH (from an exchange)
- Go to OpenSea, connect wallet
- Click Create, upload, done

The hard part is not minting. The hard part is making something worth minting.

**Over 80% of NFTs minted for free on OpenSea in 2022 were plagiarized, fake, or spam. Quality matters.**

# The Metadata Trap




**Rule of thumb: If the storage layer disappears, so does your asset.**

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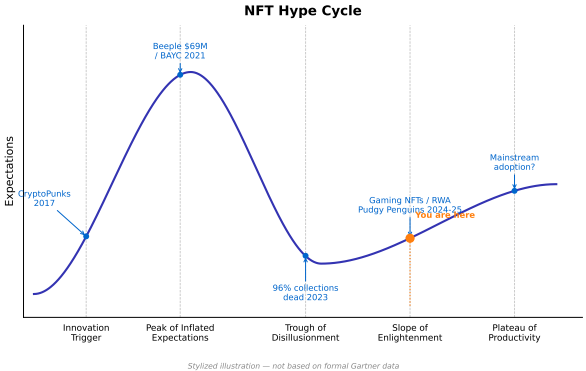
**CryptoPunks moved fully on-chain in 2021. Most NFT projects cannot afford this — IPFS with pinning is the practical middle ground.**

# The Hype Cycle

The NFT market followed a textbook hype cycle:

- 2021: Explosion. $17B in sales. Beeple, Bored Apes, everyone talking about NFTs
- 2022: Crash. Volume dropped 97%. Most collections worthless
- 2023: Quiet building. Utility-focused projects survive
- 2024+: Real use cases emerge (tickets, identity, RWA)



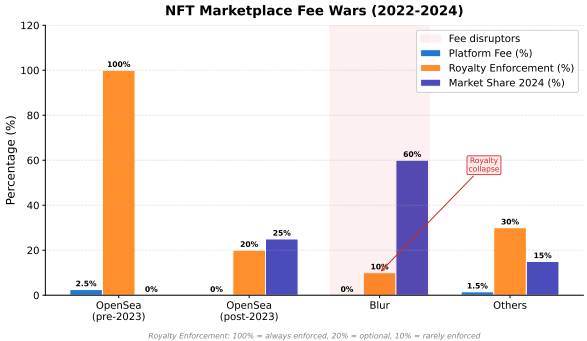

**Gartner Hype Cycle pattern: Technology Trigger, Peak of Inflated Expectations, Trough of Disillusionment, Slope of Enlightenment, Plateau of Productivity.**

# Marketplace Wars

NFT marketplaces compete on fees:

- OpenSea: First mover, 2.5% fee. Dominated 2021–2022
- Blur: Zero fees, token airdrops. Took 80% market share by early 2023
- Result: Race to zero. Marketplaces became commodities

**When the product is free, you are the product (or the liquidity).**



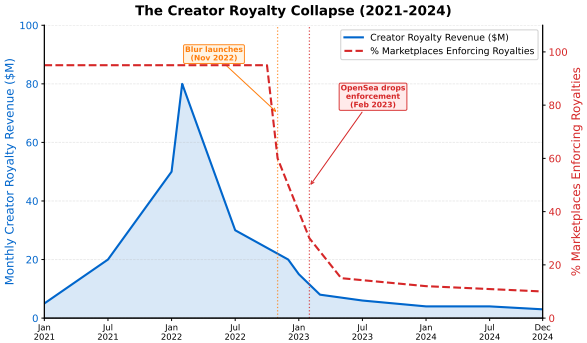

**Blur's airdrop strategy attracted volume but much of it was wash trading for token rewards.**

# The Royalty Crisis

NFTs promised creators perpetual royalties. The promise broke:

- Original promise: Creators earn 5–10% on every resale, forever
- Reality: Marketplaces made royalties optional to attract traders
- Result: Creator earnings collapsed. The "creator economy" narrative died

Lesson: On-chain rules only work if all marketplaces enforce them.



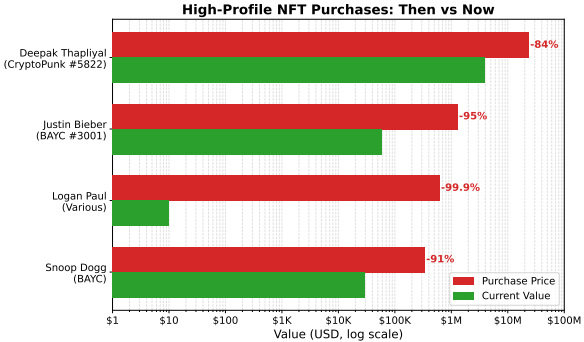

**ERC-2981 defines a royalty standard, but it is optional. Without marketplace enforcement, it is just a suggestion.**

# Celebrity NFT Graveyard

Celebrity NFTs are a cautionary tale:

- Logan Paul's CryptoZoo: Down 99%+. Lawsuits pending
- Trump Digital Trading Cards: Novelty item, not an investment
- Dozens of celebrity collections: Launched, pumped, abandoned

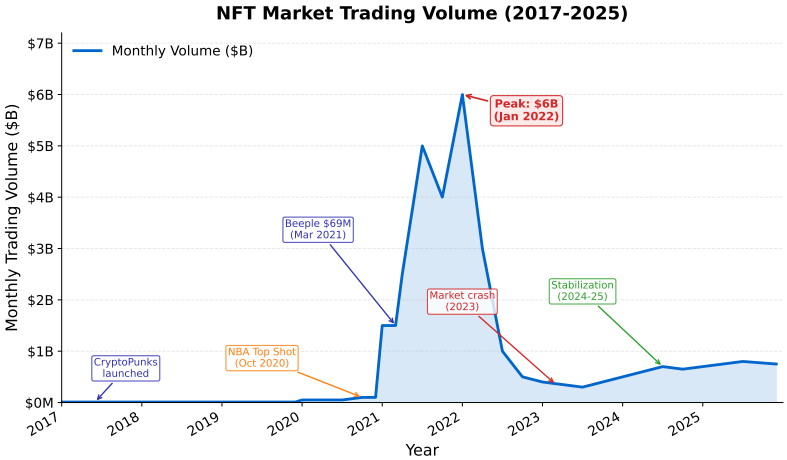
**Fame does not equal value. Utility does.**




**A study found that 95% of NFT collections launched in 2021–2022 had zero trading volume by 2024.**

# Market Timeline

A decade of digital assets — from experiment to infrastructure:



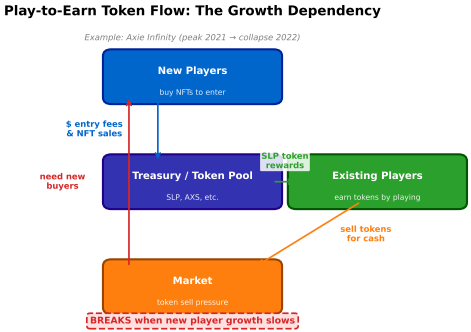

**Key milestones: CryptoKitties (2017), NBA Top Shot (2020), Beeple $69M (2021), market crash (2022), RWA tokenization (2024+).**

# Gaming NFTs

Play-to-earn promised a revolution:

- Axie Infinity: Players in Philippines earned $1,500/month (2021)
- Then: Token price crashed 95%. Earnings vanished
- Lesson: Game economies need real demand, not just new players

Sustainable model: NFTs as digital items players truly own, not as income streams.



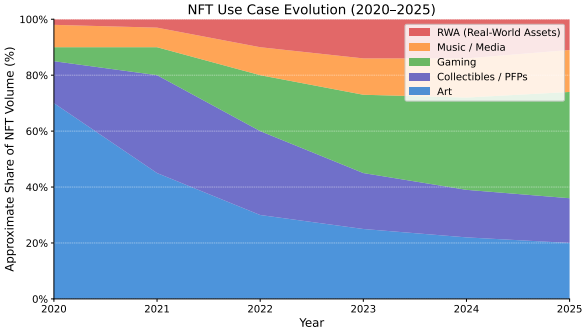

**At its peak, Axie Infinity had 2.7 million daily active players. By 2023, fewer than 100,000 remained.**

# Identity and Tickets

The boring use cases might be the biggest:

- Event tickets: No counterfeits, easy resale, provable attendance
- Soulbound tokens: Non-transferable credentials (diplomas, certifications)
- Decentralized identity: Own your data, prove claims without revealing everything

These applications do not need speculation to succeed.



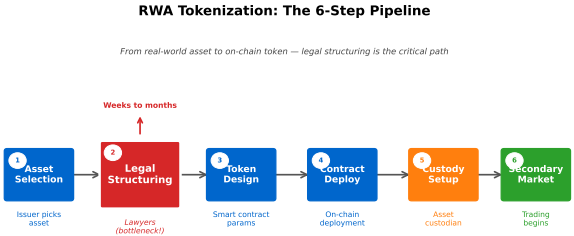

*Approximate percentages based on DappRadar Q3 2025 and CoinTelegraph H1 2025 reports*

**Ethereum co-founder Vitalik Buterin proposed Soulbound Tokens (SBTs) in 2022 as non-transferable identity primitives.**

# Real-World Asset Tokenization

Tokenization = putting real assets on a blockchain:

- Real estate: Own a fraction of a building for $100
- Treasuries: BlackRock's BUIDL fund — US Treasuries on-chain
- Art and collectibles: Fractional ownership of a Picasso
- Carbon credits: Transparent, tradeable, verifiable



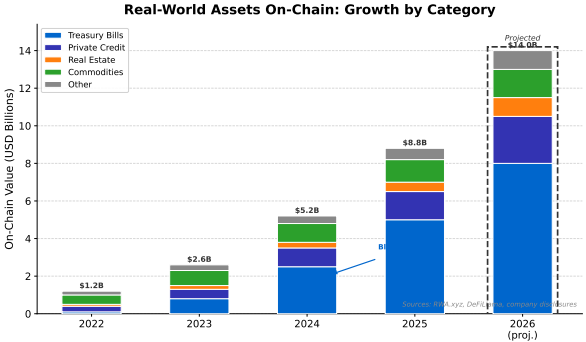

**BlackRock launched BUIDL (Build Out, Innovate, Deliver Liquidity) in March 2024 — the largest asset manager entering DeFi.**

# The RWA Opportunity

The numbers are staggering:

- BCG estimate: $16 trillion in tokenized assets by 2030
- McKinsey (conservative): $4 trillion by 2030
- BlackRock, JPMorgan, Franklin Templeton already building

This is where crypto meets Wall Street. The bridge between DeFi and traditional finance.



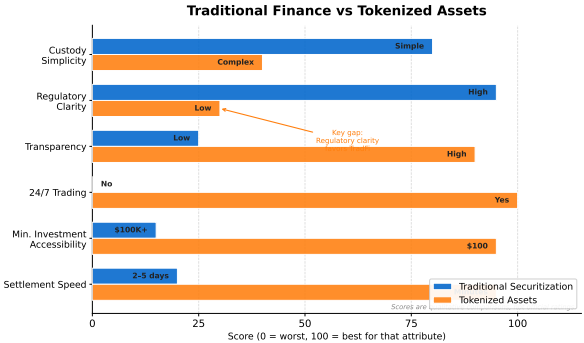

**Tokenized US Treasuries grew from near zero to over $1.5 billion in 2024. Institutional adoption is accelerating.**

# RWA vs Traditional

Why bother tokenizing?

- 24/7 trading (vs 9–5, Mon–Fri)
- Fractional ownership (vs minimum $100K+ investments)
- Instant settlement (vs T+2 days)

The catch: Legal wrappers, compliance, and custody still need traditional infrastructure.




**T+2 means it takes 2 business days for a stock trade to settle. Blockchain settlement can happen in seconds.**

# What Can Go Wrong?

### Rug Pulls

Creator takes the money and disappears. The project website goes dark. Your NFT is worthless.

### Metadata Loss

If the server hosting your NFT's image goes offline, you own a token pointing to nothing.

### Wash Trading

Selling to yourself to fake volume. Estimated 40–50% of NFT volume in 2022 was wash trading.

### Regulatory Risk

Governments may classify NFTs as securities. Marketplaces may be forced to register or shut down.

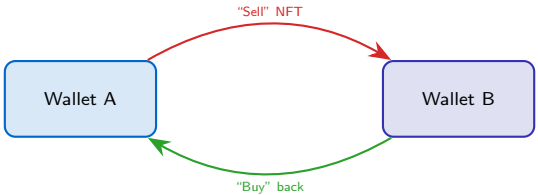
**In 2022, the SEC charged a former OpenSea employee with insider trading — the first NFT insider trading case.**

# Wash Trading Explained

**How it works:**

- Create two wallets. Sell NFT from Wallet A to Wallet B (yourself)
- The marketplace shows “volume” and “sales history”
- Real buyers see fake demand and overpay

**If it looks too active to be true, it probably is.**




Same person controls both wallets.
Fake volume, real deception.

**Chainalysis reported that one wash trader made 650,000 dollars in profit from artificially inflated sales in 2022.**

# Environmental Concerns (Solved?)

**Before: Proof of Work**

- Ethereum used as much energy as the Netherlands
- Every NFT mint = hundreds of kWh
- Massive carbon footprint criticism

**After: Proof of Stake (Sep 2022)**

- Ethereum's energy use dropped 99.95%
- Minting an NFT now uses less energy than a Google search
- Environmental argument largely resolved

**"The Merge" (September 15, 2022) switched Ethereum from Proof of Work to Proof of Stake, reducing energy consumption by over 99.95%.**

# Who Owns What?

**What You Usually Get:**

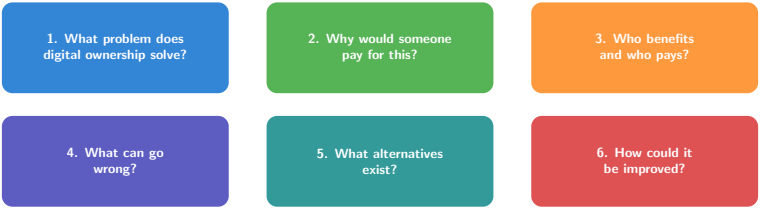
- A token proving ownership on the blockchain
- The right to display, resell, or transfer the token
- Bragging rights and community membership

**What You Usually Do NOT Get:**

- Copyright to the underlying artwork
- Commercial reproduction rights
- The right to prevent others from viewing or saving the image

**Some projects (like Bored Ape Yacht Club) do grant commercial rights. But this is the exception, not the rule. Always read the license.**

# The 6-Question Framework for Digital Assets




Apply these six questions to every digital asset project you encounter.

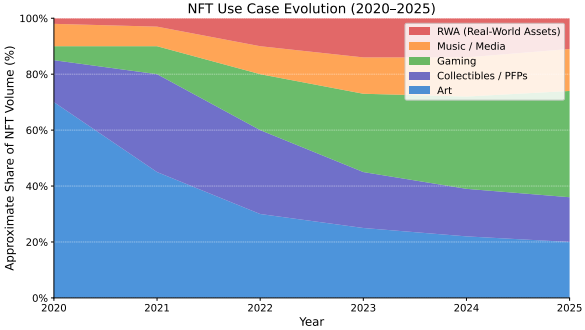
**This is the Cryptoeconomics Lens applied to digital assets. If you cannot answer all six, you are speculating.**

# From Speculation to Infrastructure

The arc of digital assets:

- Phase 1 (2017–2021): Speculation. Collectibles, art, hype
- Phase 2 (2022–2024): Correction. 97% of projects fail. Utility survives
- Phase 3 (2024+): Infrastructure. RWA, identity, compliance

The technology is not going away. The use cases are changing.




*Approximate percentages based on DappRadar Q3 2025 and CoinTelegraph H1 2025 reports*

**This pattern repeats in every technology: internet (dot-com bust then Amazon), mobile (early apps then Uber), crypto (ICO bust then DeFi).**

# Three Trends to Watch

### Dynamic NFTs

NFTs that change based on real-world data. A sports card that updates with player stats. A ticket that transforms into a souvenir.

### Token-Gated Access

Own an NFT to unlock content, communities, or experiences. Like a membership card that lives on the blockchain.

### Cross-Chain Interop

Use your NFT across different blockchains and applications. One identity, many worlds.

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**Dynamic NFTs use Chainlink oracles to pull real-world data on-chain, enabling tokens that evolve over time.**

# Key Takeaways

### What Digital Assets Are

Blockchain-based proof of ownership. Not the asset itself, but the receipt. NFTs, RWA tokens, identity credentials.

### What Matters

Where the data lives. What rights you get. Whether real demand exists. Utility beats speculation.

### What to Watch Out For

Wash trading, rug pulls, metadata loss, copyright confusion, and regulatory uncertainty.

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**Digital assets are a real innovation with real risks. Understand both before you put real money in.**

# One Last Thought

### What We Covered

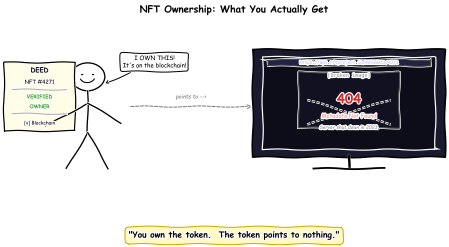
NFTs, minting, storage, markets, gaming, RWA, risks

### Why It Matters

Digital ownership changes how we trade, create, and prove identity

### What Can Go Wrong

Scams, metadata loss, wash trading, regulatory uncertainty

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# Appendix

Technical Deep Dives

The details behind the intuition

Click blue links in appendix slides to jump back to the main deck.

# A1: ERC-721 Interface

The ERC-721 standard defines six core functions every NFT contract must implement:

| Function | What It Does |
|---|---|
| `ownerOf(tokenId)` | Returns the address that currently owns the specified token |
| `transferFrom(from, to, id)` | Transfers a token from one address to another |
| `approve(to, tokenId)` | Grants another address permission to transfer one specific token |
| `safeTransferFrom()` | Like transferFrom, but checks that the receiver can handle NFTs |
| `balanceOf(owner)` | Returns the number of NFTs owned by an address |
| `getApproved(tokenId)` | Returns which address (if any) is approved to transfer this token |

← Back to main slide: ERC-721 vs ERC-1155

**ERC-721 was proposed in January 2018 (EIP-721) by William Entriken, Dieter Shirley, Jacob Evans, and Nastassia Sachs.**

# A1: ERC-1155 Multi-Token Standard

ERC-1155 handles **both** fungible and non-fungible tokens in a single contract:

| Function | What It Does |
|---|---|
| `balanceOf(account, id)` | Returns how many of token `id` this account holds |
| `balanceOfBatch()` | Batch query — check multiple balances in one call |
| `safeTransferFrom()` | Transfer a specific quantity of one token type |
| `safeBatchTransferFrom()` | Transfer multiple token types in a single transaction |

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**Key advantage:** One contract can manage an entire game economy — unique hero NFTs, stacks of identical potions, and fungible gold coins — all under one address.

← Back to main slide: ERC-721 vs ERC-1155

**ERC-1155 was proposed by Enjin (EIP-1155) in 2018 and finalized in 2019. It reduces deployment costs significantly.**

# A1: Gas Cost Comparison — 721 vs 1155

Approximate gas costs (Ethereum mainnet, January 2026 estimates):

| Operation | ERC-721 | ERC-1155 | Savings |
|---|---|---|---|
| Mint 1 token | ∼90,000 gas | ∼55,000 gas | ∼39% |
| Transfer 1 token | ∼65,000 gas | ∼52,000 gas | ∼20% |
| Batch mint 10 tokens | ∼900,000 gas | ∼135,000 gas | ∼85% |
| Batch transfer 10 tokens | ∼650,000 gas | ∼105,000 gas | ∼84% |

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**Why the difference?**

- ERC-721: Each token has its own storage slot. 10 mints = 10 separate writes
- ERC-1155: Batch operations pack multiple changes into fewer storage writes
- For collections with many items, ERC-1155 is dramatically cheaper

**At 30 gwei gas price, minting 10 ERC-721 tokens costs roughly $75 vs roughly $11 for ERC-1155 batch mint.**

# A2: Content Addressing — How IPFS Works

Traditional web: **location-addressed** ("get file at this server address").
IPFS: **content-addressed** ("get the file with this fingerprint").

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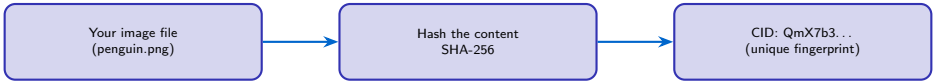


**Why this matters for NFTs:**

- If anyone changes the image, the CID changes — tampering is detectable
- The same content always produces the same CID, regardless of where it is stored
- Anyone can host a copy — no single point of failure

**CID = Content Identifier. IPFS uses the Merkle DAG structure, similar to how Git tracks file changes.**

# A2: Pinning and Permanence

IPFS does not guarantee permanence by default. Files are garbage-collected unless **pinned**:

| **Storage** | **Permanence** | **Cost** | **Examples** |
|---|---|---|---|
| On-chain | Permanent | Very high | CryptoPunks, Art Blocks |
| Arweave | Permanent (pay once) | Moderate | Permaweb, bundlr.network |
| IPFS + Pinning | As long as pinned | Low (monthly) | Pinata, Infura, NFT.storage |
| Centralized URL | Until server dies | Free to low | AWS S3, personal servers |

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| Storage | Permanence | Cost | Examples |
|---|---|---|---|
| On-chain | Permanent | Very high | CryptoPunks, Art Blocks |
| Arweave | Permanent (pay once) | Moderate | Permaweb, bundlr.network |
| IPFS + Pinning | As long as pinned | Low (monthly) | Pinata, Infura, NFT.storage |
| Centralized URL | Until server dies | Free to low | AWS S3, personal servers |

**Arweave** offers a different model: pay once and the data is stored permanently via a blockchain-based storage network. Over 150 TB of NFT data is stored on Arweave.

**NFT.storage (run by Protocol Labs) offers free IPFS pinning for NFT data. But "free" services can shut down — always have a backup plan.**

# A3: Rarity Scoring

NFT collections use trait-based rarity to determine relative value:

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**How rarity scores work:**

- Each NFT has traits (background, hat, eyes, clothing)
- Rarer traits appear in fewer items in the collection
- A rarity score = sum of inverse trait frequencies

**Example — 10,000 item collection:**

| Trait | Frequency | Rarity Score Contribution |
|---|---|---|
| Gold background | 2% (200 items) | $1/0.02 = 50$ |
| Laser eyes | 5% (500 items) | $1/0.05 = 20$ |
| Blue hat | 25% (2,500 items) | $1/0.25 = 4$ |

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**Warning:** Rarity does not equal value. A rare trait nobody wants is still worth nothing.

**Popular tools: rarity.tools, HowRare.is. Statistical rarity and perceived rarity often diverge significantly.**

# A3: Floor Price and Wash Trading Detection

**Floor price** = the lowest listed price in a collection. It acts as a rough health indicator.

**What moves the floor:**

- Genuine demand: floor rises as buyers compete
- Panic selling: floor drops as holders list below each other
- Wash trading: floor is artificially propped up by fake sales

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**Wash trading detection methods:**

| Signal | What to Look For |
|---|---|
| Self-trading | Same wallet appearing on both sides of transactions |
| Funded wallets | New wallets funded just before buying, draining immediately after selling |
| Volume spikes | Sudden volume without corresponding unique buyer increase |
| Price patterns | Trades at suspiciously round numbers or the exact floor price |

**Dune Analytics dashboards track wash trading metrics for major collections. Always check unique buyers, not just volume.**

Every NFT goes through a lifecycle managed by smart contract functions:

| Function | Pseudocode Logic |
|---|---|
| `mint(to, id)` | Create token `id`, assign to `to`, emit Transfer event |
| `approve(spender, id)` | Allow `spender` to transfer token `id` on your behalf |
| `transferFrom(from, to, id)` | Move token `id` from `from` to `to`, clear approvals |
| `burn(id)` | Destroy token `id`, send to address(0), reduce supply |

**Burning is permanent. Some projects burn tokens to increase rarity of remaining items (deflationary mechanics).**

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# A4: Royalty Standard — ERC-2981

ERC-2981 defines a standard way for NFTs to signal their royalty preferences:

| Function | What It Returns |
|---|---|
| `royaltyInfo(tokenId, salePrice)` | Returns (receiver address, royalty amount) |

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**How it works:**

- The NFT contract stores a royalty percentage (e.g., 5%)
- When queried, it returns who should receive the royalty and how much
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**The enforcement problem:**

- ERC-2981 is purely informational — a suggestion, not a rule
- Marketplaces competing for volume made royalties optional
- Some projects use "operator filter" contracts to block zero-royalty marketplaces

← Back to main slide: The Royalty Crisis

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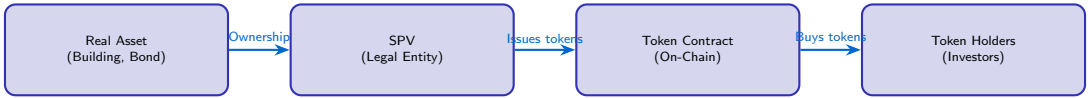
**OpenSea made creator royalties optional in August 2023. This triggered a debate about sustainable creator compensation in Web3.**

# A5: RWA Legal Structure — SPV Model

Tokenizing a real asset requires a legal wrapper connecting the physical world to the blockchain:



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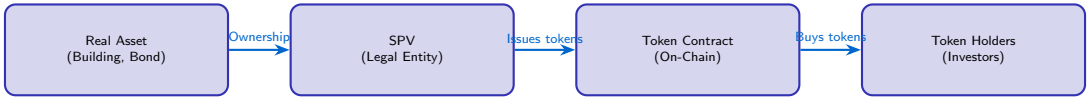


**Key components:**

- **SPV** (Special Purpose Vehicle): A legal entity that holds the real asset
- **Compliance layer**: KYC/AML checks before investors can buy tokens
- **Oracle**: Feeds real-world data (rents, dividends) to the smart contract
- **Legal agreement**: Token terms of service linking tokens to real-world rights

← Back to main slide: Real-World Asset Tokenization

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**Examples: Centrifuge (trade finance), Ondo Finance (US Treasuries), RealT (real estate). All use SPV structures.**

# A5: On-Chain vs Off-Chain in RWA

Not everything can (or should) live on the blockchain:

**On-Chain**

- Token ownership records
- Transfer history
- Dividend distributions
- Compliance status (whitelisted addresses)

**Off-Chain**

- Legal documents and contracts
- Physical asset custody
- KYC/AML identity verification
- Asset valuation and audits

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**The oracle bridge:** Chainlink or custom oracles feed off-chain data (asset prices, rental income, interest payments) to smart contracts for automated distributions.

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**The "oracle problem" is critical for RWA: if the off-chain data is wrong, the on-chain distribution is wrong. Garbage in, garbage out.**

# A6: IP Rights — What Do You Actually Own?

| License Type | Rights Granted | Examples |
|---|---|---|
| **CC0 (Public Domain)** | Anyone can use the art for anything | Nouns, Moonbirds (switched to CC0 in 2022) |
| **Commercial Rights** | Holders can use the art commercially | Bored Ape Yacht Club, Doodles |
| **Personal Use Only** | Display and resell the token, but no commercial use | CryptoPunks (pre-Yuga), most PFP projects |
| **No License Stated** | Unclear — legal gray area | Many small collections |

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**Key takeaway:** Buying a token is NOT the same as buying a copyright. Always read the project's license terms before assuming you can use the art commercially.

← Back to main slide: Who Owns What?

**Yuga Labs acquired CryptoPunks in 2022 and granted holders commercial rights. Before that, Larva Labs retained all IP.**

# A6: Regulatory Landscape

| Jurisdiction | NFT Treatment | Key Rules |
|---|---|---|
| **US (SEC)** | Case-by-case analysis | NFTs may be securities if marketed as investments. Stoner Cats fined $1M (2023) |
| **EU (MiCA)** | Excluded if unique | Fungible NFT collections may fall under MiCA crypto-asset rules |
| **UK (FCA)** | Under review | NFT advertising standards. No specific NFT legislation yet |
| **Singapore** | Light-touch | NFTs not regulated unless they function as capital market products |

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**The securities question:** If an NFT is sold with promises of profit driven by the efforts of others, it may be a security under the Howey Test. This is the biggest regulatory risk for NFT projects.

**In September 2023, the SEC settled with Impact Theory for selling NFTs that were unregistered securities. Precedent is being set.**

# A7: The Cryptoeconomics Lens Applied to Digital Assets

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| Question | Applied to Digital Assets |
|---|---|
| 1. Problem | How do we prove ownership and provenance of digital and physical assets without a central authority? |
| 2. Incentives | Creators earn from primary sales and royalties. Traders speculate on appreciation. Platforms earn fees on transactions. |
| 3. Costs/Benefits | Benefits: permissionless creation, global markets, fractional ownership. Costs: gas fees, metadata fragility, regulatory risk. |
| 4. Failure Mode | Rug pulls, wash trading, metadata loss, royalty collapse, celebrity hype, market crashes (97% volume drop 2021–22). |
| 5. Design | ERC-721 vs 1155, on-chain vs off-chain metadata, enforced vs optional royalties, open vs permissioned markets. |
| 6. Alternatives | Centralized registries, traditional certificates, DID/verifiable credentials, soulbound tokens. |

**These six questions are the "Cryptoeconomics Lens" — apply them to every blockchain topic you study.**

# A7: The Digital Asset Design Space

Every digital asset system navigates fundamental trade-offs:

**Ownership Models:**

- NFT (unique, transferable) vs. Soulbound (unique, non-transferable)
- Single-owner vs. fractional ownership
- On-chain registry vs. centralized database

**Storage Trade-offs:**

- On-chain (permanent, expensive) vs. IPFS (decentralized, needs pinning)
- Arweave (pay once, permanent) vs. URL (cheap, fragile)
- Fully on-chain art vs. off-chain with hash reference

**Market Design:**

- Open marketplace (permissionless, wash trading risk) vs. curated (quality, gatekeeping)
- Enforced royalties (creator-friendly, less volume) vs. optional (trader-friendly)
- Auction vs. fixed price vs. bonding curve

**RWA Design:**

- SPV wrapper (legally solid, slow) vs. direct tokenization (fast, legally unclear)
- Permissioned chain (compliant, centralized) vs. public chain (open, regulatory risk)
- Single-asset token vs. index/basket token

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**There is no "best" design — only trade-offs. The art of cryptoeconomics is choosing the right trade-off for your use case.**